ABILITY TO WORK AND ITS RELATIONSHIP WITH HEALTH STATUS
AND HEALTH BEHAVIORS IN NURSING ASSISTANTS EMPLOYED
IN NORTH CAROLINA NURSING HOMES

Obiajulu E. Melekwe

A dissertation submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the School of Nursing

Chapel Hill
2014

Approved by:

Mary H. Palmer
Ruth Anderson
David Couper
Cheryl B. Jones
Mark P. Toles
ABSTRACT

Obiajulu E. Melekwe: Ability to work and its relationship with health status and health behaviors in nursing assistants employed in North Carolina nursing homes (Under the direction of Mary H. Palmer)

Purpose: Research in health and productivity management link health to the ability to work. Employees’ ability to work affects work productivity. Approximately US$260 billion are lost each year due to health-related productivity loss. Workers that engage in physically demanding jobs and experience health problems may also have increased presenteeism (decreased on-the-job performance due to the presence of health problems) and absenteeism (time missed from work because of health problems). Certified nursing assistants (CNAs) employed in nursing homes perform many physically and emotionally demanding tasks and they could have health problems or engage in health behaviors that affect their ability to work. The purpose of this study is to describe the ability to work in CNAs and investigate the relationships among key variables (self-reported health status, select health conditions and health behaviors), and CNAs’ ability to work. Methods: A cross-sectional correlational survey is used to describe the relationships between CNAs ability to work and self-reported health status, health conditions and health behaviors. Results: CNAs in five nursing homes (N=106; response rate 88%) responded to a pencil and paper survey. Forty percent of the respondents’ reported at least some impairment in their ability to work. Self-reported health status, diagnosed depression and current smoking were associated with impairment in the ability to work.
Implications: Employers of CNAs need to recognize that health-related impairment in the ability to work is prevalent and they need to develop strategies to assist CNAs in optimizing their health and improving their ability to work.
To the memory of my dad

whose legacy continue to inspire and enrich me.

And for Bernie for believing
ACKNOWLEDGEMENTS

There was a time it seemed like this dissertation would never be done, and the journey seemed lonely and arduous. Although much changed in the time I have been involved in this project, I owe the completion of my doctoral program to many who inspired, taught and learned with me. I am indebted to Dr. Mary H. Palmer, my dissertation committee Chair for many hours of proofreading, helping me to refocus by asking the “real” questions, and for sticking with me for the past six years and for being my cheerleader. Your attention to detail drove me to finally learn to be consistent with the use of tenses; I could not have done this without you. And to Dr. Ruth Anderson, you were my most cherished champion. It’s been my honor to learn from you. I like to thank the members of my dissertation committee for their patience, continued support and willingness to guide me in the face of numerous obstacles.

My sincere gratitude goes to my family especially to Bernie- my spouse, for taking the blows and yet accepting nothing less than completion from me. And to my siblings for gently but periodically nudging and encouraging me to see this through, I say big thanks. And who would I be without all the teachers too numerous to mention - that I have been lucky to have along the way. I like to especially thank the faculty at the School of Nursing for crafting such a wonderful doctoral program. I’m glad I came here. Special thank you to Dr. Barbara Mark and to Dr. Bob Konrad for their guidance.

I would also like to thank my fellow doctoral students- most of whom have moved on for their friendship, support and feedback. Last, but certainly not the least, I like to thank all the
CNAs in long-term care who continually pour out their hearts to do a wonderful job in the face of many challenges. This work would not have been possible without your enthusiastic participation.
# TABLE OF CONTENTS

ABSTRACT .......................................................................................................................... iii

LIST OF TABLES .................................................................................................................. xi

LIST OF FIGURES ............................................................................................................. xii

CHAPTER 1: INTRODUCTION TO THE STUDY ................................................................. 1

  Background ....................................................................................................................... 1
  Profile and Tasks of Certified Nursing Assistants (CNAs) ............................................ 3
  Health and ability to work among CNAs ........................................................................ 4
  Impact of health on CNA workforce .............................................................................. 5
  Statement of the problem .............................................................................................. 5
  Conceptual Framework .................................................................................................. 7
  Purpose and Aims of the study ...................................................................................... 11
  Research Questions and Hypotheses ............................................................................ 12
  Definition of key terms and concepts .......................................................................... 12
  Summary ......................................................................................................................... 13

CHAPTER 2: LITERATURE REVIEW ................................................................................... 15

  Introduction ..................................................................................................................... 15
  Ability to work .............................................................................................................. 15
  Ability to work among CNAs ....................................................................................... 17
  Health Status and ability to work ................................................................................ 18
LIST OF TABLES

**Table 1.** Definition of key terms ........................................................... 13

**Table 2.** Comparison of the characteristic of a national sample with study sample ........................................................... 50

**Table 3.** Prevalence of health conditions ........................................................... 54

**Table 4.** Distribution of scores for Self-rated health and Health behaviors ...............55

**Table 5.** Regression table for Adverse health behaviors and ability to Work ............59
LIST OF FIGURES

Figure 1. Conceptual framework ........................................................................................................ 9
Figure 2. Nursing Home Administrator Participation Flow Diagram .............................................. 48
Figure 3. CNA Participation Flow Diagram ....................................................................................... 49
CHAPTER 1: INTRODUCTION TO THE STUDY

Background

The effect of health on employees ability to work has become increasingly important due to the rising trend in chronic health conditions among employed persons and the economic burden that these conditions entail on the individuals themselves, the organizations where they are employed, and society in general (Freid, Bernstein, & Bush, 2012; Schultz & Edington, 2007; Ward & Schiller, 2013). A chronic health condition is a disease that is persistent or long-lasting in its effects in excess of six months (O'Halloran, Miller, & Britt, 2004). Chronic health conditions are on the increase across all age groups; in adults, these conditions create a significant economic burden in terms of impairment in the ability to work and the associated work productivity loss (Loeppke et al., 2009).

Although the likelihood of having a chronic health condition increases with age, nearly 50% of persons aged between 18 and 64 years in the United States have at least one chronic condition (Bayliss et al., 2012; Cartwright-Smith, 2011; Ward & Schiller, 2013) that could interfere with their ability to work (Pendo, 2009; Tu & Cohen, 2009). The ability to work is the extent to which a worker, given his or her health is physically and mentally able to produce goods or deliver services that are expected of his or her occupation or job (de Vries, Reneman, Groothoff, Geertzen, & Brouwer, 2013; Escorpizo, 2008). This ability to work may be directly observable such as in counting the number of nursing home residents a certified nursing assistant (CNA) bathed during one shift or the number of telephone calls made by an employee to resolve a customer service issue. This ability to work may also be reflected in a worker’s perceived
ability to produce, for example, an employee may perceive that he or she have encountered difficulty in completing most of the assigned tasks for the day due to health, or may feel that the difficulty encountered is of such significance that he or she decides to stay away from work for a certain period of time (Escorpizo, 2008). Ability to work is generally measured by proxy. One such proxy is health-related loss of productivity which is considered to be the decline in employee productivity as a result of time missed from work and reduced productivity while at work due to health reasons (Klachefsky, 2012). Because the ability to work is a reflection of a balance between the worker’s health and physical and mental demands of the job it is measured by estimating the health-related loss of productivity associated with impairment in the ability to work (Beaton et al., 2009; Escorpizo, 2008; Escorpizo et al., 2007). Thus loss of productivity is an important indicator of the ability to work among employed persons (Davis, Collins, Doty, Ho, & Holmgren, 2005). For example, worker productivity or lack thereof is usually measured by describing the impact of a health condition on the ability to work or the effect of an intervention such as a program change on the ability to work (Beaton et al., 2009).

The majority of working adults with health conditions continue to work with limitations (Pendo, 2009). A health condition could cause a worker to work significantly below his or her par, i.e. the worker may be at work but he or she is working with reduced productivity due to a health problem or he or she may reduce the number of days that he/she comes into work (Abma, Bultmann, Varekamp, & Klink, 2013). Presenteeism is the term used when workers come to work while ill and their productivity may be reduced (Klachefsky, 2012). Presenteeism is also defined as decreased on-the-job performance due to the presence of health problems (Schultz & Edington, 2007). Studies have also shown that health conditions increase the number of days employees are absent from work. As an example, obese women (defined as body mass index
>30) are absent from work more than two times as often as normal weight women (Thorpe, Wisniewski, & Lindsay, 2009). Absenteeism is defined as the unscheduled absence from work by an employee due to a health condition (Thorpe et al., 2009).

Presenteeism and absenteeism are of great concern to employers due to the significant economic impact on productivity. Nursing home administrators, who rely on staff to patient ratios to provide care and meet regulatory statutes, are particularly affected. Thus presenteeism or absenteeism of even one CNA could affect resident care. The 2012 nursing home data compendium estimates that approximately 1.4 million persons resided in U.S nursing homes in 2011 and, on average required about two hours and thirty minutes of CNA care each day (Centers for Medicare and Medicaid Services, 2012). Nursing home residents depend on certified nursing assistants (CNAs) for the majority of the hands-on-care that they receive (Squillace et al., 2009). Keeping CNAs at work has been a challenge for nursing home administrators, according to Castle and Ferguson-Rome (2014), the average weekly rate of absenteeism for CNAs is 9.2%, a rate that is higher than the national average for all workers (Circadian Technologies, 2005).

**Profile and Tasks of Certified Nursing Assistants (CNAs)**

CNAs constitute nearly 42% of the nursing home workforce (BLS, 2006) and they work under the supervision of licensed nurses. The average age of the CNA employed in nursing homes is estimated at 40 years (PHI, 2011). Typically, CNAs are female and are single parents with an equivalent of a 12th grade education or less (Bureau of Labor Statistics, 2014; Squillace, Bercovitz, Rosenoff, & Remsburg, 2008).

In many cases, CNAs receive their training for certification while employed as a nursing assistant in a nursing home (Nursing Home Community Coalition of New York State, 2003). The
Omnibus Budget Reconciliation Act (OBRA, 1987) mandated the training and registration of nursing assistants working in nursing homes requiring that CNAs receive a minimum of 75 hours of pre-employment training, and they must pass a competency examination to become certified (Wiener, Freiman, & Brown, 2007).

The work of CNAs has been described in many studies as being physically and emotionally demanding (Gregory, 2006; Zhao, Bogossian, & Turner, 2012) since providing assistance to chronically and mentally disabled adults can be labor intensive and emotionally involved (Barry, Brannon, & Mor, 2005; Pennington, Scott, & Magilvy, 2003). The daily tasks associated with the role of the CNA involves moving residents in and out of bed, standing and walking for long hours, assuming awkward postures, and addressing complex health needs, including behavioral and psychological issues of the residents.

Health and ability to work among CNAs

Studies indicate that ability to work is strongly associated with health especially in workers whose job tasks are physically demanding (Letvak & Ruhm, 2010). For example, Meerding and colleagues (2005), found that over 50% of reduced work performance reported among workers in physically demanding jobs was due to health conditions. Persons whose jobs are physically demanding, have a 20% higher likelihood of developing a chronic condition such as heart disease than people whose jobs are not physically demanding (Clays et al., 2013; Panagiotakos et al., 2013). Because CNAs employed in nursing homes perform many physically demanding tasks (Zhao et al., 2012), it is likely that their ability to work will be associated with their health.

There is also evidence that people who work in teams where expectations to be at work are high, and are in jobs with high demands come to work when not at their optimal level of health (Dew, 2011). In nursing homes, CNAs are expected to work in teams, and are expected to
work all their scheduled shifts, so it is reasonable to assume that CNAs in nursing homes come to work while ill. Therefore, if CNAs come to work while being ill, it is likely that their ability to work will also be affected.

**Impact of health on CNA workforce**

Ability to work in CNAs employed in nursing homes has been understudied (Eriksen, Bruusgaard, & Knardahl, 2003; Letvak & Ruhm, 2010). Nursing homes do not report the work productivity data of their employees; however, the rate of work-related illness and injury, reported in CNAs is nearly double the national average of all occupations combined (McCaughey, McGhan, Walsh, Rathert, & Belue, 2013). Resident-handling tasks performed by CNAs such as lifting, turning, or bathing a resident are considered high risk for producing musculoskeletal disorders (MSDs). For example, a cross sectional study of 113 nursing personnel in one VA hospital found that 62% of the respondents experienced musculoskeletal discomfort at or above moderate severity (Menzel, Brooks, Bernard, & Nelson, 2004).

**Statement of the problem**

Several studies have linked employee health to their ability to work (Burton et al., 2005; Letvak, Ruhm, & Lane, 2011; Schultz & Edington, 2007; van den Heuvel, Geuskens, Hoofman, Koppes, & Van den Bossche, 2010). The ability of employees to work affects productivity in organizations and evidence exists that approximately $260 billion is lost in work productivity each year in the United States as a result of health-related problems (Mitchell & Bates, 2011).

Chronic health conditions such as MSDs, depression, and behaviors that may lead to obesity, diabetes, and cardiovascular disorders, among others, are associated with increased absences from work and work productivity loss (Collins et al., 2005; Mitchell & Bates, 2011). These conditions are also associated with increased morbidity and higher medical costs (Burton,
For example, obese workers are significantly more likely than normal-weight workers to report impaired ability to work or a limitation in the amount, type or quality of work they perform (Ricci & Chee, 2005).

Workers that engage in physically demanding jobs and experience health problems may have impaired ability to work as evidenced by increased presenteeism and absenteeism (Alavinia, Molenaar, & Burdorf, 2009; Meerding et al., 2005). Presenteeism and absenteeism are the major components of the measure of health-related work productivity loss (Escorpizo et al., 2007; Schultz & Edington, 2007). In workers whose job tasks are physically demanding the ability to work was strongly associated with health (Letvak & Ruhm, 2010). For example, work productivity loss among workers with any health problems in physically demanding jobs was significantly higher than in workers without any health problems (Meerding et al., 2005). Impairment in the ability to work was strongly associated with the occurrence of musculoskeletal complaints in the six months prior to the study.

Evidence exist that CNAs in nursing homes rank among the top 10 occupations with the greatest numbers of non-fatal MSDs and have the highest rates of back and shoulder injuries compared with all other occupations in the United States (Bureau of Labor Statistics, 2012). Among workers of all types, non-fatal MSDs and related injuries contribute to loss of work productivity and cost the healthcare system in excess of $950 billion or 7.4% of the national gross domestic product every year in both direct and indirect costs (United States Bone and Joint Initiative, 2011).

Using data from the 2004 National Nursing Assistant Survey (NNAS), Khatutsky, Weiner, Anderson, and Porell (2012) found that 60.2% of CNAs reported work-related injury nationally in
the year preceding the survey that resulted in 24% of them being unable to return to work. Studies indicate that a large number of CNAs in nursing homes experience ongoing or episodic periods of musculoskeletal pain with prevalence rates exceeding 60% (Gucer, Oliver, Parrish, & McDiarmid, 2009). In addition, CNAs experience back pain involving days away from work that is seven times greater than the national average and it is the highest of any occupation (Bureau of Labor Statistics, 2012).

Depression and anxiety among CNAs also have important consequences for CNAs ability to work. CNAs working in nursing homes show a higher prevalence of depression (57%) than in the national population (Muntaner et al., 2006). Depression among CNAs is a significant predictor of absenteeism (Muntaner et al., 2006; Okechukwu, Ayadi, Tamers, Sabbath, & Berkman, 2012).

Reduced work productivity due to presenteeism and health-related absences among CNAs in nursing homes is not well documented, but CNAs who work in nursing homes are listed among the top occupations with high prevalence of presenteeism (Klachefsky, 2012). Understanding the health status, health conditions and health behaviors of CNAs and the relationship that may exist among health status, health conditions and health behaviors, and ability to work among CNAs may provide a foundation to base interventions to develop or modify employee health promotion programs.

**Conceptual Framework**

Measures of ability to work have focused on either functional limitations or work productivity (Richling & Lerner, 2012). Available evidence suggests that health status, illness, and health behaviors influence the ability to work by affecting work productivity (Davis et al., 2005; Loeppke, Edington, & Beg, 2010; Merrill et al., 2013; Merrill et al., 2012; Stewart, Ricci,
Chee, Hahn, & Morganstein, 2003). Therefore, in this study, work productivity - which is directly affected by health status, chronic health conditions, and health behaviors that is potentially modifiable by health related interventions will be measured by the self-reported presenteeism and absenteeism of CNAs in order to better understand their ability to work (Escorpizo et al., 2007).

The health status of individuals is inversely associated with their health conditions and their health behaviors. Health status, health conditions and health behaviors are individually and collectively associated with the ability to work (Figure 1) (Schultz & Edington, 2007). Self-reported health status, health conditions and the health behaviors of a worker significantly impacts the ability of the individual to perform his or her job (Forsen, Bjornelv, Bentzen, Sogaard, & Graff-Iversen, 2012; Idler & Kasl, 1995). Health status is positively associated with ability to work, for example persons who rate their health as poor tend to have a higher rate of absenteeism and reduced overall ability to work than in persons who rate their health as excellent (Holden et al., 2011; Singh-Manoux et al., 2006; Taloyan et al., 2012). Impairment in the ability to work was higher for employees that had chronic health conditions and employees that engaged in unhealthy behaviors such as lack of physical exercise or smoking than in those that had no chronic conditions and those that exercised, did not smoke and maintained a healthy diet (Lenneman, Schwartz, Giuseffi, & Wang, 2011).

Individuals who reported excellent health status as measured with a self-rated health (SRH) scale, tend to have better ability to work than persons who did not report health status even after controlling for other variables such as age, gender, marriage status and socioeconomic status. (Hagglund, Helsing, & Sandmark, 2011; Malinauskiene, Leisyte, Malinauskas, & Kirtiklyte, 2011).
Literature in health and productivity indicates that self-reported health status is strongly and inversely associated with chronic health conditions (Singh-Manoux et al., 2006; Tsai, Ford, Li, Zhao, Pearson, et al., 2010). For example, individuals who rate their health as poor are more likely than those who rate their health as good or excellent to have one or more chronic health conditions (Tsai, Ford, Li, Zhao, Pearson, et al., 2010).

Health status is also strongly and inversely associated with not engaging in specific health behaviors. As an example, poor self-rated health is strongly and positively associated with smoking, excessive alcohol consumption (Hagglund et al., 2011; Prosper, Moczulski, & Qureshi, 2009) and lack of physical activity (D. Kaleta, Makowiec-Dabrowska, Dziankowska-
Zaborszczyk, & Jegier, 2006; Molarius et al., 2006). Physical activity generally refers to movement that enhances health (DHHS, 2008). It is a behavior consisting of any body movement that engages the skeletal muscles and requires energy expenditure more than resting such as walking, running, dancing and gardening (U. S. DHHS, 2011). Persons that are physically inactive are more likely than active individuals to report a poor self-rated health (Molarius et al., 2006; Tsai, Ford, Li, Zhao, & Balluz, 2010) and the prevalence of optimal SRH increased with the number of healthy behaviors (Tsai, Ford, Li, Zhao, Pearson, et al., 2010).

Many chronic health conditions are linked to health behaviors (Strine et al., 2008). For example, dementia, stroke, cardiovascular disease (CVD), depression, anxiety disorders, and alcoholic hepatitis are associated with alcohol use in excess of one drink per day for women and more than 2 drinks per day for men over time (Centers for Disease Control and Prevention, 2013; Tsai, Ford, Li, Zhao, Pearson, et al., 2010). Chronic health conditions can result in loss of independence, functional decline, impaired ability to work and may subsequently cause death (Ford, Croft, Posner, Goodman, & Giles, 2013).

Health conditions and health behaviors affect ability to work in several ways. Musculoskeletal disorders, being overweight, obesity and diabetes are associated with physical limitations that affect work productivity (Hertz, Unger, McDonald, Lustik, & Biddulph-Krentar, 2004; Mitchell & Bates, 2011; Rodbard, Fox, & Grandy, 2009). These conditions can reduce a person’s mental and physical health, thereby reducing the ability to work (Pit & Byles, 2012). Persons with obesity and engaging in behaviors that affect health such as smoking, excessive alcohol consumption, lack of physical activity, and eating unhealthy foods have a significantly higher rate of presenteeism and absenteeism than in persons who do not engage in these behaviors (Froshaug, Dickinson, Fernald, & Green, 2009; Merrill et al., 2013). Workers that are
overweight are significantly more likely than normal weight workers to report that they are limited in the amount and type of work they are able to perform (Hertz et al., 2004; Rodbard et al., 2009).

Health may also affect the value a person places on working. For example, work provides a source of income and it may also provide individuals with the opportunity to socialize with others, and to use and develop skills. Work may also provide a route to self-realization (Spencer, 2013). The importance attached to these benefits of working may be reduced by poor health, to such a degree that the person reduces their hours of work or ultimately stops working (Tunceli, Li, & Williams, 2006). Reductions in behaviors that adversely affect health are associated with improvement in work productivity (Karlsson, Bjorklund, & Jensen, 2010; Pelletier, Boles, & Lynch, 2004).

**Purpose and Aims of the study**

The purpose of this study is to describe the health status, health conditions and health behaviors of CNAs in nursing homes and to investigate the relationships among health status, health conditions, health behaviors, and CNAs ability to work in nursing homes.

The specific aims addressed in this study include:

1. To describe the health status and health behaviors among CNAs in nursing homes.
2. To explore the relationships between the health status, health conditions, health behaviors and ability to work among CNAs that work in nursing homes.
3. To explore the effect of health behaviors such as alcohol consumption, physical activity, sleep habits and smoking on the ability to work in CNAs employed in nursing homes.
Research Questions and Hypotheses

1. What is the relationship between CNAs' health status and their ability to work?
   Hypothesis 1.1: A higher self-rated health will be associated with ability to work among certified nursing assistants.

2. What is the relationship between CNAs' health conditions and their ability to work in nursing homes?
   Hypothesis 2.1: The number of chronic health conditions reported will be associated with ability to work in CNAs.

3. What is the relationship between CNAs' health behaviors and their ability to work in nursing homes?
   Hypothesis 3.1: Health behaviors will be associated with the ability to work of CNAs.

4. Is there an association among CNAs' health status, health conditions and health behaviors and ability to work in nursing homes?
   Hypothesis 4.1: Self-rated health in CNAs will be associated with the reported number of health behaviors.

Definition of key terms and concepts

Some of the key words used in this study have been given operational meanings that may differ from their common usage. These include ability to work, health status, self-rated health (SRH), health condition, and health behavior. The conceptual definitions are presented in the table 1 (see below).
Table 1. Definition of key terms

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to work</td>
<td>The degree to which a worker is physically and mentally able to produce goods or deliver services that are expected of his or her occupation or job (de Vries et al., 2013; Escorpizo, 2008). Ability to work is indicated by work performance and a workers attendance.</td>
</tr>
<tr>
<td>Presenteeism</td>
<td>Decreased on-the-job performance due to presence of health problems (Schultz &amp; Edington, 2007). Component of impaired ability to work.</td>
</tr>
<tr>
<td>Absenteeism</td>
<td>Time taken away from work due to illness (Schultz &amp; Edington, 2007). This is the second component of impaired ability to work.</td>
</tr>
<tr>
<td>Health Status</td>
<td>A subjective statement of a person’s evaluation of their own health or how they are feeling and doing. Health status is usually referred to as self-rated health (SRH).</td>
</tr>
<tr>
<td>Self-rated health</td>
<td>A global self-appraisal of one’s health, mostly using a 5 point Likert-type single item questionnaire that is measured as “excellent”, “very good”, “good”, “satisfactory”, or “poor” (Tsai, Ford, Li, Zhao, &amp; Balluz, 2010).</td>
</tr>
<tr>
<td>Health conditions</td>
<td>A chronic health condition or disease that is prolonged in duration in excess of six months, does not resolve spontaneously, and is rarely completely cured (O’Halloran et al., 2004).</td>
</tr>
<tr>
<td>Health behavior</td>
<td>Any behavior pattern, activity or habits that relate to health maintenance, to health restoration and to health improvement such as behaviors within compliance with medical service usage, compliance with medical regimens, (e.g. dietary, diabetic, adhering appropriately to prescribed medication) and self-directed health behaviors (e.g., diet, exercise, smoking, alcohol consumption) (Gochman, 1997). Health behaviors may be health enhancing or health impairing. Health impairing behaviors (also referred to as unhealthy behaviors or adverse health behaviors) can predispose individuals to disease or have a harmful effect on their health (Conner, 2002). Health behaviors described in this study are behaviors adversely affecting health and collectively account for the majority of illness and mortality in the United States (Glasgow et al., 2005).</td>
</tr>
</tbody>
</table>

Summary

The importance of examining the link between health and the ability to work in CNAs employed in nursing homes were introduced and discussed in this chapter. Chronic health
conditions were prevalent in the general adult population in the United States. Many chronic conditions were responsible for some employees working with levels of impairment in their ability to work. For this study, ability to work was defined as presenteeism and absenteeism among workers. The association between ability to work and physically demanding jobs was also established.

The study aims, research questions and hypotheses were outlined. The aim of the study is to understand the relationship that exists among ability to work, health status, and health conditions, and health behaviors of CNAs employed in nursing homes.

In Chapter 2, the relevant literature underpinning the framework for this study will be reviewed. The chapter examines literature on the ability to work, health status, health conditions and health behaviors in CNAs.
CHAPTER 2: LITERATURE REVIEW

Introduction

This chapter provides a review of the literature on ability to work, health status, health conditions and the health behaviors of CNAs employed in nursing homes. The first section of the chapter reviews the literature on health-related ability to work generally, and then focuses on health-related ability to work among CNAs working with adults who are residents in nursing homes. The second section of this review, examines research literature that has focused on the independent variables - health status, health conditions and health behaviors and the last section summarises the chapter.

Ability to work

The ability to work of employees, defined as the degree to which a worker is physically and mentally able to produce goods or services that are expected of his or her occupation or job (de Vries et al., 2013; Escorpizo, 2008) is an important indicator of economic growth and social health of the economy (Escorpizo et al., 2007; Pelletier et al., 2004). Published literature on health and productivity indicate that a person’s ability to work is affected by his or her health (Escarpozo, 2008; Letvak & Ruhm, 2010; Schultz & Edington, 2007). For example employees who have health conditions often have impaired ability to work, and are often less productive at work (Mitchell, Ozminkowski, & Serxner, 2013; Taloyan et al., 2012). Measures that can be used as abstract or general indicators of ability to work based on the perception people have of their own ability to work have often been used by researchers to measure ability to work. These
measures allow employees to evaluate their own ability to work from one of different perspectives such as: (1) the way in which employees perform in their current jobs; (2) by comparing the employees present ability to work with ability to work earlier in their careers; or (3) by comparing ability to work of persons who perform similar tasks (Ilmarinen, Gould, Jarvikoski, & Jarvisalo, 2008).

Ability to work is reflected by the work productivity of the employee. Work productivity is defined as the output per unit of input (Beaton et al., 2009), that is how much an employee accomplishes in a certain amount of time. The terms work productivity is broad in scope and mostly depends on the context in which it is used (Escorpizo, 2008). At the individual level, however, work productivity is an outcome of the ability to work (Beaton et al., 2009; Escorpizo, 2008; Vanni, Virtanen, Luukkaala, & Nygard, 2012). A conceptual linkage between increased ability to work and increased human performance (Escorpizo, 2008; O'Donnell, 2000) showed that an inverse relationship exists between health conditions and work productivity (Burton et al., 2005; Burton, Conti, Chen, Schultz, & Edington, 1999). For example as the number of health conditions increased, so did the level of impairment in the ability to work (Burton et al., 2005).

Health-related impairment in the ability to work is determined by time spent at work but with reduced levels of productivity due to an illness that is related to a chronic condition (presenteeism) and time missed from work (absenteeism) because of an illness (Beaton et al., 2009; Escorpizo et al., 2007). Health problems among employees are responsible for the costs associated with impairment in the ability to work (Schultz & Edington, 2007) especially in workers who have high physical demands in the workplace (Letvak & Ruhm, 2010). Vanni et al. (2012) contend that impairment in the ability to work may not necessarily mean that an
employee is a poor worker but that the effect of impairment in the ability to work manifests in work productivity loss.

Although the ability to work of individual workers could be evaluated from different perspectives - economic perspective, worker’s role and productivity loss, it has been evaluated mostly from the perspective of work productivity loss and its costs to the economy (Beaton et al., 2009; Goetzel et al., 2004; Lenneman et al., 2011). For instance, Burton et al. (2005) demonstrated that each health behavior such as smoking or participating in physical activity less than one time per week resulted in a 2.4% reduction in an employee’s ability to work. Presenteeism which measures the “loss of productivity for employees whose health problems have not necessarily led to absenteeism” (Schultz & Edington, 2007) alone costs U.S. employers about 260 billion dollars every year and accounts for 77% of the total in work productivity loss and absenteeism would account for 23% (Lenneman et al., 2011; Merrill et al., 2012).

**Ability to work among CNAs**

Ability to work in general is not well understood and little information exists on productivity of CNAs in nursing homes. Presenteeism has a greater impact than absenteeism on the quality of care provided by CNAs in nursing homes (Letvak & Ruhm, 2010). By coming to work while ill or impaired from a health condition, the CNA may be present but is unable to meet the physical, emotional and mental demands of the job. This has the potential of causing injury to both the CNA and the resident, increased dissatisfaction in the resident and creation of more work for other CNAs who are left to complete tasks poorly done or not done. Generally, research on the impact of presenteeism is focused on work productivity loss due to chronic conditions.
Absenteeism among CNAs in nursing homes is linked to reduced quality of care for nursing home residents (Castle & Ferguson-Rome, 2014). In a study conducted to determine the association of absenteeism in CNAs with the quality of care in nursing homes, Castle and Ferguson-Rome (2014) found that high levels of absenteeism (defined as failure of CNAs to report for work when they are scheduled to work) was associated with increases in the incidence rates of four quality indicators that included physical restraint use (IRR = 1.8; p-value <0.01), catheter use (IRR = 1.14; p-value < 0.01), pain management (IRR = 1.06; p-value 0.05) and pressure ulcers (IRR = 1.19; p-value 0.05).

**Health Status and ability to work**

Presenteeism and absenteeism due to ill health are linked to self-rated health (SRH) in various studies (Burton et al., 2005; Musich, Hook, Baaner, & Edington, 2006; Taloyan et al., 2012). Data analyzed from 28,375 employees of a large financial services company located in the Midwest of the United States, Burton et al. (2005) revealed that poor SRH was associated with impairment in ability to work; findings suggested that ability to work was mediated by workers who came to work but unsuccessfully accomplished assigned duties (e.g. presenteeism). Musich et al. (2006) also associated presenteeism and absenteeism to “poor” SRH in a study of 224 employees of an Australian insurance company. The cross sectional study measured selected self-reported presenteeism, absenteeism and their association with health conditions. Significantly high rates of absenteeism (4.75 versus 2.3 hours; p-value = 0.0039) for respondents that rated their health as “poor” were noted. The study population was 81% female with an average age of 36.3 years (Musich 2006). Although insurance work may not be physically demanding, the demographics are similar for gender and average age in the CNAs employed in
nursing homes. It may be possible that these findings could be extended to relate to CNAs in
nursing homes.

A prospective study based on the Swedish Longitudinal Occupational Study of Health
(SLOSH) followed a cohort of employees that was considered representative of the working
population in Sweden from 2006 to 2010. Data were obtained in 2008 and 2010 from 7445
participants who were working at both time points. The study found that employees that reported
presenteeism of 1 to 7 days in the past 12 months had a higher risk of suboptimal SRH with
OR=1.96 (95% CI 1.69 to 2.26) after adjustment for age, gender and income compared to those
who reported no presenteeism (Taloyan et al., 2012).

There are no known studies that exclusively examine the relationship between SRH and
ability to work or any measure of the ability to work in the CNA population, thus the relationship
between SRH and the ability to work in CNAs is unclear. However, given reports in the
literature, the SRH of CNAs employed in nursing homes is likely to be associated to their ability
to work.

**Health conditions and ability to work**

The majority of employed adults in the U.S. experience a wide variety of symptoms,
health conditions and diseases that may impede their ability to work (Schultz & Edington, 2007).
Naessens et al. (2011) noted that 75.3% of working –age adults aged 18-64 years that
participated in their study on the effect of multiple chronic conditions among working age adults
had at least one chronic condition. A chronic condition was defined in that study as a health
condition lasting or expected to last for twelve or more months and resulting in functional
limitations and/or the need for ongoing medical care.
Many health conditions that are common in the workforce such as depression, obesity, back pain, migraine and seasonal allergies negatively impact the ability to work either by increasing presenteeism, increasing absenteeism or both (Burton et al., 2004; Letvak et al., 2011; Ricci, Chee, Lorandeau, & Berger, 2007). For instance, work-related musculoskeletal disorders were associated with increase in presenteeism, reducing work productivity by about 5% in both physical and occupational therapists with moderate MSDs in one study (Campo & Darragh, 2012). In another study, the estimated economic burden of 11.07 billion 2007 U.S. dollars per year was attributed to migraines due to its prevalence and impairment in ability to work among adult workers (Hawkins, Wang, & Rupnow, 2008; Loeppke et al., 2003).

Physically demanding work such as that of CNAs in nursing homes can result in work-related injuries and chronic diseases with serious implications for both the employer and the CNA in terms of lost work productivity, absenteeism and disability (Burton et al., 2005; Mitchell & Bates, 2011; Pronk et al., 2010). Health conditions such as MSDs, diabetes, depression, back pain and arthritis have been found to be associated with decreased ability to work and work productivity losses in many industries (Ricci et al., 2006; Schultz & Edington, 2007) including among CNAs in long-term care work (Gucer et al., 2009; Muntaner et al., 2006). Researchers in occupational health found the prevalence of injury, musculoskeletal disorders and other chronic conditions is high (incidence rate per 10 000 full time employees of 225.8 against 37.8 for all other occupations) among CNAs working in nursing homes in the United States (Bureau of Labor Statistics, 2012; Chao & Henshaw, 2009).

Gucer et al. (2009) constructed an eight-item work productivity scale for use among long-term care (LTC) workers to examine work impairment resulting from musculoskeletal pain. As part of a pilot of a “safe-lifting” program in a LTC facility, 71 female workers including
“geriatric” CNAs, medication aides, licensed practical nurses (LPNs) and RNs were recruited to participate in a study. The study assessed the work duties of CNAs in geriatric care regarding resident lifting, history of MSDs and any impact on work productivity.

Regression analysis was used to determine the relationship between pain frequency and work productivity while controlling for confounding variables. The authors found that on average, respondents in pain reported being impaired in three to four out of eight work productivity scale items. The prevalence of impairment while on the job may indicate that CNAs could be working through their pain and needing to take frequent breaks, and work more slowly and experience more difficulty with resident handling tasks. They may also protect themselves by reducing their work schedule, such as “calling out” sick or selecting to work fewer shifts (Gucer et al., 2009). The limitations of this study include being a pilot study and being limited to one long-term care facility. This study was not exclusive to CNAs but included other categories of nursing personnel. The findings from this study may not be generalizable to the LTC population of CNAs due to its sampling procedures.

**Health behaviors and ability to work**

Three behaviors that affect health – “unhealthy” diet (defined as not eating 5 or more servings of fruits and vegetables on 4 or more days in past 7 days), smoking and lack of physical activity in employees resulted in higher work productivity loss that accounted for up to 77% in total health-related work productivity loss (Merrill et al., 2012). A cross-sectional study designed to identify the contribution of selected demographic characteristics, health behaviors, physical health outcomes and workplace environmental factors on presenteeism concluded that even one unhealthy behavior increases the likelihood of work productivity loss (Merrill et al., 2012). Presenteeism was measured using the health and work performance questionnaire and the work
productivity and activity limitations questionnaire. Data for the study were obtained from 19,803 employees of a large general insurance company, a health care insurance company and a third company that employs health care professionals across the United States.

Findings indicated that employees that reported unhealthy diet were 66% more likely to report having experienced a loss in productivity than those who regularly ate whole grains, fruits and vegetables. Employees who reported levels of physical activity below the recommended amount were 50% more likely to report having lower levels of productivity than employees who met the required 150 minutes of physical activity per week. Smokers were 28% more likely to report experiencing loss in work productivity than non-smokers.

Findings were reported as adjusted prevalence ratios for presenteeism. The adjusted presenteeism prevalence ratios calculated across the levels of demographic variables and adjusted for select health behaviors showed that presenteeism was more prevalent among age groups 30-39 years (95% CI, 1.13 -1.38) and 40-49 years (95% CI, 1.06 -1.29) old compared to 18-29 year olds. Individuals categorized as overweight (95% CI, 1.08-1.25) and obese (95% CI, 1.30-1.51) were significantly more likely than those in the normal weight range to have presenteeism, and non-smokers were 28% less likely than smokers to have presenteeism (95% CI, 0.66-0.78) (Merrill et al., 2012).

This study revealed that presenteeism may be associated with increasing age of the employee, health conditions and health behaviors. The authors of this study cite possible self-reporting bias as a limitation of the study. The study included a larger than average proportion of female respondents (N=12288, 62%) and professionals (N= 7784, 39%). The study findings cannot be generalized to the general population of workers as the sample was from three organizations in the insurance and healthcare arenas.
Diabetes, high risk for diabetes (defined as presence of three out of five cardiometabolic risk factors- abdominal obesity, BMI $\geq 28$ kg/m$^2$, reported diagnosis of high cholesterol, and hypertension, and history of cardiovascular disease among respondents without diabetes) and history of health behavior related factors such as obesity significantly impaired work productivity and daily activities among working adults in the U.S. (Rodbard et al., 2009). This was the finding in a cross sectional study using stratified random sampling considered to be representative of U.S. households for geographic residence, household size, and income and age of head of household that was conducted to measure work impairment. Data analyzed for the study were obtained from the 7,338 respondents that identified themselves as working adults, stratified by combinations of body mass index (BMI) and diagnosis of diabetes/risk for diabetes. For example, obese workers with low risk for diabetes reported more work productivity loss compared with normal weight (11% versus 9%, $p = .001$) and overweight employees with low risk for diabetes (11% versus 8%, $p < .001$).

Health behaviors such as physical activity, dietary intake, and use of alcohol influenced how health is perceived in a sample of adults aged 18 years and over in Texas and California (Prosper et al., 2009). A random sample of 5,001 individuals was interviewed over the telephone using a computer assisted telephone interview. Data were analyzed in three steps. Using logistic regression to examine the relationship between SRH and health behaviors, obese individuals showed greater negative perception regarding their health status compared to individuals who were not obese. Other health behaviors such as dietary intake, physical activity, smoking and alcohol consumption were all significantly associated with the self-rating of health (Prosper et al., 2009).

A study was conducted in Lodz, Poland with 94 and 93 randomly selected male and female full time employees to examine the influence of selected lifestyle indicators on ability to
work among professionally active individuals. Four modifiable health behaviors—leisure-time physical activity (LTPA), smoking, healthy weight (BMI) and excessive alcohol consumption have been individually and collectively associated with poor SRH, and poor ability to work among working adults. In a study of professionally active persons in good health, as confirmed by physical examination and treadmill test, unhealthy weight, smoking and lack of leisure-time physical activity were found to be strongly and negatively associated with ability to work (measured using the work ability index) in both men and women (Dorota Kaleta, Makowiec-Dabrowska, & Jegier, 2006). The study revealed that in men with a constructed health behavior (lifestyle) index score of 0, the risk of poor to moderate ability to work was nearly seven times higher than in men whose health behavior (lifestyle) index score exceeded 1 or more points (OR = 6.67; 95% CI: 1.94-22.90) where as in women with health behavior (lifestyle) index score =0, the risk of moderate or lower ability to work was about 14 times higher compared to those whose health behavior index scores ≥1 (OR = 14.44; 95% CI:3.53 – 59.04) (Dorota Kaleta et al., 2006). This supports findings in other studies that show the negative combined effect of multiple health behaviors on the ability to work.

**Ability to work, health conditions and health behaviors**

A cross sectional study designed to quantify how much work productivity loss is avoidable through employer sponsored health management interventions was conducted with 772,750 employees aged 18 to 64 years old. Study participants were drawn from across five Bureau of Labor Statistics (BLS) grouped industries (including finance, all goods-producing, education or health services, professional or business or information services and other services) and representing 106 employers in the United States (Riedel et al., 2009). Work productivity loss ranged from 3.4% to 24% depending on how many unhealthy behaviors were identified by the
individual (Riedel et al., 2009). The study classified health behaviors into health risk scores (i.e., low, moderate, high) that had been associated with coronary heart disease, health care costs, and productivity costs in earlier studies. Ten health risk areas were included in the study, such as alcohol consumption, smoking/tobacco status, body weight, physical activity back pain and depression among others and a measure of presenteeism. Multivariate analyses revealed a consistent relationship between number of health behaviors and work productivity loss. The study concluded that chronic health conditions such as back pain, depression and stress risk were strong predictors of on-the-job work productivity loss (Riedel et al., 2009). The main limitation of the study is the use of a single item health and performance questionnaire (HPQ) to measure work productivity, however, the authors justified their use saying they wanted to reduce response burden and obtain high completion rates.

Health status has been associated with health behavior and ability to work in several studies. Chaney, Chaney, Wang, and Eddy (2007) noted in their analysis of the 2003 Behavioral Risk Factor Surveillance System (BRFSS) survey data that persons reporting poor mental health were more likely to report unhealthy behaviors compared to individuals who reported excellent or very good health. The study indicated that persons who report healthy behaviors such as not smoking, and engaging in physical activity reported a better self-rated mental health, using self-reported data from a survey developed by the Centers for Disease Control and Prevention (CDC). The independent variables for the study included smoking, (smoker versus non-smoker), participating in physical activity in past 30 days (moderate-intensity physical activity e.g. walking for at least 30 minutes on 5 or more days per week or vigorous-intensity physical activity e.g. brisk walking, stair climbing for at least 20 minutes on 3 or more days per week), body weight, self-rated general health, and activity limitation because of health conditions.
Multivariate analysis of data for 259,427 participants indicated that the adjusted odds for a respondent indicating good self-rated mental health were higher for individuals indicating excellent general health (AOR 6.48 95% CI, 5.58-7.52) (Chaney et al., 2007).

Poor sleep was associated with increased risks for injury and time out of work (Eriksen, Bjorvatn, & Bruusgaard, 2008; Liu & Tanaka, 2002), chronic diseases, health risk behaviors, and limitations of daily activity. A cross-sectional study conducted at two large hospitals in Boston, involving 1572 hospital workers with direct care responsibilities (90% women; mean age 41 years) found significant association between sleep insufficiency and functional limitations in activities of daily living (OR, 1.85; 95% CI, 1.33 to 2.57; P < .0001) even after controlling for the effects of socio-demographic, psychological, and workplace factors (Buxton et al., 2012). Activities of daily living measured included activities such as heavy household chores, reaching for an object on a high shelf; putting on shoes or socks; getting in and out of a car; stooping or bending toward the floor; and using any handheld tools. This study was part of the inaugural project for the Harvard School of Public Health Center for Work, Health, and Well-being, exploring how policies, programs and practices of the health care unit influence the work and health of the workers. The goal was to test the hypotheses that sleep insufficiency is associated with self-reported pain, work interference due to this pain and functional limitations (Buxton et al., 2012). Sleep insufficiency was significantly associated with increased pain (“often/always” versus “never/rarely”: OR= 0.57; 95% CI, 0.39 – 0.82) and functional limitation (“often/always versus “never/rarely”: OR=0.56; 95% CI, 0.36 – 0.87). The authors suggested that sleep, pain, and pain-related disability are important health indicators for nursing personnel who bear the largest burden of injury in all health care occupational categories.
The literature shows that health behaviors such as regular physical exercise, not smoking, and moderate or no consumption of alcohol are associated with optimal self-rated health (Tran, Nguyen, Chan, & Nguyen, 2013; Tsai, Ford, Li, Zhao, & Balluz, 2010), and that health conditions are associated with ability to work (Braakman-Jansen, Tall, Kuper, & Mart A.F.J. van de Laar, 2012; Shi, Sears, Coberley, & Pope, 2013; van den Heuvel et al., 2010). However, the relationships among health status, health conditions, health behaviors, and ability to work for CNAs employed in nursing homes are not well described. Understanding the number and nature of relationships that exist among these variables may be especially important due to the modifiable nature of health behaviors.

**Summary**

This literature review examined published evidence on the relationship related to the ability to work, health status, health conditions, and the health behaviors among workers and specifically among CNAs. Ability to work was defined as the degree to which the health of a worker allowed him or her to physically and mentally perform their job tasks. The literature review reveals that health-related work productivity is a significant indicator of the individual employee’s ability to work, and is generally used as an outcome variable for measuring employee ability to work.

Impairment in the ability to work is determined by presenteeism and absenteeism both of which cost employers substantially every year. Published literature reveals that “poor” SRH, chronic health conditions and behaviors that adversely affect health were also associated with impairment in ability to work, affecting work productivity to varying degrees.

The link between physically demanding jobs such as that of CNAs and ability to work was established. Though evidence suggests that presenteeism and absenteeism in CNAs could
affect the quality of care nursing home residents receive, however, there is insufficient information about the self-reported health, health conditions, health behaviors and ability to work of CNAs. There is however, evidence that health is inextricably associated with the ability to work, but, this review demonstrates a gap in evidence regarding the relationships among the ability to work, the health, and health conditions and health behaviors in CNAs employed in nursing homes.

In Chapter 3, the research design and methodology used to examine the relationships among the independent and dependent variables will be discussed. This chapter also includes a discussion of the study sample, sampling methods, instrumentation and data collection procedures.
CHAPTER 3: RESEARCH METHOD

Introduction

This chapter describes the research design and methodology used in this study, an in-depth discussion of the population, sampling, data collection procedures, and protocol, and research questions. The chapter also includes detailed discussion on instrumentation and the psychometrics of the instruments, ethical considerations, pilot testing process, and the data analysis plan.

Research design

This study used a cross-sectional, descriptive correlational design to investigate the relationships among the health status, health conditions, health behaviors, and the ability to work in CNAs who work in nursing homes in North Carolina. The intent of the study is to describe the health status, health conditions, and health behaviors among CNAs and to investigate the relationships among health status, health conditions, health behaviors, and CNAs ability to work in nursing homes.

Self-report pencil and paper questionnaires were used for obtaining data. (See appendix A for questionnaire used in the study). Other methods of data collection considered for this study included observation, face to face and telephone interviews, and online surveys. The self-administered questionnaire method was chosen because questionnaires have been found to facilitate data collection when there are numerous items (Rama, 2008; Trochim, 2006). Questionnaires are replicable and can be reliably used if well-constructed and piloted.
Responses to the questionnaires can usually be quickly and easily quantified by either the researcher or through the use of a software package and can be more objectively analyzed than other forms of data collection (Hannan, 2008).

The survey instrument included items on demographics, health status, self-reported health conditions, health behaviors and measures of ability to work. Demographic variables obtained include age in years, gender, race/ethnicity (Hispanic or non-Hispanic origin), marital status and number of children younger than 18 years living with respondent and educational level. These variables were used to characterize the sample. They were selected in order to have a comparison with published information on the national demographics of CNAs. Weight (kg) and height were collected from which Body Mass Index (BMI) was calculated (weight/height (m²)). The health behaviors selected for analyses included alcohol consumption, physical activity, sleeping habits, and smoking habits. These are common lifestyle and lifestyle related factors that contribute significantly to the development of chronic health conditions responsible for a major proportion of morbidity, disability and mortality in the general population of the United States (Ford et al., 2013; Pelletier et al., 2004). These health behaviors also have been found to significantly increase healthcare costs to employers, including increased absenteeism and work productivity loss (Burton et al., 2005; Mayo Clinic, 2008; Merrill et al., 2013). To evaluate ability to work, measures of presenteeism and absenteeism were obtained and converted into ability to work impairment scores (Bedrosian, Striegel, Wang, & Schwartz, 2012; Letvak, Ruhm, & Gupta, 2012; Letvak & Ruhm, 2010; Reilly Associates, 2002).

Population and Sampling

There are over 1.5 million nursing assistants employed in nursing homes in the United States (Bureau of Labor Statistics, 2013). The majority are female, a single parent, and with an
average age of 40 years (PHI, 2011). In 2012, 56% of CNAs were employed in nursing and residential care facilities, 26% in hospitals, and 8% in home health services and government (Bureau of Labor Statistics, 2014) and for 10% of CNAs their employment places was not accounted for.

Because nursing homes that are publicly owned or established as part of an acute care setting or a continuing care retirement community (CCRC) may differ from traditional skilled nursing care homes, CNAs from these types of nursing homes were not approached. Eligible respondents included CNAs aged 18 years and over and who were employed in a nursing home that: (1) participated in the Medicare and Medicare program; and (2) was not embedded in an acute care setting or a CCRC. For this study, CNAs employed in nursing homes located in North Carolina within a fifty-mile radius of the zip code 28173 made up the sampling pool. There were about 1092 CNAs (Centers for Medicare and Medicaid Services, 2013) working in 42 nursing homes during the Summer 2013 that met the fifty-mile radius criterion.

Four nursing homes did not meet the eligibility criteria and CNAs employed at them were excluded from the study. Three of the four nursing homes were located within hospitals; one was located in a CCRC and government/city owned. Four nursing homes had a not-for-profit status (Centers for Medicare and Medicaid Services, 2013). The remaining 34 nursing homes that met the study’s criteria were similar to nursing homes in the US with regards to the bed size (study nursing homes average bed size was 118, and the national average bed size was 108.5 in 2011; about 52% of nursing homes nationally had bed sizes that range from 100-199 beds). All 34 nursing homes had the Medicare and Medicaid program as payment source (90-91% of nursing homes dually participated in Medicare and Medicaid), 94% (n=32) were for-profit organizations compared with 68% nationally and occupancy rate was 85.9% compared with
83.25% nationally in 2011 (Centers for Medicare and Medicaid Services, 2012). The average number of CNAs employed in each of the 34 nursing home was 26, which creates a potential sampling pool. CNAs that were less than 18 years of age were excluded from the study because of the need to obtain parental consent. With this exclusion, the pool of potential CNAs decreased by 16% to approximately 917 CNAs.

Prior studies reported that the CNA response rates to surveys vary widely ranging from 29% to over 71% (Culp, Ramey, & Karlman, 2008; Konrad, Morgan, & Dill, 2008; Lapane, Quilliam, & Hughes, 2007). Evidence also demonstrated that distribution of surveys at the workplace did not affect the response rate compared to direct mail to the CNAs homes (Lapane et al., 2007). Using this evidence about CNA response rates, the sample size of 88 CNAs was calculated using sample size calculator (Raosoft, 2004) to achieve a power estimate equal to .80, at alpha of 0.05 and 95% confidence level to detect a correlation coefficient (r) greater than 0.29 (Snedecor & Cochran, 2003). Using the lowest reported response rate of 29% (Culp et al., 2008), 300 questionnaires were estimated to be needed for distribution.

**Ethical Considerations**

Approval for this study was obtained from the UNC-CH Institutional Review Board (IRB) (see appendix B for copy of approval letter) and the legal departments of the participating nursing homes. Ethical issues considered included obtaining a signed consent to participate in the study, advising potential respondents that participation was voluntary, and assuring them of the confidentiality of responses. Respondents were requested to return completed questionnaires to the investigator in a sealed envelope, which the respondent could leave in a locked drop box provided at the nursing home, mail or directly hand to the investigator.
Data Collection

A letter (see appendix C for copy of sample letter sent to nursing home administrators) was sent by first class mail to the nursing home administrators of the nursing homes that met the criteria for the study in waves of six at a time to introduce the investigator, indicate the reason for the contact, purpose of the study, and invitation to participate in the study. Sending invitations to nursing home administrators in small clusters allowed the principal investigator to follow up with them in a timely fashion. Follow-up telephone calls were made by the principal investigator to the nursing home administrators’ 3 to 4 days after mailing a set of letters to confirm that the administrator received the letter and to request a meeting to discuss the study. During these meetings, the principal investigator explained what would be asked of the CNA and the duration of the study.

The recruitment algorithm (see appendix D) varied among the nursing homes in order to accommodate specific requests from administrators and to minimize burden or disruption of workflow in the facility. For example, two nursing home administrators allowed the principal investigator one day only to collect data; another administrator allowed the principal investigator to collect data only during the weekend; two other administrators did not restrict the number of days or times the principal investigator was allowed for data collection. Posters and flyers (see appendix E, F, G for posters and flyers prepared by the principal investigator and used to recruit CNAs) advertising the study were posted by the administrator of the nursing homes at strategic locations in the facility. Two days after the posting of the posters and flyers, the principal investigator returned to each nursing home to conduct informational meetings with CNAs, obtain written informed consent and to administer the questionnaires. Meetings were held with CNAs, either individually or in groups of 2-4, as they came into the facility’s lunchroom for their lunch
breaks. During these meetings, the study description, informed consent process and what was being asked of the CNAs were explained. CNAs were able to ask as many questions as they wanted and they were asked if they were satisfied with the answers given in response to their questions by the principal investigator. Light refreshments including pizza, fruit bowls and an assortment of sodas and fruit juices were provided by the principal investigator during all of these meetings.

CNAs that provided informed consent to participate in the study were handed a package containing a cover letter, the questionnaire, a sealable pre-addressed envelope with a first class mail stamp attached. They were also given a penlight and a pencil. CNAs completed their surveys during their lunch breaks and returned them sealed in the accompanying envelope. CNAs that could not completely fill out the questionnaires during their lunch break had the option of returning completed questionnaires by U.S. mail or by leaving, them in the drop box located in the lunchroom for the duration of data collection agreed upon with each administrator. The drop box was a durable lockable container about 18 inches wide, 12 inches in length and 22 inches tall. It allowed for easy placement of envelopes containing the completed questionnaires. The contents of the drop box were accessible only to the principal investigator.

In two of the five nursing homes, the principal investigator was allowed to return at various time points to collect completed questionnaires from the drop box located in the lunch room of the nursing home. In all nursing homes, reminders for CNAs to meet with the principal investigator in the lunchrooms were announced over the nursing homes’ public address system.

Questionnaires were collected from participating CNAs at specific times shown in the recruitment algorithm (see appendix H) in nursing homes where there were no restricted times to survey the CNAs. The principal investigator provided all respondents with a telephone number to
contact the principal investigator to clarify any questions about the questionnaire. **Data coding and input.** A codebook based on the questionnaire was developed (see appendix I). The codebook reflected the names of each variables and values for each item. The variable names are short names that reflect nominal definitions for each variables, for example GENHLTH was the code for the item that measured overall general health.

“Qualtrics” Online Research Suite was used for data input. An online version of the questionnaire was created in “Qualtrics” Research suite at http://qualtrics.unc.edu. Prior to data entry, returned questionnaires were checked for missing values, completion of and errors in the response. “Qualtrics” Online Research Suite software facilitated summing scores on select items as well as formatting results for use in printers and related software including Microsoft Excel and SPSS. After input, data were crosschecked for errors on the screen by the principal investigator on two different occasions at intervals of two days for each batch of data inputted. Missing, incorrect, or miscoded values were corrected. A report of the scores was viewed online before exporting the raw data as comma separated values file from “Qualtrics” into SAS 9.3 for analyses.

**Instrumentation**

Established instruments or subscales chosen from widely used instruments including the BRFSS, the Work Productivity and Activity Impairment (General Health) (WPAI-GH) and two single item questions adapted from the work ability index (Finnish Institute of Occupational Health (FIOH), 2012), comprised the questionnaire used in this study. Permission to use the instruments was obtained as applicable (see appendix J). The two items from the work ability index were used to ascertain the consistency of responses to the WPAI-GH questionnaire.
Obtaining reliable data from CNAs required special attention because some CNAs may have low literacy or English was their second language (Anderson and Colon-Emeric, in-press). The questionnaire was therefore constructed at below the Flesch-Kincaid eighth grade level to facilitate comprehension and completion of the questionnaire.

**Dependent variable.** Ability to work was operationalized as presenteeism and absenteeism. Ability to work was measured using the Work Productivity and Activity Impairment Questionnaire (General Health) (WPAI-GH) developed by Reilly Associates. The WPAI-GH is a public domain self-assessment tool that provides information from employees on presenteeism absenteeism, work productivity loss and activity impairment. Ability to work was calculated from scores from CNAs ratings of presenteeism and absenteeism as described in detail below.

The WPAI-GH consists of six questions regarding the effect of health problems on the ability to work and to perform regular activities during the past 7 days (Glanz et al., 2012). The first question of the WPAI-GH was not used in this study as all the respondents were currently working for pay. The other five items on the questionnaire measured employees self-reported percent of work time missed in the past seven days because of health problems and non-health related problems, the number of hours actually worked in the past seven days, the amount of impairment due to health problems while working, the percent of overall work impairment because of health problems, and the percent of activity impairment because of health problems in the past seven days (Boles, Pelletier, & Lynch, 2004; Lenneman et al., 2011; Tang, Beaton, Boonen, Gignac, & Bombardier, 2011). It was estimated that 3-5 minutes are needed to complete the WPAI-GH scale. The WPAI-GH uses a 7-day recall period. This recall period was used in all
WPAI validation studies and is believed to be suitable for the type of information that is being asked (Reilly Associates, 2002; Reilly, Zbrozek, & Dukes, 1993)

The WPAI-GH was designed to have generalizability to a broad range of occupations/diseases, and although evidence of reliability and validity was available for many MSD and non-musculoskeletal conditions (Tang et al., 2011) none exists for CNAs. Reilly et al. (1993) assessed the construct validity and test retest reliability of the self-administered version of the WPAI-GH by analyzing the extent to which the instrument correlated with several domains of the Medical outcomes study short form (SF-36) in 106 employed persons affected by a health problem. The construct validity of the WPAI measures of presenteeism and absenteeism due to overall health and symptoms were assessed relative to measures of perception of health, pain, symptom severity, and measures of work. The validation measures explained 54-64% of the variance in the work productivity loss variables of the WPAI (Reilly et al., 1993).

Construct validity of the WPAI-GH. All measures of work productivity and activity impairment were positively correlated with measures which had demonstrated construct validity. The instrument was found to have sufficient reproducibility (test retest reliability) with correlation coefficients for overall work productivity from 0.71- 0.87 (Prasad, Wahlqvist, Shikiar, & Shih, 2004).

Scores on the WPAI-GH are expressed as impairment percentages, with higher scores indicating greater impairment and less work productivity. Scores are multiplied by 100 to derive percentages (Reilly Associates, 2002). Presenteeism and activity impairment are each measured by one item on the scale, two items measure absenteeism and overall work productivity is derived from a calculation of the scores of multiple items. In all, three items on the scale are calculated based on a formula to derive impairment in the ability to work: Q21/ (Q21+Q23) +
\[\left(1 - \frac{Q_{21}}{(Q_{21} + Q_{23})}\right) \times \left(\frac{Q_{24}}{10}\right)\] (Bedrosian et al., 2012; Reilly Associates, 2002). Where, “Q21” refers to hours missed from work because of employee’s own health, “Q23’ refers to hours actually worked in past seven days and “Q24” indicates how much health problems affected productivity while working in the past seven days (see appendix A for questionnaire). A score cannot be calculated if a response to any of the corresponding three items is missing (Reilly Associates, 2002). In this study the calculated score for overall ability to work was dichotomized on the basis of the presence/absence of any impairment in the ability to work. As noted above, the range of possible WPAI-GH scores was 0 – 100; thus, the definition of impairment in the ability to work was operationalized in the following two categories: (a) WPAI-GH score = 0, no impairment in the ability to work and (b) WPAI-GH score 1 – 100 = some impairment in ability to work. This facilitated a comparison of ability to work in CNAs who self-reported no impairment in ability to work to CNAs who self-reported at least some level of impairment in ability to work.

The ability to work was also measured with two items adapted from the work ability index developed by the FIOH. These measures were included to ascertain consistency of the respondents’ responses to the work productivity questionnaire. One of the items is a self-assessment of the workers’ current ability to work compared with their lifetime best. Scores range from 0-10 and scoring is categorized into poor (0-5), moderate (6, 7), good (8, 9) and excellent (10) (Fassi et al., 2013). The second item asks the respondent to predict their ability to continue working in two years based on their present state of health. Scoring is categorized into relatively certain, not certain and unlikely.

**Independent variables.** The independent variables in this study were measures of health status, health conditions and health behaviors.
Health status. Health status was measured using a single item self-rated health questionnaire (Lorig et al., 1996). This is a 5-point Likert-type scale stated as, “In general, would you say your overall health is...?” The response options include poor, fair, good, very good or excellent. Self-rated health has been validated as a useful indicator of health for a variety of populations (Idler & Benyamini, 1997). Test-retest reliability among persons with chronic disease ($n= 1129$) of this item is 0.92 (Lorig et al., 1996) and the test retest reliability of SRH among a representative sample of adults in the US yielded a kappa coefficient of 0.43 indicating an acceptable moderate reliability (range 0.41-0.60) of the instrument (Zajacova & Dowd, 2011).

Health conditions. Presence of health conditions diagnosed by a health care provider were measured by respondents selecting from a checklist of health conditions that are prevalent, have high impact on total cost of healthcare, and previously established relationship with ability to work (Goetzel et al., 2004; Holden et al., 2011; Loeppke et al., 2009). These conditions also included those known to be prevalent in CNAs such as arthritis, back/neck pain (Graham & Dougherty, 2012; Trinkoff, Johantgen, Muntaner, & Le, 2005) depression, (Muntaner et al., 2006; Okechukwu et al., 2012) and physical injuries (Bureau of Labor Statistics, 2012; Khatutsky et al., 2012). Other conditions included are allergy, anxiety disorder, chronic pain, diabetes, fatigue, heart disease, high blood pressure, high cholesterol, obesity, sleeping problems, and other emotional strain (see appendix K for a table that lists included health conditions). Fifteen health conditions were included and they were coded as “yes” if respondents reported having been diagnosed with or having received treatment from a clinician for that condition(s) and scored as a “no” if they had never been diagnosed or had never received treatment from a clinician for the condition.
**Health Behaviors.** Four adult health behaviors: (1) alcohol consumption; (2) physical activity; (3) sleep habits; and (4) smoking were measured. Health behaviors were measured using widely used questions from the “Adult health behavior” module in the BRFSS (Centers for Disease Control and Prevention (CDC), 2011; Schoenborn & Adams, 2010).

The BRFSS is a health survey system that has tracked health conditions and risk behaviors in persons aged 18 years or older in the United States since 1984 (website: http://www.cdc.gov/brfss/). It is recognized as a unique source of representative, state-based data on adult health-risk behaviors (Nelson, Holtzman, Bolen, Stanwyck, & Mack, 2001). In all, 10 questions measured health behaviors in this study. About 2-5 minutes are needed to complete this section of the BRFSS questionnaire.

Psychometric properties of the health behavior component of the BRFSS scale were examined using representative samples of adults either in the State conducting the study or a representative sample of adults in the United States. No studies were found that used specific occupational groups as the sample for psychometric studies, however, all of the test/retest studies using the BRFSS questions show high levels of reliability (Pierannunzi, Hu, & Balluz, 2013). The assessment of health behaviors among non-institutionalized adults, using the BRFSS questionnaire showed that the reliability coefficients for health behavior factors were generally above 0.70 (Stein, Lederman, & Shea, 1993).

**Alcohol Consumption.** Alcohol consumption was measured with three items from the BRFSS that measures alcohol consumption during the past 30 days (CDC, 2011). The coefficient of reliability for “any alcohol consumption” in the general population was found to be .82, and alpha coefficient for “number of drinks” was .72 (Stein et al., 1993).
Since the United States Department of Health and Human Services (U.S. DHHS) recommends that adults consume no more than two drinks per day for men and one drink per day for women, high risk drinking was defined as the consumption of more than two drinks on any day or more than 7 per week for women and more than 3 drinks per day or more than 14 drinks per week for men (U.S.D.A. & U.S. DHHS, 2010). Scores for alcohol consumption was categorized into recommended amount, high risk and binge drinking (U.S.D.A. & U.S. DHHS, 2010). Binge drinking was defined as consuming four or more drinks per occasion for women and five or more drinks per occasion for men during the past 30 days (Kanny, Liu, Brewer, Garvin, & Balluz, 2012). In the analysis of alcohol consumption, respondents were grouped into those who consumed alcohol in excess of four drinks per occasion and those that did not.

**Physical activity.** To measure physical activity, three items adapted from the BRFSS that elicit information about the quality and quantity of a respondent’s leisure time physical activity was used (Washburn, Heath, & Jackson, 2000). The lead question asked whether a respondent participated in any physical activity in the past 30 days such as brisk walking, bicycling, gardening, vacuuming, or dancing, and running, and calisthenics – bending, jumping, swinging, twisting or kicking (CDC, 2011). For persons that respond yes, they also responded to questions about the frequency and amount of time spent on physical activity in each day of participation in physical activity.

The reliability of several categorical definitions of leisure time physical activity range from 0.46 to 0.68 (Evenson & McGinn, 2005). The test–retest reliability estimate for moderate activity ranged from 0.35 – 0.53, vigorous activity 0.80-0.86, and 0.85- 0.92 for strengthening (Yore et al., 2007).
The U.S. DHHS recommends 150 minutes per week of moderate intensity physical activity for adults. In this study, respondents were grouped into those that participated in any physical activity and those that did not in order to compare impairment in the ability to work in both groups.

**Sleep Assessment.** Sleep was measured using a single question from the BRFSS that asked how many hours of sleep CNAs got on average in a 24-hour period (CDC, 2011). Moderate correlation of 0.45 between self-reported and objectively measured sleep duration has been reported, with mean self-reported habitual sleep at 6.83 hours while mean measured sleep duration was 6.06 hours in a 24 hour period (Lauderdale, Knutson, Yan, Liu, & Rathouz, 2008). Good reproducibility of the sleep-duration question was found in two waves of a study with Cohen’s k of 0.39 ($P<0.0001$) (Patel et al., 2004).

Scores on the sleep assessment were categorized into adequate sleep and inadequate sleep. Respondents who reported sleeping between 7 and 9 hours were classified as getting adequate sleep (Lenz et al., 2013).

**Smoking status.** Measures for cigarette smoking were obtained from the BRFSS survey. Respondents of the cigarette-smoking questionnaire were categorized into current smokers, formers smokers and never smokers. “Current smokers” are individuals who report that they smoke and that they have smoked 100 or more cigarettes in their lifetime (D.E. Nelson, Powell-Griner, Town, & Kovar, 2003). They may currently smoke every day or some days (Nelson, Powell-Griner, Town, & Kovar, 2003). Individuals who report smoking 100 or more cigarettes in their lifetime but who currently do not smoke are classified as former smokers (Kuiper, Malarcher, Bombard, Maurice, & Jackson, 2005; Ryan, Trosclair, & Gfroerer, 2012). Individuals who reported that they have never smoked cigarettes are classified as “never smokers”.

42
Though the BRFSS smoking prevalence estimates were generally 1 to 3 percentage points lower than estimates obtained from household interviews, the BRFSS questions on smoking have been found to be valid, comparing favorably with biochemical measures of smoking with high sensitivity (78% for men, 86% for women) and specificity (97% for men, 96% for women) (Nelson et al., 2001). Reliability of ever smoking status ($k$: 0.79 – 0.94), current smoking status ($k$: 0.83-1.00) and for former smokers ($k$: 0.58 – 0.86). Reliabilities for both ever smoker and current smoker were higher than reliability for former smoker.

**Body mass index.** Respondents were asked to report their height and weight in feet and inches and in pounds. The Body Mass Index (BMI) was calculated using a BMI calculator and respondents were categorized as normal weight, overweight and obese based on BMI. Respondents were classified as obese if their BMI was calculated to be equal to 30 or more; and overweight if their BMI was between 25 and <30. Respondents were classified as having normal weight if BMI ranged from 18.5 to <25 (American Cancer Society, 2013; Fine, Philogene, Gramling, Coups, & Sinha, 2004). Underweight respondents were individuals who reported a BMI less than 18.5 (American Cancer Society, 2013).

**Pilot Testing**

The questionnaire for this study was pilot tested with a convenience sample of seven CNAs recruited from two nursing homes in the Charlotte area of North Carolina that met the inclusion criteria for this study. Permission was obtained from the administrators of both facilities prior to recruiting the CNAs. Although this was a convenience sample of CNAs, pilot testing simulated the expectations of the actual study. For example, a meeting was held to explain the purpose of the pilot test, discuss confidentiality of responses and how the scores would be used. Consenting CNAs were then handed questionnaires to complete. An evaluation
of the questionnaire was also completed by the respondents (see appendix L for protocol of pilot
testing including evaluation of survey items). The evaluation consisted of six items that asked
how long it took for the respondent to complete the questionnaire, difficulty level of the items by
section, perceived sensitivity to question and clarity of instructions. The pilot testing was
conducted at the facility, during the CNAs break times.

The goal of the pilot testing was to determine whether problems existed in the
questionnaire and to identify ways to improve it. The pilot study was designed to identify items
that would be skipped by respondents or would seem ambiguous to them. The length of time to
complete the questionnaire and the difficulty level of items were evaluated. Clarity of the
instructions and perceived sensitivity of item questions were also examined. The questionnaire
was not changed or modified based on the results of the pilot test.

Data Analysis

Data were analyzed using SAS 9.3 (SAS Institute Inc., 2011). Analysis included
assessment of the distribution and descriptive statistics of the independent variables and socio-
demographic variables including age in years, gender, race/ethnicity (Hispanic or non-Hispanic
origin), marital status, educational level and number of children less than 18 years living with the
respondent. Descriptive statistics included the frequency and distribution of each of the 15 health
conditions.

Bivariate analyses of the various relationships among the variables using the chi square
test of independence were conducted. These included examining the relationship between: (1)
self-rated health and ability to work; (2) each of the 15 health conditions and ability to work; and
(3) each of the four health behaviors and ability to work. Logistic regression analyses were used
to examine the relationship between the number of health behaviors and self-rated health and
also the relationship between the number of health conditions and the ability to work. Analyses of correlations among the study variables were conducted using Spearman’s correlation coefficients.

Scores on the dependent variable, ability to work were categorized into respondents that reported “impaired ability to work” and those that reported “no impairment in the ability to work”.

Multiple logistic regression analyses were used to determine if there are any associations between the dependent variable “ability to work” and the independent variables: self-rated health, health conditions and health behaviors.
CHAPTER 4: RESULTS

This chapter provides results of the data analysis and findings of the study. The chapter also provides information about the response rate, demographic data of the sample and how missing data were handled.

The overall aim of this study was to explore the association of self-rated health, select health conditions, and health behaviors with the ability to work in CNAs employed in nursing homes. A pencil and paper questionnaire comprised of 34 items that were drawn from established instruments (BRFSS, WPAI-GH and the Work ability index) was used although their use in the CNA population has not been reported. Therefore the questionnaire was pilot tested.

Pilot Study: Seven CNAs employed in two Charlotte area nursing homes completed a pilot test of the questionnaire. The aims of the pilot testing were to discover difficulties with the instrument, determine time taken to complete the questionnaire, and assess each item for range of responses. All respondents completed each item and they correctly followed the skip patterns ($n = 7$, 100%). Average completion time was 9.6 minutes, (range 7-12 minutes). The over-all difficulty level for the questionnaire was 5.7 (range 5 to 25 points) indicating little difficulty completing the questionnaire. The questionnaire was not modified based on the results of the pilot test.

Data Collection: Four waves of six letters of invitation to participate in the study were sent to nursing home administrators (NHAs). The different waves of letters were mailed nine days apart from each other. Each wave was followed with telephone calls to the nursing home administrators 3 to 5 days after the mails were sent. Eighteen NHAs were contacted by both U.S.
mail and telephone calls for permission to conduct the study in their facilities, while another six NHAs were contacted only by mail with a total of 24 NHAs being contacted (Figure 2). Six NHAs could not be contacted by telephone for follow-up. Nursing home administrators who did not respond to or return telephone calls from the principal investigator were removed from possible contacts. Among the NHAs contacted by telephone for follow up, one administrator declined to have a follow-up meeting.

Ten NHAs were visited in the Charlotte, Union and Gaston counties (all within the 50 mile radius of zip code 28173). Five of the 10 NHAs visited declined to give permission for CNAs in their facility to participate in the study. Another five nursing home administrators (20.8%) granted permission to use their facility. Three NHAs deferred granting permission until their legal departments reviewed and approved the questionnaire; one administrator reviewed the questionnaire before granting permission; another administrator notified her superiors and granted permission to contact CNAs in her facility.

The organizational structure of the nursing homes whose administrators were contacted indicated that 96% of the nursing homes (n=23) were for-profit organizations, 75% were chain-affiliated (n = 18) and bed size range from 100-289 beds (mean = 138). The nursing homes that participated in this study were not different from non-respondents in regard to chain affiliation (n=5, 100%) for profit status (n =5, 100%) and bed-size range 118 – 207 (mean = 153). All the administrators that granted permission for their staff to participate in the study indicated that CNAs would meet with the investigator in the nursing homes’ lunchrooms.
As discussed in Chapter 3, a sample size of 88 was calculated to achieve .80 power, 0.05 alpha to detect a correlation of 0.29 (Snedecor & Cochran, 2003). Although 300 questionnaires were estimated to be needed for distribution in anticipation of a 29% response rate, 120 questionnaires were distributed among CNAs with 106 CNAs providing informed consent and returning completed questionnaires (response rate of 88.3%). Eight questionnaires were excluded from analyses because respondents did not complete item on health status or they did not respond to one or more of the items about ability to work. The final sample size was 98 (Figure 3).
Figure 3. Certified Nursing Assistant (CNA) Participation Flow Diagram

Demographic data and characteristics of the sample

The respondents were predominantly female ($n = 88, 89.8\%$), and African-American or black ($n = 55, 56\%$), with a mean age of 37.2 years ($SD$ 11.1 with a range of 19 years to 69 years). Forty-three percent have never been married, 35% were married, 14%, 5% 2% were divorced, separated and widowed respectively. Over half of the respondents ($n = 52, 53\%$) have “some college or 2-year college degree”, with ($n = 17$) 17% having a “college degree”; 28 (29%) were
high school graduates or had a General Educational Development (GED). Only one respondent indicated having “some high school, but did not graduate” (1%).

Forty-eight (49%) of the respondents have worked as CNAs for over five years, 16 (16%) have worked as CNAs for over 3-years up to 5-years and 16 (16%) for over 1-year up to 3 years. Nine respondents worked as CNA for over six months but less than 1 year \( (n=9, 9\%) \) and another nine respondents worked for 0-6 months \( (n=9, 9\%) \). Seventy-eight respondents (80%) held one job. Among those that worked two jobs, 85% \( (n = 17) \) none worked as a CNA in another facility

Body mass index scores indicate that the average BMI for the CNAs in the study was 30.1 with a standard deviation of 7.8 and a range of BMI of 16.6 - 62. Table 2 shows a comparison of the characteristics of the study sample with a national sample of CNAs.

Table 2. Comparison of the characteristic of a national sample with study sample

<table>
<thead>
<tr>
<th></th>
<th>National sample ( (N = 21,636) )</th>
<th>Study sample ( (N=98) )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>92</td>
<td>89.8</td>
</tr>
<tr>
<td>Male</td>
<td>8</td>
<td>10.2</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-25</td>
<td>16.9</td>
<td>16.5</td>
</tr>
<tr>
<td>26-34</td>
<td>23.6</td>
<td>25.8</td>
</tr>
<tr>
<td>35-44</td>
<td>24.6</td>
<td>34</td>
</tr>
<tr>
<td>45-54</td>
<td>22.5</td>
<td>16.5</td>
</tr>
<tr>
<td>55+</td>
<td>12.5</td>
<td>7.2</td>
</tr>
<tr>
<td><strong>Ethnic group/Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>38.7</td>
<td>56.1</td>
</tr>
<tr>
<td>White</td>
<td>53.4</td>
<td>37.8</td>
</tr>
<tr>
<td>Other</td>
<td>7.9</td>
<td>6.1</td>
</tr>
<tr>
<td></td>
<td>National sample (N = 21,636)</td>
<td>Study sample (N=98)</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td></td>
<td>N%</td>
<td>N%</td>
</tr>
<tr>
<td><strong>Hispanic Origin</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>9.3</td>
<td>5.3</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>89.8</td>
<td>94.7</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No high school diploma</td>
<td>12.4</td>
<td>1.02</td>
</tr>
<tr>
<td>High School/GED</td>
<td>62</td>
<td>28.6</td>
</tr>
<tr>
<td>Some college or 2 year degree</td>
<td>19.4</td>
<td>53.06</td>
</tr>
<tr>
<td>College Degree</td>
<td>4.7</td>
<td>17.4</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>50.7</td>
<td>35</td>
</tr>
<tr>
<td>Divorced/separated/widowed</td>
<td>22.2</td>
<td>21.6</td>
</tr>
<tr>
<td>Never been married</td>
<td>26.4</td>
<td>43.3</td>
</tr>
<tr>
<td><strong>Body Mass Index (BMI)</strong></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>&lt; 18.5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>18.5 – 24.9</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>25 – 29.9</td>
<td>38</td>
<td>39</td>
</tr>
<tr>
<td>&gt; 30</td>
<td>36</td>
<td>37</td>
</tr>
</tbody>
</table>

*Data combined data for separated, divorced and widowed.
Source for national sample: (Squillace et al., 2009)

**Study Variables**

This section provides results on measures of central tendency and descriptive statistics for the variables under study.

**Dependent variable:** Ability to work was examined by calculating the presence or absence of impairment in the ability to work derived from the WPAI-GH scale. Ability to work scores was based on reported absenteeism in the past seven days because of the employee’s health problems (Q21), hours actually worked in past seven days, (Q23) and how much health
problems affected productivity (presenteeism) (Q24) in the past seven days. The formula \( Q_{21}/(Q_{21}+Q_{23}) + [(1-Q_{21}/(Q_{21}+Q_{23})) \times (Q_{24}/10)] \) was used to calculate scores (Bedrosian et al., 2012) (see appendix A for questionnaire). A respondent received a score of 0 if there was no reported impairment in ability to work and any score greater than 0 indicated impaired ability to work. Approximately 40% (n = 39) of respondents had a WPAI-GH score of 1 or greater, indicating at least some level of impairment in their ability to work.

Respondents were categorized into CNAs that indicated impaired ability to work and those without impairment in ability to work to analyze the relationship among health status, health conditions and health behaviors and ability to work.

**Independent variables:** Table 4 shows the distribution of responses for SRH and health behaviors. Prevalence of diagnosed health conditions is presented in Table 3. Thirty-six respondents (37%) rated their overall health status as “excellent”, 37 (38%) rated their overall health status as “very good”, 22 (22%) and 3 (3%) rated their overall health as “good” and “fair” respectively. None rated their overall health status as “poor”.

Health conditions. Table 3 lists 15 diagnosed health conditions and their prevalence among CNAs in the study. A total of 186 health conditions were reported by 67 (68.4%) of the respondents. Twenty-six (26.5%) respondents reported one diagnosed chronic health condition, 18 (18%) reported two chronic health conditions and 23 (23.5%) reported three or more health conditions. High blood pressure was the most prevalent health condition and was reported by 22 (32.4%) of the respondents followed by allergy 21 (30.9%) and back/neck pain 21 (30.9%). Diabetes was the least reported diagnosed health condition with only three (4.4%) respondents reporting having been diagnosed with diabetes.
Health behaviors. Four health behaviors included in the analysis were alcohol consumption, participation in physical activity, sleep duration and smoke status. Table 4 shows distribution of scores on each health behavior.

Fourteen respondents (14%) reported health behaviors consistent with healthy behaviors, 30 (31%) reported one adverse health behavior, 30 (31%) reported two adverse health behaviors and 21 (21.4%) reported three adverse health behaviors and three (3%) reported four adverse health behaviors. Fifty one (52.6%) respondents reported that they do not consume alcohol, 21 (21.7%) consumed alcohol about once a month while 25 (25.8%) report that they consume alcohol more than once a month. One person did not indicate any responses to the question about alcohol consumption. Among respondents who consumed alcohol, 15(32%) did not consume more than four drinks “in any one occasion” while 32 (68%) consumed more than four drinks “in any one occasion”. Respondents were dichotomized into groups of persons who consumed alcohol in excess of the recommended amount (i.e. consuming four or more drinks in any one occasion) and those that consumed alcohol in the recommended amount. Physical activity was scored as 0 if the respondent reported participating in any physical activity and as a 1 if respondent did not report any physical activity. A total of 73 (75%) respondents reported participating in physical activity and 24 (25%) did not participate in any physical activity.
Table 3. Prevalence of Health Conditions that affect the Ability to Work

<table>
<thead>
<tr>
<th>Health Condition</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 High blood pressure</td>
<td>22</td>
<td>32.4</td>
</tr>
<tr>
<td>2 Allergy</td>
<td>21</td>
<td>30.9</td>
</tr>
<tr>
<td>3 Back/neck pain</td>
<td>21</td>
<td>30.9</td>
</tr>
<tr>
<td>4 Fatigue</td>
<td>16</td>
<td>23.5</td>
</tr>
<tr>
<td>5 Insomnia/Sleep problems</td>
<td>15</td>
<td>22.1</td>
</tr>
<tr>
<td>6 Obesity</td>
<td>15</td>
<td>22.1</td>
</tr>
<tr>
<td>7 High cholesterol</td>
<td>14</td>
<td>20.6</td>
</tr>
<tr>
<td>8 Stress/other emotional disorder</td>
<td>13</td>
<td>19.1</td>
</tr>
<tr>
<td>9 Arthritis</td>
<td>12</td>
<td>17.7</td>
</tr>
<tr>
<td>10 Anxiety Disorder</td>
<td>11</td>
<td>16.2</td>
</tr>
<tr>
<td>11 Depression</td>
<td>10</td>
<td>14.7</td>
</tr>
<tr>
<td>12 Heart disease</td>
<td>5</td>
<td>7.4</td>
</tr>
<tr>
<td>13 Chronic pain</td>
<td>4</td>
<td>5.9</td>
</tr>
<tr>
<td>14 Physical Injury</td>
<td>4</td>
<td>5.9</td>
</tr>
<tr>
<td>15 Diabetes</td>
<td>3</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Respondents were categorized into two groups based on reported participation/no participation in any physical activity. Sleep was scored as 1 if the respondent reported sleep duration other than 7-10 hours of sleep every night and was scored as a 0 if the respondents reported sleep duration of 7-10 hours every night. In all 51 (52.6%) of the respondents reported sleep duration of 7-10 hours every night and 46 (47.4%) reported sleep duration other than 7-10 hours every night. The result on smoking indicate that 60 (62%) of the respondents reported that they “have never
smoked” or were former smokers and those that reported either that they smoke “every day” or “some days” were 38 (39%).

**Correlations between study variables**

Correlations among the study variables were estimated using the Spearman’s correlations coefficient (see Appendix M for a table of correlations among health condition variables). None of the correlations exceeded the value of 0.70 indicating that the variables were not strongly related. Depression was significantly correlated with anxiety disorder ($r_s=.628, p<0.0001$) and fatigue was significantly correlated with back pain ($r_s = .509, p< .0001$).

**Table 4. Distribution of Scores for SRH and Health Behaviors**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Univariate Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Rated Health (SRH)</td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>36 (37%)</td>
</tr>
<tr>
<td>Very good</td>
<td>37 (38%)</td>
</tr>
<tr>
<td>Good</td>
<td>22 (22%)</td>
</tr>
<tr>
<td>Fair</td>
<td>3 (3%)</td>
</tr>
<tr>
<td>Poor</td>
<td>-</td>
</tr>
</tbody>
</table>

Health behaviors

- Alcohol consumption (consumed alcohol) Yes 46 (47%)
- Physical activity (participation in any physical activity) Yes 73 (75%)
- Sleep duration ($\geq 7$ = 9 hours) Yes 51 (53%)
- Smoking
  - Current smoker 38 (39%)
  - Never smoker 50 (51%)
  - Former smoker 10 (10%)
**Missing Data**

There were few missing data in the returned questionnaires. Missing data were minimized by the presence of the principal investigator in the nursing homes while most questionnaires were completed. CNAs had an opportunity to ask for clarification in completing the questionnaire. When data on any of the items required in calculating the dependent variable was missing, the questionnaire was excluded from analyses.

**Research question-1**

Scores of SRH were dichotomized into “excellent SRH” scored as 0 (rating of excellent health status) and “other than excellent SRH” scored as 1 (i.e. very good, good and fair) to answer Research question 1: What is the relationship between CNAs health status and their ability to work?

A chi square test of independence was performed to examine the relationship between SRH and ability to work. SRH was significantly associated with ability to work $X^2 (1 \text{ df}, N = 98) = 9.8, p < .01$. Over half of the respondents (52%, $n = 32$) that rated their health as “other than excellent” had some level of impairment in ability to work compared to 19% of respondents ($n = 7$) who had rated their health as “excellent”.

Fisher’s exact test was used to explore the relationship between SRH and demographic variables: age, gender and education. Gender was significantly associated with SRH, Fisher’s Exact Test $p = .021$. Proportionally more men reported excellent health $n = 7$ (70%) than women $n = 29$ (33%). Because so few men were in the sample, no further exploration to determine sex differences was conducted.

Hypothesis 1.1: A higher self-rated health will be directly associated with impairment in ability to work among CNAs. The hypothesis was tested using simple logistic regression. Result
showed that comparing excellent SRH to those reporting less than excellent SRH, the odds for no impairment in ability to work was higher for persons reporting excellent health 4.4 (95% CI, 1.69- 11.59) than those who did not report excellent health. Hypothesis 1 was supported.

**Research question-2**

Research question-2 states, what is the relationship between CNAs health conditions and their ability to work in nursing homes? Bivariate analyses were conducted to examine the relationship between each of the 15 health conditions with the ability to work using Fisher’s exact test. Only depression was statistically significantly associated with ability to work ($p= .01$). Ten respondents (14.7 %) reported being diagnosed with depression. Eight respondents (80%) that reported being diagnosed with depression also reported some level of impairment in ability to work compared to 31 respondents (32%) that did not report being diagnosed with depression but reported some level of impairment in ability to work.

Hypothesis 2.1 stated that the number of chronic health conditions reported was associated with ability to work in CNAs. To test this hypothesis, a new variable was constructed to represent the number of chronic health conditions reported by each CNA. Logistic regression analyses did not reveal a statistically significant association between the number of chronic health conditions and ability to work. The hypothesis was not supported.

**Research question-3**

Research question-3 states, “what is the relationship between CNAs health behaviors and their ability to work?” Bivariate analyses using the chi-square test of independence were conducted with the variables of health behavior – alcohol consumption, physical activity, sleep duration and smoking with the ability to work variable in order to examine the relationship
between CNAs health behaviors and their ability to work in nursing homes. Smoking showed a significant association with the ability to work. $X^2 (1 \text{ df}, N = 98) = 4.3, p = .0388.$

Hypothesis 3.1 states that health behaviors will be associated with ability to work of CNAs. Multiple logistic regression analyses were conducted using alcohol consumption, physical activity, sleep duration and smoking as independent variables and ability to work as dependent variable. Although, the model fit statistic was not significant, smoking was significantly associated with impairment in ability to work (Table 5); as such a stepwise regression was conducted. The result from the stepwise regression conducted using the backward selection option in SAS showed that smoking significantly increased the odds for impairment in ability to work. OR = 2.8 (95% CI, 1.202 – 6.697). For persons that smoke, the odds of impairment in the ability to work was higher than for those that did not smoke. This finding provides partial support for the hypothesis that health behaviors will be associated with ability to work in CNAs. A total of 53% (n = 20) of persons that smoke had impairment in ability to work compared to 32% (n = 19) of persons that do not smoke and had impaired ability to work. No other health behavior had statistically significant association with ability to work.

**Research question-4.**

Research question 4 states, “Is there an association among CNAs health status, health conditions, health behaviors and ability to work in nursing homes?” Multivariable logistic regression analyses were conducted with SRH, health conditions and health behaviors as independent variables and ability to work as dependent variable. Although the overall model was not statistically significant, SRH and depression were statistically significant. The analysis showed that a report of excellent SRH was associated with lower odds of impairment in ability to work, OR=3.7 (95% CI, 1.1 -12.1). A report of depression was associated with impaired ability
to work, OR = 17.9 (95% CI, 1.07 – 297.7). The result from a stepwise regression conducted using the backward selection option in SAS showed that reporting excellent health significantly increased the odds for not having any impairment in the ability to work, OR= 3.7 (95% CI, 1.35 – 9.86). And depression significantly increased the odds for impairment in ability to work, OR = 5.8 (95% CI, 1.1 - 30.1).

Table 5. Regression of Adverse Health Behaviors and Ability to Work

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratios, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol (non vs. excess amount)</td>
<td>1.608</td>
</tr>
<tr>
<td></td>
<td>0.545</td>
</tr>
<tr>
<td></td>
<td>4.745</td>
</tr>
<tr>
<td>Alcohol (recommended amount vs. excess)</td>
<td>1.054</td>
</tr>
<tr>
<td></td>
<td>0.285</td>
</tr>
<tr>
<td></td>
<td>3.901</td>
</tr>
<tr>
<td>Physical activity (any vs. no physical activity)</td>
<td>0.574</td>
</tr>
<tr>
<td></td>
<td>0.213</td>
</tr>
<tr>
<td></td>
<td>1.549</td>
</tr>
<tr>
<td>Sleep (7-9 hours vs other than 7-9hours)</td>
<td>1.013</td>
</tr>
<tr>
<td></td>
<td>0.425</td>
</tr>
<tr>
<td></td>
<td>2.412</td>
</tr>
<tr>
<td>Non Smokers vs. smokers</td>
<td>3.304</td>
</tr>
<tr>
<td></td>
<td>1.327</td>
</tr>
<tr>
<td></td>
<td>8.223*</td>
</tr>
</tbody>
</table>

*p=0.01

Hypothesis 4.1 states that SRH in CNAs will be associated with the reported number of health behaviors. To test for this hypothesis a variable with the count of health behaviors (THB) was constructed. The variable was categorized as no health behavior reported, one health behavior reported, and two or more health behaviors reported. Logistic regression was conducted with THB as independent variable and SRH as dependent variable. Results showed that persons who reported no adverse health behaviors had higher SRH than persons who reported two or more adverse health behaviors OR= 5.14 (95% CI, 1.472 – 17.972) for a significant association. The hypothesis was supported.
Chapter Summary

In this chapter, findings from the study were reported. The chapter presented the demographic data and characteristics of the study sample and compared it with a national sample and also presented the scores on impairment in ability to work in the study sample. The results of the relationships between the independent variables and the dependent variable were reported. Results show that SRH, depression and smoking were significantly associated with ability to work. Findings supported the following hypotheses: hypothesis 1.1 which states that a higher self-rated health will be associated with ability to work and hypothesis 4.1 which states that SRH will be associated with the reported number of health behaviors of CNAs were supported. In chapter 5, the summary of the findings, implications for practice, limitations and suggestions for future studies and conclusion will be presented.
CHAPTER 5: DISCUSSION

This chapter provides a summary of the findings, conclusion and implications of the findings. The chapter also presents a discussion on the limitations of the study and makes recommendations for future research. Evidence exists that health status, health conditions and health behaviors are individually and collectively associated with the ability to work (Schultz & Edington, 2007). Thus the aim of this study was to describe the health status, health conditions and health behaviors of CNAs employed in nursing homes. The study examined relationships among health status, diagnosed health conditions, and health behaviors with the ability to work among CNAs. A cross-sectional design was used to obtain data for this study. Data were collected using self-reported pencil and paper questionnaires from CNAs employed in five nursing homes located in North Carolina between December 2013 and January 2014.

Summary

CNAs employed in nursing homes located in North Carolina form the population for this study. CNAs were eligible to participate in the study if they were employed at nursing homes that participated in Medicare and Medicaid programs, were not embedded in an acute care setting or located at a CCRC, and are located within a 50-mile radius of zip code 28173. Thirty-eight nursing homes met the stipulated eligibility criteria.

Invitations to allow CNAs to participate in the study were randomly sent to nursing home administrators in waves of six; five nursing home administrators (21%) granted permission to use their facility for this study. There was no prior information about nursing home
administrators’ willingness to grant permission for their facility staff to participate in research surveys. The nursing homes that participated in the study were similar to the other nursing homes in North Carolina in bed size, ownership structure and payment source.

The response rate of CNAs was 88.3% which was on the high end of the published in response rate ranges for CNAs who worked in nursing homes (Lapane et al., 2007). CNAs that participated in this study showed interest in completing their questionnaire and many of them, after completing their survey, informed the principal investigator that they made telephone calls to remind their peers both on duty and not on duty about the study to encourage them to participate. Although only light refreshment, a penlight and pencil were provided to the CNAs, they verbalized “gratitude” for someone “remembering CNAs and bringing them gifts”. In the other nursing homes, CNAs said that they were pleased that a study was being conducted exclusively about them.

The demographic profile and characteristics of the study sample was comparable with the national demographic profile of CNAs working in nursing homes with regards to gender, marital status, Hispanic origin and average age (Probst, Baek, & Laditka, 2009; Squillace et al., 2009). The study sample had a higher distribution of African-American/Black (56%) respondents than a national sample (38.7%) and a lower distribution of Whites (37.8%) in the study sample than a national sample (53.4%). Based on the comparison between these profiles, findings from this study may be generalizable to the general population of CNAs.

A majority of the CNAs (70%) in this study have attended college for either a two year associate degree program or for a baccalaureate degree compared with 24% in the national sample (Squillace et al., 2009). This is a surprise finding as most literature on CNA studies indicates that CNAs in general have a 12th grade education (Bureau of Labor Statistics, 2014;
Squillace et al., 2009). The educational level of the CNAs in this study may be a reflection of the metropolitan environment of the study locations or could possibly be an indicator that people with college education are working as CNAs. Recent studies suggest that the increase in foreign born new immigrants working as CNAs may be responsible for the increase in educational levels seen in CNA workforce (Khatutsky, Weiner, Anderson, Akmerova, & Jessup, 2011; Khatutsky, Wiener, & Anderson, 2010). Studies have suggested that foreign born persons working as CNAs tend to have a higher education level than their American-born counterparts (McCabe, 2012). This study did not ask for the respondents place of birth, therefore it cannot be determined if any respondents were foreign born.

Prior to this study, no known studies exclusively examined CNAs employed in nursing homes about their ability to work. Ability to work is a reflection of the productivity of the employee and the organization. In this study, as well as in literature on health and productivity management, impairment in ability to work is conceptualized as health-related work productivity loss (Beaton et al., 2009; Escorpizo, 2008). Ability to work is calculated from report on the number of hours worked in the past seven days, self-report of limitations in the amount of work accomplished at work because of a health condition and health-related absenteeism in the past seven days (Bedrosian et al., 2012; Reilly Associates, 2002). Approximately 40% (n=39) of the respondents to the survey had a WPAI-GH score of 1 or greater, indicating at least some level of impairment in their ability to work. This finding suggests the possibilities that CNAs who reported impairment in ability to work may not be able to provide the appropriate quality and quantity of care needed by residents. Working with impaired ability to work could mean working more slowly and accomplishing less than is normal for that individual (Gucer et al., 2009). Although nursing homes do not measure the productivity of their employees, they do measure
indicators such as the use of physical restraints, percentage of residents with urinary catheters, and number of low-risk residents that have developed pressure ulcers, to determine the overall quality of care that is being provided in the nursing home (AMDA, 2014). There is no evidence that impairment in ability to work plays a role in influencing quality indicators; however quality indicators may be affected when CNAs who have impaired ability to work do not complete their assigned resident care tasks as expected (Castle & Ferguson-Rome, 2014). For example, if a CNA does not attend to tasks such as turning and positioning of the nursing home resident who requires this level of care in a timely manner because of impairment in ability to work, then the resident’s skin could breakdown and pressure ulcers form (Krapfl & Gray, 2011).

Hypothesis 1.1 stated that a higher self-rated health was directly associated with ability to work. This hypothesis was supported by the strong association shown between SRH and ability to work and that excellent SRH was associated with no impairment in the ability to work. This is consistent with published literature in health and productivity management which shows that SRH is associated with presenteeism and health-related absenteeism (both components of ability to work). In a cohort study, researchers found that persons who reported more than seven days of presenteeism had higher odds for poor SRH compared to those who reported no presenteeism \((OR=5.95; 95\% CI 4.98 – 7.12)\) after adjustment for confounders. Low self-rated health also was associated with presenteeism at baseline and subsequently at 18 and 36 months follow-ups (Taloyan et al., 2012).

Hypothesis 2.1 stated that the number of chronic conditions was associated with ability to work. This hypothesis was not supported. Published literature indicates that the number of chronic health conditions and poor SRH were strongly associated with ability to work and poor performance at work. A possible explanation for the non-significant association was that only
information about health conditions that were diagnosed or confirmed by a healthcare provider was collected, thus CNAs with undiagnosed health conditions were not included. In addition, it may not be the number of chronic health conditions but the type and/or severity of the condition that has an impact on ability to work. Few CNAs had diagnosed psychological conditions and evidence exists that psychological complaints such as depression were associated with low ability to work, OR=2.62 (95% CI, 2.33 – 2.93) (van den Heuvel et al., 2010).

Fifteen health conditions that are considered prevalent and having an impact on presenteeism and absenteeism (Goetzel et al., 2004; Holden et al., 2011; Klachefsky, 2012) were analyzed in this study. High blood pressure was the most prevalent affecting 32.4% (n = 32) of the respondents while diabetes was the least prevalent affecting only 4% (n=3) of the respondents. The prevalence of high blood pressure among the respondents is similar to that of the U.S. adult population affecting approximately 30.6% between 2008 and 2010 (Mendes, 2011). The low prevalence of diabetes in this sample was a surprising finding as its prevalence in the U.S. adult population is 11.3% in 2010 (Centers for Disease Control and Prevention, 2012). One reason for the low prevalence could be that the questionnaire addressed diagnosed conditions. It may be that the respondents have not been diagnosed or in pre-clinical state (the average age of the study sample is 37.2 years and the average age at diagnosis of diabetes in the U.S. adult population in 2011 was 54 years) (Centers for Disease Control and Prevention (CDC), 2013). Given the proportion of respondents who according to their BMIs are overweight and obese, both risk factors for diabetes, concern about preventing and early detection of diabetes in CNAs should be raised.

A discrepancy also existed between obesity reported by respondents (n=15, 22%) and BMI calculated from self-reported height and weight (n =36, 37%). This discrepancy could be
due to limited or poor access to health care, poor recall or reluctance to disclose a diagnosis. Information about access to care was not collected in this study. The discrepancy could also be due to the underappreciating of obesity in clinical practice, where health care practitioners fail to identify obesity even when data obtained from the patient suggests the condition exists (Ma, Xiao, & Stafford, 2009).

Although only 10 respondents reported diagnosed depression, its presence was significantly associated with impairment in ability to work, OR=0.17 (95% CI, 0.033-0.905). The prevalence of depression was comparable to that of the U.S. affecting approximately 9.1% of the adult population in 2008 (Gonzalez et al., 2010).

Published literature in health and productivity management indicate that studies conducted among other work groups show that for employees with mental health conditions such as depression, the largest cause of impairment in ability to work was presenteeism, and this cost employers $247.11 per employee per year in 2012 US dollars (Goetzel et al., 2004; Klachefsky, 2013). Because ability to work has not been studied in CNAs who work in nursing homes, only impairment or no impairment in ability to work were examined in this study. Refining the level of impairment in the ability to work is necessary to better understand productivity of CNAs and the effect on quality of care provided. The findings suggest that administrators of nursing homes should recognize that impairment in ability to work may be a widespread problem among CNAs. Thus, to assure the highest possible care for older adults in nursing homes, it may be a necessary step to monitor impairment in the ability to work among CNAs. For example, CNAs who have depression or anxiety disorders may not exhibit physical symptoms and so continue to come to work but, mental health conditions are associated with significant distress and impaired functioning (Loy, 2013). Therefore, administrators and other nursing home managers might
monitor CNAs for depression to assure that CNAs work in nursing homes with the greatest possible health and ability to work.

All the other chronic health conditions did not show any significant association with ability to work. The possible reasons for this finding include under diagnoses, lack of access to health care, and lack of symptoms. CNAs with chronic health conditions may learn to adapt over-time to limitations in functioning to mitigate effects of health conditions on the ability to work.

Smoking was found to be associated with ability to work in CNAs in the study. Proportionally more smokers had impaired ability to work as compared to non-smokers. Thus hypothesis 3.1: health behaviors will be associated with the ability to work of CNAs in nursing homes was supported. This finding is consistent with published literature which indicated that smokers were 28% more likely to have presenteeism than non-smokers (Merrill et al., 2012). It is not clear how smoking affects ability to work. Smokers may take more breaks than non-smokers and therefore spend less time working. No literature on smoking and its effects on CNAs ability to work was located. One study found that smokers tended to have more health-related absences (9.7 days per year more than non-smokers) from work as a result of having poorer health than non-smokers (Lundborg, 2007).

Hypothesis 4.1 stated that SRH is related to the number of reported health behaviors, the study shows that the number of health behaviors and it was supported by the study findings. For example, the odds ratio for less than excellent SRH was higher for persons reporting two or more health behaviors than for persons that reported one health behavior. This finding is consistent with published literature in health and work productivity that health behaviors are associated with SRH (Taloyan et al., 2012).
Logistic regression analyses using SRH, health conditions and health behaviors as independent variables and ability to work as dependent variable was not significant. However, the result from a stepwise regression showed that reporting excellent health significantly increased the odds for no impairment in the ability to work while depression significantly increased the odds for impaired ability to work. Thus, SRH and the presence of diagnosed depression among CNAs are significantly associated to their ability to work.

**Implications of the study for nursing management and administration**

Impairment in ability to work in CNAs could be costly to the employer and nursing home residents. For instance presenteeism alone costs U.S. employers about $260 billion per year in 2003 U.S. dollars (Davis et al., 2005). Findings from this study indicate that approximately 40% of respondents (n=39) had a WPAI-GH score of 1 or greater, indicating at least some level of impairment in their ability to work. In addition, CNAs self-rating of their health at less than excellent, having diagnosed depression and smoking are associated with impairment in ability to work. This could affect the quality of care provided to nursing home residents. It could also mean that overall nursing homes operations costs are affected as well. For example management bears the financial burden of wage replacement payments associated with health-related absenteeism and for work productivity loss (Parry, 2014).

CNAs provide about 80% of the direct care that residents of nursing homes receive; their health and ability to work should be a priority for nursing management and nursing home administrators. A recent study indicated that absenteeism is higher among CNAs than the national average for all workers (Castle & Ferguson-Rome, 2014). Absenteeism is one of two components that contribute to impairment in ability to work. There appears to be a need to develop a proactive prevention focused approach to help improve and maintain the health of
CNAs. Workplace health promotion programs can reduce ability to work impairment and medical costs. As evidenced by a randomized controlled trial that evaluated the effectiveness of a health promotion program in the University of Virginia Health System and General Clinical Research Center, the researchers found that a health promotion program focusing on lifestyle change in employees who had diabetes and were overweight or obese reduced the risk of lost work days by 64.3% compared to those receiving usual medical care (Wolf et al., 2009).

Published literature indicates that the tasks associated with CNAs are physically and emotionally demanding. Results from this study show that depression in CNAs is associated with impairment in ability to work. Nursing management should be cognizant of the emotional burden of CNA work and implement stress-reduction classes or programs to increase emotional support among CNA workforce. Programs on healthy eating, and smoke cessation and encouraging employees to engage in physical activity can benefit both the employer and the employees. Employees should be encouraged to go for 10-minute walks during their lunch breaks, and the nursing home management could introduce interventions to alleviate stress like playing soft music from speakers located overhead in areas that staff frequent, dimming of some lights in some parts of the nursing homes during peak periods of activities and introducing and encouraging staff to take short breaks to stretch and relax throughout their work shift. These strategies are easy and inexpensive to implement and could lead to a low stress culture in the nursing home.

Nursing management and nursing home administrators are in a position to create and maintain friendly social work environments that focus on improving the morale and engagement of employees. This could be done by establishing and advocating the implementation of core behaviors aimed at encouraging friendship among staff, such as use of first names, encouraging
staff day outs and creating periods that can be termed a social/happy hour within the work week where staff could hold casual conversations about themselves not just the work. A prospective study of a program designed to create “nurse-friendly” hospitals found that retention rates of nurses increased (15%) from baseline to year-3 and improved in nurses’ appraisal of the work environment (Meraviglia et al., 2009). Health promotion programs should also include the management of chronic health conditions and biometric health screenings.

Nursing management and the nursing home administrator should develop strategies for assisting CNAs in taking responsibility for their own health. This could include providing the resources such as information on health care, health behavior management and other health related programs individual CNAs could benefit from, such as a Yoga club in the neighborhood and encouraging CNAs to stay at home when they are sick or feeling depressed.

The CNAs in this study reported educational levels that exceed the reported national educational level for CNAs. About 70% of respondents reported that they had a college degree, some college or a two year college degree. Increase in the educational level of CNAs employed in nursing homes could facilitate a better understanding of resident care goals among CNAs and creating health goals for themselves. Studies indicate that more educated people typically engage in healthier behaviors (Clark & Royer, 2010; Cowell, 2006).

**Healthcare and workforce policy implications**

Providing health insurance coverage to all CNAs could encourage their use of the preventive care services that are available within their community, it could also lead to early diagnosis of health conditions that would otherwise dramatically increase the cost of care if not diagnosed early. The Patient Protection and Affordable Care Act (PPACA) of 2010, requires that everyone should have affordable basic healthcare, the act provides mandate that requires
insurance companies to provide coverage at the same rate regardless of pre-existing conditions. Employers who provide health care insurance to all employees should be able to benefit from the controlled costs, the tax benefits associated with providing health insurance coverage for employees (Internal Revenue Service, 2014) and improved wellness among its staff. The CNAs would also have easier access to health care.

Policies regarding establishing Employee Assistance Programs (EAP) in nursing homes should be encouraged to assist employees with challenges that affect their jobs such as excessive alcohol consumption, substance abuse, mental health and emotional problems among other personal issues. EAPs help employers address a variety of employee problems and proactively manage issues that could lead to health-related absenteeism, physical, and mental health issues or declining morale among employees (Rothermel, Slavit, Finch, & Center for Prevention and Health Services, 2008)

Limitations of the study

This study is a cross-sectional study design, as such, the findings cannot be used to make any causal inferences about the relationship among the self-rated health, health behaviors and health conditions measured (modifiable health risks) (causes) with ability to work (effect). Responses given by participants to the questionnaire items could have been affected by a recent event of illness or an exacerbation of a chronic condition, thereby introducing bias to the study findings.

The study design is a descriptive correlational study with respondents drawn from a convenience sampling of nursing facilities based on proximity to one zip code in North Carolina. Though the study sample is comparable in certain aspects to the national sample, findings from the study should be interpreted with caution as the sample of CNAs were drawn from five
nursing homes out of a possible 38 nursing homes located in a large metropolitan area in the southeast. The respondents’ perceived health status may be influenced by their access to health care and other socio-economic situations that may be predominant in this geographical area.

Another limitation of the study was the use of a novel conceptual framework. To increase its usefulness, the conceptual frame should be modified to include the time from diagnosis and severity of chronic health condition. The conceptual framework also needs to address for the short and long-term effects of health conditions on ability to work. It is possible that impaired ability to work may not be evident for months or years after the onset of the health condition. Other limitations relate to the instrument - the WPAI-GH which provided the basis for measuring ability to work. This instrument had not been used with CNAs and it is not clear if this is the most appropriate measure to use with CNAs, and the analyses were limited to only determining the presence or absence of impairment in the ability to work. Cut-off scores to indicate the level of impairment in ability to work would be helpful to the employee and employer and future research should focus on identifying and understanding varying levels of impairment in ability to work in this population.

There may be some concern regarding the use of self-reported data, in obtaining information regarding absenteeism rather than employee records, however, self-report rather than other measures have become the accepted standard in health and productivity management studies. This study had a low willingness of NHAs to allow the principal investigator contact and administer questionnaires to CNAs working in their facilities. Requesting access to employee records would be problematic in obtaining information about employed CNAs.
Recommendations for future research

The findings from this study suggest that further cross-sectional quantitative design studies need to be conducted with a larger sample to further explore the association of self-rated health, health conditions and health behaviors and the ability to work in CNAs employed in nursing homes. The sampling should include a wider geographical spread than five nursing homes in North Carolina. Researchers will need to actively solicit the cooperation of many nursing home administrators, who appear to control access to CNAs in the workplace.

Ability to work was measured using a tool that had not been previously used in the study population as such there was no basis for comparison of how well the tool measured ability to work in CNAs; the WPAI-GH used a look back period of seven days; this timeframe may be too short to capture the full impact of impairment in ability to work and productivity loss. A longer look back period (of 14 days or 30 days) could potentially capture variation in the levels of ability to work among CNAs.

The prevalence of impairment in ability to work found in this study suggests the need for studies that will explore how impairment in the ability to work affects resident care and the overall operating costs in nursing homes. Such studies that quantify the impact of impairment in the ability to work in monetary units will also allow for evaluating the effectiveness of health promotion programs designed to reduce the practice of behaviors that do not promote health and presenteeism in employees.

Although the published literature in work productivity management suggests that health conditions and health behaviors affect the ability to work, not all health conditions and not all health behaviors demonstrated significant association with ability to work in this study. There is
need for research to more fully understand how ability to work in CNAs is associated with these health-related variables.

**Summary and Conclusion**

Approximately 40% of CNAs in this study reported a WPAI-GH score of 1 or greater, indicating at least some level of impairment in their ability to work. This finding suggests that impairment in ability to work may be a significant problem among CNAs employed in nursing homes. Impairment in ability to work could have serious financial implications for nursing homes as they do not presently measure its prevalence or measure work productivity loss. This finding highlights the importance of refining measures of the ability to work and the associated work productivity loss in nursing homes. Nursing homes should consider looking beyond attendance or non-attendance at work of its CNAs as important in measuring ability to work.

This study indicated that self-reported health status, depression and smoking among CNAs affect ability to work. These are factors that are potentially modifiable. Developing policies that will encourage investment in the health care of CNAs by their employers could serve both as basis for improving the health of the CNAs and the improving the ability to work.

The hypotheses regarding health conditions being associated with ability to work and the number of health behaviors being associated with ability to work were partially supported in this study. These findings suggest that continued research is needed to explain the relationship among health conditions and health behaviors and ability to work in CNAs. Despite the limitations of this study, it has contributed to the literature on CNA ability to work by highlighting the prevalence of the condition. The study also illustrates the importance of SRH on ability to work; it was found to be significantly associated with the ability to work.
Finally, CNAs in nursing homes cannot guarantee to remain in “good” health and always function at the optimal level. This study provides support for continued research in health-related work productivity loss in nursing homes, developing interventions to prevent or ameliorate the impact of factors that negatively impact ability to work of this essential workforce in long-term care.
APPENDIX A: ABILITY TO WORK SURVEY

Ability to work and its relationship with health status and health behaviors in nursing assistants employed in North Carolina nursing homes

This survey will take about 20 minutes to complete

IRB# 13-0906
SURVEY

Section 1

(The following section is about your job. Please complete every question as accurately as you can. Please place a check (✓) to indicate the response that is best for you.)

1 How long have you worked as a nursing assistant?
   a) ___ 0 - 6 months
   b) ___ Over 6 months – 1 year
   c) ___ Over 1 – 3 years
   d) ___ Over 3 - 5 years
   e) ___ Over 5 years

2 How many full time or part time jobs do you currently have now?
   (Please include all your jobs)
   a) ___ 1
   b) ___ 2-4
   c) ___ 5-7
   d) ___ More than 7

3 In a typical week, how many hours do you work as a nursing assistant in a nursing home?
   a) ___ 1 – 15 hours
   b) ___ 16 – 30 hours
   c) ___ 31 – 45 hours
   d) ___ Over 45 hours
4 In a typical week, how many hours do you work at all jobs?
   a) ___ 1 - 15 hours
   b) ___ 16 – 30 hours
   c) ___ 31 – 45 hours
   d) ___ Over 45 hours

5 Do you work as a nursing assistant at more than one facility?
   a) Yes ___ IF YOU ANSWERED YES SKIP QUESTION 6
   b) No _____ IF YOU ANSWERED NO ANSWER QUESTION 6

6 If you have more than one job and answered NO to question 5 above, what other type of job(s) do you hold?

_________________________________ (write in your response)
Section 2

This question is specific to your overall general health. Please disregard any recent episode of sickness when you make this assessment. If you are not sure about how to answer, please give the best answer you can. Place a check mark (✓) in the box that is most appropriate for you.

In general, how would you rate your overall health?

Excellent Very Good Good Fair Poor
5  4  3  2  1

8 The following is a list of some health conditions. Place a check mark (✓) on all the health conditions that you have been told by a doctor or nurse that you have or that you have received treatment for in the past. Place a check mark in all the boxes where it applies to you on each row.

<table>
<thead>
<tr>
<th>Own Opinion</th>
<th>Doctor/nurse Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Allergy</td>
<td></td>
</tr>
<tr>
<td>2. Anxiety disorder</td>
<td></td>
</tr>
<tr>
<td>3. Arthritis</td>
<td></td>
</tr>
<tr>
<td>4. Back/neck pain</td>
<td></td>
</tr>
<tr>
<td>5. Chronic pain</td>
<td></td>
</tr>
<tr>
<td>6. Depression</td>
<td></td>
</tr>
<tr>
<td>7. Diabetes</td>
<td></td>
</tr>
<tr>
<td>8. Fatigue</td>
<td></td>
</tr>
<tr>
<td>#</td>
<td>Own Opinion</td>
</tr>
<tr>
<td>----</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>9</td>
<td>Heart Disease</td>
</tr>
<tr>
<td>10</td>
<td>High blood pressure</td>
</tr>
<tr>
<td>11</td>
<td>High cholesterol</td>
</tr>
<tr>
<td>12</td>
<td>Insomnia/sleep problems</td>
</tr>
<tr>
<td>13</td>
<td>Obesity</td>
</tr>
<tr>
<td>14</td>
<td>Physical Injury</td>
</tr>
<tr>
<td>15</td>
<td>Stress/Other Emotional disorder</td>
</tr>
<tr>
<td>16</td>
<td>Not listed above (write in)</td>
</tr>
</tbody>
</table>

Please Go to the Next Page…
Section 3
This section is about various aspects of your lifestyle. Please read each question carefully before responding. Place a check (✓) on the response that is most appropriate for you. Please answer every question as accurately as possible. This next 3 questions talks about alcohol use. One drink of alcohol is equivalent to a 12-ounce beer (One can or bottle of beer), a 5-ounce glass of wine, one can or bottle of wine cooler, one cocktail or a drink with one shot of liquor.

9 During the past 30 days, how often did you have a drink containing alcohol such as beer, wine, wine cooler, a malt beverage or liquor? (Please place a check (✓) on the answer that is most applicable to you).
   a) ___ Never (Skip to instruction just before question 12)
   b) ___ Once a month or less
   c) ___ 2-4 times a month
   d) ___ 2-3 times a week
   e) ___ 4 or more times a week

10 During the past 30 days, how many drinks containing alcohol did you have on the average on a typical day when you drink? (Please place a check (✓) on the answer that is most applicable to you)
   a) ___ 1-2 drinks
   b) ___ 3-4 drinks
   c) ___ 5-6 drinks
   d) ___ 7-9 drinks
   e) ___ 10 drinks or more
Considering all types of alcoholic beverages, how many times during the past 30 days, did you have four (4) or more drinks in any one occasion? (Please place a check (✓) on the answer that is most applicable to you)

a) ___ Never  
b) ___ Less than once in a month  
c) ___ About once a month  
d) ___ About Weekly  
e) ___ More than once a month but less than weekly  
f) ___ 2 - 4 times a week  
g) ___ Every day or nearly every day

Please write your response in the space provided in the next two (2) questions)

12 What is your height (without shoes on)? ______ Feet ______ Inches (Please round to nearest inch)

13 How much do you weigh? ______ pounds (Lbs.) (Please round to the nearest pound)

We would like to know about your physical activity. The questions below are about the time you spent being physically active in the past 30 days. They include questions about your activities when you are not working. These are activities you did as part of your house and yard work and in your spare time for recreation, exercise or sport. Please answer each question even if you do not consider yourself an active person.
“Now, thinking about the physical activities you do (when you are not working).
In a usual week, do you do any activities for at least 10 minutes at a time, such as brisk walking, bicycling, vacuuming, gardening, dancing, or running, aerobics, heavy yard work, hiking uphill, jumping rope, swimming laps, or anything else that causes small or large increases in breathing or heart rate?”
Yes ______ No ______ (SKIP TO QUESTION 17 IF YOU ANSWERED NO)

During the past 30 days, on how many days per week did you spend at least 10 minutes at a time on any of the activities mentioned above? __________ days

On days when you do physical activities for at least 10 minutes at a time, how much total time per day did you usually spend doing these activities?
______________ minutes

During the past 30 days, on average how many hours of sleep do you usually get in a 24-hour period? Think about the time you actually spend sleeping or napping, not just the amount of sleep you THINK you should get. Please place a check mark (✓) to indicate your answer.

a) _____ 1 – 3 hours
b) _____ 4 -6 hours
c) _____ 7 – 10 hours
d) _____ 11- 13 hours
e) _____ More than 13 hours

Place a check (✓) on the response that is most appropriate for you in questions 18 – 20.

Please answer every question honestly.
18  Which of the following best describes your smoking status?
   a)  ____ I smoke every day
   b)  ____ I smoke some days
   c)  ____ I don’t smoke now, but I used to smoke
   d)  ____ I have tried smoking a few times
   e)  ____ I have never smoked (Please skip to section 4)

19  Have you smoked at least 100 cigarettes in your entire life?  *(Note: 5 packs = 100 cigarettes)*
   a)  ____ Yes
   b)  ____ No
   c)  ____ Don’t know/not sure

20  How long has it been since you last smoked a cigarette, even one or two puffs?
   a)  ____ 0 - 1 month (Less than 1 month ago)
   b)  ____ 1 - 3 months (Over 1 month but less than 3 months ago)
   c)  ____ 3 - 6 months (Over 3 months but less than 6 months ago)
   d)  ____ 6 – 12 months (Over 6 months but less than 1 year ago)
   e)  ____ 1 year - 5 years (Over 1 year but less than 5 years ago)
   f)  ____ 5 years or more
Section 4

The following questions ask about how your health problems affect your ability to work and perform regular activities. By health problems, we mean any physical or emotional problem or symptom. Please fill in the blanks or circle a number, as indicated.

The next questions are about the past seven days, not including today.

21 During the past seven days, how many hours did you miss from work because of your health problems? Include hours you missed on sick days, times you went in late, left early, took extended lunch breaks, etc., because of your health problems. Do not include the time you missed to participate in this study.

______________ HOURS

22 During the past seven days, how many hours did you miss from work because of any other reason, such as holiday time, vacation, or time off to participate in this study

______________HOURS

23 During the past seven days, how many hours did you actually work?

______________HOURS (IF “0”, SKIP TO QUESTION 25)

24 During the past seven days, how much did health problems affect your productivity while you were working?

Think about days you were limited in the amount or kind of work you could do, days you accomplished less than you would like, or days you could not do your work as carefully as usual. If health problems affected your work only a little, choose a low number. Choose a high number if health problems affected your work a great deal on the scale of 0-10 below.

85
Consider only how much health problems affected productivity while you were working.

Please circle a number ____________________________________

0 1 2 3 4 5 6 7 8 9 10

25 During the past seven days, how much did health problems affect your ability to do your regular daily activities, other than work at a job?

By regular activities, we mean the usual activities you do, such as work around the house, shopping, childcare, exercising, studying, etc. Think about times you were limited in the amount or kind of activities you could do and times you accomplished less than you would like. If health problems affected your activities only a little, choose a low number. Choose a high number if health problems affected your activities a great deal on the scale of 0-10 below.

Consider only how much health problems affected your ability to do regular daily activities, other than work at a job.

Please circle a number ____________________________________

0 1 2 3 4 5 6 7 8 9 10

26 Assume that your ability to work at its best has a value of 10 points. How many points would you give your current ability to work? (0 means that you currently cannot work at all) Please circle the most appropriate answer for you on the scale below.
Please circle a number ____________________________________________

0 1 2 3 4 5 6 7 8 9 10

completely unable to work  work ability at its best

27 According to your present state of health, do you believe that you will be able
to do your current job two years from now? Please check (✓) your answer

A. unlikely _____  B. not sure ______  C. relatively sure _______

This portion of the questionnaire concerns you as an individual. Kindly respond by
marking the response most appropriate to you.

28 What is your age? ________________ (in years)

29 Are you Female _______  Male _______

30 How many children under 18 years old do you have living in your
household? ________________ Children

31 What is your marital status?

a) _____ Married

b) _____ Separated

c) _____ Divorced

d) _____ Widowed

e) _____ Never been married


32 **What is the highest grade or level of school that you have completed?**
   a) ____ 8th grade or less
   b) ____ Some high school, but did not graduate
   c) ____ High school graduate/ GED
   d) ____ Some college or 2-year degree
   e) ____ College degree

33 **Are you of Hispanic Origin** _______ Yes _______ No

34 **What best describes your race/ethnicity?** *(Choose all that apply)*
   a) ______ African American or Black
   b) ______ American Indian or Native Alaskan
   c) ______ Asian
   d) ______ Pacific Islander
   e) ______ White
   f) ______ Other (Please specify ____________________________)

THIS IS THE END OF THE SURVEY.

PLEASE PUT THE COMPLETED SURVEY IN THE DROP BOX LOCATED AT...

YOU CAN ALSO MAIL IT IN THE ADDRESSED AND STAMPED ENVELOPE IN YOUR
PACKAGE OR RETURN DIRECTLY TO THE INVESTIGATOR.

THANK YOU FOR YOUR PARTICIPATION
APPENDIX B: IRB APPROVAL FOR STUDY

IRB Approval

To: Obi Melekwe
School of Nursing

From: Non-Biomedical IRB

Approval Date: 10/22/2013
Expiration Date of Approval: 10/21/2014

RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)

Submission Type: Initial

Expedited Category: 7.Surveys/interviews/focus groups

Study #: 13-0906

Study Title: Ability to work and its relationship with health status, and health behaviors in
nursing assistants employed in North Carolina nursing homes

This submission has been approved by the IRB for the period indicated
It has been determined that the risk involved in this research is no more than minimal.

Study Description

Purpose: To describe the health status, health conditions and health behaviors among
nursing assistants in nursing homes and to investigate the relationships that may exist among
health status, health conditions, and health behaviors, and the ability to work among nursing
assistants employed in nursing homes.
Participants: Nursing assistants in nursing homes located in NC and within 50 mile radius of zip code 28173

Procedures (methods): This is a cross-sectional, descriptive correlational study

Investigator’s Responsibilities:

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator’s responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

Your approved consent forms and other documents are available online at http://apps.research.unc.edu/irb/irb_event.cfm?actn=info&irbid=13-0906.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented. Any unanticipated problem involving risks to subjects or others (including adverse events reportable under UNC-Chapel Hill policy) should be reported to the IRB using the web portal at http://irbis.unc.edu.

Researchers are reminded that additional approvals may be needed from relevant “gatekeepers” to access subjects (e.g., principals, facility directors, healthcare system).

This study was reviewed in accordance with federal regulations governing human subjects research, including those found at 45 CFR 46 (Common Rule), 45 CFR 164 (HIPAA), 21 CFR 50 & 56 (FDA), and 40 CFR 26 (EPA), where applicable.

CC:
Mary Palmer, School of Nursing

IRB Informational Message—please do not use email REPLY to this address
APPENDIX C: LETTER OF INVITATION TO PARTICIPATE IN STUDY

IRB# 13-0906

December 6, 2013

Dear Ms. xxx,

My name is Obi Melekwe. I am a doctoral student at the School of Nursing, UNC at Chapel Hill. I am conducting a research study and am asking for your help.

The purpose of the study is to describe how nursing assistants employed in nursing homes rate their health, their health conditions and health behaviors and to investigate the relationship that may exist among the self-rated health, health conditions, and health behaviors and ability to work among nursing assistants in nursing homes. The health behaviors of interest include physical activity, use of alcohol or use of cigarettes. Ability to work is measured as rated by the nursing assistant and by recall of their attendance.

If you agree for your facility to participate in this study, I will be asking nursing assistants to complete a survey one time. It will take about 20-25 minutes of their work time to complete the survey. Nursing assistants that agree to participate will be asked to sign a consent form. I will provide them with a questionnaire and instructions on how to complete and return the survey questions.

About 300 nursing assistants from different nursing homes will take part in this study.
I have selected your nursing home to take part in this study because you are located within driving distance of my home. Only nursing homes and nursing assistants that agree to participate will be included in this study.

Your participation in this study is voluntary and answers are confidential. I will not be reporting any individual responses; rather, I will be combining and aggregating all responses.

I recognize that my study relies on volunteers like you who are willing to offer your valuable time and that of your staff to answer some questions. I want to thank you in advance for participating in this study.

Thank you!

Sincerely,

Obi Melekwe,

Doctoral Student, University of North Carolina at Chapel Hill
### APPENDIX D: RECRUITMENT STEPS

**TAILORED TO EACH NURSING HOME**

<table>
<thead>
<tr>
<th>Activity description</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mail letter of invitation to participate to nursing home administrator using first class postage</td>
<td>Day 1</td>
</tr>
<tr>
<td>2. Schedule to meet with administrator and director of nursing (DON)</td>
<td>Day 3-5</td>
</tr>
<tr>
<td>3. Meeting with nursing home administrator and director of nursing and permission to use facility and designate a location for the drop box</td>
<td>Day 4-5</td>
</tr>
<tr>
<td>4. Post posters and distribute flyers advertising study</td>
<td>Day 4-5</td>
</tr>
<tr>
<td>5. Meet with potential participants: (in small groups) provide light refreshment such as assortment of fruits, soda, ice tea, cookies, chips and or pizza</td>
<td>Day 6-10</td>
</tr>
<tr>
<td>- Meet at 11am &amp; 2pm (or as determined by NH administrator and DON)</td>
<td></td>
</tr>
<tr>
<td>- Meet at 9.30pm</td>
<td></td>
</tr>
<tr>
<td>- Meet at 12.00am.</td>
<td></td>
</tr>
<tr>
<td>- (total of 6-9 meetings over 2-3 days)</td>
<td></td>
</tr>
<tr>
<td>Discuss process of study, what is needed to do and answer their questions</td>
<td></td>
</tr>
<tr>
<td>Obtain consent and distribute survey package containing penlight and pencil as keepsakes</td>
<td></td>
</tr>
<tr>
<td>Return of completed surveys: Drop box location</td>
<td></td>
</tr>
<tr>
<td>6. Distribution of surveys to CNAs who give consent continues</td>
<td>Day 11-23</td>
</tr>
<tr>
<td>7. Retrieve completed/blank surveys from nursing home</td>
<td>Day 8-25</td>
</tr>
<tr>
<td>- Allow 2-3 days for CNA to complete and return survey</td>
<td></td>
</tr>
<tr>
<td>- Four to five visits per week on Mondays, at 12-2.00pm, Tuesdays 2.00pm - 4.00pm, Wednesdays 6.30pm – 7.30pm, Fridays at 8.00pm – 9.00pm and on Saturdays at 10A-11.00A</td>
<td></td>
</tr>
<tr>
<td>8. Distribute reminder posters and post-cards</td>
<td>Days 11, 16 and 21</td>
</tr>
<tr>
<td>- Put up reminder posters 5 days, 10 days and 15 days after initial distribution of surveys</td>
<td></td>
</tr>
<tr>
<td>- In person reminders of all CNAs as is possible</td>
<td></td>
</tr>
<tr>
<td>9. Thank you notes and close out of data collection</td>
<td>Day 25</td>
</tr>
</tbody>
</table>
ATTENTION
All CNAs

Join us for Pizza and CNA study!

Opportunity to participate in a study on CNA health status, health conditions and health behaviors & ability to work.

*This study involves completing a survey*

Oct. ?? at ?pm, ?pm

IRB# 13-0006

RSVP to: (864) 991-6796
ATTENTION
All CNAs

CNA health & ability to work matters

CNA research study

Let's meet to explain your role at:

A research study to describe CNA health status, health conditions and health behaviors and investigate how these relate to ability to work. This study involves completing a survey.

Date (variable)

Time: Will change

Refreshment will be served!!!
CNA STUDY: ability to work and its relationship with health status...

Let Your Voice Count

PLEASE return your completed survey today

1. Drop it in the DROP BOX
2. You can hand it directly back to me
3. You can also mail it today

Any Questions

phone: 844-991-4760
email: vuillette@unc.edu
## APPENDIX H: DATA COLLECTION ALGORITHM

<table>
<thead>
<tr>
<th>Activity description</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Mail letter of invitation to participate to nursing home administrator using first class postage</td>
<td>Day 1</td>
</tr>
<tr>
<td>2 Telephone to speak to administrator and/or director of nursing (DON) (Two times and schedule meeting) Terminate contact if no return calls after leaving two messages.</td>
<td>Day 3-10</td>
</tr>
<tr>
<td>3 Meeting with nursing home administrator/DON (Met with only one nursing administrator in the absence of the Nursing home administrator)</td>
<td>Day 4-15</td>
</tr>
<tr>
<td>4 Posters and flyers advertising study given to various nursing home administrators to distribute</td>
<td>Day 7-15</td>
</tr>
</tbody>
</table>
| 5 Meet with potential participants: (in small groups) provide light refreshment such as assortment of fruits, soda, ice tea, cookies, chips and or pizza  
  - Meet at 11am to 2pm (or as determined by NH administrator and DON)  
  - Meet at 9.30pm to 12.30am in two nursing homes  
  - (meeting frequency determined by break times of CNAs for 1 day in two nursing homes)  
  Discuss process of study, what is needed to do and answer questions  
  Obtain consent and distribute survey package containing penlight and pencil as keepsakes  
  Return of completed surveys: Drop box located just inside of lunch room in two nursing homes.  
  One nursing home closes their lunch room after 8.00pm and was relocated to resident lounges between two floors | Day 14-20 In 3 nursing homes only on day 14 |
| 6 Retrieve completed/blank surveys from nursing home  
  - Allow 2-5 days for CNA to complete and return survey (in two nursing homes)  
  - Provide Return address and stamped envelopes to CNAs needing them  
  - Saturday and Sunday visit (one nursing home from 12.30 – 4.30 pm both days). | Day 14-20              |
| 7 Thank you notes and close out of data collection                                  | Day 25                  |
APPENDIX I: CODEBOOK

Ability to work and its relationship with health status and health behaviors in nursing assistants

<table>
<thead>
<tr>
<th>Item</th>
<th>Variable Name</th>
<th>Variable Description</th>
<th>Value Labels</th>
<th>Variable measured</th>
</tr>
</thead>
</table>
| 1    | YRSWRKNA      | How long have you worked as a nursing assistant? | 1 0 – 6 months  
2 Over 6 months – 1 year  
3 Over 1 year -3 years  
4 Over 3 years -5 years  
5 Over 5 years | |
| 2    | NAALLJOBS     | About how many full time or part time jobs do you currently have now? | 1 1  
2 2-4  
3 5-7  
4 More than 7 | |
| 3    | HRSWRKNA      | In a typical week, how many hours do you work as a nursing assistant in a nursing home? | 1 1-15 hours  
2 16-30 hours  
3 30-45 hours  
4 Over 45 hours | |
| 4    | HRSWRKAL      | In a typical week, how many hours do you work at all jobs? | 1 1 -15 hours  
2 16 – 30 hours  
3 31 – 45 hours  
4 Over 45 hours | |
| 5    | NA2NDJOB      | Do you work as a nursing assistant at more than one facility? | 1 Yes  
2 No | |
| 6    | NAOTHERJBJ    | If you have more than one job and you answered NO to question 5 above, what type of job do you hold as second job | Write in answer |
Section Two

This question is specific to your overall general health. Please disregard any recent episode of sickness when you make this assessment. If you are not sure about how to answer, please give the best answer that you can.

<table>
<thead>
<tr>
<th>Item</th>
<th>Variable Name</th>
<th>Variable description</th>
<th>Value labels</th>
<th>Variable measured</th>
</tr>
</thead>
</table>
| 7    | GENHLTH       | In general, how would you rate your overall health | 1 Poor  
2 Fair  
3 Good  
4 Very good  
5 Excellent | Health status |
<p>| 8    |               | The following is a list of some health conditions. Place check mark on all the health conditions that you have been told by a doctor or nurse that you have or that you have received treatment for in the past. Place a check mark in all the spaces that apply to you | Numbers of health conditions |
| HC1  | Allergy       | Yes                   | No           |
| HC2  | Anxiety disorder |                       |              |
| HC3  | Arthritis     | Yes                   |              |
| HC4  | Back/Neck pain | Yes                   |              |
| HC5  | Chronic pain  | Yes                   |              |
| HC6  | Depression    | Yes                   |              |
| HC7  | Diabetes      | Yes                   |              |
| HC8  | Fatigue       | Yes                   |              |
| HC9  | Heart disease | Yes                   |              |
| HC10 | High blood pressure | Yes                   |              |
| HC11 | High cholesterol | Yes                   |              |
| HC12 | Insomnia/sleep problems | Yes                   |              |</p>
<table>
<thead>
<tr>
<th>Item</th>
<th>Variable Name</th>
<th>Variable description</th>
<th>Value labels</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC13</td>
<td>Obesity</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>HC14</td>
<td>Physical injury</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>HC15</td>
<td>Stress/other emotional disorder</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>HC16</td>
<td>Not listed above</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This section is about various aspects of your lifestyle. Please read each question carefully before responding. Place a check mark on the response that is most appropriate for you. Answer every question as accurately as possible.

One drink of alcohol is equivalent to a 12-ounce beer (one can or bottle of beer), a 5-ounce glass of wine, one can or bottle of wine cooler, one cocktail or a drink with one shot of liquor.

9  ALCDAY  During the past 30 days, how often did you have a drink containing alcohol such as beer, wine, wine cooler, a malt beverage or liquor?

   1  Never
   2  Once a month or less
   3  2-4 times a month
   4  2-3 times a week
   5  4 or more times a week

10  AVEDRNK  During the past 30 days, how many drinks containing alcohol did you have on the average on a typical day when you drink?

   1  1-2 drinks
   2  3-4 drinks
   3  5-6 drinks
   4  7-9 drinks
   5  10 drinks or more

11  BNGEDRNK  Considering all types of alcoholic beverages, how many times during the past 30 days did you have 4 or more drinks on any one occasion?

   1  Never
   2  Less than once a month
   3  About once a month
   4  About Weekly
   5  More than once a month but less than weekly
   6  2-4 times a week
   7  Every day or nearly every day
<table>
<thead>
<tr>
<th>Item</th>
<th>Variable Name</th>
<th>Variable description</th>
<th>Value labels</th>
<th>Variable measured</th>
</tr>
</thead>
</table>
| 12   | HT             | What is your height (without shoes on)? | _______ feet  
_______ inches  
(round to nearest inch) | |
| 13   | WT             | How much do you weight? | -----------pounds (lbs) | |

We would like to know about your physical activity. The questions below are about the time you spent being physically active in the past 30 days. They include questions about your activities when you are not working, but as part of your house and yard work and in your spare time for recreation, exercise or sport. Please answer each question even if you do not consider yourself an active person.

<table>
<thead>
<tr>
<th>Item</th>
<th>Variable Name</th>
<th>Variable description</th>
<th>Value labels</th>
<th>Variable measured</th>
</tr>
</thead>
</table>
| 14   | PHYEXANY       | “Now thinking about the physical activities you do (when you are not working). In a usual week, do you do any physical activities for at least 10 minutes at a time, such as brisk walking for exercise, bicycling, gardening, dancing, or vacuuming, or aerobics, heavy yard work, hiking uphill, jumping rope, swimming laps, running, or anything else that causes small or large increases in breathing or heart rate?” | 1  Yes  
2  No | Physical activity |
| 15   | EXERFREQ       | During the past 30 days, on how many days per week did you spend at least 10 minutes at a time on these activities? | 1. Range 0-7 days | Recommended level of activity |
| 16   | EXERHMM1       | On days when you do physical activities for at least 10 minutes at a time, how much total time per day do you spend doing these activities | 3  1- 759 Hours and minutes | Recommended level of activity |
| 17   | SLEEP          | During the past 30 days, on average, how many hours of sleep do you usually get in a | 1. 1-3 hours  
2. 4-6 hours  
3. 7-10 hours | Sleep habit |
<table>
<thead>
<tr>
<th>Item</th>
<th>Variable Name</th>
<th>Variable description</th>
<th>Value labels</th>
<th>Variable measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>SMOK100</td>
<td>Have you smoked at least 100 cigarettes in your entire life? (5 packs = 100 cigarettes)</td>
<td>1 Yes</td>
<td>Smoking status</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 No</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 Don’t know/not sure</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>SMOKNOW</td>
<td>Which of the following best describe your smoking status?</td>
<td>1 I have never smoked</td>
<td>Smoking status</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 I don’t smoke now, but I used to</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 I smoke occasionally</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4 I smoke every day</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>LASTSMK</td>
<td>How long has it been since you last smoked a cigarette, even one or two puffs?</td>
<td>1 0-1 month (Less than 1 month ago)</td>
<td>Smoking status</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 1-3 months (over 1 month but less than 3 months ago)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 3-6 months (over 3 months but less than 6 months ago)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4 6-12 months (over 6 months but less than 1 year ago)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 1 year – 5 years (over 1 year but less than 5 years ago)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6 5 years or more</td>
<td></td>
</tr>
</tbody>
</table>
Section 4

The following questions ask about how your health problems affect your ability to work and perform regular activities. By health problems, we mean any physical or emotional problem or symptom. Please fill in the blanks or circle a number, as indicated.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable description</th>
<th>Variable label</th>
<th>Variable measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 HRSMIHLT</td>
<td>During the past seven days, how many hours did you miss from work because of your health problems? Include hours you missed on sick days, times you went in late, left early, took extended lunch breaks, went for healthcare appointments, or treatments, etc. because of your health problems. Do not include the time you missed to participate in this study</td>
<td>1-0-52.5hours</td>
<td>Absenteeism</td>
</tr>
<tr>
<td>22 HRMIOTHER</td>
<td>During the past seven days, how many hours did you miss from work because of any other reason, such as holiday time, vacation, time off to participate in this study</td>
<td>1-0-52Hours</td>
<td>Absenteeism</td>
</tr>
<tr>
<td>23 HRSWRKED</td>
<td>During the past seven days, how many hours did you actually work</td>
<td>1-0-52Hours</td>
<td></td>
</tr>
<tr>
<td>24 WPROD</td>
<td>During the past seven days, how many hours did your health problems affect your productivity while you were working?</td>
<td>1-0-10 rating</td>
<td>Presenteeism</td>
</tr>
<tr>
<td>25 WACT</td>
<td>During the past seven days, how much did your health problems affect your ability to do regular daily activities, other than work</td>
<td>1-0-10 rating</td>
<td>Activity impairment</td>
</tr>
<tr>
<td>Variable Name</td>
<td>Variable description</td>
<td>Variable label</td>
<td>Variable measured</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------</td>
<td>----------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>CURWA</td>
<td>Assume that your ability to work at its best has a value of 10 points. How many points would you give your current ability to work?</td>
<td>Range 0-10 (value circled in the questionnaire)</td>
<td>Overall ability to work</td>
</tr>
<tr>
<td>OWNWAPROG</td>
<td>According to your present state of health, do you believe that you will be able to do your current job two years from now?</td>
<td>1. Unlikely 4. Not sure 7. Relatively sure</td>
<td>Future ability to work</td>
</tr>
<tr>
<td>AGE</td>
<td>What is your age?</td>
<td>0-99 years</td>
<td>demographic</td>
</tr>
<tr>
<td>SEX</td>
<td>Are you</td>
<td>1. Female 2. Male</td>
<td></td>
</tr>
<tr>
<td>NBRCDREN18</td>
<td>How many children under 18 years old do you have living in your household?</td>
<td>0-99</td>
<td></td>
</tr>
<tr>
<td>MARSTAT</td>
<td>Marital Status</td>
<td>1 Unmarried 2 Married 3 Unmarried but co-habiting 4 Separated 5 Divorced 6 Widow/widower</td>
<td></td>
</tr>
<tr>
<td>EDUC</td>
<td>What is the highest grade or level of schooling that you have COMPLETED?</td>
<td>1 8th grade or less 2 Some high school, but did not graduate. 3 High school graduate or GED 4 Some college or 2-</td>
<td></td>
</tr>
<tr>
<td>Variable Name</td>
<td>Variable description</td>
<td>Variable label</td>
<td>Variable measured</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------------------------------------</td>
<td>---------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td>year degree</td>
<td>5</td>
<td>College degree</td>
</tr>
<tr>
<td>32 HISORIGN</td>
<td>Are you of Hispanic origin?</td>
<td>1. Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. No</td>
<td></td>
</tr>
<tr>
<td>33 ETHNIC</td>
<td>Please indicate your race/ethnicity (Choose all that apply)</td>
<td>1 African American or Black</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 American Indian or Native Alaskan</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Asian</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 Pacific Islander</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 White</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 Other (Specify)……………</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX J: PERMISSION TO USE WORK ABILITY QUESTIONNAIRE

LICENSE AGREEMENT
Work Ability Index (WAI)

PARTIES

The Finnish Institute of Occupational Health, FICHI, public corporation from Finland, Helsinki (designated below as the Licensor) and

Obiajulu E. Melekwe
School of Nursing
University of North Carolina
Chapel Hill, NC 27514, USA

1. Background

WAI will be used only in research of Obiajulu E. Melekwe

2. Scope of the Agreement

The Licensor(s) hereby grant Licensee a permanent license to use the WAI questionnaire in research, (“Licensed Material”) in Licensee’s operations in USA as follows:

1. Licensee is entitled to use the Licensed Material for research of Obiajulu E. Melekwe in School of Nursing in University of North Carolina. For the sake of clarity it is stated that the license does not cover commercial use, nor a sublicense right or right to sell licenses. Unless otherwise agreed in writing, Licensee is not entitled to transfer the license granted in this License Agreement.

2. Licensee is entitled to use the Licensed Material on the Internet on its own web page as well as in co-operation with its partners providing always that the terms and conditions of this agreement are abide by. Licensee is obligated to gain a written commitment from the partners prior to the use of the Licensed Material with third parties.

3. Licensee is entitled to translate, or have translated to English, publish and make an e-version of the translated version of the Licensed Material only for own use. Licensee is entitled to use sub-contractors in making / having these versions (language and electronic) made as well as in maintenance of the e-versions.

4. The language versions identified above, as well as the e-versions of the Licensed Material shall include the following copyright @ Finnish Institute of Occupational Health and Tuomi K., Ilmarinen J., Jokola A., Ketola L., Tulkkia A. 1997 (the original work) Hoppe L., Seitsamo J. 2011 (the new version).

5. In addition, Licensee shall report once a year about the use of WAI, possible new language versions and other uses of the license.

6. This agreement shall become effective on the date both Parties have signed it and shall be in force for the time being, unless otherwise agreed upon by the licensor and licensee. The agreement can be terminated if one or the other cheat on the agreement.

7. In event either Party is in breach of this Agreement, the other Party may end this Agreement with immediate effect unless the defaulting Party has remedied the breach within 30 days period from the written notice received by the other Party identifying the breach of the Agreement.
9. Licensee will be free from payment in research use in School of Nursing. If the licence will be given to a third partner, FIOH has to be informed about it. An agreement will be needed in such situation.

10. The Licensor(s) guarantee that they are the owner and the holders of the copyright of the original Licensed Material and are fully entitled and authorised to grant the licence as set out in this agreement. In the event a permission by any third party, owning the intellectual property rights or part thereof, is required to legally commit to this agreement, the Licensor(s) are fully responsible for obtaining such permission from any third party.

12. Contact persons

Licensee has appointed Obiagulu Melekw as a contact person of the Licensee.

Licensor has appointed Maria Rautio, PhD, ME, maria.rautio@THL.fi, +358 40 54 29 450

The parties shall inform the other party on the changes of the contact person in writing without delay.

13. Liabilities

Each Party shall bear the sole responsibility and liability for any use in which it puts the Licensed Material. The Licensee acknowledges and agrees that the use Licensed Material shall always be within the terms and conditions of this License Agreement.

14. Applicable law

This License Agreement shall be construed in accordance with and governed by the laws of Finland, excluding any conflict of law provisions.

15. Settlement of disputes

All disputes arising out of or in connection with this License Agreement, which cannot be solved amicably, shall be submitted to the District Court of Helsinki, Finland.

This agreement has been made in two (2) originals, one for Licensor and one for Licensee.

SIGNATURES

Licensor(s)

Name
Title
Date

Name Hannu Anttonen
Title Director
Date

Licensee

Name Obiagulu Melekw
Title Doctoral student
# APPENDIX K: HEALTH CONDITIONS

<table>
<thead>
<tr>
<th></th>
<th>Health Conditions (listed in alphabetical order)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Allergy</td>
</tr>
<tr>
<td>2</td>
<td>Anxiety</td>
</tr>
<tr>
<td>3</td>
<td>Arthritis</td>
</tr>
<tr>
<td>4</td>
<td>Back/neck pain</td>
</tr>
<tr>
<td>5</td>
<td>Chronic pain</td>
</tr>
<tr>
<td>6</td>
<td>Depression</td>
</tr>
<tr>
<td>7</td>
<td>Diabetes</td>
</tr>
<tr>
<td>8</td>
<td>Fatigue</td>
</tr>
<tr>
<td>9</td>
<td>Heart disease</td>
</tr>
<tr>
<td>10</td>
<td>High blood pressure</td>
</tr>
<tr>
<td>11</td>
<td>high cholesterol</td>
</tr>
<tr>
<td>12</td>
<td>Insomnia/Sleep problems</td>
</tr>
<tr>
<td>13</td>
<td>Obesity</td>
</tr>
<tr>
<td>14</td>
<td>Physical injury</td>
</tr>
<tr>
<td>15</td>
<td>Stress/other emotional disorder</td>
</tr>
</tbody>
</table>
APPENDIX L: PROTOCOL FOR PILOT TESTING

Protocol for Pilot Testing survey items

Submitted by

Obi Melekwe

Time required: It will take approximately 30 minutes to complete the pilot test and evaluation

Subjects: 10-15 nursing assistants will be recruited from two nursing homes in the Charlotte and Gastonia areas of North Carolina to participate in the pilot testing. Permission to recruit nursing assistants will be obtained from the administrators of both facilities prior to recruiting the nursing assistants. Though this group will be a convenience sample of nursing assistants, pilot testing will simulate what is expected in the actual survey. Pilot testing will be done in the nursing homes when the participants are on duty.

Explain the purpose of the survey:

Explain the purpose of the pilot test: Responses in the pilot test are not going to be recorded or reported to anyone except to be used in assessing how best to improve the survey.

Process:

1. Participants will be seated in classroom style if possible.
2. Explain the value of participation to the subjects; indicate to participants that they should fill out the survey on their own as they would if they were at home. They may not ask questions as they go through the items. They should fill out the survey as they would under normal situations.
3. Hand out the questionnaire with a pencil in an envelope.
4. Observe for how long it takes participants to respond to all items.
Collect the completed questionnaires.

Hand out the evaluation form (see below): review with participants the evaluation before completion

Evaluation of the survey includes:

- How long it took to complete the survey
- How difficult it was to understand the survey items for each section of the questionnaire.
- Did the answer choices allow you to respond as you intended?
- Are the instructions clear on what to do with the items?
- Is there any words/language in the instrument that is confusing?
- Did you find any questions to be unnecessary or too sensitive?

Discuss with participants any items that have no rating on the evaluation form and find out why the item was not rated. Also check the difficulty ratings of each section of the questionnaire. Ask questions regarding sections rated as difficult to extremely difficult to respond to. These may be modified according to the findings from this exercise.

Read through the completed questionnaire responses. Were the questions interpreted as intended?

Enter data into Qualtrics research suite at http://Qualtrics.unc.edu.

Export the result into SAS, and run analyses, then write up results.

Modify instrument if necessary based on information obtained from the pilot test.

Review the test responses to the survey, looking for inconsistencies or unexpected answers.
13 Consider a second pilot testing if extensive changes are made to the original survey

**Evaluation of the Survey Items**

1 Record how long it took you to complete this questionnaire from start to finish _____

2 How difficult was it to understand the questions in

<table>
<thead>
<tr>
<th>Scores</th>
<th>Not Difficult (1)</th>
<th>Somewhat Difficult (2)</th>
<th>Difficult (3)</th>
<th>Very Difficult (4)</th>
<th>Extremely Difficult (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(A)</td>
<td>(B)</td>
<td>(C)</td>
<td>(D)</td>
<td>(E)</td>
</tr>
</tbody>
</table>

A - Questions 1-6

B - Questions 7 & 8

C - Questions 9-20

D - Questions 21-27

E - Questions 28-34

3 Did the answer choices allow you to respond as you intended?

<table>
<thead>
<tr>
<th>Score</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questions 1-6:</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Questions 7-8:</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Questions 9-20:</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Questions 21-27:</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Questions 28-34:</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>
4. Did you find any question to be unnecessary or too sensitive?
   
   YES_______ item no/s ______________________________
   
   NO_______

5. Are the instructions on how to complete the question clear?
   
   YES_______
   
   NO_______  Item no/s not clear ______________________________

6. Are there any words/ language in the instrument that is confusing?
   
   YES _______
   
   NO _______

   List the page number and item numbers that was confusing: ________________
| Condition          | Spearman Correlation Coefficient | Prob > |r| under H0: Rho=0 |
|--------------------|----------------------------------|--------|-----------------|
| Allergy            | 0.05064                          | 0.6204 |
| Anxiety disorder   | 0.26162                          | 0.0694 |
| Arthritis          | 0.0694                           | 0.2601 |
| Back/neck pain     | 0.0574                           | 0.036  |
| Chronic pain       | 0.26932                          | 0.0073 |
| Depression         | 0.31688                          | 0.0015 |
| Diabetes           | 0.05156                          | 0.6141 |
| Fatigue            | 0.10573                          | 0.3001 |
| Heart disease      | 0.10494                          | 0.3038 |
| High BP            | 0.01703                          | 0.8678 |
| High Chol          | 0.07107                          | 0.4868 |
| Insomnia/sleep problem | 0.12334                      | 0.2263 |
| Obesity            | -0.0148                          | 0.885  |
| Physical injury    | 0.14364                          | 0.1582 |
| Stress/other emotional problem | 0.16234                  | 0.1103 |
REFERENCES


Campo, M., & Darragh, A. R. (2012). Work-related musculoskeletal disorders are associated with impaired presenteeism in allied health care professionals. *Journal of Occupational and Environmental Medicine, 54*(1), 64-70. doi: 10.1097/JOM.0b0113e31823c768a


123


