Relationship Among Vision Status, Body Mass Index, and Employment

By

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A Thesis Submitted to Partial Fulfillment
of the Requirements for the Degree of
Masters of Science in Exercise Sciencethe
Faculty of the College of Graduate Studies at

Middle Tennessee State University
2013

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ABSTRACT

Measures of visual category (normal sight, blindness), weight classification (normal weight, overweight, obesity), employment status (employed, unemployed) were obtained in 135 male and female adults. Results indicated that weight category was not associated with employment status and the number of employment interviews was unrelated to vision status and weight for both unemployed and employed participants, after excluding data from three blind persons who reported an excessive number of job interviews. In addition, weight classification was not a significant predictor of employment status for blind or sighted adults and persons with blindness were three times more likely to be unemployed than self-employed and four times more likely to be unemployed than employed by an organization compared to normally-sighted individuals. These findings highlight the need to develop targeted strategies to reduce employment-based discrimination among adults with visual impairment.

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CHAPTER I

INTRODUCTION

Over 30% of adults in the United States are classified as obese (Center for Disease Control and Prevention, 2009b; Flegal, Carroll, Ogden, & Curtin, 2010;), a health condition defined as the presence of an excessive amount of body fat that is non-essential (American College of Sports Medicine 2010; Center for Disease Control and Prevention, 2012). Obesity can be estimated by calculating body mass index (BMI), which expresses body mass relative to the squared value of height. Using this measure of body composition, a BMI value of 30 kg/m^2 or higher is considered to be an indicator of obesity (Center for Disease Control and Prevention 2009a; Medline Plus 2010a) and extreme (or morbid) obesity is defined as having a BMI of at least 40 kg/m^2 (Wang & Beydoun, 2007). Excess food intake, poor nutrition, and a lack of physical activity (Center for Disease Control and Prevention, 2012) have contributed to the increased prevalence of adult and childhood obesity over the past 30 years (American College of Sports Medicine, 2010).

The long list of serious health risks associated with adult obesity includes cardiovascular disease, Type 2 diabetes, certain site-specific cancers, gallbladder disease, sleep apnea, osteoarthritis, and gynecological problems (Center for Disease Control and Prevention, 2009b; Flegal, et al., 2010; Ray. Harvat, Williams, & Blasch 2007). Although a sizable portion of the general population is either overweight or obese, the incidence of obesity is almost two times higher among individuals with disabilities (Rimmer & Wang, 2005).

Persons who are blind and visually impaired also display twice the propensity for obesity compared to the general population (Holbrook, Caputo, Perry, Fuller, & Morgan, 2009; U.S Department of Health and Human Services 2000). From a clinical prospective, obesity is linked with an increase in eye diseases such as macular degeneration, diabetic retinopathy, cataracts, maculopathy, and glaucoma (Capella-McDonnall, 2007; Godfrey, 2007).

Barriers to employment, including poor health, discrimination, and unequal earnings are common issues which affect persons who are obese and blind (Bell, 2010; Kirchner, Schmeidler, & Tordova, 1999; National Federation of the Blind, 2010b; Neovis, Johansson, Rossner, & Noivus, 2008; McCormic, & Stone, 2007). Obese individuals, for example, are 34% more likely to collect disability payments and disability insurance in their lifetime and up to 25% less likely to be employed compared to individuals who are not obese (McCormic & Stone, 2007; Neovis, et al., 2008). Similarly, the percentage of individuals who are blind and employed is approximately 30%, a much lower figure than the employment rate of 64.2% for the general population (Bell, 2010; Kirchner et al, 19999; U.S. Bureau of Labor Statistics, 2012; National Federation of the Blind, 2010b) concluded that individuals who are blind and report that they perceive their health as good are employed at a rate of 60%, whereas the employment rate of persons who perceive their health as poor is only 18%. When measured against the current backdrop of high adult U.S. obesity rates, these findings lend credence to the notion that persons who are blind and in poor health (Kirchner et al.,1999) may

be employed at substantially lower rates compared to persons who are not visually impaired.

The United States Bureau of Labor Statistics (2012) reports that persons with disabilities are employed at a rate of 18.7%, which is less than one-third of the employment rate (64.2%) for the general population (U.S. Bureau of Labor Statistics, 2012). The national goal (*Healthy People 2010*) of reducing the employment gap between disabled and non-disabled persons has placed a spotlight on the disparity in employment status between these groups (U.S. Department of Health and Human Services, 2009; U.S Department of Health and Human Services, 2000). This objective was not achieved as a part of *Healthy People 2010* and has been retained for *Healthy People 2020* (U.S. Department of Health and Human Services, 2010).

While some information exists regarding employment trends in persons who are blind or obese, relatively little is known regarding employment trends for persons who are both blind and obese. Hence, the purpose of this study was to document relationships among vision category, weight classification, and employment status in adults, while controlling for age, sex, race and ethnic background, and level of educational attainment.

Definition of Terms

1. Blindness: the presence of 20/200 best-corrected vision in the better eye. The criterion of 20/20 vision refers to the ability of a person to see at 20 feet what a person with typical vision could see from 200 feet or a visual

field in the better eye limited to 20 degrees or less (National Federation of the Blind, 2010b).

2. Body Mass Index (BMI): an expression of body composition derived from an individual's height and weight (Center for Disease Control and Prevention, 2011). Body mass index is expressed as kilograms (kg) per meter squared (m^2).
3. Obesity: an excessive amount of body fat, operationally defined as a BMI of 30 kg/m^2 or greater (Center of Disease Control and Prevention, 2009a; Medline Plus, 2010a).
4. Overweight: a BMI of 25 kg/m^2 to 29.9 kg/m^2 (Center for Disease Control and Prevention, 2009a; Medline Plus, 2010a).
5. Normal Weight: a BMI of 18.5 kg/m^2 to 24.9 kg/m^2 (Center for Disease Control and Prevention, 2009a; Medline Plus, 2010a).
6. Underweight: A BMI of 18.5 kg/m^2 (Center for Disease Control and Prevention, 2009a; Medline Plus, 2010a).
7. Employed: A condition in which a person with a job receives payment.
8. Unemployed: A condition in which a person is not currently working, but is available to begin working.

Basic Assumptions

1. It was assumed that participants reported accurate information regarding their vision and employment status.

Delimitations

1. Participants who are blind or visually impaired were recruited at the 2011 national convention of the National Federation of the Blind.
2. All individuals ranged from 18 to 60 years of age.

Significance

Adults who are blind and visually impaired exhibit levels of obesity which are twice as high as those reported in the general population (Center for Disease Control and Prevention, 2009b; Flegal, et al., 2010; Holbrook, et al., 2009; U.S Department of Health and Human Services 2000). While the presence of obesity has been tied to a constellation of negative health conditions (Center for disease Control and Prevention, 2009b; Flegal et al., 2010; Ray et. al 2007), individuals who are blind and obese also experience employment-related problems such as unequal wages, poor health, and employment discrimination (Bell, 2010; Kirchner et al., 1999; McCormic & Stone, 2008; National Federation of the Blind, 2010b; Neovis, et al). National attention has been directed towards the unemployment rate of persons with disabilities (U.S. Department of Health and Human Services, 2009; U.S Department of Health and Human Services, 2000).

The perception of good health among individuals who are blind is linked to higher employment rates, while the perception of poor health in persons with visual impairment has been tied to reduced employment rates (Kirchner et al., 1999). A decline in health-related quality of life resulting in poor work attendance has also been associated with a higher body mass index (Hassan, Joshi,

Madhavan, & Amonkar, 2003). If persons who are visually impaired and either overweight or obese are shown to display lower rates of employment compared to the mean national employment rate, further studies would be warranted to determine whether the promotion of physical activity and subsequent reduction in obesity and overweightness would be an effective tool in raising employment levels in blind individuals.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

This chapter highlights published research pertaining to blindness, obesity, and their relationship to job attainment. The chapter begins with a review of findings documenting the prevalence of blindness, the relationship between blindness and health outcomes, and the association between blindness and obesity. Next, the link between employment and obesity is examined, with an emphasis placed on job discrimination among persons who are obese and underrepresented in the work force. This section is followed by a discussion of visual impairment, obesity, and underemployment in the United States. The chapter ends with a brief review of literature pertaining to the control variables of age, sex, and educational level, and an overall summary.

Prevalence of Visual Impairment and Blindness

Visual-related disability is the fourth-largest group of disabilities in the United States and includes approximately 21 million individuals who are classified as visually impaired (U.S. Department of Health and Human Services, 2008) This number is not limited strictly to individuals with severe visual impairments and blindness, insofar as only 1.3 to 1.8 million individuals in the United States are considered legally blind and display vision conditions ranging from severe visual impairment to total blindness (Lighthouse International, 2002; National Federation of the Blind 2010a; Lighthouse International, 2002). It has also been projected that the number of persons who are blind and severely

visually impaired in the United States will more than double by 2030 (DiStefano, Huebner, Garber, & Smith, 2006; Lighthouse International, 2002).

In the United States, blindness is most common among persons who are elderly, with individuals over 65 comprising more than two-thirds of the blind population (DiStefano et al., 2006). According to the National Federation of the Blind, 787,691 of the approximate 1.3 million Americans who are classified as blind are 65 years of age or older (2010a). The number of individuals who are elderly and blind is expected to increase to 1.6 million by 2015 and to 2.4 million by 2030 (National Federation of the Blind, 2010a). Blindness is also more common in women (DiStefano, 2006; The Eye Disease Prevalence Group, 2004) compared to men. Individuals who are blind or visually impaired tend to be non-White, with Black Americans being nearly two times more likely to be blind than White Americans. This racial disparity in visual impairment may be due partly to limited access by Black Americans to eye care services (Lighthouse International, 2002) According to Friedman, Congdon, Kempen, Tielsch, Tielsch, & O'Colmain (2002), individuals of Hispanic descent also display a high prevalence of blindness.

Variations in the prevalence of visual impairment and blindness exist because of differences in the criteria used to classify visual impairment and blindness (Hendershot & Crews, 2006). Some classification systems, for example, are based on visual acuity and best-corrected vision, whereas other models include questions regarding functional skills of daily living that involve vision, such as reading a newspaper (Hendershot & Crews, 2006). These

authors (Hendershot & Crews, 2006) noted that this lack of standardization in evaluative criteria is an international issue which eventually led to the formation of the Disability Tabulation project (DISTAB) and the development of an international standard vision classification system called the International Classification of Functioning (ICF), Disability, and Health. Despite the efforts of the DISTAB initiative, there is still work to be done to create an accurate, usable, and versatile system for defining and classifying persons who are visually impaired and blind (Hendershot & Crews, 2006). For purposes of the current project, individuals were classified as legally blind according to definitions provided by the National Federation of the Blind (2010b) and the World Health Organization (WHO). The National Federation of the Blind definition of blindness is:

> "central acuity of 20/200 or less in the better eye with the use of a correcting lens. An eye which is accompanied by a limitation in the fields of vision such that the widest diameter of the visual field subtends an angle no greater than 20 degrees shall be considered as having a central visual acuity of 20/200 or less."

According to the WHO chart presented in Table 1, persons in Categories 2 through 5 would be classified as legally blind. This classification model is helpful because it defines visual acuity using best-possible corrected vision rather than non-corrected vision (Hendershot and Crews, 2006).

Table 1

World Health Organization Schematic for Defining Visual Impairment

Category of Visual Impairment	Visual acuity with best possible correction	
	Maximum less than:	Minimum equal to or better than:
1	6/18 3/10 (0,3) 20/70	6/60 1/10 (0,1) 20/200
2	6/60 1/10 (0,1) 20/200	3/60 1/20 (0,05) 20/400
3	3/60 1/20 (0,05) 20/400	1/60 (finger counting at 1 m) 1/50 (0,02) 5/300 (20/1200)
4	1/60 (finger counting at 1m put m on same line) 1/50 (0,02) 5/300 (20/1200)	Light perception
5	No light perception	

Note. Adapted from World Health Organization: International Statistical Classification of Diseases and Related Health Problems. 10th revision. Version for 2007. Chapter VII. H54. Blindness and low vision. Retrieved from http://www.who.int/classifications/icd/en/.

Individuals who are blind tend to come from a lower socioeconomic background and are less likely to be employed (Di Stefano et al., 2006; Lighthouse International, 2002; National Federation of the Blind, 2010a). According to Laitinen, Sainio, Koskinen, Rudanko, Laatikanen, and Aromaa (2007), many individuals who are blind have difficulty performing at least one activity of daily living (ADL) and are more inclined to have trouble with functional mobility compared to sighted individuals.

Visual Impairment and Health

The projected increase in the number of persons who are visually impaired and blind highlights the need to conduct health-related research in these populations. Blindness is associated with an increased prevalence of hypertension, heart disease, stroke, depression, diabetes, osteoporosis, arthritis, falls, and premature mortality compared to persons who are sighted (Capella-McDonnall, 2007; Ray et al., 2007). Abdulla, Amphofo-Boateng, and Zwai reported that blindness ranks eleventh in a list of disabling conditions that limits the ability of a person to engage in physical activity (2008). Individuals who are severely visually impaired also exhibit lower levels of physical fitness when compared to sighted peers. This finding has not been attributed to blindness, but rather, appears to be related to a sedentary lifestyle (Ray et al., 2007).

Persons who are blind are nearly twice as likely to be obese as their sighted peers (Capella-McDonnall, 2007; Center for Disease Control and Prevention, 2009b; Holbrook et al., 2009; Ray et al., 2007; Rimmer & Wang, 2005), which greatly increases the risk of health conditions such as

cardiovascular disease, certain site-specific cancers, Type 2 diabetes, gallbladder disease, sleep apnea, osteoarthritis, and gynecological problems (American College of Sports Medicine, 2010, Center for Disease Control and Prevention, 2009b; Ray et al., 2007). Individuals who are obese are also at greater risk for eye disease (Capella-McDonnall, 2007), as health conditions such as macular degeneration, cataracts, diabetic retinopathy, glaucoma, and maculopathy have been shown to progress more rapidly in individuals who are obese or overweight (Capella-McDonnall, 2007; Godfrey, 2007).

The high incidence of obesity also increases the likelihood that people who are blind will be less healthy and more unfit than those who are sighted (Capella-McDonnall, 2007; Center for Disease Control and Prevention, 2009b; Hollbrook et al., 2009; Ray et al., 2007). Currently, there is a dearth of health-related research focusing on individuals who are blind, and most studies pertaining to health and physical activity in persons who are blind have been conducted on children and adolescents (Holbrook et al., 2009; Ray et al., 2007).

Obesity

Obesity, defined as the presence of an excessive amount of body fat that is not essential (American College of Sports Medicine, 2010), affects more than 30% of the U.S. adult population (American College of Sports Medicine, 2010; Center for Disease Control and Prevention, 2009b; Ogden, Carroll, Curtis, McDowell, Margaret, Tabak, & Flegal, 2006.) Second only to tobacco use, obesity is one of the largest preventable causes of death in the United States (Wang & Beydoun 2007). Obesity has spread rapidly across the U.S. during the

past 30 years and is projected to continue to increase in prevalence in the foreseeable future (Wang & Beydoun, 2007). A recent meta-analysis suggested that 41% of adults in the U.S. will be obese by 2016 (Wang & Beydoun, 2007) and this percentage is expected to rise to 51% by 2030 (Wang, Beydoun, Liang, Caballero, & Kumanyika, 2008).

According to American College of Sports Medicine (2010), adult obesity is tied to a 50% to 100% increase in morbidity. Wang et al. (2008) have also projected that by 2030, U.S. annual health care expenditures related to obesity will reach approximately $860 to $957 billion dollars and will account for one of every six dollars spent on health care. Obesity prevalence varies by geographic region, with individuals living in the Southeastern region of the United States exhibiting higher obesity levels than people living in the West, Midwest, or Northeast (Wang & Beydoun, 2007). A positive relationship also exists between age and obesity prevalence (Ogden et al., 2006).

One way to estimate obesity is to determine BMI. Using this approach, a BMI at or above 30 kg/m^2 is considered an indicator of obesity (Center for Disease Control and Prevention, 2009b; Medline Plus 2010b) and extreme (or morbid) obesity is defined as having a BMI of 40 kg/m^2 or greater (Wang & Beydoun, 2007). Because the determination of BMI requires only knowledge of height and body mass, it is a simple and straightforward method of estimating body composition (American College of Sports Medicine, 2010). Although the accuracy of using BMI is questionable when applied to individuals with high relative levels of muscle mass, this approach provides a reasonably accurate

assessment of body composition among non-athletic persons who are obese (American College of Sports Medicine, 2010). While not as sensitive as the WHO obesity predictor of bioelectrical impedance, BMI displays a high rate of specificity, meaning that 95% of men and 99% of women with BMI-defined obesity also display obesity as measured using body fat percentage (Romeo-Corral et al., 2008).

From an ethnic perspective, obesity is highest in African-Americans, who exhibit an obesity prevalence of 45% (Ogden et al., 2006). Individuals who are Hispanic are also more likely to be obese (36%) compared to White, non-Hispanics (30%) (Ogden, et al. 2006). Minority groups, which include persons who are non-Hispanic and Black as well as individuals who are of Mexican origin, exceed the obesity prevalence of White individuals by 10% (Wang & Beydoun, 2007). Differences in the prevalence of obesity across racial and ethnic groups are more prominent in females compared to males (Wang & Beydoun, 2007). In this regard, Wang and Beydoun noted that from 1999 to 2002, African-American women displayed an obesity prevalence that was two times higher than that observed among White, non-Hispanic and Hispanic women (2007). In contrast, data from the Behavioral Risk Factor Surveillance System (BRFFS) (2001) indicated that persons of Asian background exhibited a 5% obesity level, which is the lowest prevalence of obesity reported across ethnic and racial groups (Wang & Beydoun, 2007).

Based on data collected in the National Health and Nutrition Examination Survey (NHANES) study spanning the years from 1971 to 2000, education is a

key factor in predicting obesity (Wang & Beydoun, 2007). Specifically, individuals who do not complete high school are significantly more likely to be obese than people who receive a high school diploma. Interestingly, this finding does not appear to hold true for African-Americans (Wang & Beydoun, 2007).

In addition to the physical health burdens which result from carrying excess body fat, obesity can also negatively affect quality of life. In considering this topic, Hassan et al., (2003) used data from the BRFSS to document the effects of obesity on quality of life in 184,450 persons who were predominately White and slightly more female than male. Data from this investigation revealed that health-related quality of life diminished with an increase in BMI. Persons who were obese reported having 4.3 physically-unhealthy days and individuals who were extremely obese reported experiencing 6.5 physically-unhealthy days when asked to recall health during the 30-day period prior to the survey. Similarly, individuals who were very obese experienced significantly more mentally-unhealthy days compared to persons who were not obese and reported experiencing 5.2 days of mental unhealthiness as opposed to the 3.2 days reported by persons who were not overweight. In terms of the impact of obesity on physical function, obese persons reported 7.2 days of activity limitation compared to 6.1 days experienced by persons of normal weight (Hassan et al, 2003).

Employment

Employment is generally discussed in terms of possessing a paying job either in the competitive work environment, in a sheltered work setting, or while working for oneself (Batcher & Park, 2008; Bell, 2010; Flagel, et al., 2010; Glass, Hass, & Reither, 2010; Kirchner et al., 1999; McCarthy, Burgess, & Keefe, 1999; Neovis et al., 2001; Rimmer & Wang, 2005). While volunteerism, school, or other life roles do not fit the definition of employment, they nonetheless represent important and meaningful ways in which individuals spend their time (Bell, 2010; Kirchner et al., 1999). The notion that work is something to be valued across the working lifespan is supported by data showing that the majority of working-age persons identify being employed as their major life role, whether they are a student, homemaker, volunteer, or fulfill another life role that might be perceived as important (Kirchner et al., 1999).

A limited amount of research has been conducted in an attempt to explain why persons who are blind are grossly underrepresented in the workplace (Bell, 2010; Kirchner et al., 1999). Moreover, mixed findings exist regarding whether employment is negatively affected by obesity. Morris (2007) conducted a survey in which two rounds of the Health Survey of England (HES) were analyzed to document the relationship between obesity and employment. In this study, Morris examined results from 16,967 cases (8,643 females and 8,324 males), wherein obesity was estimated from BMI based on self-reported height and weight and participants were asked questions regarding employment, perceived health, home and family variables, and other demographic information. Results

from this analysis indicated that obesity exerted a negative impact on employment for men and women (Morris, 2007). In another paper, Garcia and Quintana-Domeque (2006) analyzed data from ECHP Eurostats, which is an annual survey conducted in a number of European countries. Specifically, these authors examined cases over a 3-year period (1998 to 2001) of participants ranging in age from 25 to 54 years. Data from this investigation revealed an association between lower employment in obese women, but not in obese men. Garcia and Quintana-Domeque also reported a greater wage discrepancy between obese and non-obese women in countries with a greater prevalence of obesity (2006).

Identifying ways to increase employment opportunities for groups who are underrepresented in the work place or who are employed, but underpaid, can reduce the economic burden on society. According to the National Federation of the Blind, the lifetime cost to the federal government for one unemployed blind person is $916,000 when disability payments, social security, insurance, and unpaid taxes are included. Overall, the annual federal expenditure for persons who are blind and unemployed is four billion dollars (National Federation of the Blind, 2010a). Narrowing the employment gap for individuals with disabilities is one of the goals outlined in *Healthy People 2010* and has been retained as a goal for *Healthy People 2020* (U. S. Department of Health and Human Services, 2010; U.S. Department of Health and Human Services, 2009; U.S Department of Human Services, 2000). Low employment rates for the blind and obese, the importance of identification with life roles, added economic costs of persons who

are unemployed, and the lack of research regarding employment trends underscore the importance of documenting employment trends in persons with visual impairment.

In considering the association between employment and health, Kirchner et al. (1999) analyzed information gathered from the 1994-1995 National Health Interview Survey to identify trends related to employment for persons who are blind. Data were collected from 128,001 adults varying in age from 18 to 65 years, and of this sample, 1,603 persons were severely visually impaired and 334 individuals were legally blind. Findings from this survey revealed that among the blind population, perception of good health led to a robust employment rate of 60%, while perception of poor health was indicative of very low employment rates (18%).

Effects of Obesity on Employment

Underrepresentation in the workforce. McCormick and Stone (2007) documented the economic cost of obesity in the United Kingdom and considered the issue of whether this financial burden warranted government intervention. In his report, McCormick and Stone (2007) stated that persons who are obese are 25% less likely to be employed and suggested that this was due partly to employer discrimination. In another study, Batcher and Park (2008) addressed the question of whether increased obesity was related to unemployment or increased application for and receipt of disability benefits. These authors determined that as unemployment rose, so did the number of people receiving disability benefits, suggesting that underemployment in the work force was linked

more directly to health-related issues than to obesity (2008.). Although Batcher and Parker (2008) noted that some health-related disability claims might be associated with the musculoskeletal structure of persons who were obese, they failed to mention whether other health-related claims might have been tied to conditions associated with obesity, such as diabetes, heart disease, stroke, or high blood pressure. Using more than three decades of data from the NHANES study (1970 - 2004) to conduct a projection analysis of obesity in the United States (2008), Wang and colleagues (2008) predicted that by the year 2030, 1 of every 6 dollars spent on health care will be allocated to an obesity-related claim and could indirectly affect the employment status of persons who are obese, based on permanent disability and number of days absent from work. In a related report, Glass et al. (2010) reviewed three years of data to determine whether obese women would be more likely to experience difficulty in attaining employment compared to obese men. While it was concluded that no association exists between obesity and occupational attainment, they did state that persons who were obese and attending post-secondary school were less likely to complete their education and might have to settle for lower-paying jobs (Glass et al., 2010).

Attitudes and perceived discrimination. Although limited in scope, a handful of investigations have been undertaken to assess whether individuals who are obese display lower rates of occupational attainment compared to individuals who are not obese. Other studies have considered the issue of underrepresentation of obese individuals in the labor force.

Carr and Friedman (2005) surveyed over 3,000 individuals to determine whether perceived social stigma was linked to obesity status. To accomplish this task, telephone surveys were conducted with 1,696 women and 1,741 men who ranged in age from 25 to 74 years. Each participant provided information on his or her height and body mass so that they could be classified into six BMI categories ranging from underweight to morbidly obese. Participants were also asked questions regarding perceived work-related discrimination, including how many times they had been passed over for a job, a promotion, or fired due to obesity-related discrimination (2005). Results from this study demonstrated that when weight rose above the normal range, the perception of social stigma also increased in the area of employment. Specifically, individuals who were overweight were 26% more likely to perceive social stigma than were participants who were of normal weight. Moreover, among the most obese participants, there was an 84% greater likelihood of experiencing the perception of both social stigma and employment-based discrimination

In discussing hiring preference, Puhl and Brownell (2001) reported in a meta-analysis that in one study, 216 female college students were asked to read employee summaries that were fabricated for nine females of differing weights. A variety of stereotypical terms related to overweight and obesity, as well as thinness, were used to describe the body composition of the “job” candidates. In this study, participants expressed the most desire to work with thin individuals and were least interested in working with obese individuals (Puhl & Brownell, 2001). In another report, 120 participants viewed job applicants in which weight

was manipulated through video effects. Results from this study demonstrated that candidates were significantly less likely to be recommended for hiring compared to individuals in the normal-weight range (Puhl & Brownell, 2001). In a third investigation involving video manipulation of weight, (Puhl and Brownell, 2001), 320 participants who viewed videotapes were significantly less likely to recommend individuals who were obese for a job and were even less likely to recommend obese women for jobs compared to obese men. Findings from this report also revealed that participants were more inclined to recommend an obese individual for a “behind the scenes” position, such as systems analyst, instead of a sales position.

In their paper, Puhl and Brownell (2001) discussed unfounded assumptions that obese job candidates and employees are lazy, incompetent, or lacking in self-discipline. These authors stated that discrimination observed in the laboratory, as depicted in several studies reviewed in their meta-analysis, would place persons who are obese at a distinct disadvantage when interviewed and would likely result in harsher consequences when reprimands were issued in the workplace (Puhl & Brownell, 2001). Puhl and Brownell (2001) also noted that persons who are obese are likely to receive lower wages and less consideration for job promotions.

Roehling, Roehling, and Pichler (2007) analyzed data from the McArthur Foundation National Survey of Midlife Development in the United States (MIDUS) in order to draw conclusions regarding weight-based discrimination. Participants in their analysis included 2,838 individuals (93% White, 7% African American), of

which 50% were male and 50% were female. All participants displayed BMI values greater than 19 kg/m^2 and 38% were overweight, 15% were obese, and 7% were very obese, with the latter group exhibiting BMI values greater than 35kg/m^2. Data from the Roehling et al. report (2007) indicated that 4% of persons who were obese or very obese reported experiencing employment-based discrimination, which was greater than the number of persons from the sample who reported experiencing discrimination based on race, religion, or sexual orientation. These authors also noted that women were 16 times more likely to perceive weight-based discrimination in the job setting compared to men.

Wage penalty and obesity. Data from the National Longitudinal Survey of Labor Market Experience of Youth (NLSY) were reviewed by Averett and Korenman (1996) to document the association between wages and weight status. Although the NLYS was conducted from 1979 to 1990, this study focused on labor and marriage information collected in the 1988 survey. The sample population consisted of 5,090 women and 4,951 men who ranged in age from 14 to 21 years at the time of the initial survey in 1979. Averett and Korenman (1996) found that when compared to females of normal weight, obese women were of a lower socioeconomic status and tended to have diminished incomes, spend fewer years in school, and display lower levels of hourly wages, spousal income, employment, and representation in management positions. These authors also reported that women who were obese earned 6% less than women who were of normal weight and were more likely to experience health problems. Interestingly, this set of trends was not observed in men, as underweight males

actually earned a lower income and were less inclined to be married than those in higher weight ranges. However, men in the obese category were more likely to report health problems (Averett & Korenman, 1996).

In a recent investigation, Cawley (2004) analyzed 14 years of data from the NLSY and reported that obese women received approximately 9% less earnings than women of normal weight, which was greater than the 6% deficit reported by Averett and Korenman (1996). This discrepancy in findings between studies may reflect the analysis of all the years of data in the Cawley report (2004), rather than a single year's worth of data analyzed in the Averett and Korenman investigation (1996). As a final note, Cawley (2004) commented that the 9% deficit in the earnings of women who are obese was equivalent to three years of work experience or one-and-a-half years of education.

Blindness and Employment

The discouraging employment statistics of persons who are blind highlight the need to further explore the relationship between blindness and employment. In a qualitative study, Pellerin (2010) interviewed 20 participants with blindness about their employment and unemployment experiences. In answering a question about the perceived benefits of being employed, participant responses included independent support of self and others, achievement of goals, sense of purpose and self-worth, and survival as reasons for choosing to either be employed or continuing to seek gainful employment (Pellerin, 2010).

However, despite having clear reasons to become employed, the support of legislation such as the American with Disabilities Act, the availability of employment services including Vocational Rehabilitation, and increased access to technological advances that can help to level the employment playing field, persons who are blind and visually impaired are still struggling for equal opportunity in the workforce (Pellerin, 2010).

Underemployment in the United States. Kirchner et al. (1999) conducted a study to ascertain whether individuals who are visually impaired are employed at a lower rate compared to those who are not visually impaired. In their study, two rounds of surveys were conducted with 334 individuals between the ages of 18 and 65 years who were legally blind. Participants were asked questions about their height, weight, and physical limitations due to disability, and issues related to employment, education, access to and use of vocational rehabilitation services, and health as it pertains to employment were also addressed. Findings from this project revealed that younger persons who were blind displayed levels of employment that were more similar to those of sighted individuals. In contrast, the employment gap between those who were blind and those who were sighted expanded with increasing age. A potential explanation for this finding is that for people who are 50 years of age and older, the incidence of blindness increases and employment is sought after less frequently. Other data from this study revealed that there was a more dramatic difference in employment rates of sighted and blind men compared to sighted and blind women. Moreover, Kirchner and colleagues (1999) noted that as educational

attainment increased, the gap in employment between persons who were blind and sighted decreased. In addressing this latter point, 82% of blind college graduates were employed compared to a 90% employment rate of college graduates with no visual impairment. Viewed collectively, these statistics support the potential impact of educational attainment on employment status in persons who are visually impaired. As a counterpoint to these findings, McCarthy et al. (1999) found no significant underemployment in the blind and visually-impaired population of Australia. It is unclear what might underlie this striking difference in the employment of the blind in the United States and Australia.

In a recent paper, Bell (2004) reviewed cases of over 18,000 clients who were legally blind and who had exited from State Vocational Rehabilitation systems across the United States in 1997, 1999, and 2001. To avoid confusion, only the 2001 data were presented in the study unless otherwise noted (Bell, 2004). The 2001 population (average age = 51 years) consisted of 8,582 men and 10,145 women. Of these individuals, 69.7% were Caucasian, 9.4% were Hispanic, 0.7% were Alaskan or Native American, 18.8% were black, and 1.5% were Asian or Pacific Islander. While an overall employment rate of 25% was reported for participants who left State Vocational Rehabilitation programs, statewide differences in employment rates among persons who are blind varied from 12.9% in California to 56.63% in Alabama. In another study, Kelley (2001) conducted a survey to identify factors contributing to employment and unemployment of persons who were blind and graduated from high schools in Tennessee. Phone interviews were conducted with 63 adult male and females

who were visually impaired (age range = 19 to 65 years), 23% of whom self-reported chronic health problems. Results from this investigation, which showed that 22% of study participants were unemployed compared to a 3.9% unemployment rate for the general adult population in Tennessee, revealed that a much larger percentage of the blind and visually-impaired population was unemployed compared to sighted persons (Kelley, 2001).

While employment in blind and visually-impaired populations is still very low, a recent analysis incorporating 10 years of cases from individuals who exited from state Vocational Rehabilitation programs revealed a 31.2% employment rate between 1997 and 2007 (Bell, 2010.) In this report, the percentage of employment was significantly higher than the 25.1% employment rate found in an earlier study conducted by Cavanaugh (Bell, 2010). Another promising trend highlighted by Kirchner and Smith (2005) is that in 95% of cases surveyed, recent high-school graduates who are blind planned on attending a 2- to 4-year college program. This finding is noteworthy, insofar as educational attainment beyond the high school diploma has been shown to greatly reduce the employment gap between persons who are blind and those who are sighted (Kirchner & Smith 2005).

Wage penalty. Limited data suggest that the underemployment of individuals who are blind and visually impaired is accompanied by wage penalties. In the previously discussed study by Bell (2004), for instance, the discrepancy between wages of persons who were sighted and individuals who were blind and had exited from State Vocational Rehabilitation programs was

analyzed. Based on information from the 18,671 cases examined in 2001, employees who were blind earned 60 cents for every dollar earned by persons with sight.

Employer attitudes and perceived discrimination. In a study published three decades ago (Price, 1981), stratified random sampling was used to select 30 representatives from the food service business and 30 representatives from the general merchandising industry to participate in a survey regarding employer attitudes about hiring persons who were blind. Because of the sensitive nature of the questions asked in these surveys, the investigators personally administered the surveys. Findings from these interview sessions revealed that 57% of food service industry representatives indicated that they “possibly disagreed” or “strongly disagreed” that they could hire persons with visual impairments without making major alterations in their operational procedures. Of the general merchandising representatives, 87% “possibly disagreed” or “strongly disagreed” that they could hire a person with a visual impairment without making major alterations to current operational procedures (Price, 1981). The majority of food service industry and general merchandising representatives indicated that persons who are blind: a) should not work in a separate work environment (87% food service industry, 76% merchandising), b) should receive equal employment rights (73% food service industry, 94% merchandising), and c) can perform the same quality work (50% food service industry, 47% merchandising), these responses did not match their personal beliefs. This dissonance was reflected by survey results demonstrating that 60% of food service representatives “possibly

to strongly agreed" that they would rather hire a non-disabled worker instead of a worker with a disability. A similar response was also observed for representatives in the general merchandising industry, who were 67% more likely to hire an employee without a disability. For both job categories, 50% of respondents felt it was unfair for them to be required to hire persons with disabilities, and 80% of food service representatives and 56% of general merchandising representatives believed it would be unsafe for a person with a visual disability to work in their business (Price, 1981).

Additional information gleaned from this comprehensive assessment of employer attitudes (Price, 1981) revealed that 97% of representatives from the food service industry "possibly agreed to strongly agreed" that persons who were blind should strive to advance in their employment compared to 80% of representatives from the general merchandising category who responded in a similar fashion. When asked what job positions a person who was blind or visually impaired would be able to perform, both categories of job representatives agreed that persons who are visually impaired could only fulfill the duties of an entry-level position. In contrast, job descriptions that respondents from both groups thought persons with visual impairments could perform were those featuring limited customer contact (Price, 1981).

In a study discussed earlier in this chapter (Kelley, 2001), the majority of the 63 blind, adult, predominately Caucasian participants cited negative attitudes of employers and others as important barriers to successful employment. Attitudinal barriers were listed by participants as being second only to

transportation-related barriers as causes for the difficulty of attaining and maintaining competitive employment (Kelley, 2001). Participants indicated that employers either did not understand the Americans with Disabilities Act or did not care to follow it in their employment practices (Kelley, 2001).

Factors associated with low pay and employment rates in persons with visual impairment were explored in a recent qualitative project conducted by Ashi (2005). In this investigation, 15 females of varying ethnic and economic backgrounds were interviewed to discuss employment and unemployment of blind and visually impaired populations. Following these interviews, 4 focus groups were conducted with 4 to 6 participants per group. Participants for the interviews and focus groups were gathered from the National Federation of the Blind and the Lighthouse Institute, both of which serve persons who are blind and visually impaired. Both participant groups included college graduates, social workers, educators of the blind, individuals who were blind and self-employed, non-college graduates, and resource workers. Factors identified by participants that were related to low skill attainment and low-paying jobs included blindness (80%), public perception of blindness (73%), limitation in job opportunities (53%), negative attitude of employers (44%), and low levels of education (40%). Perceived employer discrimination based on blindness was also reported by 80% of participants (Ashi, 2005).

Control Variables

In order to accurately quantify the influence of blindness and obesity on employment, it is necessary to control for factors which might affect this multivariable association. The following section identifies a set of factors which should be considered when conducting research focusing on interrelationships among the trio of factors listed above.

Age. In the research literature, several studies have controlled for age. This is important as it pertains to blindness, because many individuals become blind later in life and may not choose to learn the skills necessary to seek employment (Kirchner et al., 1999.) In a 2008 study, Daransbourg also reported that individuals 18 to 36 years of age were more likely to achieve competitive employment then those over 51 years (2008). Averett and Korenman (1996) found that women who became obese between the ages of 16 and 23 years were more inclined to be negatively impacted in terms of employment than those who became obese later in life (1996). This also held true in the Cawley report (2004), which examined 14 years of data from the NLYS in documenting the association between obesity and wage penalties in obese women.

Sex. Women who are blind are unemployed at a greater rate compared to sighted women (Bell, 2004; Daransbourg, 2008; Kelley, 2001; Kirchner et al., 1999). In terms of obesity, women perceive significantly more employment-based discrimination compared to men (Carr & Friedman, 2005; Roehling, Roehling, & Pichler, 2007; Carr & Friedman, 2005) Averett and Korenman

(1996) also noted that men who were obese did not have difficulty attaining and maintaining employment, nor did they experience a negative impact on earnings related to obesity. Cawley (2004) echoed similar results in his investigation of the effect of obesity on the earnings of obese women.

Educational level. According to Kirchner et al. (1999), the rate of employment rises for persons who are blind as the level of educational attainment increases. In fact, educational level appears to be the key variable responsible for decreasing the gap in employment rates between individuals who are blind and the general population. Results by Kelley (2001) also demonstrated that individuals who had completed post-secondary studies were more likely to be employed compared to those with high-school diplomas (2001). Wang and Beydoun (2007) reported that based on NHANES data collected between 1971 and 2000, individuals with less than a high-school education were more likely to be obese. The single exception to this finding was that individuals who were Black with less than a high-school education did not exhibit a greater propensity towards becoming obese (Wang & Beydoun, 2007). Individuals who are obese are less likely to finish college, which tends to result in lower-paying jobs (Glass et al., 2010). Averett and Korenman (1996) and Cawley (2004) also reported that women who are obese complete fewer years of school than those who are not obese.

Race. Evidence demonstrates that Black women are less affected in terms of occupation and income than women who are not Black (Averette & Korenman, 2006; Cawley, 2004). No studies were found describing the effects of ethnicity on blindness and employment status.

Overall Summary

The available literature clearly shows the existence of underemployment in blind and obese individuals. Employer attitudes and perceived discrimination toward persons who are blind have changed relatively little over the past three decades. Although few studies have been conducted to identify factors responsible for the underrepresentation of persons in the workplace who are blind or obese, individuals who are blind and perceive their health status as good are employed at a significantly higher rate compared to persons who are blind who perceive their health as poor (Kirchner et al., 1999). A diminished health-related quality of life has also been linked to an increase in body mass index. Because raising the employment rate of individuals with disabilities is an objective for current science-based, national health objectives, and given that persons who are either blind or obese exhibit poorer health compared to the sighted population, it is important for researchers to better understand the rationale for underemployment in persons with visual impairment, especially as it relates to various descriptors of health.

CHAPTER III

METHODS

Participants

A total of 135 participants were recruited to participate in this investigation. Participants who were blind were recruited at the National Federation of the Blind (NFB) 2011 National Convention (Orlando, FL) using convenience sampling. Study participants included: a) individuals who were not blind and of normal weight, b) individuals who were not blind and were overweight, c) individuals were not blind and were obese, d) individuals who were blind and of normal weight, e) individuals who were blind and overweight, and f) individuals who were blind and obese. Sighted participants were recruited at local restaurants, coffee shops, and the convention hotel from July 3rd to July 15th, 2011. Study participants varied in age from 18 to 60 years, a range which is characteristic of persons in the work force who are not minors or elderly.

Procedures

Prior to their active participation in the study, each participant signed an informed consent form which was available in Braille, large-print, or audio format. If participants were unable to sign the consent form, verbal consent was given in the presence of the primary investigator and a witness.

After signing the informed consent form or providing verbal consent, each participant completed a survey of questions modified from the Disability Followback Survey (NHIS Phase II) Adult Questionnaire (DFSAQ) (U.S. Department of Commerce, 1995). The content validity of this questionnaire has

been established by an expert panel (Cinter for Disease Contron and Prevention, 2009b). Participant responses to the survey questionnaire allowed for employment status and a variety of personal, demographic, and job-related characteristics (i.e., vision status, weight status, age, sex, race/ethnic background, educational attainment, and employment status) to be determined. The following section describes the methodology used to evaluate the aforementioned variables.

Employment status. "Employment" and "job attainment" were used interchangeably for purposes of this study. The modified version of the DFSAQ (U.S. Department of Commerce, 1995) was used to quantify the number of job interviews received by each participant (Kirchner, et al., 1999). Self-employment was evaluated by participant response to a question in the modified DFSAQ (U.S. Department of Commerce, 1995). The Internal Revenue Service (2012) defines self-employment as an enterprise in which an individual or individuals conducts a trade or business as an independent contractor, as a member of a partnership, or who are otherwise in business for themselves.

Vision status. The National Federation of the Blind (2010b), which is the oldest and largest advocacy organization for persons who are blind in the United States, defines blindness as:

> "central visual acuity of 20/200 or less in the better eye with the use of a correcting lens. An eye which is accompanied by a limitation in the fields of vision such that the widest diameter of the visual field subtends an angle no greater than 20 degrees shall be considered as having a central visual acuity of 20/200 or less."

According to the World Health Organization chart presented in Table 1, persons classified as legally blind meet the criteria listed under Categories 2, 3, 4, and 5, whereas persons who are not blind meet or exceed the criteria specified for Category 1. It should be noted that this classification model of visual impairment evaluates visual acuity with best-possible corrected vision (Hendershot and Crews, 2006). Blindness was determined based on participant response to a question in the modified version of the DFSAQ (U.S. Department of Commerce, 1995).

Weight status. Normal or healthy weight is defined as a BMI from 18.9 kg/m^2 to 24.9 kg/m^2, overweight is defined as a BMI from 25.0 kg/m^2 to 29.9 kg/m, and obesity is defined as a BMI of 30 kg/m^2 or greater (MedLine Plus, 2010). To derive BMI, the height and weight of each participant were obtained using a stadiometer and digital electronic scale, respectively, after removal of shoes and unnecessary clothing (e.g., belts, jackets). Height and weight measurements were obtained in duplicate and averaged to derive mean values for each variable. Following conversion of height to meters and weight to kilograms, BMI was calculated by dividing body mass (in kilograms) by height squared (in meters).

Age. The age of the participants was determined from knowledge of the date of completion of the survey and the date and year of their birth in response to questions found in the modified DFSAQ (1995).

Sex. Sex, which refers to whether a participant is male or female, was verified based on a response to a question found in modified DFSAQ (1995).

Race and ethnic background. *Biology Online* defines race as "a group or population of humans categorized on the basis of various sets of heritable characteristics, such as color of skin, eyes, and hair." Race was determined by a response to a question found in the modified DFSAQ (U.S. Department of Commerce, 1995). (1995). Ethnic background is defined as a broad construct that refers to individuals who may share common cultural traits based on historical background, religion, genetic heritage, or cultural traditions (Buckhard, et. Al. 2003). As with race, ethnic background was assessed using the modified DFSAQ (U.S. Department of Commerce, 1995).

Educational attainment. Educational attainment was defined as the highest level of education a person has completed. Questions regarding the highest level of educational attainment were included in the modified DFSAQ (U.S. Department of Commerce, 1995).

Statistical Analysis

Data were entered and analyzed using SPSS software. Means and standard deviations were calculated to provide descriptive data for the primary variables of interest. A chi-square test of independence was conducted to evaluate the relationship between weight classification and employment status. Analysis of covariance (ANCOVA) was employed to predict the number of interviews a person completed based on vision category and weight classification, after adjustment for age, sex, race and ethnic background, and

level of educational attainment. In a similar fashion, logistic regression was used to predict employment status based on vision category and weight classification, while controlling for age, sex, race and ethnic background, and level of educational attainment.

CHAPTER IV

RESULTS

Demographic Findings

Participants were further stratified into six groups based on vision and weight status: 1) blind and obese (21 individuals); 2) blind and overweight (15 individuals); 3) blind and normal weight (15 individuals); 4) sighted and obese (20 individuals); 5) sighted and overweight (27 individuals); and 6) sighted and normal weight (37 individuals). Overall, 54% of participants were male and 46% were female and they ranged in age from 18 to 60 years, with a mean age of 35 years and a median age of 29 years. With respect to racial and ethnic background, 117 individuals (86.7%) were White and 13 (9.6%) were African-American. Survey participants represented 29 states (AK, AL, AR, AZ, CA, CO, CT, FL, HI, IL, LA, MD, MN, NC, NE, NJ, NM, NY, OH, OR, PA, RI, SC, TN, TX, UT, VA, WA, WV), with the largest number of individuals residing in North Carolina (38), Maryland (11), TN (10), and Pennsylvania (8). The educational level of the participants was high, with 82% reporting at least some college after high school. Of those persons who received post-secondary education, 27% and 20% reported earning a bachelor's and master's degree, respectively.

Employment Findings

All but one of the 135 participants in the study reported their employment status. Nineteen participants were self-employed on a full- or part-time basis, 76 participants were employed full-time by a company or agency, 14 participants were employed part-time by a company or agency, and 25 participants were

unemployed. Of the 51 participants who were blind and listed their employment status, 32% reported indicated that they were unemployed Study participants worked in a wide variety of professions, including the food service industry (16 participants), education (13 participants), information technology (10 participants), and rehabilitation services (6 participants).

Chi-Square and ANCOVA Findings

Weight category was unrelated to employment status, χ^2 (2, N = 135) = 1.74, p = .78. Among unemployed participants, the number of employment interviews was not associated with vision category or weight classification following adjustment for age, sex, race, and education, F (1,17) = 4.25, p = .06 and F (2, 17) = 1.69, p = .22. Among employed persons, the number of job interviews was related to vision category, but not weight classification, after controlling for age, sex, race, and education, F (1, 82) = 9.21, p = .003 and F (2, 82) = 0.12, p = .88. People who were blind reported having significantly more employment interviews than people who were sighted. However, three employed participants who were blind reported 30, 40, or 50 interviews, respectively, and when these data were excluded, the next highest number of job interviews received by a single person with blindness was 15. When these three outliers were excluded from the data analysis, neither vision status (F = 2.42, p = .12) or weight status (F = 0.75, p = .47) were related to the number of interviews among employed participants. Table 2 presents the average number of interviews for individuals in each of the six vision/weight groupings by employment status, including and excluding outlier data points.

Regression Findings

Multinomial logistic regression was used to predict employment status (i.e., unemployed, self-employed, employed by organization) based on vision category and weight classification, after controlling for age, sex, race, and educational level. Results from this analysis, shown in Table 3, indicated that vision category was a significant predictor of employment status, χ^2 (2, N = 135) = 7.85, p = .02. Following adjustment for weight, age, sex, race, and educational attainment, persons with blindness were 3.56 times more likely to be unemployed than to be self-employed compared to persons who were sighted and 4.47 times more likely to be unemployed than employed by an organization than those who were sighted. Weight classification was not a significant predictor of employment status for persons who were blind or sighted.

Table 2

Number of Interviews by Employment, Vision, and Weight Status

Employment Status	Vision Status	Weight Status	Mean	SD
Unemployed	Blind	Normal	1.00	0.71
		Overweight	0.83	1.17
		Obese	2.20	3.49
	Sighted	Normal	0.25	0.50
		Overweight	0.00	0.00
		Obese	0.00	0.00
Employed	Blind	Normal	10.22	14.52
			3.14[a]	3.13[a]
		Overweight	4.00	5.05
		Obese	7.27	14.49
			3.00[a]	3.20[a]
	Sighted	Normal	2.57	2.60
		Overweight	2.50	1.92
		Obese	1.69	1.03

[a]Excluding three outliers.

Table 3

Logistic Regression Model for Predicting Employment Status

Employment Status[a]		B	SE	*p*	OR	95% Confidence Interval for OR	
						Lower Bound	Upper Bound
Self-Employed	Intercept	-3.08	1.61	.06			
	Education	-0.04	0.15	.79	0.96	0.71	1.30
	Age	0.05	0.03	.07	1.05	0.99	1.12
	Blind = No	1.27	0.75	.09	3.56	0.82	15.47
	Blind = Yes	0[b]	.	.	.	.	.
	Weight = Normal	-0.79	0.86	.36	0.46	0.08	2.48
	Weight = Overweight	-0.53	0.81	.51	0.59	0.12	2.87
	Weight = Obese	0[b]	.	.	.	.	.
	Sex = Male	1.56	0.75	.04	4.75	1.09	20.74
	Sex = Female	0[b]	.	.	.	.	.
	White = No	-1.99	1.26	.11	0.14	0.01	1.61
	White = Yes	0[b]	.	.	.	.	.
Employed	Intercept	-1.10	1.14	.34			
	Education	0.15	0.12	.20	1.16	0.93	1.46
	Age	0.02	0.02	.40	1.02	0.98	1.06
	Blind = No	1.50	0.55	.01	4.47	1.54	13.03
	Blind = Yes	0[b]	.	.	.	.	.
	Weight = Normal	0.09	0.63	.89	1.09	0.32	3.72
	Weight = Overweight	0.07	0.63	.91	1.07	0.31	3.67
	Weight = Obese	0[b]	.	.	.	.	.
	Sex = Male	0.38	0.52	.47	1.46	0.52	4.06
	Sex = Female	0[b]	.	.	.	.	.
	White = No	-0.41	0.67	.53	0.66	0.18	2.44
	White = Yes	0[b]	.	.	.	.	.

Note. [a]Reference category is: Unemployed; [b] Parameter set to zero because it is redundant; OR=odds ratio

CHAPTER V

DISCUSSION AND CONCLUSIONS

Overview

The obesity rate among adults who are blind is double that found in the sighted population (Flegal, Carroll, Ogden, & Curtin, 2010; Center for Disease Control and Prevention, 2009c, Holbrook, Caputo, Perry, Fuller, & Morgan, 2009; U.S Department of Health and Human Services 2000). Individuals who are blind and obese also experience employment-related discrepancies such as unequal wages, poor health, and employment discrimination (Bell, 2010; Kirchner et al, 1999; McCormic & Stone, 2008; National Federation of the Blind, 2010b; Neovis et al., 2008). Given that the perception of health status among persons who are visually impaired has been linked to employment rates (Kirchner et al., 1999), and because poor work attendance related to a decline in health-related quality of life has been tied to elevations in BMI (Hassan et al., 2003); a primary goal of this study was to document the relationship among vision category, weight classification, and employment status in adults with normal sight and blindness. The discovery of a significant association among these variables would justify future research aimed at determining whether the promotion of physical activity to reduce the incidence of obesity and overweightness would be an effective tool in raising employment levels in blind and visually-impaired populations.

Key Findings

Analysis of covariance revealed that weight category (i.e., either normal weight or overweight/obese) was not associated with employment status.

Moreover, after adjusting for potential confounding variables (e.g., age, sex, race, and education), and removing data of three blind employed participants who reported an excessive number of job interviews, it was observed that neither vision level or weight category influenced the number of employment interviews for either employed or unemployed persons. Although speculative, it is possible that visually-impaired individuals who received an inordinately large number of job interviews may have experienced a marked degree of employment-based discrimination, but persisted in their job search until gainful employment was secured. Alternatively, the inherent difficulty and patience required of some adults with visual impairment to engage in literally dozens of job interviews without the guarantee of an eventual job offer might also be manifested in the relatively high unemployment rate of persons with blindness as compared to persons with normal vision.

Multinomial logistic regression analysis revealed that after controlling for age, sex, race, and educational level, individuals who were blind were substantially more likely to be unemployed than to either be self-employed or employed by an organization when compared to sighted individuals. Because there are no questions on a job application that would alert an employer about the visual or weight status of a job candidate, these results suggest the presence of employment-based discrimination during the interview process, thus supporting Price's findings from more than three decades ago documenting negative employer attitudes toward hiring workers with disabilities (1981). In Price's 1981 study, 30 representatives from the food-service industry and 30

representatives from the retail industry were randomly selected to provide information regarding employer attitudes toward individuals who are legally blind. Data from this study revealed negative attitudes of employers, including a 60% “possible” to “strong” agreement by food-service representatives that they would hire a non-disabled worker instead of a worker with a disability. Similarly, 67% of general merchandising representatives possibly to strongly agreed they would hire a non-disabled employee over a disabled employee. Fifty percent of individuals from both industries felt it was unfair for them to be required to hire persons with disabilities and 80% of food service representatives and 56% of general merchandising representatives believed it would be unsafe for a person with a visual disability to work in their business (Price, 1981).

More recently, in a dissertation by Kelley (2001) in which 63 blind participants were interviewed, attitudes of employers were listed as the second-largest barrier to employment, behind transportation. In a study by Ashi (2005), in which five blind females of varying ethnic and socioeconomic backgrounds were interviewed about employment and unemployment in persons who were blind, 80% of participants reported factors that they believed contributed to the unemployment of blind persons, including blindness (80%), perception of the public about blindness (73%), and negative attitudes of employers (44%). Taken together, our findings, when considered along with those of Price (1981), Kelley (2001), and Ashi 2005), highlight the need for targeted employer education aimed at reducing employment-based discrimination and increasing awareness of the capabilities of individuals who are blind.

Of the 51 blind participants who reported their employment status in the current study, 32% indicated that they were unemployed. This figure is higher than the 22% unemployment rate noted by Kelley (2001), who conducted phone interviews with 65 blind men and women from Tennessee between the ages of 19 and 65 years. This underemployment of the blind concurs with findings of Kirchner (1999), who found that people who were blind were significantly underemployed compared to sighted peers. However, the extent of unemployment revealed in the present investigation was substantially lower than the 75% unemployment reported by Bell (2004), who analyzed the files of 18,000 blind men and women who exited from state vocational rehabilitation programs from across the United States in 1997, 1999, and 2001. Interestingly, the 68% employment reported by blind survey participants in the current project is more than double the 31.8% employment rate found in the Bell (2010) study, wherein a decade of closed rehabilitation cases were scrutinized. In contrast, the marked trend towards higher levels of unemployment displayed by persons with blindness in the present study contrasts with results of McCarthy and colleagues (1999) who reported no significant difference in employment in Australia between individuals who were blind and those who were sighted. While no clear explanation for this disparity in findings is readily apparent, it is possible that differences in rehabilitation service provision and employment laws between the United States and Australia may help explain differences in employment statistics between studies.

Although weight classification was not shown to be a significant predictor of employment status or job attainment, results did show underemployment of individuals who were obese compared to national employment statistics and data presented in other reports. Of the 84 participants who were overweight or obese in the current investigation, 18% were unemployed. When considering the 41 adults who were obese, nearly 20% were unemployed, and of those who were overweight, almost 17% were unemployed. These unemployment figures for persons who were either obese or overweight are more than double the current U.S. unemployment rate (Bureau of Labor Statistics, 2012). While McCormic (2007) did not report the unemployment rate for obese individuals, adults who were obese displayed an underemployment rate of 25%, a value similar to that found among our study participants. Our data are also consistent with the findings of Morris (2007), who documented the negative impact of obesity on employment rates for men and women. In contrast, Glass and associates (2010) reported no discrepancy in employment rates between obese and non-obese adults.

Supplemental Findings

Wage penalty and blindness. While only limited data exist to support wage discrepancies in blind and visually-impaired workers, Bell (2004) reported that individuals who were blind received 60 cents on the dollar compared with their sighted peers. In the current project, 32% of employed participants either disagreed or strongly disagreed that they were paid in line with their skill set(s). Viewed collectively, the findings of Bell (2004), coupled with the perception of

receiving below-standard pay among blind employees in our investigation, suggests the need for additional research in the area of wage penalty in the blind population.

Workplace discrimination and blindness. Thirty-four of the 51 blind participants responded to questions pertaining to workplace discrimination. Of these respondents, 42.8% reported discrimination in the workplace due to blindness, but 88.6% agreed or strongly agreed that their co-workers and employers respected them. Seven of the 35 participants (20%) indicated that they strongly disagreed or disagreed that they had received opportunities for promotions, but only one respondent cited blindness as the reason for not being promoted. Five (14.7%) of the 35 participants disagreed or strongly disagreed that they had been offered opportunities for professional development and training, but again, only one participant perceived that this situation was related to blindness.

Interestingly, the number of participants reporting discrimination in the workplace contrasts with those agreeing that they are respected by their co-workers and employers. The coexistence of these somewhat dissonant observations may be related to past experiences in which study participants might not have been offered a job due to employer discrimination or even to an i

solated incident of employer discrimination in the workplace. If either of these views are credible, this would suggest that limited exposure to discrimination occurring during either the job interview or in the workplace does not necessarily shape, in a negative way, a person's overall perception of acceptance and belonging in the workplace.

Attitudes and perceived discrimination in the workplace among overweight persons . In the present investigation, none of the overweight participants and only 12% of obese participants who responded to the survey reported perceived discrimination in the workplace because of weight classification. These results differ from those of Carr and Friedman (2005), who found that 26% of overweight participants and 84% of obese participants reported perceived employment-based discrimination. These authors also noted that as weight rose above normal levels, so did the perception of employment-based discrimination. Although perceived employment discrimination was relatively low among overweight and obese survey participants in the current study, the 12% perceived employment discrimination rate was three times higher than the 4% perceived employment discrimination rate noted by Roehling et al. (2007), with the latter value exceeding the percentage of participants who reported perceived discrimination based on race, religion, and sexual orientation (Roehling et al., 2007).

Wage penalty and obesity. Authors have reported wage discrepancies between individuals who are obese and persons who are not obese (Averett & Korenman, 1996; Cawley, 2004, Averett & Korenman 1996). Of the 69

overweight and obese participants in the current project who responded, 32% indicated that they believed that their pay was not commensurate with their job skills. This finding supports work by Averett and Korenman (1996) and Cawley (2004), who noted that obese women are paid 6% and 9% less, respectively, compared to women of normal weight.

Study Limitations

A limitation of this study was that participant data were obtained from a convenience sample at the 2011 national convention of the National Federation of the Blind (NFB) and not from a random sampling of blind individuals. It is possible that individuals with the motivation and financial ability to attend a national conference might display levels of educational attainment, employment, orientation and mobility skill, and overall physical health that might have differed from persons who were unable to attend the conference. With respect to the classification of weight status, the use of BMI, while easy to determine from measures of height and weight, does not provide an indication of the quality of body composition. In addition, both sighted and blind individuals (and particularly women) who appeared to be heavier were sometimes more inclined to decline to participate in the study once they realized they had to be weighed. As a final point, the hectic nature of the NFB event caused the primary investigator to set up data collection at coffee shops and nearby restaurants and taverns that convention participants frequented before and after peak meeting activity times.

Conclusions

Results from this study demonstrated that weight classification was not associated with or predictive of employment status in blind or sighted adults. After removing outlier data points and adjusting for age, sex, race, and educational attainment, the number of job interviews received was not influenced by weight classification or vision status. However, despite high levels of educational attainment, when compared to sighted individuals, persons with blindness were substantially more inclined to be unemployed than to be self-employed or employed by an organization.

Based on these project findings, additional studies should be conducted to determine whether (1) the amount and type of orientation and mobility training received by person with blindness is related to employment status; and (2) a significant difference in the employment status of adults with visual impairment exists between those who use white canes versus dog guides. Although no relationship was detected between obesity and employment status among persons who are blind, it might be interesting to look at the relationship between employment status and the positive self-image of persons who are blind. Because physical activity is known to promote a more positive self-image, studies in this area might spur the development and implementation of specialized physical activity programming for adults with visual impairment. Lastly, it is important to recognize the need for additional employer-mandated programming that is targeted to reducing and eliminating employment-based discrimination for persons who are blind.

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APPENDICES

APPENDIX A

IRB Approval Letter

June 23, 2011

Jessica Beecham, Co investigators: Kevin Kovacs, Sheri Anderson, Lucy Alexander, Michael Harvey
Department of Health and Human Performance
jbbecham@gmail.com, dmorgan@mtsu.edu

Protocol Title: "Relationship among Vision level, Weight, and Employment Status"

Protocol Number: **11-347**

Dear Investigator(s),

The MTSU Institutional Review Board, or a representative of the IRB, has reviewed the research proposal identified above. The MTSU IRB or its representative has determined that the study poses minimal risk to participants and qualifies for an expedited review under 45 CFR 46.110 Category 7.

Approval is granted for one (1) year from the date of this letter for 300 participants.

According to MTSU Policy, a researcher is defined as anyone who works with data or has contact with participants. Anyone meeting this definition needs to be listed on the protocol and needs to provide a certificate of training to the Office of Compliance. **If you add researchers to an approved project, please forward an updated list of researchers and their certificates of training to the Office of Compliance (c/o Emily Born, Box 134) before they begin to work on the project.** Any change to the protocol must be submitted to the IRB before implementing this change.

Please note that any unanticipated harms to participants or adverse events must be reported to the Office of Compliance at (615) 494-8918.

You will need to submit an end-of-project form to the Office of Compliance upon completion of your research located on the IRB website. Complete research means that you have finished collecting and analyzing data. **Should you not**

finish your research within the one (1) year period, you must submit a Progress Report and request a continuation prior to the expiration date. Please allow time for review and requested revisions. Your study expires **June 23, 2012**.

Also, all research materials must be retained by the PI or faculty advisor (if the PI is a student) for at least three (3) years after study completion. Should you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

Emily Born
Research Compliance Officer
Middle Tennessee State University
eborn@mtsu.edu

APPENDIX B

INFORMED CONSENT FORM

Principal Investigator: Jessica Beecham
Study Title: Relationship Among Vision Level, Weight, and Employment Status
Institution: Middle Tennessee State University

Name of Participant _____ Age: _____

The following information is provided to inform you about the research project and your participation in it. Please read this form carefully and feel free to ask any questions you may have about this study and the information given below. You will be given an opportunity to ask questions, and your questions will be answered. Also, you will be given a copy of this consent form.

Your participation in this research study is voluntary. You are also free to withdraw from this study at any time. In the event new information becomes available that may affect the risks or benefits associated with this research study or your willingness to participate in it, you will be notified so that you can make an informed decision whether or not to continue your participation in this study.

For additional information about giving consent or your rights as a participant in this study, please feel free to contact the MTSU Office of Compliance at (615) 494-8918.

1. Purpose of the study:
   You are being asked to participate in a research study because we are trying to determine the relationship among vision level, weight, and employment status.

2. Description of procedures to be followed and approximate duration of the study:
   After your height and weight are measured, you will complete a survey that will contain questions related to your vision level, your employment and job status, and your overall health. The entire process should take less than 30 minutes.

3. Expected costs:
   There is no cost associated with participation in this study.

4. Description of the discomforts, inconveniences, and/or risks that can be reasonably expected as a result of participation in this study:
   There are no known discomforts, inconveniences, and/or risks associated with participation in this study.

5. Compensation in case of study-related injury:
   MTSU will not provide compensation in the case of study-related injury.

6. Anticipated benefits from this study:

a) The potential benefit to science and humankind that may result from this study is that knowledge gained from conducting this study will lead to a better understanding of how vision and weight level are related to employment status. This might spur the implementation of programs to reduce excess weight levels in persons who are blind or overweight or obese as a way to improve employment status.

b) The potential benefits to you from this study are that you will be able to request information regarding the findings of this project.

7. Alternative treatments available: Not available.

8. Compensation for participation:
   Upon completion of this survey, you will be entered in a drawing to win one of 5 $20 gift cards.

9. Circumstances under which the Principal Investigator may withdraw you from study participation:
   You will be withdrawn from the study if you are under 18 years of age or over 60 years of age.

10. What happens if you choose to withdraw from study participation:
    Participation in this study is completely voluntary and you may opt out at any time with no negative consequences.

11. Contact Information. If you should have any questions about this research study or possible injury, please feel free to contact Jessica Beecham at 615-497-0435 or my Faculty Advisor, Dr. Don Morgan, at dmorgan@mtsu.edu.

12. Confidentiality. All efforts, within reason, will be made to keep the personal information in your research record private but total privacy cannot be promised. Your information may be shared with MTSU or the government, such as the Middle Tennessee State University Institutional Review Board, Federal Government Office for Human Research Protections, and the Department of Health and Human Performance, if you or someone else is in danger or if we are required to do so by law.

13. STATEMENT BY PERSON AGREEING TO PARTICIPATE IN THIS STUDY

I have read this informed consent document and the material contained in it has been explained to me verbally. I understand each part of the document, all my questions have been answered, and I freely and voluntarily choose to participate in this study.

Date: _____ Signature of patient/volunteer: _____

Consent obtained by: _____

Date: _____ Signature: _____

Printed Name and Title: _____

APPENDIX C

Participant Survey

Examiner Use Only

1. Group _____ Participant Number _____

2. Weight Measure #1 _____ Weight Measure #2 _____
   Average Weight (lbs) _____

3. Height Measure #1 _____ Height Measure #2 _____
   Average Height (inches) _____

4. Are you legally blind in both eyes?
   a. Yes
   b. No

Participant Survey

Participant # _____ **Examiner will enter the participant number**
Group _____ **Examiner will enter the group code**

---

1. What is your age? _____

2. List your date of birth (mm/dd/yyyy): __ / __ /____

3. What is your sex?
   a. Male
   b. Female

4. In what state do you currently reside? _____

5. What is your main racial background?
   a. White
   b. Black/African-American
   c. Native Hawaiian or other Pacific Islander
   d. Asian
   e. American Indian or Alaska Native
   f. Other _____

6. What is your ethnicity?
   c. Hispanic or Latino
   d. Not Hispanic or Latino

7. What is your highest level of education?
   e. Did not complete high school
   f. High School Diploma/GED
   g. Completed some college courses
   h. Technical Training or Certification
   i. Associate Degree
   j. Bachelors Degree
   k. Completed some graduate school courses
   l. Masters Degree
   m. Doctoral Degree

8. How would you describe your employment status?
   a. Self-employed, full-time
   b. Self-employed, part-time
   c. Employed by a company or outside agency, full- time
   d. Employed by a company or outside agency, part-time
   e. Unemployed

NOTE: **A. If you are NOT EMPLOYED, please answer QUESTIONS 9-17.**
B. If you are SELF-EMPLOYED, please answer QUESTIONS 18-30.
C. If you are EMPLOYED BY A BUSINESS, COMPANY, OR OUTSIDE AGENCY, please answer QUESTIONS 22-35.

NOT EMPLOYED

9. Have you looked for work in the past four (4) weeks?
   a. Yes
   b. No

10. How many job interviews have you had over the past 12 months?_____

11. How many job offers have you received over the past 12 months? _____

12. In the past five (5) years, have you been fired from a job, laid off from a job, or resigned from a job?
    a. Yes
    b. No

    If you answered "yes", do you feel that this was based on your:
    a. Blindness
    b. Weight
    c. Blindness and Weight
    d. None of the above
    e. Don't know
    f. Other reasons (please identify):

    _____

13. Over the past 12 months, have you been unsuccessful in becoming employed?
    a. Yes
    b. No

    If you answered "yes", do you feel that this was based on:
    a. Blindness
    b. Weight
    c. Blindness and weight
    d. None of the above
    e. I don't know
    f. Other reasons (please identify):

_____

14. Has it been difficult to look for work?
    a. Yes
    b. No

    If you answered "yes", do you feel that this was based on:
    a. Blindness
    b. Weight
    c. Blindness and weight
    d. None of the above
    e. I don't know
    f. Other reasons (please identify):

_____

15. Have you retired from a job or business?
    a. Yes
    b. No

16. In what year were you last employed, even for a few days?_____

17. How would you describe your health in general?
    a. Excellent
    b. Very good
    c. Good
    d. Fair
    e. Poor
    f. Don't know

SELF-EMPLOYED

18. Did you become self-employed because of difficulty in obtaining a job with a business, company, or outside agency?
    a. Yes
    b. No

    If you answered "yes", do you feel that this was based on:
    a. Blindness
    b. Weight
    c. Blindness and Weight
    d. None of the above
    e. Don't know
    f. Other reasons (please identify): _____

19. Did you become self-employed because of a lack of advancement opportunities at work?
    a. Yes
    b. No

    If you answered "yes", do you feel that this was based on:
    a. Blindness
    b. Weight
    c. Blindness and Weight
    d. None of the above
    e. Don't know
    f. Other reasons (please identify): _____

20. In the past five (5) years have you been fired from a job?
    a. Yes
    b. No

    If you answered "yes", do you feel that this was based on:
    a. Blindness
    b. Weight
    c. Blindness and Weight
    d. None of the above
    e. Don't know
    f. Other reasons (please identify): _____

21. How would you describe your health in general?
    a. Excellent
    b. Very good
    c. Good
    d. Fair
    e. Poor
    h. Don't know

SELF-EMPLOYED OR EMPLOYED BY A BUSINESS, COMPANY, OR OUTSIDE AGENCY

22. What is your current occupation? _____

Please rate your level of agreement regarding the following statements on a scale of 1 to 5
1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree
N/A (Not applicable)

23. I am satisfied with my current pay and feel that it is in line with what others earn in my profession.

1 2 3 4 5 N/A

24. I am paid in line with my skills.

1 2 3 4 5 N/A

25. I am happy with my current job situation and the impact it has had on my lifestyle.

1 2 3 4 5 N/A

26. I have felt discriminated against in the work place because of my blindness.

1 2 3 4 5 N/A

27. I have felt discriminated against in the workplace because of my weight.

1 2 3 4 5 N/A

28. I am respected by my coworkers and employer.

1 2 3 4 5 N/A

If you strongly disagree or disagree, do you feel that this was based on:

a. Blindness
b. Weight
c. Blindness and Weight
d. None of the above
e. Don't know
f. Other reasons (please identify): _____

29. I have been given opportunity for promotion.

1 2 3 4 5 N/A

If you strongly disagree or disagree, do you feel that this was based on:

a. Blindness
b. Weight
c. Blindness and Weight
d. None of the above
e. Don't know
f. Other reasons (please identify): _____

30. I have been given the opportunity to participate in professional development and training.

1 2 3 4 5 N/A

If you strongly disagree or disagree, do you feel that this was based on:

a. Blindness
b. Weight
c. Blindness and Weight
d. None of the above
e. Don't know
f. Other reasons (please identify): _____

EMPLOYED BY A BUSINESS, COMPANY, OR OUTSIDE AGENCY

31. When looking for jobs before being hired, how many job interviews did you complete? _____

32. When looking for jobs before being hired, how many job offers did you receive? _____

33. While in your current job position, have you been denied a transfer to another job position?
    a. Yes
    b. No

    If you answered "yes", do you feel that this was based on:
    a. Blindness
    b. Weight
    c. Blindness and Weight
    d. None of the above
    e. Don't know
    f. Other reasons (please identify):
_____

34. In the past five (5) years, have you been fired from a job, laid off, or asked to resign from your job?
    a. Yes
    b. No

    If you answered "yes", do you feel that this was based on:
    a. Blindness
    b. Weight
    c. Blindness and Weight
    d. None of the above
    e. Don't know
    f. Other reasons (please identify): _____

35. How would you describe your health in general?
    a. Excellent
    b. Very good
    c. Good
    d. Fair
    e. Poor
    f. Don't know

Additional Comments regarding your employment status or employment based discrimination: