

OBESITY RISK FACTORS FOR WOMEN LIVING IN THE APPALACHIAN REGION: AN INTEGRATIVE REVIEW

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Key Words: Obesity, Physical Activity, Women, Appalachian Region, Mortality, Rural

ABSTRACT

Research Objective: This paper examines the current literature on obesity among women living in the Appalachian region and looks at factors contributing to obesity in this area.

Methods: A systematic review was conducted of research published between 1989 and 2009 regarding the research on obesity among women living in the Appalachian region. This review included both urban and rural Appalachian settings. The search used four electronic databases: CINAHL, ERIC, Medline, and Academic Search Premier. The key search terms included: Appalachian region, women, obesity, and mortality. Eight studies met the criteria for our review.

Results: The research suggests that both rural and urban Appalachian women report a lack of regular physical activity, and many are at high risk for obesity, which contributes to the high mortality rates in this group. In addition, obesity, poverty, low educational attainment, and cultural norms are associated in this group.

Conclusions: In Appalachia, cultural influences handed down for generations are more significant than the urban or rural environment in influencing obesity. To decrease the prevalence of obesity among Appalachian women, nurses need to develop, community-based interventions that take into account the income and health literacy needs of these women.

INTRODUCTION

Obesity is a contributing factor in many chronic illnesses that lead not only to poorer health outcomes, but also to higher health care costs. In 2000, the estimated medical cost of obesity was \$117 billion. Obesity has both direct medical costs (prevention, diagnosis, treatment services) and indirect costs (mortality and morbidity) (Center for Disease Control and Prevention, 2009). Obesity is a complex epidemic rooted in biological, social, and economic factors. The Social Determinants of Health framework (Wilkinson & Marmot, 2008) suggest that individuals who live in poverty experience shorter life expectancy and poorer health than the more affluent. The Appalachian region is largely rural and characterized as having high poverty rates, low educational attainment, aging population and high rate of chronic illness (Tessaro & Smith, 2005).

Life expectancy for women living in the Appalachian region has seen a decline in recent years, and obesity and obesity-related illnesses have been cited as major contributors. The prevalence of obesity among white women in the Appalachian region is estimated at 6.9% to 25%; among black women it is estimated at 11.3% to 47.1% (Halverson et al, 2004). Five

Appalachian states (AL, MS, SC, TN, and WV) have overall obesity prevalence rates equal to or greater than 30% (Centers for Disease Control and Prevention, 2009; Halverson et al., 2004; Ezzatil et al., 2008). Race seems to be a risk factor in obesity, with prevalence for white women in the Appalachian region estimated at 6.9% to 25%, while among black women prevalence is estimated at 11.3% to 47.1%. Many biological, socio-cultural and economic factors play a role in the development of obesity among women, including weight gain associated with pregnancy, menopause, estrogen metabolism, a sedentary lifestyle, and socio-economic status. The health consequences of obesity include coronary heart disease, type 2 diabetes, cancers (including breast and colon), respiratory problems, hypertension, and stroke, all contribute to the disparities in life expectancy for Appalachian women (Halverson et al., 2004; Centers for Disease Control and Prevention, 2009).

The Appalachian region is mostly white, with some representation of blacks and Native Americans (Denham, Meyer, Toborg, & Mande, 2004). The region includes 420 counties that follow the spine of the Appalachian Mountains, which spread across parts of 12 states and all of West Virginia. Eighty-two of these 420 Appalachian counties are considered distressed counties (Appalachian Regional Commission, 2010). Forty-two percent of the people living in the Appalachian Region are in rural areas, as compared with 20% of people in the US as a whole (Appalachian Regional Commission, 2010a). Poverty rates in the region range between 13 and 27%. The number of residents with at least 12 years or more of education ranges from 68 to 77%, (Appalachian Regional Commission, 2009) and most people are employed in blue-collar jobs. Unemployment is high, with many families dependent on public assistance and Supplemental Security Income (SSI) for disability. Residents have limited access to health care. This is the nation's most economically depressed and medically underserved area, with proportionately more counties considered distressed than in the rest of the nation (Bagi, Reeder, & Calhoun, 2002).

From this perspective, the lives of Appalachian women are shaped by the distribution of money, power and resources, and these forces are responsible for health inequities in this population, including obesity. This review presents what is currently known about factors that contribute to the high obesity levels among Appalachian women, identifies best practice interventions, and recommends areas for future research.

METHODS

A comprehensive literature search was conducted for the years 1989 to 2009 using four electronic databases: CINAHL, ERIC, Medline, and Academic Search Premier. We used the keywords (mesh terms): “Appalachian region” AND “women” OR “female” AND “obesity”, OR “female” AND “mortality”, with and without and “obesity”.

The following criteria were used for inclusion in the review: (a) adult population (19+ years old); (b) randomized controlled trial, observational study, epidemiological study, qualitative study, or secondary analysis of data from the Appalachian region; (c) original report, not a review or meta-analysis; and, (d) findings reported separately for women. The search returned a total of 926 hits; however, only 8 studies met the inclusion requirements. They are summarized in Table 1.

RESULTS

The eight studies were conducted in the Appalachian region between the years of 2002 and 2009. Five studies used a combination sample from both rural and urban settings in the region (Armstrong, et al., 2004; Denham, et al., 2004; Ezzatil, Friedman, Kulkarni, & Murray, 2008; Halverson, Barnett, & Casper, 2002; Ramsey & Glenn, 2002). Three studies were conducted only in rural settings (Schoenberg, Hatcher, & Dignan, 2008; Tessaro, et al., 2007; Tessaro & Smith, 2005). One study was conducted in West Virginia and did not state whether the sample was from a rural or urban setting; however, the majority of the counties in West Virginia are rural (Rye, Rye, Tessaro, & Coffindaffer, 2009). Five studies were quantitative, using secondary analysis descriptive designs (Armstrong, et al., 2004; Ezzatil, et al., 2008; Halverson, et al., 2002; Ramsey & Glenn, 2002; Rye, et al., 2009). Two studies were qualitative and used ethnographic designs (Denham, et al., 2004; Schoenberg, et al., 2008). Only one study was an intervention study (Tessaro, et al., 2007). Four studies reported on biological factors that were associated with obesity in Appalachian women, (Ezzatil, et al., 2008; Ramsey & Glenn, 2002; Rye, et al., 2009; Schoenberg, et al., 2008) and four studies reported on socio-cultural factors associated with obesity in these women (Armstrong, et al., 2004; Denham, et al., 2004; Halverson, et al., 2002; Tessaro, et al., 2007). Two studies obtained samples from the National Center for Health Statistics (Armstrong, et al., 2004; Ezzatil, et al., 2008).

Adult Appalachian women were included in all eight studies, and the range of participants' reported ages in the studies was 40-64 years. The highest level of education reported in three studies was high school (Ezzatil, et al., 2008; Rye, et al., 2009; Schoenberg, et al., 2008). Four studies did not report the level of education of participants (Armstrong, et al., 2004; Denham, et al., 2004; Halverson, et al., 2002; Tessaro, et al., 2007). Only two studies compared Black and White women, and in both of these studies the majority of participants were white women (Ramsey & Glenn, 2002; Schoenberg, et al., 2008). Two studies did not report the race of participants (Ezzatil, et al., 2008; Tessaro, et al., 2007). In three studies the majority of women earned an annual income less than \$20,000 (Ramsey & Glenn, 2002; Schoenberg, et al., 2008; Tessaro et al, 2007).

Four studies found a decrease in life expectancy for Appalachian women and an increase in chronic illnesses related to obesity (Armstrong, et al., 2004; Ezzatil, et al., 2008; Halverson, et al., 2002; Schoenberg, et al., 2008). One study found that women living in rural regions had the highest rate of obesity (Ramsey & Glenn, 2002).

Socio-cultural Factors Related to Obesity in Appalachian Women

Physical Activity. Many Appalachian residents do report engaging in some type of physical activity. According to the Behavioral Risk Factor Surveillance System, when residents of Appalachian states were asked if they participated in any form of exercise in the past month, an average of 27.33% reported "no" (CDC, 2008). When examining women, the Appalachian Regional Commission (2004) reported 19.6% to 58% of white Appalachian women are physical

Table 1. Appalachian Women & Obesity

First Author	Purpose	Sample	Design	Setting Rural/Urban	Contributing Factors	Outcome	Suggested Future Strategy
Armstrong	To determine the extent to which death rates from colorectal cancer by age, race, & gender subgroups of Appalachians differ from rates of the same subgroups elsewhere in the US	Residents of all Appalachian counties in 13 states Sample group was provided from the Multiple Cause of Death Public File; Death Certificate, which was provided by the National Center for Health Statistics (NCHS). Sample size was not provided Age 50-80 Men & women were analyzed separately for the study	Quantitative Secondary data analysis	13 Appalachia counties in both rural and urban settings of the Appalachian region	Socio-cultural factors related to the lack of education & geographic isolation (access to care)	Death rates among obese white men & women were significantly higher for colorectal cancer in the Appalachian region than in the rest of the country	Appalachian region may benefit from targeted obesity prevention to eliminate health disparities.
Denham	To determine if behavioral health interventions could be more successful if culturally sensitive	Sample group was provided from the Multiple Cause of Death Public File; Death Certificate, which was provided by the NCHS Age 50-80 (Mean age 36-45 for the adult women's group) Gender analyzed separately for the study Sample size 52 focus groups included 469 persons Adolescents n =16, adult men n= 30 adult women = 273	Qualitative Study Focus groups, common themes were analyzed	24 Appalachian counties in both rural and urban settings of the Appalachian region	Socio-cultural factors related to sensitivity of the delivery of education methods	Appalachian mothers play a major role in the health of their family members and play a major role for promoting positive health behaviors for the family.	In Appalachian families women most often have the power to influence the family health needs (including chronic conditions such as obesity), but often need support to make effective use of this role. Important cultural considerations are the need for personal contact, politely framed messages, & reliance on facts which may allow women in the Appalachian region to disseminate health information.

First Author	Purpose	Sample	Design	Setting Rural/Urban	Contributing Factors	Outcome	Suggested Future Strategy
Ezzati	To compare average life expectancies in various regions of the US	Sample group was provided by the US Census population from 1961 to 1999 which was provided by the NCHS Men & women were analyzed separately for the study Sample size was not provided	Quantitative Secondary data analysis	All US states both rural and urban settings of the US	Biological factors related to chronic diseases	Life expectancy decline for women living in the deep south of the U.S. extending into the Appalachian region. Patterns of female mortality rise are consistent with smoking, high blood pressure & obesity	Programs need to be established that increase insurance coverage for interventions for chronic disease.
Halverson	To examine geographical, racial/ ethnic differences in heart disease & stroke mortality.	Residents of all Appalachian counties in 13 Appalachian states Sample group was provided National Vital Statistics System by the NCHS White men 35-64 White men 65& older White women 35-64 White women 65& older Black men 35-64 Black men 65& older Black women 35-64 Black women 65 & older Sample size was not provided	Quantitative Secondary data analysis	403 Appalachian counties in 13 Appalachian states both rural and urban settings of the Appalachian region	Socio-cultural factors included low education attainment, low per capita income, limited access to medical care were associated with higher rates of morbidity & mortality	Nearly 35% of the US counties with the highest rates of heart disease mortality for white men & women are in Appalachia 25% of counties with the highest rates for Black men & women are the Appalachian region	Distressed counties need to use direct money & resources to make policy decisions at the local level to improve health outcomes for people living in the region. These policy changes would include various approaches to promote a healthy lifestyle for people living in the Appalachian region.
Ramsey	To investigate the differences between rural, urban, & suburban southern women based on socioeconomic factors	4,391 women living in the southern region of the US Urban n= 1,042 Suburban n=1,977 Rural n= 1,372 ages 40-64	Quantitative Descriptive study Data from National Health Survey	Women living in urban, suburban, and Rural regions analyzed separately for the study	Biological factors for white women associated with morbidity & mortality rates	Participants with higher incomes & educational levels had better health outcomes Women living in rural regions had the highest rate of obesity & reported the poorest health. Obesity & poor health related	Community health care providers should use community based health strategies to manage weight through new or existing programs. Programs need to be sensitive to income & educational factors that characterize rural regions

First Author	Purpose	Sample	Design	Setting Rural/Urban	Contributing Factors	Outcome	Suggested Future Strategy
Rye	To investigate the prevalence of lack of time & motivation as barriers to physical activity among low income women	733 women living in West Virginia 244 - aged 40-64 489 - aged 50-64	Quantitative Descriptive Health Risk/ Behavioral Survey	Rural and urban areas of West Virginia	Biological factors associated with lack of motivation & time contributed to higher rates of obesity for women	A lack of time & support was the greatest barrier reported by participants	Motivational counseling is a critical intervention to increase motivation & social support for physical activity, which will assist in decreasing the prevalence of obesity.
Tessaro	To evaluate a computer based interactive nutrition intervention	262 Women living in rural West Virginia 131 Intervention 131 Control Mean age 50.25	Quantitative Intervention	Two rural counties of West Virginia	Socio-cultural factors included to low income and rural region with a history of chronic disease	The computer based interactive nutrition intervention showed potential change in the diets for the women in the intervention group	Personal delivery of information may not always be available in rural regions. Technology may be one way to bridge the gap between education and behavior change.
Schoenberg	To determine what Appalachian women consider the most pressing threat to their communities	Snowball sample from four rural Appalachian Kentucky counties n = 52 65% women Mean age 52	Qualitative Focus groups using open ended questions	Four rural Appalachian counties in Kentucky	Biological factors of poor diet & exercise contribute to obesity	Participants identified the greatest threats to their communities as substance abuse, cancer, heart disease & diabetes, poor diet, lack of exercise, & obesity Several Appalachian areas have the highest rates of obesity & physical inactivity in the country	Lifestyle-related choices comprise the core risk factors for developing chronic disease. The best approach for addressing these threats is to develop coalitions to target troublesome community health problems. Community health promotion can best be implemented by respecting existing community knowledge, priorities, & capacities through community research partnerships that point to proven interventions.

inactivity, as compared to 12.9% to 54% of white women in the nation. Also, 35.8% to 67.2% of Appalachian black women reported physical inactivity, as compared to 25.4% to 58.1% black women in the nation. Some studies have found relationships between the lack of physical activity and long work hours, low motivation or will power, and lack of resources to participate in regular exercise, such as fitness centers, walking paths or bike paths (Rye, et al., 2009; Schoenberg, et al., 2008).

Using a cross sectional survey design, Rye and colleagues examined barriers to physical activity among low-income Appalachian women aged 40 to 60 years (n=733). Lack of support and lack of willpower were the greatest barriers to physical activity. Interestingly, among these women, lack of time was not perceived as a major barrier to physical activity.

Schoenberg and colleagues interviewed 52 middle-aged rural Appalachian women in focus groups. Women perceived that lack of character or intelligence contributed to low physical activity. Further, they said cable TV and the Internet had replaced walks to visit neighbors. Long work schedules and insufficient resources such as fitness centers also contributed to sedentary lifestyle.

Diet/Nutrition. Residents of the Appalachian region are often older, with higher poverty rates, and more limited access to healthcare than their non-Appalachian counterparts (Armstrong, et al., 2004; Ezzatil, et al., 2008; Halverson, et al., 2002; Ramsey & Glenn, 2002). The association between poverty and obesity may be related to the low cost of energy dense foods. Many Appalachian women report eating fewer fruits and vegetables, more red meat, and more foods high in saturated fats than their non-Appalachian counterparts (Schoenberg, et al., 2008; Wewers, Katz, Paskett, & Fickle, 2006). People with lower incomes are more likely to be able to afford these non-nutrient energy dense foods, including refined grains and foods containing high fat and sugar. They are less likely to be able to afford lean meats, fish, fresh vegetables, and fruits. In the studies, Appalachian residents said that overeating, defined as frequently consuming high calorie foods, was often a problem (Schoenberg, et al., 2008; Wewers, et al., 2006). Moreover, many women reported being taught to prepare traditional Appalachian foods, with recipes handed down through generations for cornbread, fried potatoes, biscuits and gravy, stack cakes, chicken ‘n’ dumplings, and grilled cheese sandwiches, all dense with calories to sustain those performing heavy manual labor (Ramsey & Glenn, 2002; Schoenberg, et al., 2008; Tessaro, et al., 2007).

Education and Socioeconomic Status. The women living in the Appalachian region received less primary education as compared to other parts of the nation (Ramsey & Glenn, 2002; Rye, Rye, Tessaro, & Coffindaffer, 2009). Ramsey & Glenn, 2002, found that obese women often had less primary education. Often women living in urban and suburban areas with higher income level have more education and report better health than women living in rural areas. As noted earlier, the Appalachian region has high poverty and low education levels (Ramsey & Glenn, 2002).

Cultural Norms. The Appalachian community also holds values that are related to obesity; cultural heritage influences food choices. Two studies reviewed here concluded that the Appalachian family is the central unit for making decisions about food selection and preparation. The mother plays the dominant role in the family, and other members of family learn from the mother’s choices (Denham, et al., 2004; Schoenberg, et al., 2008), which tend to be high calorie.

Effects on Mortality and Economic Burden. The health consequences of obesity include elevated mortality rates and economic burden. Living in the Appalachian region is linked to health disparities, more chronic illnesses and higher mortality rates for women. Over the past

few decades, average life expectancy has increased for most Americans; however, for women in this region life expectancy has decreased (Armstrong, et al., 2004; Ezzatil, et al., 2008). Mortality rates are higher for white, older Appalachian women than for women in the rest of the nation, and mortality is most often due to heart disease and stroke (Armstrong, et al., 2004; Ezzatil, et al., 2008; Halverson, et al., 2002).

Biological Factors Related to Obesity in Appalachian Women

Genetic risk factors influence energy metabolism and makes some individuals susceptible to weight gain and obesity. Even with genetic susceptibility, however, a nutritious diet and regular physical activity enable maintenance of a healthy weight. None of these studies described caloric intake or energy expenditure or genetic variations in the metabolism of women living in the Appalachian region. Future research should examine associations between caloric intake and energy expenditure of women living in this region.

DISCUSSION

Appalachian women are an understudied population in the US. Life expectancy in these women declined in recent years, with obesity and obesity-related illnesses cited as contributing factors (Halverson, et al, 2004). Biological factors in obesity include gender, age, and genetic variations in metabolism. Socio-cultural factors include socioeconomic levels, educational levels, and cultural norms. This review summarizes what is known about biological, socio-cultural and economic factors that contribute to the high levels of obesity among Appalachian women. These women clearly experience high rates of obesity, which is a multifaceted problem and is associated with both biological and environmental factors.

The per capita income of people living in the Appalachian region is approximately \$4,000 less than the national average, and 15.3% of households are at the poverty level (Armstrong, et al., 2004). Only 68% to 77% of people living in the Appalachian region have at least 12 years of education (Wewers, et al., 2006). They also have low health literacy skills, which compounds the problem of obesity. Finally, the Appalachian region has many barriers to healthy lifestyles, including limited access to health care and limited facilities for recreational activity (Tessaro, et al., 2007).

These studies did not include body mass indices (BMI's) or caloric intake of participants. Further, the majority of the studies were cross sectional or qualitative; few obesity intervention studies have been conducted with Appalachian women, making it impossible to draw causal associations. Future investigations should test interventions for women in Appalachia and other regions with high obesity rates.

IMPLICATIONS FOR NURSING

Despite their limitations, the studies reviewed provide evidence that awareness of barriers to physical activity can assist nurses in developing approaches to increase activity in Appalachian women. In addition, exploring cultural influences on food selection and preparation can suggest strategies for decreasing high calorie diets and overeating. Decreasing obesity in rural Appalachian women can in turn assist in decreasing chronic illness related mortality.

Best practice strategies for addressing the increasing obesity rates in Appalachian women include emphasis on education about health promotion and better access to preventive health care in low-income, medically underserved communities. Given the documented increase in

mortality among Appalachian women and its relationship to obesity, interventions should be tailored to women. Best practice interventions take into account Appalachian cultural and socioeconomic features, such as income and health literacy needs. Nurses can re-educate Appalachian women about healthy food choices using educational material that are culturally diverse and written at a low literacy level. Also, interventions directed at providing women with motivational and support training helps them make better healthcare decisions. Exploring obesity interventions using information technology systems or Telehealth will allow education to be delivered in remote rural regions.

Health care policies need to focus on ways to improve living environments and make healthier communities, especially communities with high obesity rates and few resources. Health care services to low-income households, including nutrition education, and health screenings to manage weight, need to be a priority. Community coalitions and neighborhood associations promoting active lifestyles for Appalachian women can provide health interventions which focus on reducing obesity, and improving health outcomes for people living in rural regions.

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