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Comprehensive Geriatric Care at an acute secondary hospital: a pre and post model of care evaluation

Kasey Owen[1], Elizabeth McCourt[1,2], Salih Salih[1,3], Rachelle De Leon[1], Niamh Boland[1]

[1] Redland Hospital, Bayside Health Service, Metro South Health, Queensland, Australia; [2] Clinical Pharmacology, Royal Brisbane and Women's Hospital, Queensland, Australia; [3] The University of Queensland, Centre for Health Service Research, Queensland, Australia

Background and aims. To evaluate Comprehensive Geriatric Care (CGC) at a small public hospital in Queensland (Australia) with limited geriatrician services. CGC is a model of care which links specialized geriatric services located in both the ED (Emergency Department) and acute medical/surgical wards with a direct referral pathway.
Methods. A retrospective pre-post study collected data from the Integrated Electronic Medical Record (ieMR) of the participants for two time periods: pre implementation of CGC (October-December 2018) and post implementation (October-December 2019).
Result. The implementation of the model resulted in increased activity by the inpatient geriatric service ($p = 0.0103$) and reduced the time from hospital admission to first contact with the inpatient geriatric service ($p = 0.029$). The need for face-to-face geriatrician consults also reduced following implementation of the model ($p < 0.001$).
Conclusions. Implementation of a unique model of care to streamline geriatric services from ED through to the acute hospital setting was able to increase the number of patients accessing the inpatient geriatric service and improve the timing of specialist geriatric input received by patients on the inpatient wards despite limited geriatrician consultation time.

Key words: geriatric, model of care, acute, emergency department, geriatrician

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Correspondence
Kasey Owen
Redland Hospital, Allied Health Department, Weippin St., Queensland, Australia 4163
E-mail: Kasey.owen@health.qld.gov.au

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INTRODUCTION

An ageing population places increasing demand on the healthcare system [1]. Significantly, patients over 65 make up more than 20% of Emergency Department (ED) presentations [2] with studies finding that increasing age is associated with higher hospital admission rates [3] and length of stay (LOS) [4,5]. Older patients are at risk of hospital acquired complications [6], with extended LOS contributing to greater healthcare expenditure and disruption to patient flow [7].
Specialist geriatric care models have been shown to improve the care of the older person during a hospital stay [8], and subsequently reduce repeated admissions and LOS [9]. However, access to geriatricians is often limited in the inpatient setting particularly in the absence of geriatric units or wards in smaller or regional/remote hospitals [10]. Models consisting

of consultation provided by mobile geriatricians, or a specialist inter-disciplinary team relies on accurate and timely identification of patient's that may benefit from geriatric input and are often considered to be a reactive rather than proactive approach [11-13].

The Geriatric Emergency Department Intervention (GEDI) represents a novel model of care placing specialist geriatric nurses in ED [14]. Developed and implemented in Australian hospitals, the initiative has demonstrated benefits for the ageing cohort [15,16]. Enhancing the capacity of the GEDI model to provide continuity of care from ED through to hospital wards is crucial to provide inpatient geriatric services in a more seamless manner [17]. Incorporating geriatric services across the hospital into one model of care may achieve this.

The aim of this study was to evaluate Comprehensive Geriatric Care (CGC), a model of care which links the GEDI program with the inpatient Geriatric Evaluation and Management (GEM) service. It was anticipated that improved identification of patients at the point of entry to ED would reduce the issue of referrals to the inpatient GEM service being requested late in the admission thus improving the effectiveness of the geriatric input. It was hypothesised that increased communication and identification of referrals would allow for improved triaging and optimised use of the limited geriatric consultation time available for inpatients.

METHODS

Study design

This retrospective pre-post study examined the impact of establishing the CGC model of care. Convenience samples were collected for the pre-period (October-December 2018) and post-period (October-December 2019). Ethics approval was granted from a Human Research and Ethics Committee.

Intervention and setting

The CGC model was implemented in 2019 at a 196-bed outer metropolitan public hospital near Brisbane. The CGC model included the implementation of the Geriatric Emergency Department Intervention which placed specialised geriatric nurses in the ED (2.2 full-time equivalent FTE). The GEDI service was linked with a direct referral pathway to the existing inpatient GEM service. The GEM service operates as a consultative service for inpatients on acute wards and consists of an inter-disciplinary team including an Advanced Trainee medical registrar (0.5FTE), Advanced Allied Health Practitioner (0.6FTE), and clinical nurse (CN, 0.5FTE) with limited access to a geriatrician (0.2FTE). An increase to 1.1FTE for the Advanced Allied Health Practitioner role was utilised in the implementation of the new CGC model.

Prior to the implementation of CGC, referrals for the inpatient GEM service were generated by the treating medical/surgical team. At the time of model implementation, a blanket referral pathway was negotiated with the treating medical/surgical teams whereby referral to the GEM service could be initiated by the GEDI nurse and actioned immediately by the GEM service following admission. Clinical handover was provided by the GEDI service at the time of referral regarding the indications for GEM service. The treating medical/surgical teams were also able to refer to the GEM service at any time during the admission. The GEDI service and the inpatient GEM service were referred to collectively as Comprehensive Geriatric Care (CGC).

Participants and data sources

Participants for the study were identified by retrospectively screening the Integrated Electronic Medical Record (ieMR) of all patients over the age of 75 that were admitted to hospital during the two time periods. Patients under age 75 years were excluded due to parameters of the GEDI service.

Patient lists were screened by the research team (KO, RDL). Participants were included in the study if they received contact from a member of the GEM service. Participants were excluded if they died during their admission. Data were extracted from the patients ieMR by the researchers (KO, RDL) using a data collection tool that was developed for the study with clear definitions and processes on where to obtain information to ensure consistency of data collected.

Variables

Variables collected for each participant included demographic data, the source of the GEM service referral, and the time from ED presentation to the first contact with the GEM service. The type of contact was also recorded and consisted of any or all of the following: chart review; face-to-face (FTF) review-no geriatrician; FTF review-with geriatrician. Outcome variables included LOS, readmission to hospital, and discharge location.

Statistical analysis

Data was analysed using SPSS v25. Data was summarised and analysed depending on variable type, normal distribution, and the ability of the data to meet test assumptions. For comparing across groups categorical data was compared using Chi-square tests (X^2). For comparing continuous data across groups Mann-Whitney U tests or Independent T-tests were used. P-values of < 0.05 were considered statistically significant.

RESULTS

Demographic data

Pre-CGC, 579 patients over the age of 75 were admitted to hospital during the study period, of these 26 (4%) received contact with the GEM service. Post-CGC, 655 patients over the age of 75 were admitted to hospital, of these 53 (8%) received the GEM service. There was a statistically significant difference in the number of referrals before and after the implementation of the CGC model ($p = 0.0103$). There was a statistically significant reduction in the time in days from admission to first contact with GEM service after implementation of the model ($p = 0.029$) (refer to Table I).

GEM service provision

The source of referral to the GEM service diversified post-CGC, with 100% (26/26) of referrals originating from the treating team pre-CGC and referrals originating from the treating team (46%, 23/50), GEDI (50%, 25/50), and a combination of treating team and GEDI (4%, 2/50) post-CGC.

There was no significant difference in the proportion of patients receiving a chart review ($p = 0.71$) or FTF- no geriatrician review ($p = 0.49$) between the pre and post periods. However, in the pre-period 73% of patients received FTF-with geriatrician review as compared to 30% in the post period. This difference was found to be significant ($p < 0.001$). There was a significant increase in the number of FTF-geriatrician reviews that resulted in a diagnosis of a major neurocognitive disorder in the post period ($p < 0.001$) (Tab. II).

DISCUSSION

Overall, this study demonstrated that implementation of a novel model of care incorporating geriatric services across the continuum of hospital care was able to significantly increase the provision of specialist geriatric services for inpatients over the age of 75. Implementation of this model of care increased the referrals to the inpatient GEM service and resulted in reduced time from the patient admission to first contact with the inpatient GEM service. The model improved identification of patients that would benefit from inpatient GEM service through specialised screening and assessment provided by the geriatric nurses in the ED.

FTF reviews with a geriatrician were reduced, however an increased proportion of these consultations resulted in a diagnosis of a neurocognitive disorder. It is thought that earlier, targeted intervention by the geriatric nurses in the ED and inter-disciplinary members of the inpatient GEM service improved the assessment and triaging of patients requiring geriatrician consults. Thus, resulting in more inpatients receiving geriatric specific care despite reduced FTF geriatrician consultation and more FTF geriatrician consults resulting in diagnosis of a neurocognitive disorder. The results suggest that the CGC model can improve access to specialist geriatric services using an inter-disciplinary approach even in the absence of a specific inpatient geriatric ward or unit potentially benefiting smaller secondary or regional hospitals [18]. Previous studies examining inpatient consultative geriatric models of care have emphasised the importance of early intervention targeted at those patients who would benefit most [13,18]. The novel CGC model has demonstrated the ability to screen and identify patients that would benefit

Table I. Patient demographic and admission information.

	Pre-CGC	Post-CGC	P-value
	N = 26	N = 53	
Gender (male), n (%)	18 (69%)	18 (34%)	**0.006**
Age (years), median (IQR)	85.5 (82-90)	86 (81-90)	0.958
Reason for ED presentation:			
Cognitive dysfunction	8 (31%)	16 (30%)	0.448
General medical issue	8 (31%)	11 (21%)	0.328
Fall	5 (19%)	10 (19%)	1**
Other	5 (19%)	16 (30%)	0.444
Time to first contact with GEM service (days), median (IQR)*	3.8 (2-4)	2.7 (1-3)	**0.029**
Number of co-morbidities, median (IQR)	7 (5-9)	5 (4-8)	0.095
Number of medicines on admission, median (IQR)	5.5 (3-8)	7 (4-9)	0.362
Number of medicines on discharge, median (IQR)	6 (4-7)	8 (5-11)	**0.031**

*Time in days (weekend and public holidays excluded) from hospital admission to first contact with GEM service; **Fishers exact test.

Table II. Outcome variables.

	Pre-CGC	Post-CGC	P-value
	N = 26	N = 53	
Length of admission (days), median (IQR)	11 (6-19)	13 (8-24)	0.378
At least 1 readmission to hospital within 30 days, n (%)	1 (4%)	6 (9%)	0.416
Diagnosis of major neurocognitive disorder by Geriatrician, n (%)	8/19 (42%)	13/16 (81%)	**< 0.001**
Discharge location:			
Home	15 (58%)	28 (53%)	0.683
RACF	10 (39%)	21 (40%)	0.884
Residential Transition Care program	0 (0%)	1 (2%)	1*
Other hospital	1 (4%)	3 (6%)	1*

*Fishers exact test.

from geriatric input resulting in a more proactive approach to inpatient specialised geriatric services.

LIMITATIONS AND FUTURE DIRECTIONS

Our results should be viewed considering several limitations. The small sample size did not allow for detection of statistically significant differences in outcomes such as length of stay, discharge destination or readmission rates. The results may not be able to be generalised to other hospitals with different discipline and skill mixes in the inpatient GEM service. While the GEM service was provided earlier in the admission, we could not test for effect on post-GEM service length of stay or changes to discharge destination following contact with the GEM service. This could give direction for future research. Additionally, future research may examine the cost-effectiveness of the CGC model or explore staff perceptions and uptake of model implementation. There has been accelerated development of models of care incorporating telehealth modalities in response to the challenges of the COVID-19 pandemic [19] and exploring the ability to implement CGC using virtual methods would be worthwhile.

CONCLUSIONS

Implementation of a unique model of care to streamline geriatric services from the ED to the acute inpatient wards was able to increase referral rates to the inpatient GEM service and improve the timing of specialist geriatric input received by patients on the inpatient wards despite limited geriatrician consultation time.

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Conflict of interest statement
The authors declare no conflict of interest.

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Author contributions
KO: lead researcher, research proposal and ethics application, design of data collection tool, data collection, data cleaning, drafting of manuscript, manuscript revision; EMC: research proposal and ethics application, Design of data collection tool, design of data analysis, data analysis, data cleaning, Manuscript revision; SS: research proposal and ethics application, design of data analysis, data analysis, manuscript revision; RDL: data collection, manuscript revision; NB: contributed to design of data collection tool, monitoring of data collection, manuscript revision

Ethical consideration
This study was approved by the Queensland Health Human Research Ethics Committee (protocol number HREC/2020/QMS/64195).
The research was conducted ethically, with all study procedures being performed in accordance with the requirements of the World Medical Association's Declaration of Helsinki.

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