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Prevalence of Pressure Ulcers by Race and Ethnicity for Older People Admitted to Nursing Homes

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Abstract

Little is known about the prevalence of pressure ulcers among racial and ethnic groups of older individuals admitted to nursing homes (NHs). NHs admitting higher percentages of minority individuals may face resource challenges for groups presenting with more pressure ulcers or ones of greater severity. This study examined the prevalence of pressure ulcers (Stages 2-4) among older adults admitted to NHs by race and ethnicity at the individual, NH, and regional levels. Results show that the prevalence of pressure ulcers in Blacks admitted to NHs were greater than that in Hispanics, which were both greater than in Whites. The pressure ulcer rate among Black admissions was 1.7 times higher than Whites. A higher prevalence of pressure ulcers was observed among NHs with a lower percentage of White admissions.

The personal and healthcare costs of pressure ulcers (PUs) are substantial. PUs cause physical pain, emotional distress, and lower quality of life. Treatment of a Stage 4 ulcer averages over \$124,000 per patient (Brem et al., 2010). The prevalence of PUs among nursing home (NH) admissions has been reported to be 10%-33% (Capon, Pavoni, Mastromattei, & Di Lallo, 2007; Baumgarten et al., 2004; Brandeis, Morris, Nash, & Lipsitz, 1990; Kiel, Eichorn, Intrator, Silliman, & Mor, 1994; Sternberg, Spector, Kapp, & Tucker, 1988; Zulkowski, 1998). Due to the difficulty in reliably identifying the least severe Stage 1 PUs (DeFloor & Schoonhoven, 2004), some studies exclude this stage (Baumgarten et al., 2004; Brandeis et al., 1990) or report Stage 1 results separately (Sternberg et al., 1988). PU rates for Stages 2-4 only among NH admissions show less variability and an upper bound that is half the rate including Stage 1 (10-13%) (Baumgarten et al., 2004; Brandeis et al., 1990; Sternberg et al., 1988). In the one study reporting the prevalence of PUs among NH admissions by stage, lower rates (2-3%) were seen in the more severe

Stages 3 and 4 (Brandeis et al., 1990). Residents with at least one Stage 2-4 PU had 1.7 PUs on average (Baumgarten et al., 2004).

Two studies examined differences in PU prevalence of NH admissions by race: one compared White and all Nonwhite races combined (Sternberg et al., 1988) and the other compared Whites and Blacks only (Baumgarten et al., 2004). Both studies found that PU prevalence among minority admissions was approximately twice that of Whites. No studies to our knowledge have compared PU rates across all racial/ethnic categories of NH admissions. Racial/ethnic differences in PU prevalence have been found in cross-sectional groups of NH residents (new admissions as well as long-term residents). Among long-term NH residents who were considered to be at high risk for PUs, there was a higher prevalence of PUs among Blacks compared to their White counterparts (Li, Yin, Cai, Temkin-Greener, & Mukamel, 2011). In five southwestern US states with a large Hispanic population, the prevalence of PUs was greater among Hispanic NH residents than White residents and was associated with NH concentration of Hispanic residents (Gerardo, Teno, & Mor, 2009). These studies show the importance of examining the rate of PUs in the various race/ethnic groups as well as at NH and regional levels for a better understanding of this health problem.

Many individuals admitted to a NH are predicted to return to their homes (Keeler, Kane, & Solomon, 1981). Therefore, recognizing health problems that can be treated and cured, such as PUs, at admission to NHs is critical to increase the likelihood of a return to living in the community. The purpose of this paper is to describe the prevalence of PUs among older adults at the time of their NH admission according to race/ethnicity at three levels of analysis: individual resident, NH, and area of the country (U.S. Census Bureau).

Methods

This study had a cross-sectional observational design. Minimum Data Set (MDS) records v. 2.0 (years 2000-2002) and the 2000 US Census tract data were used. The MDS is a record of the demographic, clinical, and functional status of NH residents; its validity and reliability have been established (Frederiksen, Tariot, & De Jonghe, 1996; Morris et al., 1997). The study cohort included all new admissions 65 years of age to NHs affiliated with the same for-profit chain during the three-year study period. All NHs were Medicare/Medicaid certified. The first full MDS record, the admission assessment, was analyzed. Demographic and clinical characteristics of this study's admission cohort are reported elsewhere and have been shown to be highly similar to the population of admissions (65 years of age) to all Medicare/Medicaid certified NHs in the US during the same time period (Bliss et al., submitted)

MDS records provided demographic information and clinical data regarding the presence and stages of PUs. Race/ethnicity categories on the MDS were American Indian/Alaskan Native; Asian/Pacific Islander; Black, not of Hispanic origin; Hispanic; and White, not of Hispanic origin. NHs were classified according to their percentage of White admissions using previously published categories: < 65% White, 65-84%, 85-94%, and 95% White (Li et al., 2011). Prevalence was measured for three outcomes: (1) PUs Stages 1 to 4 individually as well as for Stages 2-4 together in order to compare findings with those of

other published studies, (2) highest stage of all PUs present, and (3) average number of Stage 2-4 PUs per resident among those with at least one of these PUs. MDS records were de-identified, and the study was granted exempt status by the Institutional Review Board at the investigators' University. The Census tract in which each NH was located was identified by the Minnesota Population Center at the University of Minnesota. For NH and regional analyses, data were summarized according to percentage of White NH admissions and by the nine US Census divisions.

Results

There were 111,640 NH admissions of which the majority were White followed by Blacks, Hispanics, Asians, and American Indians. Females and residents aged 65-74 years were the majority in all race and ethnic groups (Table 1). About one-third of Black, Hispanic, and American Indian admissions had a high school education while almost two-thirds of Whites did. The 457 NHs of the admissions were located in 29 states and all nine Census divisions.

At the level of individual admissions, 14% of NH admissions overall had a Stage 2, 3 or 4 PU, and 5% had a Stage 1 PU. The average number of Stage 2-4 PUs ranged from 1.9 – 2.4 per resident (Table 1). Black admissions had the highest prevalence of Stages 2-4 combined, followed by Hispanics, and Whites had the lowest prevalence. Hispanics had the second greatest prevalence of the most severe PUs (Stages 3 and 4 combined=11%). Blacks had the highest prevalence of Stage 2, 3 or 4 PUs individually and the lowest prevalence of Stage 1 PUs. A Stage 2 PU was the most common highest stage among all racial/ethnic admission groups, with prevalence approximately two to three times that of the other stages. In terms of the highest stage of PUs present, the rate of Stage 1 PUs was lowest among Blacks, and Stage 4 was lowest among Whites. More Blacks admissions, followed by Hispanics, had a Stage 4 PU as the highest stage compared to the racial/ethnic groups.

At the NH level, an inverse trend was observed in the percentage of White admissions to a NH and the prevalence of some stages of PUs (Table 2). The greater the majority of White admissions, the lower the rates of Stage 4 PUs and Stages 2-4 combined. Similar to findings at the individual admissions level, Stage 1 PUs were least common and Stage 4 PUs were most common in NHs with the lowest percentage of White admissions.

The percentage of White admissions in NHs by census division ranged from 74% to 97% (Table 3.) Corresponding prevalence of PUs or highest stage of all PUs do not appear to be related to the percentage of White NH admissions within a Census division. Division 4 has the lowest rates of both PU outcome variables, as well as the highest percentage White composition of its NHs, but this observation is not consistent within all divisions. The New England and West North Central divisions illustrate this point: 97% of admissions to NHs in both these divisions were White, yet the rate of Stages 2-4 PUs combined was 15% in the former and 11% in the latter (lowest of all Census divisions). The highest prevalence of PUs among NH admissions was in the Middle Atlantic Census Division, which had the third highest percentage of Whites.

Discussion

This is the first study to compare the prevalence of pressures ulcers among all racial and ethnic groups of NH admissions represented on the MDS. Our results extend the limited data available in the literature about racial/ethnic differences in PUs. Our finding of a PU rate among Black admissions that is 1.7 times higher than Whites is consistent with that of Baumgarten et al. who reported an admission PU prevalence among Blacks that was twice that of Whites in Maryland NHs. Our results present new information that differences in the prevalence of PU Stages 2-4 reported among a cross section of NH residents as being Blacks > Hispanics > Whites (Gerardo et al., 2009) occur as early as at the time of admission. Our study adds that the admission prevalence of PUs among Asians and American Indians was less than these other three minority groups. The 14% overall prevalence of PU Stages 2-4 found in this study falls within the 10-20% reported in other studies examining all NH admissions (Brandeis et al., 1990; Kiel et al., 1994; Sternberg et al., 1988) with differences likely due in part to differences in sample size, national representation, and methods.

This is also the first study to examine the admission prevalence of PUs at the NH and regional levels. At the NH level, a higher prevalence of PUs was observed among NHs with a lower percentage of White admissions. This finding supports a similar association of a greater PU rate observed in Hispanic residents in NHs with greater concentrations of Hispanics (Gerardo et al., 2009). There was no consistent trend between PU prevalence and the percentage of White admissions to NHs by Census Division.

Our results lend support to the suggestion that Stage 1 PUs in Blacks may be under-reported or under-recognized (Baumgarten et al., 2004; Lyder et al., 1999) Black NH admissions had the lowest prevalence of Stage 1 and the highest prevalence of Stage 2 PUs among all racial/ethnic groups. Similarly, the rate of Stage 1 PUs as the highest stage of PUs was lowest in Blacks compared to other races/ethnicities. Darker skin presents challenges for detecting damage since “redness,” considered one of first signs of skin damage, can manifest as a purplish color or more subtle discoloration of usual skin tone and may be missed (Bennett, 1995).

Results of our study suggest the need for resources to assess and manage PUs from the time of admission and for NHs with higher percentages of minority admissions. Reports of lower levels of resources and care quality (Institute of Medicine, 2003; Smith, Feng, Fennell, Zinn, & Mor, 2007) in NHs with high minority concentrations suggest that higher rates of PUs among their admissions may further disadvantage these NHs. Clinical tools for assessing skin and skin damage, including PUs, that have been validated for use with dark-toned skin are lacking and are needed to help increase the awareness and ability of nursing staff to identify less severe skin pressure damage early. More intensive effort to assess for Stage 1 PUs among Black NH admissions that is supported by staff education and organizational policies is recommended.

Our findings encourage multivariate and multi-level analyses of factors that help to explain admission differences in PUs among racial and ethnic groups, an important step toward achieving the Institute of Medicine's goal of improving equity and quality of healthcare

(Institute of Medicine, 2003). Comparative research of health care policies, health care system accessibility, as well as underlying functional and clinical differences of individuals may be necessary for more complete understanding of factors that are driving racial/ethnic-based differences in PU rates and to facilitate prevention (Smith, Feng, Fennell, Zinn, & Mor, 2008; V, Zinn, Angelelli, Teno, & Miller, 2004). Further investigation into whether the differences in pressure ulcers at NH admission noted may be an issue of health disparity needs further research.

A limitation of this study is use of a convenience sample of admissions to for-profit NHs that may not be representative of all US NHs or admissions. However, 68% of all US NHs are for-profit (Centers for Medicare & Medicaid Services, 2010) and characteristics of our sample are similar to elderly admissions to all US NHs during a similar time period (Bliss et al., submitted). Our sample is the largest, most diverse, and nationally representative of any that has investigated racial/ethnic differences in PUs among NH admissions to date. Secondary source data that were collected for regulatory rather than research purposes were used to determine PU prevalence. Findings may also be limited by variations in completion of MDS items about PUs among NHs.

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Table 1
Demographic Characteristics and Prevalence of Pressure Ulcers by Race/Ethnicity of NH Admissions

Variable	n (%) of Racial/Ethnic Group					
	American Indian/Alaskan Native n = 558	Asian/Pacific Islander n = 1,944	Black, Not Hispanic n = 9,580	Hispanic n = 1,956	White, Not Hispanic n = 97,594	
Female Gender	322 (58%)	1168 (60%)	5962 (62%)	1108 (57%)	64332 (66%)	
Age Group (Years)						
65-74	206 (37%)	290 (15%)	2754 (29%)	582 (30%)	18691 (19%)	
75-84	212 (38%)	867 (45%)	3923 (41%)	805 (41%)	43282 (44%)	
85+	140 (25%)	787 (40%)	2903 (30%)	569 (29%)	35621 (36%)	
High School Education	201 (36%)	1024 (53%)	3269 (34%)	610 (31%)	60609 (62%)	
At Least One Pressure Ulcer of This Stage	43 (8%)	194 (10%)	624 (7%)	135 (7%)	8086 (8%)	
Stage 2	87 (16%)	281 (15%)	1867 (20%)	302 (16%)	11734 (12%)	
Stage 3	27 (5%)	69 (4%)	673 (7%)	121 (6%)	3126 (3%)	
Stage 4	30 (5%)	75 (4%)	719 (8%)	95 (5%)	2651 (3%)	
Stages 2-4	116 (21%)	356 (18%)	2505 (26%)	414 (21%)	14892 (15%)	
Highest Stage of Pressure Ulcer						
Stage 1	25 (4%)	113 (6%)	271 (3%)	74(4%)	4842(5%)	
Stage 2	52 (9%)	224 (12%)	1207 (13%)	207(11%)	8442(9%)	
Stage 3	15 (3%)	54 (3%)	381 (4%)	79 (4%)	2026(2%)	
Stage 4	24 (4%)	61 (3%)	596 (6%)	81 (4%)	2053 (2%)	
Number of Stage 2-4 Pressure Ulcers/ Resident	2.3 (2.1)	1.9 (1.5)	2.4 (2.2)	1.9 (1.4)	1.9 (1.6)	

Table 2
Prevalence of Pressure Ulcers by Percent White Composition of Admission

% WhiteNH Admissions	< 65% White	65-84% White	85-94% White	95% White
n (%) of NHs	51 (11%)	72 (16%)	104 (23%)	230 (50%)
n of Admissions	11,865	16,526	27,994	55,255
n (%) of NH Admissions with Pressure Ulcers				
At Least One Pressure Ulcer of This Stage				
Stage 1	966 (8%)	1497 (9%)	2833 (10%)	3787 (7%)
Stage 2	1911 (16%)	2352 (14%)	3876 (14%)	6133 (11%)
Stage 3	702 (6%)	721 (4%)	1084 (4%)	1509 (3%)
Stage 4	711 (6%)	697 (4%)	888 (3%)	1275 (2%)
Stages 2-4	2605 (22%)	3064 (19%)	4906 (18%)	7710 (14%)
Highest Stage of Pressure Ulcer				
Stage 1	517 (4%)	853 (5%)	1707 (6%)	2249 (4%)
Stage 2	1283 (11%)	1657 (10%)	2776 (10%)	4417 (8%)
Stage 3	412 (3%)	467 (3%)	731 (3%)	945 (2%)
Stage 4	574 (5%)	585 (4%)	721 (3%)	936 (2%)
Number of Stage 2-4 Pressure Ulcers/Resident (mean (sd))				
	2.2 (1.9)	2.1 (1.7)	2.0 (1.6)	1.9 (1.5)

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Table 3
Prevalence of Pressure Ulcers Presented According to the Ascending Percentage of White Admissions to NHs in within Census Divisions

Census Division	Mountain MT, ID, WY, UT, CO, AZ, NV, NM	South Atlantic MD, DE, DC, WV, VA, NC, SC, GA, FL	East South Central KY, TN, MS, AL	Pacific WA, OR, CA, AK, HI	West South Central OK, AR, TX, LA	East North Central WI, MI, IL, IN, OH	Middle Atlantic NY, PA, NJ	New England ME, VT, NH, MA, CT, RI	West North Central ND, SD, MN, NE, IA, KS, MO
% of White Admissions	74	78	81	84	85	92	95	97	97
n of Admissions	1,239	15,270	15,685	23,689	5,408	14,585	10,354	4,322	21,088
n of NHs	3	54	55	70	34	62	43	20	116
n (%) of NH Admissions with a PU by Census Division									
At Least One PU of This Stage									
Stage 1	28 (2%)	1697 (11%)	1320 (8%)	2142 (9%)	344 (6%)	1101 (8%)	1098 (11%)	267 (6%)	1086 (5%)
Stage 2	115 (10%)	2237 (15%)	2111 (13%)	3135 (14%)	671 (12%)	1790 (12%)	1756 (17%)	530 (12%)	1927 (9%)
Stage 3	20 (2%)	691 (5%)	527 (3%)	1189 (5%)	142 (3%)	462 (3%)	471 (5%)	101 (2%)	413 (2%)
Stage 4	27 (2%)	566 (4%)	861 (6%)	840 (4%)	136 (3%)	431 (3%)	392 (4%)	92 (2%)	226 (1%)
Stages 2-4	143 (12%)	2879 (19%)	2819 (18%)	4233 (18%)	814 (15%)	2264 (16%)	2179 (21%)	643 (15%)	2311 (11%)
Highest Stage of PU									
Stage 1	22 (2%)	1065 (7%)	717 (5%)	1261 (5%)	197 (4%)	634 (4%)	653 (6%)	160 (4%)	617 (3%)
Stage 2	84 (7%)	1609 (11%)	1436 (9%)	2291 (10%)	498 (9%)	1262 (9%)	1268 (12%)	376 (9%)	1309 (6%)
Stage 3	14 (1%)	417 (3%)	308 (2%)	840 (4%)	98 (2%)	269 (2%)	306 (3%)	65 (2%)	238 (1%)
Stage 4	26 (2%)	457 (3%)	711 (5%)	697 (3%)	123 (2%)	325 (2%)	273 (3%)	62 (1%)	142 (1%)
Number of Stage 2-4 Pressure Ulcers/Resident (mean (sd))	1.8 (1.3)	2.0 (1.7)	2.1 (1.9)	1.9 (1.5)	2.0 (1.8)	2.0 (1.7)	2.0 (1.7)	1.8 (1.4)	1.9 (1.6)

PU = pressure ulcer