Prevalence and management of diabetes in residential aged care facilities in north-east Victoria, Australia

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Background

Managing diabetes in residential aged care facilities (RACFs) presents challenges to general practitioners (GPs) as the incidence of the disease increases.

Objective

The objective of this article is to describe the prevalence and management of diabetes in RACFs in north-east Victoria.

Method

The method used for this study was a cross-sectional audit of medical files.

Results

Ten RACFs were invited and agreed to participate, giving a sample of 593 residents. Diabetes prevalence was 18.2% (n = 108). Half of the residents with diabetes had received a glycated haemoglobin (HbA1c) test in the previous six months. Of these residents, half had an HbA1c result of <7%, and 18% >8%. The frequency of hypoglycaemic events was found to be 10%. Hyperglycaemic episodes (HbA1C >10%) occurred in 69% of residents with diabetes; 21% had hyperglycaemic episodes when defined by levels greater than those set by the resident's GP. Diabetes-related unscheduled hospitalisations was found to be 6.5%, while diabetes-related general practice visits was 23%.

Discussion

The prevalence of diabetes in the RACFs was higher than previously reported in rural Victoria. Practice variance from evidence-based guidelines may be contributing to unplanned hospitalisations and increased acute general practice visits.

Internationally, type two diabetes mellitus (T2DM) is estimated to affect 10–20% of people in residential aged care facilities (RACFs).[1,2] A recent small Australian study of rural RACFs found a prevalence of 16%.[3] There is growing evidence to suggest that of those diagnosed with T2DM, many are not optimally managed.[4,5] This has serious implications for older persons in RACFs, many of whom have comorbid dementia.[6] Caring for people with diabetes in RACFs poses distinct challenges for nursing staff and general practitioners (GPs), including regular monitoring of blood glucose level (BGL) and blood pressure, dietary management, insulin injection, and assessment of skin integrity.[7,8] This represents a large and growing burden of care, given the increased incidence of T2DM predicted in the ageing Australian population.[9] This burden is likely to be greater in rural Australia where significant general practice workforce shortages, lower socioeconomic status and poorer access to health services persist.[10]

The current guidelines for managing older people with diabetes in residential and other care settings[11] recommend that glycated haemoglobin (HbA1c) be assessed six monthly if glycaemic control is stable, and quarterly if there is inadequate control. The guidelines also suggest a treatment HbA1c target of ≤7%, which should be individualised and can be titrated upwards to avoid hypoglycaemia, but is not recommended to be >9%. Blood pressure measurement is recommended three monthly in patients who are hypertensive, and six monthly in patients who are normotensive.[11]

Previous studies[12,13] have found that adherence to T2DM guidelines is suboptimal in RACFs. A small study of Australian rural RACFs reported that only 41% of patients were managed according to current T2DM guidelines.[3] Organisational policy appears to be poor. A study of North American RACFs[4] found that only 15% had a policy for the use of diabetes treatment algorithms, and only 1% of the study participants had an established HbA1c target. Additionally, less than one-third of RACFs had policies for BGL monitoring. Moreover, many residents with diabetes receive poor follow-up from their GPs.[13]

Well known consequences of long-term, poorly controlled diabetes mellitus include macrovascular and microvascular complications, and risk of hypoglycaemic death.[14] However, under-reported complications specifically related to older persons are numerous, including psychological issues (eg increased rates of depression)[14] and an increased risk of Alzheimer's dementia.[15] Poorly controlled diabetes mellitus increases cardiovascular morbidity and decreases overall quality of life.[16,17] It creates a significant economic burden on the healthcare system.[18]

Rural Australia faces distinct challenges in providing high-quality care for an ageing population.[19] There is little empirical research that focuses on the prevalence and management of diabetes mellitus in rural Australian RACFs.[3,9] Therefore, the aim of this study was to assess the prevalence of diabetes mellitus in high-care and low-care rural RACFs, and to evaluate if management is in accordance with current best practice guidelines.[11]

Methods

Design

A cross-sectional observational study was conducted in 2013 using a retrospective clinical file audit for the preceding six months.

Setting

Ten RACFs in the north-east region of Victoria, Australia, participated in this study.

Inclusion criteria

Men and women in permanent aged care who were aged ≥60 years and had documented type 1 diabetes (T1DM) or T2DM were included in the study.

Outcome variables

The outcome variables for this study were:

- treatment modality
- levels of HbA1c
- frequency of
  - HbA1c testing
  - BGL measurement
  - blood pressure monitoring
  - hyperglycaemia or hypoglycaemia
  - unscheduled acute general practice visits related to diabetes
  - hospitalisation secondary to diabetes.

Analysis

The data were analysed using descriptive statistics.

Ethical approval

Ethics approval was obtained under the low-risk category with consent waiver from the Northeast Health Wangaratta HREC (ethics number EC00256).

Results

Participants

Ten RACFs (299 high-care beds and 294 low-care beds) consented to participate in the study. The combined number of residents was 593; of these residents, 108 were identified by nursing staff as being eligible to participate in the study, and their medical files were included in the audit. The mean age of the participants was 85 years (standard deviation [SD]: 7.3). Sixty-eight per cent of participants were women, and the average time spent in an RACF was 2.7 years.

Prevalence and treatment

The overall prevalence of diabetes was 18.2% (n = 108): 19.1% in high-care and 17.3% in low-care. One patient had T1DM. Of the residents with diabetes, 21.3% injected insulin, 34.3% took antihyperglycaemic tablets, and 44.4% received dietary management only.

Diabetes guidelines compliance

All residents with diabetes had at least one BGL recorded. Ninety-eight per cent of participants had at least one blood pressure reading recorded, but only half had a recorded HbA1c result. Of the 60 participants who were actively managed (ie with insulin or tablets), 34 had an HbA1c result recorded in the previous six months. For approximately half of all residents with diabetes, the most recent HbA1c result was <7%, while 18% recorded a result >8% (Table 1). Almost 70% of participants had at least one hyperglycaemic event (BGL >10 mmol/L) and 10% had one hypoglycaemic event (BGL <4 mmol/L; Table 2).

Nursing and medical notes revealed that management inconsistently aligned with guidelines[11] for any diabetic monitoring, with the exception of blood pressure checks. GPs set individual notifiable BGL limits of 4–18 mmol/L for each patient (Table 2), with variant directions for treatment. These directions ranged from giving food if BGL was low to alerting the nurse unit manager and calling the GP. We were unable to determine the functional status for these residents from the medical notes and, therefore, could not conclude if management decisions were deliberately individualised.

Table 1. HbA1c data for total cohort, active management and diet

Management type	HbA1c n (%)	HbA1c mean (SD)	HbA1c >7% n (%)	HbA1c >8% n (%)	HbA1c >9% n (%)
All (diet and active treatment) **n = 108**	56 (52%)	6.81% (1.44)	17 (30.4%)	7 (12.5%)	3 (5.4%)
Active management (insulin or tablets) **n = 60**	34 (57%)	7.16% (1.42)	15 (44.1%)	6 (17.6%)	3 (8.8%)
Diet only n = 48	22 (46%)	6.26% (0.87)	2 (9.1%)	1 (4.5%)	0

HbA1c, glycated haemoglobin

Hyperglycaemic or hypoglycaemic events, unscheduled GP visits and hospitalisations

There were seven diabetes-related unscheduled hospitalisations (6.5%) and 25 acute general practice visits (23.1%) during the study period. In the active treatment group, six (10%) residents had diabetes-related hospitalisations and 18 (30%) received acute general practice visits.

Discussion

The aim of this study was to determine the prevalence of diabetes mellitus in RACFs in north-east Victoria, Australia, and to assess medical management in view of best practice guidelines. The prevalence of diabetes (18%) was higher than previously reported in rural Australian RACFs.[3] Of those whose diabetes mellitus was actively managed, there was considerable variance with current guidelines.[11]

The prevalence of diabetes in this cohort is higher than the general Australian population of the same age group.[9] Older people with diabetes have a higher likelihood than their counterparts without diabetes to have dementia, reduced functional status and an increased risk of institutionalisation.[17] However, our findings are higher than the 16% reported in a smaller study of similar rural Victorian RACFs.[3] Given the larger sample size of our study, 18% is probably a closer approximation of actual prevalence and is in line with reports of 20% from international settings.[2,13,20] The rising incidence of T2DM in general communities[18] leads us to expect further increases in RACFs, contributing to a significant burden of general practice care in an already compromised system.[21]

Our study showed that a higher percentage of residents were managed on diet alone (44%) compared with the 30% reported in previous studies.[3,5] It is unclear from our data why this might be the case; however, while the age of our population closely resembled that of the earlier work from rural RACFs,[3] it was considerably older than the large British study, which focused specifically on T2DM managed by diet.[5] Importantly, although non-pharmacological therapy for glycaemic control in an elderly T2DM population can be the optimal conservative and stepwise approach,[22] there is good evidence to show significant rates of complications and less likelihood of adequate monitoring than those treated with medication.[5,22] Consistent with this and other studies in the RACF context,[3,23] our findings indicate considerable variance from guidelines in regard to all aspects of monitoring, except for the frequency of blood pressure checks.

Guidelines recommend that HbA1c levels should be monitored every 6–12 months in patients with stable glycaemic control.[11] In this study, only 57% of patients who were actively managed on insulin or tablets had their HbA1c levels monitored in the past six months. Although it cannot be completely discounted, it seems unlikely that all of this group would have their HbA1c levels checked in the following six months.[24] Of the total pool of residents who had their HbA1c levels tested, there was compliance with the Mackellar guidelines in 70% of residents with recordings of HbA1c level <7%.[11] This aligns with the relatively large proportion of patients who needed dietary management only. However, only half of the residents who were actively treated with medication or insulin reached this same target. About one in six residents on active treatment were above the less stringent target of 8%. Importantly, the functional status of these patients could not be determined and it is possible these residents had very compromised function. The Mackellar guidelines[11] suggest HbA1c levels ≤8.5% for the frail elderly and most people with dementia. It might also be the case that GPs individualised care and chose to accept higher HbA1c results. This approach would be consistent with the recommendations of Fravel et al,[12] who suggested that the aim of management in older patients should be to address the hypoglycaemia risk with a a less stringent HbA1c target. Alternatively, as has been reported in previous studies,[13,25] these patients may be inadequately reviewed by their treating doctor.

Of concern is the number of residents with HbA1c levels that are >9%, rendering them at higher risk of chronic hyperglycaemia.[11] This is supported by the observation that GPs gave widely variant ranges of when to be notified of unusual readings (high or low), meaning that patients might potentially stay on blood glucose readings >10 mmol/L for prolonged periods. While avoiding hypoglycaemia is an important focus, hyperglycaemia is not a benign condition.[11] Sustained hyperglycaemia leads to polyuria and nocturia, which can result in dehydration, falls and associated complications. Only 42% of the participants had regular review by a GP for their diabetes. We were unable

Table 2. Percentage of patients who had at least one hyperglycemic or hypoglycemic episode stratified by whole cohort, active management and diet control over preceding six months

Patients	Hypoglycemia <4 mmol/L, n (%)	Hyperglycaemia >10 mmol/L, n (%)	Hypoglycemia <GP-set limit, n (%)	Hyperglycaemia >GP-set limit, n (%)
All (n=108)	11 (10.2%)	75 (69.4%)	10 (9.3%)	23 (21.3%)
Active management (n=60)	8 (13.3%)	49 (81.7%)	7 (11.7%)	21 (35.0%)
Diet (n=48)	3 (6.3%)	26 (54.2%)	3 (6.3%)	2 (4.2%)

to establish whether this practice is a 'patient-centred' response or if it is a result of low competence in diabetes management by GPs and/or RACF staff.[13] Further research is needed to clarify this.

The finding that 10% of residents in the active treatment group required diabetes-related hospitalisation and 30% required acute general practice visits potentially indicates suboptimal management from a quality of life and cost/system burden perspective.[17]

Limitations and strengths

The cross-sectional design and convenience sample is a clear limitation of this study, as is the inability to determine the functional status of residents from their medical records. To achieve high-quality RACF care, regular documentation of functional status is vital to guide the most appropriate medical treatment.[26]

However, the population investigated was representative of the age and gender of the broader Australian RACF population.[10] A strength of this study was the size of the sample (n = 593), which was considerably larger than the previously published Australian study of diabetes care in rural RACFs.[3]

Implications for general practice

Practice variance from evidence-based guidelines may be of concern to GPs if it contributes to unplanned hospitalisations, increased acute general practice visits and reduced quality of life for residents. Continuing education for GPs and RACF staff with the aim of reducing variation from best practice through the uptake of evidence-based guidelines is highly recommended.[11,24] Regular audit of diabetes monitoring may alert staff to gaps in optimal care. Further research on the implications of chronic hyperglycaemia in older persons is needed.

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