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ADULT AND PRE-ADULT SOCIOECONOMIC INDICES AND PRE-PREGNANCY OVERWEIGHT AND OBESITY

By

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ABSTRACT

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In light of the overall increase in overweight and obesity in the general population, it is not surprising that the prevalence of pre-pregnancy overweight and obesity have also dramatically increased over the past decade. The main objective of this study was to examine associations between adult and pre-adult socioeconomic factors, SES mobility, and pre-pregnancy overweight and obesity. Pre-pregnancy overweight and obesity were calculated based on self-reported height and weight in a sample of 2876 women, aged 15-47 years old who participated in the prospective Pregnancy Outcomes and Community Health (POUCH) study between 1998 and 2004. In White/other women: low SES in pre-adulthood was associated with pre-pregnancy obesity, AOR (adjusted OR) = 1.9 (95% CI=1.4-2.7) and low SES in adulthood was associated with pre-pregnancy overweight, AOR = 1.7 (95% CI=1.2-2.4). In both White/other and Black women: low SES in adulthood was inversely associated with pre-pregnancy obesity, AOR = 3.4 (95% CI=2.4-4.8) and 2.8 (95% CI=1.4-5.9), respectively. Social mobility also had an effect on risk of pre-pregnancy overweight and obesity and results varied by race/ethnicity. The findings suggest that ongoing public health interventions are needed to continue encouraging women to adopt or maintain healthy behaviors before pregnancy with a particular focus on the poor and minorities.

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INTRODUCTION

Maternal pre-pregnancy overweight and obesity have been associated with multiple complications both in the mother and her offspring. Pre-pregnancy overweight and obesity have been shown to increase mother's risk for chronic hypertension, gestational hypertension, (Bodnar, Catov, Klebanoff, et al. 2007; Samuels-Kalow, Funai, Buhimschi, et al. 2007) and pre-eclampsia (Baeten, Bukusi, Lambe, et al. 2001; Bodnar, Ness, Markovic, et al. 2005; Bodnar, Catov, Klebanoff, et al. 2007; Samuels-Kalow, Funai, Buhimschi, et al. 2007). In at least one report, women who experienced hypertensive disorders during pregnancy and were either overweight or obese prior to being pregnant were at increased risk of dying during the antenatal or postpartum period (Samuels-Kalow, Funai, Buhimschi, et al. 2007). Pre-pregnancy overweight and obesity have also been linked to a higher risk of developing gestational diabetes (Baeten, Bukusi, Lambe, et al. 2001). Gestational diabetes increases the risk of having a large-for-gestational age (LGA) fetus, which in turn can lead to a more difficult labor and delivery (Casey, Lucas, Mcintire, et al. 1997). Gestational diabetes has also been linked to congenital central nervous system defects (Anderson, Waller, Canfield, et al. 2005), other types of defects (Waller, Shaw, Rasmussen, et al. 2007), and development of type II diabetes (Dabelea, Hanson, Lindsay, et al. 2000) overweight, and obesity in offspring (Plagemann, Harder, Kohlhoff, et al. 1997, Dabelea, Hanson, Lindsay, et al. 2000). Pre-pregnancy overweight and obesity have also been associated with increased risk of cesarean deliveries, irrespective of gestational diabetes (Baeten, Bukusi, Lambe, et al. 2001).

Despite society's knowledge of the problems associated with overweight and obesity, the prevalence of overweight and obesity have dramatically increased over the past several decades among women, men, and children in the United States (U.S.) (Flegal, Carroll, Kuczmarski, et al. 1998; Flegal, Carroll, Ogden, et al. 2002; Caban, Lee, Fleming, et al. 2005; Wang & Beydoun 2007). Mean body mass index (BMI) for women went from 25.3 in 1976-1980 to 28.2 kg/m^2 in 1999-2000. Using these data, the authors projected that in the next 10 years, women's mean BMI will be at the level of obesity, a substantial shift from the present mean, which is in the overweight range (Wang & Beydoun 2007). In light of the overall increase in overweight and obesity in the general population, it is not surprising that the prevalence of pre-pregnancy overweight and obesity have also dramatically increased in the 1990s (Kim, Dietz, England, et al. 2007). At least two studies have noted that the prevalence of obesity has increased at a faster rate in women of childbearing age (Kim, Dietz, England, et al. 2007; Wang & Beydoun 2007), a phenomenon that may serve to increase the incidence of adverse maternal and fetal complications.

Both overweight and obesity are more common among individuals of lower socioeconomic status (SES) and among certain racial/ethnic minorities, particularly blacks (James, Fowler-Brown, Raghunathan, et al. 2006, Wang & Beydoun 2007; Zhang & Wang 2004b). As highlighted by the 2003 Institute of Medicine report '*Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*" (Smedley, Stith, Nelson, et al. 2003) and other studies (Luo & Waite 2005,. the underlying causes of this disproportionate burden of overweight and obesity are complex, incompletely understood, and merit further investigation.

Numerous studies have examined SES factors in childhood and their association with overweight and obesity in childhood and adulthood (Chu, Rimm, Wang, et al. 1998; Dietz 1998; Hardy, Wadsworth & Kuh 2000; Jolliffe 2003). Fewer studies have compared SES factors in childhood and adulthood (Greenlund, Liu Dyer, et al. 1996; Lahmann, Lissner, Gullberg, et al 2000; Giskes, Lenthe, Turrell, et al. 2008; Parson, Power, Logan, et al. 1999) or evaluated whether changes in SES status from childhood to adulthood are associated with overweight or obesity (Goldblatt, Moore & Stunkard 1965; Braddon, Rodgers, Wadsworth, et al. 1986; Blane, Hart, Smith, et al. 1996; Langenberg, Hardy, Kuh, et al. 2003; James, Fowler-Brown, Raghunathan, et al. 2006). In the case of pre-pregnancy BMI, it remains uncertain whether pre-adulthood SES, adult SES, or changes in SES across the life course are more strongly associated with overweight and obesity. In addition there are little data on which SES factors are most strongly linked to pre-pregnancy overweight and obesity. In this study, I sought to address four general questions: (1) Is there an inverse association between Adult SES and pre-pregnancy overweight and obesity? (2) Is there an inverse association between pre-Adult SES and pre-pregnancy overweight and obesity? (3) Is there a positive association between SES mobility and pre-pregnancy overweight and obesity? (4) Are the above associations modified by race/ethnicity?

BACKGROUND

Obesity and SES

Most studies have found an inverse association between obesity and SES (Brunner, Marmot, Nanchahal, et al. 1997; Croft, Strogatz, James, et al. 1992; Kuskowaka-Wolk & Pergstrom 1993; Jeffery, French, Forster, et al. 1991, Leigh, Fries & Hubert 1992; Sobal & Stunkard 1989; Wamala, Wolk, & Orth-Gomer 1997; Zhang & Wang 2004a). In an extensive review of studies published from the 1960s through the mid-1980s, Sobal and Stunkard (1989) reported that the majority of studies (75%) on women from developed countries, not including the U.S., found an inverse association between SES and obesity. The majority of studies (93%) on women from the U.S. also reported an inverse association between SES and obesity. Interestingly, in a more recent extensive review of studies from 1988-2004, McLaren (2007) also found that the majority of the studies (63%) on women from highly developed countries, including the U.S, found a negative association between lower SES and higher body size. It appears that over the past three decades, the magnitude of the inverse relation between SES and obesity observed in the U.S. has declined slightly (Flegal, Harlan & Landis 1988, Zhang & Wang 2004b; Chang & Lauderdale 2005; McLaren 2007; Wang & Beydoun 2007). Nonetheless, there is still a significantly higher proportion of individuals of lower SES compared to those of higher SES who are overweight and obese, across all ages (Wang & Beydoun 2007).

Socioeconomic Measures: A Review

Socioeconomic status is most often operationalized as education, occupation, or income or as composite of two of the above constructs (McLaren 2007). Many studies have viewed education, occupation and income as equivalent measures of SES because they tend to be highly correlated. There is increasing evidence that suggests that education, occupation and income might have distinct effects on health outcomes, (Sobal 1991; Galobardes, Smith & Lynch 2000; Herd, Goesling, & House, 2007; Kelaher, Paul, Lambert, et al. 2008), and therefore initial analyses should examine these SES factors separately. In line with this thinking investigators are increasingly calling for caution when using these SES indicators interchangeably (Herd, Goesling, & House, 2007; Geyer, Hemstrom, Peter, et al. 2006). For example, Davey, Hart, Hole, et al. (1998) found that when education and occupation were modeled together as covariates, occupation was the most powerful discriminator of all cause mortality. In a more recent study, Herd, Goesling and House (2007) found that variations in the onset of functional limitations and chronic health problems were explained more by education than income. On the other hand, they concluded that the progression of these health problems were more closely associated with income than education. The studies reviewed below, provide further insight into the potentially different associations of obesity with education, occupation, and income.

Education and Obesity

Education is the indicator most often used to define SES (McLaren 2007). Most studies have consistently found an inverse association between SES and obesity for

women in developed countries (McLaren 2007) such as the U.S. (Flegal, Harlan & Landis 1988; Leigh, Fries & Hubert 1991; Zhang & Wang 2004b), U.K. (Wardle, Waller & Jarvis 2002), Sweden (Lahmann, Lissner, Gullberg, et al. 2000) and Finland (Rissanen, Heliovaara, Knekt, et al. 1991). Some researchers have suggested that education is a good proxy of adult social class because it is very stable and unlikely to change, whereas occupation and income might change over a number of years (Zhang & Wang 2004b; Parson, Power, Logan, et al. 1999). Of course this would not necessarily hold for studies of young adults.

Studies that have used educational attainment of parents as a measure of SES have also found an inverse association with obesity in adulthood among offspring. For example, in a recent study conducted in the U.S., a low educational level in a woman's father was associated with an increase risk of her being obese as an adult (Greenlund, Liu, Dyer, et al. 1996). Interestingly, the women's mother's education had no effect. Altogether, these studies clearly suggest that the educational level of the individual and perhaps his or her parent impacts a person's health. Higher educational level seems to serve as a protective factor against overweight and obesity, while lower educational level appears to be a risk factor for being overweight or obese.

Occupation and Obesity

Occupation may be the best measure of post-education SES (Krieger, Chen, Coult, et al. 2005). When occupation has been used to indicate SES, researchers have consistently found an inverse relation between SES and obesity for women in developed countries (McLaren 2007). In a study of Swedish women, a lower occupation class in

adulthood was related to higher BMI (Lahmann, Lissner, Gullberg, et al. 2000), and low occupational class of the women's parents was also linked to a woman's risk of obesity, even after adjusting for her occupational class. In a British cohort study that used a somewhat simplified categorization scheme for occupational class (manual vs. non-manual), individuals whose parents were in the manual occupational class were at greater risk of obesity in adulthood after adjusting for adult SES and educational attainment (Hardy, Wadsworth & Kuh 2000).

Income and Obesity

Some investigators have proposed that income is a better indicator of SES than education and occupation, because income more completely captures material resources and is highly correlated with education and occupation (Zhang & Wang 2004a). In addition, income directly reflects potential access to healthier living environments such as improved and safer housing and neighborhoods with increased access to recreational and physical activity centers and parks as well as grocery stores with a variety of healthier food selections

A study in the U.S. reported that mean BMI was inversely associated with family income for women of child bearing ages 18-34 during the period 1960-1980 (Flegal, Harlan & Landis 1988). In another study, the authors also found that family annual income of women ages 18-60 years was inversely associated with risk of obesity in adulthood (Zhang & Wang 2004a), and data from the 1971-2002 National Health and Nutrition Examination Surveys (NHANES) showed an inverse relation between income

and BMI throughout the survey period in Black and White women (Chang & Lauderdale 2005).

Other SES Indicators and Obesity

Public assistance status (often times categorized – yes/ no) and housing situation (usually categorized – own/rent) are two additional indicators that have been used as proxies for SES (Wardle, Waller & Jarvis 2002). In the Wardle, Waller & Jarvis (2002) study, it was found that receiving government financial assistance was associated with becoming obese while housing situation was not, even after controls (age, marital status, and ethnicity) were included in the analyses.

SES Mobility and Obesity

Few studies have considered a life course perspective and changes in socioeconomic status in relation to adult BMI. Parsons, Power, Logan, et al. (1999) conducted a systematic review on childhood factors associated with adult obesity in developed countries, including the U.S. Three studies covered in the review (Goldblatt, Moore & Stunkard 1965; Braddon, Rodgers, Wadsworth, et al. 1986; Blane, Hart, Smith, et al. 1996) examined the effects of social mobility over the life course on risk of obesity, and two of the three studies incorporated women. Overall these studies found the prevalence of obesity was lower in women experiencing upward mobility as opposed to downward mobility, while in men no relationship was found between social mobility and obesity in adulthood.

Two other studies have presented similar evidence of the association between social mobility and risk of overweight or obesity (Langenberg, Hardy, Kuh, et al. 2003; James, Fowler-Brown, Raghunathan, et al. 2006). The results of a population-based prospective cohort study in Britain indicated that women whose social class of origin was low were more likely to be overweight as adults (Langenberg, Hardy, Kuh, et al. 2003). Among women who experienced upward social mobility, their risk of obesity was between that of women who remained in the lower social class and that of the women within the higher social class across the life course. Similarly, the risk of obesity among women who experienced downward social mobility fell between the risk within the social class they left, and the risk among the class they joined. Within this social mobility effect there was a clear gradient. For example, among women who started in the lowest occupation level, their reduction in obesity risk was modest if they moved up only to the next occupation level, and more pronounced if they moved up to the highest occupational level. This study suggests that the consequences of being in an economically disadvantaged environment in early childhood can be mitigated if women are provided opportunities for upward social mobility. On the other hand, it may be that women who experience upward mobility are those who are thinner to start with (Gotmaker, Must, Perrin, et al. 1993), assuming that thinness is socially desirable and results in more opportunities for promotion and advancement. However, this study did not examine racial differences.

In a study in Pitt County (North Carolina) by James, Fowler-Brown, Raghunathan, et al. (2006), the focus was only on African American women. In this study, the risk of obesity among women who experienced downward or upward mobility over the life-

course did not differ from the risk of obesity among women whose SES remained high over the life-course. However, a trend was observed that upwardly mobile women had the lowest prevalence of obesity compared to women who remained in lower socioeconomic position over their lives. The authors indicated that the lack of significant findings may be related to the "small numbers in the referent category ...that prevented the odds for obesity from reaching conventional levels of statistical significance" (James, Fowler-Brown, Raghunathan, et al. 2006, p. 559).

In summary, very few studies have used a life course approach to examine the development of obesity over time and consider if changes in a person's SES, or intergenerational social mobility, has an effect on risk of obesity. Even fewer studies have examined this question separately for racial/ethnic minority populations. Overall, studies that have examined this research question suggest that upward social class mobility tends to be inversely associated with risk of obesity, indicating perhaps a protective effect on health.

Pre-pregnancy Overweight, Obesity and SES

Despite the growing research on the relationship between obesity and SES, a comprehensive literature review suggested there were no published studies directly addressing the extent to which pre-pregnancy overweight and obesity are associated with SES. Previous research is relevant (Sobal & Stunkard 1989; Zhang & Wang 2004a, McLaren 2007), but pre-pregnancy weight covers a particular window in a woman's life and presents unique concerns because the burden of overweight and obesity may directly

impact the potential for complications in pregnancy as well as fetal programming for later effects in offspring.

Theoretical Framework: The Life Course Perspective

The theoretical framework that guides the proposed study is the life course perspective. The life course perspective suggests that risks of morbidity and mortality are affected by the accumulation of biological and social insults throughout a person's lifetime (Ben-Shlomo & Kuh, 2002; Halfon & Hochstein, 2002; Krieger 2001; Kuh & Ben-Shlomo, 1997). Environmental risk factors which are more prevalent among lower-SES populations such as alcohol abuse and illicit drug use, domestic violence, limited access to a healthy lifestyle (e.g. recreational physical activity, healthy food), economic hardships, discrimination, decreased access to health care or to health care of adequate quality, and other life experiences (i.e., social stressors) accumulate over time to increase the risk of pre-pregnancy overweight and obesity. The lack in of economic resources limits access to health promoting activities and resources such as healthy foods, exercise, and health care.

The life course perspective is particularly relevant to the experiences of low SES populations and racial/ethnic minorities, particularly blacks, who to this day continue to experience more economic and social discrimination that negatively impact the quality of housing (blacks tend to live in less safe neighborhoods with high crime and environmental hazards such as the presence of lead and other pollutants), educational opportunities, and health care accessibility (Williams, 1999). To further emphasize the impact of racism and discrimination, Williams indicates "It is generally recognized that

there are large racial differences in SES, and health researchers routinely adjust for SES when examining the race-health association. However, SES is not just a confounder of racial differences in health but part of the causal pathway by which race affects health. Race is an antecedent and determinant of SES, and racial differences in SES reflect, in part, the successful implementation of discriminatory policies premised on the inferiority of certain racial groups" (Williams, 1999, p. 177). In fact, studies that have adjusted for SES when exploring racial/ethnic differences in health outcomes have resulted in potential erroneous conclusions due to measurement problems and confounding (Kaufman, Cooper & McGee 1997; Morgenstern 1997). Unmeasured biological and genetic factors have been highlighted as potentially explaining the observed race/ethnic differences found, thus downplaying the historical discriminatory factors that have played a strong role in minorities' current predicament (Williams, 1999). Williams (1999) points out that racial differences in SES, in particular among Blacks suggest that race is an antecedent and determinant of SES. Williams & Collins (1995) convincingly argue that "....major social structures and processes such as racism, acculturation, work, migration, and childhood SES produce inequalities in health" (Williams & Collins, 1995, p. 349).

Research Question and Hypotheses

This study's research question is as follows: To what extent are pre-adult SES (SES of the participant's parents), adult SES, and SES mobility (changes in SES between pre-adult and adult stages) associated with pre-pregnancy overweight and obesity among a cohort of Blacks and White/other women ages 15-47.

The study's main hypotheses are:

1. Pre-adult SES will be inversely associated with pre-pregnancy overweight and obesity.
2. Adult SES will be inversely associated with pre-pregnancy overweight and obesity.
3. Women with both low pre-adult and low adult SES will be at greatest risk for pre-pregnancy overweight and obesity.
4. Women who experience upward mobility will be at a reduced risk of pre-pregnancy overweight and obesity
5. Women who experience downward mobility will be at an increased risk of pre-pregnancy overweight and obesity
6. SES will have a less protective effect on risk of pre-pregnancy overweight and obesity among Blacks when compared to Whites/Other.

METHODS

Study Population

This study uses data from the Pregnancy Outcomes and Community Health (POUCH) Study which includes pregnant women recruited to participate in a study on biologic and psychosocial factors that affect adverse pregnancy outcomes such as preterm delivery. Women were recruited from August 1998 to June 2004 from 52 clinics in five Michigan communities: Flint, Saginaw, Kalamazoo, Lansing and Grand Rapids. Women were enrolled in gestational weeks 15 through 27 (87 percent before week 25). Inclusion criteria were singleton pregnancy with no known congenital anomaly, maternal age of 15 or more years, maternal serum alpha-fetoprotein (MSAFP) screen in gestational weeks 15–22, no pre-pregnancy diabetes mellitus, and proficiency in English. Eligible women were invited to participate at the time of prenatal screening. Of the 3,038 women enrolled, 19 were lost to follow-up, leaving a cohort of 3,019. Underweight (BMI <18.5 kg/m^2) women (n=140) were excluded from analyses. Women who were underweight were excluded from these analyses for two reasons. The main purpose of the study was to focus on pre-pregnancy overweight and obesity. In addition, the sample size of the underweight group was small, 140 women, thereby limiting stable estimates in this group. Hence, this study used data from the remaining 2876 women. These participants were classified as being of normal weight, overweight, or obese. In all analyses women with 'normal weight' serve as the referent group.

The study received approval from institutional review boards at Michigan State University, Michigan Department of Community Health, and nine community hospitals.

Measures

At enrollment participants completed a self-recorded questionnaire and were interviewed by a trained research assistant (RA). In addition relevant information was abstracted from prenatal screening databases and screening forms. The data used below were gathered from these sources.

Dependent Variable - Pre-pregnancy BMI Categories

Pre-pregnancy BMI was calculated by using weight in kilograms divided by height in meters squared. Pre-pregnancy height and weight were self-reported at study enrollment. Four BMI categories were created: Underweight (<18.5 kg/m^2), normal weight (18.5-24.9 kg/m^2), overweight (25-29.9 kg/m^2) and obese (≥ 30 kg/m^2). These cut-points are in keeping with the guidelines developed by the Expert Panel on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults convened by the National Heart, Lung, and Blood Institute's Obesity Education Initiative in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases (Expert Panel on the Identification, Evaluation, and Treatment of Overweight in Adults, 1998). Underweight women were excluded from analyses. This is discussed in the Study Population section above.

Independent Variables

The study's independent variables were 'Adult SES', 'Pre-adult SES', and 'SES Mobility'.

Adult SES. This study examined women's adult SES using current education level, annual household income, usual occupation status, and Medicaid Insurance status. In addition, information was included on the education level and usual occupational status of the baby's father. Education level of the mother and the baby's father was categorized as follows: 'less than high school', 'high school', and 'greater than high school'. Mother's annual household income was assessed by asking how much her total household income was last year. In this study, this variable was categorized as follows: '<$5k to <$15k', '$15k to <$30k', '$30k to <$50k', and '$50K or greater'. Mothers were also asked if they had Medicaid coverage before or during their pregnancy. This variable was dichotomized into 'yes' and 'no' categories.

The variable "usual occupation" was assessed by asking mothers an open-ended question about their and the baby's father "usual occupation(s)." Data collected on mother's "usual occupation" from the first 1336 participants enrolled were coded by a professional occupational coder using the U.S Census Bureau's 1990 Occupational Classification System codes. Guided by the initial 1336 coded "usual occupations" the remaining mother's "usual occupation(s)" were coded and categorized by study research staff as follows:

- 003-235 professional/managerial/technical = 1
- 243-389 clerical/sales = 2
- 403-889 service/blue collar = 3
- 914 homemaker = 4
- 903-905 and 910, 911 other (military//retired/student) = 5
- 909 unemployed = 6

- 999 unknown = 7

Categories four through seven of mother's usual occupation were collapsed due to small sample size. None of the mothers reported unemployed as their usual occupation, so that category was eliminated. Thus, the final 'usual occupation' categories were: 1= professional/managerial/technical; 2= clerical/sales; 3= service/blue collar; 4=homemaker/other/unknown. The classification of the 'usual occupation' for baby's father followed the same steps as that of the mother and resulted in the following six categories: 1= professional /managerial/technical; 2= clerical/sales; 3= service/blue collar; 4=homemaker/other; 5=unemployed and 6=unknown.

Because of the high correlations between the individual Adult SES variables (range of 0.2 to 0.54), a composite measure of Adult SES, or an Adult SES index, was created based on 2794 participants. From the original 2876 participants, 82 had missing data on one or more of the variables needed to create the index. These participants were excluded from the Adult SES index. In addition, 123 participants had missing data on the variable 'father of baby's education'; however, one also had missing data on the other SES variables, leaving a total of 122 missing cases that later were re-coded as being of 'low' education. The rationale for this is twofold: first, maternal lack of knowledge about the education of the baby's father may be suggestive of a potential absentee partner, a circumstance that may be more characteristic of individuals of lower SES. Second, preliminary analyses indicated this missing item tracked with a 'low SES' within other comparable SES variables.

Hence, the Adult SES index was created using data from the 2794 participants with no missing data, and those that were recoded as 'low', as described above. The

index was created as follows. First, the individual Adult SES indices, (i.e. mother and father of baby's current education level and usual occupation, mother's annual household income and Medicaid Insurance status) were each dichotomized into 0=low SES and 1=mid to high SES. The categories that were collapsed to make-up the 'low SES' category had similar associations (ORs and 95%CI) with the three-level BMI outcome variable. The dichotomized Adult SES indices were as follows: mother's education level ('low' =high school or less, 'high' =greater than high school); father of baby's education level ('low' =high school or less and missing, 'high' =greater than high school); women's annual household income ('low' =<$50K, 'high' =$50K or greater); Medicaid coverage before or during mother's pregnancy ('low' =yes, 'high'=no); women's usual occupation ('low'=clerical/sales/service/ blue collar/homemaker/other/ unknown, 'high' =professional/ managerial/technical); and baby's father usual occupation ('low' =clerical/sales/service/blue collar/homemaker/other/unemployed/ unknown, 'high' =professional/managerial/technical).

The six dichotomized Adult SES indices, mother's education and occupation; baby's father's education and occupation; Medicaid insured status of the mother and the annual household income of mother were summed. Adding the six dichotomized adult SES values resulted in an Adult SES score that ranged from 0 to 6. Low, middle and high SES categories were constructed from the *Adult SES index* (scores 0-6). This was done to approximate quartiles as follows: the top 27.6%tile (score of 0) and lower 29.3%tile (scores 4-6) were categorized as 'low' and 'high' SES, respectively. The three middle quartiles (27.7%-70.7%, scores 1-3) were considered the 'middle' SES group. In all analyses the 'high SES' is the reference category.

One goal was to examine pre-pregnancy BMI in relation to individual SES indices but interpretations were limited by the high correlation between certain indices; these correlations ranged from 0.2 to 0.54. The Adults SES composite index addressed problems of correlation among individual indices and provided a more comprehensive assessment of SES. There was high-inter item correlation among the six SES indices composing the Adult SES index (KR-20=0.81).

Pre-adult SES. This study included five measures of pre-adult SES: education level and 'usual occupation' of the father and mother of the study participant and family receipt of public assistance during childhood, ('yes- no'). Education level was categorized as 'less than high school', 'high school', and 'greater than high school'. The 'usual occupations' of participants' parents were coded using the same scheme applied to the participant and father of the baby (described above). For the father of the participant the 'usual occupation' categories were 1=professional/managerial/technical; 2=clerical/sales; 3=service/blue collar; 4=homemaker and 5=other/unemployed/unknown. For the mother of the participant the 'usual occupation' categories were: 1=professional/ managerial/technical; 2=clerical/sales; 3=service/blue collar; 4=homemaker; 5=other; 6=unemployed and 7=unknown.

Because of the high correlations among the individual Pre-adult SES variables, a composite measure of Pre-adult SES was also created based on 2773 participants. From the original 2876 participants, 103 had missing data on one of the variables needed to create the index. These participants were excluded from the Pre-adult SES index. In addition, 119 participants had missing data on the variable 'mother's education' and 450 had missing data on the variable 'father's education'. These 569 cases were re-coded as

being of 'low' education because a respondent who does not know the education of her mother, or of her father, may be suggestive of a potential absentee parent, something that may be more characteristic of individuals of lower SES. Also, preliminary analyses showed that the missing items tracked with 'low SES' in other comparable SES variables that had minimal to no missing data.

Hence, the Pre-adults SES index was created using data from the 2773 participants with no missing data, and those that were recoded as 'low', as described above. The process for creating this composite index paralleled that used to create the Adult SES composite index as described in the previous section. Adding the five dichotomized pre-adult SES values resulted in a pre-Adult SES score that ranged from 0 to 5. The upper 23.3%tile, score of 0 and lower 25.4%tile, scores 3-5 (approximating quartiles) were categorized as 'low' and 'high' SES, respectively. The middle 23.4-74.7%tile, scores 2-3 was considered 'middle' SES. Again 'high SES' was used as the reference category. There was high inter-item correlation among the five SES items that compose the pre-adult SES index (KR-20=0.68)

SES Mobility. Mother's SES mobility was measured by change or lack of change in SES level from pre-adult to adult, i.e. at the time of enrollment in the study.

Race/ethnicity. Race/ethnicity was assessed by asking each participant to indicate her racial/ethnic heritage. Individuals were initially categorized into the following categories: Whites, Blacks, Hispanics, Asians, and Other. For the purpose of this study the race/ethnicity variable was dichotomized into Black and Whites/Other. The rationale for this categorization is described below.

Initial exploratory analyses revealed that the associations between SES and overweight and obesity were in the same direction and similar in magnitude among Whites, Hispanics, and those of Other backgrounds. Because of this and because the sample sizes for Hispanics and Others were too small to conduct separate analyses, these individuals were grouped with those of White backgrounds, resulting in a category called 'Whites/Other'. Further exploratory analyses were conducted comparing the association between the various SES measures and the dependent variable with and without Hispanics and those of 'Other' backgrounds. The results of these analyses did not differ suggesting that combining these individuals with Whites in the Whites/Other category did not affect the results.

Individuals of Asian backgrounds were also added to the 'White/Other' category because the sample size (N=57) was too small to conduct separate analyses. Furthermore, preliminary analyses revealed that the magnitude of the association between SES and overweight/obesity among individuals of Asian backgrounds was non-statistically significant and it was smaller than that observed among the other racial/ethnic groups. Exploratory analyses were conducted comparing the association between the various SES measures and overweight and obesity with and without the Asian individuals. As was the case with the other racial/ethnic variables, the results of these analyses did not differ suggesting that adding these groups to the Whites/Other category would not affect the analyses.

Covariates. Potential confounders included maternal age (in years), parity (first birth vs. two or more births), and cigarette use in the year prior to pregnancy. In women the association between age and obesity is bell-shaped with weight increasing up to ages

of 55 to 64 years and then decreasing slightly (Wardle, Waller & Jarvis 2002, Lahmann, Lissner, Gullberg, et al. 2000; Kuskowska-Wolk & Pergstrom 1993). In this study, age is a continuous variable. High parity has been found to be positively associated with adult obesity (Lahmann, Lissner, Gullberg, et al. 2000). With every subsequent pregnancy, weight gain during pregnancy has been a strong determinant in postpartum weight retention (Kac, Benicio, Velasquez-Melendez, et al. 2004). Parity was assessed by asking each woman the number of prior live births and for the purpose of this study it was categorized as a dichotomous variable (0, ≥1). Finally, cigarette use has been found to be inversely associated with weight because individuals tend to smoke to control their appetite and hence their weight, and because smokers who quit smoking tend to gain weight (U.S. Department of Health and Human Services 2004).

Several analyses were conducted to assess if cigarette smoking was associated with weight. Cigarette use was assessed by asking participants to indicate the number of cigarettes they usually smoked in a day, week, month or year, within the year before their pregnancy. One analysis compared the distribution of lifetime smoking status with pre-pregnancy BMI. A second assessed the association between BMI categories and number of cigarettes smoked per week in the year before pregnancy. The third compared the odds of overweight and obesity as a function of the number of packs of cigarettes smoked per day (V: 0, ≤1/2, >1/2 pack) in the year prior to pregnancy. None of these analyses revealed statistical associations between smoking and pre-pregnancy BMI categories in this cohort. In addition, the smoking variables were added as covariates to models testing the association between SES and pre-pregnancy weight, but did not confound the SES-BMI association. Because cigarette use was not a significant confounder explaining

the association between SES and the dependent variable in any of the analyses conducted, this variable was not included in any of the results presented in this paper.

Analytic Strategy

All analyses were performed using STATA version 9.0. Univariate statistics were used to describe distributions of each variable. The associations between individual SES indices, SES composite indices and the dependent variable, pre-pregnancy BMI categories (normal=referent category, overweight, and obese) were evaluated through multinomial logistic regression models with and without adjustment for age, race/ethnicity, parity. The analytic sequence consisted of the five steps described below.

First analyses focused on individual adult SES indices (mother and father's education level, usual occupation status, annual household income, and Medicaid Insurance status) in relation to pre-pregnancy BMI categories. The second set of analyses focused on pre- Adult SES indices (education level and 'usual occupation' of the father and mother of the study participant, and family receipt of public assistance during childhood) in relation to pre-pregnancy BMI categories and followed the same process used to assess Adult SES indices.

In a third step, the Spearman Rank test was used to determine if there was multicollinearity among all of the SES indices (results not shown). An examination of the Spearman Rank test suggested that most of the SES indices were highly correlated. As a result two separate SES composite indices were created, Adult SES and pre-adult SES (described in the methods section)

The fourth analytic step consisted of using multinomial logistic regression models to evaluate the associations between the two SES composite indices and the pre-pregnancy BMI categories. In addition interaction terms were used to empirically test effect modification by race/ethnicity. In the final fifth step SES mobility was considered in association with pre-pregnancy BMI categories.

RESULTS

The mean age of the study sample was 26.5 years (Table 1). Approximately 24% of the women were Black (n=703) and 76% were White/other (1,933 were White, 152 were Hispanic, 47 were Asians, and 41 were Other). Nearly 58% of the women had a previous live birth.

Socioeconomic status over the Life Course

While 54% of participants had over 12 years of education, only 19.7% had a usual occupation in the top SES category, i.e. professional/ managerial/ technical (Table 2). Just under half of the women were insured by Medicaid. A similar percentage reported a family income of < 30K. Approximately 60% of participants' mothers and 55% of their fathers completed 12 or fewer years of education and approximately 18% of their mothers and 18% their fathers had a usual occupation in the top SES category (Table 4). A history of receiving public assistance as a pre-adult was reported by 37% of study women.

Pre-pregnancy BMI Categories

The mean pre-pregnancy BMI was 27.1, with 27.4 % classified as obese, 24.5% as overweight and 48.1% as having normal pre-pregnancy weight (Table 1). A greater percentage of Black women (34.7%) than White/other women (25%) were obese ($p<0.001$). Women with a previous live birth were more likely to be overweight or obese ($p<0.001$).

Adult SES Indices and Pre-pregnancy BMI Categories

Pre-pregnancy BMI was significantly associated with mother's education, mother's usual occupation, Medicaid insurance status, annual household income, and father of baby's education and occupation, ($p<0.05$) when evaluated with a global chi square test for each of these SES indices (Table 2).

These relations were explored further using multinomial regression models (Table 3) and final analyses included maternal age at enrollment, parity (0 vs. ≥ 1), and race/ethnicity (White/other vs. Black) as covariates. Adult SES indices significantly related to pre-pregnancy overweight (adjusted OR range 1.4-2.1) included mother's usual occupation service or blue collar, father of baby having only high school education and father's usual occupation being service, blue collar or unknown (Table 3). Adult SES indices significantly related to pre-pregnancy obesity (adjusted OR range 1.6-4.8) included mother's having only a high school education, mother's usual occupation being sales, clerical, service or blue collar, mother's having received Medicaid insurance before and during pregnancy, mother's having an annual income of less than $50 K, and father' usual occupation being sales, clerical, service, unemployed or unknown.

Pre-adult SES Indices and Pre-pregnancy BMI Categories

Most of the respondents' mothers worked in either the service/blue collar (30%) or sales/clerical (24%) occupations while most of the fathers worked in service/blue collar (60%) occupations (see Table 4).

Pre-pregnancy BMI was significantly associated with the participant's mother's usual occupation, history of receiving public assistance in childhood, and father's

education and usual occupation when evaluated by a separate chi square test for each of the indices (Table 4).

These relations were explored further using multinomial regression models (Table 5) and final analyses included maternal age at enrollment, parity (0 vs. ≥1), and race/ethnicity (White/other vs. Black). Pre-adult SES indices significantly related to pre-pregnancy overweight (adjusted OR range 1.4-1.6) included mother's father having only a high school or less than high school education (Table 5). Pre-adult SES indices significantly related to pre-pregnancy obesity (adjusted OR range 1.3-2.0) included mother's mother usual occupation being sales, clerical, service or blue collar, history of mother receiving public assistance as a child, mother's father having only a high school education, less than high school education or education of participant's father was missing and mother's father usual occupation being service, blue collar, other, unemployed or usual occupation was unknown.

Adult and Pre-adult Composite SES Measures

Correlations among the adult and pre-adult indices were then assessed using the Spearman Rank test. Many indices were found to be highly or moderately correlated with correlations ranging from 0.2 to 0.54. As described in the Methods section, the SES indices were dichotomized (Table 6) and summed to create an Adult SES composite index and a Pre-adult SES composite.

Adult and Pre-adult Composite SES Measures and Pre-pregnancy BMI Categories

In examining the adult and pre-adult composite SES and pre-pregnancy BMI, conceptual arguments guided the decision to use race/ethnicity-specific models (see background –theoretical framework: the life course perspective section). Empirical tests of a race/ethnicity interaction were also explored. Likelihood ratio statistics were used to compare models with and without the interaction term. The improvement of model fit with the interaction term was not significant for the pre-adult model ($p=0.31$) but was of borderline statistical significance for the adult SES model ($p=0.07$). Also, in the Adult SES model the race/ethnicity interaction term was significant for pre-pregnancy obesity ($p<0.05$). The inverse association between adult SES and risk of pre-pregnancy obesity was more pronounced in white/other women as compared with that in Black women (Figure 1).

In analyses that adjusted for maternal age and parity, being in the middle or low level of the adult SES composite index was significantly associated with an increased risk of pre-pregnancy obesity in Black women (OR range 2.3-2.8) and in White/other women (OR range 2.8-3.4) (Tables 7 and 8). For the low and middle levels of the Pre-adult SES composite index the relation to obesity was more modest among both race/ethnic groups (OR range 1.5-1.9). This association was statistically significant in Whites/others only, but this may be due to the larger sample size in this race/ethnic group. The risk of pre-pregnancy overweight was predominantly linked to being in the low level of the Adult SES composite index (OR range 1.7-2.0) and again the association reached statistical significance in the White/other group only.

Life Course SES, SES Mobility and Pre-pregnancy BMI Categories

Among Black women, those who moved up to the high Adult SES level did not have a higher risk of pre-pregnancy overweight or obesity when compared with women who were always in the high SES level. For example, those who moved from low SES in Pre-Adulthood to high SES in Adulthood were no more likely to be overweight (OR=1.6, 95%CI=0.1-23.8) or obese (OR=0.5, 95%CI=0.0-5.6) than those who were of high SES in pre-adulthood and adulthood. Also, those who moved from mid SES in Pre-Adulthood to high SES in Adulthood were no more likely to be overweight (OR=2.3, 95%CI=0.4-14.3) or obese (OR=0.9, 95%CI=0.2-3.3) than those who were of high SES in pre-adulthood and adulthood (Table 9).Those who were in the high SES group as pre-adults and moved down to the mid or low level SES as adults were more likely to be overweight at pre-pregnancy than those who remained in the high SES; the odds ratios for this association ranged from 4.6-6.8 and varied slightly with the specification of the model, probably due to small numbers (Table 10).

Among Whites/others the pattern appeared a little different (Tables 11 and 12). Women who moved from low SES pre-adult to high SES as adult were still at significantly greater risk for pre-pregnancy obesity (OR=2.9, 95% CI = 1.2-6.8) compared with their counterparts who were in the high SES group across both the pre-adult and adult periods. As was true for Black women, the movement of Whites/others from high SES in pre-adult down to mid or low SES as adult was associated with an increased risk of obesity (from high to mid, OR=2.5, 95%CI=0.9-7.0 and from high to low, OR=2.7; 95%CI=1.7-4.2), though the confidence intervals around some of the elevated odds ratios included one (Tables 11 and 12). The small samples sizes in these

race/ethnicity stratified analyses of SES mobility cannot rule out Type 2 errors due to limited statistical power.

DISCUSSION

This study used a well characterized pregnancy cohort to examine pre-adult and adult SES indices and their associations with pre-pregnancy overweight and obesity. In this section, I discuss the pre-adult and adult-SES findings among Black women first and then women of White/other backgrounds. Then, I discuss the findings of the association between SES over the life course and pre-pregnancy BMI among Black and White/other women and conclude with suggestions for future research.

Pre-adult, Adult-SES and Pre-pregnancy BMI Categories

Among Black women, pre-adult SES composite index had minimal to no association with pre-pregnancy overweight or obesity. For obesity the elevated odds ratio (OR =1.6, 95% CI 0.9-2.8 for mid vs. high and OR=1.6, 95% CI 0.9-2.9 for low vs. high) was not statistically significant. This may have been due to limited sample size, but the odds ratio was similar in magnitude to that of the White/other group. The Greenlund, Liu, Dyer et al (1996) study found no association between childhood SES (parental education) and adult obesity in Black women. An additional study by Stettler, Tershakovec, Zemel et al (2000) also reported null findings for the relation between childhood SES (maternal education and household composition) and increased adiposity in Black adult women. However, these studies contrast with findings from the James, Fowler-Brown, Trevillore et al (2006) and Must, Gortmaker & Dietz (1994) studies, which found that African American women who grew up in the most economically disadvantaged households were more likely to be obese adults compared to women from less impoverished backgrounds. The James, Fowler-Brown, Trevillore et al (2006) study defined childhood SES as

occupation of family primary earner during childhood and the Must, Gortmaker & Dietz (1994) study operationalized childhood SES as parental education. These inconsistent finding could be due, in part, to differences in how SES is measured across studies.

Among Black women, those in the low to middle adult SES groups had a non-statistically significant increase in risk of pre-pregnancy overweight (OR=2.0, 95% CI=0.9-4.7 and OR=1.8, 95% CI=0.8-4.0 respectively) but a significant increase in risk of pre-pregnancy obesity compared to women in the high SES group. Black women in the high adult SES group may be engaging in healthier behaviors (e.g. consuming more fruits and vegetables and foods with lower fat content, higher levels of physical activity) than those of women in the lower SES groups (Moreiro & Padrao, 2005). Interestingly, some prior studies have found that among Black women, adult SES is inversely related to overweight (Croft, Strogatz, James et al. 1992) and adult SES has little association with obesity () (James, Fowler-Brown, Trevillore et al. 2006; Greenlund, Liu, Dyer et al. 1996). Again the different results across studies may in part be explained by variations in the indices used to measure SES. For example, in the Croft, Strogatz, James et al (1992) study, adult SES was measured using a composite of the participant's education and occupation. In the James, Fowler-Brown, Trevillore et al (2006) study, adult SES was measured using a composite of the participant's education, occupation, employment status and home ownership. The Greenlund, Liu, Dyer et al (1996) study measured adult SES by using participant's education.

Among White/other women in this study, there was no significant association between pre-adult SES and pre-pregnancy overweight. Women in the low and middle pre-adult SES groups did experience a non-statistically significant increased risk of pre-

pregnancy obesity, relative to high SES women. This is consistent with previous research; most studies of women from European backgrounds have reported an inverse association between childhood socioeconomic circumstances and body weight in adulthood (Giskes, Lenthe, Turrell et al 2008; Novak, Ahlgren & Hammarstrom 2006; Parson, Power, Logan et al 1999). In this study an inverse association also was observed between adult SES and risk of pre-pregnancy overweight and obesity. Again this is consistent with other studies of Europeans (Lagenberg, Hardy, Kuh et al 2003; Power, Manor, Matthews et al 2003; Wardle, Waller & Jarvis 2002; Lawlor, Ebrahim & Smith 2002; Sobal & Stunkard 1989) and of White American women (Ben-Shlomo & Kuh 2002; Greenlund, Liu, Dyer et al 1996) which have shown an inverse relation between adult SES and obesity. These findings suggest that for certain race/ethnic groups' socioeconomic circumstances in pre-adulthood and adulthood are associated with prevalence of obesity in adulthood.

Interestingly, in this study the 'protective effect' of adult high SES appeared larger among White/other women than among Black women. One explanation might be that the differences in lifestyle factors, perceptions of self, and wealth across adult SES groups and the impact of racial socio-historical context may vary by race/ethnicity. For example, as suggested by prior research, diet patterns, accessibility to higher quality foods, and exercising behaviors in high SES blacks may be more similar to those in lower and mid SES Blacks when compared to the differences in these factors in high versus low/mid SES Whites/other (Powell, Slater, Mirtcheva et al 2007). Also, Blacks may present with greater acceptance of larger bodies and with lower understanding of the detrimental health consequences of overweight and obesity than White/others

(Kumanyika, Wilson, Guilford-Davenport 1993), two attitudes that may differentially impact their risk of pre-pregnancy overweight and obesity. Finally, it is possible that differences in wealth or accumulated assets (home ownership, stocks) may explain the differences in the protective effect of increased SES among the racial groups (Williams, Collins 1995). That is, White/other women of high SES, or perhaps even at every SES level, may have significantly more wealth than Black women of high SES, or comparable SES level. As such, there may be substantial differences in quality of life among Black and White/other women at every SES level that were not measured or captured in this study and that may explain the larger protective effect of increased SES among Whites/other. In addition, the socio-historical context that differs substantially in the U.S. for whites and blacks could impact cultural ideas about nutrition and physical identity.

SES Over the Life Course and Pre-pregnancy BMI Categories

Black women who moved down the socioeconomic gradient from pre-adult to adulthood were more likely to be overweight and obese when compared to those who maintained high SES over the life course. These findings suggest that downward mobility may affect women's pre-pregnancy BMI or that BMI may have some influence on women's SES trajectory. There were no significant differences in risk of pre-pregnancy overweight and obesity between women who maintained low SES or middle SES and those who maintained a high SES level over the life course. However, these null findings may be due to a lack of statistical power as the magnitude of the associations were large (i.e., adjusted ORs ranged from 2.5-3.8), but small sample sizes reduced the power to detect significant differences at conventional levels. These findings

are consistent with the findings of the study by James, Fowler-Brown, Raghunathan et al (2006). Their study detected moderate effect sizes (i.e., adjusted ORs of 1.6-2.2) that were not statistically significant.

Among Black women no significant differences were detected for risk of pre-pregnancy overweight and obesity among women who improved their SES compared to those who maintained high SES. In addition, no significant differences were found among women who improved their SES from pre-adult to adult compared to their counterparts whose SES category remained static. For example, women whose SES over the life course changed from low to high had adjusted odds ratios that indicated a reduced risk of pre-pregnancy overweight and obesity (i.e., 0.3 and 0.1), essentially a protective effect, but the upper bound of these confidence intervals included ORs of 3.2 and 1.6, respectively, suggesting that the association could be in either direction, increased risk or protective.

Among Whites/other, experiencing downward mobility over the life course was associated with an increased risk of pre-pregnancy overweight and obesity when compared to Whites/other who maintained high SES over their life course. These findings are consistent with the idea that lowering one's SES over the life course is detrimental to one's BMI. Women with a low pre-adult SES who moved up the SES ladder to mid or high SES in adulthood also had an increased risk of pre-pregnancy overweight and obesity when compared to those who maintained the most advantaged SES circumstances throughout the life course. These findings suggest that SES in the pre-adult period is uniquely associated with pre-pregnancy BMI for some race/ethnic groups. That is, despite improvements made on socioeconomic circumstances in adulthood,

women still do not share the health advantages of those who maintained the most advantaged SES over their lives.

As was the case with Black women, no significant differences were found among White/other who improved their SES compared to women who remained in low SES over their life course. However, White/other women whose SES improved from mid to high were less likely to be obese than women who remained in mid SES over their lives. Essentially, this finding suggests that for White/other middle class women, improvements in SES result in improved BMI when compared to their initial middle SES status, but does not equal the weight status of those who remained with a high SES over their life course

Study Limitations

Several limitations must be kept in mind when interpreting these study findings. One limitation is that pre-pregnancy weight and height were self-reported and retrospective, raising concerns about the accuracy of the information. However, the recall time was relatively short for most women because they were asked about their pre-pregnancy weight early in pregnancy (15-22 weeks gestation) during study enrollment. Another limitation is that the measure of SES mobility over the life-course relied on only two time points, one in pre-adulthood and one in adulthood. If more assessments of SES were available over a person's lifetime, one could better assess the trajectory of the association between SES and the weight status over time. In addition, the individual SES variables utilized to form the Adult and pre-Adult SES composite indices were given equal weight, suggesting that each SES variable carried equal risk for overweight and

obesity. Further research is needed to examine if different SES variables behave differently in explaining pre-pregnancy BMI and if so to identify appropriate weights to correspond to their relative influences.

Another limitation is the relatively smaller sample size of Black women. This limited the ability to interpret observed associations, even though the magnitudes of some of the odds ratios were similar to those that were statistically significant in the larger, White/other group. These findings suggest that future research with larger samples of Black women is needed. Also, the sample sizes for women of other racial/ethnic minority groups such as Hispanics, Asians, and Others were too small to conduct separate analyses so these groups were combined with the Whites. In addition, the sample size of underweight women was too small to conduct separate analyses and appeared heterogeneous, with an overrepresentation of disadvantaged women and women of Asian race. An additional limitation of this study is that women with diabetes mellitus were excluded from the parent study. Diabetes mellitus has been shown to be associated with obesity (The Diabetes Prevention Program Research Group 2006). Thus the SES and pre-pregnancy weight findings cannot be generalized to women with pre-pregnancy diabetes mellitus. Future research is needed to investigate the association between SES mobility and pre-pregnancy BMI among these populations. Finally, this study does not measure eating and physical activity habits and patterns, two sets of behaviors that have been found to contribute to overweight and obesity.

Notwithstanding these limitations, this is the first study known to the author that examines the association between SES mobility and pre-pregnancy BMI, a critical window in a woman's life because overweight and obesity can negatively impact

pregnancy and fetal programming for later effects in offspring, and make weight loss after pregnancy more challenging. Also, study findings provide additional support for the importance of SES and the prevalence of overweight and obesity among women of childbearing age. Unlike most studies of SES and weight which tend to utilize only one or two indicators of SES (i.e., education and/or occupation), this study utilized a comprehensive set of indices to measure SES.

Implications for Public Health

For an expectant mother, making lifestyle changes to improve her health should be encouraged at all times, though evidence suggests it ideal if this occurs prior to her becoming pregnant (Lu 2007; Johnson, Posner, Biermann, et al. 2006; Lu, Kotelchuck, Culhane, et al. 2006). The current obesity epidemic (Wang & Beydoun 2007) is likely to contribute to chronic health problems among all women and in particular among racial/ethnic minority and lower SES women who are highest risk for obesity. It goes without saying that ongoing public health interventions are needed to continue encouraging women to adopt or maintain healthy behaviors before and during pregnancy with a particular focus on those most affected by health disparities, the poor and minorities. In addition to individual-level public health interventions, however, macro-social and economic public health interventions are also needed to improve the socioeconomic and social status of the population in general and of racial/ethnic minority groups in particular who face the greatest burden of disease. For example, better employment opportunities can serve as a gateway to increase access to adequate health insurance and health care, and to overall enhanced quality of life. In addition, improving

production and equitable distribution of foods and improving physical environments making it safer for individuals to engage in physical activities also can enhance quality of life. In turn, these changes can serve to influence a person's health.

Table 1. Selected demographic characteristics, POUCH study, 1998-2004

	Total (N=2876)	Normal Wt (n=1,383)	Overwt (n=705)	Obese (n=788)	Sig.
Mean age (sdev)	26.5 (5.8)				
Range = 15-47 years					
Race, %					
Black	24.4	296 (42.1)	163 (23.2)	244 (34.7)	**
White/other	75.6	1,087 (50.0)	542 (25.0)	544 (25.0)	
Parity, %					
0	42.3	658 (54.1)	273 (22.5)	285 (23.4)	**
≥1	57.7	725 (43.7)	431 (26.0)	503 (30.3)	
Mean BMI (sdev)	27.1 (0.8)				
Body weight status, %					
Obese (BMI = ≥30)	27.4				
Overweight (BMI = 25.0-29.9)	24.5				
Normal weight (BMI = 18.5-24.9)	48.1				

Notes: Differences in percents were compared with the chi-square statistic (*p<0.05; **p<0.001).

Table 2. Adult SES indices and pre-pregnancy BMI categories, POUCH study, 1998-2004

Adult SES Indices	Total (N=2876)		Normal Wt (n=1,383)		Overwt (n=705)		Obese (n=788)		Sig
	n	%	n	%	n	%	n	%	
Mother's (participant) ed									
>HS	1,551	54.0	790	50.9	366	23.6	395	25.5	**
HS	806	28.1	331	41.1	205	25.4	270	33.5	
<HS	516	18.0	261	50.6	133	25.8	122	23.7	
Mother's usual occup									
prof/mgr/tech	565	19.7	326	57.7	135	23.9	104	18.4	**
sales/clerical	1,095	38.1	508	46.4	260	23.7	327	29.9	
service/blue collar	1,068	37.1	461	43.2	276	25.8	331	31.0	
homemaker/other/unk	148	5.25	88	59.5	34	23.0	26	17.6	
Medicaid insured									
No	1,513	52.7	795	52.5	368	24.3	350	23.1	**
Yes	1,360	47.3	586	43.1	336	24.7	438	32.2	
Mother's annual hh inc									
≥50 k	895	32.0	508	56.8	221	24.7	166	18.6	**
30 to <50k	539	19.3	239	44.3	139	25.8	161	29.9	
15 to <30k	575	20.6	231	40.2	134	23.3	210	36.5	
<15 k	789	28.2	357	45.3	196	24.8	236	29.9	
Baby's father education									
>HS	1,186	41.2	670	56.5	277	23.4	239	20.2	**
HS	1,139	39.6	469	41.2	305	26.8	365	32.1	
<HS	428	14.9	191	44.6	96	22.4	141	32.9	
Missing	123	4.3	53	43.1	27	22.0	43	35.0	
Baby's father usual occup									
prof/mgr/tech	533	18.5	323	60.6	131	24.6	79	14.8	**
sales/clerical	391	13.6	195	49.9	90	23.0	106	27.1	
service/blue collar	1,710	59.5	743	43.5	430	25.2	537	31.4	
homemaker/other	102	3.6	68	66.7	18	17.7	16	15.7	
unemployed	66	2.3	29	43.9	15	22.7	22	33.3	
unknown	74	2.6	25	33.8	21	28.4	28	38.8	

Notes: Differences in percents were compared with the chi-square statistic (*$p<0.05$,** $p<0.01$). Missing data for the Adult SES Indices ranged from 3 for the variables "Mother's ed, and Medicaid uninsured" to 78 for "Mother's annual household income". Only the missing cases for the variable "Baby's father education" are included in the table because these cases were recoded as low when the Adult SES Index was constructed. Missing from the other variables are not included because they are not modeled in any of the analyses. This is described in greater detail in the Adult SES and Pre-Adult SES sub-sections of the "Measures" section of the document.

Table 3. Unadjusted and adjusted risk of pre-pregnancy overweight and obesity by adult SES indices, POUCH study, 1998-2004

Adult SES Indices (N=2876)	Unadjusted ORs				Adjusted Ors			
	Overwt		Obese		Overwt		Obese	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Mother's educ								
ref >HS								
HS	**1.3**	**1.1-1.7**	**1.6**	**1.3-2.0**	1.3	1.0-1.7	**1.6**	**1.3-1.9**
<HS	1.1	0.9-1.4	0.9	0.7-1.2	1.1	0.8-1.5	0.9	0.6-1.1
Mother's usual occup								
ref prof/mgr/tech								
sales/clerical	1.2	1.0-1.6	**2.0**	**1.6-2.6**	1.2	0.9-1.6	**2.1**	**1.6-2.7**
service/blue collar	**1.4**	**1.1-1.9**	**2.3**	**1.7-2.9**	**1.4**	**1.1-1.9**	**2.3**	**1.7-3.1**
hmaker/other/unk	0.9	0.6-1.5	0.9	0.6-1.5	0.9	0.6-1.5	1.0	0.6-1.6
Medicaid insured								
ref no								
yes	1.2	1.0-1.5	**1.7**	**1.4-2.0**	1.2	1.0-1.5	**1.7**	**1.4-2.1**
Mother's annual hh income								
ref ≥50 k								
30 to <50k	1.3	1.0-1.7	**2.1**	**1.6-2.7**	1.3	1.0-1.7	**2.2**	**1.7-2.9**
15 to <30k	1.3	1.0-1.7	**2.8**	**2.2-3.6**	1.3	1.0-1.8	**3.0**	**2.3-4.0**
<15 k	1.3	1.0-1.6	**2.0**	**1.6-2.6**	1.3	1.0-1.7	**2.2**	**1.6-2.9**
Baby's father educ								
ref >HS								
HS	**1.6**	**1.3-1.9**	**2.2**	**1.8-2.7**	**1.6**	**1.3-1.9**	**2.3**	**1.8-2.8**
<HS	1.2	0.9-1.6	**2.1**	**1.6-2.7**	1.3	0.9-1.7	**2.4**	**1.8-3.2**
missing	1.2	0.8-2.0	**2.3**	**1.5-3.5**	1.2	0.7-2.0	**2.3**	**1.5-3.6**
Baby's father usual occup								
ref prof/mgr/tech								
sales/clerical	1.1	0.8-1.6	**2.2**	**1.6-3.1**	1.2	0.8-1.6	**2.4**	**1.7-3.4**
service/blue collar	**1.4**	**1.1-1.8**	**3.0**	**2.3-3.9**	**1.4**	**1.1-1.8**	**3.1**	**2.3-4.1**
homemaker/other	0.7	0.4-1.1	1.0	0.5-1.7	0.7	0.4-1.2	1.0	0.6-1.9
unemployed	1.3	0.7-2.5	**3.1**	**1.7-5.7**	1.4	0.7-2.8	**3.4**	**1.8-6.5**
unknown	**2.0**	**1.1-3.7**	**4.6**	**2.5-8.3**	**2.1**	**1.1-4.0**	**4.8**	**2.6-8.9**

Notes: **Bold text** is used in the table to more easily identify the ORs that are statistically significant. The referent category is 'normal weight'. The 'Adjusted ORs' column represents results of analyses adjusting for maternal age at enrollment, parity (0vs≥1), and race/ethnicity (White/other vs. Black). As described in greater detail in the 'Adult SES' sub-section of the "Measures" section of the document, only the missing cases for the variable "Baby's father education" are included in the table because these cases were recoded as low when the Adult SES Index was constructed.

Table 4. Pre-adult SES indices and pre-pregnancy BMI categories, POUCH study, 1998-2004

Pre-Adult SES Variable	Total (N=2876)		Normal Wt (n=1,383)		Overwt (n=705)		Obese (n=788)		Sig
	n	%	n	%	n	%	n	%	
Mother's mother ed									
>HS	1,038	36.1	535	51.5	239	23.0	264	25.4	
HS	1,363	47.4	645	47.3	340	24.9	378	27.7	
<HS	356	12.4	150	42.1	96	27.0	110	30.9	
Missing	119	4.1	53	44.5	30	25.2	36	30.3	
Mother's mother usual occup									
prof/mgr/tech	523	18.2	287	54.9	124	23.7	112	21.4	**
sales/clerical	697	24.2	337	48.4	150	21.5	210	30.1	
service/blue collar	863	30.0	392	45.4	223	25.8	248	28.7	
homemaker	741	25.78	341	46.0	199	26.9	201	27.1	
other/unempl/unk	52	1.8	26	50.0	9	17.3	17	32.7	
Hx of Public Assist									
No	1,745	62.9	887	50.8	440	25.2	418	24.0	**
Yes	1,028	37.1	443	43.1	249	24.2	336	32.7	
Mother's father ed									
>HS	838	29.1	466	55.6	181	21.6	191	22.8	**
HS	1,241	43.1	577	46.5	331	26.7	333	26.8	
<HS	347	12.1	141	40.6	90	25.9	116	33.4	
Missing	450	15.7	199	44.2	103	22.9	148	32.9	
Mother's father usual occup									
prof/mgr/tech	503	17.5	287	57.1	116	23.1	100	19.9	**
sales/clerical	241	8.4	131	54.4	46	19.1	64	26.6	
service/blue collar	1,724	59.9	789	45.8	446	25.9	489	28.4	
hmker/oth/unempl	106	3.7	46	43.4	28	26.7	32	30.2	
unknown	302	10.5	130	43.1	69	22.9	103	34.1	

Notes: Differences in percents were compared with the chi-square statistic (*p<0.05; ** p<0.01). Missing data for the Pre-adult SES Index – "history of public assistance" was 103. Missing from this variable is not included because missing data for this variable are not modeled in any of the analyses. As described in greater detail in the 'Pre-Adult SES' sub-section of the "Measures" section of the document, the category 'Missing' is included for only the variables "Mother's mother education" and "Mother's father education" because these cases were recoded as 'low' education when the Pre-Adult SES Index was constructed.

Table 5. Unadjusted and adjusted risk of pre-pregnancy overweight and obesity by pre-adult SES indices, POUCH study, 1998-2004

Pre-Adult SES Indices (N=2876)	Unadjusted ORs				Adjusted ORs			
	Overwt		Obese		Overwt		Obese	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Mother's mother ed								
ref >HS								
HS	1.2	1.0-1.4	1.2	1.0-1.4	1.2	0.9-1.4	1.2	1.0-1.5
<HS	**1.4**	**1.1-1.9**	**1.5**	**1.1-2.0**	1.4	1.0-1.9	1.4	1.0-1.8
Missing	1.3	0.8-2.0	1.4	0.9-2.2	1.1	0.7-1.8	1.2	0.8-1.9
Mother's mother usual occup								
ref prof/mgr/tech								
sales/clerical	1.0	0.8-1.4	**1.6**	**1.2-2.1**	1.0	0.8-1.3	**1.6**	**1.2-2.1**
srvc/blue collar	1.3	1.0-1.7	**1.6**	**1.2-2.1**	1.2	0.9-1.6	**1.5**	**1.1-1.9**
homemaker	1.4	1.0-1.8	**1.5**	**1.1-2.0**	1.3	1.0-1.7	**1.4**	**1.1-1.9**
oth/unempl/unk	0.7	0.3-1.6	1.7	0.9-3.2	0.6	0.3-1.5	1.3	0.7-2.6
Hx of Public Assist								
ref No								
Yes	1.1	0.9-1.4	**1.6**	**1.3-1.9**	1.1	0.9-1.3	**1.5**	**1.2-1.8**
Mother's father educ								
ref >HS								
HS	**1.5**	**1.2-1.8**	**1.4**	**1.1-1.7**	**1.4**	**1.2-1.8**	**1.3**	**1.1-1.7**
<HS	**1.6**	**1.2-2.3**	**2.0**	**1.5-2.7**	**1.6**	**1.1-2.1**	**1.9**	**1.4-2.5**
Missing	1.3	1.0-1.8	**1.8**	**1.4-2.4**	1.2	0.9-1.7	**1.5**	**1.1-2.1**
Mother's father usual occup								
ref prof/mgr/tech								
sales/clerical	0.9	0.6-1.3	1.4	1.0-2.0	0.9	0.6-1.3	1.4	1.0-2.1
srvc/blue collar	**1.4**	**1.1-1.8**	**1.8**	**1.4-2.3**	1.3	1.0-1.7	**1.7**	**1.3-2.2**
other/unempl	1.5	0.9-2.6	**2.0**	**1.3-3.4**	1.5	0.9-2.5	**1.8**	**1.1-3.1**
unknown	1.3	0.9-1.9	**2.3**	**1.6-3.2**	1.3	0.9-1.8	**2.0**	**1.4-2.9**

Notes: **Bold text** is used in the table to more easily identify the ORs that are statistically significant. The referent category is 'normal weight'. The 'Adjusted ORs' column represents results of analyses adjusting for maternal age at enrollment, parity (0 vs ≥1), and race/ethnicity (White/other vs. Black). As described in greater detail in the 'Pre-Adult SES' sub-section of the "Measures" section of the document, the category 'Missing' is included for the variables "Mother's mother education" and "Mother's father education" because these cases were recoded as 'low' education when the Pre-Adult SES Index was constructed.

Table 6. Distribution of pre-pregnancy BMI by categories of high and low adult & pre-adult SES indices, POUCH study, 1998-2004

Adult and Pre-Adult SES Variables		Study Population (N=2876)		Normal Wt (n=1,383)		Overwt (n=705)		Obese (n=788)		Sig
		n	%	n	%	n	%	n	%	
Mother's ed										
>HS	H	1,551	54.0	790	50.9	366	23.6	395	25.5	**
≤HS	L	1,322	46.0	592	44.8	338	25.6	392	29.67	
Mother's usual occup										
prof/mgr/tech	H	565	19.7	326	57.7	135	23.9	104	18.4	**
sales/clerical/svc/ blue/hmker/oth/unk	L	2,311	80.4	1,057	45.7	570	24.7	684	29.6	
Medicaid insured										
No	H	1,513	52.7	795	52.5	368	24.3	350	23.1	**
Yes	L	1,360	47.3	586	43.1	336	24.7	438	32.2	
Mother's annual hh $										
≥50 k	H	895	32.0	508	56.78	221	24.7	166	18.6	**
<50 k	L	1,903	68.0	827	43.5	469	24.7	607	31.9	
Baby's father education										
>HS	H	1,186	41.2	670	56.5	277	23.4	239	20.2	**
≤HS/missing	L	1,690	58.8	713	42.2	428	25.3	549	32.5	
Baby's father usual occup										
prof/mgr/tech	H	533	18.5	323	60.6	131	24.6	79	14.8	**
sales/clerical/svc/ blue/hmker/oth/ unempl/unk	L	2,343	81.5	1,060	45.2	574	24.5	709	30.3	
Mother's mother education										
>HS	H	1,038	36.1	535	51.5	239	23.0	264	25.4	*
≤HS/missing	L	1,838	63.9	848	46.1	466	25.4	524	28.5	
Mother's mother usual occup										
prof/mgr/tech	H	523	18.2	287	54.9	124	23.7	112	21.4	**
sales/clerical/svc/ bluecollar/hmker/ oth/unempl/unk	L	2,353	81.8	1,096	46.6	581	24.7	676	28.7	
Hx of Public Assist										
No	H	1,745	62.9	887	50.8	440	25.2	418	24.0	**
Yes	L	1,028	37.1	443	43.1	249	24.2	336	32.7	
Mother's father education										
>HS	H	838	29.1	466	55.6	181	21.6	191	22.8	**
≤HS/missing	L	2,038	70.9	917	45.0	524	25.7	597	29.3	
Mother's father usual occup										
prof/mgr/tech	H	503	17.5	287	57.1	116	23.1	100	19.9	**
sales/clerical/svc/ bluecollar/hmker/ oth/unemp/unk	L	2,373	82.5	1,096	46.2	589	24.8	688	29.0	

Notes: H=High; L=Low; Differences in percents were compared with the chi-square statistic (*p<0.05; ** p<0.01).

Table 7. Risk of pre-pregnancy overweight and obesity by pre-adult SES composite index and adult SES composite index for Black women (N=675), POUCH study, 1998-2004

SES Indices		Unadjusted ORs				Adjusted ORs			
		Overwt		Obese		Overwt		Obese	
		OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Pre-adult SES									
	High (ref)	1.0	--	1.0	--	1.0	--	1.0	--
	Mid	1.1	0.6-2.0	1.5	0.8-2.7	1.0	0.6-1.9	1.6	0.9-2.8
	Low	1.0	0.6-1.9	1.5	0.8-2.6	0.9	0.5-1.7	1.6	0.9-2.9
Adult SES									
	High (ref)	1.0	--	1.0	--	1.0	--	1.0	--
	Mid	1.6	0.7-3.5	1.6	0.8-3.1	1.8	0.8-4.0	**2.3**	**1.1-4.8**
	Low	1.8	0.8-3.9	1.6	0.8-3.1	2.0	0.9-4.7	**2.8**	**1.4-5.9**

Notes: **Bold text** is used in the table to more easily identify the ORs that are statistically significant. The referent category is 'normal weight'. The **'Adjusted ORs'** column represents results of analyses adjusting for maternal age at enrollment and parity (0 vs ≥1).

Table 8. Risk of pre-pregnancy overweight and obesity by pre-adult SES composite index and adult SES composite index for White/other women (N=2124), POUCH study, 1998-2004

SES Indices		Unadjusted ORs				Adjusted ORs			
		Overwt		Obese		Overwt		Obese	
		OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Pre-adult SES									
	High (ref)	1.0	--	1.0	--	1.0	--	1.0	--
	Mid	1.3	1.0-1.6	**1.6**	**1.2-2.0**	1.2	1.0-1.6	**1.5**	**1.2-2.0**
	Low	1.4	1.0-1.9	**1.9**	**1.4-2.7**	1.4	1.0-1.9	**1.9**	**1.4-2.7**
Adult SES									
	High (ref)	1.0	--	1.0	--	1.0	--	1.0	--
	Mid	1.2	0.9-1.5	**2.5**	**2.0-3.2**	1.2	0.9-1.6	**2.8**	**2.2-3.7**
	Low	**1.6**	**1.2-2.1**	**2.6**	**1.9-3.6**	**1.7**	**1.2-2.4**	**3.4**	**2.4-4.8**

Notes: **Bold text** is used in the table to more easily identify the ORs that are statistically significant. The referent category is 'normal weight'. The **'Adjusted ORs'** column represents results of analyses adjusting for maternal age at enrollment and parity (0 vs ≥1).

Table 9. Risk of pre-pregnancy overweight and obesity by SES over the life course for Black women (N=642), POUCH study, 1998-2004

SES over the Lifecourse	Unadjusted ORs				Adjusted Ors			
	Overwt		Obese		Overwt		Obese	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Non-mobile High (ref) (n=22)	1.0	--	1.0	--	1.0	--	1.0	--
Mobility mid→high (n=24)	2.5	0.4-15.3	0.9	0.2-3.3	2.3	0.4-14.3	0.9	0.2-3.3
Non-mobile Mid (n=136)	3.5	0.7-16.5	1.7	0.6-4.5	3.8	0.8-18.7	2.5	0.9-7.1
Mobility low→high (n=5)	2.2	0.1-32.5	0.6	0.1-7.1	1.6	0.1-23.8	0.5	0.0-5.6
Mobility high→mid (n=40)	4.0	0.8-21.0	1.1	0.3-3.7	4.7	0.9-25.8	1.8	0.5-6.2
Mobility low→mid (n=73)	3.8	0.8-19.0	1.7	0.6-5.0	4.1	0.8-21.0	2.6	0.9-7.8
Mobility mid→low (n=142)	4.7	1.0-22.2	2.0	0.7-5.3	**5.4**	**1.1-27.1**	**3.5**	**1.2-10.0**
Mobility high→low (n=19)	5.7	0.9-34.5	0.9	0.2-4.2	**6.9**	**1.1-44.4**	1.7	0.4-8.3
Non-mobile Low (n=181)	3.5	0.8-16.3	1.6	0.6-4.2	3.9	0.8-19.3	2.8	1.0-7.9

Notes: **Bold text** is used in the table to more easily identify the ORs that are statistically significant. The referent category is 'normal weight'. The **'Adjusted ORs'** column represents results of analyses adjusted by maternal age at enrollment and parity (0 vs ≥1).

Table 10. Risk of pre-pregnancy overweight and obesity by SES mobility over the life course for Black women, POUCH study, 1998-2004

SES Mobility over the Lifecourse	Unadjusted ORs				Adjusted ORs			
	Overwt		Obese		Overwt		Obese	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
From Low SES (n=277)								
Static Low	1.0		1.0		1.0		1.0	
Low to mid	1.1	0.5-2.2	1.1	0.6-2.1	1.0	0.5-2.0	0.9	0.5-1.7
Low to high	0.6	0.1-6.1	0.4	0.0-3.9	0.3	0.0-3.2	0.1	0.0-1.6
From mid SES (n=314)								
Static Mid	1.0		1.0		1.0		1.0	
Mid to low	1.4	0.7-2.5	1.2	0.7-2.0	1.4	0.7-2.5	1.4	0.8-2.4
Mid to high	0.7	0.2-2.2	0.5	0.2-1.5	0.7	0.2-2.3	0.3	0.1-1.0
From high SES (n=84)								
Static High	1.0		1.0		1.0		1.0	
High to Mid	4.0	0.8-21.0	1.1	0.3-3.7	4.6	0.7-28.9	1.0	0.2-4.5
High to Low	5.7	0.9-34.5	0.9	0.2-4.2	6.8	0.8-55.1	0.8	0.1-5.2

Notes: **Bold text** is used in the table to more easily identify the ORs that are statistically significant. The referent category is 'normal weight'. The **'Adjusted ORs'** column represents results of analyses adjusted by maternal age at enrollment and parity (0 vs ≥1).

Table 11. Risk of pre-pregnancy overweight and obesity by SES over the life course for White/other women (N=2054), POUCH study, 1998-2004

SES over the Lifecourse	Unadjusted ORs				Adjusted ORs			
	Overwt		Obese		Overwt		Obese	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Non-mobile High (ref) (n=365)	1.0	–	1.0	–	1.0	–	1.0	–
Mobility mid→high (n=335)	1.1	0.7-1.5	1.2	0.7-1.8	1.0	0.7-1.5	1.1	0.7-1.7
Non-mobile Mid (n=536)	1.2	0.9-1.7	**2.9**	**2.1-4.2**	1.2	0.9-1.7	**3.3**	**2.3-4.8**
Mobility low→high (n=35)	1.6	0.7-3.6	**2.8**	**1.2-6.6**	1.6	0.7-3.6	**2.9**	**1.2-6.8**
Mobility high→mid (n=220)	1.0	0.6-1.5	**2.4**	**1.5-3.6**	1.0	0.7-1.6	**2.7**	**1.7-4.2**
Mobility low→mid (n=159)	1.5	0.9-2.3	**3.0**	**1.8-4.8**	1.5	0.9-2.4	**3.3**	**2.0-5.3**
Mobility mid→low (n=213)	**1.9**	**1.3-2.8**	**3.3**	**2.1-5.2**	**2.0**	**1.3-3.1**	**4.2**	**2.6-6.8**
Mobility high→low (n=28)	1.3	0.5-3.3	1.8	0.7-4.9	1.5	0.6-3.7	2.5	0.9-7.0
Non-mobile Low (n=163)	1.5	0.9-2.3	**3.1**	**1.9-5.0**	1.6	1.0-2.5	**4.1**	**2.5-6.8**

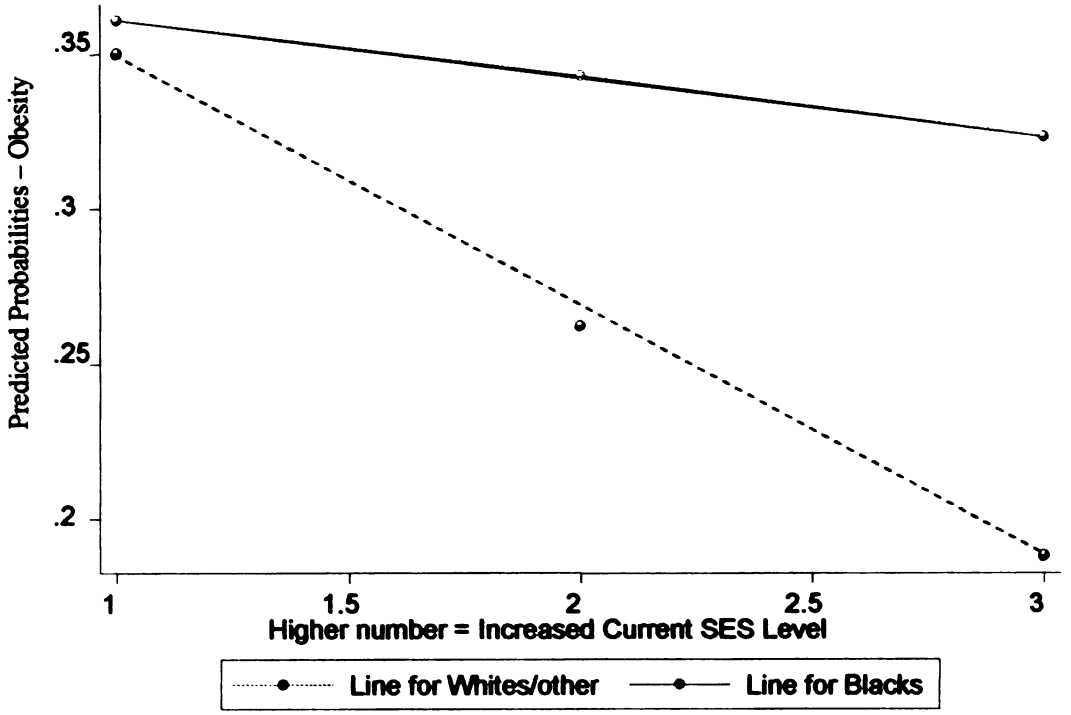
Notes: **Bold text** is used in the table to more easily identify the ORs that are statistically significant. The base category for the DV is 'normal weight'. The **'Adjusted ORs'** column represents results of analyses adjusted by maternal age at enrollment and parity (0 vs ≥1).

Table 12. Risk of pre-pregnancy overweight and obesity by SES mobility over the life course for White/other women, POUCH study, 1998-2004

SES Mobility over the Lifecourse	Unadjusted ORs				Adjusted ORs			
	Overwt		Obese		Overwt		Obese	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
From Low SES (n=369)								
Static Low	1.0		1.0		1.0		1.0	
Low to mid	1.0	0.6-1.7	1.0	0.6-1.6	0.8	0.5-1.5	0.7	0.4-1.2
Low to high	1.1	0.4-2.6	0.9	0.4-2.2	0.8	0.3-2.2	0.5	0.2-1.4
From mid SES (n=1,110)								
Static Mid	1.0		1.0		1.0		1.0	
Mid to low	**1.6**	**1.1-2.3**	1.1	0.8-1.7	**1.6**	**1.1-2.4**	1.3	0.9-1.9
Mid to high	0.9	0.6-1.2	**0.4**	**0.3-0.6**	0.8	0.6-1.2	**0.3**	**0.2-0.5**
From high SES (n=619)								
Static High	1.0		1.0		1.0		1.0	
High to Mid	1.0	0.6-1.5	**2.4**	**1.5-3.6**	0.9	0.6-1.5	**2.4**	**1.5-3.9**
High to Low	1.3	0.5-3.3	1.8	0.7-4.9	1.1	0.4-3.0	2.0	0.7-5.9

Notes: **Bold text** is used in the table to more easily identify the ORs that are statistically significant. The referent category is 'normal weight'. The **'Adjusted ORs'** column represents results of analyses adjusted by maternal age at enrollment and parity (0 vs ≥1).

Figure 1. Predicted probabilities of obesity reflecting the effect of the interaction of race/ethnicity with the three-category 'Adult SES' variable



Note. Results of the multinomial logistic regression analysis indicates that the interaction shown above is statistically significant. The slope is larger for Whites/other suggesting that as current/adult SES increases, the reduction in the likelihood of obesity is greater for Whites/other than blacks.

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