In Sickness and in Health

An Examination of Marital Status and Obesity in the United States

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By

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Abstract

Using data from the 1999 and 2002 waves of the National Health and Nutrition Examination Survey (NHANES), I examine the relationship between marital status and the occurrence of obesity. Obesity rates have risen rapidly in the U.S. over the past several decades. Because it is unlikely that rapid biological or genetic changes are responsible for this pattern, understanding the social determinants of obesity is crucial to creating solutions to this health problem. Prior research indicates that married individuals have better self-assessed health. It is unclear, however, whether this association extends to specific health problems such as obesity. Results of the present study indicate that marital status is significantly associated with obesity. Specifically, married individuals are more likely to be obese then their never married counterparts. The present analysis also considers whether the average association of marriage with increased obesity differs across a range of sociodemographic characteristics including age, race, education, and gender.

Introduction

In recent years obesity has become increasingly more prevalent in the United States. Since 1980 Americans have experienced an astounding 10% mean body weight increase, and in a mere two decades, obesity cases have doubled (Jeffery and Utter 2003). This dramatic weight increase has been called an epidemic by some and is now considered the primary nutritional issue by national public health advisors. The relatively unexplained and unpredicted arrival of the rapid spike in obesity rates raises important questions about its etiology. Scientists argue that the obesity epidemic reflects environmental changes rather than biological evolution (French, Story, and Jeffery 2001). They blame the rise in obesity on changes in the social environment that have encouraged overeating and "under-exercising". Although a rise in energy intake (eating) and a decline in energy expenditure (exercising) is likely the root of the weight problem experienced by many Americans today, devising targeting solutions to this new epidemic requires a complete understanding of the full range of social and environmental factors that influence this process.

Marriage is one of the most fundamental institutions in society. Because it has been suggested that the rise in obesity rates is a response to the social environment, it is important to analyze social institutions as possible predictors of obesity. Although the majority of studies indicate that marriage is associated with better health and well-being, its consequences for obesity are far from clear. Recent research attempting to connect marriage and obesity has been unable to reach definitive conclusions. Because marriage is a fundamental institution in American society, it is important to identify its association with overweight and obesity and understand the social structural factors that shape this association.

In this paper I will demonstrate a relationship between marriage and obesity using two waves of data (1999-2000 and 2001-2002) from the National Health and Nutrition Examination Survey (NHANES). This survey includes information from 9,805 individuals residing in the United States. My analysis will provide a detailed interpretation of the effects that marriage may have on one's weight. Unlike much prior research, this study is based on data from a recent nationally representative sample of adults that includes objective assessments of body weight. A better understanding of the association between marriage and obesity will benefit the general population as well as researchers and public health officials interested in improving population health. In addition to analyzing the relationship between marriage and obesity, I also examine whether the association between marriage and obesity applies equally to all, or differs across sociodemographic groups defined by race, gender, education and age. Upon the conclusion of this analysis the relationship between marriage, obesity, and these sociodemographic characteristics should be well established.

Literature Review

Obesity

Because of its rapid and dramatic increase in the U.S., obesity has recently been classified as an epidemic by the U.S. Surgeon General (U.S. dept. of Health and Human Services). Adults who are overweight or obese are at higher risk for diseases such as type II diabetes, cardiovascular disease, musculoskeletal disorders, depression and/or emotional instability (Jackson 2002). An estimated 300,000 deaths per year are linked to obesity, making this a serious health concern (Allison et.al. 1999). Those who are overweight or obese experience lower quality of life, encounter greater disability, and require more health care than the non-obese. In addition to health concerns for those suffering from obesity, strain is also

placed on the American public in the form of health-care costs. In 1995, indirect and direct costs for obesity were estimated to be $99 billion, making up approximately 7% of the money spent on health care for the year (Wolf and Colditz 1998). A growing awareness of the obesity epidemic has sparked the interest of many researchers who hope to find a solution to this emerging health crisis. An attempt to better understand the root of this problem may help to provide answers that will in turn decrease the incidence of obesity in the U.S.

Marriage and Health

Numerous studies show that married men and women are healthier than those who never marry (Waldron 1996). Married couples show lower rates of mortality, morbidity, and better overall physical health (Ross et al. 1990; Arber 1991; Macintyre 1992). Two possible explanations have been proposed in order to explain this finding: the marital resource model and the crisis model (Williams and Umberson 2004). The *marriage resource* model asserts that marriage provides psychosocial and material benefits that enhance health. For example, studies show that marriage reduces risky behaviors and stress, while it increases social support and income (Ross et al. 1990; Wyke and Ford 1992). In addition to these benefits, marriage may also increase behaviors more directly beneficial to physical health- more stable eating patterns and higher levels of physical activity (Lipowicz et al. 2002; Umberson 1992; Anderson et al. 2004). These benefits should help reduce the occurrence of obesity and help individuals to maintain a healthy body weight. In contrast, the crisis model suggests that differences in the health of married compared to unmarried people are due more to the negative effects of marital dissolution on health than to the resources provided by entering marriage. This perspective is supported by research showing that health differences associated with marriage are greater when the married are compared to the previously married than when the married are compared to the never-

married (Williams and Umberson 2004). Regardless of the underlying process, both perspectives suggest that married people should have better health than the unmarried. If these patterns apply to health outcomes like obesity, we would expect obesity to be less prevalent among the married compared to the unmarried.

Past Research on Marriage and Obesity

Despite the better average health of the married compared to the unmarried, the limited research available suggests an opposite pattern with respect to obesity; those who are married appear more likely to be obese. Most previous research suggests that entering into marriage is associated with weight gain, while exiting marriage is associated with weight loss (Craig and Truswell 1990; Kahn and Williamson 1991; Umberson 1992; Kahn Williamson and Stevens 1991). Three possible explanations exist for the finding that marriage is associated with weight gain. First, entry into marriage provides new obligations in terms of eating that may not have been present prior to marriage (Sobal 1999). Married men and women typically develop more regular eating habits that result in higher caloric intake. Next, with respect to exercise, those who are married generally do not participate as frequently (Craig and Truswell; 1990). This may be explained by a lack of free time due to marital responsibilities and in many cases, the need to care for children. The third factor that may contribute to weight gain for married couples concerns the unhealthy behavior of smoking. Although the negative health consequences of smoking are well-established, studies show that smoking may be associated with decreased body weight. Individuals who are married are less likely to smoke and more likely to quit smoking, which, in turn, can lead to weight gain (Sobal et al. 2002).

Another reason that married people may be more obese than unmarried individuals is that exiting marriage may result in weight loss. For example, stressful life events such as divorce,

separation, or widowhood often lead to declines in health which are often accompanied by weight loss (Hobson et al. 1998; Miller Rahe 1997). Depression often results after a marriage ends and depressed individuals eat less, on average, than those who are not depressed (Ross 1994). Social support may also play a role in weight loss and gain. A loss in support as experienced by the divorced or widowed may result in a decline in weight (Hobson et al. 1998). Even so, the best evidence suggests that divorce and widowhood are crises from which individuals eventually recover (Booth and Amato 1991) and this may mean that any weight loss associated with marital dissolution is temporary. Thus, although we might expect that, on average, married individuals will be more likely to be obese than their previously married counterparts, this difference should be smaller than the overall difference in obesity rates between married and never-married individuals.

Previous studies attempting to examine the relationship between marriage and obesity have done so with compromising limitations. Past studies have relied on non-representative samples such as community or clinical populations. Findings from these samples can not be generalized to include the entire U.S. population and therefore are of limited value for understanding the link between marriage and obesity in the nation as a whole. Previous research has also relied on self-reports of weight, which may be biased. Those who are unmarried may be more likely to under-report their weight when compared to those who are married due to the social stigma faced by single men and women (Sobal 1992). Married individuals may be less likely to experience this stigma because they are no longer on the marriage market. Thus, married people may be more likely to report being overweight or obese than the unmarried, even if there are few differences in actual weight between these two groups.

There are also substantive limitations to previous research on the link between marital status and obesity. Studies have not given sufficient attention to considering whether differences between never-married and married individuals are greater than the differences between the previously married and the married. Analysis of these patterns may help to identify the processes that underlie any observed associations. For example, it is important to determine whether observed marital status differences in obesity are due to an increase in weight upon entering marriage, or a decrease in weight do to an exit from marriage. It is also likely that obesity is not influenced by marriage in the same ways for every individual. Thus, it is important to consider how other sociodemographic characteristics might moderate the association between marital status and obesity.

In addition to analyzing the married, never married and previously married, it is important to consider those who are cohabiting. Cohabitation has increased significantly in recent years, and coincidentally obesity has rapidly increased around the same time that cohabitation has increased. In order to establish or refute a correlation between cohabiting couples and obesity, a closer look is necessary. Most research indicates that cohabitation is associated with lower levels of commitment and greater rates of instability than marriage (Brown and Booth 1996; Bumpass and Lu 2000). Thus, maintaining one's body weight in order to remain attractive on the dating and/or marriage market is likely more of a concern for cohabiters than for married people. I, therefore, expect the body weight and obesity risk of cohabiters to more closely resemble that of the never-married than the married.

Marriage and Obesity depend on other Factors

Some evidence suggests that and the link between marital status and the prevalence of obesity may depend on other variables. Specifically considering gender, some theories suggest

that men should become more physically fit after marriage, while the opposite or no effect should be observed for women (Brajczewski and Rogucka 1993). Underlying this hypothesis is evidence that single men have poor eating habits and rarely visit the doctor. After getting married, however, these habits are replaced by healthier ones under the influence of a spouse (Umberson 1992). Umberson (1992) argues that men receive greater health benefits from marriage than women because marriage provides more social control for men. Women, however, report having other forms of social control in addition to their spouse, therefore marriage does not greatly affect health or health related behavior for women.

Other scholars point to possible negative consequences of marriage for women's body weight (Lipowicz et al. 2002). In many marriages, childbearing begins shortly after the marriage and for women, having children is often accompanied by an increase in body weight. In addition, having children may lead to a decline in free time, which previously could have been used for physical activity. Raising children also seems to increase the amount of snack foods contained in the household (Lipowicz et al. 2002). This may affect the woman more than the man for the simple reason that, on average, women spend more time at home caring for children than do men (Lipowicz et al. 2002).

Still others argue that gender may have the opposite effect on the association between marriage and obesity. Some studies show that men are more likely to become obese after marriage and women do not experience this weight gain (Sobal et al. 1992). Sobal states that women are more concerned with appearance than men, therefore after marriage women continue to monitor their weight while men are not inclined to do so. Single men feel the need to stay in shape in order to attract a spouse. After this goal is accomplished, men's desire to maintain their outer appearance may wane. Therefore, body weight will increase after marriage among men.

This weight increase is not seen in women because women are more concerned with appearance and therefore continue healthy behaviors in order to maintain their body weight.

Socioeconomic status is another variable that may influence the occurrence of obesity in individuals. Those of higher socioeconomic status have a tendency to be healthier and of normal weight when compared to their lower socioeconomic status counterparts (Lipowicz 2003). This association is likely due to a number of factors rooted in the social environment. First, education is a primary indicator of socioeconomic status and more highly educated individuals may have a better understanding of the risks associated with obesity. Those who do not have high levels of education may not know which foods are healthy, or that obesity can cause serious problems. Income may also influence the decision to eat healthy. Purchasing healthy foods like fresh fruits and vegetables can be expensive and, therefore, an option that is unavailable to the poor Residential location is also a factor. Several studies indicate that poor neighborhoods have a higher concentration of fast food restaurants and less availability of affordable grocery stores than more affluent neighborhoods (Anderson 2004).

These findings suggest that the association of marriage with obesity may differ by socioeconomic status, although the nature of its moderating role is far from clear. One perspective would predict that an association of marriage with increased obesity should be stronger among those of low socioeconomic status because they are at greater risk of obesity on average. On the other hand, if socioeconomic disadvantage is already strongly associated with obesity, then marriage may make little difference in changing obesity rates for this group. No research has previously considered the role of socioeconomic status in moderating the association of marriage with obesity. Identifying the groups for whom marriage (or socioeconomic status) is most strongly associated with obesity is important to designing

interventions that might improve health. Doing so is a central focus of this study. With respect to socioeconomic status, I consider how multiple indicators or correlates of SES—including education and race—moderate the association of marital status with obesity.

In connection with SES, race may also affect the relationship between marriage and obesity. Minority groups are disproportionately represented in lower socioeconomic strata and therefore it is expected that race will affect the association between marital status and obesity along the same lines as previously mentioned with SES. Minorities may be more likely to be overweight or obese because of lower education, lower income, and fewer resources. Lacking these vital tools may result in poor diet and/or other unhealthy behaviors. This study will further clarify the influence of race on the association between marriage and obesity.

In addition, it is important to discuss the influence of one's age as being a predictor of obesity. Some evidence suggests that obesity risk increases with age (Allison 1999). Because married individuals are, on average, older than the never-married or cohabiting, observed differences in rates of obesity for these two groups could simply reflect differences in age, rather than the effects of marriage, per se. If, however, analysis shows an association between marriage and obesity that persists across different age categories, the previously mentioned spurious relationship may be ruled out.

Hypotheses

Prior research and theory suggests the following six hypotheses regarding the association of marital status with obesity and overweight:

H1. Married individuals will be more likely than their unmarried counterparts to be obese or overweight.

H2. The difference between married and unmarried individual in obesity or overweight is greater when the married are compared to the never-married than when they are compared to the previously married.

H3. The body weight of cohabitors will more closely resemble that of never-married individuals than that of the married.

H4. Marital status differences in the prevalence of obesity and overweight (outlined in H1) will be greater for men than for women.

H5: Marital status differences in the prevalence of obesity and overweight will differ by education level and by race/ethnicity. Although the direction of this difference is difficult to predict, past research and theory suggest that the association will be stronger for those most at risk of obesity: those with low levels of education and non-white racial and ethnic minorities.

H6. The association of marital status with obesity and overweight is not spurious due to the joint association of age with both variables. The association will persist when examined separately across three different adult age categories.

Data and Measures

Data

Data are from the 1999-2000 and 2001-2002 waves of the National Health and Nutrition Examination Survey (NHANES). A nationally representative sample of 9,282 and 10,477 respondents were interviewed and medically examined in the 1999-2000 study and 2001-2002 study respectively. Data from the two waves were combined to create a cross-sectional sample of 19,759 U.S. residents). For the purpose of this project, however, the sample size was limited

to those 18 years of age or older to provide a sample of 11,441. Missing values in marital status, body mass index and education further reduces the sample size to n=9,805.

Measures

Body Mass Index. Body Mass Index (BMI) is a tool that is used to determine weight status for individuals. In order to calculate one's BMI, a person's weight in kilograms is divided by his/her height in meters. The resulting number is then used to determine whether the person is of normal body weight, overweight, or obese. I created three weight categories: normal (BMI<25), overweight (25≤BMI<30), and obese (BMI≥30). Cutoff points for these categories were created using information provided by Centers for Disease Control and Prevention (CDC).

Marital Status. The NHANES identifies six categories of marital status: married, widowed, divorced, separated, never married, and cohabiting. Because I am interested in comparing the married and the cohabiting to those who are never-married and those who were previously married, the divorced, widowed, and separated were combined into a single "previously married" category. Thus, the analysis distinguishes 4 categories of marital status: (1) married, (2) widowed/divorced/separated, (3) never married, and (4) cohabiting (never previously married).

Additional Variables. Other factors may influence the association of marital status with obesity. Those examined in the present study include gender, education, race/ethnicity, and age. Gender is measured with a dichotomous variable that distinguishes males from females. Age is divided into three categories: 18-35, 36-55, and 56 and older. Race/ethnicity is grouped into three categories: white, black, and other. This reassignment combined several groups that were present in the NHANES data into the "other" category. Education is measured with a

trichotomous variable representing less than a high school diploma, high school diploma, or greater than a high school diploma.

(Table 1 about here)

Results

Table 1 provides descriptive statistics for all variables used in the analysis. The mean value for BMI falls in the overweight category (26.3788). The standard deviation for BMI is 6.87766. This deviation from the mean demonstrates a large amount of variation about the average. In reference to marital status, those who were married comprised over half of the sample (51.07%). The remaining categories, widowed/separated/divorced, never married and cohabiting comprised 20.84%, 23.07%, and 5.02% of the sample respectively. The average age for this study was roughly 47 years of age with a standard deviation of 20.71460 years. The youngest participant was 18 years of age and the oldest was 85. The gender distribution was almost equal, with slightly more female participants than male (male: 47.15% female: 52.85%). Three race categories were created for the purpose of analysis: white, black and other. These categories represented 42.39%, 21.52% and 36.09% of the sample population respectively. Education level was diverse and relatively evenly distributed across groups. Of the total analytic sample, 36.40% had less than a high school diploma, 23.95% had obtained a high school diploma, and 39.65% had more than a high school diploma.

(Table 2 about here)

Marital Status and Body Weight

I first test Hypothesis 1, which states that married individuals are more likely than their unmarried counterparts to be obese or overweight. Table 2 demonstrates the relationship between BMI and marital status. In support of Hypothesis 1, the results indicate that married individuals

are less likely than those in every other marital status to be of normal weight. Specifically, 42.9% of married individuals are of normal weight, compared to 43.7% of the previously married, 53.4% of the never married and 48.8% of the cohabiting. These differences persist when examining the "overweight" category. Married individuals are more likely to be overweight than those in every other marital status category. Specifically, 31.6% of married individuals are overweight, compared to only 30.4% of the previously married, 25.7% of the cohabiting, and 23.7% of the never-married. While differences do appear in the obese category, these differences are not substantial across marital status groups. The Pearson Chi-Square value of 79.547 is statistically significant, indicating that the null hypothesis of no difference in BMI across marital status groups can be rejected.

Closer examination of Table 2 reveals support for Hypothesis 2: Marital status differences in obesity or overweight are greater when the married are compared to the never-married than when they are compared to the previously married. Individuals who were widowed, separated, or divorced demonstrated an average BMI that closely resembled participants who were married (normal BMI: 43.7%, overweight/obese: 56.3%). These findings show that married couples are more likely to be overweight or obese when compared to those who have never married. It can also be said that participants who were once married but divorced, separated, or were widowed demonstrate an average BMI close to the married, indicating that terminating a marriage does not have a substantial effect on one's BMI.

The results in Table 2 do not clearly support Hypothesis 3, which stated that the body weight of cohabiters should more closely resemble the body weight of the never-married than that of the married. Cohabiters do not closely resemble either the married or the never married; they form their own group. The proportion of cohabitors in the "normal" weight category falls

between that of the married and the never-married. Approximately 43% of married individuals have a normal body weight, compared to 48.8% of cohabitors and 53.4% of never-married respondents. This may be that some cohabitors intend to get married and therefore show behaviors and an average body weight similar to the married participants, while others have no intention of getting married and mirror the never married.

(Table 3 about here)

Gender and Body Weight

Next, I examine hypothesis 4 which states that the association between marital status and obesity will be stronger for men than women. Table 3 demonstrates the association between marriage and obesity separately for men and women. Results indicate that the previously established association between marital status and obesity persists when looking solely at men. 34.9% of married men were overweight compared to 24.0% of the never married, 32.2% of the previously married, and 31.5% of cohabiting men. With respect to obesity, 24.5% of married men were obese, while 20.8% of the never married and 19.1% of the previously married were obese. Surprisingly, 26.7% of cohabiting men were obese, making them the group most likely to be obese. For women, slightly different results were established and the trend seen for men is not observed. The group of women most likely to be overweight was the previously married (29.6%), while 28.0% of married women and 23.4% of never married women were overweight. Cohabiting women were least likely to be overweight, with only 21.4% falling in this BMI category. A similar trend is observed for obese women. 28.8% of the previously married, 26.6% of the married and 25.0% of never married women were obese, while only 24.5% of cohabiting women were obese.

In sum, the results generally indicate that never-married men are less likely than those in all other marital status categories to be obese or overweight. The exception to this pattern is previously married men who are less likely to be obese than men in other groups (but much more likely to be overweight). The chi-square value of 78.051 for men is large and statistically significant. In contrast, the association of marital status with obesity is much weaker for women, with the currently and previously married only slightly more likely to be overweight or obese than the cohabiting or never-married. The result is that, although the association of marital status with obesity is also statistically significant for women, the value of the chi-square is much smaller for women than for men (despite a larger sample size for women). These results suggest general support for Hypothesis 4, although it is important to note that chi-square statistics do not test whether the differences between men and women in the magnitude of the association between marital status and obesity are themselves statistically significant.

(Table 4 about here)

Education/Race and Body Weight

Hypothesis 5 states that the relationship between marital status and obesity will differ by education level and race/ethnicity. Examination of Table 4 shows the relationship between marriage and obesity in terms of race/ethnicity. Of the white participants, 30.4% of the married and 24.9% of the never married were overweight, while percentages for the previously married and the cohabiting were 27.0% and 27.5% respectively. A similar trend was observed for the obese with the married comprising the largest percentage and the never married the lowest.

Results for African-American respondents and White respondents are comparable with a few exceptions. For example, married African-Americans are more likely to be overweight than any other marital category making them similar to the White respondents. However, the

African-American cohabitors resemble the never married while the White cohabitors mirror the previously married in terms of being overweight. The data also shows that African-American cohabitors are more likely to be obese than their white counterparts.

Results for the final race category differ from those for white and black respondents. Among those who are not white or black (i.e., "other" category), 33.4% of the married, 25.1% of the never married and 38.3% of the previously married were overweight and those who were living together closely resembled the never married, with 26.1% of this group being overweight. In terms of obesity, 26.3% of the married, 21.4% of the never married, 26.1% of the previously married and 27.9% of the cohabitors were obese.

In sum, the findings for race do not support hypothesis 5. I expected to find a stronger association between marriage and obesity for minorities respondents compared to their White counterparts. The data shows, however, that white and black adults show similar values for chi square; 58.345 and 57.194, respectively, while all other races showed a much stronger relationship indicated by the chi square value of 131.898. This finding suggests that marriage and obesity do not depend on race in the way that is suggested in hypothesis 5. The association is stronger for some minorities, but not for all.

(Table 5 about here)

Table 5 displays the association between marital status and obesity across different education levels. Among those with less than a high school diploma, those who are married (34.4%) or previously married (30.6%) are more likely to be overweight than those who are never married (24.9%) or cohabiting (23.3%). With respect to obesity, however, the cohabiting (32.5%), married (27.1%) and the previously married (28.1%) are all more likely to be obese

than the never married (22.5%). The Chi-Square statistic for the association of marital status with BMI among those with less than a high school diploma is 53.469 and highly significant.

With a few exceptions, the association between marital status and obesity is similar for those with less than a high school diploma and those with a high school diploma. However, the magnitude of the association appears slightly weaker for those who have obtained a high school diploma. Of those with a high school diploma, the married, previously married, and cohabiting are more likely to be overweight than the never married. In terms of obesity, however, the previously and never married fall between the married (27.8%) and the cohabiting (22.1%). The chi-square statistic for the association of marital status with BMI is also significant for this group.

Differences in rates of obesity by marital status are substantially weaker for those who have more education than a high school diploma compared to others, as is evidenced by the relatively smaller chi-square statistic for this group. Still, the association is significant at the .01 level. Although the married (29.9%) and the previously married (29.1%) are slightly more likely to be overweight than the never married (23.9%) and the cohabiting (23.4%), the difference is not as substantial for obesity. In sum, I find support for Hypothesis 5 with respect to the impact of education on the association between marital status and obesity. Marital status is more strongly associated with the prevalence of obesity and overweight among those with lower levels of education.

(Table 6 about here)

Age and Body Weight

Finally, I examine hypothesis 6, which states that the association between marital status and obesity is not spurious because of the association that exists between age and both marital

status and obesity. The results are presented in Table 6. Among the youngest respondents (18-35), the married (30.3%) and the previously married (29.3%) are more likely to be overweight than the never married (23.0%) and the cohabiting (25.4%). This is also seen in terms of obesity; however, the differences between marital categories are slight. The chi-square statistic for the association of marital status and BMI among younger adults is large and statistically significant.

A different pattern is observed among mid-life respondents. For those who are 36-55 years of age, the association of marital status with BMI is very weak. Few differences exist between the married and the unmarried in rates of obesity or overweight among adults in mid-life. Not surprisingly, the Chi-Square statistic is not significant, indicating that we cannot reject the null hypothesis of no significant difference in BMI by marital status for mid-life adults. As observed for young adults, married older adults are more likely to be overweight (34.8%) or obese (26%) than the never married (33.3% overweight and 23.6% obese), However, among older adults, the BMI of cohabiting individuals more closely resembles that of the married than that of the never-married. Moreover, for older adults, the previously married are substantially less likely than those in other marital status categories to be overweight (29.3%) or obese (25.6%). This suggests that for older adults exiting marriage may lead to weight loss and entering marriage (or cohabitation) may lead to weight gain. The association between marital status and obesity among older adults is statistically significant at the .01 level.

In sum, the association of marital status with obesity clearly depends on age. However, the pattern of age variations does not indicate that the previously observed average association of marital status with age is completely spurious due to the greater likelihood of marriage and obesity among older compared to younger adults. That the association is not significant for mid-life adults suggests that age may explain part of the association. However, it also appears that the

processes underlying marital status differences in BMI differ by age. For younger adults, the biggest differences in BMI are seen when the never-married (or cohabiting) are compared to the married or previously married. In contrast, for older adults increases in body weight may accompany marriage or cohabitation but exiting marriage may also result in weight loss.

Discussion

In recent years the numbers of obesity cases have progressively increased in the United States. According to the NHANES, an estimated 30% of Americans over the age of 20 are obese. This means that 60 million Americans have a body mass index of 30 or higher. Given the sharp rise in obesity rates, it is necessary to examine the social correlates of this epidemic in order to offer constructive solutions. Because marriage is a fundamental social institution that is strongly associated with health and well-being, the present study considers the association of marital status with obesity and overweight among adults. Prior studies have attempted to address this issue but have been limited by small non-representative samples and the reliance on self reports of body weight. Thus, it is unclear whether the findings of previous research can be generalized to the United States as a whole. The present study builds on the findings of past research by analyzing survey and clinical data from a nationally representative sample of 9,805 individuals.

The overall findings indicate that those who are married are more likely to be overweight or obese when compared to those who have never been married. Moreover, the previously married more closely resemble the married than do the never-married. This suggests that entering marriage may increase body weight significantly more than exiting marriage decreases it. The present study was not designed to test the mechanisms through which marriage might

increase body weight, but past research offers some insight. Most of those who marry eventually have children and many families with children keep unhealthy snack foods in the home that are consumed by both the children and adults (Lipowicz 2002). Moreover, the parenting of young children is stressful and stress is associated with overeating and weight gain (Gove 1983). Exiting a marriage would presumably reverse the effects of a marriage on body weight, but the present results do not support this conclusion. It may be that gaining weight is simply easier than losing it. The next step for research on marital status and obesity is to identify the precise mechanisms responsible for the pattern of findings presented here. Such information could be used to target interventions designed at reducing obesity among married individuals.

The general finding that married individuals are more likely to be overweight or obese than the never married is observed for both men and women when each gender is analyzed separately. It does appear, however, that men who were previously married have a lower BMI than their married counterparts, possibly due to the exit from marriage. However, a similar pattern was not observed among women. In fact, previously married women are slightly more likely to be obese or overweight than married women. This finding suggests that men and women react differently after ending a marriage. It could be that depression evokes different responses from men and women; women may eat more, while men eat less. This finding may also be explained by the influence of children. Typically women obtain custody of children following a divorce. Because of the presence of children, divorced women may be more likely than divorced men to have snack foods in the home or to shoulder the burden of parenting-related stress. Both of these factors may lead to increased obesity risk for women but not men following divorce

Recently, cohabitation has become an increasingly more prevalent family form. However, the reasons for cohabitation differ. Some couples opt out of marriage and instead choose cohabitation, while for others cohabitation is a pre-marriage stepping stone (Cherlin 2004). Perhaps for this reason, the pattern of results for the BMI of cohabiting individuals compared to others is complex. In some cases, those living together closely resemble the never married, but other times these individuals mirror the married. It may be that the individuals who cohabit prior to marriage resemble the married in terms of obesity, while the individuals who cohabit instead of marriage more closely resemble the never married. Future research should consider whether the link between cohabitation and obesity differs for cohabitors who plan to marry and those who are cohabiting as an alternative to marriage.

When examining marriage and obesity by race, white and black adults followed the general trend established previously, while those who fell in the "other race" category did not show these same results. This discrepancy between racial categories may be rooted in the subtle cultural differences among race and ethnic groups that both govern norms about marriage and influence dietary behavior. Although explanations for this pattern are beyond the scope of this study, it is important to note that a majority of those in the "other race" category are Hispanic. Given the projected growth of the Hispanic population in the U.S. (U.S. Census Bureau 2004) and the likelihood that marriage is likely to remain a fundamental social institution, it is especially important to understand the mechanisms that link marriage with increased body weight among this population. Qualitative research may be particularly useful in this regard as it is well-suited to understanding beliefs and norms that govern cultural patterns of behavior.

The findings with respect to age when examining the relationship between marriage and obesity were generally what might be expected, with one exception. Marriage is associated with

greater rates of obesity among young and older adults, but not for mid-life adults. The primary reason for examining age differences was to determine whether the link between marital status and obesity is spurious. In other words, married people may be more likely to be obese simply because they tend to be older than non-married people and obesity generally increases with age. Although I cannot entirely rule out this possibility, the observation that married people are more likely to be obese than the unmarried in both the younger age group and the older age group suggests that age does not completely explain this association. Multivariate analysis that allows age to be more fully controlled is an important next step in attempting to disentangle the complex association between age, marriage, and obesity.

It is unclear why marriage does not influence obesity rates among mid-life adults. It may be that a range of other factors are simply more important in increasing obesity risk for married and unmarried individuals alike at this life course stage. For example, some evidence suggests that stress substantially increases in mid-life especially for women due in part to increasing financial obligations, job stress, and parenting concerns (Mirowsky 1996). Metabolic changes that accompany aging may also play a role. These factors may converge in mid-life to influence obesity regardless of marital status. In addition to age, other markers in life may also play a role in determining obesity. Future studies should consider the role of family lifestyle, including the ages of children in the home in shaping obesity risk for individuals of all marital statuses.

The strengths of this project include a large, nationally representative sample as well as a reliable data set. Due to the nature of cross-sectional analysis, however, it is possible that the observed association between marriage and obesity is due in part to selection. In other words, rather than marital status influencing body weight, body weight may influence the probability of entering and remaining in a marriage. However, the specific pattern of results observed make it

unlikely that selection is at work. In order for selection to explain the pattern of results described here, one would have to argue that obese individuals are more likely to marry than those of normal weight. This is in sharp contrast to research which indicates that individuals with health problems are less likely to marry (Lipowicz 2002). Thus, it is unlikely that obesity increases the probability of marriage. Even so, future research should use longitudinal data in order to better determine the relationship between marriage and obesity. Longitudinal data would allow for an examination of the association between changes in marital status with changes in body weight, thus more clearly establishing causal order.

A primary limitation of this study is that it relies exclusively on bivariate analyses. Multivariate analysis provides the researcher with a greater ability to control for a full range of characteristics that might influence the association of marital status with body weight. Other variables that might be associated with both marital status and body weight should be controlled in future multivariate analyses. These include income, religious affiliation, parental status, employment status, and psychological well-being.

It is also possible that multiple social characteristics interact to moderate the association between marital status and obesity. For example, the present study found that differences in body weight between the married and unmarried are greater for men than for women. It is possible, however, that these gender differences differ by age or educational status. Future multivariate analyses should also consider complex interactions between race, gender, age and other important social structural variables in moderating the link between

In conclusion, the present study contributes two overall findings in this area of research. First, prior research indicates that marriage is associated with better health and well-being. My findings suggest that the benefits of marriage for health and well-being are outcome-dependent.

The next step in research on marriage and health is to identify which health behaviors and risks are reduced with marriage and which are increased. Second, obesity is a public health crisis that is clearly linked to the social environment. Therefore, efforts to control obesity require an understanding of the complex interplay between the full range of social and structural characteristics that increase obesity risk. The results of this research suggest that marriage is a risk factor for obesity, especially for men and especially for younger adults and those with low levels of education. It is hoped that this information will be useful to medical and public health professionals in designing targeted interventions to reduce obesity among the groups most vulnerable to it.

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