CSIRO PUBLISHING
Australian Health Review, 2017, 41, 599–605
http://dx.doi.org/10.1071/AH16019

Structured interdisciplinary bedside rounds do not reduce length of hospital stay and 28-day re-admission rate among older people hospitalised with acute illness: an Australian study

Elizabeth Huynh[1] Medical Student

David Basic[1,4] MBBS, MPH, FRACP, Staff Specialist Geriatric Medicine

Rinaldo Gonzales[1] MD, FRACP, Staff Specialist Geriatric Medicine

Chris Shanley[1,2,3] RN, ADCHN, BA, MA, EdD, Adjunct Associate Professor

[1]University of New South Wales, Aged Care Research Unit, Liverpool Hospital, LMB 7103, Liverpool BC 1871, NSW 2170, Australia. Email: e.huynh@student.unsw.edu.au; Rinaldo.Gonzales@sswahs.nsw.gov.au

[2]Centre for Applied Nursing Research, Western Sydney University, LMB 1797, Penrith, NSW 2751, Australia. Email: c.shanley@westernsydney.edu.au

[3]Ingham Institute of Applied Medical Research, PO Box 3151 (Westfields Liverpool), Liverpool, NSW 2170, Australia.

[4]Corresponding author. Email: David.Basic@sswahs.nsw.gov.au

Abstract

Objective. Structured interdisciplinary bedside rounds (SIBR) are being implemented across many hospitals in Australia despite limited evidence of their effectiveness. This study evaluated the effect of SIBR on two interconnected outcomes, namely length of stay (LOS) and 28-day re-admission.

Methods. In the present before-after study of 3644 patients, twice-weekly SIBR were implemented on two aged care wards. Although weekly case conferences were shortened during SIBR, all other practices remained unchanged. Demographic, medical and frailty measures were considered in appropriate analyses.

Results. There was no significant difference in median (interquartile range) LOS before and during SIBR (8 (5–15) vs 8 (4–15) days respectively; $P = 0.51$). In an adjusted analysis, SIBR had no effect on LOS (hazard ratio 0.97; 95% confidence interval 0.90–1.05). The presence of dementia or delirium, or the ability to speak English, did not modify the effect of SIBR ($P > 0.05$ for all). Similarly, SIBR had no effect on 28-day re-admission rates (20.3% vs 19.0% before and during SIBR respectively; $P = 0.36$).

Conclusions. Although ineffective interdisciplinary communication is associated with negative outcomes for patients and healthcare services, models of care that aim to improve communication are not necessarily effective in reducing LOS or early re-admission. Clinical services implementing SIBR are encouraged to independently evaluate their effects.

What is known about the topic? Ineffective interdisciplinary communication may harm patients and increase LOS. Only two publications have evaluated the implementation of SIBR, a new model of care that aims to improve interdisciplinary communication and collaboration. One paper reported that SIBR reduced unadjusted LOS and in-hospital mortality, whereas the other found that SIBR improved teamwork, communication and staff efficiency.

What does this paper add? The effect of SIBR among acutely unwell older people on aged care wards is unknown. The present study is the first to evaluate the effects of SIBR in this population. It shows that the implementation of SIBR did not reduce LOS or early re-admission, and suggests that existing communication strategies may have weakened the effects of SIBR.

What are the implications for practitioners? Policies and practice that promote the addition of communication strategies, such as SIBR, may not be effective in all patient populations. More research is needed to determine whether SIBR reduce these and other outcomes, particularly for services with weaker communication frameworks and protocols.

Received 27 January 2016, accepted 21 September 2016, published online 25 November 2016

Introduction

Ineffective interprofessional communication may have negative effects on the provision of efficient health care and on patient outcomes.[1,2] These include unexpected occurrences of deaths, serious physical or psychological injuries to patients,[3] hospital-acquired infections,[4] medication errors[5] and increased lengths of stay (LOS).[6]

Interdisciplinary care refers to practices characterised by a high degree of collaboration and information exchange among health professionals in order to enhance patient care. Although interdisciplinary care may occur at the bedside,[7,8] some interdisciplinary care lacks physician involvement,[7] whereas other interdisciplinary care tends to be unscheduled, unstructured and geographically fragmented. Medical and other personnel may move from one patient or ward to the next in unpredictable patterns, resulting in missed opportunities to exchange information and coordinate care.[9,10]

The use of regular, structured interdisciplinary bedside rounds (SIBR) is a new model of care that aims to improve interprofessional communication and collaboration.[9] This patient- and family-centred approach brings members of the interdisciplinary team to the patient's bedside, thus engaging the bedside nurse, the patient and the family. All rounds are attended by a senior doctor. Participants in SIBR give and receive information according to a structured communication protocol that incorporates a safety checklist, after which a care plan is formulated and verbalised. The patient and the family are encouraged to ask questions and correct misinformation.[9]

Only two publications have evaluated the association between implementation of SIBR and outcomes. In a before-after study in Atlanta (USA), Stein *et al.*[9] reviewed the effects of implementation of daily SIBR, together with other reforms, on a high-acuity 24-bed medical unit (called an accountable care unit). After 1 year, unadjusted in-hospital mortality decreased from 2.3% to 1.1% ($P = 0.004$) and LOS decreased from 5.0 to 4.5 days ($P = 0.001$). Gausvik *et al.*[11] examined staff perceptions of SIBR on an acute care unit for older people in Ohio (USA). The implementation of SIBR was associated with higher ratings for teamwork, communication and staff efficiency.

Despite this scarcity of evidence and the resource cost associated with SIBR, the Clinical Excellence Commission (CEC) is strongly encouraging the implementation of SIBR across hospitals in New South Wales (NSW), Australia, under the 'In Safe Hands' program.[12]

The relationship between LOS and quality of care remains unclear, and publications exist to support either a shorter[13] or longer LOS[14] with better quality of care. However, what is clear is that healthcare policy makers expect service providers to improve efficiency and reduce LOS year on year. This is driven largely by the rising demand for hospital services, increasing queues in emergency departments and the high bed occupancy rates in most hospitals.[15] However, excessive reductions in LOS may be harmful because discharge before medical and functional stability may result in early unplanned re-admission or the use of emergency department services.[16,17]

Although many early re-admissions are not preventable, at least 25% are linked to substandard care.[18,19] Unplanned re-admissions are arguably an indicator of the quality of acute care.[19,20] They are associated with financial penalties for hospital providers in the US and are used as a purchasing adjuster in NSW to stimulate performance improvements through funding signals.[18] Unplanned re-admissions to NSW hospitals are slowly increasing,[18] and it remains unclear whether in-hospital interventions are effective in reversing this trend. A systematic review of 17 trials in older people found that only three studies showed significant benefits,[21] suggesting that traditional interventions are mostly ineffective.

The aim of the present study was to evaluate the effects of SIBR on two interconnected outcomes, namely LOS and early (28-day) re-admission. By improving interprofessional communication and engaging the patient and the family soon after admission to formulate and verbalise a care plan, we hypothesised that SIBR would reduce LOS, if not both outcomes.

Methods

Participants

The present before-after study was undertaken at a university hospital in Sydney (NSW, Australia). Participants were consecutive patients discharged from two side-by-side 25-bed aged care wards (5A and 5B). Most patients had been admitted on the basis of targeting criteria that included delirium, deconditioning, functional decline, gait abnormality and falls, malnutrition, multiple medical diagnoses, polypharmacy and multiple unplanned admissions.[22]

The control (before) group included 1682 patients discharged between 1 January 2013 and 30 April 2014, whereas the intervention (after) group included 1962 patients discharged between 1 July 2014 and 30 September 2015. Those discharged between 1 May and 30 June 2014, during which time aged care staff were trained to perform SIBR, constituted a training group. The present study was approved by the South Western Sydney Local Health District Human Research Ethics Committee (Approval no. 14/334 LNR).

Intervention

During the training period, aged care staff participated in simulated SIBR off the ward (with community volunteers) and on both wards (with admitted patients). Project leads from the CEC supervised the training. The SIBR form, incorporating a structured communication protocol and a safety checklist, was designed and modified during this time. Because most older people have complex care needs, the SIBR form was tailored to address both acute and chronic issues relevant to aged care, such as delirium, dementia, bladder and bowel function, pressure care and falls risk (Table 1).

On 1 July 2014, both wards commenced SIBR twice weekly. Two of the four medical teams participated on Monday and Thursday, and the other two participated on Tuesday and Friday. During SIBR days, each team started on a separate ward (one on 5A and the other on 5B) and changed over after approximately 30 min. All rounds started at 1130 hours to allow prior patient assessments through usual activities. Based on staff availability, the rounds were attended by senior doctors (consultant and/or registrar), the nurse unit manager, the bedside nurse and allied health professionals. Family members and non-family carers were encouraged to attend.

Table 1. Structured interdisciplinary bedside round communication protocol

EDD, estimated date of discharge; NUM, nurse unit manager

Information exchanged	Duration (s)
Introduction (senior doctor or NUM)	15
Greet patient and family	
Introduce team	
Medical (senior doctor)	45
Premorbid domicile and reason for presentation	
Active problems and response to treatment[A]	
Tests, procedures and consultant inputs yet to be performed[B]	
Nursing (bedside nurse)	60
Relevant events during previous 48 h	
Medical emergency team calls	
Resuscitation status and documentation	
Vital signs	
Concerns related to:	
Food and fluid intake	
Bladder and bowel output	
Bladder and intravenous catheterisation	
Safety checklist	
Behaviour, including aggression and absconding	
Pressure care	
Falls	
Allied health update and plan	60
Physiotherapist	
Occupational therapist	
Social worker	
Speech pathologist	
Dietician	
Neuropsychologist	
Patient and family[C]	45
Add information, correct misinformation	
Invite limited questions	
Summary (senior doctor)	15
Verbalise care plan, including EDD and discharge domicile	

[A]Active problems (acute and chronic) were those that affected physical, social or psychological function, or those that needed medication changes, investigations or increased monitoring to treat symptoms and guide management.

[B]Delays were identified and escalated as appropriate by a senior nurse or doctor.

[C]Although patient and family input was addressed at any time during the communication protocol, prolonged discussion was deferred until completion of the structured interdisciplinary bedside round.

Most rounds occurred at the patient's bedside and each interaction lasted approximately 3–5 min. During this time, participants gave and received information according to the communication protocol (Table 1). Although staff were encouraged to adhere to this protocol, some flexibility was inevitable (e.g. following a question by the patient). Following input from the patient and the family, a care plan was formulated and verbalised. The information was recorded on a datasheet (mostly by the nurse unit manager) and attached to the bedside record.

Other aged care practices

Aged care practices before and during SIBR included journey board rounds, case conferences and medical team ward rounds. A journey board round is a process whereby members of the interdisciplinary team exchange and document information (on a whiteboard) to facilitate a coordinated approach to care and discharge planning. These 30- to 45-min unstructured rounds were held in a conference room each weekday at 0830 hours. Although it was anticipated that the board rounds would be briefer during SIBR, for the most part they were unchanged. Conversely, the weekly case conferences were shorter during SIBR. Whereas all patients were discussed before SIBR, a limit of five patients per ward was imposed during SIBR, with any staff member able to nominate patients for discussion. The medical team ward rounds remained unchanged.

Measures

Data were collected on patient demographics, referral source, premorbid frailty, medical diagnoses, patient and family participation during SIBR, in-hospital mortality, LOS and date of re-admission to hospital or re-presentation to the emergency department. Pre-SIBR data were extracted from a clinical database maintained by the aged care service for many years.

Premorbid frailty was defined as the level of frailty present 1 month before admission and was determined using the Canadian Study of Health and Aging Clinical Frailty Scale (CSHA-CFS).[23] The CSHA-CFS is a subjective scale that classifies people into one of seven ordinal categories. At the two extremes of the scale, those in Category 1 are very fit, energetic and motivated, whereas those in Category 7 are completely dependent in the activities of daily living or are terminally ill.

Medical diagnoses were based on version 5.1 of the Australian Refined Diagnosis Related Groups classification system.[24] Up to 15 active diagnoses were coded per patient (those affecting physical, social or psychological function, or those needing medication changes, investigations or increased monitoring to treat symptoms and guide management).

Data on re-admission to hospital and re-presentation to the emergency department were gathered from local health district electronic medical records that included seven hospitals. The LOS was defined as the difference in days between the date of arrival to Ward 5A or 5B and the discharge date.

Statistical analyses

Cox proportional hazards regression was used to model LOS. Risk factors for prolonged LOS in the literature (age, dementia, delirium and function)[25–27] were forced into the model. Other variables were considered for inclusion based on biological plausibility, significance and confounding (between SIBR and LOS). To evaluate whether the effect of SIBR on LOS was modified by the presence of dementia or delirium, or the ability to speak English, appropriate interaction terms were tested in the multivariate model. Between-groups comparisons were made using *t*-tests for continuous normally distributed variables, Fisher's exact tests for dichotomous variables and Wilcoxon rank sum tests for ordinal variables. Mantel–Haenszel trend analysis was used to evaluate the trend between admission from a high-care residential aged care facility (HC-RACF) and CSHA-CFS category. The study was powered to detect a 0.9-day decrease in mean LOS (Type 1 error 0.05, Type 2 error 0.20). Analyses were performed using SAS version 9.4 (SAS Institute).

Results

Characteristics of participants

The study population was multicultural, with 58.8% born in culturally and linguistically diverse countries. Most (93.2%) were admitted through the emergency department and were acutely unwell, with a median of seven active diagnoses. Participant characteristics are given in Table 2.

Patient characteristics by admission domicile (HC-RACF vs other)

Compared with other patients, HC-RACF residents were older (mean age 85.2 vs 83.4 years) and were more likely to be within the higher CSHA-CFS categories. In addition, HC-RACF residents had higher rates of dementia (53.8% vs 36.6%) and delirium (52.4% vs 36.3%), shorter LOS (median 6 vs 9 days) and higher rates of in-hospital mortality (14.4% vs 7.0%; $P < 0.001$ for all). Patients from an HC-RACF who died had a median LOS of 5.5 days.

Patient and family participation

In all, 2964 (65.7%) patients participated to some extent during 4508 documented SIBR. At least one member of the family was present in 913 of 4508 (20.3%) documented rounds (data recorded only for SIBR Sessions 1–8 per patient). Although 22.7% of SIBR Sessions 1 were attended by the family, only 14.4% of SIBR Sessions 8 were attended by the family.

Length of stay

There was no significant difference in the median (interquartile range) LOS before and during SIBR (8 (5–15) vs 8 (4–15) days respectively; $P = 0.51$). In multivariate analysis, the implementation of SIBR had no significant effect on LOS (Table 3). Older people and those residing in an HC-RACF had shorter LOS. The effect of SIBR on LOS was not modified by dementia, delirium or the ability to speak English ($P > 0.05$ for all).

Re-admissions to hospital and re-presentations to the emergency department

Before SIBR, 312 (20.3%) patients discharged alive were re-admitted within 28 days of discharge, whereas during SIBR 338 (19.0%) were re-admitted ($P = 0.36$). Similarly, there was no significant difference in the 28-day rates of re-presentation to the emergency department before ($n = 108$; 7.0%) and during ($n = 129$; 7.2%) SIBR ($P = 0.84$).

Missing data

Frailty or diagnostic data were missing in 465 patients (12.8%). Those with missing data were less likely to have been admitted through the emergency department (88.4% vs 93.9%; $P < 0.001$);

Table 2. Characteristics of study participants before and during implementation of structured interdisciplinary bedside rounds (SIBR)

Data are given as the mean ± s.d. or as percentages. BPSD, behavioural and psychological symptoms of dementia; CALD, culturally and linguistically diverse; COPD, chronic obstructive pulmonary disease; CSHA-CFS, Canadian Study of Health and Aging Clinical Frailty Scale; HC-RACF, high-care residential aged care facility; LC-RACF, low-care residential aged care facility

Characteristic	SIBR period		Characteristic	SIBR period	
	Before ($n = 1682$)	During ($n = 1962$)		Before ($n = 1682$)	During ($n = 1962$)
Age (years)	83.8 ± 7.5	83.9 ± 7.8	Medical diagnosis[B]		
Male gender	40.6	42.3	Dementia	50.7	43.1
CALD country of birth	58.5	59.0	Delirium	46.5	45.5
English-speaking	66.7	65.2	BPSD	13.5	11.5
Admission domicile			Deconditioning	28.0	28.3
Community-based	66.4	69.1	Urine retention	8.0	8.6
LC-RACF	9.4	4.1	Malnutrition (severe)	11.5	13.3
HC-RACF	24.2	26.8	Dysphagia	17.8	15.6
Referral source			Cardiac failure	18.8	18.1
Emergency department	93.7	92.7	Renal failure	27.9	27.5
Consult and transfer care	6.2	7.0	COPD	10.1	11.6
Other	0.1	0.3	Parkinson's disease	3.7	3.9
CSHA-CFS category[A]			Stroke	7.6	7.2
1	0.1	0.1	Fracture (any)	12.9	14.5
2	0.2	0.2	Fracture pelvis	2.2	2.9
3	0.6	1.4	Fracture vertebra[C]	3.3	3.4
4	4.1	4.2	Fracture proximal humerus	0.8	0.9
5	21.9	22.7	Fracture distal forearm	0.3	0.7
6	45.1	44.1	Fracture rib[C]	1.9	2.9
7	28.0	27.3	Infection (any)	71.1	73.9
			Infection respiratory tract	28.4	32.8
			Malignant neoplasm (any)	15.0	10.1
			Major depression	2.8	2.6
			Pressure area	5.5	6.1

[A]CSHA-CFS category data were missing for 216 patients (12.8%) before SIBR and for 220 patients (11.2%) during SIBR.
[B]Medical diagnosis data were missing for 203 patients (12.1%) before SIBR and for 234 patients (11.9%) during SIBR.
[C]Fracture vertebra and fracture rib include both single and multiple fractures.

Table 3. Cox proportional hazards regression model for length of hospital stay

Data for 307 patients (9.7%) were censored due to in-hospital death. Dementia, delirium, age and Canadian Study of Health and Aging Clinical Frailty Scale (CSHA-CFS) data were forced into the model: 3179 of 3644 patients (87.2%) had complete data for variables in the model. BPSD, behavioural and psychological symptoms of dementia; CI, confidence interval; HC-RACF, high-care residential aged care facility; HR, hazard ratio; SIBR, structured interdisciplinary bedside rounds

Variable	Parameter estimate	s.e.	*P*-value	HR (95% CI)[A]
SIBR implementation	–0.03	0.04	0.44	0.97 (0.90–1.05)
Dementia	–0.12	0.04	0.004	0.89 (0.82–0.96)
Delirium	–0.15	0.04	<0.001	0.86 (0.80–0.93)
Age	0.01	0.01	<0.001	1.01 (1.00–1.01)
CSHA-CFS	–0.09	0.02	<0.001	0.91 (0.87–0.96)
Admitted from HC-RACF	0.70	0.05	<0.001	2.01 (1.82–2.22)
Cardiac failure	–0.21	0.05	<0.001	0.81 (0.73–0.90)
BPSD	–0.19	0.06	0.001	0.82 (0.73–0.93)
Respiratory infection	–0.22	0.05	<0.001	0.80 (0.73–0.88)
Septic shock	–0.35	0.09	<0.001	0.70 (0.59–0.84)
Acute renal failure	–0.21	0.05	<0.001	0.81 (0.74–0.90)
Deconditioning	–0.23	0.04	<0.001	0.80 (0.73–0.87)
Malnutrition	–0.39	0.06	<0.001	0.68 (0.60–0.76)
Dysphagia	–0.17	0.06	0.004	0.85 (0.76–0.95)

[A]An HR <1.00 indicates a decreased probability of discharge at any point of time, and hence longer length of stay.

they also had shorter LOS (median 7 vs 8 days; $P = 0.002$) and were less likely to die in hospital (3.4% vs 9.7%; $P < 0.001$). However, all other characteristics were similar between those with and without missing data.

Discussion

The present large before-after study found that the implementation of SIBR among older people hospitalised with acute illness did not reduce LOS or the 28-day re-admission rate.

Although the results of the present study differ from those published by Stein *et al.*,[9] direct comparison of the studies is problematic. For example, Stein *et al.*[9] did not define the characteristics of their study population and the results from adjusted analyses were not reported. In addition, in the study of Stein *et al.*,[9] SIBR were implemented together with other features of an accountable care unit, making it difficult to isolate the effect of SIBR. Furthermore, whereas we implemented SIBR twice weekly, Stein *et al.*[9] conducted it daily. Because of competing clinical demands, we did not believe that we could sustain daily SIBR on a long-term basis. However, we believed that we could overcome some of the potential disadvantages of less frequent rounding through other communication strategies. Detailed SIBR information was recorded on a datasheet and attached to the bedside record. Staff on non-SIBR days were encouraged to view the datasheet and to follow the care plan. We continued several other communication practices, including weekday journey board rounds, medical team ward rounds and modified weekly case conferences. These practices may have provided sufficient interdisciplinary communication, potentially obviating the additional benefits of SIBR. Units without a strong culture of regular interdisciplinary communication may have different experiences with SIBR.

Although our communication strategies may explain the ineffectiveness of SIBR, other potential reasons should be considered. First, conventional models of interdisciplinary care among older people reduce outcomes strongly related to LOS, including hospital-related falls[28] and functional decline at discharge,[29,30] suggesting that additional improvements through SIBR may be limited. Second, evidence indicates that hospital discharge planning for frail older people can be improved if interdisciplinary interventions include and educate the family.[31] Although only 20.3% of the SIBR in the present study were attended by a member of the family, the effect of SIBR on LOS was not modified by the presence of dementia or delirium, or the ability to speak English (patient groups most likely to benefit from family attendance). Finally, 3- to 5-min SIBR interactions may not be long enough to have an effect on outcomes. However, Stein *et al.*[9] reported a significant reduction in LOS despite reviewing up to 24 patients during 1 h.

Although SIBR did not reduce LOS or re-admission in the present study population, this may not be the case in other patient groups and settings. LOS is determined by a complex network of multiple supply and demand factors that include organisational culture, hospital bed availability, the numbers and mix of personnel, the accessibility of subacute services, an individual patient's needs and the customs and cultures of the local population.[32] Any of these factors may affect the relationship between SIBR and LOS. Although early unplanned hospital re-admissions are increasingly associated with the quality of acute care,[19] on an operational level they are indicators of the total chain of care, rather than on the performance of the hospital and its processes alone.[16]

Older patients and those residing in an HC-RACF had shorter LOS. Residential aged care facilities provide a familiar and structured environment that allows many patients to be discharged before they recover fully.[33] Although functional and cognitive impairments should not be used to exclude HC-RACF residents from in-patient care, those with severe impairment are unlikely to benefit. The high prevalence of functional and cognitive impairments in the HC-RACF patients in the present study, together with earlier and higher in-hospital mortality, explained their shorter LOS. We are uncertain why older patients had shorter LOS. Although the patients from HC-RACFs were significantly older than other patients in the present study, the mean difference in age was only 1.8 years. Age is not a consistent predictor of LOS in the literature.[26]

The focus of the present study was on the effect of SIBR on specific quantitative outcomes because of the lack of literature in this area. However, SIBR should not be dismissed without considering their possible effects on other outcomes. Sites evaluating the qualitative outcomes of SIBR have reported improved staff satisfaction, reduction in staff turnover and improved patient–clinician communication.[11,34–37]

The present study has several limitations. First, although a before-after study is inferior to a randomised controlled study, the reforms at the hospital made the latter unachievable. However, with the exception of shortened weekly case conferences during SIBR, all other practices remained unchanged. We adjusted for many variables and included a measure of frailty

(CSHA-CFS; Table 3). Because the CSHA-CFS mixes items such as comorbidity, cognitive impairment and disability,[23] it may have captured unmeasured variables that affected LOS.[38] Second, the population of older people is more diverse than our single hospital sample, and hence the results of the present study cannot be extrapolated to all older in-patients and settings. Finally, 12.8% of the patients in the present study had missing frailty or diagnostic data. Although all other measures were fully complete, missing data may have affected the quantitative values given in Table 3. However, we believe that our qualitative conclusions are valid.

Despite these limitations, the present study has several strengths: the sample was large and all data were ascertained prospectively. Further, consecutive patients admitted to the aged care service were studied. Among all non-probability samples, consecutive sampling is the best because it is most representative of the underlying study base.

Conclusion

Despite the scarcity of peer-reviewed evidence and the associated resource cost, SIBR are being widely implemented. Although ineffective interdisciplinary collaboration is associated with negative outcomes, models of care aiming to improve collaboration are not necessarily effective in reducing LOS or early re-admission across all services and settings. Clinical services implementing SIBR are encouraged to independently evaluate the effects of SIBR on these and other outcomes.

Competing interests

None declared.

Acknowledgements

The authors acknowledge the following geriatricians for their contributions to data collection and data entry: Benyamen Benyamen, Leemin Chan, David Conforti, Angela Khoo, Florence Loh, Colin Macarthur, Nyoka Ruberu, Milan Simic and Nalini Thayaparan. The authors also acknowledge the community volunteers (for their assistance during the training period), the project leads from the CEC and all staff on the aged care wards for helping develop the communication protocol and implementing SIBR.

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