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Racial and ethnic disparities in the healing of pressure ulcers present at nursing home admission

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ABSTRACT

Background: Pressure ulcers increase the risk of costly hospitalization and mortality of nursing home residents, so timely healing is important. Disparities in healthcare have been identified in the nursing home population but little is known about disparities in the healing of pressure ulcers.

Purpose: To assess racial and ethnic disparities in the healing of pressure ulcers present at nursing home admission. Multi-levels predictors, at the individual resident, nursing home, and community/Census tract level, were examined in three large data sets.

Methods: Minimum Data Set records of older individuals admitted to one of 439 nursing homes of a national, for-profit chain over three years with a stages 2–4 pressure ulcer (n = 10,861) were searched to the 90-day assessment for the first record showing pressure ulcer healing. Predictors of pressure ulcer healing were analyzed for White admissions first using logistic regression. The Peters-Belson method was used to assess racial or ethnic disparities among minority group admissions.

Results: A significantly smaller proportion of Black nursing home admissions had their pressure ulcer heal than expected had they been part of the White group. There were no disparities in pressure ulcer healing disadvantaging other minority groups. Significant predictors of a nonhealing of pressure ulcer were greater deficits in activities of daily living and pressure ulcer severity.

Conclusions: Reducing disparities in pressure ulcer healing is needed for Blacks admitted to nursing homes. Knowledge of disparities in pressure ulcer healing can direct interventions aiming to achieve equity in healthcare for a growing number of minority nursing home admissions.

1. Introduction

Timely healing of pressure ulcers is imperative as pressure ulcers are a major health safety hazard. Pressure ulcers increase the risk of expensive hospitalization of NH residents (O'Malley, Caudry, & Grabowski, 2011) and death (Berry, Samelson, Bordes, Broe, & Kiel, 2009; Redelings, Lee, & Sorvillo, 2005). Timely healing is also important for reducing health care costs, which, for pressure ulcer treatment, can be substantial (Gallagher, 2011). Pressure ulcers among older individuals in long-term care facilities are a global problem with prevalence ranging from 10% to 30% (Ahn, Cowan, Garvan, Lyon, & Stechmiller, 2016; Bours, Halfens, Abu-Saad, & Gro, 2002; Capon, Pavoni, Mastromattei, & Di Lallo, 2007; Gunningberg, Hommel, Baath, & Idvall, 2013; Lahmann, Halfens, & Dassen, 2005; Levinson, 2014; Tannen, Bours, Halfens, & Dassen, 2006). The overall prevalence of Stage 2–4 pressure ulcers at NH admission in the United States (U.S.) ranges between 5% and 20% (Baumgarten et al., 2004; Harms et al., 2014), but among minority NH admissions in the U.S., the prevalence is nearly twice that of Whites (Baumgarten et al., 2004; Harms et al., 2014). Braveman (2006) explains that a worse health or greater risk of worse health in groups systematically disadvantaged or discriminated against due to social factors such as race, ethnicity, poverty, sex, etc. is a health disparity.

There are reports of racial and ethnic disparities in healthcare in the nursing home population, some of which may impact pressure ulcer healing. For example, fewer Black NH residents had a toileting plan for their incontinence, which is a well-known component of a comprehensive treatment plan for pressure ulcers (Frantz, Xakellis, Harvey, & Lewis, 2003), than all other racial groups of residents

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combined (Jones, Sonnenfeld, & Harris-Kojetin, 2009). The higher percentage of minority NH admissions with a pressure ulcer may increase the risk for a disparity in pressure ulcer treatment and healing. Strategies that reduce or prevent disparities related to pressure ulcers are among current federal funding priorities to improve the safety of NH residents (Department of Health and Human Services, 2015). Eliminating health and healthcare disparities is considered to offer the most feasible opportunity for improving the health of the U.S. population (Centers for Medicare and Medicaid Services, 2015; House, Lantz, & Herd, 2005; U.S. Department of Health and Human Services, 2011) and is a cornerstone of policy of federal agencies involved with healthcare (Centers for Medicare and Medicaid Services, 2015; U.S. Department of Health, 2011). Numerous other developing countries have similarly adopted policies for equity in health for their populations (Crombie, Irvine, Elliott, & Wallace, 2005).

The presence and stage of a pressure ulcer is reported as part of the comprehensive admission assessment using the Minimum Data Set (MDS). The MDS is a federally mandated assessment of residents' demographic and clinical characteristics in all Medicare- and Medicaid-certified NHs. Pressure ulcers are staged according to the severity of skin loss. According to the guidance manual for the MDS (Centers for Medicare and Medicaid Services, 2008), a Stage 2 pressure ulcer is a partial thickness loss of skin layers that can appear as an abrasion, blister, scab, or shallow crater while in a Stage 3 or 4 pressure ulcer, a full thickness of skin is lost. In a Stage 4 pressure ulcer, underlying muscle or bone may be exposed. There are a variety of issues regarding the pressure ulcer staging system used on the MDS 2.0 version as well as the current revised staging system on the MDS 3.0. Among the concerns is the adequacy of the staging system to differentiate all types of pressure ulcers. Another issue relates to reverse staging (i.e., moving from a higher to lower stage of pressure ulcer) to assess healing of pressure ulcers due to differences in these tissues from normal. Whether a system using stages is even appropriate given the lack of full understanding of the course of injury or healing of pressure ulcers has been questioned (Lyder & Ayello, 2012; Sibbald, Krasner, & Woo, 2011).

Despite some of the limitations of the pressure ulcer assessment on the MDS, the data have been useful to report the prevalence and incidence of pressure ulcers among NH residents and can show when pressure ulcers are healed. Yet little is known about disparities in the healing of pressure ulcers in NHs. An increased awareness of health disparities and their impact on the clinical outcomes of vulnerable populations, such as NH residents, is one of the goals of the U.S. National Stakeholder Strategy for Achieving Health Equity (U.S. Department of Health, 2011). In addition to the health status of individual residents as reported on the MDS, factors at the NH and community levels have been associated with poorer health outcomes (including pressure ulcers) among NH residents. Some of these factors include the concentration of minority NH residents, extent of care deficiencies, and geographic location of NHs (Gerardo, Teno, & Mor, 2009; Grabowski, 2004; Li, Yin, Cai, Temkin-Greener, & Mukamel, 2011; Mor, Zinn, Angelelli, Teno, & Miller, 2004). Therefore, analyses of health disparities need to consider these multi-level factors. The purpose of this study was to investigate racial and ethnic disparities in the healing of Stage 2 to 4 pressure ulcers that were present at NH admission at the 90-day assessment. Our analysis examined predictors at the individual resident, NH, and community levels.

2. Methods

2.1. Data sources and study design

Three data sets were linked and analyzed: (1) Minimum Dataset (MDS) (version 2.0) records, which contain demographic and health assessment data of individual residents, of a large for-profit chain of NHs; (2) the Online Survey, Certification, and Reporting (OSCAR) which contains measures of NH staffing, quality of care, and the care environment, both from years 2000 to 2002; and (3) the 2000 U.S. Census which contains socioeconomic and sociodemographic measures of the Census tract of the community in which each NH was located. The Minnesota Population Center at the University of Minnesota had identified the census tracts of the NHs. The study had a cohort design in which MDS records were searched forward after admission until a record showing healing of a pressure ulcer was identified or available records ended. The study was reviewed determined to be exempt by the Institutional Review Board of the University of Minnesota as data were de-identified.

2.2. Cohort selection and definitions of outcome and predictor variables

The criteria for inclusion in the cohort used to analyze disparities in healing of pressure ulcers were age 65 years or greater and having a Stage 2, 3 or 4 pressure ulcer reported as the highest pressure ulcer stage on the full/admission MDS record. The outcome of pressure ulcer healing was defined as the absence of a Stage 2, 3, or 4 pressure ulcer on the first MDS record at the required 90-day assessment (+14 day) after admission. The additional two weeks includes the grace period for completing the MDS and time for making significant changes to the MDS record. Three clinical consultants with expertise in the treatment and healing course of pressure ulcers in NH residents advised that a pressure ulcer of any stage would be expected to heal by the 90-day assessment after admission with proper management, which is supported by reports in the literature (Bergstrom et al., 2008; Brandeis, Morris, Nash, & Lipsitz, 1990; Horn et al., 2002). Time-to-healing for pressure ulcers has been reported as ranging from a mean (sd) of 28 (20) days for Stage 2 pressure ulcers to 42 (Bergstrom et al., 2008) days for Stage 4 pressure ulcers (Horn et al., 2002). 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.

Relevant potential predictors of pressure ulcer healing were identified using published literature and the expertise of the investigators, the study's advisory board, and the clinical consultants. Predictors at an individual's admission 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 health-related concept. When no scale or a single item was sufficient or available, composite measures were developed following previously established procedures (Savik, Fan, Bliss, & Harms, 2005) and clinical consultation.

Individual level predictors of pressure ulcer healing included variables related to demographics (e.g., age and gender), functional and physical status (e.g., activities of daily living, health comorbidities, incontinence, nutritional status), cognitive and emotional characteristics (e.g., communication difficulties, depressive symptoms), and care (e.g., use of absorbent pads/briefs, number of medications). NH level predictor variables included proportions of residents receiving Medicaid, percentages of admissions with characteristics of interest (e.g., gender and race), staffing, and deficiencies in NH care quality. Total full time equivalents (FTEs) for licensed nurses and certified nursing assistants (including full-time, part-time and contract positions) reported for a two-week period were divided by the total number of residents in a NH to calculate total nurse staffing FTEs per resident. Five composite variables were created for deficiencies in NH care: quality resident behavior-facility, practices-dignity, quality of care, and resident assessment-nursing services, and the total number of these deficiencies by NH. These variables were constructed by summarizing the scope and severity levels of the respective deficiencies for a NH.

At the community level, the sociodemographic and socioeconomic characteristics of the U.S. Census tract of each NH were described using seven Census variables in their original form and 16 variables that were converted into proportions of the Census tract population. Examples of these variables are a community's gender and minority composition and education levels as well as the percentage of the community aged ≥65