Racial and Ethnic Disparities in Time to Cure of Incontinence Present at Nursing Home Admission

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Abstract

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As many as half of older people that are admitted to nursing homes (NHs) are incontinent of urine and/or feces. Not much is known about the rate of cure of incontinence present at NH admission, but available reports suggest the rate is low. There have been racial and ethnic disparities in incontinence treatment, but the role of disparities in the cure of incontinence is understudied. Using the Peters-Belson method and multilevel predictors, our findings showed that there were disparities in the time to cure of incontinence for Hispanic NH admissions. A significantly smaller proportion of older Hispanic admissions were observed to have their incontinence cured and cured later than expected had they been White non-Hispanic. Reducing disparities in incontinence cure will improve health outcomes of Hispanic NH admissions. Significant predictors in our model suggest strategies to reduce the disparity including attention to managing fecal incontinence and incontinence in those with cognitive impairment, improving residents' functional status, and increasing resources to NHs admitting older Hispanics with incontinence to develop innovative and cost effective ways to provide equitable quality care.

Keywords

Disparities; Incontinence; Nursing Homes

Cover Page Footnote

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ABSTRACT

As many as half of older people that are admitted to nursing homes (NHs) are incontinent of urine and/or feces. Not much is known about the rate of cure of incontinence present at NH admission, but available reports suggest the rate is low. There have been racial and ethnic disparities in incontinence treatment, but the role of disparities in the cure of incontinence is understudied. Using the Peters-Belson method and multilevel predictors, our findings showed that there were disparities in the time to cure of incontinence for Hispanic NH admissions. A significantly smaller proportion of older Hispanic admissions were observed to have their incontinence cured and cured later than expected had they been White non-Hispanic. Reducing disparities in incontinence cure will improve health outcomes of Hispanic NH admissions. Significant predictors in our model suggest strategies to reduce the disparity including attention to managing fecal incontinence and incontinence in those with cognitive impairment, improving residents' functional status, and increasing resources to NHs admitting older Hispanics with incontinence to develop innovative and cost effective ways to provide equitable quality care.

Keywords: Incontinence, Health Disparities, Nursing Homes

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Donna Z. Bliss, et.al

INTRODUCTION

Incontinence is a major health problem of older adults admitted to nursing homes (NHs), and cure of incontinence continues to be largely elusive. We recently reported that the prevalence of any incontinence in a national sample of for-profit NHs differed by the race and ethnicity of admissions (Bliss et al., 2013). Overall, 49% of 111,640 admissions had some type of incontinence, and Asians/Pacific Islanders (APIs), Blacks, and Hispanics had a 10%-20% higher prevalence of incontinence compared to Whites and American Indians/Alaskan Natives (AIANs). Cure of incontinence, which can be accomplished with assistance of medications, behavioral therapies, or toileting help, or independently (Fonda & Abrams, 2006), is an important but challenging objective of NH care. A study of NHs in upstate New York reported that only 6% of 200 residents that developed bladder/urinary incontinence (referred to as urinary incontinence) after admission were cured, i.e., achieved continence, at 12 weeks after onset of urinary incontinence (Watson, Brink, Zimmer, & Mayer, 2003).

Racial and ethnic disparities have been reported in incontinence treatment but are understudied as potential factors influencing cure of incontinence. In one study of residents in NHs, a smaller percentage of Black residents with urinary incontinence had a toileting plan in place (20%) compared to residents of all other races combined (26%) (Jones, Sonnenfeld, & Harris-Kojetin, 2009). Although use of medications for treating urinary incontinence is low in the NH population, with only 7%-8% of residents with urinary incontinence documented in their health assessment record receiving drug treatment (Jumadilova, Zyczynski, Paul, & Narayanan, 2005; Narayanan, Cerulli, Kahler, & Ouslander, 2007), being White was associated with a greater likelihood of receiving medication for urinary incontinence (Narayanan et al., 2007).

Most research on incontinence treatment assesses the outcome of a specific treatment developed for that study, and treatments have been wide-ranging. The most common treatment protocols tend to be composite programs that include multiple treatment strategies; examples include increased physical activity, diet change, and prompted voiding (Schnelle et al., 2010) or Kegel exercises with bladder training (Aslan, Komurcu, Beji, & Yalcin, 2008). The variety of treatments studied is probably related to the extensive array of risk factors associated with urinary incontinence and/or bowel/fecal incontinence (referred to as fecal incontinence) and their effectiveness has been reviewed by others (Fink, Taylor, Tacklind, Rutks, & Wilt, 2008; Flanagan, 2012). Studies that examine overall cure of incontinence present at NH admission are rare, and, to our knowledge, none have investigated racial and ethnic disparities in this outcome. The purpose of this study was to investigate whether there were racial or ethnic disparities in the time to cure of incontinence that was present at NH admission.

METHODS

Design and Data Files

The study had a prospective cohort design. Three national data sets were linked and analyzed: (1) the Minimum Dataset (MDS) version 2.0 containing demographic and comprehensive health assessment data of individual residents of a national for-profit chain of NHs; (2) the Online Survey, Certification, and Reporting (OSCAR) containing measures of NH staffing, quality of care, and the care environment, both from years 2000-2002; and (3) the 2000 U.S. Census containing socioeconomic and socio-demographic measures of the Census tract of the community surrounding the NHs. The Minnesota Population Center at the University of Minnesota in Minneapolis, MN, identified the census tracts of the NHs. The study was reviewed

by the Institutional Review Board of the University of Minnesota and was exempt because data were de-identified.

Cohorts, Outcomes, and Predictors

The cohort for analyzing disparities in time to cure of incontinence that was present on NH admission included older adults (aged 65 years or greater) with urinary, fecal, or dual incontinence (urinary and fecal incontinence on the same MDS) on their first full/admission MDS record. Incontinence was defined as being incontinent, frequently incontinent, or occasionally incontinent per the MDS form. Time to cure of incontinence was determined by date of the first MDS record after the admission MDS that reported the resident as being continent or usually continent. For residents with dual incontinence at admission, the criteria for continence cure needed to be met for both urinary and fecal incontinence. Individuals were excluded if their admission or last observed MDS record indicated that they had an indwelling urinary catheter or an ostomy. Individuals with an indwelling urinary catheter were excluded because they were considered continent according to the guidance manual for the MDS v.2.0 (Centers for Medicare and Medicaid Services, 2008) and our interest was in achieving continence without use of indwelling catheterization. The MDS manual does not explain how to classify continence when an ostomy is present, but since a rationale similar to that used for an indwelling catheter could be adopted, individuals with an ostomy were also excluded. Race and ethnicity groups were defined according to MDS classifications: American Indian and Native Alaskan (AIAN), Asian and Pacific Islander (API), Black non-Hispanic (Black), White non-Hispanic (White) and Hispanic.

Each resident's MDS records were followed until the date of the MDS with the incident incontinence cure was identified or their last observed MDS record, whichever came first. Relevant predictors of incontinence cure were identified using the literature and expertise of the investigators and clinical consultants. Potential predictors at the individual level were defined using single items of the data records and established scales with good psychometric properties as multiple items on a record are often related to the same concept Where there was no scale or a single item was deemed insufficient, composite measures were developed following previously established procedures (Savik, Fan, Bliss, & Harms, 2005) and consultation with clinical experts. In addition to the variables listed in Tables 1-3, the following were screened for inclusion in a model: having any plegias or pareses (MDS item I1v-z), being bedfast or transfer dependent (G6a, G6d), any acute condition (Jb5), having a bowel problem (I2b, H2b-d), and number of indicators of oxygenation problems (J1b, J1k-l, P1ag, P1ai-j, P1a1, P1bdA), perfusion problems (J1a, J1c-d, J1g) or vision problems (D1, D2a-b). Variables were screened for inclusion using bivariate associations with an outcome and those with an association at $p < .05$ were considered model candidates. Bivariate associations between variables were also performed to check for collinearity. If an individual level and NH/community level variable were highly correlated, the individual level variable was included in the model due to its greater specificity.

Potential NH and community level predictors were similarly screened for inclusion in the models. NH level predictors included proportions of residents receiving Medicaid, NH quality deficiencies, staffing, and percentages of admissions with characteristics of interest, such as gender and race. Composite predictor variables for NH quality deficiencies were constructed in four areas (resident behavior-facility, practices-dignity, quality of care, and resident assessment-nursing services) by summarizing the scope and severity levels of the respective deficiencies for a NH. Additionally, the total number of these deficiencies by NH comprised a fifth composite

variable. Composite predictor variables for all NH staff (e.g., certified nursing assistants/medication aides (CNA), licensed nurses (LN, including registered nurse (RN) and licensed practical nurse (LPN)), physician/extender, therapists (physical, occupational), etc.) were developed and screened for inclusion in the models. Staffing full time equivalents per resident were calculated by dividing the total of the type of staff reported for a two-week period (including full-time, part-time and contract positions) by the total number of residents in a NH.

The socioeconomic and socio-demographic of the US Census tract surrounding each NH were described using seven Census level variables in their original form and 16 variables that were converted into fractions of the Census tract population. Tables 4-5 describe key predictors at the NH and community levels. Community socioeconomic and socio-demographic variables not listed in Tables 4-5 that were assessed for inclusion in the models were: proportion of males or females aged <65 years old and 65^{+} years in the tract, proportion of tract population in an urban cluster, proportion of tract population with 1-8 years or 9-16 years of education, proportion of tract population at <50%, 50-99% or ≥100% of poverty, median home value, and poverty rank of the tract population.

The model for time to incontinence cure in White non-Hispanic admissions, from which disparities for the minority groups were estimated, included the following predictors: scores for deficits in activities of daily living and cognition, age, comorbidity index, gender, having any fecal incontinence (with or without urinary incontinence), receiving behavioral treatment for incontinence (i.e., toileting, bladder training) at admission, percentage of NH residents that were on Medicaid, proportion of NH admissions that were White non-Hispanic, proportion of the Census tract around a NH that was below poverty level or in an urban area, and the Census division in which a NH was located.

Statistical Analysis

Data were summarized using descriptive statistics appropriate to their level, but differences were not formally tested for significance as the very large sample size renders even the smallest differences as statistically significant; hence no p-values were generated. Health disparities were analyzed using the Peters-Belson method (Eberly et al., 2013; Rao, Graubard, Breen, & Gastwirth, 2004). The Peters-Belson method tests whether observed outcomes of a disadvantaged group (presumed to be racial-ethnic minority NH admissions in this study) differ from their predicted outcomes based on a regression model of outcomes for an advantaged group (presumed to be White non-Hispanic NH admissions in this study). The Peters-Belson method is a two-stage approach in which outcomes for a group of minority admissions are first predicted based on the regression model for White non-Hispanic admissions and then compared to their own observed outcomes. Each of the racial and ethnic groups was analyzed separately. Because the cohort is clustered within NHs, we controlled for unmeasured NH effects by insuring that residents of each racial and ethnic minority of interest were in the same NHs as White non-Hispanics whose modeling coefficients were applied to their group; these are hence referred to as mixed race NHs.

For time to incontinence cure, data for each group of White non-Hispanic residents were analyzed using proportional hazards regression including individual and NH/community level factors. The estimated regression coefficients (beta weights) from the White non-Hispanic model were applied to each minority group to calculate predicted time to incontinence cure. For visual comparison, Kaplan-Meier curves for each minority group's predicted and observed time to

incontinence cure were plotted together. These two survival curves were compared using a one-sample two-sided log-rank test (Eberly et al., 2013).

When the log-rank statistic using predictors at the individual and NH/community predictors was significant, this was defined as a significant disparity based on race or ethnicity. There is no racial-ethnic disparity when the difference between the observed and expected outcome is not significant or when the minority group has a better than expected outcome. Overall disparity is the difference in the observed proportion between minority vs. White non-Hispanic admissions that developed an outcome. The percent of disparity explained by predictors in the model is calculated as ((Expected proportion of minority group-Observed proportion of White non-Hispanics)/(Observed proportion of minority group-Observed proportion of White non-Hispanics))*100 (Rao et al., 2004).

For ease of explaining the graphs, Figure 1 shows the observed and predicted proportion of admissions that were cured of incontinence over time. For each minority group, proportions of residents that were observed and expected to be cured of incontinence and the proportion of White non-Hispanics observed to be cured were calculated at selected time points over the follow-up time (Table 3). All steps of the Peters-Belson analysis were performed using R 2.14. Data management and descriptive statistics of the racial and ethnic groups' characteristics and the NHs and their Census tracts were conducted using SAS 9.2 (SAS Institute Inc., Cary, NC, USA) and SPSS v. 18 (SPSS, Chicago, IL). Final results were considered significant at the $p < .05$ level.

RESULTS

Characteristics of the Cohort

The characteristics of each racial and ethnic group of NH admissions in our cohort (n = 28,119), which was followed for cure of incontinence, are presented in Tables 1-3. In an earlier study, we showed that the characteristics of older adults admitted to NHs analyzed in this study are comparable to those of admitted to all Medicare or Medicaid certified NHs in the US in the same time period (Bliss et al., 2013). The percentage of admissions that was female ranged from 58%-67% and slightly higher among Blacks and White Non-Hispanics (Table 1). The average age of admissions was approximately 80 years with APIs and Whites among the oldest. Greater percentages of White non-Hispanic and API admissions had a high school education. Regarding function and physical health, deficits in ADLs seemed similar across racial and ethnic groups (Table 2). APIs had a higher risk for mortality compared to other groups. White non-Hispanics took more medications. Nutrition problems were present in nearly 40% of admissions. APIs, who had the lowest BMIs, were more likely to be tube-fed. Pressure ulcers were least common among White non-Hispanic admissions. Use of restraints was relatively low overall (<10% of admissions) with slightly higher use among API and Black admissions.

Having any urinary incontinence (with or without fecal incontinence) was similar among racial and ethnic groups at admission while having any fecal incontinence was slightly higher among Black and Hispanic admissions. Higher percentages of APIs (65%) and Hispanics (51%) received behavioral therapy for incontinence at admission compared to AIANs (37%), White non-Hispanics (36%), and Blacks (20%).

Table 1. Demographic Characteristics by Race and Ethnicity of Older Nursing Home Admissions followed for Cure of Incontinence

Variable	MDS Item	American Indian, Alaskan Native	Asian, Pacific Islander	Black	Hispanic	White Non-Hispanic
Admissions[a]		n = 135	n = 749	n = 3,332	n = 495	n = 23,408
n (%) of admissions (unless indicated otherwise)						
Demographics						
Age at Admission (mean(sd))	AA3, AB1	79.52 (8.47)	84.00 (7.00)	81.29 (8.25)	81.12 (7.94)	83.13 (7.40)
Gender - Female	AA2	83 (61.5)	437 (58.3)	2,129 (63.9)	290 (58.6)	15,620 (66.7)
≥ High School Education	AB7	41 (30.4)	365 (48.7)	1,080 (32.4)	138 (27.9)	14,250 (60.9)

[a]Race data were missing for 1 admission

Table 2. Functional and Physical Status by Race and Ethnicity of Older Nursing Home Admissions followed for Cure of Incontinence

Variable *Scale/Measure*	MDS Item Range of Score	American Indian, Alaskan Native	Asian, Pacific Islander	Black	Hispanic	White Non-Hispanic
Admissions[a]		n = 135	n = 749	n = 3,332	n = 495	n = 23,408
n (%) of admissions (unless indicated otherwise)						
Functional and Physical Status						
Activities of Daily Living Scale score (Morris, Fries, & Morris, 1999) (mean(sd))	G1a-bA, G1eA, G1g-jA range 0 – 28	18.50 (6.43)	20.28 (4.78)	19.84 (6.22)	19.48 (6.24)	18.14 (6.13)
Body Mass Index (mean (sd))	K2a, K2b	25.05 (4.81)	22.51 (3.61)	25.13 (5.19)	25.04 (4.79)	24.88 (4.87)
Comorbidities *Charlson Index* (Charlson, Pompei, Ales, & MacKenzie, 1987) (mean(sd))	I3a-e and/or I1 range 0 – 30	2.39 (1.66)	2.38 (1.74)	2.44 (1.69)	2.68 (1.76)	2.01 (1.57)
Incontinence--Any Fecal Incontinence (with or without	H1a	103 (76.3)	576 (76.9)	2,807 (84.2)	398 (80.4)	16,247 (69.4)

urinary incontinence)						
Incontinence--Any Urinary Incontinence (with or without fecal incontinence)	H1b	124 (91.9)	729 (97.3)	3,249 (97.5)	484 (97.8)	22,696 (97.0)
Number of Medications (mean(sd))	O4a-e range 0 - 35	5.25 (5.92)	2.90 (4.30)	5.02 (5.56)	5.45 (6.01)	6.93 (6.16)
Mortality risk *CHESS Scale* score (Hirdes, Frijters, & Teare, 2003) (mean(sd))	J1c, J1g, J1l, J1o, K3a, K4c, J5c, B6, G9 range 0 – 5	1.37 (1.09)	2.27 (1.00)	1.62 (1.08)	1.50 (1.07)	1.87 (1.10)
Pads/Briefs *Any use*	H3g	126 (93.3)	711 (94.9)	3,090 (92.7)	460 (92.9)	21,132 (90.3)
Poor Nutrition *Number of Indicators*	K3a, K4c					
1		51 (37.8)	368 (49.1)	1,343 (40.3)	210 (42.4)	11,337 (48.4)
2		10 (7.4)	84 (11.2)	185 (5.6)	32 (6.5)	1,987 (8.5)
Pressure Ulcer *Any Stage 2, 3, or 4*	M2a	16 (11.9)	129 (17.2)	677 (20.3)	89 (18)	3,214 (13.7)
Restraints-*Any Use*	P4c-e	10 (7.4)	72 (9.6)	218 (6.5)	44 (8.9)	1,487 (6.4)
Tube Feeding	K5b	11 (8.1)	88 (11.7)	327 (9.8)	63 (12.7)	1,083 (4.6)

[a]Race data were missing for 1 admission

In terms of cognitive and emotional status, cognitive deficits measured by the MDS-COGS scale (Hartmaier et al., 1994) were similar among racial and ethnic groups while more severe delirium was found among API and White non-Hispanic admissions (Table 3). More AIAN and White non-Hispanic admissions had depressive symptoms. White non-Hispanics and Blacks had fewer communication difficulties than the other groups.

Table 3. Cognitive and Emotional Characteristics by Race and Ethnicity of Older Nursing Home Admissions followed for Cure of Incontinence

Variable *Scale/Measure*	MDS Item Range of Score	American Indian, Alaskan Native	Asian, Pacific Islander	Black	Hispanic	White Non-Hispanic
Admissions[a]		n = 135	n = 749	n = 3,332	n = 495	n=23,408
n (%) of admissions (unless indicated otherwise)						
Cognitive and Emotional Status						
Cognition *MDS-COGS* score (Hartmaier, Sloane, Guess, & Koch, 1994) (mean(sd))	B2a-b, B3b, B3d-e, B4, C4, G1gA range 0 - 10	4.70 (3.03)	4.61 (2.47)	4.79 (2.84)	4.91 (2.95)	4.40 (2.91)
Communication difficulty score (adapted from Hopper, Bayles, Harris, & Holland, 2001) (mean(sd))	C1, C5, C6, C3b-f range 0 – 9	2.13 (1.81)	2.64 (1.79)	1.65 (1.66)	2.02 (1.80)	1.67 (1.63)
Delirium *MDS-CAM* (Dosa, Intrator, McNicoll, Cang, & Teno, 2007)	B1, B5a–f, B6, E3, E5					
Sub-syndromal delirium level 1		25 (18.5)	152 (20.3)	524 (15.7)	77 (15.6)	4,050 (17.3)
Sub-syndromal delirium level 2		19 (14.1)	167 (22.3)	320 (9.6)	39 (7.9)	3,008 (12.9)
Full delirium		1 (0.7)	10 (1.3)	21 (0.6)	3 (0.6)	300 (1.3)
Depression *Any indicator from MDS Depression Scale* (Burrows, Morris, Simon, Hirdes, & Phillips, 2000)	E1a, E1d, E1f, E1h, E1i, E1l-m	45 (33.3)	90 (12)	722 (21.7)	107 (21.6)	7,100 (30.3)

[a]Race data were missing for 1 admission

Characteristics of the NHs and Surrounding Communities

Residents were located in 444 NHs in 27 states in 9 Census Divisions. Staffing of the NHs by licensed nurses was 1.10 (0.51) hrs/resident/d (mean (sd)) while CNA staffing was approximately twice that. The average number of deficiencies per NH was fairly low (Table 4). Approximately three-quarters of residents in the NHs were on Medicaid. The majority of NHs

(71%) was located in a community whose population was mostly White non-Hispanic, and 6% of the NHs were in communities whose populations were 25%-50% Hispanic (Table 5).

Table 4. Characteristics of Nursing Homes

	Licensed Nurses (FTE[a]/ resident)	Licensed Nurses (hours/ resident/d)	CNA[b] (FTE/ resident)	CNA (hours/ resident /d)	Number of Deficiencies[c]	Quality of Care Index[d]	% of Residents on Medicaid
Mean (sd)	0.22 (0.10)	1.10 (0.51)	0.44 (0.43)	2.20 (2.14)	3.82 (2.34)	7.69 (6.30)	73.93 (15.50)

[a]Full time equivalent
[b]Certified Nursing Assistant
[c]Selected deficiencies related to outcome of interest
[d]Scope and severity of selected quality of care deficiencies relevant to outcome

The majority of NHs (92%) was in a community that had < 25% of their population below the poverty level (Table 5). About half of the NHs were in a community that was mostly urban, and the average median household income in Census tracts around the NHs was modest ($25,000 to <$50,000/yr).

Table 5. Characteristics of Communities Surrounding Nursing Homes

Level (%) of community characteristic	< 25%	25 to < 50%	50 to < 75%	≥ 75%
	n (%) of Nursing Homes			
Census Tract Community Characteristic				
% American Indians, Asians, Pacific Islanders[a]	433 (97.5)[b]	9 (2.0)	0	2 (0.5)
% Black non-Hispanics	386 (86.9)	34 (7.7)	17 (3.8)	7 (1.6)
% Hispanics	405 (91.2)	28 (6.3)	8 (1.8)	3 (0.7)
% White non-Hispanics	16 (3.6)	41 (9.2)	74 (16.7)	313 (70.5)
% of tract below poverty level	408 (91.9)	34 (7.7)	2 (0.5)	0
% working class	2 (0.5)	46 (10.4)	336 (75.7)	60 (13.5)
% tract residing in an urban area	209 (47.1)	1 (0.2)	13 (2.9)	221 (49.8)
% tract residing in a rural area	341 (76.8)	36 (8.1)	9 (2.0)	58 (13.1)
Level of community characteristic	< $25,000	$25,000 to < $50,000	$50,000 to < $75,000	≥ $75,000
	n (%) of Nursing Homes			
Median household income	40 (9.0)	326 (73.4)	63 (14.2)	15 (3.4)

[a]Racial and ethnic categories are according to US Census
[b]For example, 433 (97.5%) of the 444 NHs in our sample were located in Census tracts that had a community population with <25% American Indian, Asian, or Pacific Islanders.

Disparities in Time to Cure of Incontinence

Overall 22.3% of older individuals were cured of incontinence after NH admission. There was a significant disparity in time to cure of incontinence in Hispanic admissions. A smaller

proportion of Hispanics was observed to be cured of incontinence and cured later than expected had they been White non-Hispanic. The disparity is illustrated in Figure 1: the observed proportion of Hispanics that were cured of incontinence, represented by the solid line, was substantially lower than the proportion of Hispanics expected to be cured of incontinence had they been White non-Hispanic, represented by the dotted line. The total disparity, which is the difference between the proportion of Hispanics observed to be cured of incontinence and the proportion of White non-Hispanics cured, is shown in Figure 1 by the gap between the solid line and the dashed-dotted line. The percentage of the total disparity unexplained by the available predictors is shown by the space between the dotted line, representing the proportion of Hispanics expected to be cured of incontinence, and the solid line, representing the Hispanics actually cured. Figure 1 also shows that the proportion of Hispanics expected to be cured of incontinence (dotted line) was lower than the proportion of White non-Hispanics observed to be cured (dashed-dotted line).

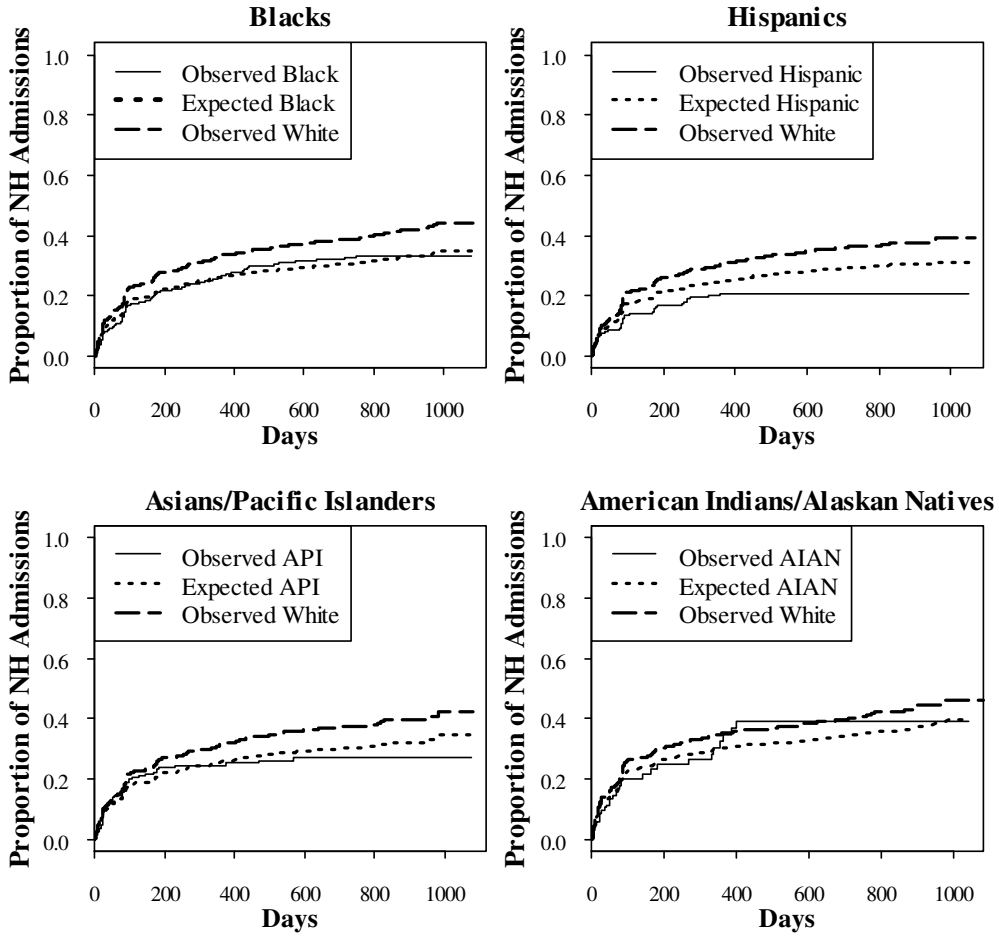

Figure 1. Curves of time to cure of incontinence after nursing home admission are shown. The proportion of Hispanic admissions (solid line) observed to be cured of incontinence was lower and later than the proportion Hispanic admissions that were expected to be cured (dotted line) ($p = 0.003$). There was no

significant difference in the observed versus expected proportion of American Indians, Alaskan Native (p = .39), Asians, Pacific Islanders (p = 0.63), or Blacks (p = 0.58) that were cured of incontinence over time. The proportion of White non-Hispanic residents in the mixed race nursing homes observed to be cured of incontinence is also shown (dashed dotted line). Analyses adjusted for individual and nursing home/community predictors.

Table 6 shows percentages of minority groups that were expected and observed to be cured of incontinence and the percentage of White non-Hispanics observed to be cured of incontinence at selected time points of follow-up. The overall disparity in time to incontinence cure between Hispanic and White non-Hispanic admissions was approximately 7.1% at 3 months and increased over time, reaching 13.4% at 18 months. Predictors for faster time to incontinence cure that were significant in White non-Hispanics in mixed NHs with Hispanics and used in determining the disparity for Hispanics were fewer deficits in activities of daily living and cognitive functioning, having only urinary incontinence (vs. fecal or dual incontinence), and a lower percentage of the community surrounding the NH below poverty level or in an urban area (Table 7). Predictors in the model explained more than half (54%-66%) of the disparity in time to incontinence cure seen for Hispanics (Table 6).

Table 6. Percentage of Older Adults by Race and Ethnicity Cured of Incontinence at Selected Times after Nursing Home Admissions

Minority Group	Months after Admission	Expected % of Minority Group Cured of Incontinence	Observed % of Minority Group Cured of Incontinence	Observed % of White Non-Hispanics Cured of Incontinence	Total % Disparity and % of Disparity Explained by Predictors[a]
Hispanic	3	15.6	12.3	19.4	3.3, 54.1
	6	19.9	16.4	25.0	3.5, 59.3
	12	23.9	20.6	30.4	3.0, 66.1
	18	26.6	20.6	34.0	6.0, 55.5
AIAN[b]	3	21.4	19.2	24.6	
	6	25.8	23.9	30.3	
	12	29.7	33.8	35.1	
	18	31.6	38.1	37.2	
API[c]	3	14.8	19.1	20.2	
	6	18.9	23.3	25.9	
	12	23.2	24.6	31.3	
	18	25.8	25.9	35.5	
Black	3	15.6	15.7	21.0	
	6	20.0	21.0	27.2	
	12	24.2	26.0	33.0	
	18	26.6	30.6	36.4	

[a]((Expected proportion of minority group-Observed proportion of White non-Hispanics)/ (Observed proportion of minority group-Observed proportion of White non-Hispanics))*100
[b]American Indian, Alaskan Native
[c]Asian, Pacific Islander

Table 7. Significant Predictors of Time to Cure of Any Incontinence for White Non-Hispanic Admissions in Mixed Race Nursing Homes Used to Model Disparities in Hispanics

Hazard Ratio (95% CI)	Individual Level Predictors			Community Level Predictors	
	Activities of Daily Living Deficits	Cognitive deficits	Any Fecal Incontinence	Proportion of community around nursing home below poverty level	Proportion of community around nursing home in an urban area
White Non-Hispanics in Nursing Homes with Hispanics	0.95 (0.94, 0.96)	0.84 (0.82, 0.86)	0.62 (0.55, 0.69)	0.99 (0.98, 1.00)	0.72 (0.63, 0.83)

[a]significant at $p < .05$

Cure in other minority admissions

There was no significant disparity in time to incontinence cure disadvantaging API, AIAN, and Black admissions. In Figure 1, the curves that represent the proportion of admissions of the other minority groups that were observed to be cured of incontinence (solid line) were not different than those representing the proportion that was expected be cured (dotted line).

DISCUSSION

Managing incontinence is often difficult for older individuals living at home and their families and, therefore, is a common reason for seeking NH care (Armstrong, 2000; Friedman, Steinwachs, Rathouz, Burton, & Mukamel, 2005; Holroyd Leduc, Mehta, & Covinsky, 2004). Cure of incontinence is not typically reported by NHs, and studies are scarce. In this study, the overall cure of incontinence at NH admission was 22%, considerably higher than the 6% reported for new incontinence that developed during NH stay (Watson et al. 2003). Our results show, however, that there were disparities in incontinence cure for older Hispanic admissions -- fewer Hispanics had their incontinence cured and did so at a later time after admission than expected. No disparity was found in the time to cure of incontinence for the other racial and ethnic groups investigated.

Our Peters-Belson method provided a very intuitive understanding of the Hispanic-White non-Hispanic comparison in incontinence cure. When we predict, based on the White non-Hispanic cure model, using the characteristics of the Hispanics, it is as if we are examining a hypothetical population of White non-Hispanics who have exactly the same characteristics and care environments as the Hispanics. When we then compared that hypothetical population's predicted outcomes to the observed Hispanic outcomes, we saw that the Hispanics are in fact doing worse in incontinence cure, given those clinical characteristics and care environments. An advantage of the Peters-Belson method used in this analysis is quantification of the percentage of the observed group disparity that is explained and unexplained by the available predictors (Eberly et al., 2013; Rao et al., 2004). In this study, the explained disparity estimates how close

the outcomes of Hispanic admissions are to White non-Hispanic outcomes "as if the Hispanics were White non-Hispanic," i.e., had the same predictor-outcome associations as White non-Hispanics. The predictors in the model of time to incontinence cure explained between 54% and 66% of the disparity for Hispanics. Significant predictors at the individual resident level suggest that time to incontinence cure for Hispanics might be decreased by attention to managing fecal incontinence and incontinence in those with cognitive deficits and improving ADL function from the point of admission. Descriptors of the health status of Hispanics at NH admission showed that the presence of any FI and the extent of their cognitive and functional deficits were higher than in White non-Hispanics, indicating a greater need for care.

The finding that community level predictors for disparities in incontinence cure were location of a NH in a tract with higher poverty and urban location suggest that NHs admitting Hispanics may have inadequate quality of care and resources to effectively manage this problem. Fennell et al. (2010) showed that older Hispanics tend to be in "lower tier" NHs that provide poorer care quality and are under-resourced (Mor, Zinn, Angelelli, Teno, & Miller, 2004). Disparity in time to cure of incontinence among Hispanics illustrates a poor health outcome that can result from this difference in care quality. Although our quality of care variable, which was based on the scope and severity of selected care deficiencies, and the percentage of residents on Medicare, which reflects revenue available to NHs, was not significant independent predictors in our model, Fennell et al. (2010) used a broader, more comprehensive definition of care quality. Therefore, increasing resources to NHs admitting older Hispanics with incontinence to develop innovative and cost effective ways to improve quality of care directed at reducing the disparity in achieving continence may be another strategy.

The unexplained disparity in time to incontinence cure represents factors that may be missing from the model or have a differential effect for the minority group (Eberly et al., 2013). Discriminatory practices are also a possibility (Graubard, Sowmya Rao, & Gastwirth, 2005; Rao et al., 2004). Smith (2002) proposed that healthcare systems, organizations, and providers contribute to disparities in treatment, variables which were not part of our model. Smith (2002) and others (Chin et al., 2012) recommended that greater transparency in performance outcomes by race, such as the results of this study offer, are critical to reverse inequalities. Other key recommendations for eliminating healthcare disparities by organizations and their providers, including those for treatment outcomes, are organizational commitment to change and accountability. Beyond training individual staff in cultural competency, creating and sustaining a culture of equity in care and quality improvement in NHs are essential recommendations (Chin et al., 2012). Smith (2002) also observed that in systems with more centralized accountability and universal healthcare coverage, as is being implemented in the Affordable Care Act (US Department of Health & Human Services), disparities in healthcare outcomes and access are considerably lower.

There are limitations of our study. The generalizability of results to non-profit NHs is limited as our data are from for-profit NHs. For-profit NHs comprise 69% of all US NHs (Centers for Medicare & Medicaid Services). The characteristics of our admission cohort seem comparable to those of all US NHs (Bliss et al., 2013) but may not be representative of residents in all NHs. Our models of incontinence cure included incontinence of any type and any treatment. Findings may differ by type of incontinence or if a specific treatment is examined. Not all relevant predictors that could increase the explained disparity may be known or possible to include in our models.

CONCLUSION

This study is among the first to reveal disparities in the time to cure of incontinence among older Hispanic NH residents. Predictors explained more than half of the disparity and identified factors that can be targeted to reduce inequality in the cure of this common problem among NH admissions. The results of this study will be useful to NHs seeking guidance to improve their healthcare outcomes and practices and establish a commitment to equitable care. Recommendations for eliminating disparities and raising quality of care for healthcare organizations include recognizing the problem, implementing infrastructure and interventions for improvement, and benchmarking progress in outcomes, such as incontinence cure, by race and ethnicity.

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