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Research Article

Change in Resident Weight Status Post Admission to Long-Term Care Facilities: A Population-Based Study

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Abstract

Background: Research has demonstrated that newly admitted residents to long-term care facilities throughout America are entering at a higher weight. But once admitted, is there a "Freshman 15" weight gain that further compromises the health and well-being of those residents who are already overweight or obese? Currently there is limited research examining the change in weight after admission to long-term care facilities in the United States. This research provides a foundation study for future investigation.

Objective: Determine the change between initial weight and Body Mass Index (BMI), and final weight and BMI within the first year of residence, in 2007, among newly admitted residents to Medicare and Medicaid certified long-term care facilities.

Design: Retrospective population-based cohort study examining the Minimum Data Set (MDS) assessments for five states in 2007.

Results: The mean initial weight was 152.84 pounds (+/- s.d. = 43.70). The median initial weight was 146 pounds (range = 408 pounds). The mean initial BMI was 25.97 (=/- s.d. = 6.80). The median initial BMI was 24.800 (range = 50.43). The mean final weight was 161.23 (+/- s.d. = 45.46). The median final weight was 154 pounds (range = 409). The mean final BMI was 27.41 (+/- s.d. = 7.080). The median final BMI was 26.15 (range 50.97). There was a significant increase ($p<.001$) in both the weight (8.39 +/-8.93) and Body Mass Index(1.43 +/-1.51) within the first year after admission.

Conclusions: There was an increase in weight status among residents, post admission, to long-term care facilities in the United States during the year 2007. The MDS offers the opportunity to further explore this change to assess and manage health risks associated with rising weight in already overweight or obese residents.

Keywords: Elderly; Long-Term Care Facilities; Weight Gain; Obesity

Introduction

The long-term care industry, in the United States, has had a tumultuous history. At the turn of the 20th century, poor farms and almshouses were the final homes for many sick, poor, elderly and disabled Americans [1]. By the turn of the 21st century, however, many of these final homes evolved into state of the art complexes offering condominium living, community centers and fitness spas.

As the long-term care industry was transforming in America, so were the demographics of the adult and elderly population. At the turn of the 20th century, 75% of the population in America was deceased by the age of 65, but by 1995, 75% of the population of America was alive after the age of 65. Additionally, the average life expectancy had grown from 50 years at the turn of the 20th century to an average of 80 years and beyond currently with one of the fastest growing segment of the population being those 80 years of age and older [2].

The residents currently being admitted into the long-term care facilities are primarily of the Veteran generation, which is defined by the U.S. Census Bureau [3] as those individuals born from 1922 and 1945. The Veteran generation will slowly be replaced by the Baby Boomers, whom the U.S. Census Bureau reports are those individuals born from 1946 through 1964.

The transformation of the long-term care facilities has continued in the 21st century as they are now finding themselves struggling with the responsibility of the younger disabled adults who are unable to live independently without assistance. Research shows that the percent of residents under the age of 65 has increased from 7% to 14%, while the average age of residents has gone down from age 83 to age 79 [4]. Unfortunately, the Baby Boomers have experienced a greater weight gain throughout their life than the Veteran generation. Research has demonstrated that the higher an elderly individual's BMI, the increased risk the elderly individual has for mobility problems and the ability to carry out activities of daily living [5].

The transition from the 20th to the 21stcentury has also evidenced a change of the weight status in the United States. At the turn of the 20th century, of primary concern to the long-term care industry were the under-fed, under-weight and malnourished elderly individuals. However, by the turn of the 21st century, the United States was struggling with an obesity epidemic that was affecting adults across the age continuum and from all social and economic status [5, 6]. The long-term care facilities are just beginning to experience the rising body weight of newly admitted residents. As the Baby Boomers (who will be between the ages of 51 years and 69 years in 2015) begin entering the long-term care facilities, an average of 66% of them will also bring both their increasing weight and weight related health issues [7]. As the population of individuals over the age of 65 continues to increase, the cumulative effect of their increasing weight is forecasted to have negative effect on both their physical well-being and on the ability of the long-term care facility to financially and physically care for these individuals [7, 8, 9, 10,11, 12, 13]. While it is difficult to abandon the thinking that the majority of our elderly residents are malnourished and underweight, the disease burden of obesity has signaled that we must begin.

The "Freshman 15" is a 15 pound weight gain that is witnessed in individuals residing, for the first time, in colleges and universities throughout the United States during their first year. The sudden changes in meal patterns, late night eating, limitless cafeterias, minimal exercise and alcohol are some of the reasons linked with the weight gain. [14]. While excessive alcohol intake is not usually associated with long-term care facilities, sudden changes in eating patterns, late night eating from the unit pantries, all you can eat dining rooms and limited exercise are. While many of these factors have been implemented to assist the newly admitted malnourished and underweight resident of the past, is it possible that these same factors are causing a further increase in weight status among those residents who are already overweight or obese upon admission? The first step in answering this question is to examine what is the change in weight in residents admitted to the long-term care facilities, within their first year of residency, in the United States.

The purpose of this study was to examine and define the change in weight and Body Mass Index (BMI) during the first year of residence among newly admitted residents to Medicare and Medicaid certified long-term care facilities in the United States in 2007.

Methods

A quantitative research design using secondary analysis examined data obtained from the Minimum Data Set (MDS) assessment to assess changes in weight and BMI among residents in long-term care facilities, in 2007. The MDS is a data collection tool that is required by all Medicare and Medicaid certified long-term care facilities in the United States. The MDS provides a comprehensive assessment of the resident upon admission and again at specified time intervals. The study sample was obtained from the Centers for Medicare and Medicaid Services (CMS) through the Research Data Assistance Center (ResDAC) at the University of Minnesota. The study sample data was from the National Repository of MDS data (1998-2008). The CMS data from the states of Hawaii, California, Missouri, Kentucky and New York was obtained for the 2007 year. Each state was randomly selected from the five geographic census areas of the United States. The BMI, also known as the Quetelet's index, is a screening tool which calculates a number that is based on the height and weight of an individual. This calculated number is an indicator of the degree of overweight or obesity although the BMI does not measure an individual's actual body fat. The World Health Organization has adopted the BMI as an assessment tool to determine the levels of under-weight, normal-weight and over-weight throughout the world population [15]. A BMI under 18.9 is considered underweight. A BMI of 19 to 24.9 is considered normal weight. A BMI of 25 to 29.9 is considered overweight, while a BMI greater than or equal to 30 is considered obese.

Statistical Methodology

The original sample size, received from the Centers of Medicare and Medicaid, was 3,092,121 cases with 35.7% of the sample male and 63.3% female. The average age was 80 years and the mean weight was 153 pounds. The mean BMI was 25.94 with 50% of the sample with a BMI of 24.75 or greater and 25% of the sample with a BMI of 29.17 or greater. The original sample was transformed based on each resident's identification number. This was necessary as each resident had the potential to be identified for two or more cases as each case was a MDS assessment. Next, the sample was filtered, with cases deleted, for residents with chemotherapy, radiation therapy, artificial Enteral or Parenteral nutrition feeding, a diagnosis of End Stage Disease or receiving Hospice or Comfort Care upon admission due to anticipated short-term decline in health status. Those residents with a birth year greater than 1989 were deleted as it was assumed the year was an inaccurate entry since individuals below the age of 19 would be admitted to a children's or adolescent facility. Those residents with weights greater than 660 pounds were deleted as the maximum weight for a bariatric wheelchair or bed, found in a long-term care facility in 2007, was 650 pounds. Finally, those residents who only had one weight entered, whether due to discharge, admission to the long-term care facility too late in the study year, or death were deleted as there was not an additional weight entry with which to compare for change. After the initial data was filtered the sample size was 132,231 cases with 32.2% of the sample male (n = 42,578) and 67.8% female (n = 89,653). The average age was 80 years and the mean weight was 153 pounds. The mean BMI was 25.93 with 50% of the sample with a BMI of 24.82 or greater and 25% of the sample with a BMI of 29.12 or greater.

A paired two-tailed t-test was used to identify change in weight and BMI between Time 1 (at admission) and Time 2 (at the last weight entered for the year 2007). Significant levels were set at $p < .05$.

Results

The final sample size was 132,231 and was comprised of 32.2% male and 67.8% female. The average age was 80 years and the mean BMI was 25.93 with 50% of the sample with a Body Mass Index of 24.82 or greater and 25% of the sample with a Body Mass Index of 29.12 or greater. A Paired two-tailed t-test was calculated to examine the change between initial weight and final yearly weight for the residents within the first year after admission in 2007. The mean initial weight was 152.84 pounds (+/- s.d. = 43.70), while the median initial weight was 146 pounds (range = 408 pounds). The mean final weight was 161.23 pounds (+/- s.d. = 45.46), while the median final weight was 154 pounds (range = 409 pounds). A significant increase from initial weight to final weight was found ($t(132320) = 347.29$, $p<.001$) as seen in Table I. The effect size was small ($d = 0.19$).

Table I. Change between Initial Weight and Maximum Weight

	Mean ± SD[b]	P Value
Change Between Initial Weight And Maximum Weight	8.39 ± 8.93	<.001

SD[b]= Standard Deviation.

A Paired two-tailed t-test was also calculated to examine the change between initial BMI and final BMI for residents within the first year after admission. The mean initial BMI was 25.97 (+/- s.d. = 6.80), while the median initial BMI was 24.8003 (range = 50.43). The mean final BMI was 27.41 (+/- s.d. = 7.08074), while the median final BMI was 26.15 (range = 50.97). A significant increase from initial BMI to final BMI was found ($t(132320) = 345.90$, $p<.001$) as seen in Table II. The effect size was small ($d = 0.21$).

Table II. Change Between Initial Body Mass Index and Maximum Body Mass Index

	Mean ± SD[b]	P Value
Change Between Initial Body Mass Index And Maximum Body Mass Index	1.43 ±1.5	<.001

SD[b]= Standard Deviation.

Discussion

The United States populace has witnessed a steady rise in the percent of adults who are overweight or obese to the current level of 69 percent\[16]. In this study, the increase in weight and BMI were both found to be significant, with a five percent increase in weight and a six percent increase in BMI, in the average first 137 days after admission. These changes in weight and BMI demonstrated astonishing continual rise in weight status, within the long term care facility, similar to that witnessed outside the long term care facility in the general population and on college campuses.

These results are alarming when framed with the current plethora of research demonstrating the negative force that rising weight exerts on health [6, 13, 17, 18, 19, 20, 21, 22, 23]. These results also raise questions as to what are the possible contributing factors, within the long-term care facility, that might be contributing to the increasing weight of the residents. The ability to draw a comparison between the weight trends witnessed in this research and the weight trends seen outside the long-term care facilities are truncated by the limited research examining the change in weight gain in the elderly population residing in the long term care facility. The health concerns related to the effect of overweight and obesity, in the elderly population, are just emerging [13, 25, 26, 27]. The current trend in the rising weight of the general United States population is being associated with the lack of physical activity, the increasing portion sizes of the food, frequent dining outside the home and the increasing time spent with technical devices such as television, computers and hand held devices which, in part, may be similar in the long-term care facility [17, 18, 19].

While examining these trends, it becomes apparent that

the Baby Boomer generation is experiencing a greater rise in weight than the Veteran generation. Individuals from the Veteran generation are the primary residents in the long-term care facilities in the United States today with the Baby Boomer generation poised for increasing admissions. With the focus and the policies of the long-term care facilities in America immersed in the prevention of weight loss of its residents, the rising percentage of residents experiencing weight gain may potentiate the same health concerns as experienced outside the long-term care facility for the Baby Boomers.

The federal and state policies, which have helped and continue to help nourish the poor, frail and sick elderly of yesteryear and still today, may now be jeopardizing the health of the current and future long-term care residents who are entering the facilities already overweight and obese. The residents admitted to the long-term care facilities in this study are weighing in, at the time of admission, with an average BMI of 25.9736 which, according to the World Health Organization [15], is considered overweight. Within an average of 137 days (~4.5 months), the residents have increased their BMI to 27, which is quickly approaching the criteria for obesity. This may be problematic given the estimated length of stay in a long-term care facility is 13.7 months [28].

These results reveal a startling trend in the increasing weight seen in the elderly population residing within the long-term care facilities in the United States. These results are consistent with the research of Lapane and Resnik [7] who examined the trends of overweight and obesity in nursing homes in the United States using data from the Systematic Assessment of Geriatric Drug use via Epidemiology database. Those researchers found that the residents within nursing homes across the United States were becoming increasingly fatter and that the residents who were obese were more likely to have been diagnosed with diabetes mellitus, arthritis, heart disease, hypertension, depression, and to have allergies. These results have also been substantiated by other researchers [19, 23], who found that the weight of new residents being admitting to the nursing homes was increasingly higher each year.

With the combination of the aging Baby Boomers and the current estimates predicting the percent of Americans who are over-weight or obese to reach 86% by 2030 [24], it is imperative that the long-term care facilities prepare themselves not only for the future over-weight and obese residents, but also for the prevention of further weight gain, within this population, after admission. While emerging research [29] is indicating that an increased BMI may be protective against certain cardiovascular related diseases, there remains concern with continued weight gain in the already overweight elderly individual. Investigating effective weight management within the elderly population is a new area of study. Friedrich [30] discusses the limited assessment and treatment modalities that target effective weight loss in the elderly and encourages individual assessment. In further studies [31] examining current literature that addresses effective weight loss techniques in the elderly population, behavioral interventions are being encouraged. As the number of the Baby Boomers residing in long-term care facilities begins to increase, residents have the potential to live longer than the current Veteran generation. However, with increased longevity comes the possibility of decreased quality of life and increased illness related to their adiposity. The development of effective weight management techniques will be critical to the health and wellbeing of the elderly now and in the future. Until the techniques are refined, it will be important to prevent further weight gain within this population. It will also be crucial to create new policy that embraces health promotion interventions to maximize the health status of the long-term care residents who are overweight or obese to prevent further weight gain of the newly admitted overweight or obese residents in long-term care facilities in the United States.

Acknowledgments

None

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