Report

Structured Abstract: Purpose: Document and compare nursing home (NH) resident outcomes by obesity status, characterize NHs that experience high rates of adverse outcomes, and explore NH staff experiences in the care of obese residents. Scope: Obesity rates among US NH residents are increasing. NHs are ill prepared to care for residents with obesity, resulting in poor and unsafe care that leads to adverse outcomes. Methods: Existing data were used to compare NH resident outcomes by obesity status and characterize NHs that experience high rates of adverse outcomes among obese residents. Qualitative interviews were used to explore NH staff experiences caring for obese residents. Results: Compared Z L W K normal weight, obesity was associate with clinically lower rates of falls, falls with injuries, and pressure injuries. There were significant differences in NHs with high and low rates of falls, falls with injuries, pressure injuries, and urinary tract infections (UTIs) among their obese residents. NH directors of nursing reported 1) challenges admitting obese persons, 2) the need for more staff education to provide proper care for obese residents, 3) that desirable weight loss among obese residents is possible with an interdisciplinary team and consistent effort over time, 4) that caring for young obese people in NHs with mostly older adults was complex, and 5) that limited resources make transitioning short-term residents with obesity out of the NH difficult. Key Words: Obesity, Nursing Homes, Quality of Care, Long-term Care, Patient Safety

Purpose. The overarching goal of the study was to describe and compare patient safety (henceforth, resident safety) outcomes among obese and non-obese residents of NHs in the US. The goal was achieved through execution of three specific aims:

Aim 1. Document and compare key resident safety outcomes between obese and non-obese NH residents.

Aim 2. Identify the resident, facility, and community factors that characterize NHs in which obese residents experience high rates of adverse safety events.

Aim 3. Explore the experiences of NH staff regarding disparities in resident safety among obese NH residents and their recommendations to prevent and eliminate obese resident safety disparities.

3. Scope. Background/Context. The US obesity epidemic now affects one third of adults.(1) As the pop among obese residents.(17) Yet, the literature lacks coverage of NH-related factors contributing to adverse safety events among NH residents with obesity.

Settings: US nursing homes.

Participants. See Table 1 for enrollment numbers of participants. For Aim 1, participants

Table 1. Enrollment Tables

For Aim 1 - Nursing Home Residents

FIRST QUARTERLY ASSESSMENT & LOS>= 100 DAYS & NON-MISSING BMI

	not Hispanic			Hispanic			Xnknown ethnicity		
	female	male	unknown	female	male	unknown	female	male	unknown

Aim 2. Identify the resident, facility, and community factors that characterize NHs in which obese residents experience high rates of adverse safety events.

Study Design. The study used a cross-sectional observational design.

Data Sources/Collection. Resident-level data came from the Minimum Data Set (MDS) assessments in 2017-2018 but was aggregated to the level of the NH quarter. NH facility characteristics (e.g., size, ownership type, inspection deficiencies) that are obtained through federal inspections came from CMS' Certification and Survey Provider Enhanced Reporting (CASPER) dataset and the LTCFocus 2017-2018 dataset. These facility data do not contain protected health information that would allow for the identification of individuals. Community characteristics (e.g., percentage of population < 65 years SHUFHQWDJH RI FRXQW\ ZLWK came from the Area Health Resource File, US Census data, County Health Rankings, or other publicly available sources. State Medicaid per diem was from Genworth Financial, Inc.

Interventions. Not applicable.

Measures. There were four outcome variables of interest among residents with obesity for Aim 2: rates of falls, falls with injuries, pressure injuries and UTIs. These outcomes in each NH were categorized into four groups: zero percent of the rate of the outcome, quartile 1 of the rate of the outcome, quartile 2 of the rate of the outcome, and quartile 3 of the rate of the outcome. The zero percent and quartiles 1 and 2 were combined to represent low rates of the outcomes (separately for each of the four outcomes), DQG quartile 3 represented high rates of the outcomes (separately for each of the four outcomes). Structure characteristics included occupancy rate, chain affiliation, for-profit status, the Herfindahl-Hirschman Index (HHI, sum of the NH market share of beds squared for that county) as a measure of competition, and size in FDWHJRULHV EDVHG RQ QXPEHU RI EHGV VPDOO IDFLOLWLHV RI beds, and large facilities of >150 beds. Process measures included percent of residents who were restrained, acuity index, skill mix (ratio of registered nurses (RN) to other nurses), the number of RN hours per patient day (HRPPD), the number of Licensed Practical Nurse (LPN) HRPPD, the number of Certified Nursing Assistant (CNA) HRPPD, the number of severe life safety inspection deficiencies, and the number of severe health inspection deficiencies. Resident antecedent conditions included the percent of all residents on Medicaid, percent of all residents on Medicare, percent of racial/ethnic minority residents, and the percent of all residents with obesity (divided into quartiles). Environmental characteristics included rurality (measured by CBSA), county income, percent of racial/ethnic minorities in the county, person of residents of county under the age of 65 years, and county obesity rate.

Limitations. There were more than 15,000 NHs included in the facility-level dataset. Because we only included NHs with complete information, our final sample included only 8,814 individual NHs. It is possible that NHs with missing information are different from NHs with complete information, thereby introducing selection bias into our results. Despite this limitation, this is one of the first studies to examine adverse safety outcomes among residents with obesity and organizational factors related to those adverse outcomes.

Aim 3. Explore the experiences of NH staff regarding disparities in resident safety among obese NH residents and their recommendations to prevent and eliminate obese resident safety disparities.

Study Design: This study employed a qualitative descriptive design.

Data Sources/Collection. We drafted a semi-structured questionnaire based on our conceptual framework that was reviewed by our external advisory board. The questionnaire was then field tested with five interviews at the National Association of Directors of Nursing

Administration’s (NADONA) annual conference in 2019. No changes were made to the questionnaire, so the original questionnaire was used for the remaining data collection. Target respondents were DONs of US NHs. Recruitment for additional interviews took place at NADONA’s 2020 conference which was converted to a virtual conference due to the COVID-19 pandemic. Recruitment suffered from the new conference format and DONs’ focus on their facilities during the pandemic. Additional strategies were employed for recruitment, including word of mouth and posting notices on nursing and geriatric association blogs. Remuneration was initially a $50 gift card but was increased to a $100 gift card due to recruitment issues. Data collection was either in person or via internet streaming video. All interviewers were recorded and later transcribed for analysis purposes. 7ranscripts were coded individually and then reviewed jointly by two investigators using a priori codes derived from the study’s conceptual framework and new codes derived from emerging interview content.

Interventions. No intervention took place through this study aim.

Measures. Given W K D W this was a qualitative aim, there were no statistical analyses performed and no actual measures used. However, codes were created to categorize content and themes of the interview data. Initial codes were drawn from our conceptual framework: antecedents, structure, process and outcomes. Subcategory codes for antecedents were environment, NH, individual personal characteristics. Subcategory codes for structure were equipment, physical environment, staffing and organizational characteristics Subcategory codes for process were professional staff, residents with obesity, and family members. Subcategory codes for outcomes were residents with obesity, staff, and NHs.

Limitations. M2d4.72 Tm 27sH4 <</MCID(y)-1.7 (, owlthroaand)Tsr, codes

lowest among underweight residents (2.8%).The variation in rates of the four adverse safety events across the BMI categories was significant (each chi square p<0.001).

Due to the large sample size (n=1,350,353), many associations assessed in the multivariate logistic regressions were statistically significant but not likely clinically significant (i.e., ORs were very close to 1.0). We elected to focus on more clinically meaningful results which we defined as having a relative difference of 10% or more (i.e., an aOR <= 0.9 or >= 1.1). In our preliminary analysis, we examined characteristics of NH residents and NHs that were associated with the four adverse resident outcomes. For the falls model, we found that increasing BMI was a protective factor for falls, after accounting for resident personal and clinical characteristics and facility characteristics. Specifically, relative to normal weight residents, residents who were overweight were 10.1% less likely to fall (SE=0.01, p<0.001), residents who were obese class 1 were 17.8% less likely to fall (SE=0.01, p<0.001), residents who were class 2 obese had 22.0% less likely to fall (SE=0.01, p<0.001), and residents who were class 3 obese were 34.2% less likely to fall (SE=0.01, p<0.001). : R P H Q had significantly lower odds of falling than P H Q G L G (OR=80.2, SE=0.00, p<0.001). Relative to White residents, Black residents were 30.7% less likely to fall (SE=0.01, p<0.000), Hispanics were 22.7% less likely to fall (SE=0.01, p<0.000), and residents of other racial/ethnic groups were 19.9% less likely to fall (SE=0.01, p<0.000). Relative to making self understood, those who usuallymade self understood or sometimes made self understood were significantly more likely to experience a fall (OR=1.29, SE=0.01, p<0.001; OR=1.28, SE=0.01, p<0.001; OR=0.84, SE=0.01, p<0.001, respectively). Relative to those needing help staff, those who needed one person to help with bed mobility were self understood, those who usually are understood or sometimes understood were 29% (SE=0.01, p<0.001) and 31% (SE=0.02, p<0.001) more likely to experience a fall with injury U H V S H.F W L Residents who needed one person to assist with bed mobility were 34% (SE=0.02, p<0.001) less likely to experience a fall with injury than those who did not any need support for bed mobility. Compared Z L W K those who needed no transfer assistance, those who needed set up (OR=1.25, SE=0.03, p<0.001) or one person to help with transfers (OR=1.13, SE=0.03, p<0.001) were significantly more likely to experience a fall with injury; F R Q Y H U V H O \ those who needed two+ persons to assist with transfers were less likely to experience a fall with injury (OR=0.65, SE=0.05, p<0.001). Compared Z L W K those who needed no help to walk in the corridors, those who needed one person to assist were significantly less likely to experience a fall with injury (OR=1.11, SE=0.04, p<0.001). Those who needed two+ persons to assist with locomotion on the unit were 47% (SE=0.02, p<0.001) less likely to experience a fall with injury than those who needed no assistance. For locomotion off the unit, those who needed assistance from one person were more likely to experience a fall with injury than those who needed no assistance (OR=0.88, SE=0.03, p<0.001). Those who needed progressing levels of support for dressing from set-up (OR=1.20, SE=0.03. p<0.001

experience a pressure injury (SE=0.02, p<0.001) than Z H U H those who needed no assistance for locomotion off the unit. Residents Z K R needed one person to assist with locomotion off the unit were 13% more likely to experience a pressure injury (SE=0.04, p=0.005) than Z H U H those who needed no assistance for locomotion off the unit. Residents who needed set up assistance for eating (OR=1.22, SE=0.01, p<0.001) and who needed assistance from one person for eating (OR=1.33, SE=0.07, p<0.001) were more likely to experience a pressure injury than Z H U H Whose who needed no assistance with eating. Residents who needed set up assistance or two+ persons for assistance with toileting were 17%

pressure injuries. However, we found that the quartile of obesity was clinically significantly associated with UTIs, with shifts to higher quartiles of obesity being associated with lower rates of UTIs, a finding opposite of our expectations.

Several other variables were found to be associated with more than one outcome. See Table 3. For-profit NHs were clinically significantly less likely to have higher rates of falls, falls with injuries and UTIsamong obese residents, but were clinically significantly more to be associated with high rates of pressure injuries among obese residents. Previous research has shown that for-profit NHs had lower quality of care than not-for-profit NHs (28, 29). 7 K X V, it was unexpected that for-profit NHs had lower adverse events among their residents with obesity for three of the four adverse safety outcomes. It is possible that for-profit NHs do a better job caring for their obese residents but when taken as a whole, looking at survey deficiencies for the entire facility, those NHs are rated as lower quality.

Larger sized facilities (higher bed count) have also been found to be associated with poor quality of care.(30) However, for pressure /injuries and UTIs, larger facilities (beds > 150 beds) were associated with lower rates of may be more involved in direct personal care (e.g., bathing, grooming, toileting, turning) and less available to monitor residents at risk for falls or minimize the risk of injuries with falls. Moreover, DONs have noted that some CNAs do not want to work with residents with obesity for fear of personal injury.(35) As such, some CNAs may not try to prevent a fall they saw in process to avoid injury to themselves. Because they are more involved in personal care, they may be better able to prevent or address pressure injuries among obese residents as indicated by our results.

The level of NH competition in a market area can affect the behavior of NHs in that market.(36-38) The HHI for NHs (the sum of the NH market share of beds squared for its county) (39) is a measure used to determine the industry's level of competition in a given market. In the present study, we found that as the HHI increases, indicating the marketplace is becoming less competitive, NHs are 33% more likely to have higher rates of UTIs among their residents with obesity ($p<0.0011$). Previous research has indicated W K D W NHs in highly competitive markets are more likely to innovate (e.g., adopt Total Quality

Discussion. Limited knowledge about the care of NH residents with obesity is available in the literature, despite rising rates of obesity among US NHs residents. (18) We interviewed DONs of US nursing homes to inquire about their experience caring for residents with obesity. We applied an adapted Structure-Process-Outcome framework to analyze their responses. (40, 41) The adapted model included antecedent conditions of the environment and the person being considered for admission as being important to outcomes as are the structure of the NH and their processes of care.

In terms of antecedent conditions, DONs focused on absolute weight rather than a resident's BMI and were most concerned about residents with severe obesity (e.g., weights upward of 550 pounds). Reports on obesity in NHs haYH shown that residents with obesity are significantly younger than residents without obesity. (3) DONs were particularly concerned about challenges with caring for younger residents with obesity (age < 65 years) in a facility with a population of ROGHU UHVLGHQWV hen DJH making admission \HDUV decisions, DONs noted that many factors are taken into consideration as WKH\ relate to persons with obesity. DONs mentioned the lack of sufficient reimbursement to care for the high cost of care of residents with obesity that has been previously reported. (42) They reported that they considered the ability of local healthcare and medical transportation providers to support emergency care for residents with obesity.

In terms of structure, DONs reported appropriate resources, medical equipment, and staffing were important for ensuring safe care for residents with obesity. These have also been noted as problematic when caring for residents with obesity. (6, 16) They reported the availability of those items were considered in admission decisions for persons with obesity. They also reported the need to provide additional training and coaching to staff specific to providing appropriate, high-quality care for residents with obesity. Additional research is needed to develop and test staff training curricula and training modes for the care of residents with obesity.

In terms of process of care, DONs noted WKDW two staff members were needed to care for residents with obesity compared ZLWK only one staff member needed to care for residents without obesity. More intensive staffing needs for residents with obesity has been observed in other studies. (3, 9) DONs described efforts