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Relationship between nurse staffing and quality of life in Iowa nursing homes

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University of Iowa

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RELATIONSHIP BETWEEN NURSE STAFFING AND QUALITY OF LIFE
IN NURSING HOMES

by

Juh Hyun Shin

An Abstract

Of a thesis submitted in partial fulfillment of the
requirements for the Doctor of Philosophy degree
in Nursing in
the Graduate College of
The University of Iowa

August 2008

Thesis Supervisor: Associate Professor Janet K. Specht

The purpose of this study was to investigate the relationship between nursing staffing and quality of life (QOL) in nursing homes (NHs). The relationships between nursing staff hours per resident day, nursing staffing skill mix, turnover of nursing staff, and the answers given to QOL questions by 231 residents in Iowa NHs were investigated. Unexpectedly, only part of staffing variables were statistically significantly correlated with QOL of residents and nurse staffing variables seemed to have little influence on predicting QOL of residents in this study. The major differences between this study and previous studies are that previous research focused on quality of care (QOC) and this study measured QOL by measuring residents' outcomes. Previous studies found that nurse staffing is an important factor in improving QOC (and by implication, QOL) of NH residents. Based on the statistically significant relationships, RNs' unique contributions were supported by the findings that NHs with more RNs, compared with LPNs/LVNs and CNAs, had residents with higher scores in the functional competence domain and overall QOL summary items. This study found that nurse staffing turnover is positively correlated with QOL, especially in the individuality domain. However, the whole study takes place in one state, Iowa. Iowa has a homogeneous population with limited racial diversity. Only Iowa NHs were selected and it is questionable whether the findings may be generalizable to the rest of the United States. Further research is required to confirm the relationship and provide policy guidelines, including nurse staffing recommendations, to guarantee optimal QOL for NH residents.

Abstract Approved: _____

Thesis Supervisor

Title and Department

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Graduate College
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CERTIFICATE OF APPROVAL

PH.D. THESIS

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ABSTRACT

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LIST OF ABBREVIATIONS

ADL Activities of Daily Living

CMS Center for Medicare and Medicaid Services

CNA Certified Nursing Assistant

CRG Cowles Research Group

DON Director of Nursing

FTE Full Time Equivalent

GAO General Accounting Office

GAPN Gerontological Advanced Practice Nurse

HCFA Health Care Financing Administration

HLM Hierarchical Linear Modeling

HPRD Hours per Resident Day

IOM Institute of Medicine

LPN Licensed Practical Nurse

LVN Licensed Vocational Nurse

MDS Minimum Data Set

NCCNHR National Citizen's Coalition for Nursing Home Reform

NH Nursing Home

NOC Nursing Outcomes Classification

NP Nurse Practitioner

OBRA 1987 Omnibus Budget Reconciliation Act of 1987

ODH Ohio Department of Health

OSCAR Online Survey Certification and Reporting

PPS Prospective Payment System

PT Part Time

QOC Quality of Care

QOL Quality of Life

RA Research Assistant

RAI Resident Assessment Instrument

RAP Resident Assessment Protocol

RN Registered Nurse

RUGS Resource Utilization Groups

CHAPTER I.
OVERVIEW OF THE RELATIONSHIP BETWEEN NURSING STAFFING
AND QUALITY OF LIFE IN NURSING HOMES

Overview of the Problem

In the United States, approximately 17,000 nursing homes (NHs) care for 1.6 million elders (those who are older than 65) and play a critical role in the health care system (American Health Care Association [AHCA], 1999; Federwisch, 1999; General Accounting Office [GAO], 2002a, 2002b; Harrington, Woolhandler, Mullan, Carrillo, & Himmelstein, 2002; Winzelberg, 2003; Wunderlich & Kohler, 2001). It is expected that in 2030 about 70 million people will be between the ages of 65 and 84 while 5 million people will be 85 years of older (Harrington, O'Meara, Collier, & Schnelle, 2003; Hicks, Rantz, Petroski, & Mukamel, 2004; Hooyman & Kiyak, 1996; National Institute on Aging, 2007; Wunderlich, Sloan, & Davis, 1996). Approximately 3 million of these people will receive NH care (Harrington et al., 2003; Hicks et al., 2004; Hooyman & Kiyak, 1996; National Institute on Aging, 2007; Wunderlich et al., 1996).

There continues to be concerns about the quality of NH care in both the public and private sectors, including concerns about quality of life (QOL) in NHs. This occurs despite 30 years of public and government efforts to improve care. For many reasons, people are usually reluctant to live in or even visit NHs, or place their spouses in NHs (Tesh, McNutt, Courts, & Barba, 2002). In addition, the residents spend most of their time alone and cannot care for themselves or their environment (Tesh et al, 2002). The experience of transitioning to and living in NHs is a challenging experience in many regards, including physical relocation and dramatic changes in relationships with family

and friends, and new relationships with NH staff (Guse & Masesar, 1999). Most residents in NHs suffer from the changed lifestyles imposed by living in a NH where the emphasis is placed on health problems and group living (R. A. Kane, 2003). Life in NHs may be sterile, restricted, and involve loss of privacy and significant relationships in a hospital-like environment (Agich, 1993; R. A. Kane, 1990; R. A. Kane et al., 2003; Lidz, 1992). While NHs have achieved some improvement in quality of care (QOC), QOL has largely been ignored (for the last 5 years). QOC refers to the process and outcome of measures that effect residents' care directly including: nursing services, dietary services, dental services, and infection control, while QOL relates to the rights of patients such as privacy and dignity (Akinici & Krolkowski, 2005). Most components of QOC itself are related to health issues. The emphasis on health-related QOL narrows QOL to the parts of life influenced by health conditions (R. A. Kane, 2003). Health-related QOL cannot explain the lives of residents completely. QOL is not easy to define because the concept covers diverse parts of human life including physical, mental, social, and spiritual well-being (Fletcher, Dickinson, & Philp, 1992; Guse & Masesar, 1999). Furthermore, elements of QOL depend on the diverse needs of people who live in a facility or at home (Fletcher et al., 1992; Guse & Masesar, 1999). However, as health care providers, it is necessary to determine all potential and culturally sensitive aspects and determining factors that may influence QOL, especially for residents in NHs, so that health care providers can provide intervention to improve QOL (Aller & Van Ess Coeling, 1995). For example, interviews with residents in long-term care settings show that the major factors defining residents' QOL include the ability for residents to communicate with others, care for themselves, and care for others. Furthermore, NHs are common places where family members and

staff experience the death of residents, yet NHs have serious problems providing end-of-life care for residents including failing to address their spiritual and emotional needs (Keay, Alexander, McNally, Crusse, & Eger, 2003). Current NH rules that focus on health problem treatment and recovery conflict with the needs of dying residents (Oliver, Porock, & Zweig, 2004). Consequently, dying NH residents suffer from undetected, untreated, and uncontrolled pain (Bernabei et al., 1998; Keay et al., 2003; Oliver et al., 2004; Sengstaken & King, 1993).

In essence, quality has not reached acceptable levels since the Omnibus Budget Reconciliation Act of 1987 (OBRA, 1987) passed (GAO, 1998, 1999a, 1999b; Harrington, 2001a, 2001b; Kovner, Mezey, & Harrington, 2000; Wunderlich & Kohler, 2001). OBRA 1987 required the development of standardized assessment for NH residents (Wunderlich, & Kohler). Consequently, in 1998, the Resident Assessment Instrument (RAI) was implemented nationally through the Center for Medicare and Medicaid Services (CMS)' Health Care Quality Improvement Program for NHs (Mukamel & Spector, 2003). The RAI is based on interdisciplinary care and offers each resident a consistent and all-inclusive assessment of care (Center for Medicare and Medicaid [CMS], 2002). After implementing RAI in NHs, researchers reported the following benefits: (a) the ability of NH staff to detect residents with geriatric syndrome and clinical problems, and (b) the possibility of recovery. The RAI increases staff problem-solving ability through systematized assessments (Won, Morris, Nonemaker, & Lipsitz, 1999). According to CMS's RAI Version 2.0 Manual, the RAI has three components: (a) minimum data set (MDS), (b) resident assessment protocols (RAPs) and (c) use guidelines. RAPs are organized, problem-oriented frames for the MDS

information and include additional clinical information about residents (CMS, 2002) while MDS is used as a preliminary screening to recognize potential problems and strengths of residents (CMS, 2002). RAPs in 18 areas indicate general problems and risk factors for the residents of NHs (Wunderlich, & Kohler). The 18 areas include: delirium, cognitive loss, visual function, communication, activities of daily living (ADLs), functional/rehabilitation potential, urinary incontinence and indwelling catheter, psychosocial well-being, mood state, behavioral symptom, activities, falls, nutritional status, feeding tubes, dehydration/fluid maintenance, dental care, pressure ulcers, psychotropic drug use, and physical restraints (CMS, 2002). Lastly, use guidelines are the instructions about how and when to use the RAI (CMS, 2002).

The benefits of OBRA can be summarized : dramatic decrease in the use of physical restraint (Hawes et al., 1995; R.A. Kane, 2001; Marek, Rantz, Fagin, & Krejci, 1996; Migdail, 1992; Wunderlich et al., 1996), decreased use of urinary catheters (Hawes et al., 1995), decreased bowel incontinence without residents having to go through a toileting program (Hawes et al.), the increased accuracy of medical records (Hawes et al.), the increased completion rate of advance directives (Hawes et al.), the decreased number of residents who do not participate in activities (Hawes et al.), improved nutrition and vision health of residents (Fries et al., 1997), decreased pain complaints (Fries et al., 1997), decreased stasis ulcers (Fries et al., 1997), decreased dehydration (Fries et al., 1997), and increased physical and cognitive function especially for some residents with poor baseline ADLs (Phillips et al., 1997).

However, overall QOC in many NHs is still very poor (CMS, 2001; Harrington, 2001b; Reynolds, 2003; Winzelberg, 2003; Wunderlich & Kohler, 2001). Between 25%

and 33% of NHs do not meet even minimal federal standards, and more than 25% of NHs have deficiencies that may cause serious and harmful health outcomes for NH residents (GAO, 1999a). Also, an increasing number of complaints about NH care were reported to ombudspersons in 1999 (Guse & Masesar, 1999). In a study of 9,105 terminally ill adult patients, 30% expressed that they would rather die than live in NHs (Mattimore et al., 1997). Many studies found that many NH residents spend unnecessary time in bed (Alessi et al., 1995; Fetveit & Bjorvatn, 2002; Schnelle et al., 1998), and consequently suffer from pressure ulcers, pneumonia, urinary incontinence, and infections (Alessi et al.; Bergstrom, Braden, Kemp, Champagne, & Ruby, 1996; Kiely & Flacker, 2002; Langmore, Skarupski, Park, & Fries, 2002; Spector, 1994). The prevalence of pressure ulcers among long-term care residents was reported as ranging from 2.3% to 28%; incidence rates ranged from 2.2% to 23.9% (Cuddigan, Ayello, & Sussman, 2001).

Also, it is estimated that about three times more residents in NHs fall than the elders who live in the community (Rubenstein, Josephson, & Robbins, 1994). Approximately 50% to 60% of NH residents are estimated to fall each year (Katz, Rupnow, Kozma, & Schneider, 2004), resulting in an estimated 1.5 falls per bed per year (Rubenstein et al.). Furthermore, about 4 % of those who fall in NHs suffer fractures, including hip fractures (Rubenstein et al.). For elders, hip fractures are serious because they are highly correlated with morbidity and mortality (Hofmann, Bankes, Javed, & Selhat, 2003; Katz et al., 2004; Vu, Weintraub, & Rubenstein, 2004).

Many studies have reported undernutrition and weight loss among NH residents (Abbasi & Rudman, 1993; Blaum, Fries, & Fiatarone, 1995; Kayser-Jones, & Schell, 1997; Kayser-Jones et al., 1999; Morley & Kraenzle, 1994; Rudman & Feller, 1989;

Starkey & Ryan, 1996; Wang et al., 2004; White, Pieper, & Schmader, 1998; Zahler, Holdt, Gates, & Keiser, 1993). The U.S. General Accounting Office (GAO) and the Health Care Financing Administration (HCFA) have identified these as serious problems for NH residents (Findorff et al.). In 2005, 9 % of NH residents experienced weight loss, according to the Nursing Home Compare website (Findorff et al.) and 60 % of residents suffered from undernutrition (Clarke, Wahlqvist, & Strauss, 1998). Approximately 30 to 50% of residents have symptoms related to protein-calorie malnutrition (Abbasi & Rudman, 1993). In addition, weight loss is highly related to mortality (White et al.).

NH staff also suffers from the poor NH environments. Another staff factor that can impact quality is turnover. Turnover can be defined as the intentional ending of a job by an employee within a short period of time after being employed (Banaszak-Holl & Hines, 1996; Schwartz, 1974). Lower wages than the competing hospital industry and poor working environments combine to make turnover of nursing staff in NHs very high (estimates range from 50 % to 100%). Research on nursing staff turnover has shown varied results (Harrington, 2001a; Spector & Takada, 1991; Stone, 2001; Wagner, 1998; Wunderlich et al., 1996). Steiner and colleagues (2004) reported that in Michigan the nationwide average turnover in NHs staffing was approximately 69 %. The turnover rate of Registered Nurses (RNs) was reported as 40% to 70% across the states (AHCA, 2001; Decker et al., 2003; Wunderlich & Kohler, 2001). The turnover rate of Certified Nursing Assistants (CNAs) was reported from 80% to 100% across the states (AHCA, 1999, 2001; Decker et al., 2003; Wagner, 1998; Wunderlich & Kohler, 2001). The turnover rate of Licensed Vocational Nurses (LVNs) was reported as 40% to 70% across the states (AHCA, 2001). The turnover rate of administrators was estimated to be approximately 40

% across the states (AHCA, 2001; N.G. Castle, 2001; Singh & Schwab, 1998). Many studies found that a high turnover of nursing staff, including top management, impacts the QOC and has negative financial effects on NHs (Anderson, Issel, & McDaniel Jr, 2003; Banaszak-Holl & Hines, 1996; Christensen & Beaver, 1996; Cohen & Spector, 1996; Davis, 1991; Deutschman, 2001; Francese & Mohler, 1994; Riggs & Rantz, 2001; Singh, Amidon, Shi, & Samuels, 1996; S. Zimmerman, Gruber-Baldini, Hebel, Sloane, & Magaziner, 2002). Currently, the research regarding the impact of turnover on residents' outcomes in NHs is very sparse and future studies are required (Maas, Buckwalter, & Specht, 1996). This study fills this research gap in regards to the impact of turnover on residents' outcomes in NHs, as well.

As the population of people 65 years and older increases, the number of qualified staff to care for this age group also should rise (Geiger-Brown, Muntaner, Lipscomb, & Trinkoff, 2004). Usually, nursing staff (RNs, LVNs/LPNs, and CNAs) make up approximately 60% of total NH human resources, making nursing staff the major human resource in NHs (Harrington, Carrillo, Thollaug, & Summers, 2000). Nonetheless, 90 % of NHs are facing a staffing crisis that endanger not only the safety but also the QOC for the thousands of elders in NHs in the United States (CMS, 2001; McKeon, 2001; NCCNHR, 1999; Pear, 2002).

Many studies and government reports have identified staffing as one of the fundamental reasons for the poor QOC provided to NH residents (Eaton, 2000; Harrington, 2001b; Harrington, Carrillo, Mullan, & Swan, 1998; Hickey et al., 2005; National Citizen's Coalition for Nursing Home Reform [NCCNHR], 1999; Reinhardt & Stone, 2001). While the relationship between staffing and QOC has been investigated, the

relationship between staffing and QOL has been only minimally studied. Thus, this study contributes to the knowledge base of staffing and QOL for NH residents. Harrington (2001b) reported that in state NH surveys poor staffing accounts for 26% of NHs with unsafe food, 19% of NHs with inappropriate and unsafe environments, 18% of NHs with inappropriate treatment of pressure ulcers, and 21% of NHs with inappropriate care. The reports from the CMS (2001; formerly known as the HCFA) revealed that NHs which are below the standard level of staffing are more likely to have deteriorating resident outcomes. High staff turnover, staff shortages, and the way in which the problems of both NH staff and residents are addressed are major concerns in trying to manage the complex needs of the NH population (Kayser-Jones & Schell, 1997; Krichbaum, Pearson, Savik, & Mueller, 2005; Mukamel & Spector, 2000; Winzelberg, 2003; Wunderlich et al., 1996).

Specific Aims

1. To complete an integrated literature review of the relationship between staffing and quality of care (QOC) and quality of life (QOL) in nursing homes (NHs).
2. To examine the relationship between nursing staff hours per resident day (HPRD), skill mix, turnover, and quality of life (QOL) in nursing homes (NHs).
 - a. What is the relationship between the nursing staff hours per resident day (HPRD) and the quality of life (QOL) of residents in nursing homes (NHs)?

Hypothesis: Nursing home residents with higher nursing staff hours per resident day (HPRD) will have better quality of life (QOL) scores.

- b. What is the relationship between the skill mix nursing staff hours per resident day (HPRD) and quality of life (QOL) in nursing homes (NHs)?

Hypothesis: As the proportion of Registered Nurses (RNs) hours compared with Certified Nursing Assistants (CNAs), and Licensed Vocational Nurses (LVNs)/ Licensed Practical Nurses (LPNs) hours increases, quality of life (QOL) scores will increase.

- c. What is the relationship between the turnover rates of nursing staff and the quality of life (QOL) in nursing homes (NHs)?

Hypothesis: As turnover rates decrease, quality of life (QOL) scores will increase.

3. To test the psychometric properties of a research instrument (Quality of Life section in the Minimum Data Set 3.0) and to measure quality of life (QOL) of nursing home (NH) residents.

- a. What is the criterion validity of the quality of life (QOL) section of the Minimum Data Set (MDS) 3.0 compared with the quality of life (QOL) outcome of the nursing outcomes classification (NOC)?
- b. What is the interrater reliability for the quality of life (QOL) section of the Minimum Data Set (MDS) 3.0?

Background and Significance

In the following sections, literature that investigates the relationship between staffing and QOC in NHs is reviewed and discussed. First, a brief literature review from 1996 to 2006 is provided. Then, the conceptual framework that guides this study, the Donabedian model, is described to explain the theorized relationship between staffing and QOL.

Nursing Home Staffing Levels

Many previous studies support the fact that there are insufficient numbers of qualified staff to provide adequate care for NH residents (Akinci & Krolikowski, 2005; Geiger-Brown et al., 2004; Harrington, Zimmerman, Karon, Robinson, & Beutel, 2000; Krichbaum et al., 2005). The number of RNs, LPNs, and CNAs who worked in NHs increased approximately 56%, 55%, and 20% respectively from 1985 to 1995 (American Federation of State, County and Municipal Employees, 1998). The nurse staffing level increase came after the implementation of the Nursing Home Reform Act, part of OBRA 1987 (Zhang & Grabowski, 2004). Harrington and colleagues (2000) reported no improvement in nursing staffing from 1993 to 1999. During this time, an average NH resident received less than 1 hour of nursing care per shift. The Harrington study showed that residents did not get appropriate RN/LPN care at all, considering that this 1 hour included all direct and indirect care, including administration and charting (Harrington, 2001a). Additionally, residents in more than half of the NHs in this study received less than 3.5 total hours of nursing care a day (Harrington, Carrillo et al., 2000). According to the most current data from the Nursing Home Compare site, from January 2006, the national total average licensed nursing staff hours per NH resident was 1 hour, 12 minutes (RN hours = 30 minutes, LPN/LVN=42 minutes; CMS, 2006). The national average for CNA hours was 2 hours, 18 minutes (CMS, 2006). RN hours included both clinical and administrative hours from Directors of Nursing (DON) and MDS coordinators.

Need for Improved Staffing Levels

Because of the close relationship between staffing and QOC, staffing standards in NHs are a contemporary issue at both state and federal levels (Harrington, 2005c). Since the 1980s, research investigating staffing and QOC in long-term care facilities has been initiated (Bowers, Esmond, & Jacobson, 2000). More recently, the goal of research supported by the Institute of Medicine (IOM) and OBRA '87 has been to provide evidence for establishing thresholds for minimum NH staffing ratios (Bowers et al., 2000). However, the nurse staffing mandated by OBRA 1987 was too vague and inadequate in practice (Wunderlich & Kohler, 2001). Moreover, it became clear that the issue of setting thresholds for desirable staff ratios is very complex and results differ, requiring more research (see Table 1.1; Masterson, 2004).

The National Citizen's Coalition for Nursing Home Reform (NCCNHR; 1999), NH staffing experts, President Clinton (2000), and several senators suggested higher minimum NH staffing. In 2000 and 2001, the House of Representatives initiated legislation requiring minimum federal staffing levels, enhanced staffing regulation and reporting requirements for NHs (Waxman, 2002). However, different staffing ratios with different staffing classification criteria were proposed by expert panels made up of representatives from the NCCNHR, Hartford Institute for Geriatric Nursing Expert Panel, the CMS and IOM (see Table 1.1; Harrington, 2001a; Harrington et al., 2000; Harrington, Zimmerman, et al., 2000; Wunderlich et al., 1996). The classification of nurse staffing was unclear, vague and inconsistent: (a) some reports were based on direct and indirect care, (b) some reports were based on licensed versus nonlicensed staff, (c) some reports identified the specific nursing staff at mealtime while other reports did not, and (d) some

reports specified nursing staff based on the size of facilities while others did not (see Table 1.1). Moreover, a 2000 study by the CMS, in response to a 1990 mandate from the U.S. Congress to set minimum staffing level in NHs, failed to quantify the need for professional nurses, and minimum staffing requirements were never implemented (Mohler, 2001). The following section is the summary of three major recommendations: IOM, CMS, and experts.

IOM Recommendation

IOM proposed that CMS require an RN 24 hours a day in 1996, recommended a minimum federal standard of 24-hour RN coverage a day with adjusting case mix in 2001, and recommended the presence of at least one RN always and increased staffing level based on increased resident numbers in 2003 (Harrington, 2005c).

CMS Recommendation

In the report by Abt Associates, which was commissioned by CMS, the thresholds of staff working hours were explained: the requirements were 0.75 RN hours per resident day, 1.3 LPN hours per resident day, and 2.78 CNA hours per resident day (see Table 1.1; Kramer & Fish, 2001). However, approximately 52% of NHs were estimated to have failed to meet all three standards proposed by CMS in 2000 and about 97% were estimated to have failed to meet more than one standard in 2000 (Kramer & Fish, 2001). Long-term care facilities that have less than 4.1 Nursing Staff HPRD (less than 1.3 licensed hours and less than 2.8 CNA or assistant HPRD) may have adverse resident outcomes (CMS, 2001; GAO, 1999b). In 2003, the thresholds of over 4.1 HPRD showed improved quality for Californian NHs (Rosenfeld, 2003). In 2005, Harrington compared

the actual staffing and recommended staffing standards by CMS throughout the U.S. and found that 97% of NHs should increase nurse staffing to meet the CMS standard. Eighty seven percent NHs need more RNs, 76 % require more LPN/LVNs, and 92% need more CNAs (Harrington, 2005c). Even with these studies, key policy makers including Tommy Thompson, Secretary of Health and Human Services, do not believe there is enough information regarding the adequacy of minimum staffing ratios applied in practical NH settings to improve the quality of NH care (Harrington et al., 2000).

Experts' Recommendation

There are two major available expert recommendation sources: Hartford Institute for Geriatric Nursing Expert Panel (2000) and NCCNHR (1998; see Table 1.1; Harrington et al., 2000). Hartford experts recommended one RN nursing supervisor at all times with minimum 4.3 nursing direct care resident hours, and at least one LPN/RN per 15 (day), 20 (evening), and 30 (night) residents (Harrington et al., 2000). They also required a minimum of one CNA per 5 (day), 10 (evening), and 15 (night) residents (Harrington et al., 2000).

The NCCNHR recommendation includes one Full Time Equivalent (FTE) RN DON, one Part Time (PT) RN assistant DON and one FTE assistant DON over 100 beds, one FTE RN who can provide education service in each facility (over 100 beds), and one RN nursing supervisor at all times (see bottom of Table 1.1; Harrington et al., 2000). NCCNHR suggested minimum direct and minimum licensed nursing staff (Harrington et al., 2000). The minimum direct nursing staff should have one FTE RN, LVN/LPN or CNA per 5 (day), 10 (evening), 15 (night) residents (see bottom of Table 1.1; Harrington et al., 2000). The recommended minimum nursing staff is one RN, LPN/LVN per 15

(day), 20 (evening), and 30 (night) residents (Harrington et al., 2000). This recommendation also suggested the specific nurse staffing ratio at mealtime; that is one nursing FTE per 2 to 3 entirely dependent residents, and one nursing FTE per 2 to 4 partially dependent residents (see bottom of Table 1.1; Harrington et al., 2000). The 4.4 HPRD which exclude DON and assistant DON hours was proposed (see bottom of Table 1.1; Harrington et al., 2000).

Summary and Conclusion

As shown, the federal NH staffing standards/numbers were not established by law at the national level although much literature reported the positive relationships between staffing and QOC in NHs. Furthermore, Mueller and colleagues (2006) reported that 11 out of 51 states (50 states plus the District of Columbia) met only federal guidelines. The remaining 40 states had their own staffing requirements including minimum nursing care hours, and staff- to-resident ratio (Harrington, 2001a; Mueller et al., 2006). In conclusion, no federal laws require NHs to follow the recommendations for staffing levels, and there is much variation between states (Harrington & O'Meara, 2006; Mueller et al., 2006). Out of all 51 states, only California was successful in increasing staffing levels (3.09 HPRD in 2000 to 3.37 in 2003) after the establishment of a law regarding mandatory staffing level (Harrington & O'Meara, 2006). Harrington and O'Meara (2006) also reported that the percent of California NHs that met state nursing hour standards (3.2 HPRD) increased from 36% in 2000 to 73% in 2003. However, few states other than California regarded the effects of mandatory staffing requirements. Hickey and colleagues (2005) found that NHs that met the minimum staffing level of NCCNHR had smaller pressure- ulcer development rates than NHs which did not meet the guideline ($P = .07$; Hickey et al.).

Consequently, the absence of compulsory staffing standards may trigger poorer resident outcomes. The assumption is that NHs usually have a low level of nursing staff because NHs are likely to decrease staffing levels to decrease expenditures.

Concerns Regarding Recommended Minimum Staffing

There are a number of concerns about the thresholds for staffing. First, the estimates for increased staffing costs are from \$6.6 billion to \$7 billion (CMS, 2001; Harrington et al., 2000). It is a major concern that policymakers of CMS will not increase staffing levels because of the high cost to the government (Harrington, 2001b). However, others argue that because the estimated increase is only equal to 6% to 8% of the total nursing expenditure in 2000, and the poor quality of residents' care and life is an urgent concern, increasing staffing is necessary (Harrington, 2005b). Also, to set higher staffing standards (to recruit a highly trained workforce), an increase in payment rates of Medicaid is also necessary. The reason is that Medicaid reimbursement rates are low, much lower than Medicare, and vary across states (CMS, 2001; Grabowski, Angelelli, & Mor, 2004; Harrington, 2001a; Wunderlich & Kohler, 2001). Almost one half of nursing facilities (48%) use Medicaid funding, whose NH expenditures totaled 92 million in 2000 (Levit, Smith, Cowan, Lazenby, & Martin, 2002).

To satisfy the threshold staffing levels recommended by CMS, the wages of RNs should be increased by about 2.5% to 7%, and those of CNAs should be increased by 10% to 22% (Kovner & Harrington, 2002). Moreover, the minimum staffing requirement may cause limited admission rates while the growing aging population needs long-term care (Evans, 2001). Consequently, NHs under the Medicare Prospective Payment System (PPS) will suffer from financial issues because reimbursement is based on the number of

residents (Evans). Evans also insisted that it may cause decertified bed numbers so that the facilities have higher occupancy rates. Other important staffing aspects beyond minimum staffing ratios should be investigated in relation to the effectiveness aspects including education, use of Nurse Practitioners (NPs), appropriate allocation of direct and indirect care and the quality of provided care by staff rather than focusing on quantity of staffing depending on the number of residents and care needs (Cohen & Spector, 1996; Evans; Gelman, 2001; Health Care Financing Administration, 2000b; R. L. Kane, 2004). Third, the minimum ratio should not be misunderstood as a maximum ratio (Evans). The reason is that the current nurse staffing ratios are inadequate to address the diverse needs of residents (Nevada Nurses Association, 2000).

Although little research has been done about the relationship between total nursing staff levels and outcome indicators of QOC, very little research included QOL as an outcome measure (Dellefield, 2000; Kovner et al., 2000). The limited number of studies demonstrated that nurse staffing is a significant organizational variable related to resident outcomes and appropriate staffing levels are an essential step in improving QOC (N.G. Castle & Fogel, 1998; Harrington, Carrillo et al., 2000; Harrington, Kovner et al., 2000; Harrington, Zimmerman, et al., 2000; Johnson-Pawlson & Infeld, 1996; Porell, Caro, Silva, & Monane, 1998; Unruh & Wan, 2004; Wunderlich et al., 1996). However, each researcher studied different aspects of staffing and different resident or organizational outcomes making determination of appropriate staffing levels difficult (see Table 1.2; Maas & Specht, 1999). The discussion regarding the studied outcomes can be found in chapter 2. The research that has examined the relationship between total nurse staffing levels, process, and outcome has not clearly defined the relationship between

differing levels of nursing staff skill mix and specific structural, process, outcome, and composite indicators of quality (Dellefield, 2000). This inconsistency in findings suggests that more research is needed, including nursing staff skill mix as an independent variable, and QOL beyond QOC as a dependent variable.

Conceptual Framework: Donabedian

Donabedian's framework (see Figure 1.1) was selected as the conceptual framework because most of the studies in looking at outcomes of care in nursing and regulatory reform in NHs have been heavily based on the Donabedian (1966) framework, including structure, process, and outcome, and this model offers avenues for problem solving (Frost, 1992; Holzemer, 1996; Schirm, Albanese, & Garland, 1999). Moreover, the Donabedian framework offers a heuristic tool to examine QOC or QOL (Schirm et al.; Wunderlich et al. 1996). The presentation of Donabedian's work (Quality in Health Care at the National Health Forum) in 1968 was a foundation for measuring quality in NHs (Bostick, 2002). Both QOC and QOL can be approached in terms of the following three concepts: structure, process, and outcomes (Wunderlich et al. 1996).

Structure

Structure includes all of the attributes of the settings of care and refers to the institution and capacity of the facility to offer QOC and QOL (Cameron, DiFazio, & Regan, 1997; Glass, 1991). Structural variables mainly include inputs as well as characteristics of facilities and residents (Wunderlich et al. 1996). Inputs include the level and mix of staffing and teamwork, while characteristics of facilities include ownership, size, accreditation, management styles, organization of resources, and teaching status.

The characteristics of residents include demographics and payer mix (Wunderlich et al. 1996). While structure is an indirect measure of quality, structure may have a direct influence on process and outcomes and may be considered an important factor that impacts on NH residents' outcomes (Campbell, Roland, & Buetow, 2000; Schirm et al. 1999). The operational model of this study uses staffing variables such as HPRD, skill mix HPRD, and turnover that are attributes of the structure in Donabedian's model.

Process

Process refers to the tasks involved in giving and receiving care as an approach to outcomes that indicate the effect of care (Cameron et al., 1997). Process may include evaluation of actual services and activities offered to the residents (Wunderlich et al.), and the provision of special care and treatment to prevent outcome problems such as relapses in physical and psychosocial functioning (Wunderlich et al.). Process variables are usually defined as activities that include planning and procedures (Krichbaum et al., 2005). For instance, procedures for medication administration and staffing protocols are examples of process variables (Krichbaum et al.). In view of the QOC in NHs, process is a direct assessment of care delivery, plan of care, and interventions. Donabedian emphasizes not only technical but also interpersonal aspects among NH staff and residents (Schirm et al., 1999). Technical aspects include underuse of care (care is not provided when it is needed) or overuse of care (care is provided when it is inappropriate; Brook, 1994; Kahan et al., 1994). Interpersonal care refers to the management of the social and psychological interaction among health care providers and residents and includes communication, relationship with trust, empathy, sensitivity, and responsiveness (Blumenthal, 1996; Carmel & Glick, 1996; Donabedian, 1980). For instance, the well

established rapport among health care professionals and residents would improve the relationship aspects of the QOL. Also, the effort of staff to know and learn the residents' personal histories would facilitate the individuality of residents. The interaction would let staff know what residents want to change and what they want to keep.

Process will not be examined in this study because of lack of data and measurement difficulties; process data are currently not available in a large database. This does not mean that the actual influence of process on outcomes can be ignored. Rather, process is very important to resident outcomes. Further research that investigates the effectiveness of process in Donabedian's model is necessary to transform research into practice. The inability to measure the influence of structure mediated by process on outcome is a limitation in this study.

Outcomes

Outcome is defined as a change in health status such as physical, psychological, or social functioning in response to provided care. Both structure and process may impact the outcomes directly or indirectly, and the importance of each component of structure and process depends on diverse situations (Campbell et al., 2000). Outcomes in NHs represent the changes in health and conditions ascribed to the care given or not given, symptom relief, and knowledge and behavior changes regarding health (Campbell et al.; Schirm et al. 1999; Wunderlich et al., 1996). In addition, outcome variables include residents' morale, lifestyle behaviors, and satisfaction with care (Campbell et al.; Donabedian, 1966; Shaughnessy, Kramer, & Hittle, 1990). In this study, QOL variables were measured as outcome variables.

Proposition

The proposition of Donabedian's model is that: (a) structure leads to process; (b) process leads to outcomes; and (c) structure can directly influence outcomes, although the direct effect of structure on quality is difficult to evaluate (Sainfort, Ramsay, Ferreira, & Mezghani, 1994). Donabedian (1988) insisted that good structure offers a framework for effective processes, which result in good outcomes. Staffing is a structural variable which impacts the processes and outcomes of care (Wunderlich et al., 1996).

Rantz et al (2004) developed the "Theoretical Model of Organizational Attributes of Nursing Facilities Achieving Good Resident Outcomes" based on their study's findings. They emphasized the importance of staff because staff does actual care planning to get better resident outcomes, pain management, skin integrity, walking ability, nutrition and weight, hydration, and continence (Rantz et al., p. 35). Rantz et al. explained that better outcomes can be accomplished through nursing and administrative leadership, teams and group interaction, and an active quality improvement program (Rantz et al.). The major advantage of Rantz' and colleagues' theoretical framework is that it is based on empirical findings. Practitioners, readers and policy makers may understand the phenomena regarding staffing and resident outcomes easily with the help of Figure 2.1.

The nursing and administrative leadership, team and group interaction, and active quality improvement program in Rantz and colleagues' (2004) theory corresponds to the process, and the resident outcomes in Rantz and colleagues' theory distinctly correspond to the outcomes in Donabedian's model. The proposition is expressed by an arrow, which is similar to the way it is expressed by Donabedian. However, how each process variable

(nursing and administrative leadership, team and group interaction, and active quality improvement program) and each outcome variable (pain management, skin integrity, walking ability, nutrition and weight, hydration, and continence) interact and relate, and should be described concretely. Obviously, the Rantz and colleagues' model lacks structure, which is well defined in the Donabedian model. The residents' outcomes in the Rantz et al.' model were limited to only six clinical outcomes while they measured 21 quality indicators of the MDS. Furthermore, QOL was not measured in this model, as mentioned.

Significance and Justification

The cross-sectional, correlational study proposed here began to fill two major gaps in research regarding staffing and QOC or QOL for NH residents based on the previous research.

Differing Nurse Staffing

One of the gaps in research is that RNs and other nursing staff such as LPNs/LVNs have often been grouped together as licensed staff, although RNs and LVNs/LPNs can not replace one another in preparation or in legal authority to provide care (Baldwin, Roberts, Fitzpatrick, While, & Cowan, 2003; Dellefield, 2000; Masterson, 2004). NHs employ less licensed nursing staff (RNs/LPNs/LVNs) and more unlicensed nursing staff (CNAs), due to financial pressures (Conant; Curtin & Simpson, 2000; Harrington, 2005a; Hunt & Hagen, 1998). It is true that the most direct caregivers of NHs are CNAs (Conant, 2004; Wells, 2004). Moreover, the Balanced Budget Act of 1997, that initiated Medicare PPS was not required to reveal specific staff levels (Harrington,

2005a). Thus, after the Balanced Budget Act of 1997 was set up, the RN level, and overall HPRD were decreased with worse resident outcomes (Harrington, 2005a; Konetzka, Yi, Norton, & Kilpatrick, 2004). So far, very few studies differentiate RNs in the area of NH staffing research. In addition, the report to Congress by CMS (2001) also failed to identify RNs' diverse and specific roles in NHs (Mohler, 2001). The number of RNs, LPNs, and CNAs who worked in NHs increased approximately 56%, 55%, and 20% respectively from 1985 to 1995 (American Federation of State, County and Municipal Employees, 1998). The nursing staffing level increase occurred after the implementation of the Nursing Home Reform Act (NHRA), part of OBRA 1987 (Zhang & Grabowski, 2004). By analyzing the 1987 Medicare/Medicaid Automated Certification System (the precursor to OSCAR) and the 1993 Online Survey Certification and Reporting (OSCAR) data (Zhang & Grabowski), this report found that RN HPRD increased from 0.26 in 1987 to 0.30 in 1993, LPN HPRD increased from 0.46 in 1987 to 0.6 in 1993, and CNA HPRD increased from 1.61 in 1987 to 1.99 in 1993.

However, more recently, Harrington (2005a) reported that the number of RNs in long-term care facilities decreased by approximately 25% between 1999 and 2003, which means the HPRD decreased from .8 to .6. In the same study, Harrington (2005a) also reported that the HPRD of LVNs/LPNs were consistent at 0.7 while HPRD of CNAs increased from 2.1 to 2.5. This occurred despite the fact that complexity of care for NH residents has increased. It is likely that the staff shortage problem will worsen with the aging population and nationwide nursing shortage problems (Evans, 2001).

RNs in NHs usually have many independent and leadership responsibilities including providing assistance to residents, supervising staff, recognizing significant

changes of residents, screening for disease and teaching staff and caregivers, and being involved in staffing, delegation, communication, quality assurance and advocacy issues (Harrington et al., 2003; Heath & Masterson, 2001; Masterson, 2004). According to the Department of Health and Human Services, the proportion of RNs who are working in NHs of total RNs was 6.9% in 2000 and 6.3% in 2004, which shows that the proportion of RNs working in NHs decreased during this time period (Harrington, 2005a). The work of RNs is difficult because they do not have enough time to provide direct care for residents and opportunities for professional fulfillment, especially in long-term care settings (Cardona, Tappen, Terrill, Acosta, & Eusebe, 1997; Fulmer & Mezey, 1999). RNs often experience feelings of geographical and professional isolation and marginalization (RCN News, 1999).

The care nurses provide in NHs is complex for a variety of reasons. The residents in long-term care settings were reported to have 3 to 6 medical diagnoses and receive 3 to 18 drugs a day (Mohler, 2001). Approximately 75% of residents needed assistance with more than three ADLs (Kovner, Mezey, & Harrington, 2002; Wunderlich & Kohler, 2001). About 51% of residents in NHs suffer from dementia (National Academy on an Aging Society [NAAS], p. 3, 2000) with approximately one third of NH residents having Alzheimer's disease (NAAS, p. 2). In conclusion, RNs bear great burden because of the severity of the residents' health. NHs have a mix of residents including severely ill elderly residents and terminally ill younger residents (RCN News, 1999).

Despite the need for more research, some studies have supported the contribution of RNs with the conclusion that the presence of RNs affects residents' positive outcomes, directly and indirectly (Aaronson, Zinn, & Rosko, 1994; Anderson, Hsieh, & Su, 1998;

Bliesmer, Smayling, Kane, & Shannon, 1998; Bostick, 2004; Munroe, 1990; Sullivan-Marx, Strumpf, Evans, Baumgarten, & Maislin, 1999; Weech-Maldonado, Neff, & Mor, 2003). RNs can contribute their skills and knowledge to make a difference in process and outcome measures of NH residents (Harrington et al., 2003; Weech-Maldonado et al., 2003). They also play a critical role in care planning and supervising other nursing staff (Dellefield, 2000), because they have been educated as problem solvers and have broader clinical preparation (Coccia & Cameron, 1999). RNs usually are required to have at least two years of college education with geriatric training and have the ability to cope with emergency situations, while LPN/LVN and CNAs are only required to have 1 or less than 1 year of training and their training focuses on the nursing skills to assist the residents' ADLs (Bostick, 2002; Conant, 2004; Cohen & Spector, 1996). The federal government requires only 75 hours of training for CNAs according to the 1987 Nursing Home Reform Act (Department of Health and Human Services, 2008). It is true that the salaries of RNs are higher than those of other licensed and certified nursing staff, such as CNAs and LPNs (Mukamel & Spector, 2000; Weech-Maldonado, Neff, & Mor, 2003). However, wages of RNs are quite low compared with those of hospital staff, in general. The residents' better outcomes even with the cost of RNs provide a stable financial situation for NHs (Mukamel & Spector, 2000; Weech-Maldonado, Neff et al., 2003). Unlike RNs, CNAs have not been educated to provide individualized care for residents as have RNs (Conant, 2004). The short training time for LPNs/LVNs and CNAs seems inadequate considering the challenging roles they must fill in NHs (Harrington, 2001a).

The previous findings can not be used for national policy because the studies did not address specific RN ratios. Further research regarding nursing staffing contributes to

the basis for the case mix reimbursement systems in the future (Fries, Schneider, Foley, & Dowling, 1989; Fries et al., 1994). Many studies were not large enough to draw inferences for national policy, which indicates that more research should be done (Kramer & Fish, 2001). To establish and improve the QOC in NHs by setting up legal minimum staffing ratios and minimum levels of total nursing care hours, it is important to explore and define the RNs' contribution to the QOC in NHs. RNs' unique contribution to resident outcomes versus alternative nurse staffing requires further research to see which staffing mix maximizes desirable outcomes for residents.

Emphasizing Quality of Life Beyond Quality of Care

Previous research has focused on the QOC for NH residents such as urinary tract infections and malnutrition (R. A. Kane et al., 2003). These studies measured only QOC by using Quality Indicators of the MDS 2.0 which does not measure QOL (Harrington, Carrillo, Thollaug et al., 2000; Zimmerman, 1998). Moreover, QOL has not been measured extensively for NH residents, and it has not been protected by politicians or by law (R. A. Kane, 2003; R. A. Kane et al., 2003). To offset the limitation of Quality Indicators in version 2.0 and to advance the measurement which reflected the psychosocial areas of NH residents, a University of Minnesota research team contracted and developed QOL measurement with the CMS (R. A. Kane et al., 2003).

This study is developed to measure QOL by using MDS 3.0. It is very important to measure QOL because NHs are expected to provide social and even end of life services as well as health services. Although QOC is necessary for, and plays a large part in QOL, it is not sufficient. It takes more than QOC to have QOL (Guse & Masesar, 1999; Harrington et al., 2002). Additionally, it is also obvious that the health state of

residents affect QOL regardless of nursing services. However, there are very few studies that investigate the relationship between quality of nursing care and QOL. This study is a pilot study to investigate these relationships.

Methods Overview

Design

The design for aim two and research questions a, b, and c was a cross-sectional and correlational study. Cross-sectional designs are used to investigate groups of subjects in diverse stages of development at the same time (Burns & Groves, 2001). Because the relationship between the independent variables and dependent variables was examined (see Table 1.2), this study will be a descriptive correlational study. The data for this study comes from two major sources: OSCAR and MDS 3.0. Demographic information from MDS 2.0, and section F of MDS 3.0, which is currently not required in NHs, were used in this study.

The independent variables were HPRD, skill mix HPRD, and turnover rate of nursing staff. The sources for these variables were the CMS' OSCAR. In this study, the ratio of RNs to LPNs/LVNs, and the ratio of RNs to LPNs/LVNs/ plus CNAs were used as a tool to measure skill mix. The skill mix of NHs means the variation in skill and educational background of nursing staff in NHs (Dellefield, 2000). According to the CMS website (2006), Nursing Staff HPRD means "the average hours worked by the licensed nurses or nursing assistants divided by total number of residents." The concrete procedure of calculating this HPRD is described in Table 1.3. This definition was used in this study.

To calculate turnover of total nursing staff and each level of nursing staff (RN, LPN/LVN, and CNA), a crude turnover rates was used. A crude turnover rate is calculated as the numerator (number of nursing staff who left = number of nursing staff who quit the job) divided by the denominator (numbers at start plus numbers at end divided by 2, and then multiplied by 100 usually for 1 year (see Table 1.4; Duxbury & Armstrong, 1982). As turnover and staff turnover data do not exist, the actual turnover was obtained from the administrative staff at each NH using the Nursing Personnel Data Collection Tool developed by Bostick (2002; see Table 1.5).

OSCAR has no information about turnover, temporary staffing, educational level, motivation, experience, use of advanced nurses and capability of staffing (Harrington, Zimmerman et al., 2000; R. L. Kane, 2004). The experience, wages, educational level, and age of nursing staff were obtained directly from NH administrative staff via interview and records in NHs because these data can not be obtained through OSCAR.

The data for the dependent variables were collected using the QOL section in MDS for Nursing Home Resident Assessment and Care Screening, version 3.0 (see Table 1.6). Version 3.0 of the MDS will be updated from MDS 2.0 and was proposed for validation to CMS of 2003 April (Anderson, Connolly, Pratt, & Shapiro, 2003). As of July, 2007, MDS 3.0 is still not implemented.

The QOL section in the MDS 3.0 was developed by a University of Minnesota research team (Kane et al., 2003) through a contract with CMS to offset the limitation of quality indicators in MDS 2.0 and to advance the measurement of the psycho-social aspects of NH residents' lives (R. A. Kane et al., 2003). Based on the literature review, opinions of professionals, group discussions, and stakeholders' discussions, the

University of Minnesota research team determined 11 QOL domains. The team developed 54 questions for health care providers to ask resident directly to assess the 11 domains: dignity, comfort, privacy, meaningful activity, relationships, spiritual well-being, autonomy, individuality, food enjoyment, security and functional competence. The relationships and preferred routine categories were extracted from MDS 2.0. The proposed version of the MDS 3.0 included both dichotomous and Likert scales.

QOL is subjective and should reflect the variety of experiences of residents (R. A. Kane et al., 2003). It has been reported that there is a perception gap regarding QOL ratings between NH residents and proxies (families or staff; Berlowitz, Du, Kazis, Lewis, 1995; Kane et al., 2000; R. A. Kane et al., 2005; R. L. Logsdon, 1999; Mittal et al., 2007). Especially when the answers of proxies are used for personal thinking or feeling, the use of proxies should be used with caution because variation between residents and their proxies would be larger than the objective facts, such as falls (CMS, 2007). It would be problematic because proxy members would bring their own views and insights that may be different from the residents' (CMS, 2007). Thus, because they report directly about the lived experience of residents, their self-reports have more validity. The QOL section of the MDS 3.0 was designed to get answers from residents directly (R. A. Kane, 2003; Rubinstein, 2000). R. A. Kane and colleagues (2003) established three groups based on the 11 domains according to similar characteristics in domains: comfort and security questions, social questions, self-worth and individual questions (R. A. Kane et al., 2003). The comfort domain extends the current QOC domains in the MDS 2.0 by including a broader variety of discomforts (R. A. Kane et al., 2003). For instance, the comfort domain includes the status of freedom from pain, shortness of breath, constipation,

appropriate room temperature, and even clean bed sheets (R. A. Kane, 2001). The security domains cover the general concepts of security and safety as well as QOC issues such as falls and accidents (R. A. Kane et al., 2003). R. A. Kane (2003) explained that the security concept includes giving people confidence about their own benevolent environment where normal rules of life can be followed.

The social areas include relationships, meaningful activities, functional competence, and enjoyment (R. A. Kane et al., 2003). Relationships include all residents, staff, family, friends, and others even outside the NHs (R. A. Kane et al., 2003). Meaningful activity covers many kinds of flexible activities based on the residents' needs and excludes the ADLs (Kane et al., 2003). Functional competence is identified as the maximized independence of residents in the scope of allowed abilities (R. A. Kane et al., 2003). R. A. Kane and colleagues (2003) hypothesized that the more pleasure the residents experience, the more their enjoyment will be increased. Food enjoyment was only included as a subscale in the QOL section.

The self-worth and individual area includes individuality, autonomy, privacy and dignity (R. A. Kane et al., 2003). Individuality is significant in that it is hard for residents to maintain continuity and uniqueness in NH settings (R. A. Kane, 2003; Tobin, 1991). Autonomy is understood as self-direction, having choice of exercise, and containing recognized control of daily life (Avorn & Langer, 1982; R. A. Kane, 2003; Langer & Rodin, 1976; Rodin, 1986). Furthermore autonomy has been related to reduced morbidity and mortality rates (Avorn & Langer; R. A. Kane et al., 2003; Langer & Rodin; Rodin). Privacy is considered a precondition of autonomy, and is defined by Kane as a resident's control of their own experience, information, and rights of choice in informal interaction

with other people (R. A. Kane et al., 2003). Residents' dignity was described as an emotion experienced by residents as well as the living conditions imposed on residents (Kane et al., 2003). R. A. Kane and colleagues did not provide any specific definition regarding spiritual well-being, but emphasized that spiritual well-being has received attention in the literature (R. A. Kane, 2003; Kimble, McFadden, Ellor, & Seeber, 1995; National Institute on Aging Working Group, 1999). McInnis-Dittrich (2004) defined spirituality as "about finding meaning in life now and cultivating ways to explore and express those beliefs" (McInnis-Dittrich, p. 267). Spiritual well-being is highly related to the overall well-being of elders, including their physiological and psychological well-being (Bensley, 1991; Carson, Soeken, Shanty, & Terry, 1990; Fry, 2000; Hungelmann, Kenkel-Rossi, Klassen, & Stollenwerk, 1996; Koenig, MaCullough, & Larson, 2001; Powell, Shahabi, & Thoresen, 2003; Reed, 1992). The experience of more fulfilling spirituality was related to psychological well-being for institutionalized elders as well as the role of RNs, who are expected to share in the spiritual experience of residents in NHs (Fry; Hicks, 1999; McKinley, 2005).

Ten of the 11 domains were determined by confirmatory factor analysis ($n=1,988$; R. A. Kane et al., 2003). Individuality was dropped because individuality and relationship domains were identical ($r = .99$) and reliability of individuality was poor ($\alpha = .56$; R. A. Kane et al., 2003). The internal consistency (Cronbach alpha) was reported from 0.76 (functional competence) to 0.52 (meaningful activity) in Kane and colleagues' study (2003).

Sample/Setting

The setting for this study is NHs that are certified for Medicare and Medicaid. Sample size was 25 NHs within a 70 mile radius of Iowa City. Iowa is a good setting for research because a larger percentage of elders (older than 65) in Iowa use certified nursing facilities (5.8%) than the national average (3.8%), and about 25,220 residents lived in nursing facilities in Iowa in 2003 (Kaiser Family Foundation, 2006). The stratified random sampling was applied to this NH list to identify representative characteristics of the sample (Burns & Groves, 2001). Of the 76 NHs within 70 miles of Iowa City (CMS, 2006), only 36 NHs have between 50 and 100 beds. Among the 36 NHs, 12 for-profit NHs and 12 not-for-profit NHs were selected randomly. Ten percent of residents in the 25 NHs (approximately 9 per each nursing home, N=231) were recruited.

The following demographic characteristics of Iowa are based on the U.S. Census in 2005. Total Iowa population was estimated as 2,966,334 (U.S Census, 2005). Males composed about 49.2% of the population with females composing about 50.8 % (U.S. Census, 2004). Almost 14 % (13.9%) of the population was 65 years and over. Almost 2 % (1.8%) of the population was 85 years and over (U.S. Census, 2004). The majority of the population was native born (96.6%) with 94.6% of the population using English as the language spoken at home. The majority of the population is White (93.8%); 2.2% African American; 0.4% Indian American and Alaska Native American; and 1.2% Asian.

There are a total of 455 NHs in Iowa (CMS, 2006). The number of Medicare and Medicaid certified NHs is 325 (70.19%; Cowles Research Group [CRG], 2002). The number of Medicaid eligible NHs is 127 (27.42%) and the number of Medicare eligible

NHs is 11 (2.37%; CRG, 2002). About half of NHs in Iowa (49.9%) is dominated by Medicaid, and only 4.85 % of NHs in Iowa are certified for Medicare (CRG, 2002). Iowa is one of the lowest Medicaid- reimbursed states, ranking 47 out of 51 states (Swan et al., 2001).

The total licensed HPRD (1 hour 6 minutes) in Iowa is lower than the national average (CMS, 2006). However, RN hours were a little higher than the national average (36 minutes vs 30 minutes) and LPN/LVN hours were a little lower than the national average (30 minutes vs 42 minutes; CMS, 2006). CNA hours were also a little lower than the national average (2 hours 6 minutes vs 2 hours 18 minutes; CMS, 2006).

The sample for this study is the residents of the selected NHs described above. To be consistent with Kane's pilot study using MDS 3.0, residents with dementia or poor cognitive function were included in this study. However, the comatose residents, those who could not maintain a simple conversation, screen, and answer 4 of 6 questions, were excluded (Anderson, Connolly et al., 2003). If the Likert scale was too difficult for the residents, it was changed to a dichotomous scale, which includes yes or no answers (Anderson, Connolly et al.). As part of the inclusion criteria for the sample, the responsiveness screen used in the Simmons and Ouslander (2005) study was applied here. The residents were asked to say their names when requested or to reliably recognize two common objects (Simmons & Ouslander). If the resident could not answer these questions, they were excluded from the sample.

The experience, wages, educational level, and age of the nursing staff in NHs were obtained. These data were collected directly from the NHs because OSCAR data does not have this information.

Instruments

Two sources of data, OSCAR and QOL section in the MDS 3.0 were used to examine the relationship between staffing and residents' QOL in NHs in this study.

OSCAR

OSCAR includes the NH characteristics and the residents' health deficiencies collected during the three most current state surveys and additional complaint examinations (CMS, 2006). OSCAR is completed by NH administrators, and collected by the state survey agencies who conduct on-site evaluations at least once every 15 months. The evaluation also can be conducted when there are complaints regardless of the 15-month inspection cycle. After collecting data, the state survey agencies are in charge of entering survey information into the OSCAR database and doing updates if necessary (CMS, 2006).

There are also limitations when using OSCAR as a tool for measuring staffing at NHs. The major limitation of OSCAR is that the staffing of OSCAR could be higher than the usual staffing levels because some facilities augment staffing levels just before the annual certification survey (CMS, 2001; Harrington, Zimmerman et al., 2000). Secondly, data are not collected at the same time because of the continuing annual survey process (Straker, 1999). Thus, the time deviation between facilities can be another limitation. Third, this data cannot investigate the entire elderly population in NHs in the United States because not every NH is certified for Medicare and Medicaid (Straker). Fourth, there is continuous concern about the validity and reliability of OSCAR (GAO, 2002b; Harrington et al., 1998; Harrington et al., 2003; Harrington, Zimmerman et al., 2000; Schnelle, 2004; Health Care Financing Administration, 2000b; Straker, 1999).

Psychometric Properties of OSCAR

Despite concerns regarding the psychometric characteristics of OSCAR, few studies have been done regarding its validity and reliability (Feng, Katz, Intrator, Karuza, & Mor, 2005). Straker (1999) compared 1995 OSCAR data to 1995-1997 data from the Ohio Department of Health (ODH) to examine consistency, discrepancies, and the reasons for discrepancies between the two databases (Straker). This study showed that the correlation of the mean number of beds between ODH and OSCAR was .65 (see the upper part of Table 1.7). Whereas, the correlation between ODH's and OSCAR's data on the number of Medicare or Medicaid certified beds was higher ($r = .952$) (see the middle part of Table 1.7).

OSCAR showed higher numbers of staff hours than those of ODH due to the different data-collection methods, which ignored the staff pay system (Straker, 1999). The correlation range regarding HPRD was from .083 to .34 (see Table 1.8). There was more consistency in RN and LPN HPRD than for CNAs (see Table 1.8). The correlation range regarding the number of hours worked a day was from .56 to .73 and the correlation of RN hours per day was high with $r = .731$ (see Table 1.8).

OSCAR validity was evaluated by Straker (1999), comparing OSCAR data, Medicaid cost-report data and the Ohio payroll data in the CMS 2002 report. Straker compared mean staffing levels and analyzed the proportion of facilities that had "more valid" data in OSCAR than in the Ohio payroll data. The mean HPRD was the same across the three data sources, while mean staffing measures from OSCAR of the facilities which ranked in the bottom 20 in total HPRD was closer to the payroll data than the Medicaid Cost Report (see Table 1.9).

This study also suggested that the correlation of the total HPRD between the pre-survey period and survey period was .76 (CMS, 2001). This means that the staffing of OSCAR could be higher than the usual staffing level because some facilities augment the staffing levels just before the annual certification survey (CMS, 2001). The researchers for this study analyzed the Pearson, Spearman and Kendall's Tau-b correlations for the two periods. Pearson correlation coefficient was calculated by regression (Straker, 1999). Spearman was also calculated because the Spearman correlation coefficients consider the correlation of the ranks and offset the limitation of the Pearson correlation coefficients, which may be impacted by the outliers (Straker). Straker used Kendall's Tau-b to explain the relationship between ordinal variables. In the pre-survey period (see Table 1.10), the Pearson correlation coefficient of total hours per resident day was higher between OSCAR and the payroll data (.761) than between the Cost Report and payroll data (.697). The correlation for total RN and LPN hours was somewhat higher for OSCAR (.811) than for the Cost Report data (.794). The Spearman rank correlation was higher for the Cost Report data (.61) than for OSCAR (.532) whereas the Kendall Tau-B statistic was .473 for the Cost Report compared to .406 for OSCAR. Both the Spearman and Kendall Tau-B Statistic were approximately .2 higher for OSCAR than the payroll data for RN and LPN hours.

In the survey period (see Table 1.11), the Pearson correlation coefficient for total hours was .594 for the Cost Report data but only .49 using OSCAR. Both the Spearman and Kendall correlations were higher for the Cost Report data than OSCAR. For RN and LPN hours, this correlation was .687 for the Cost Report Data and only .521 in OSCAR.

Furthermore, both the Spearman and Kendall Tau-B correlation coefficients were higher for OSCAR than for the Cost Report data.

There are remarkable differences in case of the low-staffed facilities that have less than the median total nursing hours. In the pre-survey period (see the bottom of Table 1.10), the Pearson correlation of total nursing hours of the Cost Report Data was .559 while the correlation of OSCAR was .459. The Spearman and Kendall correlations of Cost Report data were higher than OSCAR. Regarding the RN and LPN hours, the Pearson correlation coefficient of Cost Report data was .706 while that of OSCAR was .252.

In the survey period (see the bottom of Table 1.11), the Pearson correlation coefficient of Cost Report of the total nursing hours was even higher (.310) than OSCAR (.121). Both Spearman and Kendall Tau-B correlation coefficients were significantly higher for the Cost Report data. The Kendall Tau-B statistic of Cost Report data was .236 while that of OSCAR was .126. Regarding the RN and LPNs hours, all three correlation measures of the Cost Report data were higher than those of OSCAR.

In conclusion, the Cost Report was more valid than OSCAR regarding staffing measures. Remarkably, most correlations of Cost Report were higher in the case of low-staffed facilities. However, Feng and colleagues (2005) argued that comparing OSCAR with Cost Report or payroll data should be interpreted cautiously. The reason is that (a) Cost Reports are generally limited to cost by staff classification over the financial year, while staffing levels are subject to change because of high nursing turnover rates (Feng et al., 2005); (b) the data collection regarding staffing is not standardized and it varies state by state (GAO, 2002b); (c) payroll data also have flaws in that it is not clear that staff

working hours include paid but not working hours like vacation (CMS, 2001); and (d) those studies used small sample sizes and limited geographical areas and time (Feng et al., 2005). To compensate for explained limitations, Feng and colleagues (2005) compared OSCAR with the New York State survey which uses accurate processes and protocols. This report supported the usefulness of OSCAR in that correlations measured by Spearman correlation were quite high (RN FTEs : .78, LPN FTEs: .71, CNA FTEs : .8), although the Spearman correlation regarding average HPRD was quite low at .27 (RN : .57, LPN: .45, CNA: .29; Feng et al.).

Besides the limitations of cost reports and payroll data over OSCAR when testing psychometric characteristics of OSCAR, OSCAR is the only available electronic source from the CMS (Straker, 1999). Furthermore, OSCAR provides insight into the physical, cognitive, and behavioral problems of the residents (Straker, 1999) and the evaluations can assure the QOC and services of the residents in NHs compliance with the rules mandated by CMS (CMS, 2006). To increase the validity of OSCAR, this report suggested the exclusion of extreme staffing values and the exclusion of facilities that reported a large change in staffing levels across time. Because there was no extreme staffing information in the obtained OSCAR for the sample, no cleaning strategies were necessary.

Quality of Life Section in MDS 3.0.

Section F, QOL, in the MDS 3.0 was used as a measurement for outcomes in NHs in this research. In 2003, the draft MDS 3.0 was proposed to CMS for validation (CMS, 2003b). According to an interview with a staff member at the Research Data Assistance Center (2004), the MDS 3.0 assessment instrument is in the development stage, yet a

timeline for implementation and release of 3.0 data has not been set. CMS-development team members, an Information Technology coordinator, a social worker, an RN and a Physical Therapist, built the MDS 3.0 and received feedback through teleconferences from key stakeholders (Anderson, Connolly, Pratt, & Shapiro, 2003). According to the CMS's MDS 3.0 development process data (2003b), new items in the MDS 3.0 were based on the input of the Professional Groups and Technical Expert Panels in 2002 (Anderson et al., 2003). The QOL section in MDS 3.0 is based on interviews to allow researchers to hear the responses of residents directly, rather than filtered through staff or family members (Anderson et al, 2003).

CMS contracted with the University of Minnesota from 1998 to 2003 and did the pilot study to test 11 domains in the MDS 3.0's QOL section in 100 NHs in 6 states (Anderson, Connolly et al., 2003). Fifty-four items were used to create 11 QOL scales (Anderson et al, 2003). Residents with poor cognitive function were included in this study. However, comatose residents, those who could not maintain a simple conversation screen and answer 4 of the first 6 questions were excluded (Anderson et al, 2003). If the Likert scale was too difficult for the residents, it was changed to a dichotomous scale, which includes yes or no answers (Anderson et al, 2003).

The result of this study showed the response patterns between those who have good and bad cognition was similar and on average 60 % of residents could respond (Anderson, Connolly et al., 2003). In addition, items were found to be useful not only for residents but also for the facility in analyzing the QOL (Anderson et al, 2003). The proxy test showed that family is a bit better than the staff and neither was better than $r = .3$ when predicting the responses of residents (Anderson et al, 2003). Cronbach's alpha tests

showed good scale properties; between .82 and .64 (100 NHs in 6 states; Anderson et al., 2003). A high correlation was shown between the emotional-well-being and being in private room domains indicative of concurrent validity (Anderson et al, 2003). Ten of the 11 domains were determined by confirmatory factor analysis ($n=1,988$; R. A. Kane et al., 2003). Individuality was dropped because individuality and relationship domains were identical ($r = .99$) and reliability of individuality was poor ($\alpha = .56$; Kane et al., 2003). The internal consistency (Cronbach's alpha) was reported from .76 (functional competence) to .52 (meaningful activity) in Kane and colleagues' study (R. A. Kane et al., 2003).

For data collection, the QOL data were collected by the RNs, social workers and other activity staff (Anderson, Connolly et al., 2003). The response to staff of NHs was similar to the researchers and the differences between researchers and staff were comparable to the test-retest reliability differences (Anderson et al, 2003). Additionally, there was no systematic variation between RNs and other staff in their similarity with researchers (Anderson et al, 2003).

Procedures

The researcher interviewed and collected QOL section data in MDS section 3.0 from the sample population ($n=231$). The researcher collected the QOL section data in the MDS 3.0 from the selected sample ($n=31$). Then, the correlations between the data of the researcher and a graduate student's data were analyzed to examine interrater reliability. It was expected that the researcher would complete 9 cases per day and it took 1 to 2 months to complete data collection. A graduate student was provided \$ 700 to collect data from residents. QOL is very subjective so the best way to measure it is to get

answers from residents directly (R. A. Kane et al., 2003). If the residents are alert, the researcher obtained their consent and collected data directly from them. For persons who were cognitively impaired or demented, the consent form was also obtained from the proxy or family members. Residents with poor cognitive function for whom consent was granted by their legal representative and who assented to participate were included only if the resident could answer the questionnaires. However, comatose residents, those who could not answer the simple questions, the terminally ill and residents with multiple chronic conditions and severe cognitive and functional impairments were excluded.

Because the only available electronic sources regarding staffing is CMS's OSCAR (Straker, 1999), the federal OSCAR data set for the year of 2006 was used to measure staffing independent variables such as skill mix and HPRD by RNs, LPNs/LVNs and CNAs. These inspection results are collected by the state survey agencies who implement the online evaluations (Harrington et al., 2000). These data are collected every 12 months during regular certification surveys given by state agencies that confirm compliance (Harrington et al, 2000). OSCAR data can be purchased through CRG, the research company that tailors the information extracted from government health related databases (CRG, 2004). Because the NH survey process is thorough, the most extensive data in OSCAR is the data for NHs, which has about 700 variables (CRG, 2004). CRG regularly purchases and records the complete OSCAR to eliminate the problem that the new survey data is overwritten when the new survey is done (CRG, 2004). Through mailing lists which are available on CRG's website, the OSCAR file can be imported directly into programs such as the Statistical Package for the Social Sciences (SPSS) or Excel (CRG, 2004). The cost of OSCAR data of skilled nursing facilities nationwide is

\$900 and individual state's data is \$250 (CRG, 2004). This is less expensive than buying it directly from the government (CRG, 2004). In spite of CMS' cleaning efforts, OSCAR has some problems regarding validity, as mentioned above (Harrington et al., 1998). Therefore, cleaning strategies proposed by Harrington and colleagues (1998) were planned to be applied. If staffing hours are extremely high or low because of mistaken reporting by NHs, these outliers in the lower 2 % and upper 2 % of facilities in each staffing category were supposed to be removed (Dyck, 2004; Harrington et al., 1998). However, there were no outliers in the obtained datasets and cleaning procedures were not needed.

Data Analyses

Primarily, SPSS 12.0 for Windows was used for formatting and discovering duplicate and imperfect data. The researcher obtained and reviewed the data between 1 and 2 months. The researcher saved and locked the files with a password in the researcher's laptop and hard copies will also be saved in the locker of the researcher.

Preliminary Analysis

Using SPSS statistical software, descriptive statistics were obtained. To assess the central tendency, the means, modes, and medians were generated, while ranges, variance, and standard deviation were calculated to explore variability in the data. Preliminary analyses established the association and relationship among the variables and the probable confounders in the regression models.

When doing multivariate analysis, resident case mixes were controlled because sicker residents are assumed to have poorer outcomes yet require more staffing efforts

(Arling, Karon, Sainfort, Zimmerman, & Ross, 1997; Harrington et al., 2000; Harrington et al., 2002). Case mix means the comprehensive profile of patients including functional and health status, clinical situations that the provided care or interventions are not effective (Berlowitz et al., 1996; Zimmerman et al., 1995). Thus, to compare outcomes validity, risk factors should be removed (Berlowitz et al., 1996; Zimmerman et al., 1995). Controlling case mix validated the comparison by removing resident variations (Berlowitz et al., 1996; Zimmerman et al., 1995). The rationale is that case mix is a major factor for verifying the required amount of nursing staffing hours (Harrington, 2001b). CMS started its Nursing Home Casemix and Quality Demonstration project in various states using MDS and other measures (Wunderlich & Kohler, 2001). Based on these data, Resource Utilization Groups-III (RUGS-III) has advanced (Wunderlich & Kohler). MDS categorizes residents into 44 different RUGS-III groups for the Medicare PPS (Wunderlich & Kohler). Reliability and validity were tested (Fries & Cooney, 1985; Mueller, 2000; Schneider, Fries, Foley, Desmond, & Gormley, 1988). The 44 RUGs are classified based on seven major categories including rehabilitation, extensive special care, clinically complex, cognitive impairment, behavioral problem, and physical function (Mueller).

The RUGS-III system is used for PPS for nursing facilities, hospital swing-bed programs, and Medicaid case- mix payment systems for reimbursement (CMS, 2002). Thus, NHs with residents who belong to higher RUGS groups are paid more than those with lower RUGS groups (Wunderlich & Kohler, 2001). For example, residents who need intensive care require three times the level of care of residents who need lower levels of care, and highest RUGS group required 7.2 hours per resident day while the

average group required 1.15 RN hour, .7 LPN/LVN hour, and 2.32 CNA hour (Burke & Cornelius, 1998). One of the concerns about this system is that it is possible that the NHs might give false reports for the purpose of higher payments (Wunderlich & Kohler). Consequently, MDS data may be less reliable because it is not accurate. Thus, CMS is developing automatic monitoring programs for reporting MDS data accurately and consistently (Wunderlich & Kohler). Another concern is that the adequacy of nursing time of RUGS-III was questioned in the Delphi study, which means that the estimated time of experts was higher than that shown by RUGS-III (Mueller, 2000).

In this study, RUGS was used to control residents' different functional status. The RUGS classification was turned into numbers to be used as control variables based on the case mix set B02, which was developed for research by CMS (CMS, 2007). The range of the case mix index was from 0 to 1.52 in this study. The smaller number represented healthier residents. These factors were taken into account to investigate the relationship between staffing variables and QOL. The obtained RUGS sample data ($N=231$) had 28 categories, and each different group was functioned as one control variable.

Hierarchical Linear Modeling (HLM)

Hierarchical Linear Modeling (HLM), interchangeably called mixed-effects models, random-effects models, random-coefficient regression models, and covariance component models (Bryk, Raudenbush, & Congdon, 1994) was used to answer the specific aim of research questions of a, b and c. HLM is appropriate to discover the relationships in hierarchical data structures (Sullivan, Dukes, & Losina, 1999). There is some rationale as to why HLM is the appropriate statistical method for analyzing data in this study. HLM is designed especially for a situation where causal relationships are

hypothesized on different levels of analysis, and the units on one level are nested within the units on another level (Wu, 1996). HLM permits researchers to simultaneously estimate effects at the individual level and the NH level. An HLM analysis also is properly applied in this study because HLM takes into account those observations of individuals which are not statistically independent because they are clustered within NHs. The residents in one NH are not independent because they are clustered within a specific NH. This study examined the analysis of NHs, but the impact of resident characteristics on outcomes was also considered. The researcher analyzed the data by using the Proc Mixed of SAS program.

Three Papers Proposed

The three papers proposed describe continuous investigation of QOC or QOL for residents in long-term care facilities. The first paper will synthesize the literature examining the relationship between quality and staffing from 1996 to 2006. Keywords include staffing, QOC, QOL, long-term care settings, and NH from a computerized search of MEDLINE, CINAHL, Healthstar and PubMed. The primary focus in this thesis is to examine the relationship between nursing staffing and QOL and will be studied in the second paper. The third paper will test criterion validity by comparing the measurement properties of two measures of QOL: the QOL section in the MDS 3.0 and the QOL Nursing Outcomes Classification outcome.

Overview of Paper 1: Literature Review Regarding Staffing and Quality of Care and
Quality of Life in Nursing Homes, 1996–2006

Purpose and Scope of the Paper

The purpose of this study is to review and synthesize the literature regarding nursing staffing and QOC or QOL in NHs. Literature will be reviewed in the following aspects: (a) the investigated staffing, (b) investigated relationship, (c) measured outcomes, (d) use of theory, (e) source of research, and (f) analysis methods.

Methods

A computerized search of MEDLINE, CINAHL, Healthstar, and PubMed will be conducted to retrieve studies, using a keyword search for the following terms: nursing facility, nursing homes, quality, long-term care and nursing staffing. The journal articles published from 1996 to 2006 will be included in the review.

There are many empirical studies investigating staffing and QOC or QOL in NHs. Only staffing-related predictor variables and QOC or QOL related outcome measures will be investigated in this paper although some articles examined other predictor variables besides staffing. An extensive part of chapter I of this paper will be a large part of a proposed paper I.

Overview of Paper 2: Relationship Between Nursing Staffing and Quality of Life in Iowa Nursing Homes

Purpose and Scope of the Paper

The purpose of paper II is to report the results of the investigation into the relationship between nursing staffing and QOL in Iowa NHs using the OSCAR and the MDS 3.0.

Method

The design was a cross-sectional and correlational study. The data for this study will come from two major sources: OSCAR and MDS data.

Source of Data

The independent variables were HPRD, skill mix HPRD and turnover rate of nursing staff from OSCAR. The data for the dependent variables were collected by the researcher using the QOL section in MDS 3.0.

The setting for this study was the 12 not-for-profit and 12 for-profit NHs (from 50 to 100 beds to control bed size) within 100 miles of Iowa City that are certified for Medicare and Medicaid. Then, 10 % of residents in the 24 NHs ($N=231$) were randomly recruited.

Collection of Data

The researcher collected the data from each NH. If the residents were alert, the researcher obtained their consent and collected data directly from them. For persons who were cognitively impaired, the consent form was obtained from a proxy or family

member. Residents with poor cognitive function were included only if the resident could answer the questionnaires. However, comatose residents who could not answer simple questions, the terminally ill, and residents with multiple chronic conditions and severe cognitive and functional impairments were excluded.

Because the only available electronic sources regarding staffing is CMS's OSCAR (Straker, 1999), the federal OSCAR data set for the year 2006 was purchased and used to measure staffing independent variables. As turnover data did not exist, actual turnover data was obtained from the administrative staff at each NH using the Nursing Personnel Data Collection Tool (see Table 1.5).

Analyses of Data

HLM (Bryk, Raudenbush, & Congdon, 1996) was used to analyze data.

Overview of Paper 3: Validity and Reliability of Quality of Life Section in the Minimum Data Set 3.0

Purpose and Scope of the Paper

The previous studies measured only QOC by using Quality Indicators of MDS 2.0, which lacks measurement of QOL. QOC means the process and outcome measures that affect residents' care directly, including nursing, dietary, dental services, and infection control, while QOL is related to the rights of patients, such as the right to privacy and dignity. To offset the limitation of Quality Indicators in MDS 2.0 and to advance the measurement of QOL to reflect the psychosocial areas of NH residents, a new section, section F of the MDS 3.0, was added to hear residents' voices directly. However, there has been little research on the psychometrics properties of the QOL.

The purpose of Chapter 4 is to evaluate criterion validity of the QOL section of MDS 3.0 compared with the QOL outcome of the NOC, and establish interrater reliability for the QOL section of MDS 3.0.

Methods

For the criterion validity, the answers of 231 residents in 25 Iowa NHs were analyzed. Pearson correlation coefficients between the relationship scales in the QOL of MDS 3.0 and relationship indicator of the NOC, and the correlation between QOL summary scale in the QOL questionnaire of MDS 3.0 and the QOL NOC outcome was calculated. For interrater reliability, two raters interviewed 48 residents independently in 6 Iowa NHs. Intraclass correlation coefficients were calculated.

Table 1.1 Minimum Nursing Staffing Recommendation

| Source | Year | Licensed HPRD (RN, LPN/LVN) | RN HPRD | LPN/LVN HPRD | CNA HPRD | Direct care | Total |
|--|------|--|--|-----------------|---|--|-------------------|
| Center for Medicare and Medicaid (CMS, formerly known as the HCFA) | | | | | | | |
| CMS | 2001 | 1.3 (0.75+0.55) | 0.75 | 0.55 | 2.8 | N/A | 4.1 |
| HCFA | 2000 | 1.11 (including DON) | Not Available (N/A) | N/A | 3.0 | N/A | 4.11 |
| Institute of Medicine (IOM) | | | | | | | |
| IOM | 1996 | N/A | 24 hr/day | N/A | N/A | N/A | N/A |
| | 2001 | N/A | 24 hr/day with adjusting case mix | N/A | N/A | N/A | N/A |
| | 2003 | N/A | 24 hr/day (increased staffing level based on increased residents) | N/A | N/A | N/A | N/A |
| | 2004 | N/A | 45 RN HPRD including direct and indirect hour 1 RN : 32 long stay residents | N/A | N/A | N/A | N/A |
| Experts Recommendation | | | | | | | |
| Hartford Institute for Geriatric Nursing Expert Pane | 2000 | 1 LPN/RN/15 residents (day) 1 LPN/RN/20 residents (evening) 1 LPN/RN/30 residents (night) | 1 RN nursing supervisor at all times | N/A | 1 CNA/5 residents (day) 1 CAN/10 residents (evening) 1 CNA/15 residents (night) | 4.13 | N/A |
| NCCNHR | 1998 | 1 FTE RN DON 1 part time RN assistant DON (1 FTE assistant DON > 100 beds) 1 FTE RN in-service education > 100 beds 1 RN nursing supervisor at all times 1 RN, LPN/LVN/15 residents (day) 1 RN, LPN/LVN/20 resident (eve) 1 RN, LPN/LVN/30 residents (night) | N/A | N/A | N/A | N/A | 4.44 ^a |
| | | | N/A | N/A | N/A | 1 FTE RN, LVN/LPN, CNA/5 residents (day) 1 FTE RN, LVN/LPN, CNA/10 residents (eve) 1 FTE RN, LVN/LPN, CNA/15 residents (night) | A |
| * Minimum nursing staff at mealtime 1 nursing FTE / 2-3 entirely dependent residents 1 nursing FTE / 2-4 partially dependent residents | | | | | | | |

Notes: ^a (Excluding DON and assistant DON). From “Experts Recommend Minimum Nurse Staffing Standards for Nursing Facilities in the United States,” by C. Harrington, C. Kovner, M. Mezey, J. Kayser-Jones, S. Burger, M. Mohler, M., et al., 2000, *Gerontologist*, 40(1), 5–16; “The Relationship Between Nurse Staffing Levels and the Quality of Nursing Home Care” by A. M. Kramer & R. Fish, 2001, in ABT Associates (Ed.), *Appropriateness of Minimum Staffing Ratios in Nursing Homes Report to the Centers for Medicare & Medicaid Services(Phase II Final Report to the Centers for Medicare & Medicaid Services)* (pp. 1-26), Washington DC: Department of Health and Human Services, Health Care Financing Administration; “The Case for Minimum Nurse Staffing Standards in Nursing Homes:A Review of the Literature,” by J. C. Wells, 2004, *Alzheimer’s Care Quarterly*, 5(1), 39–51; *Nursing Staff in Hospitals and Nursing Homes: Is it Adequate*, by G. S. Wunderlich, F. Sloan, & C. Davis, 1996, Washington D.C: National Academy Press.

Table 1.2 Variables with Definitions

| Variable | Data Set | Definition |
|--|-------------------------------|---|
| Nursing staff (Independent Variables) | | |
| Skill Mix | OSCAR | Variation in skill and educational background of nursing staffing in nursing homes |
| Nursing Staff Hours Per Resident Day | OSCAR | Average number of nursing hours budgeted or delivered per patient per day |
| Turnover | Turnover Tool (Bostick, 2004) | Number(<i>N</i>) of leavers $\frac{N \text{ at start} + n \text{ at end}}{2} \times 100$ |
| Quality of Life (Residents' outcomes) (Dependent Variables) | | |
| Dignity | | Residents recognize that dignity is integral and respected, and do not have feelings of humiliation, underestimation, or devaluation. |
| Comfort | | Residents experience least physical symptoms like pain, and recognize that NH staff takes care of the discomfort. |
| Privacy | | Resident privacy is respected and their information kept confidential. They can be alone if they wish and communicate with others in private. |
| Meaningful activity | | Residents do not feel bored at NHs, by participating in diverse activities that they feel are interesting. |
| Relationships | MDS 3.0 | Residents participate in meaningful social interchange. |
| Spiritual well-being | | The meanings in life are fulfilled, and recognize their needs and concerns regarding religion, prayer, and moral values. |
| Autonomy | | Residents make plans and have choices for their lives and care. |
| Individuality | | Residents can express preference and participate in their own past and current interests. |
| Food enjoyment | | Residents show their pleasure and enjoyment. |
| Security | | Residents feel safe and secure for themselves and their belongings and have clarity regarding rules. |
| Functional competence | | NH staff and polices do not discourage residents from being independent about care, mobility, and their environment. |

From 2006 *Nursing Home Compare*, by Centers for Medicare and Medicaid Services, 2006, Retrieved January 12, 2006, from <http://www.medicare.gov/NHCompare/Static/Related/Datacollection.asp?>; "2007 Quality of Life Volume I" Center for Medicare and Medicaid Services, 2007, retrieved March 3, 2007, from http://www.cms.hhs.gov/NursingHomeQualityInits/05_NHQIHighlights.asp#TopOfPage; "The Relationship Between Nursing Staffing in Nursing Homes and Quality Indicators," by M. E. Dellefield, 2000, *Journal of Gerontological Nursing*, 26(6), 14–28; "Calculating Nurse Turnover Indices," by M. L. Duxbury & G. D. Armstrong, 1982, *Journal of Nursing Administration*, 12(3), 18–24.

Table 1.3 Staffing Hours Per Resident Day Calculations

-
1. To determine staffing hours per day
 - A. Computed $\frac{\text{RNFTE} \times 2080 \text{ hours worked/year}}{365 \text{ days}} = \text{RN hours per day}$
 - B. Computed $\frac{\text{LPNFTE} \times 2080 \text{ hours worked/year}}{365 \text{ days}} = \text{LPN hours per day}$
 - C. Computed $\frac{\text{CNA FTE} \times 2080 \text{ hours worked/year}}{365 \text{ days}} = \text{NA hours per day}$
 2. To determine staffing hours per resident day
 - D. $\frac{\text{computed RN hours per day}}{\text{Bed size}} = \text{RN hours per resident day}$
 - E. $\frac{\text{computed LPN hours per day}}{\text{Bed size}} = \text{LPN hours per resident day}$
 - F. $\frac{\text{computed CNA hours per day}}{\text{Bed size}} = \text{NA hours per resident day}$
 3. To determine staffing hours per resident day for-profit or other facilities, the same procedure was followed after selecting for-profit or other facilities.
 4. To determine mean minutes of RN and LPN time per resident day,
 - G. Computed mean of (RN hours per resident day + LPN hours per resident day) per facility
 - H. Converted hours to minutes
-

From M. Dyck (Personal communication, January, 16, 2006).

Table 1.4 Calculation Formula for Crude Turnover Rate with the Application of Nursing Personnel Collection Tool developed by Bostick

Crude Turnover Rate by Duxbury & Armstrong = $\frac{\text{Number } (N) \text{ of leavers}}{N \text{ at start} + n \text{ at end}} \times 100$

2

Applied crude turnover rate by Bostick's tool

Crude Turnover Rate for RNs = $\frac{\text{Total number of RNs left}}{\text{Total number of RN employed as of January 2007} + \text{Total number of RN employed as of October 2007}} \times 100$

2

Crude Turnover Rate for LPNs = $\frac{\text{Total number of LPNs left}}{\text{Total number of RN employed as of January 2007} + \text{Total number of RN employed as of October 2007}} \times 100$

2

Crude Turnover Rate for CNAs = $\frac{\text{Total number of CNAs left}}{\text{Total number of RN employed as of January 2007} + \text{Total number of RN employed as of October 2007}} \times 100$

2

From "The Relationship of Nursing Personnel and Nursing Home Care Quality," by J. E. Bostick, 2002, unpublished doctoral dissertation, University of Missouri–Columbia, *Dissertation Abstracts International*, (UMI No. AAI3052150); "Calculating Nurse Turnover Indices," by M. L. Duxbury & G. D. Armstrong, 1982, *Journal of Nursing Administration*, 12(3), 18–24.

Table 1.5 Nursing Personnel Collection Tool to Measure Turnover Rate of Nursing Staff

| Dates Employed or Working | Total Number of RNs Employed/Working | | Total Number of LPNs/LVNs Employed/Working | | Total Number of CNAs Employed/Working | |
|--------------------------------------|---|--------------------------------|---|--------------------------------|--|--------------------------------|
| | Full-time (35 hours or more) | Part-time (Less than 35 hours) | Full-time (35 hours or more) | Part-time (Less than 35 hours) | Full-time (35 hours or more) | Part-time (Less than 35 hours) |
| As of January 1, 2006 | | | | | | |
| As of April 1, 2006 | | | | | | |
| As of July 1, 2006 | | | | | | |
| As of October 1, 2006 | | | | | | |
| Time Period Left or Quit | Total Number of RNs Left/Quit | | Total Number of LPNs/LVNs Left/Quit | | Total Number of CNAs Left/Quit | |
| | Full-time (35 hours or more) | Part-time (Less than 35 hours) | Full-time (35 hours or more) | Part-time (Less than 35 hours) | Full-time (35 hours or more) | Part-time (Less than 35 hours) |
| During January 1 – March 31, 2006 | | | | | | |
| During April 1 – June 30, 2006 | | | | | | |
| During July 1 – September 30, 2006 | | | | | | |
| During October 1 – December 31, 2006 | | | | | | |

Using information found in your facility payroll records or staffing schedules, please list the following information:

1. The total number of nursing personnel who were employed or working in your facility.
2. The total number of nursing personnel who voluntarily or involuntarily left or quit your facility.

Please return in the enclosed self-addressed stamped envelope by February, 28 2007.

Thank you for your assistance.

From "The Relationship of Nursing Personnel and Nursing Home Care Quality," by J. E. Bostick, 2002, unpublished doctoral dissertation, University of Missouri-Columbia). *Dissertation Abstracts International*, (UMI No. AAI3052150).

Table 1.6 Part of the Quality of Life section in the Minimum Data Set 3.0 Comfort Scale: The first questions are about how comfortable the resident is and the help they get to make them more comfortable.

| CMF | | Ofte n | Sometime s | Rarel y | Never 4 | Mostl | | DK | NR/ REF |
|-----|--|-----------|---------------|------------|------------|----------|---------|----|------------|
| | | | | | | y yes | y no | | |
| 1 | How often are you too cold here? | 1 | 2 | 3 | 4 | 1.5 | 3.8 | 0 | 0 |
| 2 | How often are you so long in the same position that it hurts? | 1 | 2 | 3 | 4 | 1.5 | 3.8 | 0 | 0 |
| 3 | How often are you in physical pain? | 1 | 2 | 3 | 4 | 1.5 | 3.8 | 0 | 0 |
| 4 | How often are you bothered by noise when you are in your room? | 1 | 2 | 3 | 4 | 1.5 | 3.8 | 0 | 0 |
| 5 | How often are you bothered by noise in other parts of the nursing home, for example, in the dining room? | 1 | 2 | 3 | 4 | 1.5 | 3.8 | 0 | 0 |
| 6 | Do you get a good night's sleep here? | 4 | 3 | 2 | 1 | 3.8 | 1.5 | 0 | 0 |

Note: 4 out of the 6 questions must be answered in the first 6 columns to construct the scale. 2 DK/NR responses may be imputed to the domain score average. Score Range: 24–6. A higher score is more positive.

From “2003 Minimum Data Set (MDS) 3.0, by Centers for Medicare and Medicaid Services, 2003. Retrieved June 26, 2003, from <http://www.cdc.hhs.gov/quality/mds30/>

Table 1.7 Mean Number of Ohio Nursing Home Beds in 1995, Ohio Department of Health and OSCAR Data

| | ODH Data | OSCAR | r |
|---|---------------|----------------|---------|
| Jan. 1, 1995 | | | |
| Licensed Capacity | 102.5 | 111.23 | .648*** |
| (sd) | (62.63) | (73.95) | |
| Dec. 31, 1995 | | | |
| Licensed Capacity | 103.9 | 111.23 | .647*** |
| (sd) | (63.05) | (73.95) | |
| Total Beds 1/1/95 | 92,267 | | |
| Total Beds 12/31/95 | 93,534 | 100,106 | |
| Medicare | | | |
| Certified Beds in all Facilities | 2.05 | 2.02 | .999*** |
| (sd) | (8.23) | (8.12) | |
| (n=900) | | | |
| Medicare Certified | | | |
| Beds in Facilities with Medicare or Dual Beds | 2.87 | 2.83 | .900*** |
| (sd) | (9.62) | (9.49) | |
| (n=644) | | | |
| Dually Certified | | | |
| Beds in All Facilities | 35.89 | 36.14 | .883*** |
| (sd) | (48.62) | (48.61) | |
| Medicaid Beds in All Facilities | 54.32 | 53.49 | .995*** |
| (sd) | (52.30) | (51.97) | |
| Total Certified Beds | 92.26 | 93.38 | .952*** |
| (sd) | (56.91) | (57.00) | |
| Beds in Hospital-Based Units | 41.64 | 221.66 | .070 |
| (sd) | (58.06) | (174.93) | |
| Total Beds in Hospital-Based Units | | | |
| (n=44) | 1,832 | 9,753 | |
| Beds in Nursing Homes with Rest Home Beds | 143.41 | 132.80 | .844*** |
| (sd) | (69.27) | (65.06) | |
| Total Beds in Facilities with Rest Homes | | | |
| (n=90) | 12,907 | 11,952 | |
| Total Certified Beds | 83,037 | 84,045 | |

Note: *** $p < .001$.

From "Reliability of OSCAR Occupancy, Census and Staff Data: A Comparison With the Ohio Department of Health Annual Survey of Long-Term Care Facilities," by J. K. Straker, 1999, Tech. Rep. No. 3, Ohio, U.S. Miami University, Scripps Gerontology Center.

Table 1.8 Mean Hours of Nursing Care in Ohio Nursing Homes in 1995, Ohio Department of Health and OSCAR data

| | ODH Data | OSCAR | r |
|---|----------------------------------|----------------------------------|----------------|
| Nurse Aide Hours Per Day (sd) | 182.39 (123.30) | 194.09 (204.87) | .585*** |
| LPN Hours Per Day (sd) | 66.10 (50.77) | 69.08 (99.38) | .561*** |
| RN Hours Per Day (sd) | 43.95 (36.26) | 36.48 (38.53) | .731*** |
| Total Nursing Hours Per Day (sd) | 292.45 (191.94) | 299.64 (325.03) | .613*** |
| Nurse Aide Hours Per Resident Per Day (sd) | 1.99 (.68) | 2.51 (2.98) | .083* |
| LPN Hours Per Resident Per Day (sd) | .75 (.44) | .97 (1.47) | .310*** |
| RN Hours Per Resident Per Day (sd) | .55 (.63) | .67 (1.71) | .344*** |
| Total Nursing Hours Per Resident Per Day (sd) | 3.30 (1.29) | 4.14 (5.53) | .223*** |

Note: Cases reporting 0 hours were excluded from analysis.

*** $p \leq .001$.

From "Reliability of OSCAR Occupancy, Census and Staff Data: A Comparison With the Ohio Department of Health Annual Survey of Long-Term Care Facilities," by J. K. Straker, 1999, Tech. Rep. No. 3, Ohio, U.S. Miami University, Scripps Gerontology Center.

Table 1.9 Comparison of Reported Staffing Levels from Ohio Payroll Data to Medicaid Cost Report and OSCAR-Average Staffing Levels

| | Ohio payroll data | | Medicaid Cost Report | OSCAR |
|---|-------------------|----------------|----------------------|----------------|
| | pre-survey period | survey period | | |
| All facilities | | | | |
| Total hours per resident day | 3.43 (1.28) | 3.40 (1.55) | 3.44 (0.96) | 3.35 (1.31) |
| RN and LPN hours per resident day | 1.21 (0.79) | 1.29 (0.98) | 1.28 (0.65) | 1.21 (0.68) |
| Low staffed facilities- Bottom 20 in total weighted nursing hours per resident day | | | | |
| Total hours per resident day | 2.65 (0.70) | 2.31 (0.46) | 2.99 (0.46) | 2.73 (0.51) |
| RN and LPN hours per resident day | 0.88 (0.27) | 0.84 (0.33) | 1.09 (0.26) | 0.99 (0.39) |

Note: $N = 78$.

Standard deviations shown in parentheses.

From "Reliability of OSCAR Occupancy, Census and Staff Data: A Comparison With the Ohio Department of Health Annual Survey of Long-Term Care Facilities," by J. K. Straker, 1999, Tech. Rep. No. 3, Ohio, U.S. Miami University, Scripps Gerontology Center.

Table 1.10 Consistency of Reported Staffing Levels from Ohio Payroll Data to Medicaid Cost Report and OSCAR: Correlation Analysis-Pre-Survey Period

| Staffing measure | Correlation with payroll data—pre-survey period | | | | | |
|---|---|-------|---------------------------|-------|----------------------|-------|
| | Pearson correlation | | Spearman rank correlation | | Kendall's Tau-b | |
| | Medicaid Cost Report | OSCAR | Medicaid Cost Report | OSCAR | Medicaid Cost Report | OSCAR |
| All included facilities | | | | | | |
| Total hours per resident day | 0.697 | 0.761 | 0.610 | 0.532 | 0.473 | 0.406 |
| RN and LPN hours per resident day | 0.794 | 0.811 | 0.565 | 0.585 | 0.432 | 0.453 |
| Excluding top 10 facilities (based on payroll data, total staffing) | | | | | | |
| Total hours per resident day | 0.611 | 0.454 | 0.641 | 0.538 | 0.481 | 0.390 |
| RN and LPN hours per resident day | 0.554 | 0.331 | 0.539 | 0.520 | 0.404 | 0.386 |
| Low staffed facilities— lowest 50% (based on payroll data, total staffing) | | | | | | |
| Total hours per resident day | 0.559 | 0.459 | 0.625 | 0.579 | 0.465 | 0.403 |
| RN and LPN hours per resident day | 0.706 | 0.252 | 0.609 | 0.445 | 0.487 | 0.311 |

Note: $N = 78$.

From “Reliability of OSCAR Occupancy, Census and Staff Data: A Comparison With the Ohio Department of Health Annual Survey of Long-Term Care Facilities,” by J. K. Straker, 1999, Tech. Rep. No. 3, Ohio, U.S. Miami University, Scripps Gerontology Center.

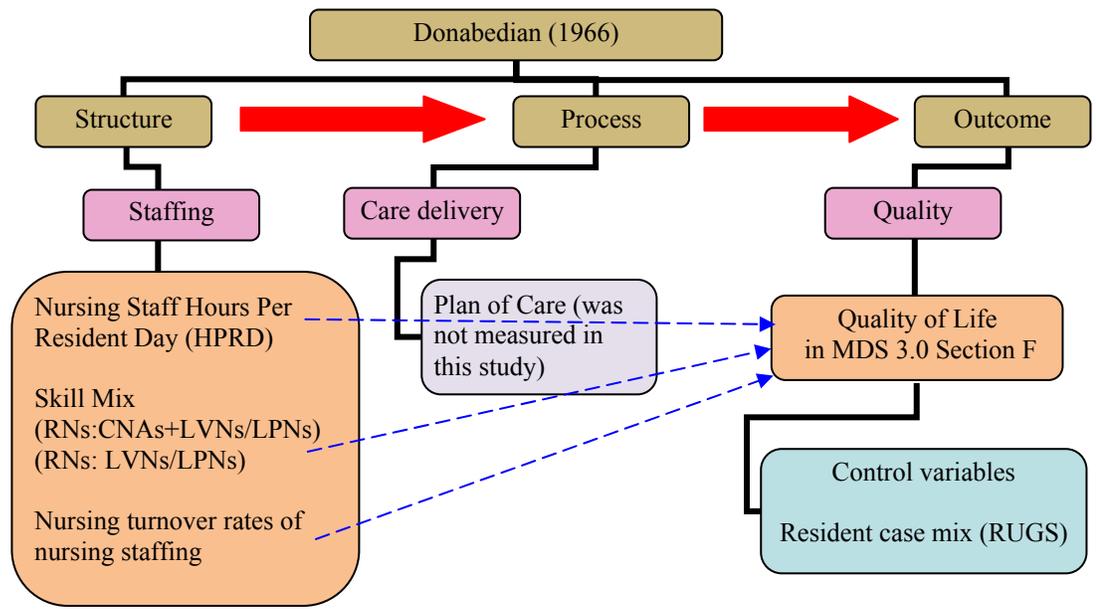
Table 1.11 Consistency of Reported Staffing Levels from Ohio Payroll Data to Medicaid Cost Report and OSCAR: Correlation Analysis-Survey- Period

| Staffing measure | Correlation with payroll data-survey period | | | | | |
|--|---|-------|---------------------------|-------|----------------------|-------|
| | Pearson correlation | | Spearman rank correlation | | Kendall's Tau-b | |
| | Medicaid Cost Report | OSCAR | Medicaid Cost Report | OSCAR | Medicaid Cost Report | OSCAR |
| All included facilities | | | | | | |
| Total hours per resident day | 0.594 | 0.490 | 0.449 | 0.392 | 0.343 | 0.297 |
| RN and LPN hours per resident day | 0.687 | 0.521 | 0.509 | 0.610 | 0.391 | 0.486 |
| Excluding top 10 facilities (based on payroll data, total staffing) | | | | | | |
| Total hours per resident day | 0.444 | 0.265 | 0.445 | 0.391 | 0.337 | 0.274 |
| RN and LPN hours per resident day | 0.602 | 0.455 | 0.540 | 0.629 | 0.413 | 0.473 |
| Low staffed facilities-- lowest 50% (based on payroll data, total staffing) | | | | | | |
| Total hours per resident day | 0.310 | 0.121 | 0.332 | 0.196 | 0.236 | 0.126 |
| RN and LPN hours per resident day | 0.563 | 0.269 | 0.551 | 0.471 | 0.436 | 0.344 |

Note: $N = 78$.

From "Reliability of OSCAR Occupancy, Census and Staff Data: A Comparison With the Ohio Department of Health Annual Survey of Long-Term Care Facilities," by J. K. Straker, 1999, Tech. Rep. No. 3, Ohio, U.S. Miami University, Scripps Gerontology Center.

Figure 1.1 Donabedian’s Conceptual and Operational Model which was adopted for NH research



Note: From “Evaluating the quality of medical care,” by A. Donabedian, 1966, *Milbank Memorial Fund Quarterly*, 44(3), Suppl: 166–206.

CHAPTER II.

LITERATURE REVIEW REGARDING NURSING STAFFING AND QUALITY OF CARE AND QUALITY OF LIFE IN NURSING HOMES, 1996–2006

Introduction and Overview

In the U.S., approximately 17,000 NHs care for 1.6 million elders (those who are older than 65) and play a critical role in the health care system (American Health Care Association, 1999; Federwisch, 1999; GAO, 2002a, 2002b; Harrington et al., 2002; Winzelberg, 2003; Wunderlich & Kohler, 2001). It is expected that in 2030 about 70 million people will be 65 years of age or older, 5 million people will be over 85 years, and approximately 3 million people will be receiving NH care (Harrington et al., 2003; Hicks, Rantz, Petroski, & Mukamel, 2004; National Institute on Aging, 2007; Wunderlich et al., 1996). However, overall QOC in many NHs is still very poor ([CMS], 2001; Harrington, 2001a; Reynolds, 2003; Winzelberg; Wunderlich & Kohler). Between 25% and 33% of NHs do not meet even minimal federal standards, and more than 25% have deficiencies that may cause serious and harmful health outcomes for NH residents (GAO, 1999a). Quality has not reached acceptable levels since the Nursing Home Reform Act, part of the OBRA Act of 1987 was passed (GAO, 1998, 1999a, 1999b; Harrington, 2001a, 2001b; Kovner et al., 2000; Wunderlich & Kohler). There continue to be concerns about the quality of NH care in both the public and private sectors, especially about the QOL in NHs.

As the population of people 65 years or older increases, the number of qualified staff should also rise (Geiger-Brown et al., 2004). Usually, nursing staff (RNs, LVNs/LPNs, and CNAs) make up approximately 60% of total NH staff, making nursing

staff the major human resource in NHs (Harrington et al., 2000). Nonetheless, 90 % of NHs are facing staffing crises that endanger not only the safety, but also QOC and QOL, for the thousands of elders in NHs (CMS, 2001; Harrington et al., 2000; McKeon, 2001; National Citizen's Coalition for Nursing Home Reform, 1999; Pear, 2002). This chapter reviews studies in which researchers systematically focused on nurse staffing and QOC, or nurse staffing and QOL, in NHs.

Scope of Literature Review

A computerized search of MEDLINE, CINAHL, OVID, and PUBMED was conducted using keyword searches for the following terms: “long-term care settings,” “nursing homes,” “quality of care,” “quality of life,” and “nursing staffing.” Journal articles published from 1996 to 2006 were selected. Only staffing-related predictor variables and resident outcomes variables (QOC or QOL) were investigated. Although some articles examined other predictor variables besides staffing, a total of 21 articles relating nurse staffing and QOC, including articles that investigated QOL in addition to QOC in NHs were systematically reviewed and synthesized. Literature was reviewed for the following characteristics: (a) use of theory, (b) research methods, (c) staffing issues investigated, (d) resident outcomes measured, and (e) relationships between staffing variables and resident outcomes.

Theory

A major limitation of the studies described in the reviewed articles is the absence of theoretical frameworks. To investigate phenomena and relationships in a valid and reasonable way, a theoretical framework is necessary (Polit & Beck, 2000). The concepts

to be measured are defined as variables and tested based on theory. It is questionable to examine concepts of interest without a theoretical framework. Only 6 of the 21 studies examined applied a theoretical framework (Anderson et al., 1998; Bliesmer et al., 1998; Krichbaum et al., 2005; Rantz et al., 2004; Wan, 2003; Weech-Maldonado, Meret-Hanke, Neff, & Mor, 2004)

Bliesmer et al. (1998), Krichbaum et al. (2005) and Weech-Maldonado et al. (2004) applied the Donabedian model, and Wan (2003) applied components of this model (structure, process, and outcomes) while not identifying it by name. Anderson et al. (1998) applied configurational theory in classifying the mutually dependent resident outcomes in their study (see Figure 2.1). In addition to configurational theory, Anderson et al. also used structure and process variables to investigate these outcomes.

The Donabedian model is a useful theoretical model because both QOC and QOL can be approached in terms of the three concepts in its framework: structure, process, and outcomes (Wunderlich et al., 1996). Most of the developments in looking at outcomes of care in nursing and regulatory reform in NHs have been based on the Donabedian (1966) framework of structure, process, and outcomes (Frost, 1992; Holzemer, 1996; Schirm, Albanese, & Garland, 1999). The Donabedian model offers problem-solving potential (Frost; Holzemer; Schirm et al., 1999). The presentation of Donabedian's work (Quality in Health Care at the National Health Forum) in 1968 is a foundation for measuring quality in NHs (Bostick, 2002). Moreover, the Donabedian framework offers a heuristic tool for examining QOC or QOL (Schirm et al. ; Wunderlich et al., 1996).

Methods

Quantitative Versus Qualitative Studies

The majority of articles (18 out of 21) reported on quantitative research, while only 2 studies used qualitative research (Bowers, Esmond, & Jacobson, 2003; Kayser-Jones & Schell, 1997) and 1 study used a combination of quantitative and qualitative research (Kayser-Jones et al., 1999). To examine how staffing impacts resident outcomes specifically, beyond establishing a simple relationship between staffing and QOC or QOL, more qualitative research should be done to elicit staff and residents' perspectives.

Data Sources

Secondary data analysis is defined as a procedure that uses already collected data (Kiecolt & Nathan). In contrast, primary data collection means that investigators acquire information directly from a sample or population to answer research questions (Kiecolt & Nathan, 1985). In this review, 10 studies used primary data collection and 21 studies used secondary data analysis (see Table 2.1). Six studies used both primary and secondary data (Anderson et al., 1998; Bates-Jensen, Schnelle, Alessi, Al-Samarrai, & Levy-Storms, 2004; Hickey et al., 2005; Kayser-Jones et al., 1999; Schnelle et al., 2004; Simmons, Osterweil, & Schnelle, 2001)

A limitation of the research investigating the relationship between staffing and quality is that most studies used the retrospective method by employing secondary data analysis. All reviewed articles used secondary databases for investigating this relationship. Four studies used the MDS, 6 studies extracted data from the OSCAR, 5 studies reviewed medical records, 2 studies reviewed staffing records, 2 studies used the

Veterans Affairs database, 3 studies used state databases, and 6 studies used national government databases including the CMS database and Medicaid cost reports (see Table 2.1).

Bates-Jensen et al. (2004), Crogan and Shultz (2000), Anderson et al. (1998), and Krichbaum et al. (2005) used a variety of tools to collect data directly from NH residents (see Table 2.1). The researchers who used primary data-collection methods did not have a system of continuous direct supervision and instead depended on reporting by NH staff. The use of a consistent tool to measure residents' outcomes in NHs is required in the future (R. L. Kane, 2004).

In summary, studies that investigate staffing and QOC in NHs depend heavily on secondary data analysis. There are advantages and disadvantages to using secondary-data methods. Secondary-data analysis has some advantages in that (a) it can save time and effort, (b) it saves human resource expense such as paying people to collect data, (c) it is useful especially in exploratory and correlational studies, (d) it examines trends over time, (e) it can be used when further research is needed (Castle, 2003; Nicoll & Beyea, 1999), (f) researchers can get large samples in many geographic areas, and (g) it does not burden patients or residents in NHs. However, secondary data analysis has limitations in that (a) investigators cannot directly manage the data, (b) the accuracy of the data may be questionable, and (c) the data may be old and may have been collected for purposes other than research (J. E. Castle, 2003; Nicoll & Beyea, 1999). Efforts should be made to manage the broad range of timely updated and revised data in large, national datasets so that NH researchers can access the collected and available data. Future studies should include more primary data collection methods such as interviews with residents and

direct observation so that the residents' voices can be heard directly, rather than being filtered through NH staff. R. L. Kane (2004) advocated studies that used direct observation and interviews with staff, family, or residents, because these data collection methods may make interviews more accurate. Researchers can contact residents directly through these methods rather than depending on datasets such as the MDS or OSCAR. However, interviews with proxies should be used with caution because there is a perception gap regarding quality between NH residents and proxies (families or staff) (Berlowitz et al., 1995; R. A. Kane et al., 2000; R. L. Kane et al., 2005; Logsdon, 1999; Mittal et al., 2007). The gold standard for measuring QOL of residents is direct interviews with residents. However, it is not always possible to get answers from residents due to limited physical and cognitive functioning (R. A. Kane, 2003; Rubinstein, 2000). Assumptions are often made about residents' ability to respond without attempting to ask questions when recruiting residents to interview. The strength of the current study compared with other studies is that a less restrictive responsiveness screen (Simmons & Ouslander, 2005) was used as an inclusion criterion. For example, some residents (that would not have been included if the Mini Mental State Examination had been used because their scores would have been too low) were included as participants in this study. The responsiveness screen used in this study was one that asked residents to say their names or to reliably recognize two common objects (Simmons & Ouslander). If a resident could not answer these two simple questions, that subject was excluded from the sample.

Large health care data sets like the MDS and OSCAR are characterized as having the following: (a) computer-based forms, (b) a large enough size to accommodate a wide

variety of statistical methods, and (c) availability to researchers who are not responsible for data collection (Connell, Diehr, & Hart, 1987). Large data sets have been used and are expected to be used in the future to improve quality, especially in long-term care research (Ryan, Stone, & Raynor, 2004). However, use of large data sets may be inherently threatened by sampling and measurement errors (Jacob, 1984).

Sample Selection Error

The CMS data center holds and manages basic resident demographic and clinical information of all the reported MDS data for the purpose of payment, survey, certification, regulation, and research (CMS, 2007). All MDS records are stored on magnetic media, and the CMS has a system of safeguards for the MDS including security codes, staff training to retrieve MDS information, and access to data restricted only to authorized staff (CMS, 2007). The storage system managed by CMS decreases concerns about data storage.

Large data sets like MDS generally have no sample inclusion and exclusion criteria, because the databases are not developed as a result of a study protocol (Lange & Jacox, 1993). Thus, the sample may not represent the whole population in which the researchers are interested (Lange & Jacox). For instance, data regarding NHs that are not certified as Medicare or Medicaid are not available in the MDS, and so it may not represent the entire NH population, although it is widely used to study NHs.

Measurement Error

Measurement error occurs due to the failure to match theoretical concepts and operational concepts (variables in data sets; Lange & Jacox, 1993). For example, the

operational definition of Nursing Staff HPRD in a research study might be different from the definition in the database. According to the Center for Medicare and Medicaid's Nursing Home Compare website (2006), HPRD represents the "average hours worked by licensed nurses or nursing assistants divided by total number of residents." However, using HPRD from the OSCAR requires recalculation into hours per day because staff hours are reported in 2 week periods, assuming that FTE work equals 70 hours per 2 weeks (M. Cowles, personal communication, March, 3, 2007). This process of recalculation might incur measurement error because FTE might differ based on the situation and facilities. An inappropriate choice of variables will also threaten validity (Lange & Jacox). In designs where researchers have a research question first and then search for existing data, external validity is threatened because the data set may not represent the target of population in the research (Lange & Jacox). Likewise, internal validity is threatened because researchers may not control for confounding variables (Lange & Jacox).

For example, a proposed QOL instrument (operational conceptualizations) in MDS 3.0 may not reflect the real QOL (theoretical conceptualizations) regarding NH residents because QOL is very subjective and multidimensional. The MDS 3.0 measures only 11 domains of QOL(dignity, comfort, privacy, meaningful activity, relationships, spiritual well-being, autonomy, individuality, food enjoyment, security and functional competence, and this may cause measurement error. Another example is that the staffing in OSCAR could appear to be higher than usual staffing levels because some facilities augment their staffing levels just before the annual certification survey (CMS, 2001; Harrington, Zimmerman et al., 2000). Studies that use OSCAR data may not have

accurate staffing information because of this manipulation. These examples cause measurement errors described above.

Another example is that if researchers use MDS data in their studies, their conceptual definitions may differ from the operational definition of MDS because all NHs are not certified as Medicare or Medicaid.

Data Storage

Appropriate choices of hardware and software with necessary expert technical support should be made in order to store data accurately (Pabst, 2001). As large data sets such as MDS and OSCAR can be used across different facilities and over time, the data storage format should be consistent (Pabst). For example, researchers should be aware of the different formats (proprietary format vs. generic format), in which data can be stored when data are transferred from one facility to another or from one research team to another. Also, coding systems will be different depending on different software. MDS developers also need to set up data- set structures carefully based on sample data sets before actually collecting large data sets. This process will lessen the extra work of changing formats. File backup of large data sets is necessary to safeguard against computer problems (Pabst. If researchers do not consider these kinds of issues and use data without verifying the format, accuracy will be threatened. Many studies describe where they saved their data but none of the reviewed studies address data- storage concerns.

Data Collection and Documentation

Because large data sets are usually collected by many different facilities or states, they are usually assessed, collected, and documented by many different people. Thus, inter-rater variation, especially for subjective items, will threaten validity (vonKoss Krowchuk, Moore, & Richardson, 1995).

Data documentation or coding of MDS may be performed by the same person who assessed the resident, or by a different person who did not assess the resident. If the data collection and coding are performed by the same person, shortcuts may be used to save time and effort. For example, MDS data collectors can enter their observations directly into a laptop computer in practice, if it is available (Pabst, 2001). However, each NH maintains its own data, and the simultaneous work of data documentation and coding is not applied. Furthermore, if the data recorder has to recall the observations when they document or code, recall bias will decrease the accuracy of the information (vonKoss Krowchuk et al., 1995). A huge amount of data must be entered in large data sets, and a demanding workload may make data entry people tired and errors will occur (Pabst). Appropriate allocation of work and use of additional human resources during peak times is suggested to lessen error rates (Pabst). These stored data may be linked directly to the central research data repository, or copied data may be sent by mail or email (Pabst). These innovative methods will decrease errors because the process of data entry is shortened, but appropriate training for data collection and a regular check of the data are necessary.

Data Extraction

Some factors may make data extraction difficult. It is common to have missing data problems in large data sets (vonKoss Krowchuk et al., 1995). Part or all of a record may be missing, or data may never have been recorded (Byar, 1980; VonKoss Krowchuk et al., 1995). Missing data, may threaten the study findings (VonKoss Krowchuk et al., 1995). For instance, newly admitted residents do not have completed MDS data in their charts. To make a data set more accurate, additional extraction is needed in addition to the original extraction.

Data Interpretation

If the extracted data are too complicated or illegible, even extracted data sets may be useless (vonKoss Krowchuk et al., 1995). Different formats used by different data sets may make it difficult for researchers to match them (e.g., different use of surnames, or acronyms), and so data analysis can not be performed (vonKoss Krowchuk et al.). The variation of interpretation of extracted data among researchers is another concern (VonKoss Krowchuk et al.). For instance, the interpretation of data collected by trained nurses was found to be more accurate than that of medical record specialists (Richardson, Selby-Harrington, Krowchuk, Cross, & Williams, 1994).

In summary, the NH industry is under heavy regulatory pressure. Many NH databases are large because of regulations and reporting needs. When using these datasets, researchers should be cautious to avoid the errors described above, and should use appropriate statistical methods to lessen errors. The reviewed articles did not pay attention to these issues and future studies are necessary to fill the knowledge gaps.

Predictor Variables

One of the research gaps in examining NH staffing and QOC/QOL is that RNs and other nursing staff such as CNAs and LPNs/LVNs have often been grouped together as nursing staff (Baldwin et al., 2003; Dellefield, 2000; Masterson, 2004), however, their preparation is different and they cannot replace one another in legal authority to provide care (Baldwin et al.; Dellefield, 2000; Masterson). NHs employ more unlicensed nursing staff (CNAs) than licensed nursing staff (RNs/LPNs/LVNs) due to financial pressures (Conant, 2004; Curtin & Simpson, 2000; Harrington, 2005a; Hunt & Hagen, 1998). RNs can contribute their skills and knowledge to make a difference in process and outcome measures of NH residents (Harrington et al., 2003; Weech-Maldonado et al., 2003). They also play a critical role in care planning and supervising other nursing staff (Dellefield, 2000), because they have been educated as problem solvers and have broader clinical preparation (Coccia & Cameron, 1999). RNs usually are required to have at least 2 years of college education and to be able to cope with emergency situations, while LPN/LVN and CNAs are only required to have 1 or less than 1 year training and their training focuses on nursing task skills to assist residents with ADLs (Bostick, 2002; Conant, 2004; Cohen & Spector, 1996). Although the salaries of RNs are much higher than other licensed and certified nursing staff such as CNAs and LPNs, residents' better outcomes even with the cost of RNs provides a stable financial situation for NHs (Mukamel & Spector, 2000; Weech-Maldonado et al., 2003). In contrast, CNAs have not been educated to provide individualized care for residents as have RNs (Conant, 2004). The short training time for LPNs/LVNs and CNAs seems inadequate considering the challenging roles they must fill in NHs (Harrington, 2001a).

In this systematic review, only 6 of 21 articles differentiated RNs from other nursing staff (Akinici & Krolkowski, 2005; Anderson et al., 1998; Berlowitz et al., 1999; Bostick, 2004; Horn, Buerhaus, Bergstrom, & Smout, 2005; Johnson-Pawlson & Infeld, 1996). Furthermore, although many studies agreed on the contributions of Gerontological Advanced Practice Nurses (GAPNs) to cost-effectiveness, decreased length of stay in hospitals, and decreased use of emergency rooms, these studies were limited to anecdotal evidence. Few studies have studied the effects of GAPNs on residents' outcomes until now (Burl & Bonner, 1991; Burl, Bonner, Rao, & Khan, 1998; R. L. Kane et al., 1989; Krichbaum et al., 2005; McDougall & Roberts, 1993; Melillo, 1993; Naylor et al., 1999; Ruiz, Tabloski, & Frazier, 1995). Krichbaum et al. investigated the effects of the use of GAPNs and the use of specific organization-level interventions by GAPNs on residents' health status. They used a three-group, quasi-experimental, repeated measures design in three long-term care facilities (control group = 111, GAPN group = 65, GAPN + organization level group = 22) in three phases of 6 months each (Krichbaum et al., 2005). The major finding was that GAPNs with organization level interventions were effective in decreasing depression and improving morale for residents (Krichbaum et al., 2005). This study is also relevant in that the researchers applied the Donabedian model as their theoretical framework, investigated hierarchical variables (use of GAPNs, and organization level interventions), and used a variety of instruments to measure residents' outcomes directly. However, there was a limitation in that they measured only QOC and did not include QOL outcomes.

Only two studies investigated the relationship between NH administrators or administrative staff and resident outcomes (Christensen & Beaver, 1996; Harrington,

Zimmerman et al., 2000). Christensen and Beaver compared three groups (NHs with one administrator during a given period of time, NHs with two consecutive administrators, and NHs with more than two consecutive administrators) and found that NHs with the lowest administrator turnover showed the lowest amount of health and safety deficiencies ($N=147$ NHs). Administrative staff hours were inversely related to administrative deficiencies (Harrington et al., 2000).

In summary, studies that investigated the relationships between staffing and quality continue to be conducted. However, research that takes account of nursing educational level, differentiating among advanced nursing professionals including Gerontological Nurse Practitioners, and Clinical Nurse Specialists is required in the future. The effectiveness of the administrative staff (DON, administrator) should be studied, as well. For example, the comparisons could be made between QOL in traditional NHs and in NHs that use nurse practitioners or the impact of leadership styles of DONs and other administrators on residents' QOL could be studied.

Outcome Variables (Resident Outcomes)

It is difficult to categorize resident outcome variables because different studies have examined different outcomes using diverse methods. The variables included in one category in some studies were not the same as those of other studies. Major variables measured were synthesized, and specific items constituting the variables were not categorized in this review. A total of 13 categories (41 subcategories) of resident outcomes were studied: activity, infection, medication, nutrition, necessary medical treatment, use of catheters, accidents, psychiatric status, behavior problems, overall health quality, QOL, relocation, and others (see Table 2.2). In the activity category, bed

rest, ADL function, exercise and repositioning, and patterns of activity outcomes were included. A total of 6 studies examined activity outcomes.

About half of the articles (10 of 21) included eating, hydration and weight loss of residents as outcome variables because many studies and government reports have addressed undernutrition and weight loss as serious problems for NH residents (Abbasi & Rudman, 1993; Blaum et al., 1995; Morley & Kraenzle, 1994; Rudman & Feller, 1989; Starkey & Ryan, 1996; Wang et al., 2004; White et al., 1998; Zahler, Holdt, Gates, & Keiser, 1993). Furthermore, the GAO and the CMS have identified undernutrition and weight loss as serious problems (Findorff et al., 2005).

Pressure ulcers were also researched in 8 out of the 21 studies, and 3 studies focused on urinary tract infections. These studies were classified in the infection category. Rantz et al. (2004), Weech-Maldonado et al. (2004), and Wan (2003) investigated medication overuse, use of psychoactive medications, and medication errors as outcome variables in relation to staffing. Contractures, bladder or bowel incontinence, and fecal impaction were investigated in 5 studies. Rantz et al. and Wan included use of catheters as outcome variables. Anderson et al. (1998), and Rantz et al. examined falls and fractures. Regarding the psychological status of residents, Rantz et al., Weech-Maldonado et al., and Wan studied depression therapy, cognitive impairment, mood change, and retardation in residents. In the behavior problem category, verbal/physical aggression, behavior change, and restraint use were examined in 7 studies. Nine studies used QOC as outcome variables, and 7 studies investigated QOL aspects of residents, including dignity, respect, and accommodation of individual needs. Considering that

previously explained outcomes were considered to be QOC outcomes rather than QOL, more studies focusing on QOL are necessary in the future.

In summary, previous research has focused on QOC for NH residents, looking at issues such as urinary tract infection and malnutrition (R. A. Kane et al., 2003). These studies measured only QOC, lacking specific measurement of QOL although QOC contributes to QOL (Harrington, Carrillo et al., 2000; Zimmerman, 1998). Moreover, QOL has not been measured extensively for NH residents, and it has not been protected by politicians or by law (R. A. Kane, 2003; R. A. Kane et al., 2003). The experience of transition into living in NHs is challenging in many aspects including physical relocation, dramatic change of relationships with family and friends, and new relationships with NH staff (Guse & Masesar, 1999). Most residents in NHs suffer from the changed lifestyles imposed by living in a NH where emphasis is placed on health problems and is not a normal life (R. A. Kane, 2003). Life in NHs may be barren, restricted, and involve loss of privacy and significant relationships in a hospital-like environment (Agich, 1993; Lidz, 1992). QOC refers to the process and outcome measures that affect residents' care directly, including nursing services, dietary services, dental services, and infection control, while QOL is related to rights of patients such as privacy, dignity, autonomy, and social, psychological, and spiritual well-being (Akinci & Krolikowski, 2005). Residents' health-related QOL is the subset of QOL that pertains to the parts of life influenced by health conditions (R. A. Kane, 2003). That is, health-related QOL cannot fully explain the life of residents. QOL is not easy to define because the concept covers diverse parts of human life including physical, mental, social, and spiritual well-being. The elements of

QOL depend on the diverse needs of people who live in a facility or at home (Fletcher et al., 1992; Guse & Masesar, 1999).

However, it is very important to measure QOL because NHs are expected to provide social and end of life services as well as health services. NH staff are expected to deal with people who do not live in their own homes. NH residents are a very heterogeneous group and health care providers are expected to provide medical care as well as rehabilitation and functional care for the residents (Krichbaum et al., 2005; Mattimore et al., 1997; Zbylot, Job, McCormick, Boulter, & Moore, 1995). Unlike acute care settings, NH residents usually cannot change their health care providers, they cannot go home, and they have limited choices in many aspects of life (Harrington et al., 2002). Although QOC is necessary for and plays a large part in QOL, it is not sufficient. It takes more than high QOC to have good QOL (Guse & Masesar, 1999; Harrington et al., 2002). Additionally, it is also agreed that residents' state of health affects QOL regardless of the quality of nursing care provided. However, there are only 4 studies that investigate the relationship between nursing staffing and QOL (Bowers et al., 2000; Harrington, Zimmerman et al., 2000; Johnson-Pawlson & Infeld, 1996; Wan, 2003). Bowers et al., Harrington et al. and Johnson-Pawlson and Infeld used the QOL category directly, while Wan examined dignity and respect emphasizing their impact on the QOL.

Johnson-Pawlson and Infeld (1996) measured resident outcomes using deficiencies defined by the CMS including resident rights, behavior, resident assessment, and QOL. The ratio of RNs to residents did not have a statistically significant influence on the total CMS deficiency index, while total nursing staff had a significant inverse effect on the overall CMS deficiency index (Johnson-Pawlson & Infeld). That is, more

nursing hours contribute to better outcomes. However, an increase of RNs did not contribute to better resident rights outcomes (Johnson-Pawlson & Infeld). The study does not examine what RNs actually do, and so the results could be different if RNs' actual processes were taken into account.

Harrington et al. (2000) investigated the relationship between staffing and deficiencies using data retrieved from OSCAR ($N = 15,536$ NHs). CNA hours and other care staff hours were inversely related with QOL deficiencies. Moreover, the researchers in this study examined the different aspects of deficiencies including QOC, QOL, and other administrative deficiencies. This investigation is quite different from others in that it broadens the scope of outcomes beyond previous research that focused only on QOC deficiencies. However, interpretation of the findings should be done carefully because the explained variance (R^2) may be too small to conclude that staffing is an important predictor variable of resident outcomes. R^2 is defined as the "proportion of variance in the dependent variable accounted for by the independent variable" (Pedhazur, 1997, p. 27). Staffing hours explained less than 1%, and staffing and resident characteristics explained only 3%, of total variance in deficiencies. Future studies are required to confirm these findings. Harrington et al. reported that RN and CNA hours were inversely related to total deficiencies and QOC deficiencies, and administrative staff hours were inversely related to administrative deficiencies. In addition, Akinci and Krolikowski (2005) reported that total nursing HPRD was inversely related to deficiency rate. However, the R^2 was only 0.104, a very small explained variance. Future studies must explore if staffing is a strong predictor variable for resident outcomes or if other factors have more impact on resident outcomes.

Bowers et al. (2000) conducted a qualitative study using grounded theory research. Their study is very important because they examined how staffing impacts QOC and QOL. In this study, CNAs reported that (a) appropriate and constant staffing develops familiar relationships, like those of families, between CNAs and residents, and (b) this relationship is highly related to better outcomes. It was found that CNAs recognize a broad range of components of QOL such as dignity and competence that are not limited to clinical outcomes. Staffing has usually been considered a structural variable (Bowers et al., 2000). However, researchers in this study investigated this again and concluded that staffing can be a process variable based on their study's findings (Bowers et al., 2000). Relevant process variables may include (a) how nursing staff spend their time and what nursing staff actually do (direct care and indirect care) and (b) how nursing staff interact with other staff, residents, and families (communication). Wan's study (2003) is also significant because dignity and respect are considered in the study, and these are important contributors to a high QOL. Further research should focus on new ways to measure quality of staffing because it is questionable whether QOC or QOL can be defined by the quantity of nursing staff; rather, it comes from the effectiveness of the professional nursing staff (Bowers et al., 2000; R. L. Kane, 2004).

Relationship Between Nursing Staff and Resident Outcomes

The majority of the reviewed articles showed that increased numbers of nursing staff and stable nurse staffing with less frequent turnover contribute positively to a variety of resident outcomes in NHs (see Table 2.3). However, the findings of Berlowitz and colleagues (1999), and Johnson-Pawlson and Infeld (1996) did not support the hypothesis that an increased number of RNs positively affects resident outcomes.

Bostick's (2004) findings did not support the hypothesis that an increased number of LPNs positively affects resident outcomes. Rantz et al. (2004) and Wan (2003) reported that overall nursing staff was significantly related to positive resident outcomes.

Berlowitz et al.'s (1999) study showed a positive correlation between the number of RNs and the degree of negative patient outcomes, which was contrary to the author's expectation. The independent variables were the number of FTEs per 100 NH residents ($N = 128$ NHs, $N = 24,025$ residents). The FTEs included physicians, RNs, medical residents, and support staff. The results showed that more RNs (10 per 100 residents) were correlated with a 0.5% increase in the rate of more than stage 2 pressure ulcers (Berlowitz et al., 1999). The persons in the sample had no pressure ulcers at the beginning of the study, but having stage 1 pressure ulcers was considered as pressure ulcer-free. Increased pressure ulcers were correlated with staff levels of 60 and 120 FTEs per 100 residents, controlling for case mix (Berlowitz et al., 1999). This study has the limitation that the inclusion of staffing criteria is unclear and physician staffing hours were only divided into three categories: direct care, teaching, and research. Other staffing in addition to physicians should have been divided into direct care hours, indirect hours, and administrative hours. In addition, this study reviewed articles from 1996 to 2006, and the articles published before 1996 were not included. The studies currently being conducted may support the contribution of RNs' direct care on pressure ulcers. A study by Horn (2005) reported that the more RN direct care hours (10 minutes increase up to 40 minutes) were related to decreased pressure ulcers in long-term care settings.

Johnson-Pawlson and Infeld (1996) completed a cross-sectional study examining the relationship between RNs and FTE nursing staff and QOC ($N = 198$ NHs). QOC was

measured by using the input of ombudspersons and records of facility survey deficiencies (Johnson-Pawlson & Infeld, 1996). The deficiencies index included resident rights, resident behavior, QOL, resident assessment, and QOC (Johnson-Pawlson & Infeld). This study supported the contribution of total nursing staff, but the RN contribution hypothesis was not supported. The relationship between the ratio of RNs and the total amount of deficiencies was not statistically significant (Johnson-Pawlson & Infeld). One of four deficiencies, the residents' rights deficiency index increased with more RNs (Johnson-Pawlson & Infeld), opposite of what was expected. The relationship between total nursing staff and total deficiencies was statistically significant: the more total nursing staff NHs had, the lower the deficiencies (Johnson-Pawlson & Infeld).

Bostick (2004) matched MDS and OSCAR data from 485 NHs and investigated the relationship between nursing hours and pressure ulcers. The interesting result was that while RN hours were a factor in preventing pressure ulcers (odds ratio = 0.97), more LPN hours contributed to more negative outcomes (odds ratio = 1.03; Bostick, 2004).

Bostick (2004) discussed the importance of an increase in the amount of staff with higher degrees and also insisted that substitution of LPNs/LVNs for RNs should be avoided in order to improve QOC. In Rantz et al.'s (2004) study, there were no differences in staffing or staff mix (RN, LPN, CNA HPRD hours) in NHs with good, average, and poor resident outcomes based on the 23 quality indicators of the MDS ($N = 92$ NHs). Nonetheless, the important point is that although staffing hours were not significantly different among the three groups, there were basics of care differences among three groups (Rantz et al.). For example, the discussion and actual implementation of the care plan was identical for staff in NHs with good residents' outcomes for

ambulation, nutrition, hydration/dehydration, toileting, bowel regularity, skin integrity, and pain management (Rantz et al.).

Wan's (2003) large sample study found that there is a weak relationship between HPRD hours and the adequacy of nursing care process ($N = 14,642$ NHs) using OSCAR and cross-sectional and longitudinal analyses (factor analysis and path analysis). Moseley and Jones (2003) reported that RN level was not significantly related to any of the OBRA survey deficiencies ($N = 28$ NHs). A higher RN level was related to the QOL deficiencies. In summary, while the majority of studies have supported the contribution of nursing staff, some studies (4 of 21) have not.

Conclusions and Discussion

The majority of the studies that investigate staffing and quality in NHs (a) have no theoretical framework, (b) depend largely on quantitative research, (c) depend heavily on secondary data analysis, (d) fail to differentiate RNs from other nursing staff, and (e) measured only QOC, which lacks specific measurement of QOL. Although little research has investigated the relationship between total nursing staff levels and outcome indicators of QOC (Dellefield, 2000; Kovner, Mezey, & Harrington, 2000), the reviewed studies demonstrate that nurse staffing is a significant organizational variable related to resident outcomes, and appropriate staffing levels are essential to improving QOC (N. G. Castle & Fogel, 1998; Harrington et al., 2000; Harrington, Zimmerman et al., 2000; Johnson-Pawlson & Infeld, 1996; Porell & Caro, 1998; Unruh & Wan, 2004; Wunderlich et al., 1996). However, each researcher studied different aspects of staffing and different resident or organizational outcomes making determination of appropriate staffing levels difficult (Maas & Specht, 1999). The research that has examined the relationship between

total nursing staff levels and process and outcome quality indicators has not clearly defined the relationship between differing levels of nursing staff skill mix and specific structural, process, outcome, and composite indicators of quality (Dellefield, 2000). The inconsistency of findings suggests that more research is needed (Dellefield; Kovner et al., 2000; Sovie, 1996). Future research may include identifying skill mix, investigating QOL beyond QOC, and observing what nursing staff actually do.

Findings should be interpreted in light of the limitations in the studies. NHs usually have a very small number of RNs. The small number of RNs may be a true predictor variable, but this does not mean that the conclusions of the above studies are valid (Johnson-Pawlson & Infeld, 1996; Maas et al., 1996; Moseley & Jones, 2003). The impact of RNs on resident outcomes may be mediated by other factors including geriatric education, staffing turnover, job satisfaction, experience of staff, and supervision (Maas et al., 1996). Future studies are needed to include effectiveness aspects of staffing such as education, use of advanced nurse staffing, appropriate allocation of direct and indirect care, and the QOC provided by staff rather than focusing on the number of staff in relation to the number of residents and care needs (Cohen & Spector, 1996; Evans, 2001; Gelman, 2001; R. L. Kane, 2004). QOL is impacted by many factors other than staffing. Staffing is not enough to explain or define QOL of residents. However, residents cannot live very long without the help of the nursing staff. It should be kept in mind when examining the impact of nurse staffing on resident outcomes that nurse staffing is much more than numbers. Nurses may practice and interact differently, and each nurse may have a different philosophy of nursing. These factors may impact resident QOL. Nurses who emphasize holistic care may interact more with residents and respond more

positively to them. Nursing educators should keep in mind that education in holistic nursing care may improve the NH resident QOL because nurses can apply their own nursing philosophy to actual settings.

Table 2.1 Source of Data

| Data collection method | | Source |
|--------------------------|--|--|
| Primary data collection | | |
| Resident interview | | Bates-Jensen et al., 2004 Bowers et al., 2000 Kayser-Jones & Schell, 1997 Schnelle et al., 2004 |
| Staff interview | | Hickey et al., 2005 Kayser-Jones & Schell, 1997 Schnelle et al., 2004 |
| Direct observation | | Bates-Jensen et al., 2004 Bowers et al., 2000 Kayser-Jones & Schell, 1997 Kayser-Jones et al., 1999 Schnelle et al., 2004 |
| Data collection by tools | Physical performance test 38 item questionnaire Resident assessment Review, and evaluation form 3652-A BMI Feeding assistance intervention tool Mini mental status exam Geriatric depression scale Philadelphia geriatric center morale scale Apparent emotion rating scale Ryden aggression scale Braden scales of pressure sore risk Incontinence | Bates-Jensen et al., 2004 Crogan & Shultz, 2000 Anderson et al., 1998 Anderson et al., 1998 Simmons et al., 2001 Simmons et al., 2001 Krichbaum et al., 2005 Krichbaum et al., 2005 |
| Secondary data analysis | | |
| MDS | | Bostick, 2004 Rantz et al., 2004 Simmons et al., 2001 Weech-Maldonado et al., 2004 |
| OSCAR | | Akinci & Krolikowski, 2005 Bostick, 2004 Harrington, Zimmerman et al., 2000 Johnson-Pawlson & Infeld, 1996 Wan, 2003 Weech-Maldonado et al., 2004 |
| State database | Nursing home standard output reports and nursing home performance profiles database from Pennsylvania Department of Health Minnesota Department of Human Services Long-term care Division facility profiles Oregon Board of Examiners of NH Administrators | Akinci & Krolikowski, 2005 Bliesmer et al., 1998 Christensen & Beaver, 1996 |
| Medical record review | | Bates-Jensen et al., 2004 Horn et al., 2005 Kayser-Jones et al., 1999 Schnelle et al., 2004 Simmons et al., 2001 |

Table 2.1 Continued

| Data collection method | Source |
|--|--------------------------------|
| Secondary data collection. (continued) | |
| Staffing records review | Hickey et al., 2005 |
| Veterans Affairs VA patient assessment file database | Krichbaum et al., 2005 |
| | Berlowitz et al., 1999 |
| Department of Veterans Affairs' national long term care database | Hickey et al., 2005 |
| National database | Christensen & Beaver, 1996 |
| HCFA database (NH survey) | |
| HCFA deficiencies index | Johnson-Pawlson & Infeld, 1996 |
| Statement of deficiencies and plan of correction reports (HCFA-2567) | Moseley & Jones, 2003 |
| Subset data from the national pressure ulcer long-term study | Horn et al., 2005 |
| Medicaid cost reports | Rantz et al., 2004 |
| Texas Medicaid nursing facility 1990 cost reports | Anderson et al., 1998 |

Note. MDS = *Minimum Data Set.*

OSCAR = *Online Survey Certification and Reporting.*

VA = *Veterans Affairs.*

HCFA = *Health Care Financing Administration.*

NH = *Nursing Home.*

Table 2.2 Resident Outcome Variables Which Were Studied in the Reviewed 21 Articles

| Resident outcomes | | |
|-----------------------------|---|---|
| Activity | Bed rest | Bates-Jensen et al., 2004 Rantz et al., 2004 Schnelle et al., 2004 |
| | ADLs functions | Bostick, 2004 Horn et al., 2005 Rantz et al., 2004 Wan, 2003 |
| | Exercise and repositioning | Schnelle et al., 2004 |
| | Patterns of activity | Rantz et al., 2004 |
| Infection | Pressure ulcers | Anderson et al., 1998 Berlowitz et al., 1999 Bostick, 2004 Hickey et al., 2005 Horn et al., 2005 Rantz et al., 2004 Wan, 2003 Weech-Maldonado et al., 2004 |
| | Urinary tract infection | Anderson et al., 1998 Horn et al., 2005 Rantz et al., 2004 |
| Medication | Medications overuse | Rantz et al., 2004 |
| n | Psychotic medication | Rantz et al., 2004 Weech-Maldonado et al., 2004 |
| | Medication errors | Wan, 2003 |
| Nutrition | Eating patterns (feeding of resident/ food or fluid consumption, nutrition, tube feeding) | Crogan & Shultz, 2000 Kayser-Jones & Schell, 1997 Kayser-Jones et al., 1999 Rantz et al., 2004 Schnelle et al., 2004 Simmons et al., 2001 Wan, 2003 |
| | Hydration/dehydration | Anderson et al., 1998 Rantz et al., 2004 Wan, 2003 |
| | Weight loss | Bostick, 2004 Horn et al., 2005 Rantz et al., 2004 |
| Necessary medical treatment | Contractures | Anderson et al., 1998 |
| | Bladder or bowel incontinence | Bostick, 2004 Rantz et al., 2004 Schnelle et al., 2004 Wan, 2003 |
| | Fecal impaction | Rantz et al., 2004 |
| Use of catheters | Indwelling catheters | Rantz et al., 2004 Wan, 2003 |
| | Urinary catheters | Wan, 2003 |
| Accidents | Fracture | Anderson et al., 1998 Rantz et al., 2004 |
| | Falls | Rantz et al., 2004 |

Table 2.2 Continued

| | | Resident outcomes |
|------------------------|---|--------------------------------------|
| Psychotic status | Depression without antidepressant therapy | Rantz et al., 2004 |
| | Cognitive impairment | Rantz et al., 2004 |
| Behavior problem | Mood decline | Weech-Maldonado et al., 2004 |
| | Retardations | Weech-Maldonado et al., 2004 |
| | Verbal aggression | Wan, 2003 |
| | Physical aggression | Anderson et al., 1998 |
| | Behavior change | Anderson et al., 1998 |
| | | Anderson et al., 1998; Bostick, 2004 |
| | | Johnson-Pawlson & Infeld, 1996 |
| Overall health quality | Restraints | Rantz et al., 2004 |
| | | Moseley & Jones, 2003 |
| | | Anderson et al., 1998 |
| | | Bostick, 2004 |
| | | Rantz et al., 2004 |
| Quality of life | Quality of care | Weech-Maldonado et al., 2004 |
| | | Akinci & Krolikowski, 2005 |
| | | Bowers et al., 2000 |
| | | Harrington, Zimmerman et al., 2000 |
| | | Johnson-Pawlson & Infeld, 1996 |
| | | Moseley & Jones, 2003 |
| | Health and safety deficiencies | Christensen & Beaver, 1996 |
| | Health and function | Bliesmer et al., 1998 |
| | | Krichbaum et al., 2005 |
| | Life safety code deficiencies | Christensen & Beaver, 1996 |
| Quality of life | Quality of life | Akinci & Krolikowski, 2005 |
| | | Bowers et al., 2000 |
| | | Harrington, Zimmerman et al., 2000 |
| | | Johnson-Pawlson & Infeld, 1996 |
| | | Moseley & Jones, 2003 |
| | Dignity and respect | Wan, 2003 |
| | Accommodation of individual needs and preferences | Wan, 2003 |
| | Resident rights | Johnson-Pawlson & Infeld, 1996 |
| | Relocation | Bliesmer et al., 1998 |
| | Discharge to home | Horn et al., 2005 |
| Hospitalization | Bliesmer et al., 1998 | |
| Death | Bliesmer et al., 1998 | |
| Etc | Resident assessment | Johnson-Pawlson & Infeld, 1996 |
| | | Moseley & Jones, 2003 |
| | Administrative deficiencies | Harrington, Zimmerman et al., 2000 |
| | Other deficiencies | Akinci & Krolikowski, 2005 |
| | Harrington, Zimmerman et al., 2000 | |

Note. ADL = *Activities of Daily Living*.

Table 2.3 Summary of Relationship between Nursing Staffing and Resident Outcomes

| Nurse Staffing variables | Resident outcomes | Relation-ship | Contribution to | |
|---|--|---------------|-------------------|-------------------------------|
| | | | resident outcomes | Source |
| RN HPRD RN number/bed | Verbal aggression | Negative | + | Anderson et al., 1998 |
| RN HPRD RN number/bed | Physical aggression | Negative | + | Anderson et al. 1998 |
| RN HPRD RN number/bed | Disruptive behavior | Negative | + | Anderson et al., 1998 |
| RN HPRD RN number/bed | Restraints | Negative | + | Anderson et al., 1998 |
| RN HPRD RN number/bed | Decubitus | Negative | + | Anderson et al., 1998 |
| RN HPRD RN number/bed | Contractures | Negative | + | Anderson et al., 1998 |
| RN HPRD RN number/bed | Dehydration | Negative | + | Anderson et al., 1998 |
| RN HPRD RN number/bed | Urinary tract infection | Negative | + | Anderson et al., 1998 |
| RN HPRD RN number/bed | Fracture | Negative | + | Anderson et al., 1998 |
| Nursing HPRD RN HPRD CNA HPRD LPN HPRD | QOC deficiencies QOL deficiencies Other deficiencies | Negative | + | Akinci & Krolikowski, 2005 |
| Total nursing staff | Out of Bed | Positive | + | Bates-Jensen et al., 2004 |
| RN level | Pressure Ulcer | Positive | - | Berlowitz et al., 1999 |
| More licensed nursing hours vs less nonlicensed nursing hours | Discharge to home | Positive | + | Bliesmer et al., 1998 |
| More licensed nursing hours vs less nonlicensed nursing hours | Death | Negative | + | Bliesmer, et al., 1998 |
| More licensed nursing hours vs less nonlicensed nursing hours | Functional ability | Positive | + | Bliesmer et al., 1998 |
| RN HPRD | Pressure ulcers | Negative | + | Bostick, 2004 |
| LPN HPRD | ADL Loss | Positive | - | Bostick, 2004 |
| Better relationship between CNAs and residents | Better resident outcomes | Positive | + | Bowers et al., 2000 |
| Administrator turnover | Health and safety deficiencies | Positive | - | Christensen & Beaver, 1996 |
| Workload Supervision constraints Poor relationship between nurses and CNAs Needs of food intake | Food intake | Negative | + | Crogan & Shultz, 2000 |
| Total nursing staff | Pressure ulcers | Negative | + | Hickey et al., 2005 |
| Staff mix (Less LPN, more CNAs) | Pressure ulcers | Negative | LPN - CNA + | Hickey et al., 2005 |

Table 2.3 Continued

| Nurse Staffing variables | Resident outcomes | Relation-ship | Contribution to resident outcomes | Source |
|---|---|-----------------|-----------------------------------|------------------------------------|
| Changes in staffing patterns | Pressure ulcers | Positive | - | Hickey et al., 2005 |
| RN, CNA hours | QOC deficiencies QOL deficiencies Administrative deficiencies | Negative | + | Harrington, Zimmerman et al., 2000 |
| CNA, other care staff | QOL deficiencies | Negative | + | Harrington, Zimmerman et al., 2000 |
| Administrative staff hours | Administrative deficiencies | Negative | + | Harrington, Zimmerman et al., 2000 |
| RN level | Pressure ulcers Hospitalization Urinary tract infections Weight loss Catheterization ADLs | Negative | + | Horn et al., 2005 |
| CNA level | Pressure ulcers | Negative | + | Horn et al., 2005 |
| LPN level | | | | |
| RN level | QOL deficiencies QOC deficiencies Resident behavior and facility practices deficiencies Resident assessment deficiencies | Not significant | Not significant | Moseley & Jones, 2003 |
| RN level | QOL deficiencies | Positive | - | Moseley & Jones, 2003 |
| More RN Less LPN (Skill mix) | Resident assessment deficiencies | Negative | RN + LPN - | Moseley & Jones, 2003 |
| Differences of NHs in staffing, skill mix among good, average, and poor resident outcomes | 21 MDS QIs | Not significant | Not significant | Rantz et al., 2004 |
| RN level | Out of bed engagement | Positive | + | Schnelle et al., 2004 |
| LVN level | | | | |
| CNA level | | | | |
| RN level | Feeding assistance | Positive | + | Schnelle et al., 2004 |
| LVN level | | | | |
| CNA level | | | | |
| RN level | Incontinence care | Positive | + | Schnelle et al., 2004 |
| LVN level | | | | |
| CNA level | | | | |
| RN level | Exercise and repositioning | Positive | + | Schnelle et al., 2004 |
| LVN level | | | | |
| CNA level | | | | |
| CNA, research staff | Food/fluid intake during feeding assistance | Positive | + | Simmons et al., 2001 |

Table 2.3 Continued

| Nurse Staffing variables | Resident outcomes | Relation-ship | Contribution to resident outcomes | Source |
|---|--|-----------------|-----------------------------------|---|
| RN level | HCFA deficiencies index - Resident rights deficiencies - Resident behavior deficiencies - QOL deficiencies - QOC deficiencies - Resident assessment deficiencies | Not significant | - | Johnson-Pawlson & Infeld, 1996 |
| Total nursing staff | HCFA deficiencies index | Negative | + | Johnson-Pawlson & Infeld, 1996 |
| RN level LVN level CNA level More qualified staff | Better eating pattern Fluid intake | Positive | + | Kayser-Jones & Schell, 1997 |
| Organization level interventions by Gerontological Advanced Practice Nurses | Health function | Positive | + | Kayser-Jones et al., 1999 Krichbaum et al., 2005 |
| RN level LPN level CNA level | Retardations Dignity and respect NG tubes Accommodation of individual needs and preferences ADL Pressure sores Urinary catheters Bladder incontinence Nutrition Hydration Drugs Medication errors | Not significant | - | Wan, 2003 |
| Skill mix (More RN, Less LPN and CNA) | Physical restraints Antipsychotic drugs Pressure ulcers Mood decline Cognitive decline | Negative | + | Weech-Maldonado et al., 2004 |

Note. + Staffing variables contribute to residents' outcomes.

- Staffing variables did not contribute to residents' outcomes.

RN = *Registered Nurse*.

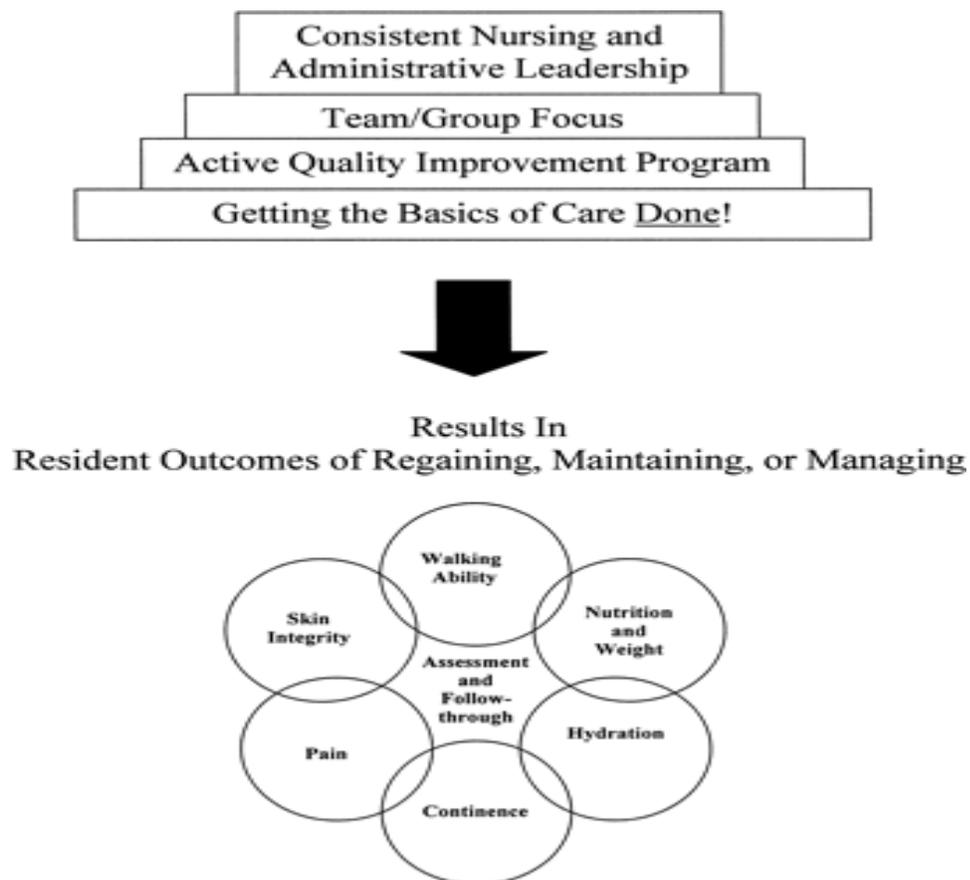
LPN = *Licensed Practical Nurse*.

LVN = *Licensed Vocational Nurse*.

CNA = *Certified Nursing Assistant*.

HPRD = *Nursing Staff Hours Per Resident Day*.

Figure 2.1 Theoretical Model of Organizational Attributes of Nursing Facilities Achieving Good Resident Outcomes



From "Nursing Home Quality, Cost, Staffing, and Staff Mix," by M. J. Rantz, L. V. G. Hicks, G. F. Petroski, R. W. Madsen, D. R. Mehr, D. R., et al., 2004, *Gerontologist*, 44(1), 24–38.

CHAPTER III.
RELATIONSHIP BETWEEN NURSING STAFFING AND QUALITY OF LIFE IN
IOWA NURSING HOMES

Introduction and Overview

Many studies and government reports have identified staffing as one of the fundamental reasons for the poor QOC of NH residents (Eaton, 2000; Harrington et al., 1998; Harrington, 2001; Hickey et al., 2005; National Citizen's Coalition for Nursing Home Reform, 1999; Reinhardt & Stone, 2001). This study addressed several gaps in NH staffing research by (a) focusing on the contribution of RNs, and (b) investigating the QOL of residents, not QOC. One of the research gaps has been that RNs and other nursing staff have often been grouped together (Baldwin et al., 2003; Dellefield, 2000; Masterson, 2004). NHs employ more unlicensed nursing staff (CNAs), and less licensed nursing staff (LVNs/LPNs) due to financial pressures (Conant, 2004; Curtin & Simpson, 2000; Hunt & Hagen, 1998). So far, very few staffing research studies differentiate RNs from other NH staff. In addition, the report to Congress by HCFA (2000) also failed to identify the specific diverse roles of RNs' in NHs (Mohler, 2001).

Most previous research has measured only QOC by using Quality Indicators of MDS 2.0 which lacks measurement of QOL for measuring psychosocial aspects of residents (Harrington, Zimmerman et al., 2000). QOC means the process and outcome measures that affect residents' care directly including nursing services, dietary services, dental services and infection control, while QOL is related to rights of residents such as privacy and dignity (Akinci & Krolikowski, 2005). NH lives may be barren, restricted and have loss of privacy and significant relationships that are not apparent in a hospital-

like environment (Agich, 1993; R. A. Kane, 1990; Lidz, 1992). Previous research has focused on the QOC for NH residents such as urinary tract infection (R. A. Kane, 2003). Moreover, QOL has not been measured extensively for NH residents, and it has not been protected by politicians or by law (R. A. Kane, 2003; Kane et al., 2003). It is very important to measure QOL because NHs are expected to provide social and even end-of-life services as well as health care services. QOL is heavily affected by QOC especially in NHs, but it takes more than QOC to optimize QOL (Harrington et al., 2002). Additionally, the health status of residents can affect the QOL regardless of nursing services. However, there are very few studies that investigate the relationship between nursing care and QOL. There is no existing tool to measure QOL in NHs (CMS, 2007).

The purpose of this study is to investigate the relationship between nurse staffing and QOL in Iowa NHs. The specific aims with these hypotheses were:

1. What is the relationship between the nursing staff hours per resident day (HPRD) and the quality of life (QOL) of residents in nursing homes (NHs)?
2. What is the relationship between the skill mix nursing staff hours per resident day (HPRD) and quality of life (QOL) in nursing homes (NHs)?
3. What is the relationship between the turnover rates of nursing staffing and the quality of life (QOL) in nursing homes (NHs)?

Methods

Design of the Study

The design was a cross-sectional correlational study. Cross-sectional designs are used to investigate groups of subjects in diverse stages of development at the same time (Burns & Groves, 2001). Because the relationship between independent variables and

dependent variables was examined, this study was a descriptive correlational study. The data came from two major sources, OSCAR and MDS 3.0 data. Only demographic information from MDS 2.0, and section F of MDS 3.0 which is currently not required in NHs, was used.

Independent variables were Nursing Staff HPRD, skill mix HPRD, and turnover rate of nursing staff. The source for these variables was the CMS' OSCAR. The HPRD was divided into FTE hours and PT hours. The HPRD included FTE RN HPRD, PT RN HPRD, compiled HPRD of FTE and PT RN, FTE LPN/LVN HPRD, PT LPN HPRD, compiled HPRD of FTE and PT LPN/LVN, FTE CNA HPRD, PT CNA HPRD, compiled HPRD of FTE and PT CNA. The ratios of (a) RNs to LPNs/LVNs, and CNAs, and (b) RNs to LPNs/LVNs plus CNAs were used to measure skill mix. The skill mix of NHs means the variation in skill and educational background of nursing staff in NHs (Dellefield, 2000). According to CMS (2006), HPRD means "the average hours worked by the licensed nurses or nursing assistants divided by total number of residents." The concrete procedure of calculating HPRD was described in chapter I (Table 1.3).

To calculate turnover of total nursing staff and each level of nursing staff (RN, LPN/LVN, and CNA), a crude turnover rate was used. A crude turnover rate is calculated as the numerator (number of nursing staff who left = number of nursing staff who quit the job) divided by the denominator (numbers at start plus numbers at end divided by 2, and then multiplied by 100 usually for 1 year (see Table 1.4; Duxbury & Armstrong, 1982). As turnover and staff turnover data do not exist, the actual turnover was obtained from the administrative staff (administrator, DON) at each NH using the Nursing Personnel Data Collection Tool developed by Bostick (2002; see Table 1.5). The data for the

dependent variables were collected by the researcher using the QOL section in MDS 3.0. The proposed QOL section in the MDS 3.0 was obtained from R. K. Kane (2007) who developed this instrument.

Sample/Setting

Stratified random sampling was applied to the retrieved NH list from the NH Compare Site to identify representative characteristics of the sample (Burns & Groves, 2001). The list of Iowa NHs was obtained from the Nursing Home Compare Site (CMS, 2006). There were a total of 455 NHs in Iowa (CMS, 2006). Sixty-six NHs had 50- 100 beds and 33 of these within 70 miles of Iowa City were randomly selected. NH administrators were contacted for approval to interview and access residents' data. Eight NHs declined to participate, however, a total of 25 out of 33 NHs in the Iowa City area agreed to participate. The administrators of NHs that declined to participate in this study gave reasons for not participating, including lack of time, and reluctance to impose on residents. Some administrators gave no explanations as to their reason for declining the offer. A total of 231 residents from 25 NHs were included in the criterion validity analyses. Twelve NHs were for-profit NHs, 12 NHs were not-for-profit NHs, and 1 NH was a government-owned NH. Using the OSCAR's designation for urban/rural, 15 NHs were located in a rural area and the other 10 were located in urban areas in Iowa. OSCAR designates a place as an urban area if the county is in an urban statistical area based on its Core-Based Statistical Area, otherwise it is rural.

Instruments

Two sources of data, the OSCAR and QOL section in MDS 3.0 were used to examine the relationships between staffing and QOL in NHs.

OSCAR

OSCAR includes the NH characteristics and the residents' health deficiencies collected during the three most current state surveys and additional complaint examinations (CMS, 2006). OSCAR is completed by NH administrators, and collected by the state survey agencies who conduct on-site evaluations at least once every 15 months. The evaluation can also be conducted when there are complaints regardless of the 15-month inspection cycle. After collecting data, the state survey agencies are in charge of entering survey information into the OSCAR database and updating it if necessary (CMS, 2006).

There are limitations with OSCAR when using it as a tool for measuring staffing of the NHs. The major limitation of OSCAR is accurate staffing levels. Staffing of OSCAR could be higher than the usual staffing levels because some facilities augment the staffing levels just before the annual certification survey (CMS, 2001; Harrington, Zimmerman et al., 2000). Secondly, data are not collected at the same time from each unit because of the continuing annual survey process (Straker). Thus, the time deviation between facilities can be another limitation. Third, these data cannot investigate the entire elderly population in the NHs in the United States because not every NH is certified for Medicare and Medicaid (Straker, 1999). Fourth, there is continuous concern about the validity and reliability of OSCAR (GAO, 2002b; Harrington et al., 1998; Harrington et al., 2003; Harrington, Zimmerman et al., 2000; Health Care Financing Administration,

2000b; Schnelle, 2004; Straker, 1999). However, OSCAR is the only available electronic source regarding the NH staffing (Straker). Thus, the federal OSCAR data set for the year 2006 was used to measure staffing independent variables. These inspection results are collected by state survey agencies who carry out online evaluations (Harrington et al., 2000).

Quality of Life Section in MDS 3.0

In 2003, the draft MDS 3.0 was proposed to CMS for validation (CMS, 2003). As of June, 2007, MDS 3.0 is still not implemented. The QOL (section F) in MDS 3.0 was developed by a University of Minnesota research team (R. A. Kane et al., 2003) through a contract with CMS to offset the limitation of quality indicators in version MDS 2.0 and to advance a measurement which reflected the psycho-social aspects of NH residents' lives (R. A. Kane et al., 2003). Ten of the 11 domains were determined by confirmatory factor analysis ($n=1,988$; R. A. Kane et al., 2003). The internal consistency (Cronbach's alpha) was reported from .76 (functional competence) to .52 (meaningful activity) in R. A. Kane and colleagues' study (2003). Validity was tested by regression of each domain scale with summary measures ; all 11 items were matched with summary items (CMS, 2007). Consequently, the constructs were correlated (CMS, 2007).

According to an interview with a staff member at the Research Data Assistance Center (2006), the MDS 3.0 assessment instrument is in the development stage. However, a timeline for implementation and release of 3.0 data has not been set. CMS development team members, an Information Technology Coordinator, a social worker, an RN and a physical therapist, built the MDS 3.0 and received feedback through teleconferences from key stakeholders (Anderson et al., 2003). According to the CMS's MDS 3.0 development

process data (2003), new items in MDS 3.0 were based on the input of the Professional Groups and Technical Expert Panels of 2002 (Anderson et al., 2003). The rationale for using this section is that data collection regarding QOL information depends on evidence-based research in order for researchers to hear the responses of residents directly (Anderson et al, 2003). Furthermore, there is no existing tool to measure QOL in NHs in the literature other than proposed QOL section in MDS 3.0 (CMS, 2007).

QOL is subjective and should reflect the variety of experiences of residents (R. A. Kane et al., 2003). The self- reports of residents have more validity to get the lived experience of residents than staff or family reports ; self reports from residents are more valid (Kane et al., 2003; Rubinstein, 2000). It has been reported that there is a perception gap regarding QOL ratings between NH residents and proxies (families or staff; Berlowitz et al., 1995; R. A. Kane et al., 2000;R. L. Kane et al., 2005; Logsdon, 1999; Mittal et al., 2007). However, it is not always possible to get answers from the residents because of their physical and cognitive function (R. A. Kane, 2003; Rubinstein, 2000). Moreover, there is staff and researchers bias that underestimate the functional competency of residents even if they can answer some questions and express their feelings without difficulty. This study tried to offset this limitation by the less strict inclusion criterion responsiveness screen proposed by Simmons and Ouslander (2005).

Based on the literature review, opinions of professionals, group discussion, and stakeholders' discussion, the University of Minnesota research team determined the 11 QOL domains. The team developed 54 questions for health care providers to ask residents directly to assess 11 domains, which are dignity, comfort, privacy, meaningful activity, relationships, spiritual well-being, autonomy, individuality, food enjoyment,

security and functional competence (Anderson et al., 2003). The research team excluded emotional, health, and functional status because it was beyond the contract scope, although they are related to QOL (R. A. Kane et al., 2003). R. A. Kane and colleagues (2003) established three groups of the 11 domains according to the similar characteristics of domains: comfort and security questions, social questions, self-worth and individual questions (R. A. Kane et al., 2003).

Ten of the 11 domains were determined by confirmatory factor analysis ($n=1,988$; Kane et al., 2003). Individuality was dropped because individuality and relationship domains were identical ($r = .99$) and reliability of individuality was poor ($\alpha = .56$; R. A. Kane et al., 2003). Internal consistency (Cronbach's alpha) was reported to range from .76 (functional competence) to .52 (meaningful activity) in R. A. Kane and colleagues' study (2003). Validity was tested by the regression of the each domain scale with summary measures and all 11 items were matched with summary items (CMS, 2007). Examined separately for the higher and lower cognitive groups, the comfort and individuality domains were not matched with summary measures for the low-cognitive group, furthermore, the individuality was not matched with the summary measures for the high-cognitive group (CMS, 2007). Consequently, constructs were correlated, but successfully able to measure QOL (CMS, 2007).

Procedure

Approval to conduct this study was obtained from the Institutional Review Boards of the University of Iowa and the research committee for doctoral dissertations at the University of Iowa, College of Nursing. The sample for this study was the residents of the selected NHs described above. After the researcher first randomly selected every 5th

resident, NH staff (RN, DON, administrator, activity director, and social worker) defined the availability of the resident to answer the questionnaire until the goal of the sample size per facility (10 per NH) was reached. Exclusion criteria were: comatose residents, terminally ill residents and residents with multiple chronic conditions and severe cognitive and functional impairments. Residents who were younger than 60 were excluded because the QOL of younger people was assumed to be different from that of older people (CMS, 2007). Cognitive impairment of residents in some facilities made it impossible to interview 10 residents. Cognitive impairment was measured by the responsiveness screen described by Simmons and Ouslander (2005). The residents were asked to say their names when requested or to reliably recognize two common objects (Simmons & Ouslander, 2005). If a resident could not answer these questions, that subject was excluded from the sample. Long-stay and recently admitted (1 to 3 days) residents were included. If residents were alert, the researchers obtained their consent and collected data directly from them. For persons who were cognitively impaired or demented, consent forms were obtained from their legal proxies or family members by mail, phone, or in person. Residents with poor cognitive function for whom consent was granted, and who assented to participate, were included only if the residents met the responsiveness screening. Residents were encouraged to answer using both the Likert scale and dichotomous scale because it was assumed that the QOL of MDS 3.0 is in a development stage so it may be more accurate to measure QOL using both of the scales than transforming into Z scale because some could not use Likert scale. If the Likert scale was too difficult for some residents, only the dichotomous scale was used (Anderson et al., 2003). The Likert scale consisted of “often”, “sometimes”, “rarely”, or “never” while

the dichotomous scale was composed of “mostly yes” and “mostly no” answers (CMS, 2007). Of the 231 interviews, 224 residents answered by using both Likert and dichotomous scale. However, 7 residents answered using only the dichotomous because it was too difficult for them to answer using a Likert scales.

The OSCAR data were purchased through the CRG. The OSCAR file was imported directly into the SPSS program and analyzed by using HLM with Proc Mixed of SAS program (CRG, 2004). There were no extremely high or low HPRD in the OSCAR data for the 25 NHs and cleaning strategies were not necessary. However, there were missing data for RUGS and the Nursing Personnel Data Collection Tool. The missing data of RUGS were from the inability to access residents, incompleteness of MDS data for newly admitted residents, and the loss of the interviewed residents’ list by NH staff. There were 15.56 % missing data of sample for the RUGS. The missing data of the RUGS were imputed based on the residents’ age, education, bed size, the geographical area, sex, functional status, autonomy domain score, outdoor activities domain score, and the overall satisfaction score in the QOL questionnaire. Then, the RUGS classification was converted into numbers to be used as control variables based on the case-mix set B02, which was developed for research by CMS (CMS, 2007). The range of the case-mix index was from 0 to 1.52 in this study. The smaller number represented healthier residents. These factors were taken into account to investigate the relationship between staffing variables and QOL.

The Nursing Personnel Data Collection surveys developed and used by Bostick (2002) for the turnover data were returned with an 80% response rate, which was a higher response rate than in Bostick’s study (7.4%). The reason for this difference may be that

direct contacts with administrators by phone and visits were performed rather than depending on direct mail. The 20 % missing turnover data were imputed by using an average with exclusion of the number over 100.

Results

The OSCAR file was imported directly into the SPSS program and the QOL scores, skill mix and turnover data were entered into the SPSS program. An HLM model was used to investigate the relationship between HPRD and QOL scores with Proc Mixed of the SAS program. HLM is the appropriate statistical method designed for analyzing data in this study, designed especially for a situation where the causal relationships are hypothesized on different levels of analysis and where the units on one level are nested within the units on another level (Wu, 1996). HLM permits simultaneously estimating effects at the individual level and the NH level. An HLM analysis also properly takes into account that observations of individuals are not statistically independent because they are clustered within NHs. This study examined the analysis of NHs, but the impact of resident characteristics on outcomes was also considered.

Two HLM models were developed (see Appendix 1). The model is divided into two because there were too many predictors in one model. Staffing was divided into FTE and PT and the compiled staffing data of FTE and PT was examined respectively. One model included FTE and PT, and the other model had only total staffing variables (see Appendix 1).

Demographics of Residents

Facility' bed sizes ranged from 44 to 120 (Mean =70, *SD*=18.53). Most of the resident participants were women (72.7%), White (99.1%), widowed (67.1%), with a high school diploma (52.8%). The sample of residents in this study is similar to national data in terms of age, gender and marital status. Seventy- five percent of residents were women and majority of them were widowed (Gabrel, 2000; National Center for Health Statistics, 2003). In addition, lack of racial diversity in Iowa made the sample not representative of the population parameter in terms of race. It was reported that African American elders use more NH services than Caucasian, especially for males (National Center for Health Statistics, 2005).

The average age of participants was 85.11 years (*SD*=8.4) and about one quarter of the residents (26.8%) had been diagnosed with dementia. This study included all residents who were older than 60. The most current available data showed that a majority of NH residents (44.9%) across the United States are older than 85 while only 12.2 % were between 65 and 74, and 33. 5% were between 75 and 84 in 1999 (Hetzel, Lisa & Annetta, 2001). The QOL of the oldest old group (older than 85) may be different than the youngest old (over 65) because their physical, cognitive, and functional capacities were different from the middle and youngest old people of the elderly population. Thus, future studies require the differentiation of sample in terms of age. The average months of stay in the residents' current NH was 22.75 months (1 year 9 months) (*SD* =26.89), which was shorter than the national average. The national average stay in NHs was 29 months (2 years 4 months; Gabrel, 2000). The average time required to complete the QOL interview per resident was 26.06 minutes (*SD* = 10.8; see Table 3.1). The mean and

standard deviation scores for each domain are presented in Table 3.2. A higher score represents a more positive QOL. The score differences between dichotomous and Likert scales were not noticeable. The only available previous study that used QOL section of MDS 3.0 as a data collection tool was Kane's study (2000). The scores in most domains of this study were slightly lower than or similar to that of Kane's study (2000; $n=12,928$). Noticeably, the privacy score of the sample in this study was 1.99 lower than that of Kane's study (dichotomous) and 1.74 lower than Kane's study (Likert). However, the meaningful activity scores were 1.62 higher than Kane's (dichotomous) and 0.86 higher than Kanes in the Likert Scale. The individuality scores were not reported in Kane's study and the differences could not be investigated (see Table 3.2).

Correlations Among Variables

The magnitudes of the correlations between nursing staffing and the QOL domains was small without considering case mix of residents (see Table 3.3 and Table 3.4). The highest correlation was shown between the turnover of CNA and functional competence domain ($r = -.24$; see Table 3.3)

The correlations among the independent variables (QOL domains) were examined. In general, the measures of the QOL domains demonstrated low to moderate correlations (from $r = .11$ to $r = .45$) with each other in the Likert Scale (see Table 3.5). The highest correlation was shown between relationship and individuality in the Likert scale ($r = .45$). The measures of the QOL domains in the dichotomous scale demonstrated a moderate to high range (from $r = .36$ to $.72$; see Table 3.6). Of the examined domains, the dignity domain was highly correlated with the security ($r = .72$) and individuality domains ($r = .67$; see Table 3.6). The security domain was highly correlated with the

autonomy ($r = .66$), individuality ($r = .72$), and enjoyment domains ($r = .68$; see Table 3.6). The correlation between the relationship and individuality domains was high ($r = .7$), as well (see Table 3.6). R.A. Kane et al.'s study (2000) showed low to moderate correlation (between $r = .123$ and $.565$). The researchers compiled the Likert and dichotomous answers by using Z transformation, but the answers were differentiated between Likert and dichotomous scales in this study. The high correlation between dignity and security shown in this study was highly intercorrelated in R. A.Kane et al.'s (2000) study as well ($r = .531$).

The correlations among the dependent variables (staffing variables) were examined. Of particular note are the moderate negative correlations observed when more DON HPRD was related to more stable levels of CNA and LPN staffing without controlling for case mix of residents. That is, NHs with more DON hours had less CNA and LPN turnover. The important role of DON as nursing-staff leader is supported here. There was moderate correlation between PT CNA HPRD and PT LPN HPRD. There was high correlation between the FTE RN turnover and PT RN turnover (see Table 3.7).

Descriptive Characteristics of Nurse Staffing

The descriptive characteristics of nursing staffing were collected directly from the 25 NHs in the sample. The average number of total RNs, LPNs, and CNAs was 7.7 ($SD=4.28$), 4.95 ($SD=2.86$), and 28.32 ($SD= 8.53$) respectively. The average number of FTE RNs per NH was 4.63 ($SD=2.43$) and that of PT RNs was 3.1 ($SD=3.0$). The average number of FTE LPNs was 3.46 ($SD=2.14$) and that of PT LPNs was 1.47 ($SD=1.7$). The average number of CNAs per NH was 18.74 ($SD=6.87$) and that of PT CNAs was 9.57 ($SD=5.18$; see Table 3.8).

The majority of RNs in this study had an Associate Degree in Nursing (68%), however, few had graduate school (1%). The average age of the RN's was 46.23 years ($SD = 12.4$), with 4.5 years professional experience and \$21.23/hr wage (see Table 3.9). Likewise, the majority of LPNs had completed 1 year training at a hospital, vocational/technical school, or community college (55.4%). The average age of an LPN was 41.88 years old, and the average professional experience earned was 2.5 years, with a mean hourly wage of \$18.52 (see Table 3.9). The majority of CNAs had earned high school diplomas (61.7%) with the average age of 31.05 years, the average professional experience of 17 months, and the mean hourly wage of \$11.04 (see Table 3.9).

Nursing Staff Hours Per Resident Day

The Nursing Staff HPRD of the DONs, RNs, LPNs/LVNs and CNAs (FTE HPRD, PT HPRD), and compiled HPRD of FTE and PT, respectively) were explored in this study. The amount of PT RN HPRD had a statistically significant positive influence on the comfort and enjoyment domains of residents (see Table 3.10). This finding indicates that the greater amount of RN HPRD that residents had, the higher the reported comfort level. Despite these findings, the compiled RN HPRD had a statistically significant negative influence on the meaningful activity and relationship domains (see Table 3.11). Unexpectedly, the scores of meaningful activity and relationships were lower when more RN HPRD were provided to the residents. None of the DON variables had a statistically significant influence on any domain of QOL. It is assumed that although major DON work is based in administrative work, it includes less direct contact with residents than RNs. These findings are quite different from the findings shown in

Tables 3.3 and 3.4 because these findings controlled the case mix of residents while the investigated correlation in Tables 3.3 and 3.4 did not consider residents' case mix.

There was a statistically significant negative relationship between the amount of PT LPN HPRD and comfort domain (see Table 3.10). Both FTE LPN HPRD and the compiled FTE and PT LPN HPRD had a statistically significant positive influence on the dignity domain (see Table 3.11). In other words, residents were more satisfied with their dignity when more LPN hours were provided.

The PT CNA HPRD had a statistically significant positive impact on the functional competence domain for the residents (see Table 3.10). The total CNA HPRD had a statistically significant positive impact on the security domain, as well (see Table 3.11). This finding suggests that CNAs care for the majority of residents' ADLs, so that the more a CNA's have contact hours with the residents, the higher the scores for functional competence and security.

Skill Mix

Skill mix was examined to see if it was a predictor of QOL for NH residents. The ratio of more RNs to less LPNs/LVNs was found to have a statistically significant negative influence on the autonomy and spiritual well-being domains (see Table 3.11). However, the ratio of more RNs to less LPNs/LVNs and CNAs had a statistically significant positive influence on the functional competence domain and overall summary item of residents' QOL (see Table 3.10). In other words, RNs had a positive effect on resident functioning, but apparently a negative effect on the autonomy and spiritual well-being domains. This may be because CNAs rather than RNs help the residents with going to bed, getting up, and changing clothes, activities that may improve the autonomy

domain scores. Furthermore, CNAs are more involved in transporting residents to religious services and, therefore, residents have more opportunity to attend religious services like church or mass. RNs are responsible for indirect care including notifying doctors, charting, and administering medications.

Turnover

The turnover rate of RNs, LPN/LVNs, and CNAs (FTE, PT and compiled) was investigated. Contrary to the researcher's expectations, the turnover of FTE RNs had a statistically significant positive impact on the functional competence and enjoyment domains (see Table 3.10). The compiled turnover of FTE and PT RNs had a statistically significant positive impact on the enjoyment domain (see Tables 3.10 and 3.11). This may be interpreted that newly hired RNs are more concerned about the easiness of residents getting around in their room, the time and easiness for using the bathroom, respect for the residents' tastes of their own room preferences, and the assurance that residents can get their favorite food.

The turnover of FTE LPNs also had a statistically significant positive impact on the privacy and relationship domains (see Table 3.11). A reason for higher score in privacy and relationship domains with increased turnover could be attributed to the fact that new hired nurses are more cautious about their relationships with residents and therefore try to protect the residents' privacy more than the staff who had worked at the NHs longer. The turnover of the FTE LPNs (see Table 3.10) and the compiled FTE and PT LPNs (see Table 3.11) had a statistically positive impact on the individuality domain. It may be inferred that the higher score of the individuality domain with increased turnover of LPNs is that the new hired LPNs would be more eager to establish rapport

and learn about the residents including information about their previous lives, experiences, and preferences than the staff who worked at the NHs for a long time.

There was a statistically significant negative relationship between the compiled turnover of FTE and PT CNAs and the security and individuality domains (see Table 3.11). In other words, the stable staffing of CNAs was important for the security and individuality of the residents. As CNAs spend more time with residents than RNs/LPNs, they may interact more with residents and have more opportunity to ask about the residents' previous lives, preferences, and experiences than RNs and LPNs. Thus, the decreased turnover of CNAs would contribute to the higher scores of individuality of residents.

Limitations

The present study is limited. The first limitation is that the whole study takes place in one state, Iowa. Iowa has a very homogeneous population with limited racial diversity. Only Iowa NHs were selected for this study and the findings are not generalizable to the rest of the United States because Iowa may have a unique population profile, which is hard to apply to other states. However, this limitation controlled the confounding factors present in different environments of sample NHs. The environment of the participated NHs was similar in the state regulation, weather, social cultural, neighborhood, and race factors.

The researchers could not interview residents at the NHs that denied participation in this study. It may be possible that those residents could have worse QOL than the residents in NHs who participated in this study because the NHs which refused may have worse environments, or fewer services for the residents. The average number of health

deficiencies in the NHs who refused to participate in this study was higher (6.4/NH) than NHs that participated in this study (4.8/NH) according to the Nursing Home Compare Website (CMS, 2007). The health deficiencies were reported by the health inspection of the government (CMS, 2007). Furthermore, NH staff who agreed to participate in this study may have more enthusiasm for quality improvement and therefore, external validity would be affected (Bostick, 2002).

Direct answers from the residents who are cognitively intact are regarded as the gold standard to measure QOL (Mittal et al., 2007). However, many residents failed to meet the inclusion criteria because of decline in cognitive function, severe dementia, and other medical/situational reasons, therefore, the QOL of these residents could not be investigated. Furthermore, the QOL of residents with declined functionality and dying residents were not investigated.

This is not an interventional study but rather an observational study. This study is limited to showing the association or relationships among variables. The causality suggested in an observational study is not as certain as the causality in randomized controlled trials (Horn et al., 2005). It is difficult to conduct randomized controlled trials in NH staffing research. In an observational study, researchers are able to observe conditions without manipulating the situation, which best fits for the NH residents' lives.

The impact of nursing staff on the resident outcomes may be mediated by other factors including geriatric education, staffing turnover, job satisfaction, experience of staff, and supervision (Maas, Buckwalter, & Specht, 1996).

Conclusions and Discussion

Unexpectedly, nursing staffing variables seemed to have little influence on predicting QOL of residents in this study. The major differences between this study and previous studies is that previous research focused on QOC and measured QOL by measuring residents' outcomes. Previous studies found that nurse staffing is an important factor in improving QOC (and by implication, QOL) of NH residents. The majority of the previous studies showed that increased nursing staff, stable nurse staffing, and less frequent turnover positively contribute to a variety of residents' outcomes in NHs (see Table 2.14). The findings of Berlowitz and colleagues (1999) and Johnson-Pawlson and Infeld (1996) did not support the hypothesis that an increased amount of RNs positively affects resident outcomes. Bostick (2004) did not support the hypothesis that an amount of time given by LPN positively affects resident outcomes. Rantz and colleagues (2004) and Wan (2003) reported that overall, nursing staff was not a statistically significant factor in residents' outcomes, which was opposite to the expected direction. RNs' unique contributions were supported by the findings that NHs with more RNs, compared with LPNs/LVNs and CNAs, had residents with higher scores in the functional competence domain and the overall QOL summary items. However, the unique contributions of the LPNs and CNAs were also supported in the autonomy and spiritual well-being domains. Therefore, further research is required to discover the unique contributions of RNs. Interestingly, this study found that nursing staff turnover is positively correlated with QOL, especially with the individuality domain, for some residents. Further research is required to explore the relationship between nursing turnover and residents' QOL.

Several factors may not accurately reveal the relationships of nursing staff to residents' outcomes in this study. The method of measuring nurse staffing is very important. In this study, the HPRD, skill mix and turnover were chosen as structure variables. The process of nurse staffing is assumed to be a very important factor in the residents' outcomes. Further research that investigates the effectiveness of process in the Donabedian's model is necessary to transform research into practice, what nursing staff actually does (process), how nursing staff interacts with residents, the assignment of RNs to different resident, and the impact on the residents. However, while structure is an indirect measure of quality, structure may have a direct influence on the process and outcomes and may be considered as an important factor that impacts the NH residents' outcomes (Campbell et al., 2000; Schirm et al., 1999). These reported results failed to investigate the process on the resident outcomes because process was challenging to measure and currently not available in a large database. The inability to measure the influence of structure, as mediated by process, on outcome may not reliably reflect the contributions of nursing staff in this study. Thus, future studies should address the process of staffing, which include the effective aspects of advanced nursing education (use of NPs or CNS), appropriate allocation of direct and indirect care, and the quality of provided care by staff (Cohen & Spector, 1996; Evans, 2001; Gelman, 2001; R. L. Kane, 2004; Health Care Financing Administration, 2000b).

This study did not differentiate between direct and indirect care, which may be a factor is in not fully revealing nursing influence on outcomes. Direct care means the actual nursing care for residents, including assessment, medication, and communication with residents, while indirect nursing care includes charting and administrative process.

HPRD in the OSCAR data does not differentiate between direct and indirect care. The contributions of nursing staff might be supported if direct and indirect nursing care were differentiated. Future studies should investigate the concrete relationship between direct/indirect care and resident outcomes; the OSCAR should include a mandatory reporting system of differentiated direct/indirect hours.

One of the most important staffing factors that can impact quality is nursing staff turnover. However, the current research regarding the impact of turnover on residents' outcomes in NHs is limited. The current research has investigated the effect of turnover on residents' QOL. As OSCAR has no information about turnover, attempts were made to obtain these data directly from NH administrative staff via interviews and records. Obtaining this information was quite difficult and took approximately 5 months. Some NHs reported that they did not have the required information and the turnover of administrators and DON, who are in charge of answering this information, made it difficult for the researcher to obtain the data. Whether or not NH staff report their staffing turnover data accurately is questionable, and may not reflect accurately the effect of turnover on QOL outcomes of NH residents. Future research regarding turnover of nursing staffing and the top managers including administrators and DON is necessary.

In conclusion, OSCAR data should expand the scope of the staffing information. In addition, OSCAR should include turnover and other important staffing information, such as temporary staffing, educational level, motivation, experience, use of advanced nurses, and capability of staff to confirm the relationship between nurse staffing and QOL in NH residents (Harrington, Zimmerman, Karon, Robinson, & Beutel, 2000; Kane,

2004). As stated above, the differentiation between direct and indirect care by nursing staff is also necessary.

The challenge of putting the QOL section into practice still remains. As Kane pointed out (CMS, 2007), interviewing residents for the QOL instruments takes noticeable time and effort. QOL is very subjective and the best way to measure it is to get answers from residents directly (R. A. Kane et al., 2003). The average time required to complete the QOL instrument per resident was 26.06 minutes ($SD = 10.8$) in this study. Considering the time needed to establish rapport (which was not included in the time required to complete this questionnaire), the actual time would be longer than the average time. Many factors such as hearing loss, vision loss, and the powerlessness of residents to remain alert, made the interviewing process difficult in this study. Furthermore, it is questionable who would be responsible for interviewing residents to determine their QOL. The possible interviewers could be internal staff, including MDS coordinators, RNs, and social workers in the NHs, or external staff, including long-term care surveyors or ombudspersons (CMS, 2007). For the NH staff, this would mean extra work on top of their current work. Kane (2007) reported that charge RNs, and MDS coordinators mentioned that they do not have enough time or eagerness to complete the interviews, while PT RNs and staff developers were quite interested in the interview. If the QOL section is implemented and required to be reported for the purpose of regulations, additional staffing from outside the NH would be appropriate to conduct the interviews. However, it is still questionable whether funding permits the additional hiring of staff for QOL surveys. Furthermore, if NH staff is required to give this questionnaire after implementation of MDS 3.0 in the future, residents may not reply honestly, especially

regarding their attitude or complaints toward staff, as they may be afraid of repercussions. Given this issue, the results may be inaccurate if these questionnaires were given by the NH staff for regulation purposes (CMS, 2007). Residents may hide their negative feelings or complaints in order to have a good relationship with the staff (CMS, 2007). Also, the staff already has its own perceptions of the residents' life based on their interaction with residents and interviews by staff which would not reflect the real lives of residents (CMS, 2007). Kane's study (2007) suggested a staff bias because the average QOL scores of NH staff were higher in the comfort, privacy, autonomy, enjoyment, and security domains than that of researchers. In the CMS study, the staff is provided two different trainings for interviewing residents: only paper materials, or paper materials with personal instruction with a researcher is provided. The staff who received only materials recorded higher scores than the staff who had in-person interviews (CMS, 2007). Thus, the training of the in-person interviewer used in this study would be helpful to decrease the bias for NH staff regarding the residents' QOL.

Despite these limitations, further examination of the relationship between nurse staffing and QOL is needed to confirm the relationship and provide policy guidelines, including nurse staffing recommendations, in order to guarantee the optimal QOL for NH residents. Many studies report that ownership of NHs is one of the factors that impact quality of NHs (Aaronson et al., 1994; Davis, 1993; Harrington et al., 2002; Harrington, Zimmerman et al., 2000; Hillmer, Wodchis, Gill, Anderson, & Rochon, 2005; Konetzka, Spector, & Shaffer, 2004; Morris et al., 1999; Morris et al., 1990; O'Neill, Harrington, Kitchener, & Saliba, 2003; Spector, Selden, & Cohen, 1998). Thus, studying the impact of ownership on resident outcomes is necessary.

As previously stated, the recruitment of 10 residents per NH was sometimes impossible (4 of 25 NHs) because of their cognitive impairments. It is estimated that 51% of residents in NHs suffer from dementia (National Academy on An Aging Society, 2000, p.3). Approximately one third of NH residents have Alzheimer disease (National Academy on An Aging Society, 2000, p.3). According to National Hospice and Palliative Care Organization, about 25 % of Americans die in nursing homes and approximately one third die within 1 year of admission (National Hospice and Palliative Care Organization, 2005). Future developments of the QOL tool besides QOL of MDS 3.0 should be differentiated for cognitively intact residents, residents with dementia and dying residents. The standards and expectation of QOL among these groups are different. A different version should be included in the MDS 3.0 to assess, protect and optimize the QOL of the majority of NH residents. The instructions for staff to interview or observe residents regarding QOL should be developed, too.

Table 3.1 Demographic Characteristics of 231 Residents of 25 NHs in Southeast Iowa, 2007

| Demographics | Criterion Validity (<i>N</i> = 231) |
|--|---|
| Age (years), mean \pm <i>SD</i> | 85.11 \pm 8.4 |
| Time residing in current NH (months) | 22.75 \pm 26.89 |
| Minutes required to complete questionnaire (minutes) | 26.06 \pm 10.8 |
| Gender | |
| Female, <i>n</i> (%) | 168 (72.7%) |
| Male, <i>n</i> (%) | 63 (27.3%) |
| Ethnicity | |
| Caucasian (%) | 229 (99.1%) |
| Non-Caucasian (%) | 2 (0.8%) |
| Marital Status | |
| Widowed | 155 (67.1%) |
| Married | 35 (15.2%) |
| Divorced | 17 (7.3%) |
| Single | 24 (10.4%) |
| Highest Level of Education | |
| Less than high school | 49 (21.2%) |
| High school | 122 (52.8%) |
| More than high school/college | 60 (26%) |
| Dementia Diagnosis | |
| Demented residents | 62 (26.8%) |
| Total residents | 231 (100%) |

Note. *SD* = Standard Deviation.

Table 3.2 Mean and *SD* for the proposed MDS 3.0 QOL measures for the sample of 25 NHs in Southeast Iowa, 2007

| Domain | Number of Items | Score Range | Scores of Kane's study | Dichotomous | | Likert | |
|--------|-----------------|-------------|------------------------|-------------|-----------|--------|-----------|
| | | | | Mean | <i>SD</i> | Mean | <i>SD</i> |
| CMF | 6 | 6–24 | 18.13 | 17.22 | 4.55 | 19.38 | 3.38 |
| FC | 5 | 5–20 | 16.23 | 16.08 | 4.54 | 16.25 | 3.42 |
| PRI | 5 | 5–20 | 16.66 | 14.67 | 4.78 | 14.92 | 3.86 |
| DIG | 5 | 5–20 | 18.33 | 17.51 | 4.27 | 17.81 | 2.45 |
| MA | 5 | 6–24 | 13.49 | 16.11 | 4.06 | 14.35 | 3.09 |
| REL | 5 | 5–20 | 15.32 | 15.29 | 4.33 | 16.01 | 3.33 |
| AUT | 4 | 4–16 | 13.19 | 12.15 | 3.53 | 12.53 | 2.34 |
| ENJ | 3 | 3–12 | 9.65 | 9.28 | 2.96 | 9.71 | 2.33 |
| SWB | 4 | 4–16 | 12.6 | 11.98 | 4.04 | 12.75 | 2.88 |
| SEC | 5 | 5–20 | 16.97 | 15.89 | 4.33 | 16.49 | 2.81 |
| IND | 6 | 6–24 | N/A | 18.94 | 5.82 | 19.68 | 4.10 |
| SUM | | N/A | | 33.25 | 11.99 | 40.95 | 6.92 |

Note. A higher score represents more positive QOL.

The item of sum was not summed to create a scale, but used as individual criterion measures for the separate domain scales.

CMF = *Comfort*.

FC = *Functional Competence*.

PRI = *Privacy*.

DIG = *Dignity*.

MA = *Meaningful Activity*.

REL = *Relationship*.

AUT = *Autonomy*.

ENJ = *Enjoyment*.

SWB = *Spiritual Well-Being*.

SEC = *Security*.

IND = *Individuality*.

SUM = *Summary*.

Table 3.3 Correlation Matrix of Nursing Staffing and QOL domains (Likert scale)
(N = 224)

| Staffing | QOL | | | | | | | | | | | |
|----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | CMF | FC | PRI | DIG | MA | REL | AUT | ENJ | SWB | SEC | IND | SUM |
| RN:LPN | -0.09 | 0.01 | -0.07 | -0.16 | 0.003 | -0.04 | -0.05 | -0.08 | -0.03 | -0.003 | -0.004 | 0.03 |
| RN:LPN+CNA | 0.08 | 0.08 | -0.05 | 0.11 | -0.04 | 0.008 | -0.01 | 0.109 | 0.04 | 0.08 | 0.04 | 0.02 |
| RN FT HPRD | 0.12* | 0.01 | 0.11 | 0.15** | -0.04 | -0.04 | -0.01 | 0.12* | 0.03 | 0.034 | 0.005 | -0.04 |
| RN PT HPRD | 0.07 | -0.07 | -0.04 | -0.03 | -0.04 | 0.03 | 0.06 | -0.01 | -0.08 | -0.06 | 0.02 | 0.08 |
| DON HPRD | 0.11* | 0.13* | 0.001 | 0.003 | 0.85 | 0.9 | -0.09 | 0.06 | 0.12* | 0.08 | 0.06 | 0.04 |
| LPN FT HPRD | -0.06 | -0.03 | 0.1 | 0.01 | -0.02 | 0.001 | -0.01 | -0.07 | 0.03 | -0.01 | 0.05 | 0.03 |
| LPN PT HPRD | 0.001 | 0.01 | -0.09 | -0.07 | 0.04 | -0.01 | 0.07 | -0.01 | -0.07 | 0.01 | -0.02 | 0.04 |
| CNA FT HPRD | 0.09 | -0.03 | -0.01 | 0.04 | -0.08 | 0.13** | 0.03 | 0.11* | 0.01 | 0.07 | -0.01 | -0.01 |
| CNA PT HPRD | -0.02 | 0.1 | -0.07 | -0.03 | 0.05 | 0.03 | 0.09 | -0.05 | 0.005 | 0.04 | 0.07 | 0.12 |
| Compiled RN HPRD | 0.14** | -0.03 | 0.07 | 0.12* | -0.05 | -0.02 | 0.02 | 0.09 | -0.01 | 0.003 | 0.01 | 0.003 |
| Compiled LPN HPRD | -0.06 | -0.03 | 0.05 | -0.02 | -0.002 | -0.009 | 0.02 | -0.07 | -0.004 | 0.0008 | 0.03 | 0.05 |
| Compiled CNA HPRD | 0.07 | 0.01 | -0.04 | 0.03 | -0.05 | -0.11 | 0.06 | 0.08 | 0.01 | 0.09 | 0.01 | 0.04 |
| TO RN FT | 0.04 | 0.09 | 0.09 | 0.02 | -0.02 | 0.04 | -0.04 | 0.15** | 0.03 | 0.004 | 0.03 | 0.07 |
| TO RN PT | 0.11 | 0.04 | 0.05 | 0.05 | -0.08 | 0.02 | -0.06 | 0.14** | 0.01 | 0.01 | -0.004 | 0.06 |
| TO LPN FT | 0.04 | -0.13* | -0.04 | 0.04 | -0.06 | -0.07 | 0.01 | -0.02 | -0.12* | -0.06 | -0.06 | -0.06 |
| TO LPN PT | -0.06 | 0.02 | 0.04 | 0.05 | 0.05 | 0.09 | 0.1 | 0.03 | 0.03 | 0.08 | 0.14** | 0.08 |
| TO CNA FT | -0.006 | 0.19** | -0.05 | 0.03 | -0.1 | -0.05 | 0.03 | -0.03 | -0.11* | -0.13* | -0.09 | -0.04 |
| TO CNA PT | 0.03 | 0.13** | -0.004 | -0.05 | -0.04 | -0.005 | -0.04 | 0.01 | -0.03 | -0.06 | -0.07 | 0.13** |
| TO Compiled RN | 0.05 | 0.09 | 0.07 | 0.07 | 0.0002 | 0.05 | 0.02 | 0.15** | 0.08 | 0.02 | 0.03 | 0.03 |
| TO Compiled LPN | -0.07 | -0.08 | 0.02 | -0.03 | -0.02 | 0.02 | 0.008 | -0.05 | -0.13 | -0.03 | 0.02 | -0.007 |
| TO Compiled CNA | 0.02 | -0.24* | -0.07 | -0.03 | -0.08 | -0.05 | -0.002 | -0.02 | -0.1 | 0.15** | -0.14* | -0.07 |

Note. RN = Registered Nurse.

LPN = Licensed Practical Nurse.

LVN = Licensed Vocational Nurse.

CNA = Certified Nursing Assistant.

DON = Director of Nursing.

FTE = Full-Time Equivalent.

PT = Part Time.

HPRD = Nursing Staff Hours Per Resident Day.

TO = Turnover.

CMF = Comfort.

FC = Functional Competence.

PRI = *Privacy*.

DIG = *Dignity*.

MA = *Meaningful Activity*.

REL = *Relationship*.

AUT = *Autonomy*.

ENJ = *Enjoyment*.

SWB = *Spiritual Well-Being*.

SEC = *Security*.

IND = *Individuality*.

SUM = *Summary*.

* $p < .1$ ** $p < .05$ *** $p < .01$,

Table 3.4 Correlation Matrix of Nursing Staffing and QOL domains (Dichotomous Scale)
(N = 231)

| Staffing | QOL | | | | | | | | | | | |
|-------------------|---------|---------|---------|--------|--------|--------|---------|---------|---------|--------|---------|-------|
| | CMF | FC | PRI | DIG | MA | REL | AUT | ENJ | SWB | SEC | IND | SUM |
| RN : LPN | -0.14** | -0.09 | -0.15** | -0.13 | -0.07 | -0.07 | -0.14** | -0.15** | -0.08 | -0.09 | -0.11* | -0.08 |
| RN: LPN+CNA | 0.16** | 0.11* | 0.005 | 0.13** | 0.005 | 0.04 | 0.06 | 0.14** | 0.11* | 0.14** | 0.09 | 0.1 |
| RN FT HPRD | 0.14** | 0.9 | 0.17** | 0.096 | 0.05 | -0.005 | 0.083 | 0.14** | 0.06 | 0.08 | 0.07 | 0.03 |
| RN PT HPRD | 0.11* | -0.03 | 0.04 | 0.06 | -0.03 | 0.06 | 0.07 | 0.01 | -0.05 | 0.03 | 0.05 | 0.02 |
| DON HPRD | 0.11 | 0.1 | 0.02 | 0.04 | 0.08 | 0.04 | -0.02 | 0.05 | 0.09 | 0.05 | 0.07 | 0.07 |
| LPN FT HPRD | -0.07 | 0.02 | 0.08 | 0.005 | 0.05 | 0.02 | -0.01 | -0.05 | 0.002 | -0.02 | -0.02 | 0.04 |
| LPN PT HPRD | -0.05 | -0.12* | -0.13** | -0.09 | -0.11 | -0.07 | -0.08 | -0.14** | -0.18** | -0.09 | -0.09 | -0.11 |
| CNA FT HPRD | 0.05 | -0.06 | -0.009 | -0.02 | -0.11 | -0.13 | -0.06 | -0.01 | -0.07 | -0.04 | -0.07 | -0.07 |
| CNA PT HPRD | -0.04 | 0.05 | -0.05 | 0.01 | -0.04 | 0.01 | 0.04 | -0.09 | -0.03 | 0.006 | 0.02 | 0.03 |
| Compiled RN HPRD | 0.18** | 0.06 | 0.17** | 0.12* | 0.03 | 0.03 | 0.11 | 0.13* | 0.03 | 0.09 | 0.09 | 0.04 |
| Compiled LPN HPRD | -0.09 | -0.04 | 0.01 | -0.04 | -0.003 | -0.03 | -0.06 | -0.13 | -0.09 | -0.07 | -0.07 | -0.02 |
| Compiled CNA HPRD | 0.03 | -0.04 | -0.03 | -0.01 | -0.12* | -0.12 | -0.04 | -0.05 | -0.08 | -0.03 | -0.06 | -0.06 |
| TO RN FT | 0.01 | 0.1 | 0.07 | 0.06 | -0.003 | 0.05 | 0.02 | 0.14 | 0.07 | 0.02 | 0.04 | 0.04 |
| TO RN PT | 0.12* | 0.08 | 0.09 | 0.09 | -0.01 | 0.05 | 0.04 | 0.16* | 0.09 | 0.07 | 0.05 | 0.04 |
| TO LPN FT | -0.05 | -0.01 | 0.03 | 0.06 | 0.05 | 0.08 | 0.08 | -0.05 | 0.03 | 0.04 | 0.11* | 0.04 |
| TO LPN PT | 0.02 | -0.05 | 0.02 | 0.02 | 0.02 | 0.009 | 0.04 | 0.01 | -0.07 | -0.2 | 0.002 | -0.05 |
| TO CNA FT | 0.02 | -0.09 | 0.02 | 0.04 | -0.05 | 0.04 | 0.06 | 0.008 | -0.03 | 0.03 | -0.004 | -0.02 |
| TO CNA PT | 0.07 | - | -0.07 | -0.09 | -0.05 | -0.05 | -0.06 | 0.04 | -0.05 | -0.12* | -0.18** | -0.09 |
| | | 0.22*** | | | | | | | | | | |
| TO Compiled RN | 0.07 | 0.06 | 0.07 | 0.01 | -0.03 | 0.03 | -0.07 | 0.15** | 0.03 | 0.005 | 0.003 | 0.06 |
| TO Compiled LPN | -0.04 | -0.09 | 0.05 | 0.09 | -0.04 | 0.02 | 0.06 | -0.04 | -0.1 | 0.001 | 0.07 | 0.03 |
| TO Compiled CNA | 0.04 | -0.12 | 0.005 | 0.005 | -0.04 | 0.03 | 0.03 | 0.01 | -0.03 | -0.002 | -0.03 | -0.07 |

Note. RN = Registered Nurse.

LPN = Licensed Practical Nurse.

LVN = Licensed Vocational Nurse.

CNA = Certified Nursing Assistant.

DON = Director of Nursing.

FTE = Full-Time Equivalent.

PT = Part Time.

HPRD = Nursing Staff Hours Per Resident Day.

TO = Turnover.

CMF = Comfort.

FC = Functional Competence.

PRI = Privacy.

DIG = Dignity.

MA = Meaningful Activity.

REL = *Relationship*.

AUT = *Autonomy*.

ENJ = *Enjoyment*.

SWB = *Spiritual Well-Being*.

SEC = *Security*.

IND = *Individuality*.

SUM = *Summary*.

* $p < .1$ ** $p < .05$ *** $p < .01$.

Table 3.5 Correlations among domain scores for QOL scale of MDS 3.0 (Likert Scale)

| | CMF | FC | PRI | DIG | MA | REL | AUT | ENJ | SWB | SEC | IND | SUM |
|-----|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| CM | 1.00000 | | | | | | | | | | | |
| F | | | | | | | | | | | | |
| FC | 0.11* | 1.00000 | | | | | | | | | | |
| PRI | 0.02 | -0.01 | 1.00000 | | | | | | | | | |
| DIG | 0.11* | 0.04 | 0.35*** | 1.00000 | | | | | | | | |
| MA | 0.002 | 0.18** | 0.25*** | 0.16** | 1.00000 | | | | | | | |
| REL | 0.12* | 0.13* | 0.29*** | 0.34*** | 0.31*** | 1.00000 | | | | | | |
| AUT | 0.02 | 0.3*** | 0.09 | 0.18*** | 0.23*** | 0.22*** | 1.00000 | | | | | |
| ENJ | 0.23*** | 0.22*** | 0.15** | 0.31*** | 0.19** | 0.19*** | 0.21*** | 1.00000 | | | | |
| SW | -0.02 | 0.17*** | 0.1 | 0.16*** | 0.33*** | 0.33*** | 0.09 | 0.18*** | 1.00000 | | | |
| B | | | | | | | | | | | | |
| SEC | 0.23*** | 0.23*** | 0.2*** | 0.35*** | 0.12* | 0.19*** | 0.1* | 0.31*** | 0.13** | 1.00000 | | |
| IND | 0.06 | 0.16** | 0.39*** | 0.41*** | 0.34*** | 0.45*** | 0.26*** | 0.25*** | 0.26*** | 0.34*** | 1.00000 | |
| SU | 0.23*** | 0.2*** | 0.23*** | 0.33*** | 0.12* | 0.34*** | 0.2*** | 0.29*** | 0.17** | 0.28*** | 0.37*** | 1.00000 |
| M | | | | | | | | | | | | |

Note. CMF = *Comfort*.

FC = *Functional Competence*.

PRI = *Privacy*.

DIG = *Dignity*.

MA = *Meaningful Activity*.

REL = *Relationship*.

AUT = *Autonomy*.

ENJ = *Enjoyment*.

SWB = *Spiritual Well-Being*.

SEC = *Security*.

IND = *Individuality*.

SUM = *Summary*.

* $p < .1$ ** $p < .05$ *** $p < .01$.

Table 3.6 Correlations among domain scores for QOL scale of MDS 3.0 (Dichotomous Scale)

| | CMF | FC | PRI | DIG | MA | REL | AUT | ENJ | SWB | SEC | IND | SUM |
|-----|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| CM | 1.00000 | | | | | | | | | | | |
| F | | | | | | | | | | | | |
| FC | 0.5*** | 1.00000 | | | | | | | | | | |
| PRI | 0.36*** | 0.36*** | 1.00000 | | | | | | | | | |
| DIG | 0.51*** | 0.53*** | 0.6*** | 1.00000 | | | | | | | | |
| MA | 0.34*** | 0.41*** | 0.4*** | 0.42*** | 1.00000 | | | | | | | |
| REL | 0.41*** | 0.42*** | 0.5*** | 0.62*** | 0.53*** | 1.00000 | | | | | | |
| AUT | 0.45*** | 0.58*** | 0.5*** | 0.64*** | 0.49*** | 0.58*** | 1.00000 | | | | | |
| ENJ | 0.48*** | 0.47*** | 0.5*** | 0.58*** | 0.46*** | 0.56*** | 0.6*** | 1.00000 | | | | |
| SW | 0.38*** | 0.42*** | 0.4*** | 0.5*** | 0.51*** | 0.6*** | 0.5*** | 0.54*** | 1.00000 | | | |
| B | | | | | | | | | | | | |
| SEC | 0.55*** | 0.51*** | 0.6*** | 0.72*** | 0.46*** | 0.6*** | 0.66*** | 0.68*** | 0.54*** | 1.00000 | | |
| IND | 0.43*** | 0.45*** | 0.6*** | 0.67*** | 0.54*** | 0.7*** | 0.62*** | 0.59*** | 0.59*** | 0.72*** | 1.00000 | |
| SU | 0.48*** | 0.47*** | 0.4*** | 0.57*** | 0.5*** | 0.58*** | 0.53*** | 0.54*** | 0.5*** | 0.58*** | 0.63*** | 1.000 |
| M | | | | | | | | | | | | |

Note. CMF = *Comfort*.

FC = *Functional Competence*.

PRI = *Privacy*.

DIG = *Dignity*.

MA = *Meaningful Activity*.

REL = *Relationship*.

AUT = *Autonomy*.

ENJ = *Enjoyment*.

SWB = *Spiritual Well-Being*.

SEC = *Security*.

IND = *Individuality*.

SUM = *Summary*.

* $p < .1$ ** $p < .05$ *** $p < .01$.

Table 3.7 Correlations among staffing variables

| | RN:LPN | RN:LPN +CNA | RN/FT/HPRD | RN/PT/HPRD | DON/HPRD | LPN/FT/HPRD | LPN/PT/HPRD | CAN FT/HPRD | CAN PT/HPRD | Compiled RN/HPRD | Compiled LPN/HPRD | Compiled CNA/HPRD | TO RN FT | TO RN PT | TO LPN FT | TO LPN PT | TO CAN FT | TO CAN PT | TO Compiled RN | TO Compiled LPN | TO Compiled CNA | |
|-------------------|---------|-------------|------------|------------|----------|-------------|-------------|-------------|-------------|------------------|-------------------|-------------------|----------|----------|-----------|-----------|-----------|-----------|----------------|-----------------|-----------------|--|
| RN :LPN | 1.00 | | | | | | | | | | | | | | | | | | | | | |
| RN : LPN + CNA | -0.55** | 1.00 | | | | | | | | | | | | | | | | | | | | |
| RN/FT/HPRD | -0.74** | 0.27** | 1.00 | | | | | | | | | | | | | | | | | | | |
| RN/PT/HPRD | -0.15** | -0.04 | -0.02 | 1.00 | | | | | | | | | | | | | | | | | | |
| DON/HPRD | -0.23** | 0.12* | 0.29** | 0.12** | 1.00 | | | | | | | | | | | | | | | | | |
| LPN/FT/HPRD | 0.57** | -0.68** | -0.22** | -0.09 | -0.11* | 1.00 | | | | | | | | | | | | | | | | |
| LPN/PT/HPRD | 0.12* | -0.29** | -0.08 | 0.63** | 0.06 | -0.2** | 1.00 | | | | | | | | | | | | | | | |
| CNA/FT/ HPRD | 0.002 | -0.02 | 0.45** | -0.01 | -0.08 | 0.04 | 0.28** | 1.00 | | | | | | | | | | | | | | |
| CNA/PT/ HPRD | 0.27** | -0.24** | -0.37** | 0.39** | 0.01 | -0.03 | 0.51** | -0.1* | 1.0 | | | | | | | | | | | | | |
| Compiled RN HPRD | -0.72** | 0.22** | 0.87** | 0.48** | 0.32** | -0.24** | 0.24** | 0.41** | -0.13** | 1.00 | | | | | | | | | | | | |
| Compiled LPN HPRD | 0.61** | -0.8*** | -0.26** | 0.18** | -0.08 | 0.9*** | 0.25** | 0.18** | 0.2*** | -0.14** | 1.00 | | | | | | | | | | | |
| Compiled CAN HPRD | 0.12** | -0.12** | 0.3*** | 0.15** | -0.08 | 0.03 | 0.48** | 0.91** | 0.3*** | 0.34** | 0.25** | 1.00 | | | | | | | | | | |
| TO/RN/FT | 0.1 | 0.09 | -0.22** | 0.002 | 0.05 | 0.03 | -0.23** | -0.18** | 0.06 | -0.19** | -0.07 | -0.15** | 1.00 | | | | | | | | | |
| TO/RN/PT | -0.22** | 0.57** | 0.02 | 0.18** | 0.07 | -0.27** | -0.24** | -0.11 | -0.08 | 0.11* | -0.34** | -0.14** | 0.76** | 1.00 | | | | | | | | |
| TO/LPN/FT | 0.1 | -0.15** | -0.11* | 0.05 | -0.27** | 0.07 | 0.11* | 0.05 | 0.37** | -0.08 | 0.09 | 0.2*** | -0.12* | -0.31** | 1.00 | | | | | | | |
| TO/LPN/PT | -0.19** | -0.06 | 0.23** | 0.06 | -0.23** | 0.01 | -0.0001 | 0.11 | -0.11 | 0.23** | 0.001 | 0.06 | -0.1 | -0.08 | 0.39** | 1.00 | | | | | | |
| TO/CNA/FT | -0.05 | 0.03 | -0.0006 | 0.02 | -0.46** | -0.04 | -0.01 | 0.18** | -0.11* | 0.009 | -0.06 | 0.13** | -0.07 | 0.05 | 0.24** | 0.45** | 1.00 | | | | | |
| TO/CNA/PT | -0.17** | 0.04 | 0.1 | 0.16** | -0.04 | -0.18** | 0.04 | 0.12* | -0.03 | 0.17** | -0.16 | 0.1 | -0.002 | 0.13 | 0.07 | 0.48** | 0.61** | 1.00 | | | | |
| TO Compiled RN | 0.003 | 0.19** | -0.14** | 0.05 | 0.09 | -0.03 | -0.25** | -0.16** | 0.04 | -0.09 | -0.14** | -0.14** | 0.98** | 0.83** | -0.2*** | -0.09 | -0.05 | 0.09 | 1.00 | | | |
| TO Compiled LPN | 0.1 | -0.27** | -0.02 | 0.18** | -0.47** | 0.24** | 0.19** | 0.16** | 0.12* | 0.06 | 0.3*** | 0.21** | -0.15** | -0.26** | 0.69** | 0.68** | 0.38** | 0.14** | -0.21** | 1.00 | | |
| TO Compiled CNA | -0.09 | 0.02 | 0.03 | 0.11 | -0.34** | -0.07 | 0.002 | 0.15** | -0.12* | 0.08 | -0.08 | 0.09 | -0.07 | 0.06 | 0.17** | 0.45** | 0.94** | 0.83** | -0.02 | 0.3*** | 1.00 | |

Note. RN = Registered Nurse.

LPN = Licensed Practical Nurse.

LVN = *Licensed Vocational Nurse.*

CNA = *Certified Nursing Assistant.*

FTE = *Full-Time Equivalent.*

PT = *Part Time.*

HPRD = *Nursing Staff Hours Per Resident Day.*

TO = *Turnover.*

CMF = *Comfort.*

FC = *Functional Competence.*

PRI = *Privacy.*

DIG = *Dignity.*

MA = *Meaningful Activity.*

REL = *Relationship.*

AUT = *Autonomy.*

ENJ = *Enjoyment.*

SWB = *Spiritual Well-Being.*

SEC = *Security.*

IND = *Individuality.*

SUM = *Summary.*

* $p < .1$ ** $p < .05$ *** $p < .01$.

Table 3.8 Number of Nursing Staff of 25 NHs

| Type of Staff | Mean | Standard Deviation | Minimum | Maximum |
|---------------|-------|--------------------|---------|---------|
| FTE RN | 4.63 | 2.43 | 0 | 10 |
| PT RN | 3.05 | 3 | 0 | 11 |
| Total RN | 7.7 | 4.28 | 3 | 19 |
| FTE LPN | 3.47 | 2.14 | 0 | 8 |
| PT LPN | 1.47 | 1.68 | 0 | 5 |
| Total LPN | 4.95 | 2.86 | 1 | 9 |
| FTE CNA | 18.74 | 6.87 | 6 | 36 |
| PT CNA | 9.58 | 5.2 | 2 | 23 |
| Total CNA | 28.32 | 8.53 | 13 | 51 |

Note. RN = Registered Nurse.

LPN = Licensed Practical Nurse.

LVN = Licensed Vocational Nurse.

CNA = Certified Nursing Assistant.

FTE = Full Time Equivalent.

PT = Part Time.

Table 3.9 Descriptive Characteristics of Nursing Staff in 25 NHs

| Type of Staff | Age | Wage | Experience | Education |
|---------------|--------------------|------------------|---------------------|--|
| RN | 46.23 (± 12.4) | 21.23 (± 2.9) | 55.18 (± 102.98) | 68% (AND) 25% (BSN) 6% (Diploma) 1% (Graduate) |
| LPN | 41.88 (± 11.83) | 18.52 (± 7.3) | 30.88 (± 48.27) | 55.4% (one year training) 21.4% (2 year college) 16.1% (college) 7.1% (ADN) |
| CNA | 31.05 (± 12.21) | 11.04 (± 5.2) | 19.01 (± 22.7) | 61.7% (Diploma) 18.6% (college) 15.1% (enrolled college) 2.7% (enrolled at the BSN program) 1.5% (11 th grade students) 0.4% (AND) |

Note. RN = Registered Nurse.

LPN = Licensed Practical Nurse.

LVN = Licensed Vocational Nurse.

CNA = Certified Nursing Assistant.

FTE = Full Time Equivalent.

PT = Part Time.

Table 3.10 Influence of Nursing Staff on Residents' QOL (Likert Scale)

| Staffing | QOL | CMF | FC | PRI | DIG | MA | REL | AUT | ENJ | SWB | SEC | IND | SUM |
|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | t-value |
| RN : LPN | 0.8 | 0.37 | -0.04 | 0.06 | -0.42 | -0.18 | -0.2 | 1.27 | 0.62 | 0.8 | 0.35 | -0.13 | |
| RN : LPN+CNA | 0.34 | 1.87* | -0.43 | 1.51 | 0.00 | 0.45 | -0.09 | 0.84 | 0.19 | 1.18 | 0.23 | 1.77* | |
| RN FT HPRD | 0.46 | 1.35 | 1.21 | 0.68 | 0.18 | 0.1 | 0.42 | 1.79 | 0.84 | 1.2 | 0.72 | 0.36 | |
| RN PT HPRD | 2.7** | 0.23 | 0.71 | 1.07 | -0.25 | 0.63 | 1.25 | 1.99** | 0.61 | 0.77 | 1.49 | 0.78 | |
| RN Compiled HPRD | 0.48 | -0.01 | 0.83 | 0.33 | -0.71 | -0.38 | 1.04 | 0.68 | 0.06 | 0.26 | -0.35 | -0.66 | |
| DON HPRD | 1.1 | -0.31 | -0.38 | 0.07 | 0.77 | 0.62 | -0.14 | -0.29 | 0.51 | 0.18 | 1.02 | 0.72 | |
| LPN FT HPRD | -1.02 | 1.21 | 0.44 | 0.96 | 0.74 | 0.2 | -0.34 | -0.57 | -0.11 | 0.5 | -0.41 | 1.14 | |
| LPN PT HPRD | -2.1 * | 0.13 | -0.69 | -0.38 | -0.04 | -0.36 | -1.1 | -1.3 | -0.99 | -0.18 | -1.21 | -0.37 | |
| LPN Compiled HPRD | -0.01 | 0.97 | 0.74 | 1.48 | 0.75 | 0.49 | 0.24 | -0.48 | 0.24 | 0.7 | 0.1 | 1.62 | |
| CAN FT HPRD | 0.86 | -1.11 | -0.59 | -0.35 | -0.86 | -0.68 | -0.19 | -0.66 | -0.52 | -0.97 | -0.47 | -0.43 | |
| CAN PT HPRD | 0.87 | 1.76* | 0.06 | 1.03 | -0.39 | -0.2 | 1.11 | -0.45 | 0.26 | 0.42 | 0.35 | 0.85 | |
| CAN Compiled HPRD | -0.72 | -0.12 | -0.98 | -0.38 | -1.33 | -1.37 | -0.59 | -1.07 | -0.82 | -0.79 | -0.83 | -0.44 | |
| TO RN FT | 0.24 | 1.79* | 0.07 | 1.28 | -0.24 | 0.00 | 0.36 | 1.78* | 0.1 | 0.6 | 0.43 | 1.06 | |
| TO RN PT | -0.59 | -1.55 | 0.41 | -1.23 | 0.23 | 0.13 | -0.42 | -1.15 | 0.03 | -0.61 | -0.35 | -1.11 | |
| TO Compiled RN | 0.26 | 0.71 | 1.18 | 0.54 | -0.13 | 0.38 | 0.15 | 1.95* | 0.47 | -0.16 | 0.23 | 0.11 | |
| TO FT LPN | -1.1 | -0.65 | 1.13 | -0.41 | 1.13 | 1.12 | 0.2 | 0.75 | 0.95 | 0.67 | 1.66* | 0.23 | |
| TO PT LPN | 0.77 | -0.14 | -1.05 | 0.02 | 0.01 | -0.41 | 0.03 | -0.82 | -1.03 | -0.66 | -0.32 | -0.26 | |
| TO Compiled LPN | -0.73 | -0.13 | -0.12 | -0.3 | 0.38 | 0.7 | -0.21 | -0.05 | -0.82 | -0.09 | 0.95 | 0.55 | |
| TO FT CAN | 1.23 | 0.84 | 0.14 | 1.24 | -0.23 | 1.03 | 1.53 | 0.37 | 0.45 | 1.35 | 1.35 | 1.28 | |
| TO PT CAN | -1.05 | -0.65 | 0.00 | -0.74 | -0.14 | -0.49 | -1.28 | 0.08 | -0.07 | -0.66 | -1.49 | -1.26 | |
| TO Compiled CNA | 0.94 | -0.78 | -0.33 | 0.09 | -0.23 | 0.62 | 0.16 | -0.01 | 0.06 | 0.14 | -0.42 | -0.68 | |

Note. RN = Registered Nurse.

LPN = Licensed Practical Nurse.

LVN = Licensed Vocational Nurse.

CNA = Certified Nursing Assistant.

FTE = Full-Time Equivalent.

PT = Part Time.

HPRD = Nursing Staff Hours Per Resident Day.

TO = Turnover.

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AUT = Autonomy.

ENJ = Enjoyment.

SWB = *Spiritual Well-Being*.

SEC = *Security*.

IND = *Individuality*.

SUM = *Summary*.

* $p < .1$ ** $p < .05$ *** $p < .01$.

Table 3.11 Influence of Nursing Staff on Residents' QOL (Dichotomous Scale)

| Staffing | QOL | CMF | FC | PRI | DIG | MA | REL | AUT | ENJ | SWB | SEC | IND | SUM |
|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | t-value |
| RN : LPN | -0.14 | 0.37 | -0.2 | -1.28 | -0.6 | -1.22 | -1.84* | 0.27 | -1.7 * | -0.79 | -0.25 | -0.23 | |
| RN : LPN+CAN | -1.08 | 1.67* | -0.28 | 1.27 | 0.34 | -0.26 | -0.1 | 1.6 | 0.17 | 1.1 | 0.75 | 0.46 | |
| RN FT HPRD | -0.44 | 0.87 | 1.11 | 0.15 | -0.13 | -0.68 | -1.28 | 1.03 | -0.56 | -0.44 | -0.06 | -0.21 | |
| RN PT HPRD | 0.76 | -1.21 | -0.76 | -0.9 | -1.28 | -0.91 | 0.02 | -0.58 | -1.36 | -1.68 | 0.29 | 0.28 | |
| RN Compiled HPRD | -0.2 | -0.7 | 0.33 | -0.56 | -1.67* | -1.76* | 0.83 | -0.93 | -1.34 | -1.43 | -1.18 | -0.73 | |
| DON HPRD | 1.39 | -0.1 | -0.85 | -0.01 | 0.28 | 0.89 | -0.68 | -0.44 | 0.53 | 0.23 | 0.72 | 0.59 | |
| LPN FT HPRD | -1.08 | 0.95 | 1.06 | 1.94* | 0.71 | 0.84 | 0.37 | 1.01 | 1.22 | 1.5 | 0.74 | 0.63 | |
| LPN PT HPRD | -1.12 | 1.42 | 0.7 | 0.91 | 1.26 | 0.99 | 0.07 | 1.32 | 0.6 | 1.4 | 0.01 | 0.1 | |
| LPN Compiled HPRD | -0.45 | 0.23 | 0.6 | 2.34** | -0.24 | 0.58 | 0.9 | 0.12 | 1.19 | 1.21 | 0.96 | 0.93 | |
| CAN FT HPRD | 1.39 | -0.99 | -1.04 | -0.16 | -0.82 | -0.76 | 1.02 | -0.22 | 0.32 | 0.37 | 0.11 | 0.24 | |
| CAN PT HPRD | 0.37 | 1.32 | -0.85 | 0.69 | -0.37 | -0.98 | 1.03 | -0.63 | -0.08 | 0.41 | 0.42 | 1.22 | |
| CAN Compiled HPRD | 0.46 | 0.97 | -0.6 | 0.86 | 0.4 | -0.61 | 1.38 | 1.46 | 1.31 | 2.08** | 0.42 | 0.57 | |
| TO RN FT | -0.91 | 1.38 | 0.06 | 0.68 | 0.31 | -0.4 | 0.05 | 1.99** | -0.26 | -0.08 | 0.37 | 0.27 | |
| TO RN PT | 1.06 | -0.98 | 0.71 | -0.38 | -0.28 | 0.74 | -0.32 | -0.95 | 0.48 | 0.22 | -0.31 | 0.01 | |
| TO Compiled RN | 0.81 | 0.21 | 1.28 | 0.41 | -0.53 | 0.28 | -0.71 | 2.27** | 0.2 | -0.13 | 0.11 | 0.91 | |
| TO FT LPN | -0.13 | -0.47 | 1.66* | 0.25 | 0.94 | 2.04** | -0.29 | 0.18 | -0.26 | 0.75 | 1.21 | 0.11 | |
| TO PT LPN | 1.05 | 0.02 | -1.58 | 0.11 | -0.72 | -1.1 | 0.26 | -0.88 | 0.48 | -0.02 | -0.09 | -0.05 | |
| TO Compiled LPN | -0.45 | 0.29 | 0.6 | 1.44 | 0.38 | 1.5 | -0.09 | 0.36 | -0.48 | 1.19 | 2.19** | 0.11 | |
| TO FT CAN | 0.17 | 0.17 | -0.77 | 1 | -0.82 | 0.15 | 0.76 | -0.85 | -1.02 | -0.93 | 0.38 | 0.85 | |
| TO PT CAN | -0.47 | -0.93 | 0.51 | -1.07 | 0.65 | -0.05 | -1.08 | 1.45 | 0.87 | -0.05 | -1.53 | -1.06 | |
| TO Compiled CNA | 0.77 | -2.1 | -1.27 | -1 | -0.72 | -0.29 | -0.25 | -0.27 | -0.66 | -1.82* | -2.05** | -0.84 | |

Note. RN = Registered Nurse.

LPN = Licensed Practical Nurse.

LVN = Licensed Vocational Nurse.

CNA = Certified Nursing Assistant.

FTE = Full-Time Equivalent.

PT = Part Time.

HPRD = Nursing Staff Hours Per Resident Day.

TO = Turnover.

CMF = Comfort.

FC = Functional Competence.

PRI = Privacy.

DIG = Dignity.

MA = Meaningful Activity.

REL = Relationship.

AUT = *Autonomy*.

ENJ = *Enjoyment*.

SWB = *Spiritual Well-Being*.

SEC = *Security*.

IND = *Individuality*.

SUM = *Summary*.

* $p < .1$ ** $p < .05$ *** $p < .01$.

CHAPTER IV.
VALIDITY AND RELIABILITY OF THE QUALITY OF LIFE SECTION IN
MINIMUM DATA SET 3.0.

Introduction and Overview

The MDS was developed to offer a comprehensive assessment for NH residents because of concerns about the QOC in NHs that were expressed in the OBRA '87 (Hawes et al., 1995; Mukamel & Spector, 2003). The Nursing Home Reform Act was passed as a part of OBRA'87 to improve QOC through regulation and inspections (Mukamel & Spector, 2003). OBRA'87, with its implementing regulations, extended and reshaped regulation of NHs to improve QOC (Wunderlich, 2001). OBRA required development of a standardized assessment for NH residents (Wunderlich, 2001). Consequently, in 1998, the RAI was implemented nationally through the CMS Health Care Quality Improvement Program for NHs (Mukamel & Spector, 2003). The RAI is based on interdisciplinary care and offers each resident a consistent and all- inclusive assessment of care (CMS, 2002). The model is based on assessment, decision-making, care planning, implementation, and evaluation of the resident (CMS, 2002).

QOC refers to the process and outcome measures that affect residents' care directly, including nursing services, dietary services, dental services, and infection control, while QOL is related to rights of residents such as privacy and dignity (Akinci & Krolikowski, 2005). Health-related QOL is a subset of QOL that pertains to the parts of life influenced by health conditions (R. A. Kane, 2003). That is, health-related QOL cannot fully explain the life of NH residents. QOL is not easy to define because the concept covers diverse parts of human life including physical, mental, social, and

spiritual well-being, and the elements of QOL depend on diverse needs of people whether they live in a facility or at home (Fletcher et al., 1992; Guse & Masesar, 1999).

Previous research regarding NHs has focused on QOC such as urinary tract infection and malnutrition (R. A. Kane et al., 2003). These studies measured only QOC and used the Quality Indicators of MDS 2.0, which lacks measurement of QOL (Harrington et al., 2000). Moreover, QOL has not been measured extensively for NH residents, and it has not been protected by politicians or by law (R. A. Kane, 2003; R. A. Kane et al., 2003). QOL continues to be an issue because elders still do not want to live in NHs.

A new section, section F of MDS 3.0, will be added to the current version 2.0. In the new version, residents will be asked questions, so their voices will be heard more directly. However, it is not always possible to get answers from residents because of their physical and cognitive functioning (R. A. Kane, 2003; Rubinstein, 2000). Many studies have reported that there is a perception gap regarding QOL ratings between NH residents and proxies (families or staff; Berlowitz et al., 1995; CMS, 2007; R. A. Kane et al., 2000; R. L. Kane et al., 2005; Logsdon, 1999; Mittal et al., 2007). Especially when the questions are about personal thoughts or feelings, proxy answers should be used cautiously because variation between residents and their proxies would be greater than when the questions are about facts such as falls (CMS, 2007). This would be problematic because the proxies would bring their own views and insights that may be different from those of the residents (CMS, 2007). Because residents are expected to directly report their own lived experience, these self-reports should improve the validity of the measurement of QOL.

QOL is subjective and should reflect the variety of experiences of the residents (R. A. Kane et al., 2003). The QOL section in MDS 3.0 was designed to get answers from residents directly (R. A. Kane, 2003; Rubinstein, 2000). The QOL section in MDS 3.0 was developed by a University of Minnesota research team through a contract with CMS to offset the limitations of the quality indicators in version 2.0 and to advance the measurement of the psychosocial aspects of NH residents' lives (R. A. Kane, 2003). Based on a literature review, opinions of professionals, group discussions, and stakeholders' discussions, the University of Minnesota research team defined 11 QOL domains. The team developed 54 questions for health care providers to ask residents directly to assess 11 domains: dignity, comfort, privacy, meaningful activity, relationships, spiritual well-being, autonomy, individuality, food enjoyment, security, and functional competence. The relationship and preferred routine categories were extracted from MDS 2.0. The proposed version of the MDS 3.0, includes both dichotomous variables and Likert scales.

R. A. Kane and colleagues (2003) divided the 11 domains into 3 groups of according to their characteristics: comfort and security questions, social questions, and self-worth and individual questions (R. A. Kane et al., 2003). The comfort domain extends the current QOC domains in MDS 2.0 by including a broader variety of discomforts (R. A. Kane et al., 2003). For instance, the comfort domain includes the status of freedom from pain, shortness of breath, constipation, appropriate room temperature, and clean bed sheets (R. A. Kane, 2001). The security domains cover the general concepts of security and safety as well as QOC issues such as frequency of falls and accidents (R. A. Kane et al., 2003). R. A. Kane (2003) explained that the concept of

security includes people's confidence about their own environment: whether or not it is a benevolent place where normal rules of life can be followed.

The social areas include relationships, meaningful activities, functional competence, and enjoyment (R. A. Kane et al., 2003). Relationships include all relationships such as with other residents, staff, family, friends, and others inside and outside the NH (R. A. Kane et al., 2003). Meaningful activity is a flexible concept and covers many kinds of activities based on the residents' needs. It excludes ADLs (R. A. Kane et al., 2003). Functional competence is identified as the maximum independence of residents within the scope of their abilities (R. A. Kane et al., 2003). R. A. Kane and colleagues (2003) hypothesized that the more pleasure the residents experience, the more their enjoyment will increase. Food enjoyment is included as a subscale in the QOL section.

The self-worth and individual area includes individuality, autonomy, privacy, and dignity (R. A. Kane et al., 2003). Individuality is significant in that it is difficult for residents to maintain continuity of identity and uniqueness in NH settings (R. A. Kane, 2003; Tobin, 1991). Autonomy is defined as being self-directing, having the ability to exercise choices, and having control over one's daily life (Avorn & Langer, 1982; Kane, 2003; Langer & Rodin, 1976; Rodin, 1986). Autonomy has been shown to be related to improved morbidity and mortality rates (Avorn & Langer; R. A. Kane et al., 2003; Langer & Rodin; Rodin). Privacy is considered a precondition of autonomy and is defined by Kane as a resident's control over their own experience, information, and choice in informal interaction with others (R. A. Kane et al., 2003). Resident dignity is described as the emotional experience of residents as well as the external living

conditions imposed on residents (R. A. Kane et al., 2003). R. A. Kane et al (2003) did not provide any specific definition regarding spiritual well-being but emphasized that spiritual well-being has received attention in the literature (R. A. Kane, 2003; Kimble et al., 1995; National Institute on Aging Working Group, 1999). McInnis-Dittrich (2004) defined spirituality as “about finding meaning in life now and cultivating ways to explore and express those beliefs” (McInnis-Dittrich, 2004, p. 267). Spiritual well-being is highly related to overall well-being for elders, including their physiological and psychological well-being (Bensley, 1991; Carson et al., 1990; Fry, 2000; Hungelmann et al., 1996; Koenig et al., 2001; Powell et al., 2003; Reed, 1992). The experience of more fulfilling spirituality has been related to psychological well-being for institutionalized elders as well as to the role of RNs, who are expected to share in the spiritual experience of residents in NHs (Fry; Hicks, 1999; McKinley, 2005)

Ten of the 11 domains were determined by confirmatory factor analysis ($n = 1,988$; R. A. Kane et al., 2003). Individuality was dropped because the individuality and relationship domains were identical ($r = .99$), and the reliability of individuality was poor ($\alpha = .56$; Kane et al., 2003). Internal consistency (Cronbach’s alpha) was reported to range from .52 (meaningful activity) to .76 (functional competence) by R. A. Kane et al. (2003). Validity was tested by the regression of each domain scale with summary measures, and all 11 items matched with summary items (CMS, 2007). Examined separately for higher and lower cognitive groups, the individuality domain did not match the summary measures for either the low or high-cognitive groups, and comfort did not match the summary measures for the low- cognitive group (CMS, 2007). The constructs were correlated but were sufficiently differentiated to measure QOL (CMS, 2007).

Because there is no existing tool with psychometric properties to measure QOL in NHs (CMS, 2007), and the tool used in this study is in the development stage and is the only available tool to measure QOL in NHs, it is very timely to test the psychometric characteristics of the QOL section now. The aims of this study were to evaluate criterion validity using an outcome from the NOC measuring QOL and interrater reliability for the QOL section of MDS 3.0.

This study tested criterion validity by comparing the measurement properties of two measures of QOL: the QOL section in MDS 3.0 and the QOL outcome in NOC. The summary item and relationship domain of MDS 3.0 were compared with the two questions from NOC. Intercorrelations between the variables were investigated using Pearson's correlation coefficient.

The rationale for using the QOL outcome from NOC is presented in this study. NOC (3rd ed) was developed by a research team at the University of Iowa, College of Nursing (Center for Nursing Classification and Clinical Effectiveness) in 1991, and has undergone modifications since then (Moorhead et al., 2004). NOC is a "comprehensive, standardized classification of patient/client outcomes developed to evaluate the effects of nursing interventions" (Moorhead, Johnson, & Maas, 2004). As NOC is one of the standardized languages recognized by the American Nurses' Association, it meets the language guideline principles of their Nursing Information and Data Set Evaluation Center for nursing information system vendors (Moorhead et al.). NOC has 330 outcomes (seven domains, 31 classes). The seven domains are: Functional Health, Physiologic Health, Psychosocial Health, Health Knowledge & Behavior, Perceived Health, Family Health, and Community Health (Moorhead et al.). Researchers are developing additional

outcomes for the next edition to add to the existing 317 individual outcomes, 10 family outcomes, and 9 community outcomes including settings for the elderly (Moorhead et al.). There are several strengths of NOC, which can be summarized : (a) it can measure the all-inclusive resident outcomes that respond especially to nursing intervention, (b) not only RNs but other professionals can use it, (c) NOC gives more detailed outcome measurements than global health measures, (d) NOC supplies intermediary outcomes that help accomplish long-term outcomes, (e) NOC is applicable to an organization or managed care system, and (f) NOC can identify risk adjustment factors (University of Iowa, 2006).

Systems of standardized terminology such as NOC have been recommended for implementation in NHs for many reasons including monitoring quality, payment for resident services, outcomes research, and decision support (Harris, Chute, Harvell, White, Moore, 2003). Furthermore, standardized terminology systems make it possible to use and exchange data across systems (Harris et al.), settings, and specialties (Daly, Maas, & Buckwalter, 1997). Maas and Specht (1999) also emphasized the importance of standardized nursing languages, saying that, (a) nursing activities should be in clinical information systems so that it is possible to pull out comparable data from all health care settings to include in a large dataset, (b) nursing has to identify the responsibility of nurses through nursing effectiveness and health policy research, and (c) a nursing language has to be used to develop nursing knowledge as a scientific discipline. Several authors have emphasized the use of computerized care plans of standardized languages to accomplish individual and organizational outcomes (Bock & Kane, 1991; Daly et al., 1997). However, very little research has been reported describing the use of NOC in

long-term care settings, and there has been no research to validate the adequacy of NOC in long-term care settings.

The overall definition of the NOC QOL label is the “extent of positive perception of current life circumstances “ (Moorhead et al., 2004, p. 455). It is composed of 11 indicators with 5-point Likert-type scales (not at all satisfied, somewhat satisfied, moderately satisfied, very satisfied, and completely satisfied). These indicators are health status, social circumstances, environmental circumstances, economic status, education level, occupation, close relationships, achievement of life goals, ability to cope, self-concept, and pervasive mode (Moorhead et al.). Psychometric testing regarding the QOL outcome was done at 10 sites. Near agreement interrater reliability was reported at 89 % ($n = 49$), absolute agreement was 64% ($n = 42$), intraclass correlation was 0.8 ($n = 42$), and criterion validity measured by correlating it with the Satisfaction with Life scale developed by Diener, Emmons, Larsen, and Griffiin (1985) was .65 ($n = 56$) (Moorhead et al.). Near agreement means that only one value is different on a Likert scale between raters’ answers, and absolute agreement means that two answers are exactly the same (Moorhead et al.). The 10 sites included tertiary hospitals, health clinics, visiting nurse associations, community family health centers, and long-term care settings (Moorhead et al.).

Only one QOL relationship indicator and the overall QOL NOC outcome were used for testing criterion validity (see Figure 4.1) with the QOL from MDS 3.0 because the concepts that the other NOC indicators are based on do not match the concepts on which the QOL section is based. As it was difficult for NH residents to understand the QOL NOC outcome question, this outcome was revised to read, “How satisfied are you

with your life here?” The close relationship indicator in the NOC QOL outcome was measured by asking “How satisfied are you with your close relationships here?” The QOL NOC outcome was compared with the summary QOL item from MDS 3.0: “How would you rate the quality of your life here with respect to your life as a whole?” The NOC close relationship indicator was compared with each of the items in the MDS relationship domain and with the sum of the relationship items. The MDS relationship items are as follows:

1. Is it easy to make friends at this NH?
2. Do you consider that any other resident here is your close friend?
3. In the last month, have people who worked here stopped by just to have a friendly conversation with you?
4. Do you consider any staff member to be your friend?
5. Do you think that [name of facility] tries to make this an easy and pleasant place for families and friends of residents to visit?

Methods

Participants and Setting for Criterion Validity

Stratified random sampling was used to identify representative characteristics of the sample (Burns & Groves, 2001). A list of Iowa NHs was obtained from the Nursing Home Compare Site (CMS, 2006). There are a total of 455 NHs in Iowa (CMS, 2006). Thirty-three NHs within 70 miles of Iowa City were randomly selected. NH administrators were contacted to get approval for interviews and access to residents’ data. Eight NHs declined to participate in this study, and a total of 25 out of 33 NHs in Iowa agreed to participate. A total of 231 residents from 25 NHs were included in the criterion

validity analyses. The sample size was justified by the guidelines of Cohen and Cohen (1983). Twelve NHs were for-profit, 12 were not-for-profit, and one was government-owned. Using the OSCAR's designation for urban/rural, 15 NHs were located in a rural area and the other 10 were located in urban areas in Iowa. OSCAR designates a place as an urban area if the county is in an urban statistical area based on its Core-Based Statistical Area, otherwise it is rural. The facilities' bed sizes ranged from 44 to 120 (Mean = 70, $SD = 18.53$). Most resident participants were women (72.7%), White (99.1%), widowed (67.1%), and high school graduates (52.8%). The mean age of the participants was 85.11 years ($SD = 8.4$), and about one quarter of the residents (26.8%) had been diagnosed with some type of dementia (see Table 4.1). The mean stay in months at residents' current NH was 22.75 months ($SD = 26.89$). The mean time required to complete the QOL per resident was 26.06 minutes ($SD = 10.8$) (see Table 4.1).

Participants and Setting for Interrater Reliability

A subsample of 6 NHs out of the 25 were approached for interrater reliability testing. A total of 48 residents were included in the interrater reliability analyses. Only 1 NH was for-profit; the others were not-for-profit. Using OSCAR's designation for urban/rural, only one NH was located in a rural area, and the other 5 were located in urban areas in Iowa. The facilities' bed sizes ranged from 48 to 100. Most of resident participants were women (66.7%), White (97.9%), widowed (52.1%), and high school graduates (39.6%) or college graduates (47.9%). The mean age of participants was 84.86 years ($SD = 8.14$), and about 39.6% had been diagnosed with some type of dementia. The mean stay at residents' current NH was 7.4 months ($SD = 32.95$). The mean time required to complete the QOL per resident was 26.06 minutes ($SD = 10.8$; see Table 4.1).

Procedure

The researcher first randomly selected every 5th resident and then the NH staff (administrator, DON, RN, social worker, or activity director) identified whether or not the residents could communicate with researchers until the goal of the sample size per facility (10 per NH) was reached. Exclusion criteria were: comatose residents, those who cannot answer simple questions, the terminally ill, and residents with multiple chronic conditions and severe cognitive and functional impairments. Cognitive impairment of residents in some facilities made it impossible to interview 10 residents. Inclusion criteria for the sample included the responsiveness screen described by Simmons and Ouslander (2005). The residents were asked to say their names when requested or to reliably recognize two common objects (Simmons & Ouslander). If a resident could not answer these questions, the resident was excluded from the sample. If the residents were alert, the researchers obtained their consent and collected data directly from the residents. For persons who were cognitively impaired or demented, the consent forms were obtained from their legal proxies or family members by mail, phone, or in person. Residents with poor cognitive function for whom consent was granted, and who assented to participation, were included only if the resident met the responsiveness screening. Both long stay and recently admitted residents were included. Residents were encouraged to answer both the Likert scale and the dichotomous scale. If the Likert scale was too difficult, only the dichotomous scale was used (Anderson et al., 2003).

To assess interrater reliability, one researcher and a research assistant (RA) who is also an RN independently interviewed 48 residents. A gerontological nurse practitioner program student from the University of Iowa College of Nursing with experience with

elders, was recruited. This RA was required to obtain University of Iowa Institutional Review Board training before the interviews. The researcher gave the RA instructions on how to conduct interviews and how to explain informed consent. The RA was also given a list of the NHs to visit and an overview of this study. The RA observed the interview process conducted by the researcher, and then the RA initiated interviews in the presence of the researcher. After two of these, the researcher and the RA conducted interviews together taking turns asking the questions. The researcher and the RA then rated the questionnaires independently. Approximately 8 to 10 residents in the 6 NHs ($N = 48$) were randomly recruited. The researcher and the RA visited one NH per day and interviewed approximately 4 residents each day. After this training process, the RA conducted the interviews.

Results

Criterion Validity

Criterion validity is the correlation between an instrument with an outside instrument (Jacobson, 1988). The relationship reflected by Pearson correlation coefficients is usually considered as weak when it is below 0.3, moderate when it is .3 to .5, and strong when it is above 0.5, although the interpretation depends on the studies and variables (Burns & Grove, 2001). To measure the criterion validity of the QOL questions in the MDS, Pearson correlation coefficients were calculated for the relationship questions in the MDS and NOC as well as for the QOL summary scale in the MDS and the overall QOL outcome in NOC. Correlations regarding the relationship questions range from .18 ($p = .0104$) to .28 ($p < .001$) for the Likert scale (see Table 4.2). There is insufficient evidence of a linear relationship between relationship item 5 (“Do you think

that [name of the facility] tries to make this an easy and pleasant place for families and friends of residents to visit?") and the relationship outcome of the NOC ($p = .2231$). Correlations regarding the relationship questions range from .16 ($p = .0171$) to .25 ($p = .0005$) for the dichotomous scale (see Table 4.3). There is insufficient evidence of a linear relationship between relationship item 2 from the MDS ("Do you consider that any other resident here is your close friend?") and the relationship outcome from NOC (see Table 4.3).

Correlation regarding the overall QOL was .58 ($p < .0001$) for the Likert scale and .34 ($p < 0.0001$) for the dichotomous scale (see Table 4.4). So, there was moderate linear correlation between the overall QOL item in the QOL outcome of the NOC and overall MDS QOL rating lending modest support for construct validity.

Interrater Reliability

Interrater reliability evaluates whether the results from two raters using the same instrument are consistent (Wood & Ross-Kerr, 2006). In this study, the results were expected to be reliable because of the positive results from Kane's study. The kappa statistic (K) is often used to measure agreement between raters. It compares two sets of raters who have each interviewed the same respondent independently. It may generally be concluded that a kappa statistic that is greater than or equal to .7 is a good indication of reliability, but a kappa statistic lower than or equal to .4 is unacceptable; a kappa statistic between 0.4 and 0.7 is acceptable (Mor et al., 2003).

The Likert and dichotomous scales were analyzed separately. For the Likert scales, no items were found to be in the poor ($K < .4$) range, three items were in the

acceptable ($K = .4$ to $.7$) range, and 64 items (98.48 %) were in the good ($K = .7$ to $.99$) range. One item (1.52 %) had 100% agreement for all pairs of raters (see Table 4.5).

For the dichotomous scales, only two items (3.08%) were found to be in the poor ($K < .4$) range, 6 items (9.23 %) were in the acceptable ($K = .4$ to $.7$) range, and 49 items (75.39 %) were in the good ($K = .7$ to $.99$) range. Eight items (12.3 %) had 100% agreement for all pairs of raters (see Table 4.6). So, two items (comfort #1, privacy #5) showed unacceptable reliability, but all others showed good strength of agreement. The items with low kappas probably were heavily influenced by the discordance of some of the items. Because the sample itself is not large in this study, the discordance of a small number of incidences may underestimate interrater reliability (see Table 4.6).

Analysis

Based on the Pearson correlation coefficients, criterion validity for QOL in the MDS shows low to moderate correlation with NOC's QOL outcome. The correlation between the QOL relationship items in MDS 3.0 and the NOC QOL relationship item is low. There is a moderate correlation between the general QOL item in MDS 3.0 and the NOC QOL outcome. A possible reason for this low correlation is that the relationship item in NOC includes relationships in other settings besides NHs, while the MDS relationship items focus on relationships in NHs (with staff and other residents), although the MDS also includes relationships within surrounding communities of NHs. The QOL outcome of the NOC was not developed specifically for NH residents, while the QOL in MDS 3.0 was developed only for NH residents and may be measuring different aspects of QOL.

MDS 3.0 assesses limited domains of the residents' QOL while each resident subjectively has their own most important domains related to QOL (Sloane et al., 2005). MDS 3.0 stresses the psychological and social aspects of QOL (CMS, 2007; R. A. Kane et al., 2003). The University of Minnesota research team excluded emotional, some health, and some functional status aspects of QOL because it was beyond the contract scope of the question, although those issues are related to QOL (CMS, 2007; R. A. Kane et al., 2003). Also, MDS 3.0 excludes QOL for dying residents (CMS, 2007). Thus, validity remains a challenge because QOL depends heavily on theory and values, not inferences, and MDS 3.0 does not include all aspects of QOL (Patrick & Erickson, 1993).

This study shows excellent interrater reliability for the QOL section of MDS 3.0, and the results of this study are consistent with R. A. Kane's study (CMS, 2007). In 2002, R. A. Kane et al. tested the strength of agreement in 8 NHs in the Minneapolis/St. Paul area (6 residents per NH; CMS, 2007). They compared QOL scores by NH staff and researchers on both the item and domain levels (CMS, 2007). The only difference between this study and Kane's is that for this study the researcher and an RA conducted interviews together and recorded the questionnaires independently, but in R. A. Kane et al.'s (2003) study the researchers and NH staff interviewed residents 2 to 5 days apart. R. A. Kane et al.'s (2003) study found quite a strong degree of agreement between NH staff and researchers (CMS, 2007): Kappas for 7 items were greater than .6, for 33 items kappas were between .4 and .6, and for the remaining 14 items, kappas were between .24 and .4 (CMS, 2007). At the domain level, all 11 domains were reported to have kappas greater than .6 (CMS, 2007). The correlations between researchers and surveyors were also examined (CMS, 2007). At the item level, the kappas for 7 items were greater than

.6, for 27 items they were between .4 and .6, and for 8 items they were reported to be less than .4. The remaining 12 items were not significantly correlated (CMS, 2007). At the domain level, 5 of 11 domains were reported to have kappas greater than .6 (CMS, 2007). R. A. Kane et al.'s (2003) study showed good interrater reliability between NH staff and researchers as well as between researchers and NH surveyors, while this study showed good interrater reliability between this researcher and an RA.

Both this study and R. A. Kane et al.'s study (2003) had small sample sizes. However, this study makes a meaningful contribution in that the state of Iowa is largely a rural area while R. A. Kane's study (2003) was conducted in an urban area (St. Paul) (CMS, 2007). Future studies should be conducted in many different settings with larger samples that include socioeconomic and geographical differences. Overall findings from this study suggest that QOL as measured by MDS 3.0 may have value in assessing QOL for residents in NHs. However, due to the limited available empirical data, the psychometric properties of the QOL measure should be explored with larger populations in the future. This would offer valuable additional information in deciding the usefulness of this scale.

Discussion

This is an ideal time to discuss QOL for NH residents. There is no available measure to assess QOL for NH residents, and there has been little research on the psychometrics of the QOL section in MDS 3.0. As a pilot study, this study contributes by performing the empirical test (criterion validity/interrater reliability) to determine if this tool can be applied. This study attempts to respond to this gap by testing the psychometric properties of a research instrument designed to measure QOL of NH

residents. Further research is needed to offer scientific evidence to support implementation of the QOL section of the MDS in practice, outcome research, resource allocation, and policy-making based on the reported QOL data across the United States (McKinley, 2005).

While interviewing, some questions were not applicable to the residents' situation and some residents could not understand the questions. A revision of the questionnaire was required. For example, questions 3 and 4 of the functional domain ("If you are anywhere in the nursing home and need a bathroom, can you get to one quickly?" and "Can you easily reach your toilet articles and things that you want to use in your bathroom?") were difficult to answer for people who are wheelchair bound after a stroke, as they never go outside their rooms and the NH staff usually takes care of ADLs for the residents with bowel or bladder incontinence. Even though these questions are important, residents often cannot answer them: they do not reflect what they are meant to reflect. More than 90 % of the residents could not understand the fourth question in the autonomy domain ("Have you been successful in making changes in things that you do not like?"), and there was a need to rephrase it for them. Regarding clothing issues, it is questionable whether the question, "Do your clothes get lost or damaged in the laundry?" really asks about the security concerns of residents because the laundry of 10 residents (4.4 %) was cared for by their family members. When they were asked, "Taking all staff together, nurses, aides and others, does the staff know about your interests and what you like?," some residents said that it really depends on who is working with them that day. The question was revised to ask about the attitudes of the majority of staff rather than focusing on specific staff persons. From residents' answers to this question, it appears

that there is a large amount of variation in staff members' attitudes, and the stability of these questions may be unreliable. About 95 % of residents replied that staff members knew them as a person, and 82% replied that other residents knew them as a person. However, some residents said that they do not really want to get to know other residents. Also, some of them said they do not know whether other people know them as a person. A question might be revised to read, "Do you feel that the staff members know you as a person?" to base it more on the residents' own feelings.

Considering the role of the MDS (which includes placement, care planning, and reimbursement), psychometrics become a very important issue (Lawton et al., 1998). Since all Medicare- and Medicaid-eligible NHs use the MDS, and it is the most widely used tool, stable psychometrics should be a prerequisite for using MDS 3.0 in practice in the future. Version 3.0 of the MDS will be updated from version 2.0 and was proposed to the CMS for validation in April, 2003 (Anderson et al., 2003). As of June, 2007, MDS 3.0 still has not been implemented. MDS 3.0 was revised from MDS 2.0 in order to (a) have more clinical relevance, (b) make the use of the MDS easier, (c) enhance efficiency, (d) synthesize the standard scales, and (e) hear residents' voices directly through interviews (CMS, 2006).

This study supported good interrater reliability and low to moderate criterion validity for the relationship indicators with QOL NOC outcomes. NOC has a global measure of QOL, while the QOL section of MDS 3.0 is designed for NH residents. This may be the reason for the low to moderate correlation between the two scales. The QOL section in MDS 3.0 is the only available tool to evaluate the QOL of residents. As this tool is in the development stage, it is very timely and necessary to test the psychometric

characteristics of the QOL section now. As there is no validated gold standard tool for measuring QOL for residents (Lum, Lin, & Kane, 2005), testing criterion validity seems not to be appropriate at this point. But studies to perform confirmatory factor analysis to test construct validity would be appropriate. A confirmatory factor analysis can determine which measurement items are related to detailed latent concepts (Burns & Groves, 2001). More funding and research are needed that focus on construct validity. Without confirmed validity and reliable psychometric characteristics of this tool, it is not possible to implement and use the QOL section of MDS 3.0 in the Medicare and Medicaid NHs. A well-designed tool to assess QOL of NH residents will accurately reveal the lives of NH residents and may protect, and even optimize, the QOL of NH residents.

Figure 4.1 Nursing Outcome Classification QOL outcomes

Quality of Life (2000)

Domain-Perceived Health (V) Care Recipient:
 Class-Health & Life Quality (U) Data Source:
 Scale(s)-Not at all satisfied to Completely satisfied (s)

Definition: Extent of positive perception of current life circumstances

| OUTCOME TARGET RATING: | Maintain at _____ | Increase to _____ | | | | | |
|--------------------------------|-----------------------------|-------------------------|---------------------------|---------------------|---------------------------|---|----|
| Quality of Life Overall Rating | Not at all satisfied 1 | Somewhat satisfied 2 | Moderately satisfied 3 | Very satisfied 4 | Completely satisfied 5 | | |
| INDICATORS: | | | | | | | |
| 200001 | Health status | 1 | 2 | 3 | 4 | 5 | NA |
| 200002 | Social circumstances | 1 | 2 | 3 | 4 | 5 | NA |
| 200003 | Environmental circumstances | 1 | 2 | 3 | 4 | 5 | NA |
| 200004 | Economic status | 1 | 2 | 3 | 4 | 5 | NA |
| 200005 | Education level | 1 | 2 | 3 | 4 | 5 | NA |
| 200006 | Occupation | 1 | 2 | 3 | 4 | 5 | NA |
| 200007 | Close relationships | 1 | 2 | 3 | 4 | 5 | NA |
| 200008 | Achievement of life goals | 1 | 2 | 3 | 4 | 5 | NA |
| 200009 | Ability to cope | 1 | 2 | 3 | 4 | 5 | NA |
| 200010 | Self-concept | 1 | 2 | 3 | 4 | 5 | NA |
| 200011 | Pervasive mood | 1 | 2 | 3 | 4 | 5 | NA |

1st edition 1997; Revised 3rd edition

From *Nursing Outcomes Classification (NOC): Iowa Outcomes Project* (3 ed.) by S. Moorhead, M. Johnson, & M. Maas, M, 2004, St. Louis, MO: Mosby.

Table 4.1 Resident Demographics for Criterion Validity and Interrater Reliability Studies

| Demographics | Criterion Validity ($N = 231$) | Interrater Reliability ($N = 48$) |
|---|----------------------------------|--|
| Age (years), mean \pm <i>SD</i> | 85.11 \pm 8.4 | 84.86 \pm 8.14 |
| Time residing in current NH (months) | 22.75 \pm 26.89 | 27.4 \pm 32.95 |
| Time required to complete questionnaire (minutes) | 26.06 \pm 10.8 | 35.54 \pm 1.03 |
| Gender | | |
| Female, n (%) | 168 (72.7%) | 32 (66.7%) |
| Male, n (%) | 63 (27.3%) | 16 (33.3%) |
| Ethnicity | | |
| Caucasian (%) | 229 (99.1%) | 47 (97.9%) |
| Non-Caucasian (%) | 2 (0.8%) | 1 (2.1%) |
| Marital Status | | |
| Widowed | 155 (67.1%) | 25 (52.1%) |
| Married | 35 (15.2%) | 7 (14.6%) |
| Divorced | 17 (7.3%) | 12 (12.0%) |
| Single | 24 (10.4%) | 4 (8.3%) |
| Highest Level of Education | | |
| Less than high school | 49 (21.2%) | 6 (12.5%) |
| High school | 122 (52.8%) | 19 (39.6%) |
| More than high school/College | 60 (26%) | 23 (47.9%) |
| Dementia Diagnosis | | |
| Demented residents | 62 (26.8%) | 19 (39.6%) |
| Total residents | 231 (100%) | 38 (100%) |

Notes. *SD* = Standard deviation

Table 4.2 Relationship Domain in MDS 3.0 and Relationship Questions in NOC (Likert Scale): Pearson Correlation Coefficients

| | Item description of MDS | NOC | Pearson Correlation Coefficients | <i>p</i> -value |
|------------------|--|--|----------------------------------|-----------------|
| Relationships #1 | Is it easy to make friends at this nursing home? | | 0.2788 | < 0.001 |
| Relationships #2 | In the last month, have people who worked here stopped by just to have a friendly conversation with you? | How satisfied are you with your close relationships? | 0.17724 | 0.0104 |
| Relationships #4 | Do you consider any staff member to be your friend? | | 0.24289 | 0.0005 |
| Relationships #5 | Do you think that (name of the facility) tries to make this an easy and pleasant place for families and friends of residents to visit? | | 0.08675 | 0.2231 |
| Sum | Total scores from #1 to #5 | | 0.23526 | 0.0013 |

Notes. The scores range from 5 to 20.

Table 4.3 Relationship Domain in MDS 3.0 and the Relationship Question in NOC (Dichotomous Scale): Pearson Correlation Coefficients

| | Item description of MDS | NOC | Pearson Correlation Coefficients | <i>p</i> -value |
|------------------|--|--|----------------------------------|-----------------|
| Relationships #1 | Is it easy to make friends at this nursing home? | | 0.2027 | 0.003 |
| Relationships #2 | Do you consider any other resident here as your close friend? | | 0.08864 | 0.1975 |
| Relationships #3 | In the last month, have people who worked here stopped by just to have a friendly conversation with you? | How satisfied are you with your close relationships? | 0.16397 | 0.0171 |
| Relationships #4 | Do you consider any staff member to be your friend? | | 0.19543 | 0.0046 |
| Relationships #5 | Do you think that (name of the facility) tries to make this an easy and pleasant place for families and friends of residents to visit? | | 0.07525 | 0.2824 |
| Sum | Total scores from #1 to #5 | | 0.25027 | 0.0005 |

Notes. The scores range from 5 to 20.

Table 4.4 QOL in MDS 3.0 and the QOL Outcome in NOC: Pearson Correlation Coefficients

| Item | QOL | NOC | Likert | <i>p</i> -value | Dichotomous | <i>p</i> -value |
|-------------|--|--|--------|-----------------|-------------|------------------|
| Description | | | | | | |
| QOL summary | How would you rate the quality of your life here with respect to your life as a whole? | How satisfied are you with your life here? | 3 | 0.5773 | < 0.0001 | 0.33945 < 0.0001 |

Table 4.5 Interrater Reliability between Researcher and RA (Likert Scale)

| | Item description | K (ICC) | Strength of agreement |
|--------------------------|---|---------|-----------------------|
| Comfort #1 | How often are you too cold here? | 1.00000 | Good |
| Comfort #2 | How often are you so long in the same position that it hurts? | 0.99182 | Good |
| Comfort #3 | How often are you in physical pain? | 0.99121 | Good |
| Comfort #4 | How often are you bothered by noise when you are in your room? | 0.98892 | Good |
| Comfort #5 | How often are you bothered by noise in other parts of the nursing home, for example, in the dining room? | 0.94886 | Good |
| Comfort #6 | Do you get a good night's sleep? | 0.83858 | Good |
| Functional competence #1 | Is it easy for you to get around in your room by yourself? | 0.92427 | Good |
| Functional competence #2 | Can you easily reach the things that you need? | 0.96923 | Good |
| Functional competence #3 | If you are anywhere in the nursing home and need a bathroom, can you get to one quickly? | 0.67388 | Good |
| Functional competence #4 | Can you easily reach your toilet articles and things that you want to use in your bathroom? | 0.81569 | Good |
| Functional competence #5 | Do you do as much to take care of your own things and your room as you can and want? | 0.92991 | Good |
| Privacy #1 | Can you find a place to be alone if you wish? | 0.95738 | Good |
| Privacy #2 | Can you make a private phone call? | 0.91318 | Good |
| Privacy #3 | When you have a visitor, can you find a place to visit in private? | 0.76296 | Good |
| Privacy #4 | Can you be together in private with another resident (other than your roommate)? | 0.84475 | Good |
| Privacy #5 | Do the people who work here knock and wait for a reply before entering your room? | 0.86337 | Good |
| Dignity #1 | Do staff here treat you politely? | 0.87575 | Good |
| Dignity #2 | Do you feel that you are treated with respect here? | 0.95535 | Good |
| Dignity #3 | Do staff here handle you gently while giving you care? | 0.81435 | Good |
| Dignity #4 | Do staff here respect your modesty? | 0.80115 | Good |
| Dignity #5 | Do staff take time to listen to you when you have something to say? | 0.83006 | Good |
| Meaningful activity #1 | Do you get outdoors? | 0.89435 | Good |
| Meaningful activity #2 | About how often do you get outdoors? | 0.98139 | Good |
| Meaningful activity #3 | Do you enjoy the organized activities here at the nursing home? | 0.87410 | Good |
| Meaningful activity #4 | Outside of religious activities, do you have enjoyable things to do at the nursing home during the weekend? | 0.89803 | Good |
| Meaningful activity #5 | Despite your health condition, do you give help to others, such as other residents, your family, people at this nursing home, or the outside community? | 0.92194 | Good |
| Meaningful activity #6 | Do the days here seem too long to you? | 0.89315 | Good |
| Relationship #1 | Is it easy to make friends at this nursing home? | 0.98542 | Good |
| Relationship #2 | In the last month, have people who worked here stopped by just to have a friendly conversation with you? | 0.97252 | Good |
| Relationship #4 | Do you consider any staff member to be your friend? | 0.94903 | Good |

Table 4.5 continued

| | Item description | K (ICC) | Strength of agreement |
|-------------------------------|--|---------|-----------------------|
| Relationship #5 | Do you think that (name of the facility) tries to make this an easy and pleasant place for families and friends of residents to visit? | 0.88542 | Good |
| Autonomy #1 | Can you go to bed at the time you want? | 0.93704 | Good |
| Autonomy #2 | Can you get up in the morning at the time you want? | 0.86135 | Good |
| Autonomy #3 | Can you decide what clothes to wear? | 0.90239 | Good |
| Autonomy #4 | Have you been successful in making changes in things that you do not like? | 0.75952 | Good |
| Enjoyment #1 | Do you like the food at (name of the facility)? | 0.64609 | Good |
| Enjoyment #2 | Do you enjoy mealtimes at (name of the facility)? | 0.88721 | Good |
| Enjoyment #3 | Can you get your favorite foods at (name of the facility)? | 0.90081 | Good |
| Spiritual well-being #1 | Do you participate in religious activities here? | 0.98743 | Good |
| Spiritual well-being #2 | Do the religious activities here have personal meaning for you? | 0.93693 | Good |
| Spiritual well-being #3 | Do you feel your life as a whole has meaning? | 0.98322 | Good |
| Spiritual well-being #4 | Do you feel at peace? | 0.94208 | Good |
| Security #1 | Do you feel that your possessions are safe at this nursing home? | 0.82571 | Good |
| Security #2 | Do your clothes get lost or damaged in the laundry? | 0.84857 | Good |
| Security #3 | Do you feel confident that you can get help when you need it? | 0.95567 | Good |
| Security #4 | If you do not feel well, can you get a nurse or doctor quickly? | 0.65884 | Good |
| Security #5 | Do you ever feel afraid because of the way you or some other resident is treated? | 0.79393 | Good |
| Individuality #1 | Taking all staff together, does the staff know about your interests and what you like? | 0.86360 | Good |
| Individuality #2 | Do staff members know you as a person? | 0.92273 | Good |
| Individuality #3 | Are the people working here interested in your experiences and the things you have done in your life? | 0.93227 | Good |
| Individuality #4 | Do staff here take your preferences seriously? | 0.83939 | Good |
| Individuality #5 | Do residents here know you as a person? | 0.73285 | Good |
| Individuality #6 | Are your personal wishes and interests respected here? | 0.74110 | Good |
| Comfort summary | How would you rate the quality of your life here with respect to feeling physically comfortable? | 0.81850 | Good |
| Functional competence summary | How would you rate the quality of your life here with respect to doing as much for yourself as you want? | 0.96932 | Good |
| Privacy summary | How would you rate the quality of your life here with respect to having the privacy that you want? | 0.97948 | Good |
| Autonomy summary | How would you rate the quality of your life here with respect to having choice and control in your daily life? | 0.98741 | Good |
| Dignity summary | How would you rate the quality of your life here with respect to feeling that your dignity is respected? | 0.87536 | Good |
| Meaningful activity summary | How would you rate the quality of your life here with respect to having interesting things to see and do? | 0.97968 | Good |
| Enjoyment summary | How would you rate the quality of your life here with respect to enjoying your food and meals? | 0.92068 | Good |

Table 4.5 continued

| | Item Description | K (ICC) | Strength of agreement |
|------------------------------|--|---------|-----------------------|
| Individuality summary | How would you rate the quality of your life here with respect to following your own interests and preferences? | 0.96762 | Good |
| Relationship summary | How would you rate the quality of your life here with respect to having good friendships and relationships? | 0.97363 | Good |
| Security summary | How would you rate the quality of your life here with respect to feeling safe and secure? | 0.87119 | Good |
| Spiritual well-being summary | How would you rate the quality of your life here with respect to meeting your spiritual and religious needs? | 0.83920 | Good |
| Quality of life summary | How would you rate the quality of your life here with respect to your life as a whole? | 0.94446 | Good |

Table 4.6 Interrater Reliability between Researcher and RA (dichotomous scale)

| | Item Description | K (ICC) | Strength of agreement |
|--------------------------|---|---------|-----------------------|
| Comfort #1 | How often are you too cold here? | 0.37333 | Poor |
| Comfort #2 | How often are you so long in the same position that it hurts? | 1.00000 | Good |
| Comfort #3 | How often are you in physical pain? | 1.00000 | Good |
| Comfort #4 | How often are you bothered by noise when you are in your room? | 0.91280 | Good |
| Comfort #5 | How often are you bothered by noise in other parts of the nursing home, for example, in the dining room? | 0.87863 | Good |
| Comfort #6 | Do you get a good night's sleep? | 0.47028 | Acceptable |
| Functional competence #1 | Is it easy for you to get around in your room by yourself? | 0.94568 | Good |
| Functional competence #2 | Can you easily reach the things that you need? | 0.74067 | Good |
| Functional competence #3 | If you are anywhere in the nursing home and need a bathroom, can you get to one quickly? | 0.62851 | Good |
| Functional competence #4 | Can you easily reach your toilet articles and things that you want to use in your bathroom? | 0.65948 | Good |
| Functional competence #5 | Do you do as much to take care of your own things and your room as you can and want? | 0.52713 | Acceptable |
| Privacy #1 | Can you find a place to be alone if you wish? | 0.91430 | Good |
| Privacy #2 | Can you make a private phone call? | 0.83149 | Good |
| Privacy #3 | When you have a visitor, can you find a place to visit in private? | 0.50722 | Acceptable |
| Privacy #4 | Can you be together in private with another resident (other than your roommate)? | 0.84873 | Good |
| Privacy #5 | Do the people who work here knock and wait for a reply before entering your room? | 0.39112 | Poor |
| Dignity #1 | Do staff here treat you politely? | 1.00000 | Good |
| Dignity #2 | Do you feel that you are treated with respect here? | 1.00000 | Good |
| Dignity #3 | Do staff here handle you gently while giving you care? | 0.80884 | Good |
| Dignity #4 | Do staff here respect your modesty? | 0.66422 | Good |
| Dignity #5 | Do staff take time to listen to you when you have something to say? | 0.82050 | Good |
| Meaningful activity #1 | Do you get outdoors? | 0.84711 | Good |
| Meaningful activity #3 | Do you enjoy the organized activities here at the nursing home? | 0.95859 | Good |
| Meaningful activity #4 | Outside of religious activities, do you have enjoyable things to do at the nursing home during the weekend? | 0.85557 | Good |
| Meaningful activity #5 | Despite your health condition, do you give help to others, such as other residents, your family, people at this nursing home, or the outside community? | 0.81864 | Good |
| Meaningful activity #6 | Do the days here seem too long to you? | 0.95336 | Good |
| Relationship #1 | Is it easy to make friends at this nursing home? | 0.97893 | Good |
| Relationship #2 | Do you consider that any other resident here is your close friend? | 0.93931 | Good |

Table 4.6 Continued

| | Item Description | K (ICC) | Strength of agreement |
|-------------------------------|--|---------|-----------------------|
| Relationship #3 | In the last month, have people who worked here stopped by just to have a friendly conversation with you? | 0.91608 | Good |
| Relationship #4 | Do you consider any staff member to be your friend? | 0.93498 | Good |
| Relationship #5 | Do you think that (name of the facility) tries to make this an easy and pleasant place for families and friends of residents to visit? | 0.81205 | Good |
| Autonomy #1 | Can you go to bed at the time you want? | 0.84887 | Good |
| Autonomy #2 | Can you get up in the morning at the time you want? | 0.80972 | Good |
| Autonomy #3 | Can you decide what clothes to wear? | 0.85360 | Good |
| Autonomy #4 | Have you been successful in making changes in things that you do not like? | 0.77191 | Good |
| Enjoyment #1 | Do you like the food at (name of the facility)? | 0.82027 | Good |
| Enjoyment #2 | Do you enjoy mealtimes at (name of the facility)? | 1.00000 | Good |
| Enjoyment #3 | Can you get your favorite foods at (name of the facility)? | 0.78244 | Good |
| Spiritual well-being #1 | Do you participate in religious activities here? | 0.91931 | Good |
| Spiritual well-being #2 | Do the religious activities here have personal meaning for you? | 0.75048 | Good |
| Spiritual well-being #3 | Do you feel your life as a whole has meaning? | 1.00000 | Good |
| Spiritual well-being #4 | Do you feel at peace? | 0.64954 | Good |
| Security #1 | Do you feel that your possessions are safe at this nursing home? | 0.76382 | Good |
| Security #2 | Do your clothes get lost or damaged in the laundry? | 0.97584 | Good |
| Security #3 | Do you feel confident that you can get help when you need it? | 0.52508 | Acceptable |
| Security #4 | If you do not feel well, can you get a nurse or doctor quickly? | 0.59129 | Acceptable |
| Security #5 | Do you ever feel afraid because of the way you or some other resident is treated? | 0.70111 | Good |
| Individuality #1 | Taking all staff together, does the staff know about your interests and what you like? | 0.85101 | Good |
| Individuality #2 | Do staff members know you as a person? | 0.94908 | Good |
| Individuality #3 | Are the people working here interested in your experiences and the things you have done in your life? | 0.77631 | Good |
| Individuality #4 | Do staff here take your preferences seriously? | 0.84134 | Good |
| Individuality #5 | Do residents here know you as a person? | 0.81980 | Good |
| Individuality #6 | Are your personal wishes and interests respected here? | 0.74692 | Good |
| Comfort summary | How would you rate the quality of your life here with respect to feeling physically comfortable? | 0.94185 | Good |
| Functional competence summary | How would you rate the quality of your life here with respect to doing as much for yourself as you want? | 0.92302 | Good |
| Privacy summary | How would you rate the quality of your life here with respect to having the privacy that you want? | 0.93419 | Good |
| Autonomy summary | How would you rate the quality of your life here with respect to having choice and control in your daily life? | 0.69044 | Good |

Table 4.6 Continued

| Item Description | | K (ICC) | Strength of agreement |
|------------------------------|--|---------|-----------------------|
| Dignity summary | How would you rate the quality of your life here with respect to feeling that your dignity is respected? | 0.08049 | Good |
| Meaningful activity summary | How would you rate the quality of your life here with respect to having interesting things to see and do? | 0.63225 | Acceptable |
| Enjoyment summary | How would you rate the quality of your life here with respect to enjoying your food and meals? | 0.92300 | Good |
| Individuality summary | How would you rate the quality of your life here with respect to following your own interests and preferences? | 0.92070 | Good |
| Relationship summary | How would you rate the quality of your life here with respect to having good friendships and relationships? | 1.00000 | Good |
| Security summary | How would you rate the quality of your life here with respect to feeling safe and secure? | 1.00000 | Good |
| Spiritual well-being summary | How would you rate the quality of your life here with respect to meeting your spiritual and religious needs? | 0.81409 | Good |
| Quality of life summary | How would you rate the quality of your life here with respect to your life as a whole? | 0.94667 | Good |

CHAPTER V.

SUMMARY AND DISCUSSIONS

The work in chapters 2, 3, and 4 proposed a new paradigm of NH research because studies attempted to respond to research gaps by (a) focusing on the contributions of RNs, (b) investigating the QOL of residents, beyond QOC, and (c) testing the psychometric properties of a research instrument (QOL section in MDS 3.0) designed to measure QOL of NH residents. This study is a starting point to further diverse research with a variety of methodologies, including quantitative and qualitative research.

The first specific aim was addressed in chapter 2. The aim was to complete an integrated literature review of the relationship between staffing and QOC and QOL in NHs. The majority of the reviewed studies (a) had no theoretical framework, (b) depended largely on quantitative research, (c) depended heavily on secondary data analysis, (d) failed to differentiate RNs from other nursing staff, and (e) measured only QOC which lacking specific measurement of QOL. Although little research has investigated the relationship between total nursing staff levels and outcome indicators of QOC (Dellefield, 2000; Kovner et al., 2000), the reviewed studies demonstrate that nurse staffing is a significant organizational variable related to resident outcomes, and appropriate staffing levels is an essential step in improving QOC (N. G. Castle & Fogel, 1998; Harrington et al., 2000; Harrington, Zimmerman et al., 2000; Johnson-Pawlson & Infeld, 1996; Porell & Caro, 1998; Unruh & Wan, 2004; Wunderlich et al., 1996). However, each researcher studied different aspects of staffing and different resident or organization outcomes making determination of appropriate staffing levels difficult (Maas & Specht, 1999). The research, which has examined the relationship between total

nurse staffing levels and process and outcome quality indicators, has not clearly defined the relationship between differing levels of nurse staffing skill mix and specific structural, process, outcome, and composite indicators of quality (Dellefield, 2000). Thus, the inconsistency of findings suggests that more research is needed (Dellefield; Kovner et al., 2000; Sovie, 1996). Future research may include identifying skill mix, investigating QOL beyond QOC, and observing what nursing staff actually do.

The second specific aim was addressed in chapter 3, to examine the relationship between nurse staffing HPRD, skill mix, and turnover, and QOL in NHs. The relationships between nursing staff HPRD, nurse staffing skill mix, turnover of nursing staff, and the answers given to QOL questions by 231 residents in Iowa NHs were investigated. Unexpectedly, only part of staffing variables were statistically significantly correlated with QOL of residents and nurse staffing variables seemed to have little influence on predicting QOL of residents in this study. The major differences between current study and previous studies are that previous research focused on QOC and measured QOL by measuring residents' outcomes. Previous studies found that nurse staffing is an important factor in improving QOC (and by implication, QOL) of NH residents. Based on statistically significant relationships, RNs' unique contributions were supported by the findings that NHs with more RNs, compared with LPNs/LVNs and CNAs, had residents with higher scores in the functional competence domain and the overall QOL summary items. Interestingly, this study found that nurse staffing turnover is positively correlated with QOL, especially in the individuality domain.

The third specific aim was addressed in chapter 4, to test the psychometric properties of a research instrument (QOL section in the MDS 3.0) to measure QOL of

NH residents. This chapter supported good interrater reliability and low to moderate criterion validity with the Nursing Outcome Classification outcomes of the QOL section in MDS 3.0. The testing tool (QOL section in MDS 3.0) is a well developed and easy-to-administer tool. However, it takes time to administer this tool. In this study, the average time required to complete this form was 26.06 minutes in addition to time needed to establish a rapport. The limitation of the QOL section in MDS 3.0 still remains because this tool measures only a limited part of the QOL.

Implications for Research

This is a preliminary study to investigate the relationship between nursing staffing and QOL in NHs. More research is required to confirm the relationship. Future research should investigate how resident outcomes are achieved, including what nursing staff actually does; how nursing staff interacts with residents, family, and other staff; and how nursing staff spends their time between direct and indirect care. The research tested ways to innovate the process, for example, how RNs are assigned to different residents. Furthermore, this study investigated only staffing variables in the structure as predictor variables on outcomes. Other important predictor variables such as rural vs. urban NHs, profit vs not-for-profit NHs, bed size of NHs, and the culture change and environment of NHs on the residents' outcomes should be investigated.

Implications for Practice

The improvement of the pain assessment tool for the pain management program is required because about one third of residents reported that they often had pain in this study. Most of the residents cannot access the bathroom in the dining room, and the

residents usually have to go to the bathroom before lunch time, although they do not want to. It is suggested that a bathroom be installed in dining rooms or living areas to decrease waiting time for toileting. Also, grabbers and lower bathroom shelves and sinks are required because residents can not grasp the ones currently in place.

A phone adaptor must be provided so that the residents with hearing problems can call and NHs should supply the available long distance call system for the residents. Staff must be required to remember to knock when they walk in residents' bathroom for privacy. Most staff were reported to have knocked on the room door, but forgot to knock on the bathroom door. NH residents suffered because of broken wheelchairs; broken ones should be repaired. To meet diverse religious needs, individualized and denominational religious services should be provided; NH staff are supposed to inform residents about religious activities and services once admitted. Dining times are the best time for friendships; staff should keep this in mind and facilitate residents' friendships during dining times. The time for eating should be shortened. Individualized breakfast times are required so that residents need not be annoyed by being awakened; necessary awakening should be done in a polite way. Residents' involvement in QOL group discussion is very important to build projects or programs that will improve their QOL.

The ultimate goal of this research is to improve the QOL of NH residents. It is necessary to hear the voices of the NH residents. From the information obtained as part of the data-collection procedure, important comments from the sample of residents were not reflected in analyzed data. The following section is a brief summary of interviews with residents, which was not included in the questionnaires. Based on the comments from residents, the QOL tool must be updated and revised.

Summary of the Residents' Interviews

As stated in chapters 3 and 4, the QOL section in the MDS 3.0 is composed of 11 domains: comfort, functional competence, privacy, dignity, meaningful activity, relationships, autonomy, food enjoyment, spiritual well-being, security, and individuality. The following discussion adds information provided by the residents that is not represented in the questionnaires described and has many implications for ways to improve the QOL for residents in NHs.

Comfort Domain

Residents were asked to answer the following questions: (a) if they feel too cold, (b) if they have physical pain, (c) if they stay so long in the same position that it hurts, (d) if they are interrupted by noise in their room, (e) if they are interrupted by noise elsewhere in NHs, and (f) if they have a good night's sleep. The average score in the comfort domain was quite high: 17.22 (dichotomous) and 19.38 (Likert; score range was between 6 and 24; see Table 3.2). Twenty one percent of the residents answered that they often had pain and 27.3% sometimes had pain in the Likert scale. About 35 % of the sample in the dichotomous scale answered that they suffered from different kinds of pain. More than 90% of the pain was because of arthritis. About 50 of the 231 (21.6 %) interviewed residents in the NHs said that they sit in wheelchairs for many hours (from 3 to over 10 hours per day) and that this position hurts them. Approximately 75% of the sample were not bothered by noise, and if they closed the door, they were not at all disturbed by it. The reason for their noise insensitivity could be assumed to be because their hearing capacity was not good as a result of the aging process. However, 43 out of 231 residents complained about noise from the ice machine, TV, music from the piano,

and especially noise from the dining room. About 35 residents mentioned that they were also bothered by the irritating screams of people with dementia. About 30 residents could not have a good night's sleep because the aides woke them up to change diapers and the staff chats at night in the hallway.

Functional Competence Domain

Residents were asked the following questions: (a) if they can easily get around by themselves, (b) if they can easily reach things that they need, (c) if they can get to the bathroom quickly, (d) if they can reach toilet articles without difficulty, and (e) if they can take care of their own things and their room as much as they want. When asked, "Is it easy for you to get around in your room by yourself?" one resident said that she has a wheelchair but wanted to have an electric chair for more convenience. However, the state does not pay for an electric chair. Devices such as electric chairs would increase the residents' functional status. The average score in functional competence was quite high: 16.08 (dichotomous) and 16.25 (Likert; score range was between 6 and 20; see Table 3.2).

Questions 3 and 4 of the functional domain ("If you are anywhere in the nursing home and need a bathroom, can you get to one quickly?" and "Can you easily reach your toilet articles and things that you want to use in your bathroom?") were a hard set of questions to answer for people who are wheelchair bound after a stroke because they never go outside their rooms and the NH staff usually takes care of ADLs for the residents with bowel or bladder incontinence. These questions, therefore, needed to be reworded to reflect whether they are able to go outdoors and obtain assistance when they need to leave their rooms.

Regarding the convenient use of the bathroom, most residents mentioned that there is no bathroom in the dining room so residents usually have to go before lunch time, or they have to come back to their room to use the bathroom. However, there is a short supply of help. Fifteen of 231 interviewed residents also said that the bathroom shelves are so high that they cannot reach some of them. When they were asked, “Do you do as much to take care of your own things and your room as you can and want?” one female resident said, “it is not a nursing home anymore, it is an insane asylum.” One resident used to enjoy woodworking and can no longer do this hobby.

Privacy Domain

These questions referred to the residents’ ability to: (a) be alone, (b) make a phone call, (c) have privacy with visitors, (d) have privacy with other residents, or (e) have privacy when the staff knocks and waits for their reply before entering their room. The average score in the privacy comfort domain was quite high: 17.22 (dichotomous) and 19.38 (Likert; score range was between 6 and 24; see Table 3.2). A few said that the bathroom is the only place to be alone if they wish. In other words, the NH does not have specific private areas for residents. Regarding phone use, a few residents said that they do not have phones and cannot afford them. Although residents have phone cards given to them by family members, they do not have a phone on which to call. Some of them said they have nobody to call. Most of residents suffer from hearing problems and they cannot call because of hearing problems. Phone adaptors should be provided so that residents can call their family or friends. Several residents complained because they cannot make long-distance calls. About one third cannot call because of hearing problems. When they are asked, “Can you be together in private with another resident other than your

roommate?” 82 (35.5 %) residents replied that they had never tried and two answered that they could not do so because of their immobility. Thus, this question may not be valid to judge whether the residents have enough privacy or not. No one encourages residents to visit one another.

More than 80% of residents said that the staff usually knocks but does not wait for a reply; they just come in. They knock on the door to the room, but do not knock on the bathroom door. Many staff refuted this issue by saying that they do not have enough time to wait for an answer, and that some of the residents have serious hearing problems. Ten residents also preferred to always keep the door open. One resident proposed that if the staff says, “This is (name of staff)” or “This is housekeeping” when they knock, it would be much better because he is sometimes alarmed by the staff coming in.

Dignity Domain

In the dignity domain, residents were asked if the NH staff (a) treats them politely, (b) treats them with respect, (c) handles them gently, (d) respects residents’ modesty, and (e) takes time to listen to them when they have something to say. The average score in the dignity domain was moderate: 17.51 (dichotomous) and 17.81 (Likert; score range was between 5 and 20; see Table 3.2). About 10 residents complained that the staff move them so fast that they feel it is rough on them. When they are asked about modesty, one woman seemed to be bothered by a male caregiver, but she admitted that “they are just doing their job.” Several residents also asserted that their modesty is not respected when staff walks in their bathroom. A few people said that when taking a shower with the assistance of aides, they are naked and feel ashamed.

Meaningful Activity

Residents were asked if they (a) get outdoors as much as they want, (b) have enjoyable things to do on weekends, (c) have enjoyable activities at NHs, and (d) help others. The average score in the meaningful activities was moderate: 16.11 (dichotomous) and 14.35 (Likert; score range was between 6 and 24; see Table 3.2). In regards to outdoor activities, 4 out of 231 residents could not go out because of immobility. In several cases, wheelchairs were broken and therefore residents could not go out. One fourth of the residents commented that the staff usually were too busy to help them go outdoors.

When they were asked if they enjoy the activities in the NHs, 15 residents could not participate in activities because of pain although they wanted to. The newly admitted residents (4 of 231) usually did not know about or participate in the activities, so it is recommended that information regarding activities should be provided at admission. Approximately 20 residents said that they preferred doing their own activities like reading or watching TV to the organized activities. Some of them did not participate in them because the NH did not have many organized activities. For example, one woman who was over 100 mentioned that the activities here are for people younger than her. Activities for the eldest population are needed to meet their need or activities. When the researcher asked if the residents help others, responses included emotional support and praying for others. Many of NH residents cannot help each other socially and emotionally.

Relationship Domain

Residents answered 5 questions in the relationship domain, including if (a) it is easy to make friends at NHs, (b) they consider any resident to be their close friend, (c) staff stop by just to have a friendly conversation with residents, (d) they consider any staff members to be their friend, and (e) NHs make it easy for family and friends to visit. The average score in the relationship domain was high: 15.29 (dichotomous) and 16.01 (Likert; score range was between 5 and 20; see Table 3.2). When asked about making friends and having any close friends, there was a big difference in NHs that have small communities compared to bigger communities. In small communities, residents may have grown up with one another and known each other since they were young. In a small community, the staff may consist of sons, daughters, or granddaughters of people they know. These NHs have a different sense of community. When they were asked, “Do you consider any staff member to be your friend?”, 10 % of residents thought that staff are “just” staff while about 90% expressed special thanks and friendship for specific staff members. A few also expressed dislike for specific people. For example, one man said, “I have trouble with the woman DON and I just went to the administrator.”

Furthermore, dining times were a very good time for making friends; however, one woman complained that the staff changed dining tables without notice so she could not see her friend as often. Eighteen residents also mentioned that some people are so disabled that the difference between residents is large. They cannot make friends with severely disabled residents easily. Moreover, several residents also said that they have roommates but do not talk with their roommates at all. When asked about the visiting

conditions, three residents said that they do not have any family members or visitors to come to visit them.

Autonomy Domain

The average score in the autonomy domain was high: 12.15 (dichotomous) and 12.53 (Likert; score range was between 4 and 16; see Table 3.2). Two hundred and seven of the total 231 (93.7%) in the sample said that they could go to bed at any time they wanted. However, 14 residents said that they wanted to go to bed later but the staff usually encourages them to go to bed at a certain hour. One resident reported that if the resident is sick, s/he can go to bed any time that s/he wants; otherwise, staff regulates regular bed times. Sixty-three out of 231 residents (27.3%) mentioned that they have to wake up earlier than they wish. They said that the time they have to awaken is dictated by the time that breakfast is served. About half of the sample said that even if they are not hungry, the staff encourages them to make time for breakfast.

The waiting time for meals turned out to be long. About half said that it usually takes about 30 minutes to 1 hour to get them ready for breakfast. Because some of the residents are incapacitated, they rely on the aides to get them ready for breakfast.

Twelve residents did not like the way that the staff wakes them up, saying things like, "Get up," or "Time to eat." For question number 4 of the autonomy domain ("Have you been successful in making changes in things that you do not like?"), more than 90 % of the residents could not understand the question and there was a need to rephrase it for them. Forty four of 231 residents said that there is nothing to change or that they never even tried to make a change. Some of the interviewed residents (27 residents) just assumed that the NH staff would amend the problem in some way if there was a problem.

Issues they wanted to change included shower time or the height of their sinks. A few residents also mentioned that they have a resident council that meets once a month; at this council, they can complain about anything and this is very good way of hearing the voices of residents. However, only two NHs mentioned this council when interviewed. Both of those complaints (shower time and the height of the sinks) could not be changed. One female resident said that she really enjoys TV but because Medicaid does not pay for the cable in her room, she has to go out of her room to watch TV. Several residents are bothered by the way the staff talks to the residents. A few residents complained about this questionnaire, saying “most of these questions are silly.” The mean time required to complete the QOL per resident was 26.06 minutes (SD = 10.8). They usually continued to answer in spite of complaints. The primary reason for discontinuing an interview was that the residents were tired.

Food Enjoyment

Residents were asked if (a) they like food, (b) they enjoy mealtimes, and (c) they can get their favorite foods at the NH. The average score in the food enjoyment domain was quite high: 9.28 (dichotomous) and 9.71 (Likert; score range was between 3 and 12; see Table 3.2). When they are asked about how often they are offered their favorite foods at NHs, 14 residents answered that they do not have specific favorite foods. Some residents said that they could not get their favorite foods like fried oysters. Regarding the question whether or not they enjoy mealtimes, about 60 residents said that dinner time is the only social time, saying, “We have a great table.” Thirty six residents disagreed by saying, “I take what they bring me and shut up.” A few residents also said, “I eat in my room, because of immobility, but if I wanted to go, they would take me to the dining

room.” Two residents had a gastric tube and could not answer. As stated in the autonomy domain, more than half of the interviewed residents did not like waiting for meals, saying, “They take me down 30 minutes before it is time to eat and the women at the table do not talk. I usually have to wait 30 minutes for food.” One woman mentioned that staff weighs them once a week to make sure that there is no weight loss, but she does not enjoy it too much.

Spiritual Well-Being Domain

The spiritual well-being scale asked the following questions: if (a) the residents participated in religious activities, (b) those activities are meaningful, (c) they feel that life as a whole has meaning, and (d) they feel at peace. The average score in the spiritual well-being domain was 11.98 (dichotomous) and 12.75 (Likert; score range was between 4 and 16; see Table 3.2). One hundred forty four of 231 residents reported their participation in religious services at NHs and 146 said that it is a meaningful activity. Two residents engaged in solitary prayer. However, the main problem was that it is only required for NHs to provide individualized religious services to the residents in the future. Usually, the NHs provided one church service and some residents went out for church because the NHs did not provide for their church denomination services. For example, the residents who are Methodist did not want to participate in Baptist services and others felt that the religious services sometimes are meaningless. In addition, two residents had just been admitted and did not know if there were church services, and three additional residents also did not know about the religious services. NH staff should make an effort to let them know about these services at admission so that residents can participate in religious services if they want. Those who had arthritis pain or other

mobility limitations (40 of 231) said they could not participate in religious activities and that they hoped a minister would come to their room. For example, one woman's church activities were limited by an oxygen concentrator and she could not participate in church services because it was so loud. One third of people complained about hearing problems and could not hear the church services. A few residents said that they enjoy hearing the church service if they opened their doors. One way to address staff shortage did not allow providing broadcasting religious services to each room. As many NHs have staff shortages, hearing services in residents' rooms would be appropriate if there is a shortage of help to assist the residents to get to religious services.

Security Domain

Residents were asked the following: (a) if their belongings are safe, (b) if their clothes get lost or damaged in the laundry, (c) if they feel convinced that they can get help when needed, (d) if they can get a nurse or doctor quickly, and (e) if they are afraid because of the way the NH staff treats the residents or how other residents are treated. The average score in the security domain was 15.89 (dichotomous) and 16.49 (Likert; score range was between 5 and 20; see Table 3.2). Most residents (205 of 231) felt their belongings were safe. It is questionable whether the question, "Do your clothes get lost or damaged in the laundry?", really asks about the security concerns of residents because the laundry of 10 residents (4.4 %) was taken care of by their family members. A few residents complained about the loss of clothing by saying "I lost 75% of my clothes" or "the color of my underwear changed to pink." Furthermore, one fourth of male residents said they did not care about clothes at all. When asked, "Do you feel confident that you can get help when you need it?", 22 of 231 residents complained that it depends on the

situation. It takes anywhere from 15 minutes to more than 1 hour to get help. They have to wait to be moved from the wheelchair to the recliner. More than 80% of residents said that they could get a nurse quickly but did not know how they could get a doctor quickly, because the doctor seldom visits the NHs while nurses are always in the NHs. When they are asked if they ever felt afraid because of the way they or some other resident was treated, 27 of 231 residents said they felt afraid when they first arrived at the NH and still feel afraid sometimes when they look at the way the residents with dementia or Alzheimer's are treated or when an Alzheimer's patient (a roommate) was in the wrong bed.

Individuality Domain

The individuality domain scale asked if (a) staff knows about their interests, (b) staff knows about their experiences, and what residents did in their pre-NH lives, (c) staff know the resident as a person (d) other residents know the resident as a person, (e) staff take the preferences of residents sincerely, and (f) the desires and interests of residents are respected at NHs. The average score in the individuality domain was quite high: 18.94 (dichotomous) and 19.68 (Likert; score range was between 6 and 24; see Table 3.2). About 73% of the sample answered that the NH staff knows about their interests and reported that the NH staff were interested in their experiences and what residents had done in their pre-NH lives. About 95% of residents replied that staff members knew them as a person and 82% replied that other residents knew them as a person. However, some residents (6 to 33 residents per question) said that they do not really want to get to know other residents. The reason is that they have to assume answers based on others' knowledge rather than basing the answers on their own experiences, like with the other

questions. These questions may be revised to ask specific situations of residents, “Do people know you are a (occupation)? Do people know you live in (location)? “Do other people here know you as a person?” and so on to remove the assumptions and base questions on the residents’ own feelings.

Also, the residents had a hard time answering the question asking if staff or other residents know and are interested in their experiences. When they were asked, “Taking all staff together, nurses, aides and others, does the staff know about your interests and what you like?”, some residents said, “ it really depends on who is working with you that day.” It seems that the attitude of staff depends on the specific staff members and the stability of these questions may be unreliable.

In conclusion, the QOL of the MDS 3.0 is the only available tool to evaluate the QOL of NH residents in particular and measures the multidimensional aspects of QOL successfully, which are represented in 11 domains. The previous short forms which were used before the development of this tool (QOL section in MDS 3.0) were not appropriate to measure the QOL of the elderly because of overgeneralizations (CMS, 2007). Furthermore, this tool meets the requirements of NH regulations including dignity, autonomy, and individuality (CMS, 2007). However, many important parts of residents’ real lives were not considered in the questionnaire and scores, and the qualitative component of this interview may be encouraged to be used in developing and updating QOL questionnaires for the NH residents.

Implications for Education

Nursing staff have different levels of interest for the health care of elders. Future long-term care settings are required more RNs. This study supported the concept that

RNs are important for functioning. Generally speaking, RNs practice independently in the role of nurses with more professional and advanced skills and knowledge of gerontology. Moreover, the emerging concept of evercare, using NPs in NHs, is recommended. GNPs play diverse and important roles in NHs, which may be summarized as collaborator, clinician, care manager, coordinator, coach/educator, counselor and communicator (Abdallah, 2005). GNPs in NHs were reported to have more advanced knowledge and skills than RNs, they can observe residents closely and regularly, and they can take action in the residents' physical or psychological situation in an appropriate time period. Because physicians seldom visit NHs, NH residents have not been treated quickly and meeting time with physicians was very limited (Abdallah, 2005). Nurses should be encouraged to develop their career, role, and activities with the educational opportunities offered to NPs. Furthermore, more research with respect to the effectiveness of GNPs in NHs is required.

More importantly, the basic philosophy of nursing (holistic care including dignity, autonomy, and individuality) should be emphasized for nursing students and nurses. Then, nurses should be encouraged to keep those concepts in mind in practice so that more residents in NHs in the future will enjoy their life in NHs with improved QOL. This will aid residents in receiving high professional nursing services with the protection of dignity, individuality, autonomy and respect.

Implications for Policy

The nurse minimum staffing standards are proposed to establish guard levels of QOC and QOL in NHs. However, alarming effects have emerged. The first one is that RN HPRD have decreased because of POS and legislated minimum staffing hours. The

second one is that required minimum staffing standards have had a dampening effect, happened in Florida. NHs in Florida decreased licensed nursing staffing hours to only those required to meet regulations. Thus, some strategies were discussed to increase nurse staffing, including increasing Medicaid reimbursement, the change from the PPS to Pay for Performance system, and differentiating cost centers by dividing direct care, indirect care, capital cost, and administrative cost centers.

If the mandatory use of NPs in NHs is enacted into law, the new policy will be a shortcut to improving QOC and QOL of residents in the future.

Nursing Home Staffing Levels

As stated in chapter 1, the issue of setting thresholds for desirable nurse staffing ratios was very complex. The requirements of the IOM, CMS, and experts differed and results suggested the need for more research (Masterson, 2004; see Table 1.4). The federal NH staffing standards/numbers were not established by law at the national level; therefore, only 11 of 51 states meet federal guidelines (Mueller et al., 2006). The remaining 40 states had their own staffing requirements, including minimum nursing care hours, and staff- to-resident ratio (Harrington, 2001a; Mueller et al., 2006). As a result, no federal laws require NHs to follow the recommended staffing levels and there is much variation between and within states (Harrington & O'Meara, 2006; Mueller et al., 2006).

The number of RNs, LPNs/LVNs, and CNAs who worked in NHs increased approximately 56%, 55%, and 20% respectively, from 1985 to 1995 (American Federation of State, County and Municipal Employees, 1998). The nursing staffing level increase came after the implementation of the Nursing Home Reform Act (NHRA), part of OBRA 1987 (Zhang & Grabowski, 2004). Harrington and colleagues (2000) reported

no improvement in nursing staffing from 1993 to 1999. During this time, an average NH resident received less than 1 hour of RN/LPN nursing care per shift. The Harrington study showed that residents did not get appropriate RN/LPN nursing care at all, considering that this 1 hour included all direct and indirect care, including administration and charting (Harrington, 2001a). Additionally, residents in more than half of the NHs in this study received less than 3.5 total hours of nursing care a day (Harrington, Carrillo et al., 2000).

There were few reports of actual staffing level changes as a result of mandatory staffing requirements. Harrington and O'Meara (2006) reported that the percent of NHs which met state nursing hour standards (3.2 HPRD) increased from 36% in 2000 to 73% in 2003. Out of 51 states, California was successful in increasing staffing levels (3.09 HPRD in 2000 to 3.37 in 2003) after the establishment of a law regarding mandatory staffing levels, but still did not satisfy the state minimum standards (3.2 HPRD) in 2005 (Harrington, 2007; Harrington & O'Meara, 2006).

Recent studies have given researchers and policymakers a cause for concern because the RN HPRD had decreased due to the implementation of PPS and legislative minimum staffing hours (Harrington, 2007; Konetzka et al., Norton, Sloane, Kilpatrick, & Stearns, 2006; Konetzka et al., 2004). PPS (started in 1998) reimburses based on the number of residents, a fixed amount based on the health status adjustments of residents, but the NHs do not have to supply the appropriate level of direct care for the residents to receive the funding (Evans, 2001; Harrington, 2007; Harrington, Carrillo, Helen, 2007; Konetzka et al., 2004). The Balanced Budget Act of 1997, which required a decrease in payment for residents who were covered by Medicare since 1965, initiated Medicare

PPS, which was not required to reveal specific staff levels (Harrington, 2005a). Thus, after Balanced Budget Act 1997 was set up, the RN level and overall nurse staffing hours per resident day decreased with worsening resident outcomes (Harrington, 2005a; Konetzka et al., 2004). RN HPRD hours have decreased approximately 25% across the U.S since 2000 because of the implementation of PPS (Harrington, Carrilo, & LaCava, 2006; Konetzka et al., 2004; Konetzka et al., 2006).

There is another concern that the minimum staffing ratio requirement has a dampening effect, which means that NHs do not have more staff than the minimum staffing standards and just meet the minimum requirements (Mueller et al., 2006). The purpose of setting a minimum staffing ratio is to guarantee basic care and should not be misunderstood as a maximum ratio (Evans, 2001; Mueller et al., 2006). The current nurse staffing ratios are inadequate to address the diverse needs of residents (Mueller et al., 2006; Nevada Nurses Association, 2000). Mueller and colleagues (2006) showed that NHs with lower than 2.5 HPRD minimum staffing requirements had lower staffing in practice than NHs with higher than 2.5 HPRD minimum staffing requirements among 50 states. In the case of Florida, licensed nurse staffing increased from 0.6 HPRD to 1.0 HPRD in 2002 by law, but the staffing level was already higher than 1.0 HPRD before the regulation was instituted (K. Hyer, personal communication, June, 3, 2007). Then, the average licensed HPRD was decreased despite meeting the requirements. Consequently, mandatory requirements did not work to increase staffing. The staffing requirements contributed to the increase in the CNAs but did not increase licensed nurse staffing because the requirements were already low in practice in Florida (K. Hyer, personal communication, June, 3, 2007). Moreover, the minimum staffing requirement may cause

limited admission rates, even though the growing aging population needs long-term care (Evans, 2001). Evans insisted that minimum nurse staffing ratios may cause decertified bed numbers so that facilities have higher occupancy rates.

More studies are necessary to guide states to determine appropriate nurse staffing requirements and to increase staffing ratios, which adjust the intensity of nursing care for residents based on the RUGS, which was reflected only in New Jersey's minimum staffing ratio (Harrington et al., 2000; Mueller et al., 2006). Moreover, future studies should include other important staffing aspects beyond minimum staffing ratios. These aspects include the effectiveness of education, use of GNPs, working environments, appropriate allocation of direct and indirect care and the quality of provided care by staff (Cohen & Spector, 1996; Evans, 2001; Gelman, 2001; Health Care Financing Administration, 2000b; R. L. Kane, 2004; Mueller et al., 2006). Evaluating these criteria is as important as focusing on staffing ratios, depending on the number of residents and care needs (Cohen & Spector, 1996; Evans, 2001; Gelman, 2001; Health Care Financing Administration, 2000b; R. L. Kane, 2004; Mueller et al., 2006).

In conclusion, minimum nursing staffing requirements have not been established nationally and more research is necessary to institute these requirements. Currently, there is a lot of concern that nurse staffing decreased after the implementation of PPS and caused a dampening effect on minimal staffing requirements. Thus, the following section discusses the strategies to increase nurse staffing.

Strategies for Increasing Nurse Staffing

Medicaid alone accounted for about 48% of the \$92 million total nursing facility expenses in 2000 and 51% of the total \$103 billion in NH expenditures in 2002 (Levit et

al., 2002; Levit, Smith, Cowan, Sensenig, Catlin, 2004). As a strategy to set higher staffing standards, an increasing Medicaid reimbursement rate was proposed (Harrington, Swan, & Carrillo, 2007). Although NHs heavily rely on Medicaid payments, Medicaid reimbursement rates are regarded as low, much lower than Medicare, and varying across states (CMS, 2001; Grabowski et al., 2004; Harrington, 2001a; Harrington et al., 2007; Wunderlich & Kohler, 2001). For instance, the average Medicaid reimbursement for NHs was \$ 115 per day while that of Medicare was \$ 269 per day in 2000 (CMS, 2003; GAO, 2000). A very recent study by Harrington and colleagues (2007) reported that NHs with higher Medicaid reimbursement had higher RN levels and total nursing hours (Harrington et al., 2007). Therefore, an increase in payment rates of Medicaid is necessary to recruit a highly trained workforce (CMS, 2001; Grabowski et al., 2004; Harrington, 2001a; Wunderlich & Kohler, 2001). To satisfy the threshold staffing levels recommended by CMS, the wages of RNs should increase by about 2.5% to 7 %, and that of CNAs should increase by 10% to 22% (Kovner & Harrington, 2002).

Another strategy suggested by Harrington and colleagues (2007) is to use pay-for-performance indicators, in which each health care act including nursing acts are reimbursed. This system may possibly be supplemented by decreasing costs other than staffing, like hospitalizations, to make up for the increase in nurse staffing costs (Harrington et al., 2007).

Harrington and colleagues (2007) also strongly recommended differentiating cost centers by dividing direct care, indirect care, capital costs, and administrative cost centers. For example, direct care services include nursing and therapy; indirect care services include dietary, laundry, and housekeeping; and capital costs include buildings

or land costs (Harrington et al., 2007). Then, they insist that funding from Medicare or Medicaid is required to establish the appropriate allocation of funding for direct care in advance and NHs should use the determined amount of funding only for direct care (Harrington et al., 2007). In other words, NHs should not allow the budget to be used for other needs. This strategy would increase direct care staffing like nurse staffing (Harrington et al., 2007). These researchers also have required NHs to report nursing hours on the Medicare cost reports and retrospective auditing to account for the appropriate use of funding, including penalties if NHs violate these instructions (Harrington et al., 2007).

Previous findings cannot be used for national policy because the studies did not address specific RN ratios. Furthermore, other research regarding nurse staffing contributes to the basis for case mix reimbursement systems in the future (Fries et al., 1989; Fries et al., 1994). Many studies were not large enough to draw inferences for national policy, which indicates that more research should be done (Kramer & Fish, 2001). To establish and improve the QOC in NHs by establishing legal minimum staffing ratios and minimum levels of total nursing care hours, it is important to explore and define RNs contribution to the QOC in NHs. RNs' unique contribution to resident outcomes versus alternative nursing staffing requires further research to see which staffing mix maximizes desirable outcomes for residents. Researchers, clinicians, and policymakers should do further research and develop the minimum staffing standards (at the state and federal levels) (Harrington, 2007; Mueller et al., 2006).

APPENDIX.

HIERARCHICAL LINEAR MODEL THAT WAS USED

25 nursing homes (Level 2)

231 residents within 25 nursing homes (Level 1)

Model 1

Level 1

$$QOL_{ij} = \mu_j + \beta_{1j}(RUGSCMI)_{ij} + \varepsilon_{ij}$$

→ 25 regressions

Level 2

$$\begin{aligned} \mu_j = & \beta_{00} + \beta_2(RNLPNratio)_j + \beta_3(RNLPNCNAratio)_j + \beta_4(RNTPPD)_j + \beta_5(RNPTPPD)_j \\ & + \beta_6(DONPPD)_j + \beta_7(LPNFTPPD)_j + \beta_8(LPNPTPPD)_j + \beta_9(CNAFTPPD)_j \\ & + \beta_{10}(CNAPTPPD)_j + \beta_{11}(TurnoverRNFT)_j + \beta_{12}(TurnoverRNPT)_j + \beta_{13}(TurnoverLPNFT)_j \\ & + \beta_{14}(TurnoverLPNPT)_j + \beta_{15}(TurnoverCNAFT)_j + \beta_{16}(TurnoverCNAPT)_j + u_{0j} \end{aligned}$$

$$\beta_{1j} = \beta_{11}$$

Combined model

$$\begin{aligned} QOL_{ij} = & \beta_{00} + \beta_{11}(RUGSCMI)_{ij} + \beta_2(RNLPNratio)_j + \beta_3(RNLPNCNAratio)_j + \beta_4(RNFTPPD)_j \\ & + \beta_5(RNPTPPD)_j + \beta_6(DONPPD)_j + \beta_7(LPNFTPPD)_j + \beta_8(LPNPTPPD)_j + \beta_9(CNAFTPPD)_j \\ & + \beta_{10}(CNAPTPPD)_j + \beta_{11}(TurnoverRNFT)_j + \beta_{12}(TurnoverRNPT)_j + \beta_{13}(TurnoverLPNFT)_j \\ & + \beta_{14}(TurnoverLPNPT)_j + \beta_{15}(TurnoverCNAFT)_j + \beta_{16}(TurnoverCNAPT)_j + u_{0j} + \varepsilon_{ij} \end{aligned}$$

→ Random effect: u_{0j}

Model 2

Level 1

$$QOL_{ij} = \mu_j + \beta_{1j}(RUGSCMI)_{ij} + \varepsilon_{ij}$$

→ 25 regressions

Level 2

$$\begin{aligned} \mu_j = & \mu_{00} + \beta_2(RNLPNratio)_j + \beta_3(RNLPNCNAratio)_j + \beta_4(RNTOTAL)_j + \beta_5(TOTALRNDON)_j \\ & + \beta_6(LPNTOTAL)_j + \beta_7(CNATOTAL)_j + \beta_8(TurnoverTotalRN)_j + \beta_9(TurnoverTotalLPN)_j \\ & + \beta_{10}(TurnoverTotalCNA)_j + u_{0j} \end{aligned}$$

$$\beta_{1j} = \beta_{11}$$

Combined model

$$\begin{aligned} QOL_{ij} = & \mu_{00} + \beta_{11}(RUGSCMI)_{ij} + \beta_2(RNLPNratio)_j + \beta_3(RNLPNCNAratio)_j + \beta_4(RNTOTAL)_j \\ & + \beta_5(TOTALRNDON)_j + \beta_6(LPNTOTAL)_j + \beta_7(CNATOTAL)_j + \beta_8(TurnoverTotalRN)_j \\ & + \beta_9(TurnoverTotalLPN)_j + \beta_{10}(TurnoverTotalCNA)_j + u_{0j} + \varepsilon_{ij} \end{aligned}$$

→ Random effect: u_{0j}

Note. RN = Registered Nurse.

LPN = Licensed Practical Nurse.

LVN = Licensed Vocational Nurse.

CNA = Certified Nursing Assistant.

FTE = Full-Time Equivalent.

PT = Part Time.

HPRD = Nursing Staff Hours Per Resident Day.

TO = Turnover.

TOTAL = Combination of FT and PT.

RNLPNratio = Ratio of RN and LPN.

RNLPNCNAratio = ratio of RN and LPN + CAN.

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