Financial Status and Body Mass Index of Middle-Aged and Older Men and Women

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Using data from the 2014 Health and Retirement Study (HRS), this study examined the association of financial status and body weight for retirement-aged men and women. The descriptive results show that more men (80.3%) were overweight or obese than women (77%). However, the prevalence of obesity was higher for women (46.3%) than men (39.2%), and obese women had significantly lower levels of income and net worth than those of normal weight and overweight women. The multivariate results indicate that poor financial status was significantly associated with high body mass index (BMI) for both men and women; however, poor health conditions played an even more important role than financial status in determining high BMI for men and women aged 51–64.

Keywords: body mass index (BMI), financial status, gender, health, quality of life

Americans aged 65 years or older represented 14% of the total population in 2014 (The World Bank, 2014). By 2050, this age group is projected to reach about 88 million, accounting for 20% of the entire population (Administration on Aging, 2014; Stats, 2016). The aging population has led to an important issue: how to finance the increasing longevity and quality of life for older adults (DeVaney, 2008). There is a significant association between financial status and retirement satisfaction, suggesting that wealth, debt, and income are important factors influencing the well-being of older adults (Bender, 2012; Jivraj & Nazroo, 2014).

There appears to be an overlooked element to the health-related quality of life through later years. Individuals facing financial distress, those with health problems, and those with high body mass index (BMI) may have difficulty with saving money to use in retirement. Being able to maintain quality of life through an extended life span can be dramatically influenced by financial conditions, health conditions, and personal habits associated with a healthy lifestyle (Michishita et al., 2016; Noone, Alpass, & Stephens, 2010).

In the United States, obesity rates have increased over the last 30 years (Ogden, Lamb, Carroll, & Flegal, 2010; Rosin, 2008). More than two in three adults in the United States are considered overweight or obese, and it is projected that 50% of the population will solely be obese by 2030 (Dor, Ferguson, Langwith, & Tan, 2010). The prevalence of obesity is similar (36%) for both men and women (National Institute of Diabetes and Digestive and Kidney Diseases, 2012). With the substantial increase in obesity over the past decades, it is now one of the major health concerns of the United States (Minet Kinge & Morris, 2010; Lehnert, Sonntag, Konnopka, Riedel-Heller, & König, 2013; Preiss, Brennan, & Clarke, 2013; Sinha & Jastreboff, 2013).

A substantial increase in the prevalence of obesity will contribute to an increase in the medical costs of obesity among the aging population (Cawley & Meyerhoefer, 2012; Parks, Alston, & Okrent, 2013; Sun, Webb, & Zhivan, 2010; Yang & Hall, 2008). Obese individuals have an increased likelihood of having multiple chronic illnesses, including coronary heart disease; type 2 diabetes; cancers (endometrial, breast, and colon); high blood pressure; high cholesterol; stroke, liver, and gallbladder disease; sleep apnea and respiratory problems; osteoarthritis; musculoskeletal disorders; and gynecological problems (Finkelstein, Fiebelkorn, & Wang, 2003; Yang & Nichols, 2011). Many of these illnesses have the potential to decrease quality of life, particularly in later years. Direct health care costs of obesity due to treatment of morbidity, and indirect costs due to lost

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productivity and forgone earnings caused by premature mortality could be a great challenge for older individuals (Colditz, 1999; Yang & Hall, 2008).

Economic status is a key that influences healthy food choices and healthy lifestyles (Larson, Story, & Nelson, 2009). Poor families have poor food choices under limited budgets; they often live in poor neighborhoods with more small food stores providing cheap, high-fat foods (Harrison et al., 2010). Previous studies found that household indebtedness was associated with adverse health; in particular, there existed a significant association between financial distress and psychological well-being (Gathergood, 2012; Starkey, Keane, Terry, Marx, & Ricci, 2013). Debt stress was associated with poorer health outcomes (Clayton, Liñares-Zegarra, & Wilson, 2015). Longer periods of holding debt, poverty, or low income (i.e., poor financial status) had a negative effect on health and such poor financial status could contribute to obesity (Keese & Schmitz, 2011). In previous studies, the association between debt burden and health outcomes is well documented; however, the association between poor financial status and body weight for older adults is not well known.

The current study focused on the association of poor financial status and high BMI among middle-aged and older individuals. Poor financial status can be measured by lower levels of income and wealth. Individuals' BMI is a reliable measure of body fatness that takes into account height and weight (National Heart, Lung, and Blood Institute, 2016). To reduce health care cost for individuals and the nation, and to enhance the economic well-being of older adults, it is crucial to investigate the association between financial status and body weight. Dealing with the issue of increasing obesity in this country should require multi-level approach through professionals in multiple-disciplines. Financial educators and health educators may need to work together to promote a budget and plan for a healthy diet and lifestyle. The findings can provide financial and health practitioners and counselors with insight into how they can develop a health-wealth program that specifically targets poor people with high BMI.

Literature Review and Hypotheses

Factors Contributing to Body Weight

Although the causes for the increases in obesity over the last 30 years are not fully understood, what is understood is that economic, technological, and social changes have created an environment conducive to weight gain (Lehnert et al., 2013; Rosenheck, 2008). Government policy, food industry, market, and environmental changes have influenced people's eating habits and food choices. Lifestyle choices such as hours of sleep, time spent watching television, workload, smoking, alcohol intake, and physical activity can influence how much weight an individual gains or losses over time (Haapanen, Miilunpalo, Pasanen, Oja, & Vuori, 1997; Mozaffarian, Hao, Rimm, Willett, & Hu, 2011). Several studies have also reported race, education, region, and gender as contributing factors of being obese (Levine, 2011; Wardle, Waller, & Jarvis, 2002; Veronese et al., 2016).

Government policies have encouraged production of the corn syrup industry through subsides. The growth of the corn syrup industry made unhealthy foods (e.g., high calorie and good tasting foods) more available in the market, particularly in poor communities. The cost of healthy food is linked to poor diet choices for people with low-income and living in poor communities (Harrison et al., 2010). Residential factors, such as unhealthy food choices in that community, can contribute to the prevalence of obesity (Corral et al., 2012). Consumption of fast food can increase the rate of overweight and obese people in the United States (Rosenheck, 2008). Over a long period of time, this eating habit could gradually increase body weight levels for the most Americans.

The prevalence of obesity has increased more rapidly for men than women in the past few decades (Sutherland, Christianson, & Leatherman, 2008). Manios, Panagiotakos, Pitsavos, Polychronopoulos, and Stefanadis (2005) examined the effect of Socioeconomic Status (SES) on the prevalence of obesity, and they indicated that men and women in the higher SES categories had a significantly lower prevalence of obesity than those in the middle and lower SES categories. The prevalence of obesity was higher in poor families (Pampel, Denney, & Krueger, 2012). Zhang and Wang (2004) examined gender differences in the relationship between SES and obesity, and found that there was a negative relationship between SES and obesity among women, whereas there was no significant relationship for men. Ogden et al. (2010) examined the prevalence of obesity by comparing income levels, race, education, and gender, and revealed that obesity prevalence was similar at all income levels among men; higher income women were less likely to be obese than lower income women.

The findings related to the associations between SES and BMI are inconsistent in previous literature. Obesity is especially prevalent among those with the lowest level of education and those with lower SES (Lee, Harris, & Gordon-Larsen, 2009). On the other hand, Fernald (2007) also examined the association between SES and BMI, and found that those with higher education and occupation had higher BMI in low-income Mexican adults. There is also evidence that there is a positive association between race and body weight, and was noted that there was higher prevalence of obesity among African American women across all socioeconomic strata (Walcott-McQuigg, 1995).

Using data from the 1992 Health and Retirement Study, Fonda, Fultz, Jenkins, Wheeler, and Wray (2004) examined the relationship between body weight and net worth for retirement-aged men and women. Their main hypothesis was that body weight was negatively related to SES. For women, they found that overweight and obesity related to lower net worth; while for men, overweight and obesity related to higher net worth, even when covariates were controlled (Fonda et al., 2004). Using the 2014 HRS data, the current study focuses on financial status and its association to body weight. While using the most recent data, knowledge on the association between financial and health behavior could contribute to the literature and provide insights for financial practitioners and educators such as putting financial and health practices together in their intervention programs. Healthy habits in finances and health can help people in most aspects of life (O'Neill, Xiao, & Ensle, 2017).

Financial Distress and Health Outcomes

There has been a growing amount of literature that examined the relationship between household indebtedness and health outcomes, indicating that household debt was a significant predictor of health (Grafova, 2007; Lau & Leung, 2011; Richardson, Elliott, & Roberts, 2013; Sweet, Nandi, Adam, & McDade, 2013). Being over-indebted could cause stress due to high repayment costs, and remaining in a high stress situation can cause physiological responses (Keese & Schmitz, 2011). Stress is a process where overwhelming emotions or a series of events result in adaptive or maladaptive processes required to regain homeostasis or stability; thus, high stress could affect eating behavior and weight-control behavior (Torres & Nowson, 2007; Walcott-McQuigg, 1995). High levels of stress from debt could contribute to higher obesity risk (Kivimäki et al., 2006; Mouchacca, Abbott, & Ball, 2013).

Research has shown a link between debt and depression, indicating that as individuals had financial stress due to debt problems, they were more likely to have depression (Bridges & Disney, 2010). Keese and Schmitz (2011) examined the effect of household financial indebtedness on different health outcomes (e.g., health satisfaction, mental health, and obesity), and suggested that household debt deteriorated the psychological well-being, whereas there were no significant relationships between household indebtedness and being obese. On the other hand, financial stress such as difficulty in paying bills influenced obesity, and prolonged financial stress was a significant predictor of obesity (Averett & Smith, 2014; Bridges & Disney, 2010; Siahpush et al., 2014).

The relationship between financial strain and mental health was examined, and the findings indicate that financial strain was a strong predictor of mental health (Selenko & Batinic, 2011). Lyons and Yilmazer (2005) found that financial strain did not contribute to poor health, but poor health conditions increased financial burden among poor people. It was also found that financial stress negatively influenced physical and mental health (Kim, Garman, & Sorhaindo, 2003). Sweet et al. (2013) also examined the relationship between financial debt and health, and revealed that debt was strongly associated with mental health, while the relationship between debt and physical health was not statistically significant. In the literature, while financial strain or financial stress was an important predictor of poor physical health, its impact on physical health was not consistently observed in previous studies.

Previous studies have examined the relationship between household indebtedness and health, and the effect of obesity on health outcomes and financial well-being. However, there have been only limited studies concerning the association between financial status and the prevalence of being overweight or obese for retirement-aged men and women. The association between poor financial status and obesity was stronger for lower income groups than for higher income groups (Mazzocchi & Traill, 2008; Zagorsky, 2005). However, a few studies examined to what extent financial status played a role in determining the levels of body weight among older adults, while controlling health factors.

Understanding the association between financial status and body weight would provide meaningful information to assist the aging community.

Hypotheses

The main objectives of this study are to examine (a) to what extent poor financial conditions are associated with high BMI, (b) whether there is a gender difference in this association, and (c) the role of poor health conditions on high BMI. Based on previous studies (Averett & Smith, 2014; Keese & Schmitz, 2011; Michishita et al., 2016; Sutherland et al., 2008; Yang & Hall, 2008), three main hypotheses are presented. Poor financial status positively relates to high BMI (H1); the association between poor financial status and high BMI is greater for women than men (H2); and poor health status positively relates to high BMI (H3). Since little is known about whether poor financial status relates to high BMI among middle-aged and older men and women, exploring these associations is important and timely. As the aging population grows, the findings of this study could inform financial educators and health professionals as they develop ways to improve the quality of life in later years through early intervention.

Methods

Data

This study employed the 2014 Health and Retirement Study (HRS), a nationally representative, longitudinal survey of individuals over 50 years of age. The HRS has been conducted every 2 years since 1992. It surveys more than 22,000 Americans aged 51 and above and their spouses. The main goal of the HRS is to provide data that enable research and analysis in support of policies concerning retirement, savings, and economic well-being of older households. The survey elicits information about income, income sources, assets, physical and mental health, out-of-pocket costs for all health-care services, family structure and care giving, intergenerational transfers, job status, and demographic characteristics. This study utilized the Rand HRS data file, which is a streamlined version of the HRS with derived variables that include imputations for income, assets, and other variables developed at Rand.

Sample

Using the 2014 Rand HRS data file, the sample for this study included male and female respondents aged 51–64. With respect to sample selection, observations for which there were missing values for one or more of the variables used in the analysis were dropped. To eliminate some skewedness in the wealth of the sample, cases with one million dollars or more in net worth were dropped. This process results in a total of 7,155 cases. There were few underweight (i.e., those with a BMI of less than 18.5) respondents (n = 205), males (n = 51) and females (n = 154). Since the primary focus of this study was overweight and obese males and females, underweight respondents (n = 205) were also excluded from the study sample. These selection criteria resulted in a final study sample of 6,950 respondents. The subsample consisted of 2,984 male and 3,966 female respondents. In the study sample, 65.5% of them were married.

Variables

Dependent variable. In the multivariate analyses, the dependent variable was the level of BMI and was included as a continuous variable in empirical models. Body Mass Index (BMI) is the ratio of weight (in kilograms) to height (in meters) squared. For descriptive analyses, BMI was categorized by three categorical variables: normal weight (BMI 18.50–24.99), overweight (BMI 25.0–29.99), and obese (BMI 30.0 and higher). This categorization was based on the definition of obesity provided by the National Heart, Lung, and Blood Institute (2016).

Independent variables. The independent variables consisted of three domains: financial status, health conditions, and demographics. Table 1 shows measurements of these variables. Financial status was measured by two variables: household income and net worth. In analyses, household income was classified into four income groups: bottom quartile (below 25%), second quartile (25–50%), third quartile (50–75%), and top quartile (above 75%). The bottom quartile was included as a reference group in the regression models. Net worth was calculated as all assets minus all liabilities, and it was included as a continuous variable in the regression models.

The health conditions were measured by four health variables: number of chronic illnesses, number of depressive symptoms, perceived health status, and functional limitation. Both chronic illness and depressive symptoms were included as continuous variables in the regression models. The chronic illness variable was the sum of the occurrence of any of eight items. The eight items include high blood pressure, diabetes, cancer, lung disease, heart disease, stroke,

TABLE 1. Variable Measurements and Sample Characteristics of Men and Women Aged 51–64 (*N* = 6,950)

Variables	Measurement	Mean (Median) Frequency (%)
Financial status		
Income:		$68,193 (46,000)
(Bottom quartile)	1 if total income ≤ $18,188, 0 if otherwise	1,737 (25.0%)
Second quartile	1 if total income $18,189–$45,878, 0 if otherwise	1,735 (25.0%)
Third quartile	1 if total income $45,879–$90,836, 0 if otherwise	1,739 (25.0%)
Top 25 quartile	1 if total income greater than $90,836, 0 if otherwise	1,739 (25.0%)
Net worth	Continuous, total household all asset–all liabilities	$163,039 (70,000)
Health conditions		
Chronic illness	Continuous, sum of conditions ever had including high blood pressure, diabetes, cancer, lung disease, heart disease, stroke, psychiatric problem, arthritis, range 0–8	1.9 (2.0)
Depressive symptoms	Continuous, CESD score, depression, thing is an effort, sleep is restless, felt alone, felt sad, could not get going, felt unhappy, not enjoyed life, range 0–8	1.7 (1.0)
Perceived health:		
Poor	1 if R's perceived health fair/poor, 0 if otherwise	2,140 (30.8%)
Good	1 if R's perceived health good, 0 if otherwise	4,224 (60.8%)
(Excellent)	1 if R's perceived health excellent, 0 if otherwise	581 (8.4%)
Functional limitations:		
Have ADL	1 if R having difficulty in daily activities, 0 if otherwise	1,095 (15.8%)
(No ADL)	1 if R having no difficulty, 0 if otherwise	5,855 (84.2%)
Demographics		
Age	Continuous, R's age (years)	58.5 (58.0)
Education years	Continuous, R's formal education attainment	12.8 (13.0)
Race/Ethnicity:		
White	1 if White, 0 if otherwise	4,006 (58.0%)
Black	1 if Black, 0 if otherwise	1,962 (28.4%)
(Others)	1 if Hispanics/Asians/Others, 0 if otherwise	982 (13.6%)
Region:		
Midwest	1 if R residing in the Midwest, 0 if otherwise	1,326 (19.1%)
West	1 if R residing in the West, 0 if otherwise	1,566 (22.5%)
South	1 if R residing in the South, 0 if otherwise	2,893 (41.6%)
(Northeast)	1 if R residing in the Northeast/Others, 0 if otherwise	1,165 (16.8%)
Dependent variable		
BMI[a]:	Continuous, body mass index (BMI)	30.0 (29.0)
Normal weight	1 if 18.5 ≤ BMI ≤ 24.99, 0 if otherwise	1,499 (21.6%)
Overweight	1 if 25.0 ≤ BMI ≤ 29.99, 0 if otherwise	2,443 (35.1%)
Obese	1 if 30.0 ≤ BMI, 0 if otherwise	3,008 (43.3%)

Note. Reference categories in the multivariate analyses are presented in parentheses.

[a]In multivariate analyses, the dependent variable is the level of BMI and included as a continuous variable.

psychiatric problems, and arthritis. The chronic illness was created by summing up the occurrence of any of these eight items. The CES-D, a self-report depression scale, was used to measure depressive symptoms. The scale was composed of eight items, including depression, everything is an effort, sleep is restless, felt alone, felt sad, could not get going, felt unhappy, and did not enjoy life. Self-reported perceived health was categorized as three dummy categorical variables, including poor, good, and excellent (reference group). The functional limitation variable was the sum of the number of daily living activities (e.g., getting out of bed, bathing, dressing, and eating) and was classified by two groups: having some difficulty (ranging from 1 to 4) and having no functional limitations in daily living activities (reference group).

The demographics of middle-aged and older men and women (e.g., age, education, race, and region) were included as controlling variables in the regression models. Age and education were included as continuous variables in the regression models. Race/ethnicity of the respondents was included as three dummy categorical variables: White, Black, and Hispanics/Asians/Others (reference group). Using census regions, region was categorized as four dummy categorical variables: Midwest, West, South, and Northeast (reference group).

Statistical Analyses

Percentages, means, and medians were calculated for all variables to obtain descriptive statistics of the total sample (Table 1). To compare the differences in financial status, health conditions, and demographic characteristics of middle-aged and older men and women by three BMI categories (e.g., normal weight, overweight, and obese), F-test and χ^2 test were completed (Tables 2 and 3). Ordinary Least Squares (OLS) regression analyses were performed to examine the association between financial status and the BMI level for men and women aged 51–64. The OLS regression analyses were also employed to investigate the role of poor health conditions in determining the high BMI for men and women between the ages of 51 and 64. To test the three main hypotheses, stepwise regression analyses were performed, and the OLS regression results from the three regression models for both men and women were presented (Tables 4 and 5).

Results

Sample Characteristics

As seen in Table 1, the mean level of BMI for typical individuals in the sample was 30. Specifically, 35.1% of the study sample were in the overweight category, whereas 43.3% were in the obese category, suggesting that 78.4% of the study sample, individuals at or near retirement, were overweight or obese. Less than a quarter (21.6%) of them were in the normal weight category. As for the information related to financial status, the mean level of total household income was $68,193 (median $46,000), while that of net worth was $163,039 (median, $70,000). In the study sample, 18.5% had zero or negative net worth.

The mean number of chronic illness was 1.9 out of 8, whereas the mean number of depressive symptoms was 1.7 out of 8. The majority of the sample reported good health (60.8%); however, about 31% reported their health as poor. While 15.8% reported that they had functional difficulty in daily activities, 84.2% reported no difficulty in daily activities. The average age of the sample was about 59 years old. The mean level of education was 12.8 years, which is about equivalent to a high school diploma. The majority of the sample was White (58.0%), and the largest percentage (41.6%) of the sample reported living in the South region.

A Profile of Financial Status and Health Conditions by BMI Classification

Men. Table 2 profiles the financial status, health conditions, and demographics of male adults nearing or at retirement by three BMI categories. Overweight men had greater levels of average household income ($74,066) and net worth ($189,162), as compared to those of normal weight and obese men. It is interesting to note that normal weight men had the lowest level of income ($70,330), while obese men had the lowest level of net worth ($149,903). Table 4 also shows that more of the obese men had chronic illnesses (2.1) and reported poor health (44.2%). However, more of overweight men (52.2%) reported their perceived health as excellent compared to normal (28.0%) or obese men (19.8%). It also shows that normal weight men had greater depressive symptoms (1.7), but they had less problems with functional limitations than those men who were in either the overweight or obese groups.

TABLE 2. Financial Status, Health Conditions, and Demographics Among Men by BMI (n = 2,984)

Variables	BMI Classification: Normal Weight (n = 587) (19.7%)	Overweight (n = 1,224) (41.1%)	Obese (n = 1,169) (39.2%)	Test Statistics
Financial status				
Income:	$70,330	$74,066	$73,149	$F = 0.34$
(Bottom quartile, ≤ $20,700)	26.3%	39.2%	34.5%	$\chi^2 = 33.22^{***}$
Second quartile, $20,701–51,012	19.8%	40.2%	40.0%	
Third quartile, $51,013–98,000	15.7%	42.3%	42.0%	
Top quartile, > $98,000	16.9%	42.5%	40.6%	
Net worth:	$166,675	$189,162	$149,903	$F = 8.29^{***}$
Zero or negative	26.3%	35.8%	37.9%	$\chi^2 = 18.22^{**}$
(Positive net worth)	18.3%	42.2%	39.5%	
Health conditions				
Chronic illness	1.5	1.6	2.1	$F = 50.33^{***}$
Depressive symptoms	1.7	1.4	1.5	$F = 3.97^{*}$
Perceived health:				
Poor	21.6%	34.2%	44.2%	$\chi^2 = 64.81^{***}$
Good	17.5%	42.9%	39.6%	
(Excellent)	28.0%	52.2%	19.8%	
Functional limitations:				
Have difficulty	20.5%	32.5%	47.0%	$\chi^2 = 16.64^{***}$
(No difficulty)	19.5%	42.5%	38.0%	
Demographics				
Age	58.8	58.7	58.5	$F = 1.80$
Education years	12.8	12.9	12.6	$F = 2.80^{+}$
Race/Ethnicity:				
White	18.0%	41.9%	40.1%	$\chi^2 = 13.44^{**}$
Black	23.9%	38.0%	38.1%	
(Hispanic/Asians/Other)	19.1%	43.4%	37.5%	
Region:				
Midwest	17.4%	41.2%	41.4%	$\chi^2 = 5.24$
West	20.1%	39.5%	40.4%	
South	20.0%	39.7%	40.3%	
(Northeast)	20.2%	42.9%	36.9%	

Note. Reference categories are presented in parentheses.
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

The results of χ^2 tests indicate that there was a significant association between race/ethnicity and BMI levels. Obesity or overweight was more common among all racial groups. Among White men, 18.0% were in the normal weight category, 41.9% were in the overweight category, and 40.1% were in the obese category. Among Black men, 23.9% were normal weight, 38.0% were overweight, and 38.1% were obese. A relatively higher proportion of men with Hispanic/Asians/Other races (43.4%) were found in the overweight category. Obese or overweight men were more common across four regions; however, higher proportions of obese men were found in the Midwest, West, and South regions than the Northeast region. Table 2 summarizes that obese men had lower levels of net worth and more physical health problems, and were less educated.

Women. Table 3 presents a profile of financial status, health conditions, and demographics among females by three BMI categories. The associations of the two financial status variables (i.e., income level and net worth) and BMI categories were statistically significant. Overall, obese women reported the lowest level of annual income ($56,548) and net worth

TABLE 3. Financial Status, Health Conditions, and Demographics Among Women by BMI (*n* = 3,966)

Variables	BMI Classification: Normal Weight (*n* = 912) (23.0%)	Overweight (*n*=1,217) (30.7%)	Obese (*n*=1,837) (46.3%)	Test Statistics
Financial status				
Income:	$80,129	$65,113	$56,548	$F = 24.62^{***}$
(Bottom quartile, ≤ $16,988)	19.4%	29.4%	51.2%	$\chi^2 = 56.28^{***}$
Second quartile, $16,989–42,000	20.3%	30.8%	48.9%	
Third quartile, $42,001–86,280	21.8%	30.8%	47.4%	
Top quartile, > $86,280	30.4%	31.8%	37.8%	
Net worth:	$219,691	$177,063	$115,403	$F = 74.30^{***}$
Zero or negative	19.0%	25.3%	55.7%	$\chi^2 = 33.92^{***}$
(Positive net worth)	23.9%	32.0%	44.1%	
Health conditions				
Chronic illness	1.5	1.8	2.4	$F = 147.89^{***}$
Depressive symptoms	1.7	1.7	2.1	$F = 11.63^{***}$
Perceived health:				
Poor	17.4%	27.4%	55.2%	$\chi^2 = 147.96^{***}$
Good	23.3%	31.6%	45.1%	
(Excellent)	42.6%	36.7%	20.7%	
Functional limitations:				
Have difficulty	16.8%	24.4%	58.8%	$\chi^2 = 50.34^{***}$
(No difficulty)	24.2%	32.0%	43.8%	
Demographics				
Age	58.3	58.4	58.4	$F = 0.16$
Education years	13.4	12.7	12.6	$F = 20.20^{***}$
Race/Ethnicity:				
White	27.6%	30.8%	41.6%	$\chi^2 = 130.82^{***}$
Black	13.5%	28.1%	58.4%	
(Hispanic/Asians/Other)	25.2%	36.1%	38.7%	
Region:				
Midwest	21.9%	28.6%	49.5%	$\chi^2 = 54.01^{***}$
West	29.0%	32.5%	38.5%	
South	19.1%	30.2%	50.7%	
(Northeast)	26.1%	32.6%	41.3%	

Note. Reference categories are presented in parentheses.
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

($115,403) than women of the other two BMI categories. A larger percentage of obese women (51.2%) was found in the bottom income group (income ≤ $16,988), while a relatively larger percentage of normal weight women (30.4%) were found in the top income group (income > $86,280). Obese women had greater mean levels of chronic health problems (2.4) and depressive symptoms (2.1) than those women in normal weight and overweight categories. More of obese women (58.8%) reported functional limitations than those overweight (24.4%) or normal weight (16.8%) women.

It is noted that normal weight women had a higher level of formal education than those of both overweight and obese women, whereas obese women had a lower level of education than that of overweight women. Obesity was significantly more common among Black (58.4%) and White women (41.6%), than among Hispanic/Asians/Other race women (38.7%). From Table 3, obese women can be described as those with low income (51.2%), no net worth (55.7%), more chronic illness problems (2.4), more depressive symptoms (2.1), and more functional limitations (58.8%). These

TABLE 4. OLS Results: Factors Associated With BMI for Men Aged 51–64 (*n* = 2,984)

	BMI Model 1		BMI Model 2		BMI Model 3	
Variables	**Estimated Coefficient**	***SE***	**Estimated Coefficient**	***SE***	**Estimated Coefficient**	***SE***
Financial status						
Income:						
Second quartile	0.93***	0.29	1.89***	0.29	1.15***	0.29
Third quartile	1.48***	0.30	1.84***	0.30	1.76***	0.31
Top quartile	1.39***	0.32	1.98***	0.33	1.96***	0.34
(Bottom quartile)						
Net worth	−0.19***	0.05	−0.17***	0.05	−0.17***	0.05
Health conditions						
Chronic illness			0.89***	0.08	0.95***	0.08
Depressive symptoms			−0.32***	0.06	−0.32***	0.06
Perceived health:						
Poor			1.92***	0.43	1.75***	0.43
Good			1.58***	0.37	1.47***	0.37
(Excellent)						
Functional limitations:						
Have difficulty			1.11***	0.33	1.06***	0.33
(No difficulty)						
Demographics						
Age					−0.10***	0.03
Education years					−0.08*	0.04
Race/Ethnicity:						
White					0.13	0.31
Black					−0.58	0.35
(Hispanic/Asians/Other)						
Region:						
Midwest					0.35	0.34
West					−0.23	0.33
South					0.04	0.30
(Northeast)						
Constant	28.78***	0.21	25.68***	0.41	32.586***	1.97
F	8.92***		29.35***		17.79***	
Adjusted R^2	0.01		0.08		0.09	

Note. Reference categories are presented in parentheses.
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

women tend to be Black (58.4%), and live in the South region (50.7%).

OLS Results of BMI Level

Men. Table 4 presents factors affecting BMI level among men (n = 2,984). The influence of financial status on BMI (Model 1), the associations among financial status, health conditions, and BMI (Model 2), and the associations among financial status, health conditions, demographics, and BMI (Model 3) were analyzed through stepwise regression models. In Model 1, all three coefficients associated with income quartiles were statistically significant, indicating that as the income levels increased, the levels of BMI significantly increased among men. On the other hand, as the level of net worth increased, the levels of BMI significantly decreased.

In Model 2, by adding four health-related variables (chronic illness, depressive symptoms, poor perceived health, and having functional limitations daily), adjusted R^2 improved from R^2 = .01 to R^2 = .08, indicating that the regression model became more significant. Similar to the results in Model 1, the coefficients associated with all three income quartiles were statistically significant and positive, suggesting that men in the lowest income category had lower BMI

TABLE 5. OLS Results: Factors Associated With BMI for Women Aged 51–64 (*n* = 3,966)

	BMI Model 1		BMI Model 2		BMI Model 3	
Variables	**Estimated Coefficient**	***SE***	**Estimated Coefficient**	***SE***	**Estimated Coefficient**	***SE***
Financial status						
Income:						
Second quartile	−0.27	0.31	0.15	0.31	0.29	0.31
Third quartile	−0.10	0.32	0.71*	0.32	0.90**	0.33
Top quartile	−0.93**	0.35	0.32	0.36	0.49	0.37
(Bottom quartile)						
Net worth	−0.60***	0.05	−0.43***	0.06	−0.32***	0.06
Health conditions						
Chronic illness			1.07***	0.08	1.06***	0.09
Depressive symptoms			−0.20***	0.06	−0.20***	0.06
Perceived health:						
Poor			2.39***	0.48	2.51***	0.49
Good			1.95***	0.41	1.89***	0.41
(Excellent)						
Functional limitations:						
Have difficulty			1.42***	0.34	1.40***	0.34
(No difficulty)						
Demographics						
Age					−0.11***	0.03
Education years					−0.03	0.04
Race/Ethnicity:						
White					0.49	0.34
Black					2.20***	0.38
(Hispanic/Asians/Other)						
Region:						
Midwest					1.11***	0.36
West					−0.06	0.36
South					0.63*	0.31
(Northeast)						
Constant	31.69***	0.22	26.91***	0.47	32.19***	1.96
F	48.56***		57.97***		38.73***	
Adjusted R^2	0.05		0.12		0.14	

Note. Reference categories are presented in parentheses. *SE* = standard error.
†p < .10. *p < .05. **p < .01. ***p < .001.

than men in higher income categories (second, third, and top quartiles). The relationship between net worth and the BMI level was also significant and negative. The significant coefficients associated with four health variables mean that the poor health conditions of men played an important role in their levels of BMI. Specifically, men with more chronic health problems, poor perceived health, and having functional limitations were more likely to have a higher BMI than men who had less chronic illness problems, excellent perceived health, and had no functional limitations. On the other hand, the relationship between the levels of depressive symptoms and BMI levels was negative, indicating that men with higher levels of depressive symptoms had lower levels of BMI.

While adding the demographic characteristics (age, education, race, and region) to Model 2, adjusted R^2 was further improved in Model 3. Like Models 1 and 2, the coefficients associated with the three income quartiles were statistically significant and positive. The findings suggested that men in the higher income groups had significantly higher levels of BMI than those in the lowest income group. Across the

three regression models, having lower levels of net worth was associated with higher BMI, suggesting that household wealth was an important indicator in decreasing their body weight. These findings partially support Hypothesis 1—poor financial status positively relates to high BMI. Like Model 2, the coefficients associated with all poor physical health-related variables were significant and positive, whereas the relationship between depressive symptoms and BMI level was significant and negative in Model 3. Thus, these findings support Hypothesis 3 —poor health positively relates to high BMI. Table 4 reveals that all else being equal, age and education had significant influence on levels of BMI, suggesting that, as age and formal education levels increased, the levels of BMI decreased.

Women. Table 5 presents the OLS results of the associations among financial status, health conditions, and demographics on BMI level among middle-aged and older women (n = 3,966). Unlike the male regression Model 1, only the coefficient associated with top income quartile was statistically significant and negative in the female regression Model 1, indicating that as compared to women in lowest income level, women in the highest income level had lower levels of BMI. Like the male regression Model 1, as the level of net worth increased, the level of BMI significantly decreased. Thus, it can be said that poor financial conditions were associated with higher levels of BMI among women in this age group. Thus, Hypothesis 1 is supported.

By adding four health-related variables to Model 1, adjusted R^2 improved from R^2 = .05 to R^2 = .12, indicating that the regression Model 2 became more predictive than Model 1. The coefficient associated with the third income quartile was statistically significant and positive in Model 2, indicating that as compared to the bottom income quartile, women in higher income levels (i.e., third quartile) reported higher levels of BMI. This result is similar to the male regression Model 2. The coefficients associated with all four poor health conditions were statistically significant in the female regression Model 2, suggesting that the poor health conditions of women played an important role in predicting their levels of BMI. It can be said that women with more chronic health problems, perceived poor health, and having functional limitations were more likely to have a higher BMI than women who had less chronic illnesses, perceived excellent health, and no functional limitations. Like the male regression model, the relationship between the levels of depressive symptoms and their levels of BMI was negative, indicating that women with higher levels of depressive symptoms had lower levels of BMI. Thus, these findings support Hypothesis 3.

In the full model (Model 3), the coefficient associated with the third income quartile was statistically significant, suggesting that women with an annual household income of $42,001–$86,280 had significantly higher BMI than women in the lowest income quartile (less than $16,989). Like the male regression Model 3, the association between age and BMI level was significant and negative, indicating that as men and women aged, their BMI levels significantly decreased. Unlike the male Model 3, women's race and residing region were statistically significant. The findings suggested that all else being equal, Black women had significantly higher levels of BMI than women of other racial backgrounds. It is also noted that women living in the Midwest and South regions were more likely to have higher levels of BMI than women living in the Northeast.

Summary, Discussion, and Implications

Using data from the 2014 Rand Health and Retirement Study, this study examined the association between financial status and body weight for middle-aged and older men and women aged 51–64. Descriptive results showed that more men in this age group were overweight or obese (80.3%) than women in this age group (77.0%), and this finding is consistent with findings in the previous study (Sutherland et al., 2008). However, women in this study sample showed higher obese rate (46.3%) than that of men (39.2%). The descriptive results also revealed that while normal weight women had higher levels of both income and net worth than the other two groups, overweight men had higher of both income and wealth than men in normal and obese categories.

The multivariate results showed that the relationships between financial status and BMI levels were statistically significant for regression models for both male and female samples. The OLS results for male and female models indicate that lower levels of net worth were positively associated with the high BMI level for both males and females. However, the association between income levels and BMI was more statistically significant in the male than female samples; thus, it can be said that wealth is a significant influence on body weight for both men and women, while

income is a more significant influence on BMI for men than women in this age group.

There were gender differences in the association between poor financial status and BMI levels. It is interesting to note that the wealthy group was the overweight group for men, whereas the wealthy group was the normal weight group for women. For example, overweight men had the highest level of net worth ($189,162) as compared to normal weight ($166,675) and obese ($149,903) men. On the other hand, normal weight women had the highest level of net worth ($219,691) as compared to overweight ($177,063) and obese ($115,403) women.

In the United States, the rate of overweight and obese individuals has increased more for men than women, over the past few decades (Sutherland et al., 2008). The descriptive findings show that overweight men had higher levels of income and assets as compared to men in the other two BMI categories. Twenty years ago, the men in this age group were often classified as normal weight; however, while shifting toward a more overweight and obese trend, overweight could now be viewed as normal weight for men in this age group. Policy makers might need to create public health programs to accommodate the increased obese population of men who are likely to need health care. Further, policy makers could assist with the development of programs that reward the public for healthy lifestyle choices, including physical activities and eating foods that are low in fat and sugar.

The findings, regarding the gender difference in the association between financial status and body weight, could imply that women with low wealth could be more likely to have higher health care costs in their future retirement period. Since women generally live longer than men, and have lower levels of net worth than men, elderly women could be more likely to require more health care at higher costs to themselves and society. Thus, the implications for individuals, practitioners, and society could include education in health and financial planning targeted specifically toward women. Women in early stages of life could receive education on the significant association between poor financial status and high BMI, and practice healthy lifestyles. Similar to maintaining good health, controlling their body weight could help to lighten the financial burden placed on society and to reduce financial stress for women individually.

The OLS results show that men in higher income quartiles had higher levels of BMI than that of men in the bottom income quartile; yet, women in the third income quartile had higher levels of BMI than that of women in the bottom income quartile. Women might have a stronger societal expectation to have low BMI, and generally speaking, some women base at least part of their self-worth on the way they look (Grabe, Ward, & Hyde, 2008; Paquette & Raine, 2004). Therefore, the better a woman feels about the way she looks, the more confident she will be in other areas of her life. However, men might not have the same societal expectation put upon them that women do. The findings of the current study are somewhat consistent with the previous study (Fonda et al., 2004), suggesting that greater weight might be related to social success for men, but not for women.

There is no question that obese people may pay more health care costs as they age than normal weight people (Dor et al., 2010). The major findings indicate that poor financial status was significantly associated with high BMI levels for both men and women. Information generated from this study could be useful in developing health education programs for individuals and families in poor economic status. One concept that is relevant for interventions is self-efficacy. The self-efficacy concept is a person's belief that they can succeed in a specific situation or to accomplish a task. Strecher, DeVellis, Becker, and Rosenstock (1986) addressed the role of self-efficacy in achieving health behavior, and suggested incorporating the enhancement of self-efficacy into health behavior change programs. It has been noted that losing weight improved financial position, and good physical health positively influenced the decision to contribute to a 401(k) retirement plan (Gubler & Pierce, 2014; Zagorsky, 2005). Thus, it might be useful for financial counselors and health educators to apply the self-efficacy concept in achieving healthy financial and health behaviors in the lives of the people they help (Lown, 2011; O'Neill, Sorhaindo, Xiao, & Garman, 2005).

There is no single cause of being overweight or obese, and no single approach that can help prevent or treat high BMI (National Institute of Diabetes and Digestive and Kidney Diseases, 2012). Identifying factors influencing high BMI could be informative to consumer educators, financial counselors, and policy makers because these professionals could be more capable of targeting at-risk individuals

and implementing necessary programs that could enhance quality of life through financial and physical health of individuals in old age. Since the causes of obesity are complex, it important for financial educators, health educators, dietitians, and policy makers to closely work together to help prevent and reduce the rate of high BMI (Goel, 2006). Individuals should be careful in maintaining physical activity in their lives to better prepare for unexpected health shocks and financial risks in old age. Healthy eating habits can help individuals avoid various health threats and prolong their physical well-being over their lifetime.

Elderly men and women who were overweight or obese spent more money on healthcare expenditures than those who were normal weight; these increasing expenses on healthcare and health problems could cause significant financial strain for older men and women (Yang & Hall, 2008). Those with obese BMI conditions tend to develop a relatively high risk of chronic diseases in the later stages of life (Centers for Disease Control and Prevention, 2012). Consumer educators working with the association between financial and health issues need to consider developing programs that help decrease weight gain and obesity. Considering that 78.4% of the sample in this study are obese or overweight, these health education programs could include physical activity workshops that outline rules of proper health activity and further detail good eating behaviors. Financial advisers and planners could also assist clients, especially those close to retirement, in making financial goals to build wealth against high health care expenses that were caused by obesity problems. Health care professionals (e.g., educators, physicians, and dietitians) could work in teams to provide interventions for those with high BMIs (Rippe, 1998).

Carr, Sages, Fernatt, Nabeshima, and Grable (2015) found that when individuals consciously choose healthy options (e.g., reading labels on food, exercise and diet, and searching for health information), they tend to choose good financial behaviors such as engaging in financial planning activities. Further, as a person makes good financial decisions, they have a greater chance to make smart health decisions (O'Neill et al., 2017). For example, if individuals create a budget, they may be less likely to go out to eat. Considering the connection between financial and health behaviors, it might be crucial for professionals or practitioners to tailor financial and health programs designed individuals in lower SES, (Smith 2004).

There are a few limitations to this study. First, the current study used cross-sectional data; however, using longitudinal data would have allowed for the observation of finances, physical health, and body weight changes over time. For example, wealth accumulation or wealth reduction over time might be linked to gain or loss of body weight over time, and this association could be measured in a longitudinal study design. If future studies examine the relationship between poor financial status and body weight over time, the findings could have more implications for preparing aging populations in the coming decades. Second, the current study did not include lifestyle variables such as eating and exercise habits of the respondents nearing or at retirement. Using secondary data, the empirical models did not include these variables that could better explain the high BMI levels. Third, since the focus of the study was to explore the relationship between financial status and BMI levels, only age, education, race, and region were included in the empirical models as demographics of individuals. However, other demographics such as marital status might need to be considered in future studies.

Relatively few studies have examined the association between financial status and body weight for middle-aged and older men and women. While the limitations inherent in the current study design mentioned above, it is hoped that the findings could provide insightful information for financial professionals and educators concerning the association between poor financial status and greater body weight, especially for women. If good financial and physical health conditions are now predictors of low healthcare expenses over the remaining life time (Sun et al., 2010), it is important for financial educators, planners, and counselors to recognize the association between poor financial status and high BMI. With knowledge in respect to the relationship between poor financial status and greater body weight, financial professionals could provide their clients with a holistic approach of achieving financial goals. Accordingly, ensuring the effective provision of financial advice based on their wealth, health, and body weight is important, and training these financial professionals is crucial.

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