TITLE PAGE

Title

Investigating the Management of Diabetes in Nursing Homes using a Mixed Methods Approach.

Authors and affiliations

Hurley L^a, O'Donnell M^b, O'Caoimh R^b and Dinneen SF^{a,b}

^aDiabetes and Endocrinology Centre, Galway University Hospitals, Health Service Executive, Newcastle Road, Galway, Ireland

^bDepartment of Medicine, Clinical Sciences Institute, National University of Ireland, Galway, Ireland

E-mail addresses of authors

Lorna.Hurley@hse.ie ; Maire.odonnell@nuigalway.ie ; Ronan.ocaoimh@nuigalway.ie ; Sean.dinneen@nuigalway.ie

Corresponding author and contact details:

Lorna Hurley

Diabetes and Endocrinology Centre, Galway University, Health Services Executive West, Galway, Co Galway, Republic of Ireland

E-mail: Lorna.Hurley@hse.ie

STRUCTURED ABSTRACT

Aims

As populations age there is an increased demand for nursing home (NH) care and a parallel increase in the prevalence of diabetes. Despite this, there is growing evidence that the management of diabetes in NHs is suboptimal. The reasons for this are complex and poorly understood. This study aimed to identify the current level of diabetes care in NHs using a mixed methods approach.

Methods

The nursing managers at all 44 NHs in County Galway in the West of Ireland were invited to participate. A mixed methods approach involved a postal survey, focus group and telephone interviews.

Results

The survey response rate was 75% (33/44) and 27% (9/33) of nursing managers participated in the qualitative research. The reported prevalence of diagnosed diabetes was 14% with 80% of NHs treating residents with insulin. Hypoglycaemia was reported as 'frequent' in 19% of NHs. A total of 36% of NHs have staff who have received diabetes education or training and 56% have access to diabetes care guidelines. Staff education was the most cited opportunity for improving diabetes care. Focus group and interview findings highlight variations in the level of support provided by GPs and access to dietetic, podiatry and retinal screening services.

Conclusions

There is a need for national clinical guidelines and standards of care for diabetes management in nursing homes, improved access to quality diabetes education for NH staff, and greater integration between healthcare services and NHs to ensure equity, continuity and quality in diabetes care delivery

HIGHLIGHTS

- The reported prevalence of diabetes in nursing homes in the West of Ireland is 14%
- Only one third of nursing homes have staff with diabetes education or training
- 80% of nursing homes have residents that are managed with insulin
- The level of medical support with insulin titration varies widely
- Nursing home residents have limited access to ancillary diabetes services

KEYWORDS

Diabetes; ageing; nursing homes; residential care.

INTRODUCTION

The management of diabetes in residents of nursing homes (NHs) is challenging. The American Diabetes Association position statement recommends comprehensive assessment and goal directed care for these patients (residents), recognising the unique challenges faced by this population and the staff caring for them. (1) Changes in demographics, which have resulted in an increasing prevalence of diabetes, means that our population is growing older and living longer with more co-morbidities. (2) In Ireland, 97% of residents receiving long-term care in NHs are aged over 65 years and more than half are over 85 years of age, with 65% reported to have high levels of functional dependency (3). People with diabetes in NHs have a high prevalence of physical and cognitive disability, circulatory complications and pressure ulcers as well as greater susceptibility to infections and high hospitalisation rates (4) (5) (6) (7) (8). The effects of hypoglycaemia in older patients has been described as ‘catastrophic’, being linked to falls and the development of dementia and can be easily missed in this population, as the presenting symptoms of confusion, delirium and dizziness may not be recognised as being related to hypoglycaemia. For these reasons, residents with diabetes in NHs have been described as a highly vulnerable group (9).

Diabetes care in NHs has been identified as a neglected clinical area, with the NH sector being ill equipped to meet the rising challenge of diabetes (9). This is demonstrated by a lack of diabetes-specific policies and procedures, untrained staff and ineffective linkages with ancillary health services revealed in a United Kingdom (UK) audit (10). To address this area of need, guidelines and standards of care specific to nursing homes were developed in the UK in 2010. (9) (11) Recommendations have also been published by international organisations including the American Diabetes Association and the International Association of Gerontology and Geriatrics (1) (12). Included in their recommendations is that NHs develop policies and protocols on various aspects of diabetes care, that care goals are individualised, and that staff receive adequate training in diabetes care.

While some studies have explored the management of diabetes in NHs, few studies have performed a qualitative evaluation. In Ireland, there has been no exploration of diabetes management in NHs. It is projected that by 2021, the number of people aged 65+ using residential LTC in Ireland will rise to between 32,993-36,933, an increase of 59-64% since 2006. (13) While 4.7% of the adult population is estimated to have diabetes, this increases to 13.8% in those aged 60+, and is thought to be higher again in NH residents (14) (15). Given these, this study aimed to explore the current state of diabetes management in NHs, using a mixed methods approach. It aimed to investigate diabetes care provision in NHs within County Galway, a large representative mixed urban-suburban-rural area in the West of Ireland with a population of 250,000 people.

SUBJECTS

The nursing manager (either the director of nursing, where these posts existed, or the clinical nurse manager) at all 44 public, private and voluntary NHs identified in Galway City and County were invited to participate in the study. The people holding these senior posts are all experienced

registered nurses. The majority are also involved in the direct care of residents as well as the supervision of staff grade nurses and care assistants. The NHs included were all registered nursing facilities managing residents with moderate to high functional dependency excluding assisted-living units, sheltered accommodation or other retirement communities.

MATERIALS AND METHODS

A confidential self-completion postal survey was developed, piloted and sent to the nursing manager at all 44 public, private and voluntary NHs identified in Galway City and County in February 2013 (Supplementary material). A reminder letter was sent 6 weeks later to any non-responders. Following the completion of the survey, all respondents were sent a postal invite to participate in a focus group (or if unavailable, a telephone interview) to further explore issues arising from the survey findings. A topic guide was used to direct the interviews and focus group. The focus group was led by a research nurse and diabetes clinical nurse specialist (CNS). The telephone interviews were conducted by the research nurse. Verbal and recorded consent of all participants was obtained.

Quantitative data were analysed using SPSS V18 (SPSS Ireland Ltd, Dublin, Ireland). Means (standard deviation) are presented. Medians (minimum-maximum) are also presented where data were not normally distributed. Between-group comparisons were performed using independent sample t-tests or one-way analysis of variance for parametric data. Voluntary and private NHs, both of whom receive the same level of State funding, were grouped for analysis due to the low number of voluntary NH.

All qualitative data were recorded and transcribed verbatim. Thematic analysis was used to code and clarify the themes emerging from the data.

RESULTS

Of the 44 NH facilities identified, 80% (n=35), 16% (n=7) and 4% (n=2) were private, public and voluntary NHs respectively. In all, 75% (33/44) of questionnaires were completed and returned. Of the responding NHs, 79% (n=26), 18% (n=6) and 3% (n=1) were private, public and voluntary NHs respectively. Four of the NHs (12%) were urban/sub-urban, with the remaining NHs being rural. There were a total of 1,260 residents in the responding 33 NHs. The size of the NHs ranged from 10 residents to 100 residents [median 32 (range 10-100)]. A total of 171 residents were reported to have a diagnosis of diabetes giving a prevalence of 14% [median 14 (range 4-25)].

In all, 17 NHs responded to the focus group/interview invitation. Nine agreed to participate in the focus group and 8 agreed to take part in telephone interviews. Time and geographical constraints were the reasons given for choosing a telephone interview over a focus group. On the day of the focus group, six nursing managers (4 private, 1 voluntary and 1 public) were available to attend

and participated. Three telephone interviews were also conducted (2 private; 1 public) and at this point ‘data saturation’ had been reached, with no new findings emerging.

Staff Education and Access to Guidelines

The survey revealed that 36% of NHs have staff with any sort of post-graduate diabetes education or training, other than glucometer training (Table 1). The qualitative research found that this education and training tends to be provided in-house. Company dietitians and diabetes CNSs provide education free of charge, whereas education is provided at a fee from private education consultants and through Nursing Homes Ireland, the representative organisation for the Irish private and voluntary NH sector.

“We have a dietitian who comes into us every 6 months and she gives a talk to us on nutrition. But we pay for this.” (Participant 4, Focus Group)

“They’ve just been trained in monitoring. Now it doesn’t go into any detail really on hypo’s or hypers or anything but covers the basics” (Participant 6, Focus Group)

In all, 56%(18/32) of NHs have access to diabetes care guidelines. Nine reported access to locally developed guidelines for diabetes management in primary care, and five respondents accessed various other non-specific guideline resources (Table 1). The remaining four respondents did not provide information on their guidelines. No nursing home reported accessing diabetes guidelines specific to a nursing home environment. Significantly more public NHs than private NHs accessed guidelines ($p=0.01$) (Table 2). The qualitative research found that public NHs had been sent a copy of locally developed diabetes guidelines in 2008 and most private NHs were not aware that these guidelines existed.

Routine diabetes care

Diabetes policies and care planning

The survey found that 42% of NHs report having developed policies on aspects of diabetes management and 97% have diabetes care plans for residents. The qualitative results found that diabetes care is incorporated into the resident’s general care plan with the level of detail varying, and where diabetes policies exist, they are referenced in the individual residents care plan.

“In it (the resident general care plan) we’d refer to our policies on insulin administration, hypoglycaemia, blood sugars, sharps etc.” (Participant 3, Interview)

“We wouldn’t see diabetes as a problem. We wouldn’t have as such a care plan for diabetes. It’s only for any problems like hypos.” (Participant 6, Focus group)

“No we don’t use a special template of anything, but a structured plan with your (specialist) input would be great”. (Participant 2, Focus group)

Routine GP reviews

In all, 97% of nursing managers reported that GPs perform diabetes reviews. However, the focus group and interviews revealed that the frequency and subjective quality of diabetes reviews vary depending on the GP:

“One of our residents has diabetes but he hasn’t actually been looked at all since he came. We feel constantly with the GPs you’re ringing them, they don’t want to come up, they’re too busy.” (Participant 2, Interview)

“We’re very lucky; we have a very good GP service.” (Participant 1, Focus Group)

The majority, 70%, of NHs, obtain residents blood test results from the GP and keep them on site. However, ease of access to these results varies:

“The blood results all go to the GP ...you ring and say well what was the blood result? And over the phone, they will say to keep the same dose, or maybe it has to be changed. You then have to send down the chart to them to get them to write it. They just don’t come up to write it. You’re going up and down to the GP literally continuously.” (Participant 2, Interview)

“Some GPs will say ‘he’s my patient so the results are mine’. Now most are very good and they will just fax them on, but I have 3 GPs and that’s the standard answer” (Participant 3, Focus Group)

Insulin management

Based on the survey data, 33% of residents with diabetes are treated with insulin therapy and hypoglycaemic episodes are a frequent occurrence in one-fifth of NHs. In all, 80% of NHs have the insulin dose titrated by the specialist diabetes service or the GP. The remaining 20% of NHs titrate insulin without either GP or specialist support (Table 1). The qualitative research found that the specialist outpatient diabetes service is the first port of call for support with insulin titration if the resident has been attending the outpatient clinic. If the resident did not attend the outpatient clinic, the NH relied on the GP for guidance on insulin titration and the level of support provided varies depending on the GP.

“One of them is on sliding scale insulin and we phone into the diabetes nurses in the hospital regularly. That particular GP tends to be hands off.” (Participant 3, Interview)

“If they are on insulin, you would have guidance on what to do if blood sugars go up etc. It’s agreed with the GP.” (Participant 5, Focus group)

“Our biggest problem is the titration of insulin. The nurses (in the NH) are afraid to take the responsibility. I’m always getting calls saying these are the BSL’s (blood sugar levels) what should I do.....The GP will say ‘I don’t know anything about diabetes get onto the diabetes nurses’, and that strengthens their fear. It’s a massive concern. But he (the

resident) is not a patient of the diabetes centre, so they can't get involved.” (Participant 3, Focus group)

Access to ancillary public and private services

The survey found that dietitians visit 82% of NHs (Table 1) and that private or nutrition company dietitians are the only source of in-house dietetic support. The qualitative research revealed that individualised advice for residents is not always available from company dietitians. There was a general recognition that they are promoting a product but that this does not influence the service they provide.

“In fairness, they're promoting their drinks but they always do say to try the meal first” (Participant 2, Focus group)

“Before ever, ever, I ordered anything, when the girl came in advertising her products and she asked what we'd need, and I said well we need a dietician and we'd need a speech and language therapist... Within a week we had both on site.” (Participant 2, Interview)

In total, 97% of NHs report having access to chiropody/podiatry services for their residents (Table 1). The qualitative research revealed that this in-house service is private and paid for by the resident in the vast majority of cases. In some public NHs, the cost is covered by the Health Service Executive (HSE) but this option is not available in all public NHs. The cost ranges from €25 to €40 per visit. In many instances, residents cannot avail of podiatry/chiropody services due to cost:

“We have a chiropodist and she is brilliant. She does all the diabetic screens and everything. However, that is a private service and only 4 out of the 7 (residents with diabetes) would have access, as it's private, and they have to pay for it.” (Participant 3, Interview)

The survey found that 70% of NHs report that their residents have retinal screening examinations (Table 1). However, the qualitative research revealed that eye tests are performed by visiting eye care companies (paid for by the HSE) and there is uncertainty whether the test performed includes an examination for diabetic retinopathy:

“The diabetes test isn't covered according to the people that came to us. It's only for routine eye test and glaucoma.” (Participant 4, Focus Group)

“I think they check for retinopathy as they ask who is diabetic.” (Participant 1, Interview)

In total, 30% of NH residents with diabetes attend the specialist diabetes outpatient clinic, with significantly more patients from public than private NHs attending [38% (SD 33) v's 1% (SD 2), $p=0.01$] (Table 2). Although all residents of NHs can avail of hospital outpatient services and other public health services including podiatry, dietetics and the national retinal screening service, these services are often inaccessible due to the transport issues:

“If we’ve to bring anyone to Galway and if they’ve no family member, we have to hire a taxi and someone would have to go with them and they’d have to pay for it themselves.” (Participant 2, Interview)

“If the family weren’t taking her there would be no service.” (Participant 1, Focus group)

Regulation

NHs are subject to regular inspections by the Health Information and Quality Agency (HIQA), an independent, statutory, government-funded agency in Ireland, which monitors the safety and quality of health and social care including NH care. The qualitative research revealed that when HIQA inspectors visit NHs, they do not target diabetes care specifically but aspects of diabetes care are indirectly subject to investigation such as care plans and nutritional plans. When asked about the frequency of GP reviews, some expressed difficulty in adhering to HIQA regulations where they are dependent on the services of others:

“According to regulations all patients should be reviewed 3 monthly. But the GPs aren’t governed by HIQA so we find it hard to get follow ups.” (Participant 3, Focus group)

“They (the GPs) say, “what do you need 3 monthly reviews for”. Oh it’s a pain now, that kind of thing.” (Participant 2, Interview)

Opportunities for development of diabetes care

Responses to the survey found that 88% of nursing managers identified staff education as the main opportunity for developing diabetes care in NHs. The qualitative research found that participants have a preference for education by practicing specialists, preferably delivered in-house:

“If you go into a Nursing Home that has ten diabetics and if the education programme is focused on the residents that are there, and includes the residents, cooks, carers and nursing staff, the outcome would be that they are focused on their residents...They will make more sense of what they are learning that day.” (Participant 2, Focus group)

“When you bring in a specialist, who is currently practicing, you know that they are at the cutting edge of their specialism. You’re not always that confident about others” (Participant 1, Focus Group)

Other opportunities for improving diabetes care, as reported in the survey, were access to services (67%), specialist support (49%) and GP support (33%).

DISCUSSION

This study involving 33 NHs in the West of Ireland is the first to investigate the management of diabetes in an Irish NH setting. The study is also one of the first to use a mixed methods approach

to research diabetes care in NHs (16). A reasonable response rate (75% for the questionnaire) allows comparison to other Irish studies of NHs in other contexts (17). The results show that despite a high stated prevalence of diabetes of 14% with a third on insulin, only 36% of NHs have staff with education or training in the management of diabetes. The study also reveals that NH residents have very limited access to ancillary diabetes services, with transport and cost identified as significant barriers to accessing these services.

The prevalence of diagnosed diabetes was reported to be 14%, comparable with other reports in Europe of 10-16% (10) (18) (19). A previous screening study found that over half of NH residents with diabetes are undiagnosed indicating that the true prevalence is higher (14). Guidelines in the UK recommend screening on admission but 60% of NHs have not yet implemented this policy (10). Higher prevalence rates (25%-33%) have been reported in NHs in the United States, possibly due to better implementation of screening on admission (20).

While the study found that 36% of NHs have staff with diabetes education or training, it would appear that not all of these would have received sufficient education to equip staff with the skills necessary to competently care for residents with diabetes, as education provided can be topic specific (e.g. foot care or nutrition), rather than comprehensive diabetes management education. Good clinical practice guidelines would indicate that each resident with diabetes should have access to a member of staff appropriately training in diabetes care (9) (11). This study suggest that NHs in Ireland are falling short of this recommendation and the need for education was recognised by NH staff. While 56% of NHs reported having access to diabetes guidelines, these guidelines are not specific to the needs of older residents of nursing homes. Almost all nursing homes reported having diabetes care plans. However, without quality education and evidence-based guidelines specific to diabetes care in nursing homes, care-planning quality is likely to be substandard.

A comprehensive annual review including screening for complications is the cornerstone of diabetes care (21) (22). However, these services are not always easily available to residents with diabetes and the quality of the services provided varies. There is a lack of public ancillary services in-house, the cost and logistics of providing transport to outpatient services is inhibitory, and the cost of accessing private in-house services is out of reach given the resources of many residents. There is considerable variability reported by respondents in the diabetes care provided by GPs. The level of input appears to be dependent on the particular GPs interest in diabetes, whether the patient is managed on oral agents or insulin and whether the patient is attending the hospital outpatient clinic suggesting that some residents and NH staff are left in a vulnerable position, especially with regards to the titration of insulin. While it was beyond the scope of this study to explore the thoughts of GPs, it would appear from this focus group with nursing managers that lack of time and lack of knowledge might be significant barriers for some GPs to providing better diabetes support.

The study has a number of limitations. These findings represent the views of just one stakeholder group, that of the nursing managers. The study was conducted in a single region with a homogenous population in one country, Ireland. However, the sample is broadly representative of the 600+ NHs in Ireland and other more rural-urban European NHs. Most respondents were from private NHs. This said, in Ireland the private and voluntary sector combined provide 81% of NH beds (23) suggesting that the sample is broadly representative although comparison between public

and private NHs was limited due to the low number of public NHs included. However, in Ireland the majority of patients, regardless of whether the NH is private, public or voluntary, are part funded at least by the HSE through the 'Fair Deal' scheme. Few patients are entirely self-funding, private residents with the majority of beds in private NHs being contracted by the HSE making the comparison a moot point.

Further research is needed to help inform policy and practice developments in this area. In particular, the perspectives of other stakeholders (GPs, residents and their families, specialist diabetes staff) should be explored.

In conclusion, there is considerable scope for improvement in the quality of diabetes care provided to NH residents in Ireland. There is a need for the development of national clinical guidelines and standards of care to support the delivery of high quality diabetes care in residential NH settings. Steps need to be taken to improve access to quality diabetes education for NH staff. This study also points to the need for more integration between healthcare services and NHs to ensure equity, continuity and quality in diabetes care delivery.

ACKNOWLEDGEMENTS

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors

CONFLICTS OF INTEREST

None

REFERENCES

1. Munshi MN, Florez H, Huang ES, Kalyani RR, Mupanomunda M, Pandya N, et al. Management of diabetes in longterm care and skilled nursing facilities: A position statement of the American Diabetes Association. *Diabetes Care*. 2016; 39: p. 308-318.
2. Prince MJ, Wu F, Guo Y, Gutierrez Robledo LM, O'Donnell M, Sullivan R, et al. The burden of disease in older people and implications for health policy and practice. *The Lancet*. 2015; 385: p. 549-562.
3. Nursing Homes Ireland. Annual Private Nursing Homes Survey 2014-2015. Dublin: 2015.

4. Sinclair AJ, Allard I, Bayer AJ. Observations of diabetes care in long-term institutional settings with measures of cognitive function and dependency. *Diabetes Care*. 1997; 20(5): p. 778-784.
5. Carter MW. Variations in hospitalization rates among nursing home residents: the role of discretionary hospitalizations. *Health Services Research*. 2003: p. 1177-1206.
6. Gadsby R, Barker P, Sinclair A. People living with diabetes resident in nursing homes--assessing levels of disability and nursing needs. *Diabetic Medicine*. 2011: p. 778-780.
7. Resnick HE, Heineman J, Stone R, Shorr RI. Diabetes in US nursing homes, 2004. *Diabetes Care*. 2008: p. 287-288.
8. Mooradian AD, Ottersweil D, Petrusek D. Diabetes mellitus in elderly nursing homes patients. A survey of clinical characteristics and management. 1988: p. 391-396.
9. Diabetes UK. Good Clinical Practice Guidelines for Care Home Residents with Diabetes; 2010.
10. Institute of Diabetes for Older People and the Association of British Diabetologists. England wide care home diabetes audit. Bedfordshire: Institute for Diabetes in Older People; 2014.
11. Guidelines and Audit Implementation Network (GAIN). Guidelines and standards of care for people with diabetes in care homes. Belfast; 2010.
12. Sinclair A, Morley JE, Rodriguez-Manas L, Paolisso G, Bayer T, Zeyfang A, et al. Diabetes mellitus in older people: position statement on behalf of the International Association of Gerontology and Geriatrics (IAGG), the European Diabetes Working Party for Older People (EDWPOP), and the International Task Force of Experts in Diabetes. *Journal of the American Medical Directors Association*. 2012; 13(6): p. 497-502.
13. Wren M, Normand C, O'Reilly D, Cruise S, Connolly S, Murphy C. Towards the development of a predictive model of long-term care demand for Northern Ireland and the Republic of Ireland. Belfast; 2012.
14. Sinclair AJ, Gadsby R, Penfold S, Croxson SC, Bayer AJ. Prevalence of diabetes in care home residents. *Diabetes Care*. 2001; 24(6): p. 1066-1068.
15. The Institute of Public Health in Ireland. Making Diabetes Count: A systematic approach to estimating population prevalence on the Island of Ireland in 2005. Belfast; 2005.
16. Osman O, Sherifali D, Stolee P, Heckman G. Diabetes Management in Long-Term Care: An Exploratory Study of the Current Practices and Processes to Managing Frail Elderly Persons with Type 2 Diabetes. *Canadian Journal of Diabetes*. 2016; 40(1): p. 17-30.

17. Cahill S, O'Nolan C, O'Caheny D, Bodersky A. An Irish national survey of dementia in long term residential care. Dublin: Dementia Services Information and Development Centre; 2014.
18. Andreassen LM, Sandberg S, Christensen GB, Solvik U, Kjome RL. Nursing homes patients with diabetes: prevalence, drug treatment and glycaemic control. *Diabetes Research and Clinical Practice*. 2014; 105(1): p. 102-109.
19. Bouillet B, Vaillant G, Petit JM, Duclos M, Poussier A, Brindisi MC, et al. Are elderly patients with diabetes being overtreated in French long-term-care homes? *Diabetes Metabolism*. 2010: p. 272-277.
20. Dybicz SB, Thompson S, Molotsky S, Stuart B. Prevalence of diabetes and the burden of comorbid conditions among elderly nursing home residents. *American Journal of Geriatric Pharmacotherapy*. 2011: p. 212-223.
21. Harkin V, National Clinical Programme Diabetes Working Group , Department of Health and Children , HSE. A practical guide to integrated type 2 diabetes care; 2016.
22. NICE. CG87: Type 2 diabetes: The management of type 2 diabetes. National Institute for Health and Care Excellence; 2014.
23. Nursing Homes Ireland. Ageing crisis: time for action; a future for Ireland's long term residential care. Dublin. 2014.

TABLES

Table 1		
Survey findings	Yes (n)	%
Guidelines, policies, education and care planning		
Nursing home has staff with education in diabetes care [◇]	12 (33)	36
Nursing home has access to diabetes care guidelines [♦]	18 (33)	56
Nursing home has written diabetes policy/ies [■]	14 (33)	42
Residents with diabetes have a diabetes care plan	32 (33)	97
Support with diabetes care		
Residents receive a diabetes review by their GP	31 (32)	97
Nursing home has ≥1 residents attending the diabetes outpatient clinic	21 (31)	68
Residents with diabetes have access to chiropody/podiatry	31 (32)	97
Residents with diabetes have access to a dietitian	27 (33)	82
Residents with diabetes have access to retinal screening	23 (33)	70
Medication and monitoring		
Results of diabetes related blood tests are available on site	21 (30)	70
Nursing home has ≥1 resident that is managed with insulin	25 (31)	81
Titration of insulin is performed by the GP and/or specialists	20 (25)	80
<i>Titration by GP</i>	5 (25)	20
<i>Titration by specialists</i>	5 (25)	20
<i>Titration by GP and specialists</i>	10 (25)	40
Titration of insulin is performed by nursing home staff alone	5 (25)	20
Nursing home has ≥1 resident that is managed on hypoglycaemic agents (other than insulin) [○]	27 (31)	87
Complications		
Hypoglycaemia is a frequent occurrence	6 (31)	19
Nursing home has ≥1 resident with an active diabetic foot ulcer	4 (32)	13

[◇]11 NHs provided details of education. Staff completed a diabetes course (n=4), education provided by local specialists (n=3), education by pharmaceutical/commercial company (n=3), education on foot care (n=1), education by private education consultant (n=1)

[♦]14 NHs provided details of guidelines: HSE West Diabetes Resource Manual (n=9), various guidelines from the UK (n=3), “the internet” (n=1) and “diabetes guidelines”(n=1)

[■] 4 NHs provided details of policies: “Care of the diabetic resident”, “Nursing guidelines on the management of hypoglycaemia in the diabetes resident”, “Management of nutrition including diabetic diet” and “Standing Operating Procedures (SOP’s)”.

[○] Hypoglycaemia medication in use at the time of the survey were Biguanides (n=26), Sulphonyureas (n=20), Incretin based therapies (n=4), and Thiazolidinediones (n=2)

Table 2 Comparison of public and private nursing homes	Private / voluntary nursing homes	Public nursing homes	All nursing homes
Response rate	73% (n=27)	86% (n=6)	75% (n=33)
Prevalence of diabetes (n=33)	13% (SD 6)	16% (SD 5)	14% (SD 6)
Interest in diabetes	72% (n=18)	67% (n=4)	71% (n=22)
Staff with diabetes education/training	37% (n=10)	33% (n=2)	36% (n=12)
Access to diabetes guidelines*	46% (n=12)	100% (n=6)	56% (n=18)
Diabetes policy in the Nursing Home	41% (n=11)	50% (n=3)	42% (n=14)
Diabetes care plan for residents	100% (n=27)	83% (n=5)	97% (n=32)
Access to chiropody/podiatry	96% (n=25)	100% (n=6)	97% (n=31)
Access to dietetics	82% (n=22)	83% (n=5)	82% (n=27)
Access to retinal screening	74% (n=20)	50% (n=3)	70% (n=23)
Regular diabetes review by GP	100% (n=27)	80% (n=4)	97% (n=31)
Access to blood test results	68% (n=17)	80% (n=4)	70% (n=21)
Resident/s taking insulin (n=31)	30% (SD 29)	40% (SD 24)	32% (SD 28)
Titration of insulin with GP/PN and/or Specialists	79% (n=15)	80% (n=5)	80% (n=20)
Titration by staff nurse	21% (n=4)	17% (n=1)	20% (n=5)
Rate of referral to diabetes OPD* (n=31)	38% (SD33)	1% (SD 2)	30% (SD 33)
Frequent/ very frequent hypos	20% (n=5)	17% (n=1)	19% (n=6)
Opportunities for improving diabetes care:			
Diabetes education sessions	89% (n=24)	83% (n=5)	88% (n=29)
Access to services	74% (n=20)	33% (n=2)	67% (n=22)
Specialist (consultant/CNS) support	48% (n=13)	50% (n=3)	49% (n=16)
GP support	37% (n=10)	20% (n=1)	33% (n=11)

*Significant difference at 95% confidence interval on One Way Analysis of Variance