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Fingerstick Glucose Monitoring in Veterans Affairs Nursing Home Residents with Diabetes Mellitus

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Abstract

BACKGROUND/OBJECTIVE: Guidelines recommend less intensive glycemic treatment and less frequent glucose monitoring for nursing home (NH) residents. However, little is known about the frequency of fingerstick (FS) glucose monitoring in this population. Our objective was to examine the frequency of FS glucose monitoring in Veterans Affairs (VA) NH residents with diabetes mellitus, type II (T2DM).

DESIGN AND SETTING: National retrospective cohort study in 140 VA NHs.

PARTICIPANTS: NH residents with T2DM and older than 65 years admitted to VA NHs between 2013 and 2015 following discharge from a VA hospital.

MEASUREMENTS: NH residents were classified into five groups based on their highest hypoglycemia risk glucose-lowering medication (GLM) each day: no GLMs; metformin only; sulfonylureas; long-acting insulin; and any short-acting insulin. Our outcome was a daily count of FS measurements.

RESULTS: Among 17,474 VA NH residents, mean age was 76 (standard deviation (SD) = 8) years and mean hemoglobin A1c was 7.6% (SD = 1.5%). On day 1 after NH admission, 49% of NH residents were on short-acting insulin, decreasing slightly to 43% at day 90. Overall, NH residents had an average of 1.9 (95% confidence interval (CI) = 1.8–1.9) FS measurements on NH

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Author Contributions: Drs Jeon and Shi led the analyses and drafted the manuscript. Dr Hunt, Dr S. Lee, and Dr A. Lee helped conceptualize the study and provided critical revisions to the manuscript. Dr Lipska provided critical revisions to the manuscript. Dr Boscardin supervised the statistical analyses. Dr S. Lee provided overall supervision of the research and manuscript.

Conflict of Interest: All authors had access to data. Authors have no potential conflicts of interests to disclose. No other persons beyond the authors have made substantial contributions to this work.

day 1, decreasing to 1.4 (95% CI = 1.3–1.4) by day 90. NH residents on short-acting insulin had the most frequent FS measurements, with 3.0 measurements (95% CI = 2.9–3.0) on day 1, decreasing to 2.6 measurements (95% CI = 2.5–2.7) by day 90. Less frequent FS measurements were seen for NH residents receiving long-acting insulin (2.1 (95% CI = 2.0–2.2) on day 1) and sulfonylureas (1.7 (95% CI = 1.5–1.8) on day 1). Even NH residents on metformin monotherapy had 1.1 (95% CI = 1.1–1.2) measurements on day 1, decreasing to 0.5 (95% CI = 0.4–0.6) measurements on day 90.

CONCLUSION: Although guidelines recommend less frequent glucose monitoring for NH residents, we found that many VA NH residents receive frequent FS monitoring. Given the uncertain benefits and potential for substantial patient burdens and harms, our results suggest decreasing FS monitoring may be warranted for many low hypoglycemia risk NH residents. J Am Geriatr Soc 00:1–8, 2020.

Keywords

fingerstick; diabetes mellitus; type II; glucose monitoring; Veterans Affairs nursing home; glucose-lowering medication

INTRODUCTION

Nursing home (NH) residents with diabetes mellitus (DM) are a large, rapidly growing population of U.S. older adults.[1–3] Currently, over 400,000 U.S. NH residents have DM, type II (T2DM), representing about one-third of the U.S. NH population.[2,4] The numbers of NH residents with T2DM are expected to increase sharply over the next 30 years due to increases in the overall number of U.S. NH residents as well as increased obesity and other metabolic risk factors among older adults.[5] By 2050, the number of U.S. adults aged 65 years and older with diagnosed DM is projected to reach 26.7 million,[6] and those persons with DM are twice as likely as those without DM to reside in a NH.[4]

Capillary blood glucose or fingerstick (FS) monitoring is a central component of DM care for NH residents that can provide critical information but may also impose substantial patient burdens and harms. FS monitoring can provide clinicians important information on patterns of hypoglycemic and hyperglycemic excursions beyond the average glucose measured by hemoglobin A1c (HbA1c). Careful review of the trends and patterns of FS measurements can guide adjustments in the timing and dosage of glucose-lowering medications (GLMs). However, FS monitoring may be burdensome, decreasing quality of life for many NH residents with DM.[7] Excessive FS monitoring may lead to hypoglycemia from overcorrection of hyperglycemia,[8,9] which has been identified by the Office of the Inspector General of the Department of Health and Human Services as a common adverse event in NHs.[10,11] In addition, FS monitoring increases staff burden and staff-resident contacts, which would be especially detrimental in the current severe acute respiratory syndrome coronavirus 2 pandemic. Thus, decreasing FS monitoring may represent “low hanging fruit”: a relatively straightforward change that may provide substantial benefits to NH residents.[12,13]

Unfortunately, there is surprisingly little evidence to guide the optimal frequency of FS glucose monitoring in NH residents. Studies of FS monitoring in community-dwelling older adults with T2DM have been mixed, with patients on insulin receiving some benefit from routine FS monitoring but patients on noninsulin regimens receiving minimal benefit.[14–16] It is unclear how best to extrapolate these results to NH residents.

Guidelines currently recommend that NH residents (compared with noninstitutionalized older adults) receive less aggressive glycemic treatment using simplified treatment regimen with less frequent glucose monitoring.[17–19] Recommended frequency of FS glucose monitoring varies across guidelines, but generally ranges from three or more times per day for recently admitted NH residents on complex insulin regimens to no routine FS glucose monitoring for long-term NH residents with noninsulin regimens.[18,20–22]

The current frequency of FS monitoring practices in NH residents with T2DM is unknown; thus, it is unclear whether practice is congruent with national guidelines. Knowledge of current FS glucose monitoring practices in NHs will provide critical baseline data for future quality improvement efforts and identify specific patient populations who may benefit from increased or decreased FS monitoring. Thus, the objective of this study was to determine the frequency of FS glucose monitoring in Veterans Affairs (VA) NH residents with T2DM for 90 days after their NH admission from the hospital. We hypothesized that NH residents on higher hypoglycemia risk medications (i.e., short-acting insulin) would receive more frequent FS monitoring. In addition, we further hypothesized that the frequency of FS monitoring would be highest on NH admission and decrease thereafter as NH residents' clinical status stabilizes after hospitalization.

METHODS

Study Cohort

Our study cohort included VA NH residents with T2DM, aged 65 years and older, who were admitted to VA NHs (also called Community Living Centers) between 2013 and 2015 following discharge from a VA hospital. NH residents were identified as having T2DM if, in the year before NH admission, they had (1) an HbA1c level of 6.5% or greater, (2) used GLMs, or (3) had an *International Classification of Diseases* (*ICD*) code for T2DM (*ICD-9*: 250.xx and 249.xx; *ICD-10*: E11.x and E09.x). NH residents with any codes for DM, type I (*ICD-9*: 250.x1 and 250.x3; *ICD-10*: E10.x) in the year before NH admission were excluded since FS monitoring requirements will differ among these patients. NH hospice admissions were excluded.

We utilized VA inpatient Corporate Data Warehouse data to identify VA hospital discharge date, VA NH admission date, and VA NH discharge date. We determined NH residents' demographic characteristics using linked VA inpatient and outpatient data. Chronic conditions were ascertained using *ICD-9* and *ICD-10* codes. We used the laboratory results (LAR) file to obtain HbA1c values.

Medication Categories

We determined each NH resident's medication use using the bar code medication administration data, which identifies all medications dispensed to each NH resident. We classified NH residents into five categories based on GLM use: no GLMs used; metformin monotherapy; sulfonylureas or other nonmetformin, noninsulin medications; long-acting insulin; and any short-acting insulin. Since both metformin and acarbose have similar low risk of hypoglycemia, acarbose users were included in the metformin group and comprised less than 2% of the metformin group. A small number of residents (N = 33) who were on glucagon-like peptide 1 (GLP1) medications were placed in the sulfonylurea category. Intermediate-acting insulins (such as neutral protamine Hagedorn) were included in the long-acting insulin category. Due to the small numbers of residents receiving other classes of medications, such as thiazolidinediones (n = 8) and dipeptidyl peptidase 4 inhibitor users (n = 16), we omitted these medications from further analysis.

Patients taking multiple medications were classified according to the medication associated with the highest hypoglycemia risk (short-acting insulin > long-acting insulin > sulfonylureas > metformin).[23] For example, a NH resident taking both metformin and a sulfonylurea on the same day was categorized as a sulfonylurea user for that day. Similarly, a NH resident taking both long- and short-acting insulin was categorized as a short-acting insulin user for that day. To account for changing medication regimens, we recategorized the residents each day by the medications they were taking, resulting in residents changing medication categories as their medication regimen evolved during their NH stay.

FS Measurements

We determined each NH resident's FS glucose measurements using the VA LAR file. We obtained the total number of FS measurements per day from day 1 in the NH to day 90 for all residents in each medication category. To compute a daily mean number of FS measurements, we divided the total number of FS measurements for all residents within each medication category by the number of residents in that medication category on the same day. Those who died or were discharged from NH before day 90 were censored at the day of the event.

Statistical Analysis

To compare the baseline characteristics of VA NH residents by medication class, we performed a set of analyses of variance on the group means of age and HbA1c level, chisquare tests on the distributions of race/ethnicity and chronic conditions, and Mann-Whitney tests on the group medians of day spent in VA hospital before NH admission and days spent in VA NH. To understand how the frequency of FS measurements changes over time in NHs, we tracked the longitudinal trend of daily average of FS measurements for each medication class starting from day 1 in NH to day 90. To determine whether the number of FS measurements was changing over time, we conducted a hypothesis test on the slope of the linear trend line. We calculated the 95% confidence intervals (CIs) of FS measurements/day, using the daily average and standard deviation (SD) of the FS measurements and group size of each day. All tests of statistical significance were two sided. All analyses were

performed using statistical software SAS 9.4 (SAS Institute Inc) and STATA 15.1 (Stata Corp).

The study was reviewed and approved by the University of California, San Francisco Committee on Human Research and the San Francisco VA Research and Development Committee.

RESULTS

Among 17,474 VA NH residents with T2DM, the mean age (SD) was 76 (8) years, 98% were men, 77% were White, 39% had a diagnosis of chronic kidney disease, and 20% had a diagnosis of dementia (Table 1). Fifty-seven percent had an HbA1c test result within the VA system in the 90 days preceding NH admission; among these NH residents, the mean HbA1c (SD) was 7.6% (1.5%). The median hospital length of stay before NH admission was 8 days (interquartile range = 5–14 days), and median NH length of stay was 28 days (interquartile range = 12–62 days). By day 30, 14% of NH residents were deceased and 39% had been discharged.

On NH day 1, almost half of the cohort (49%) were receiving short-acting insulin, whereas 36% received no GLMs, 4% were on metformin monotherapy, 4% used sulfonylureas, and 7% were using long-acting insulin (Table 1). More than one-third of NH residents with DM received no GLM on NH day 1, potentially due to mild, diet-controlled DM in these residents.[24] Of the NH residents receiving any GLMs, 76% were on short-acting insulin on admission. An exploratory chart review of 49 randomly selected patients who received short-acting insulin on day 1 revealed that 30 (61%) were on sliding scale insulin, 10 (20%) were on a fixed-dose short-acting insulin regimen, and 9 (18%) were on a bolus plus correction regimen.

Mean HbA1c levels were higher for those NH residents on higher hypoglycemia risk medications ($P < .001$). For example, NH residents taking no medications had a mean HbA1c of 6.9%, whereas NH residents on short-acting insulin had a mean HbA1c of 7.9%. In addition, NH residents requiring insulin had longer NH stays compared with NH residents not taking insulin ($P < .001$).

Most NH residents were receiving more than one class of GLM (Table 2). Among 11,197 residents who were on GLMs on day 1, 57% were on multiple medications of different classes. Specifically, 37% of NH residents in the sulfonylurea medication category were also taking metformin and 20% of residents in the long-acting insulin medication category were also taking metformin and/or sulfonylureas. Nearly 70% of NH residents in the short-acting insulin medication category were also taking other medications, with most taking long-acting insulin as well as short-acting insulin. Of those who were still living in NH on day 30, 47% were taking short-acting insulin, whereas 8% were receiving long-acting insulin, 6% were using sulfonylureas, and 5% were on metformin monotherapy.

Overall, VA NH residents had an average of 1.9 (95% CI = 1.8–1.9) FS measurements on NH day 1, decreasing to 1.4 (95% CI = 1.3–1.4) FS measurements by day 90 (Figure 1). As hypothesized, this decreasing trend over time was observed across all medication categories

(*P* values for trend <.001 for all medication categories). In addition, we found that NH residents using higher hypoglycemia risk medications received more frequent FS measurements. NH residents on short-acting insulin had the highest average number of FS measurements per day throughout the 90 days (3.0 measurements/day (95% CI = 2.9–3.0) on day 1, decreasing to 2.6 measurements/day (95% CI = 2.5–2.7) by day 90). Long-acting insulin users averaged 2.1 FS measurements per day (95% CI = 2.0–2.2) on day 1, decreasing to 1.4 (95% CI = 1.2–1.5) on day 90. NH residents not taking insulin also frequently received regular FS monitoring, with NH residents on sulfonylureas receiving 1.7 measurements (95% CI = 1.5–1.8) on day 1, decreasing to 0.8 (95% CI = 0.7–1.0) on day 90. NH residents receiving metformin monotherapy received 1.1 FS measurements (95% CI = 1.1–1.2) on day 1, decreasing to 0.5 (95% CI = 0.4–0.6) on day 90. Even residents in the no GLMs category received 0.4 (95% CI = 0.4–0.4) measurements on day 1, but this decreased to 0.1 (95% CI = 0.1–0.1) measurements on day 90.

Thirty percent (95% CI = 29%–31%) of NH residents received four or more FS measurements on day 1, and 18% (95% CI = 17%–20%) of NH residents received four or more FS measurements on day 90 (Figure 2). On day 1, more than half of NH residents on short-acting insulin (53% (95% CI = 52%–54%)) and 25% (95% CI = 23%–28%) of NH residents on long-acting insulin had four or more FS measurements. By day 90, the percentages decreased to 39% (95% CI = 36%–42%) among the short-acting insulin group and 11% (95% CI = 7%–14%) among the long-acting insulin group.

FS measurements were also common among NH residents taking oral GLMs. In the metformin group, 52% (95% CI = 48%–56%) had one or more FS measurements on day 1 and 32% (95% CI = 25%–39%) had one or more FS measurements on day 90. For NH residents taking sulfonylureas, 52% (95% CI = 48%–55%) had two or more FS measurements on day 1, decreasing to 26% (95% CI = 19%–32%) on day 90. Even among those taking no GLMs, 19% (95% CI = 18%–20%) had one or more FS measurements on day 1, which decreased to 8% (95% CI = 6%–10%) on day 90.

DISCUSSION

In a national study of over 17,000 VA NH residents with T2DM following discharge from a VA hospital, we found that FS glucose monitoring occurred frequently, with NH residents receiving an average of 1.9 FS measurements on their first full day in the NH (day 1). Although the number of FS measurements declined over time, NH residents received 1.4 FS measurements at day 90, with 18% of NH residents still receiving four or more FS measurements. As hypothesized, FS glucose monitoring occurred more frequently in patients using medications associated with a higher risk of hypoglycemia, such as short-acting insulin. However, FS glucose monitoring occurred even among residents using low-risk medications, such as metformin.

These results suggest that FS glucose monitoring is occurring more frequently than recommended by guidelines.[17–19,22,25] For example, the 2016 American Diabetes Association position statement on the management of DM in long-term care recommends, for “most patients residing in long-term care facilities with type 2 diabetes… capillary

monitoring of blood glucose…could vary from twice daily to once every 3 days."[19] The 2008 American Medical Directors Association (AMDA) guideline on DM management recommended 4 to 14 FS measurements *per week* for residents taking oral GLMs.[25] The 2015 AMDA guidelines reiterated these recommendations, further suggesting that residents taking oral GLMs decrease FS measurements to two to four times *per week* after 1 to 2 weeks in the NH.[18] Taken together, guidelines recommend that most NH residents on oral medications should receive zero to one FS measurement daily, whereas those on long-acting insulin should receive one to two FS measurements/day and those on short-acting insulin should receive three or fewer FS measurements/day.[17–19,22,25] Our results suggest that across most medication categories, one-half to one-third of NH residents are receiving FS monitoring more frequently than recommended by guidelines.

Guidelines generally recommend more frequent glucose monitoring during acute illness or recent admission to the NH, with less frequent FS measurements thereafter.[18,19,25] As hypothesized, we found that clinicians followed this recommendation, with declining frequency of FS measurements across all GLMs. However, although guidelines recommend dramatic decreases in the frequency of FS measurements, we observed modest decreases in FS measurement frequency. For example, we found that for NH residents on sulfonylureas, 1.7 FS measurements occurred on day 1, decreasing to 1.1 FS measurements on day 30. In contrast, although guidelines acknowledge the need for up to twice daily FS measurements immediately after NH admission, they recommend decreasing FS frequency to several times a week thereafter.[18,19] Thus, although the decline in the frequency of FS monitoring after NH admission was consistent with guidelines, guidelines generally recommend dramatic decreases in FS monitoring rather than the modest decrease we observed.

Our results point to three potential reasons for the relatively high frequency of FS measurements in NH residents. First, despite the mean HbA1c of 7.6% being lower than that recommended for NH residents, a substantial proportion of NH residents with T2DM following discharge from a VA hospital were prescribed short-acting insulin, which often necessitates more frequent FS monitoring. Among NH residents requiring GLM, we found that 76% used short-acting insulin on day 1 and had an average of three FS measurements per day. There is evidence that insulin simplification can often eliminate the need for short-acting insulin in community-dwelling older adults with T2DM.[26] Insulin simplification may lead to decreased hypoglycemia risk and decreased DM-related distress with no change in glycemic control. Similar studies are urgently needed among NH residents to help clinicians simplify insulin regimens and transition NH residents off of short-acting insulin when appropriate.

A second reason for the observed high rates of FS monitoring is due to relatively frequent FS monitoring in the setting of lower hypoglycemia risk oral medications, such as metformin and sulfonylureas. There is widespread agreement that there is little utility in FS measurements for patients on metformin monotherapy.[27] However, we found that NH residents on metformin monotherapy averaged 1.1 FS measurements per day on admission, decreasing to 0.5 FS measurements per day by day 90. Similarly, although sulfonylureas do pose hypoglycemia risks, a Cochrane meta-analysis of studies of community-dwelling adults using self-monitoring of blood glucose concluded that FS glucose monitoring has little

clinical utility in these patients.[14] Although NH residents recently discharged from the hospital are likely at higher hypoglycemia risk and require more frequent FS measurements, the 26% of NH residents treated with sulfonylureas who received two or more FS measurements on day 90 of their NH stay would likely be better served with less frequent FS monitoring.

The final reason for the relatively high rates of FS monitoring may be a consequence of the institutional NH setting and the power imbalance between healthcare professionals and NH residents.[28] NH clinicians may reasonably view their patients as being at high risk for hypoglycemia, resulting in efforts to monitor FS measurements more frequently. In addition, some NHs may have a deeply entrenched culture and tradition among nurses and practitioners to check "AC (before meals) and HS (at bedtime)" blood glucose values. In contrast, some NH residents may find FS monitoring to be onerous.[7] Although community-dwelling patients may forget or ignore clinician recommendations for FS monitoring at home, NH residents are a "captive audience" who may find it difficult to decline FS monitoring due to the power imbalance. Thus, common power imbalances in healthcare settings between healthcare professionals and NH residents may contribute to higher rates of NH FS monitoring.[29]

Our results should be interpreted in light of our study's strengths and limitations. To our knowledge, this is the first study to examine the frequency of FS glucose monitoring in a national sample of NHs. Thus, we can provide initial estimates of the frequency of FS glucose measurements stratified by the type of GLMs. The first limitation of our study stems from our reliance on VA NHs. VA NHs differ from non-VA NHs, with an overwhelmingly male sex distribution (98%) and relatively shorter length of stay (28 days, median). Additional research is needed to determine whether the rates of FS glucose monitoring is similar in non-VA NHs. The second limitation of our study stems from our inability to isolate sliding scale insulin use. Focused chart review suggests that most NH residents receiving short-acting insulin did so with sliding scale insulin orders. Regardless of whether short-acting insulin was used as part of a fixed-dose, bolus plus correction, or sliding scale regimen, our results show that short-acting insulin is strongly associated with more frequent FS monitoring. The AMDA Choosing Wisely recommendation joined many previous guidelines in discouraging the use of sliding scale insulin (SSI) for long-term DM management in the NH.[30] Finally, as a descriptive observational study, we are unable to establish causality between GLM use and FS monitoring.

In summary, we found that FS glucose monitoring in NH residents recently discharged from the hospital occurs more frequently than generally recommended by guidelines. The high frequency of FS monitoring appears to be due to the high proportion of NH residents receiving short-acting insulin as well as the frequent monitoring in NH residents receiving oral GLMs. Given the uncertain clinical benefits and potential for patient burdens and harms, future research should explore whether FS frequency can be safely decreased in NH residents with T2DM.

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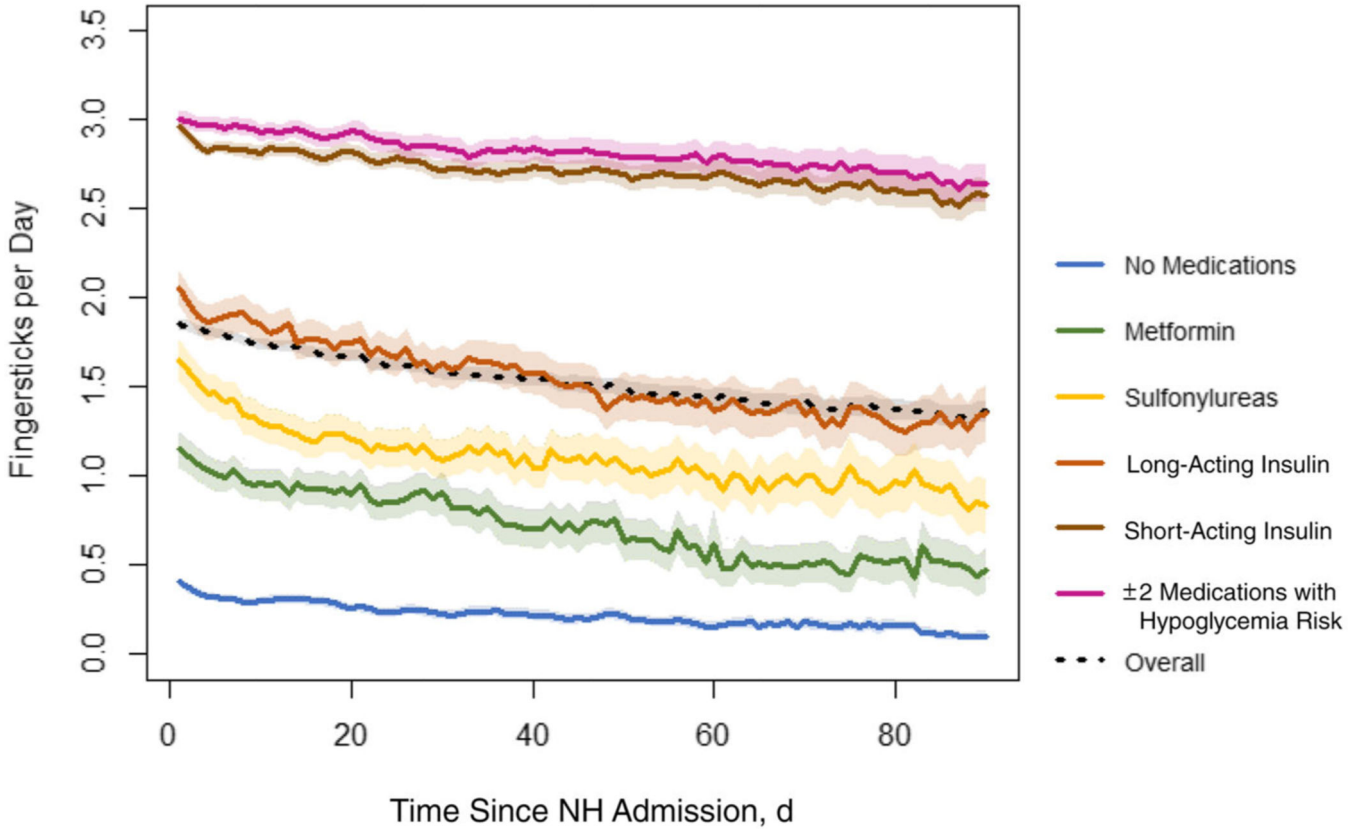

Figure 1.

Average number of fingersticks per day by medication category in Veterans Affairs nursing home (NH) residents with diabetes mellitus, type II. Shaded bands represent 95% confidence intervals.

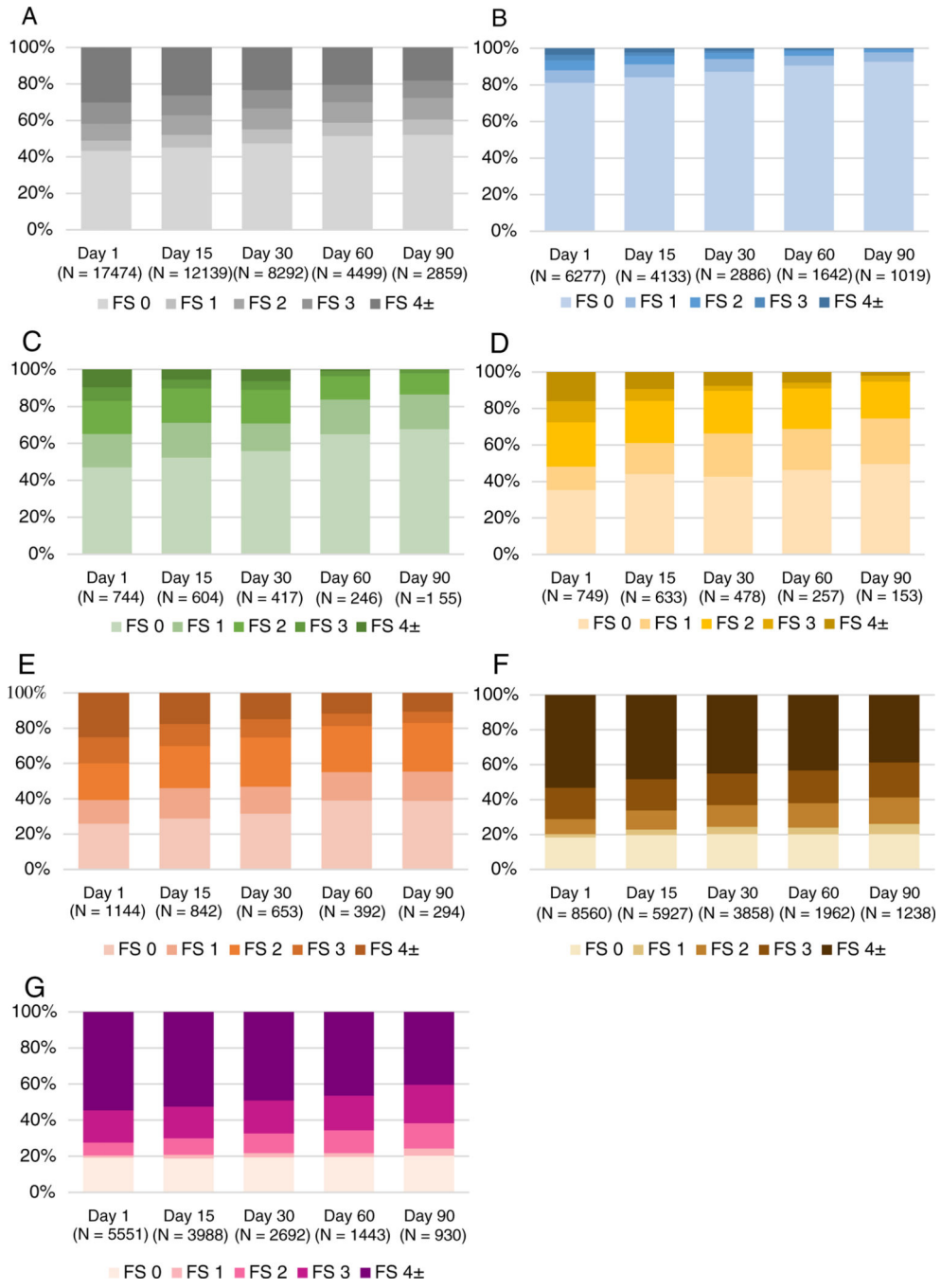

Figure 2.

Number of fingersticks (FSs) per day by medication category in nursing home residents with diabetes mellitus, type II. (A) Overall. (B) No medication. (C) Metformin. (D) Sulfonylureas. (E) Long-acting insulin. (F) Short-acting insulin. (G) Two or more hypoglycemia risk medications. For example, the “FS 0” bar represents the proportion of nursing home residents who received no FS measurements on that day.

Table 1.

Baseline Characteristics of Veterans Affairs NH Residents with Diabetes Mellitus, Type II

Patient characteristics[a]	All patients (N = 17,474)	Medication categories[b]					*P* Value
		No GLMs (n = 6,277)	Metformin only (n = 744)	Sulfonylureas (n = 749)	Long-acting insulin[c] (n = 1,144)	Short-acting insulin (n = 8,560)	
Age, mean (SD), y	76 (8)	77 (9)	74 (7)	76 (8)	75 (8)	75 (8)	<.001
Male sex, %	98	98	99	97	99	99	.01
Race/ethnicity, %							
White	77	75	81	81	76	78	<.001
Black	18	20	13	14	17	17	
Other	5	5	6	5	7	5	
Diagnoses, %							
Congestive heart failure	37	37	22	32	40	39	<.001
Hypertension	89	86	89	89	90	90	<.001
Chronic kidney disease	39	38	9	32	46	42	<.001
Chronic pulmonary disease	36	39	32	34	34	34	<.001
Cancer	38	46	31	30	34	33	<.001
Dementia	20	24	19	18	20	17	<.001
Hemoglobin A1c test within 90 d before or after NH admission, %	57	33	57	68	73	71	<.001
Hemoglobin A1c test, mean (SD), %	7.6 (1.5)	6.9 (1.0)	6.9 (0.9)	7.3 (1.1)	7.9 (1.6)	7.9 (1.6)	<.001
LOS in hospital before NH, median (IQR), d	8 (5–14)	8 (5–14)	6 (4–12)	6 (4–11)	9 (5–17)	8 (5–15)	<.001
LOS in NH, median (IQR), d	28 (12–62)	23 (9–54)	26 (12–57)	28 (13–69)	32 (15–70)	31 (14–67)	<.001

Abbreviations: GLM, glucose-lowering medication; IQR, interquartile range; LOS, length of stay; NH, nursing home; SD, standard deviation.

[a]Missing data: six had missing age and sex data.

[b]Medication categories on each day are mutually exclusive and hierarchical, with the highest hypoglycemia risk medication determining the category for each NH resident. For example, a NH resident on metformin and sulfonylureas on the same day would be included in the sulfonylureas category for that day. This table presents baseline data on NH day 1.

[c]Long-acting insulin includes intermediate insulin (i.e., neutral protamine Hagedorn).

Table 2.

Baseline Combinations of Medications Used by Medication Categories in Veterans Affairs Nursing Home Residents with Diabetes Mellitus, Type II

Variable	No GLMs (n = 6,277)	Metformin only (n = 744)	Sulfonylureas (n = 749)	Long-acting insulin (n = 1,144)	Short-acting insulin (n = 8,560)
No other medications	6,277 (100)	744 (100)	475 (63)	911 (80)	2,651 (31)
Metformin			274 (37)	144 (12)	447 (5)
Sulfonylureas				54 (5)	523 (6)
Metformin + sulfonylureas				35 (3)	199 (2)
Long-acting insulin					4,091 (48)
Metformin + long-acting insulin					397 (5)
Sulfonylureas + long-acting insulin					174 (2)
Metformin + sulfonylureas + long-acting insulin					78 (1)
≥2 Medications with hypoglycemia risk				89 (8)	5,462 (64)
Residents at day 30 (% compared with baseline)	2,886 (46)	417 (56)	478 (64)	653 (57)	3,858 (45)

Note: All numbers in the table are number (percentage).

Abbreviation: GLM, glucose-lowering medication.

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