# Development and Testing of Quality Work Environments for Nursing

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Funded by The Ontario Ministry of Health and Long-Term Care

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## EXECUTIVE SUMMARY

The Quality Work Environments for Nursing (QWEN) Project was an intervention study designed to provide support and assistance to hospitals as they addressed work life issues for nurses. The QWEN project had two primary purposes. These were to: (1) assist nurse executives to develop interventions that enhance the quality of work life for nurses in a sample of hospitals in Ontario; and (2) to evaluate the impact of those interventions on patient, system quality, and nurse outcomes. The study was conducted in three phases extending over 28 months from July of 2001 to November of 2003. Eight acute care publicly funded hospitals participated in this project, representing teaching and community organizations located in different geographical regions of Ontario. Following consultation sessions with nurse executives and staff from the participating study sites, an intervention was developed to help staff nurses learn to design and evaluate small tests of change to improve the quality of their work environment with a particular focus on improving nurses' workload.

### Workload Intervention and the Nursing Work Environment

The intervention employed in this study had a positive impact on nurses' perceptions of their work and the work environment, but had little impact on any of the other nurse or patient outcomes. A number of individual nurse characteristics were found to impact on the study outcomes including gender, age, work status, education and experience. As well, a number of hospital or unit characteristics affected the outcomes including hospital type (i.e., teaching or community), unit type (i.e., medical or surgical), patient gender, number of Registered Nurse (RN) resignations, number of RN vacancies, care delivery model, and proportion of RNs.

### Teaching and Community Hospitals

This study highlights some important differences between teaching and community hospitals that were evidenced with both nurses and patients. Nurses in teaching hospitals reported higher perceptions of the quality of the work and work environment, levels of job satisfaction, perceptions of nursing unit leadership, perceptions of the quality of care and teamwork, role tension, and job stress. Patients in teaching hospitals reported higher judgments of hospital quality, perceptions of the health benefit of nursing care, and levels of independence in activities of daily living.

### Medical and Surgical Units

Distinctions between the work on medical and surgical units were evidenced by nurses and patients in this study. Nurses in medical units reported higher levels of job satisfaction, and perceptions of the quality of care and teamwork. Patients in medical units reported higher judgments of hospital quality, while patients on surgical units reported higher knowledge and ability to assume self-care and independence in activities of daily living.

### The Influence of Individual Nurse Characteristics

Individual nurse characteristics can affect nurse and patient outcomes. These individual nurse characteristics underscore the importance of considering variables such as nurses' work experience, education, work status, and age when examining the work environment and worklife issues for nurses. In this study, the experienced nurses demonstrate more positive perceptions of nursing unit leadership and patients rate them highest in terms of their abilities to promote patient self-care activities. This study also demonstrates that older nurses experience the most

job stress and concern with the quality of their work and work environment, although they continue to be supportive of the unit-based nursing leadership. A high level of stress was described by nurses with Baccalaureate degrees, yet they continued to support their unit nursing leader. In this study, casual nurses reported a high degree of job satisfaction, and they were judged by patients to be the most likely to assist them during the hospital stay.

### The Influence of Unit Characteristics

Unit characteristics can affect nurse and patient outcomes. One of the most consistent unit characteristics to have a negative affect on nurse outcomes was the nurse-patient ratio, with high nurse-patient ratios having a negative impact on nurses' perceptions of work and the work environment, nurses' perceptions of unit-based nursing leadership, and nurses' job stress.

### Nurse Staffing

A number of nurse staffing variables were explored in this study, yet only one was linked to patient outcome achievement. Specifically, a higher proportion of RNs was linked to patients achieving a higher level of independence related to activities of daily living.

### Conclusion

An intervention designed to improve worklife can have a positive impact – improving nurses' perceptions of their work and work environment. However, a number of unit and individual nurse factors are also important to consider. The majority of the findings in this study underscore the importance of understanding the factors in the environment in which nurses' work that can have an affect on the outcomes that nurses' experience, as well as outcomes for patients.

## KEY POINTS

### Workload Intervention and the Nursing Work Environment

The intervention had a positive impact on nurses' perceptions of their work and the work environment, but had little impact on any of the other nurse or patient outcomes.

### The Influence of Individual Nurse Characteristics

Individual nurse characteristics can affect nurse and patient outcomes (e.g., age, gender, work status, education and experience).

| Nurse Outcomes | Patient Outcomes |
|---|---|
| **Work Quality and Work Environment**<br>✔ higher ratings reported by male nurses<br>✔ lower ratings reported by older nurses | **Perceived Health Benefit of Nursing Care**<br>✔ higher ratings when unit has higher percentage of casual nurses |
| **Job Satisfaction**<br>✔ higher ratings reported by casual and part-time nurses | **Therapeutic Self-Care**<br>✔ higher ratings when cared for by more experienced nurses |
| **Nursing Leadership**<br>✔ higher ratings by older nurses<br>✔ higher ratings by nurses with higher education<br>✔ higher ratings by more experienced nurses | |
| **Quality of Care**<br>✔ higher ratings by more experienced nurses | |
| **Job Stress**<br>✔ higher ratings by nurses with higher education<br>✔ higher ratings by older nurses | |

### The Influence of Unit Characteristics

Unit characteristics can affect nurse and patient outcomes (e.g., nurse-patient ratios, RN vacancy rates, RN resignations, care delivery model).

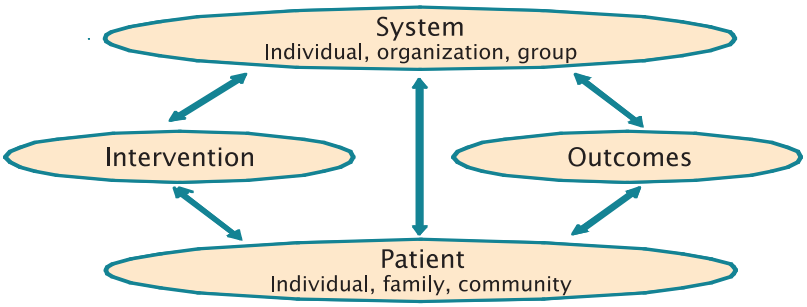
| Nurse Outcomes | Patient Outcomes |
|---|---|
| **Work Quality and Work Environment**<br>✔ lower perceptions when nurse-patient ratios increase | **Activities of Daily Living**<br>✔ higher levels of independence reported for female patients<br>✔ higher levels of independence when proportion of RNs increases |
| **Job Satisfaction**<br>✔ higher ratings reported when RN vacancies increase | |
| **Nursing Leadership**<br>✔ lower ratings when nurse-patient ratios increase | |
| **Role Tension**<br>✔ lower ratings reported when RN resignations increase | |
| **Quality of Care**<br>✔ higher ratings when team nursing utilized | |
| **Job Stress**<br>✔ higher ratings when nurse-patient ratios increase | |

## TABLE OF CONTENTS

## LIST OF TABLES



## LIST OF FIGURES




# 1

# Chapter One: Overview

**Introduction**

**Background**

**Purpose**

**Objectives**

**Conceptual Framework**

## INTRODUCTION

Changes to health care in Ontario over the latter part of the 1990s have resulted in a number of new challenges for hospital nurse executives and health care leaders. In response to fiscal constraints and funding reductions, Ontario health care settings have restructured and downsized in an effort to reduce costs and improve the efficiency of services provided. Change has occurred at all levels within the organization, as settings reconfigured their services and structures, redesigned patient care systems and processes, and introduced new staff mixes and models for providing patient care. These changes, coupled with an impending nursing shortage, prompted concern in the nursing community regarding the quality of the work life environment for nurses.

## BACKGROUND

The College of Nurses of Ontario Quality Assurance Program (2000) defines a quality practice setting as one in which client needs are met within the quality framework mandated by the organization and where nurses are supported by strong organizational attributes to meet standards of practice. A study of the work life concerns of Ontario nurses conducted in 1995 identified quality of work life settings as those that place an emphasis on workplace safety, personal satisfaction and support, teamwork, a reasonable workload, and adequate physical surroundings (Villeneuve et al., 1995). The Advisory Committee on Health Human Resources (2000) suggested that the quality of work life for nurses is determined by a number of interrelated issues including "appropriate workload, professional leadership and clinical support, adequate continuing education, career mobility and career ladders, flexible scheduling and deployment, professional respect, protection against injuries and diseases related to the workplace, and good wages" (p. 10).

The report of the Nursing Task Force (1999) in Ontario also identified the importance of a quality practice work environment suggesting that "continuity and quality of care is highly dependent on the retention of experienced and knowledgeable nurses and requires not only a sufficient number of permanent positions for registered nurses and registered practical nurses (RPNs) but also a working environment that offers flexibility and professional satisfaction" (p. 5). The Task Force recommended "that employers of nurses mount pilot projects to test alternative models of nursing care (e.g., flexible hours, environments that enable nurses to develop clinical skills, etc.) and that these models be evaluated to assess the impact on client outcomes and the working environment for nurses" (p. 5).

Governmental support federally for interventions directed towards improving the quality of work life for nurses is also evident. In the September 11, 2000 Communiqué on Health, First Ministers identified strategies to improve the quality of nursing work life to be a priority for the health system, suggesting their governments would work together to identify approaches to improve the education, training, recruitment, and retention of the future health care workforce. The First Ministers also directed their Ministers of Health to collaborate on identifying approaches that can improve work life conditions such as flexible working arrangements and continuing education (Communiqué on Health, 2000).

## PURPOSE

The Quality Work Environments for Nursing (QWEN) Project was an intervention study designed to provide support and assistance to hospitals as they addressed work life issues for nurses. The QWEN project had two primary purposes. These were to: (1) assist nurse executives to develop interventions that enhance the quality of work life for nurses in a sample of hospitals in Ontario; and (2) to evaluate the impact of those interventions on patient, system quality, and nurse outcomes.

## OBJECTIVES

The specific objectives explored were to:

1) identify strategies for enhancing the quality of work life for nurses in health care organizations in Ontario;

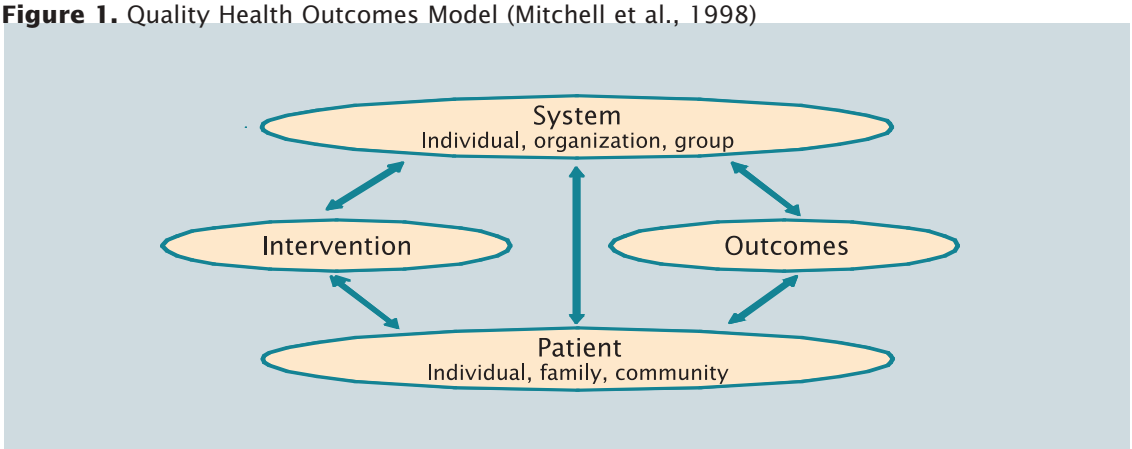
2) design interventions for select strategies for enhancing nursing work life; and

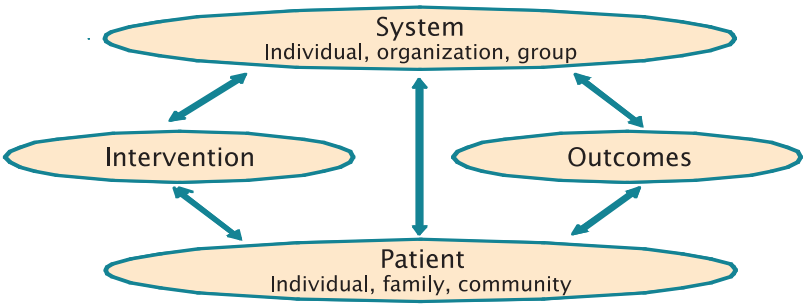
3) evaluate the impact of these interventions on patient, system quality, and nurse outcomes.

## CONCEPTUAL FRAMEWORK

The quality health outcomes model was used to guide this research (Mitchell, Ferketich, Jennings, & American Academy of Nursing Expert Panel on Quality Health Care, 1998). The model expands on Donabedian's (1966) structure, process, and outcomes framework by proposing two-directional relationships among the components, with interventions always acting through the characteristics of the system and of the patient (Mitchell et al.). This model includes four components: (1) system – structural elements within the organized setting or system that interact with the intervention processes to affect outcomes; (2) interventions – the direct or indirect interventions and activities or clinical processes employed; (3) patient characteristics – the characteristics of the patients to whom the interventions are directed including health states, demographics, and disease risk factors; and (4) outcomes – outcome measures that result from care structures and processes that integrate functional, social, psychological, physical, and physiologic aspects of the patient experience in health and illness to capture the contribution of nursing interventions and care delivery systems (see Figure 1). In this study the structural system variables included nurse staffing and nursing care delivery assessments (e.g., nursing staff mix model, staff-to-patient ratio, and nursing care delivery model), as well as demographic characteristics of the nurses (e.g., educational preparation and experience level). The intervention in this study was a workload intervention process employed on each of the study units. Patient characteristics included age and gender demographics. Finally, outcomes are explored for patients, system quality, and nurses. The specific patient outcomes examined include activities of daily living, self-care ability, and patients' perceptions of the health benefit of nursing care, while the system quality outcomes include patient judgments of hospital quality and nurses' perceptions of the effectiveness of care. As well, nurse outcomes include nurses' job satisfaction, job stress, role tension, relationships with nursing unit leadership, and perceived quality of nursing work and the work environment.

**Figure 1.** Quality Health Outcomes Model (Mitchell et al., 1998)






# 2

# Chapter Two: Methods

**Design**

**Data Collection**

**Procedure for Data Collection**

**Data Analysis**

## DESIGN

The study was conducted in three phases extending over 28 months from July of 2001 to November of 2003.

### Phase 1

An exploratory research design was used to address the objectives of the first study phase in which nurse executives in Ontario hospitals were surveyed to determine their interest in participating in the study. A letter of explanation was provided to explain the study. Selection criteria were used to determine which of the interested sites were eligible for inclusion in the study. Following this, consultations with the nurse leaders from the selected sites were held to identify the key nursing work life issues that would form the intervention in the study.

### Phase 2

Phase two of the study involved the development of specific interventions or small workplace changes within the participating hospitals for addressing the workplace issues identified in Phase 1. To do so, an adaptation of a framework for quality improvement proposed by Nelson, Mohr, Batalden, and Plume (1996); Batalden, Nelson, and Roberts (1994); and Batalden and Stoltz (1993) was used. Hospitals used the methods identified in the Clinical Value Compass Worksheet (Batalden et al., 1994; Nelson et al.) to study their local work environments, identify issues within their environments that were interfering with the achievement of the quality work interventions identified in Phase 1, and design changes in the work environment. Each hospital employed a uniform set of nurse, patient, and system quality outcomes which were the foci of change and the basis for evaluation of the changes. These outcomes were assessed by reliable and valid methods which are described under Phase 3 below.

A nurse facilitator in each selected hospital was trained in the use of the Clinical Value Compass Framework and its specific adaptation for this project. These facilitators were assisted by a project coordinator who conducted site visits to provide ongoing communication and problem solving support to them. The nurse facilitators worked intensively with the nursing staff and unit managers on medical and surgical units within the organization for a 6 month period to design and implement the changes in practice. The nurse facilitators also met with the full research team every 2 months to share their progress, obtain feedback, and problem-solve with the other facilitators.

### Phase 3

Phase three of the study involved a single group experimental design, with repeated measures, which was used to evaluate the effects of the intervention on patient, nurse, and system quality outcomes. The design involved (1) obtaining baseline data on all units participating in the intervention; (2) giving the intervention (i.e., training the nurse facilitators) to the nurse facilitators assigned to all units and supporting them in their efforts to implement the innovative strategies on their respective units for a 6 month period. This period provided the facilitators with enough time to work with the staff on the units to initiate, deliver, and maintain the strategies; and (3) collecting post-test data on the selected outcomes from all participating units at post-test, and at 3- and 6-month follow-up. The two follow-ups were necessary to investigate the short- and long-term effects of the intervention. It was anticipated that the effects of the intervention on patient outcomes would take some time to occur (e.g., Time 4 – about 6 months post-test).

In addition, the design incorporated a qualitative component aimed at examining the processes underlying the effects of this intervention (Sidani & Braden, 1998). In particular, the qualitative component explored the specific innovative strategies used by the nurse facilitators on their respective units, while investigating the nurse facilitators' and the staff nurses' perception of which strategies were useful and how they affected the outcomes. This qualitative component was important for gaining a better understanding of how the intervention and the innovative strategies work, which is critical for their future applications.

### Setting and Sample

Eight acute care, publicly funded hospitals participated in this project. The eight hospitals represent teaching, community, and small rural organizations located in different geographical regions of Ontario to enhance the representativeness of hospitals across the province. These eight hospitals were randomly selected from hospitals who had met the study selection criteria that included: (1) providing a commitment to participate in the research for the duration of the study; (2) committing to the provision of one on-site facilitator for a period of one year as outlined in the proposal; (3) committing to the secondment of one on-site data collector for the periods adding up to 5 months required for data collection; (4) that the facility had one adult, general medical and one adult surgical patient care unit available for the duration of the study; and (5) that the facility had the ability to provide the required study data to the research team.

There were 28 hospitals who met the criteria for the study. These hospitals were grouped into the seven regions identified by the Ontario Ministry of Health and Long-Term Care at that time: Region 1 – north; Region 2 – north central; Region 3 – north east; Region 4 – east; Region 5 – central east and Toronto; Region 6 – central south and west, and Region 7 – south west. From each of these seven regions, one hospital was randomly selected as the participating site. As well, a backup site for each region was also randomly drawn from each group. For the Toronto region, where there is a larger number of hospitals, two sites were randomly selected. In one of the regions, a site withdrew from the study late in the process. The backup site in that region was no longer able to commit to the project resulting in an alternate site being selected from one of the other regions.

Of the 131 sites invited to participate in this study, 21 sites identified an interest in participating but were unable to meet the study requirements, while nine other sites indicated that they were not interested in participating. A number of reasons were provided for non-participation including: (1) having combined medical/surgical units; (2) not having nurses with graduate educational preparation to serve as intervention facilitator; (3) unable to remove any nurses from their positions as replacing them is very difficult/do not have sufficient staff; (4) currently involved in other work activities that address quality of work life/recruitment/retention issues; (5) becoming a long-term care centre; and (6) small rural hospital with no surgeries performed so unable to provide a surgical and medical unit for the study.

The process of determining which study units met the eligibility criteria was based on responses to a survey of nurse executives conducted as the first phase of this study. The selection of medical and surgical units for this project was based on recent reports that nurses working on general medical and surgical units have lower job satisfaction and a lower level of reported health states (i.e., increased sick leaves, lower autonomy, less control over their practice, and poorer relationships with physicians) than nurses working in specialty areas (Healthy Nurses, Healthy Workplaces, 2001).

### Sample Size

#### Nurses

It was expected that the number of available nurses across the eight participating sites would be limited by each unit's staffing pattern. The number of nursing staff on any unit could vary from as low as 15 to as high as 35. The total number available ranged from 240 to 560. Assuming a 70% participation rate for this subgroup, the sample of nurses across the eight sites, was estimated to range from 168 to 392 participants. This range of sample size is adequate to detect a moderate-to-large effect of the strategies implemented to improve the nurses' work environment, from pre-test to 6-month follow-up (Cohen, 1992).

#### Patients

Four independent samples of patients were included in the study. The first sample participated at pre-test, that is, before the nurses' training and the implementation of the selected intervention; the second, third, and fourth were included at post-test, 3- and 6-month follow-up respectively. Comparison among the subgroups of patients was made to determine the effects of the implemented strategies on patient outcomes, after controlling for patient characteristics that are known to affect the outcomes, such as age and medical diagnosis. A small-to-moderate effect was anticipated. Setting the alpha at .05 and the beta at .80, 200 patients in each subgroup (i.e., at occasion of measurement) were needed and obtained to detect a small-to-moderate effect (Cohen, 1992). An equal number of patients were recruited from the eight participating sites at each occasion of measurement.

## DATA COLLECTION

The evaluation of this intervention was based on quantitative and qualitative data collected from patients and nurses on the participating units and from data collected at the unit-level from unit managers.

### Quantitative Data Collection Instruments

The following quantitative data were obtained at each point of data collection:

#### 1. Unit-Level Data

System outcomes data describing the structural variables for the organization and support of nursing work, the demographic characteristics of nurses providing care to patients on the study units, and selected patient complication rates were acquired through a survey of unit managers. These data were essential for describing the units which participated in the study and for examining factors that could influence the implementation of the intervention and the strategies as well as outcomes. Unit managers were provided with a letter explaining the study. Data for this survey were collected at four points in time including: baseline (Time 1); post-test following the intervention/training (Time 2); 3-month follow-up (Time 3); and 6-month follow-up (Time 4). Data pertinent to the following variables were obtained from the unit manager.

**Unit Manager Survey:** A measure of the structural characteristics of the patient care unit including a description of nurse *staffing and nursing care delivery*: nursing staff mix model, staff-to-patient ratio, nursing care delivery model, nursing staff turnover rates, nursing

absenteeism hours, nursing orientation hours, nursing continuing education hours; as well as *demographic characteristics* of the nurses: educational preparation, experience level; and *unit-level patient characteristics and complications*: daily patient census, patient length of stay data, rates of patient falls, nosocomial infections, and patient complaints. This survey is an adaptation of one used in previous research (McGillis Hall, 1999; McGillis Hall et al., 2001).

### 2. Nurse Outcomes

Information such as demographics and nurse outcome data were acquired through a survey of registered nursing staff on units involved in the study. These data included: individual demographic and professional characteristics, perceptions of job satisfaction, job stress, role tension, nursing unit leadership, effectiveness of care provided on the unit, and quality of nursing work and the work environment. Nurse outcome data were comprised of subjective measures that have well established reliability and validity:

**I. Job Satisfaction:** A measure of registered nurse satisfaction with specific facets of their work: satisfaction with extrinsic rewards, scheduling, family/work balance, co-workers, interaction, professional opportunities, praise/recognition, and control/responsibility was obtained using the McCloskey-Mueller Satisfaction Scale (MMSS; Mueller & McCloskey, 1990). This scale contains 31 Likert-like items with five response categories including "very dissatisfied", "moderately dissatisfied", "neither satisfied nor dissatisfied", "moderately satisfied" and "very satisfied". The scale items are coded such that a 1 was equal to "very dissatisfied" and a 5 is equal to a "very satisfied". Cronbach's alpha was reported as .89 by the instrument developers and both construct and criterion-related validity were also demonstrated (Mueller & McCloskey).

**II. Work Quality Index:** A measure of nurses' satisfaction with the quality of their work and their work environment using six subscales for job properties: work environment, autonomy, work worth, professional relationships, role enactment, and benefits (Whitley & Putzier, 1994) was obtained using the Work Quality Index (WQI; Whitley & Putzier). This scale contains 38 Likert-like items with seven response categories ranging from "not satisfied" to "satisfied". The scale items are coded such that a 1 was equal to "not satisfied" and a 7 is equal to "satisfied". A high score on this scale indicates a higher degree of job satisfaction. Cronbach's alpha was reported as .94 for the overall scale, .87 for the work environment scale, .84 for the autonomy scale, .79 for the work worth scale, .80 for the relationships scale, .72 for the role enactment scale, and .79 for the benefits scale by the instrument developers and construct validity was also demonstrated (Whitley & Putzier).

**III. Perceived Effectiveness of Care:** The nurses' perceptions of the effectiveness of the care provided on the unit and the capability of the unit to meet the needs of the patients and family members was measured with the Perceived Effectiveness of Care Questionnaire (PECQ), a scale developed by Shortell, Rousseau, Gillies, Devers, and Simons (1991). Cronbach's alpha reliability estimates for this scale among a sample of nurses was .85 (Irvine, Sidani, Keatings, & Doidge, 2004). Construct validity for the scale was supported through factor analysis (Shortell et al.).

**IV. Nursing Leadership on the Unit:** The degree to which nursing leadership sets and communicates clear goals and expectations and is responsive to changing needs and situations was measured with an instrument developed by Shortell et al. (1991). Shortell et al. reported reliability based on Cronbach's alpha ranging from .64 to .88.

**V. Role Tension:** The strain or tension experienced by nursing staff in response to their work was measured by the 9-item Tension Index developed by Lyons (1971). This instrument had demonstrated internal consistency (split-half correlation coefficient = .70) and construct validity as evidenced by negative correlations between role strain and job turnover, propensity to leave, and perceived role clarity (Lyons).

**VI. Job Stress:** A measure of nurses' job stress was obtained using the Stress in General Scale (SIG; Smith et al., 1992). This instrument is comprised of 18 items that measure global judgments of job stress. Cronbach's alpha over four study samples was reported as ranging from .91 to .92. Convergent and discriminant validity have also been reported.

### 3. Patient Outcomes

**I. Patient data:** Patient data included age, gender, education, primary diagnosis, secondary diagnoses acquired through abstraction of the patient record, and demographics. *Patient outcome* data included several subjective outcomes with previously established sensitivity to illness and patient care: index of Activities of Daily Living (ADL; Katz, 1976), therapeutic self-care, (Sidani & Irvine, 1999), patient satisfaction (Perceived Health Benefit from Nursing Care by Irvine & Petryshen, 2001); and Patient Judgment of Hospital Quality Questionnaire by Rubin, Ware, and Hayes (1990). Patient outcome data were obtained within 24-48 hours prior to discharge.

**II. Index of ADL:** This widely used instrument assesses independence in six activities: bathing, dressing, toileting, transferring from bed to chair, continence, and feeding (Katz et al., 1963, Katz, Downs, Cash, & Grotz, 1970). The registered nurse assigned to the patient completed the instrument. The Index of ADL predicted long-term outcomes as well as or better than selected measures of physical and mental function (McDowell & Newell, 1996).

**III. Therapeutic Self-Care:** The Therapeutic Self-Care Scale (TSC; Sidani & Irvine, 1999) is a 13-item instrument that assesses the patient's knowledge of their prescribed medication and treatment, their ability to recognize signs and symptoms, their ability to carry out treatments as prescribed, and knowledge of what to do in case of an emergency. Patient's ability to assume therapeutic self-care is assessed using a 6-point numeric rating scale. High scores reflect high levels of self-care. The items comprising the total scale and its subscales demonstrated acceptable internal consistency reliability (Cronbach's alpha coefficients >.70) in a sample of 539 patients admitted to medical and surgical in-patient units. The construct validity of the scale was supported by significant correlation coefficients with theoretically related concepts, including functional status ($r$=.36) and perceived health ($r$=.30; Sidani & Irvine). Cronbach's alpha has been reported as .88 (Doran, Sidani, Keatings, & Doidge, 2002). The TSC instrument was completed within 24 hours of hospital discharge.

**IV. Patient Satisfaction:** Patient satisfaction was measured using two instruments: the Nursing subscale of the Patient Judgment of Hospital Quality (PJHQ) Questionnaire (Meterko, Nelson, & Rubin, 1990) and the Perceived Health Benefit from Nursing Care (PHBNC) Questionnaire. The Nursing subscale of the PJHQ Questionnaire consists of 5 items, in which patients are asked to rate on a 5-point scale the quality of care received from nurses during the hospital stay. The subscale was found to be highly reliable (alpha= .94) in a study of in-patients from a large tertiary care hospital in southern Ontario (Doran et al., 2003). Support for construct validity was demonstrated by significant correlations between the patient's satisfaction with nursing care and nurse-patient ratio, RN staffing, and the quality of unit communication and coordination (Doran et al.).

**V. Patient's Perception of the Health Benefit Derived from Nursing Care** was assessed by a new questionnaire developed by Irvine & Petryshen in 1997. The PHBNC is an 8-item instrument measuring patients' judgment of the degree to which nurses were able to assist them achieve symptom relief and functional recovery during their hospital stay. The PHBNC was found to have good test-retest reliability ($r$=.55) in a sample of patients from acute care hospitals in southern Ontario (Irvine Doran et al., 2001). Support for construct validity was demonstrated by significant correlations between the PHBNC and nursing interventions and nursing staff mix (Irvine Doran et al.).

### Description of Qualitative Data Collection

The qualitative component of this study was performed following the delivery of the intervention and included:

I. Semi-structured interviews with the nurse facilitators, to explore the innovative strategies they implemented on their units, barriers and facilitators to the implementation of strategies, and the usefulness of the strategies used. Nurse facilitators were also asked to maintain field notes describing their experiences and their reflections on the study process.

II. Semi-structured interviews with a subgroup of staff nurses employed on the participating units and inquiring about their perception of the intervention strategies used were also conducted.

## PROCEDURE FOR DATA COLLECTION

### Research Ethics Approval Process

The study received ethics approval from the Human Subjects Committee of the Office of Research Services, University of Toronto. Once this approval was obtained and the participating site selection was finalized, individual hospital ethics review boards were approached. Ethics approval was obtained from each of the eight participating study sites. The complexity of the process varied greatly between sites. In the majority of hospitals, the research team was required to submit the study protocol and application to the hospital's research ethics board for a full ethics review process. One site was able to offer an expedited review process. A number of delays occurred as a result of the ethics review process. Generally, the sites required a number of minor questions to be answered, and often requested that letters of information and consent forms

be placed on their own letterhead. Each new change made and response given entailed waiting for the reply from the ethics board and final ethics approval. Because the review boards met only once each month, there were prolonged waiting periods that led to substantial delays in the anticipated timeline of the study. This process took five months to complete, from October of 2001 to February of 2002. Following that, Time 1 baseline data collection began in February of 2002; Time 2 post-test data collection took place throughout September and October of 2002; Time 3 occurred 3-months following the intervention, in February of 2003; and Time 4, took place 6-months following the intervention in September of 2003.

### Establishing On-Site Data Collectors

As part of the agreement with each of the individual hospitals, an on-site data collector was provided from each hospital to collect the patient and nurse survey data. The time commitment for the data collectors was a total of 5 months at four different points of data collection. The nurse executives were provided with guidelines related to the necessary skill set of the individual to be chosen, and each site was reimbursed for the time the data collectors spent working on the study.

### Orientation of Data Collectors

Prior to the beginning of data collection at each site, the on-site data collectors were invited to the University of Toronto for a data collector training seminar. The session was 8 hours long and held in January of 2002. It involved working from data collector manuals designed by the principal investigator that were provided to each data collector as a reference, and hands-on practice with samples of the study materials that would be administered by the data collectors. This meeting also provided an open forum for questions and answers, and the opportunity for data collectors to collaborate with one another.

### Nurse Recruitment

For each participating unit, the on-site data collector generated a list of all eligible nursing staff (registered nurses and registered practical nurses) with the assistance of the unit manager or designate. The on-site data collector then met with the nursing staff during a regular staff meeting to explain the study and the sampling procedure. The data collector then contacted each staff member individually to ascertain their interest in participation. A questionnaire package was given to all nurses who consented to participate, along with a letter of explanation and stamped return envelope. As part of the returned questionnaire package, nursing staff were asked to indicate their interest in participating in a semi-structured follow-up meeting to be held at a later point in the study designed to discuss their experiences with the intervention. All data collection forms completed by each nursing staff member and patient were coded and kept in a locked file cabinet until they were forwarded to the university for data entry.

### Patient Recruitment

The on-site data collector made a daily round on the participating hospital's units to recruit patients for the study. Patients who met the study eligibility criteria were enrolled within 24 to 72 hours of their admission to the hospital unit. Eligibility criteria included the following: (1) admitted for an acute medical illness or for a surgical procedure; (2) English speaking;

(3) consent to participate in the study; (4) over 21 years of age; and (5) oriented to time, place, and person. The on-site data collector requested the assistance of the nursing staff assigned to each unit in identifying eligible patients and in introducing the project to patients. The data collector provided the unit staff with a written list of the inclusion and exclusion criteria to facilitate the staff's ability to identify eligible patients. Once eligible patients were identified, the nursing staff introduced the study to them using a standardized script to inquire about their interest in learning more about the study and to obtain verbal permission to release their names to the on-site data collector. The data collector then approached patients indicating willingness to learn more about the study, explained the study to them, invited their participation, and obtained their written consent prior to collecting the data. All data collection forms relating to the patients were coded and kept in a locked file cabinet, then forwarded to the university for data entry.

### Establishing On-Site Intervention Facilitators

An on-site intervention facilitator was seconded in each hospital to work with the nurses on each unit as they developed the workload intervention, as part of the agreement with each of the individual hospitals. The time commitment for the intervention facilitator was a total of 6 months per unit, at one point in time during the study. The nurse executives were provided with guidelines related to the skill set required of the individual to be chosen as a facilitator, and each site was reimbursed for the time the facilitators spent working on the study.

### Orientation of Intervention Facilitators

Prior to beginning the process of developing the intervention at each site, the on-site intervention facilitators were invited to the University of Toronto for a training seminar. The session was 8 hours long and was held in January, 2002. It involved working from a training manual designed by one of the study co-investigators and provided to each facilitator as a reference. The session involved hands-on practice with scenarios.

### Ongoing Study Communication

Several methods of communication were established and employed to ensure effective interaction between sites, and to disseminate information to stakeholders, data collectors, and facilitators. On-site data collectors and facilitators each had telephone and email access and were encouraged to make use of both methods of communication to contact the study team as well as one another. Email was very useful during data collection, enabling the research coordinator to receive weekly data collection reports and to circulate "Frequently Asked Questions" (FAQs) to data collectors as needed. As well, a listserv was created for the data collector group and for the facilitator group so that ongoing group interaction could take place. The facilitators used this means of correspondence regularly to encourage and support one another in their efforts as well as to share ideas and suggestions. They were also able to keep one another and the study team updated on their progress throughout the intervention. Finally, a newsletter was created and distributed to the study hospital sites, the study team, and the stakeholders. The newsletter provided a study progress update, an overview of the study timeline, and a preview of the upcoming study plans.

## DATA ANALYSIS

Descriptive statistics were used to characterize the samples of patients, nurses, and units on background information, and to investigate the pattern of change in the unit-level outcomes. Orthogonal polynomials repeated measures multivariate analysis of variance was performed to examine change in the nurse outcomes over time. Analysis of covariance in a hierarchical nested random effects mixed model was used to examine the effects of the intervention on patient outcomes, with patients' medical diagnosis and age used as the covariates in this analysis.

Several preliminary steps were taken prior to conducting the statistical analyses on this data set obtained from different sites (i.e., 16 units located in 8 hospitals across the province) and from different sources (i.e., patients, nurses, and unit managers) on multiple variables of interest. The purpose of these preliminary steps was to ensure accuracy and to address issues of missing data and measurement error. The preliminary steps are presented in sequential order.

### Data Entry Error

Data entry error could occur for several reasons, such as an unclear response (e.g., circling two response options for the same item) and simple human error in transcribing coded data from the questionnaires. Since such errors can adversely effect the accuracy of the data set and potentially, the validity of the study conclusions, each survey was inspected to ensure accuracy. The potential for data entry error was minimized by: (1) developing decision rules with the principal investigator, research coordinator, and research assistant for addressing unclear responses to ensure validity; (2) following the coding scheme to maintain consistency of the data upon entry; and (3) reviewing the raw data (i.e., forms completed by respondents) when inconsistency was suspected and correcting the questionable value accordingly.

### Data Coding

Data coding was formulated based on the responses that participants gave for each item. Codes were assigned to responses to open-ended questions. Items which could be grouped together were coded accordingly. To ensure validity, the coding scheme was developed by the principal investigator, research coordinator, and research assistant. Coding was consistently carried out by these three study team members to minimize discrepancies.

### Assessing the Reliability of Measures

Measurement error or the unreliability of measures can present a major threat to statistical conclusion validity. Measurement error can increase random or error variance, which decreases the statistical power for detecting significant effects or correlation, potentially leading to type II error (Cook & Campbell, 1979). The reliability of measures used in this study was enhanced in two ways. First, the instruments selected to measure the variables of interest were well-established; they have demonstrated reliability and validity in previous studies involving various nurse and patient populations that are similar to those sampled in this study. Second, the internal consistency reliability of multi-item measures was assessed. The mean inter-item correlation, the item-to-total correlation coefficients, and the Cronbach's alpha coefficient were examined and compared to the criterion/standard values. All multi-item measures employed in this study demonstrated acceptable internal consistency reliability (see Tables 1 and 2). Thus, the extent of measurement error was considered minimal and the validity of the statistical conclusions was enhanced.

## Reliability of the Nurse Outcome Measures

**Table 1: Means, Standard Deviations, and Cronbach Alphas for Multi-Item Nurse Outcome Measures**

| Scale/Subscale | Pre-Test [1] Mean, Standard Deviation, Cronbach's alpha α | Post-Test [2] Mean, Standard Deviation, Cronbach's alpha α | Post-Test [3] Mean, Standard Deviation, Cronbach's alpha α | Post-Test [4] Mean, Standard Deviation, Cronbach's alpha α | α scale developers |
|---|---|---|---|---|---|
| **Work Quality Index** | | | | | |
| Professional work environment | 3.4 (1.2) .87 | 3.4 (1.2) .89 | 3.4 (1.2) .91 | 3.6 (1.1) .88 | .87 |
| Autonomy of practice | 4.7 (1.2) .86 | 4.6 (1.2) .86 | 4.5 (1.3) .87 | 5.0 (1.0) .87 | .84 |
| Work worth to self and others | 4.8 (1.2) .83 | 4.7 (1.3) .86 | 4.6 (1.3) .87 | 5.0 (1.1) .85 | .79 |
| Professional relationships | 4.3 (1.0) .83 | 4.2 (1.1) .87 | 4.3 (1.1) .87 | 4.5 (1.0) .83 | .80 |
| Professional role enactment | 3.8 (1.0) .76 | 3.9 (1.0) .74 | 4.0 (1.1) .81 | 4.2 (0.9) .74 | .72 |
| Benefits | 3.8 (1.2) .85 | 3.8 (1.2) .87 | 3.8 (1.2) .87 | 4.0 (1.1) .85 | .79 |
| Overall scale | 4.0 (0.9) .95 | 4.0 (0.9) .96 | 4.0 (1.0) .97 | 4.3 (0.9) .95 | .94 |
| **Job Satisfaction** | | | | | |
| Extrinsic rewards | 3.0 (0.88) .74 | 3.1 (0.84) .76 | 3.0 (0.87) .71 | 3.1 (0.88) .74 | .52 |
| Scheduling | 2.8 (0.83) .78 | 2.9 (0.85) .80 | 2.9 (0.87) .80 | 2.9 (0.85) .79 | .84 |
| Family/work balance | 3.0 (0.82) .34 | 3.0 (0.82) .41 | 2.6 (0.84) .51 | 3.1 (0.78) .51 | .57 |
| Co-workers | 3.5 (0.72) .38 | 3.5 (0.72) .55 | 3.5 (0.70) .52 | 3.6 (0.67) .39 | .54 |
| Interaction opportunities | 3.2 (0.78) .75 | 3.2 (0.74) .75 | 3.0 (0.79) .77 | 3.2 (0.77) .76 | .72 |
| Professional opportunities | 2.5 (0.84) .80 | 2.4 (0.80) .80 | 2.5 (0.80) .79 | 2.6 (0.76) .79 | .64 |
| Praise/recognition | 3.0 (0.80) .72 | 3.0 (0.85) .77 | 2.9 (0.84) .75 | 3.1 (0.78) .74 | .80 |
| Control and responsibility | 2.5 (0.73) .78 | 2.6 (0.76) .81 | 2.5 (0.86) .88 | 2.6 (0.77) .83 | .80 |
| Overall scale | 2.8 (0.58) .92 | 2.9 (0.59) .93 | 2.9 (0.64) .93 | 3.0 (0.59) .91 | .89 |
| **Nursing Leadership** | 3.2 (0.71) .83 | 3.1 (0.75) .84 | 3.1 (0.80) .84 | 3.1 (0.74) .85 | .87 |
| **Role Tension** | 3.0 (0.65) .82 | 3.0 (0.65) .83 | 3.0 (0.67) .83 | 2.9 (0.65) .83 | .70+ |
| **Quality of Care/ Teamwork** | 3.6 (0.71) .85 | 3.6 (0.65) .84 | 3.6 (0.74) .86 | 3.7 (0.66) .85 | .75 |
| **Job Stress** | 11.9 (10.24) .85 | 12.5 (10.9) .86 | 12.9 (12.0) .89 | 13.4 (12.0) .89 | .88 |

+ Split-half reliability

## Reliability of the Patient Outcome Measures

**Table 2: Means, Standard Deviations, and Cronbach Alphas for Multi-Item Patient Outcome Measures**

| Instrument | Pre-Test [1] Mean, Standard Deviation, Cronbach's alpha α | Post-Test [2] Mean, Standard Deviation, Cronbach's alpha α | Post-Test [3] Mean, Standard Deviation, Cronbach's alpha α | Post-Test [4] Mean, Standard Deviation, Cronbach's alpha α | α scale developers |
|---|---|---|---|---|---|
| Patient judgments of hospital quality | 2.05 (0.85) .90 | 1.93 (0.72) .87 | 1.92 (0.72) .89 | 1.91 (0.74) .89 | .95 |
| Therapeutic self-care | 4.01 (0.74) .84 | 4.01 (0.75) .87 | 4.00 (0.83) .89 | 4.14 (0.66) .86 | .70 |
| Perceived health benefit of nursing care | 4.02 (0.91) .82 | 4.15 (0.73) .78 | 4.17 (0.70) .84 | 4.13 (0.72) .79 | .55+ |
| Index of activities of daily living | 1.89 (1.79) .78 | 1.73 (1.84) .81 | 2.15 (2.01) .83 | 1.91 (1.85) .80 | N/A |

+ Split-half reliability

## Computing Total Scale Scores

Total scale or subscale scores were computed to quantify the variables of interest. The total scores were calculated based on the scores of the individual items comprising each scale or subscale, as recommended by the tool developer in the respective scale scoring manual. The subscales represented the different domains of the concept being measured. The formulae for computing the total scores were those provided in the respective scale scoring manual. The formulae usually consisted of taking either the sum or the mean of the items' scores.

## Handling Missing Data

Missing data (i.e., cases with incomplete data or responses) can be problematic in multivariate analyses, particularly when different subgroups of cases have incomplete data on different subsets of variables. This causes the number of cases available for analysis to be reduced, which decreases the statistical power to detect significant effects or correlations; this, in turn, potentially leads to type II error (Ward & Clark, 1991).The percentage of missing data in this study varied from 0% up to 4% for the variables of interest in this study, which is considered relatively low.

## Multivariate Analysis of Variance (MANOVA)

A repeated measures orthogonal polynomials multiple analysis of variance (MANOVA) was used with the individual level nurse data to ascertain the effect of fixed covariates of interest (e.g., hospital type, unit type) on the outcomes of interest (e.g., work quality, job satisfaction, nursing leadership, quality of care, role tension, job stress).

## Multi-Level Analyses

Multi-level analyses were employed for this study as the data were collected at different levels or units of analysis, and one level was nested in the other (Bryk & Raudenbush, 1992). The levels of analysis represented in this study were: (1) individual level, where data were

obtained from patients and nurses assigned to different hospital units; and (2) unit level, where some data, representing the unit characteristics, were obtained from the unit manager or other administrative bases in the hospitals. Thus, the individual patients and nurses were nested within the hospital unit. Accounting for this "nesting" or multi-level effect is essential for improving the estimation of the effects of the hypothesized effects of variables measured on one level on outcome variables measured on another level (Bryk & Raudenbush).

Hierarchical linear modeling (HLM) was the approach used to analyze the multi-level data in this study. HLM involves pre-specifying two or more level models and conducting the analyses accordingly, typically using regression-type analyses. The regression parameters can be estimated for relations occurring within each level and across levels. The HLM models specified here involved two levels: (1) the individual respondent level; and (2) the hospital unit level. The HLM models varied slightly across the subgroups of participants (i.e., nurses and patients).

### Hierarchical Linear Model for Nurse Outcomes

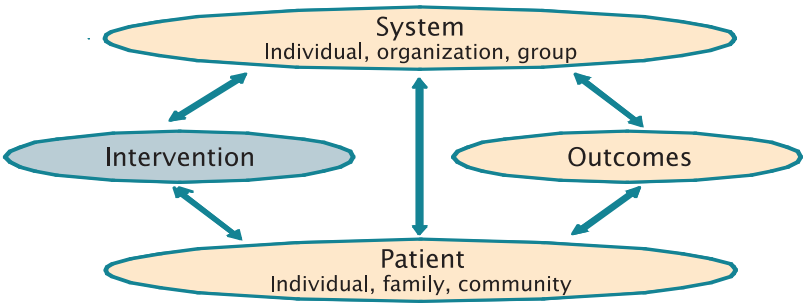
Outcome data were obtained from nurses at four occasions of measurement: (1) time 1 or baseline data were collected prior to the beginning of the intervention; (2) time 2 data were obtained approximately 6 months later, after the intervention had occurred; (3) time 3 data were collected 3 months following completion of the intervention; and (4) time 4 data were collected 6 months following completion of the intervention. As well, the individual pattern of change in the nurse outcomes over time was examined using data from the nurses who had participated in the intervention, and at all four points of time in the study. Examining the individual patterns of change in outcomes is very informative in terms of determining whether individual nurses involved in the intervention experienced the expected, desired outcomes identifying the direction and rate of change, and identifying factors that could affect the pattern of change. Consequently, a multi-level HLM model was specified to analyze the nurse outcome data.

In the first level of the HLM model, the influence of individual nurse or patient characteristics on the nurse outcome variables was examined. These nurse characteristics were considered individual factors that determine, partially, variability in outcome achievement and their effects on the outcome were controlled for. They included the nurses' age, gender, education, and work status. The effects of these variables on the outcomes of interest were investigated through Time 1 to Time 4 only for variables that were not involved in significant interaction terms. Earlier in the data analysis, after examining linear, quadratic and cubic trends over time using orthogonal polynomial contrast techniques, many of the variables were only found to display significant differences between Time 1 and Time 4, thus only these two time points were included in the model. In the second level of the HLM model, the influence of the unit-level unit characteristics were examined (e.g., bed size, patient age, patient length of stay, patient gender, unit type, proportion of RNs, care delivery model, % full-time RNs, % part-time RNs, % casual RNs, RN age, RN gender, RN experience on unit, RN experience in hospital, RN highest education, % RN Baccalaureate staff, number of RN resignations, number of RN vacancies, number of RN hires, nurse-patient ratio, absenteeism hours, education hours, orientation hours, agency hours, mechanisms for determining staffing effectiveness).

## General Linear Model for Patient Outcomes

Outcome data were obtained from different patients at each of the four occasions of measurement: (1) time 1 or baseline data were collected prior to the beginning of the intervention; (2) time 2 data were obtained approximately 6 months later, after the intervention had occurred; (3) time 3 data were collected 3 months following completion of the intervention; and (4) time 4 data were collected 6 months following completion of the intervention. As the study was longitudinal in nature over four points in time, and different patients were in hospital and participated at different points of time in the study, individual patterns of change in the patient outcomes variables could not be explored. However, individual data from nurses and patients, and unit data were available, thus a general linear model (GLM) was employed for this analysis.

In the GLM model, the influence of the unit hospital type (i.e., teaching or community) and characteristics on the patient outcome achievement was examined. These unit characteristics were considered aggregate factors that partially determine variability in outcome achievement and their effects on the outcome were controlled for. These included bed size, patient age, patient length of stay, patient gender, unit type, proportion of RNs, care delivery model, staff mix model, % full-time RNs, % part-time RNs, % casual RNs, RN age, RN gender, RN experience on unit, RN experience in hospital, RN highest education, % RN Baccalaureate staff, number of RN resignations, number of RN vacancies, number of RN hires, nurse-patient ratio, absenteeism hours, education hours, orientation hours, agency hours, and mechanisms for determining staffing effectiveness.




# 3

# Chapter Three: Intervention: Development and Implementations

## INTRODUCTION

A review of the literature was conducted to determine the key current work life issues for nurses that could inform the selection of the intervention in this study. In Ontario, the Nursing Task Force (1999) identified the importance of a quality practice environment for nursing suggesting that "continuity and quality of care is highly dependent on the retention of experienced and knowledgeable nurses and requires not only a sufficient number of permanent positions for registered nurses and registered practical nurses, but also a working environment that offers flexibility and professional satisfaction" (p. 5). In 2000, at the federal level, the first ministers had identified that strategies to improve the quality of nursing work life should be a priority for the health system, suggesting their governments would work together to identify approaches to improve the education, training, recruitment, and retention of the future health care workforce (Communiqué on Health, 2000). The first ministers also directed their ministers of health to collaborate on identifying approaches that can improve the work life conditions such as flexible working arrangements and continuing education (Communiqué on Health). A federal report from the Advisory Committee on Health Human Resources (ACHHR, 2000) in Canada identified a number of key nursing work life issues including appropriate workloads, professional leadership and clinical support, adequate continuing education, career mobility and career ladders, flexible scheduling and deployment, professional respect, protection against injuries and diseases related to the workplace, and good wages. Similarly, a report from the Office of Nursing Policy at Health Canada (Healthy Workplaces, Healthy Nurses, 2001) suggested that the key nursing work life issues were: reasonable workloads; job security; feeling appreciated, valued, and recognized; feeling safe from verbal, physical, or sexual threats and abuse in the workplace; supports to carry out nursing work; access to safe equipment and sufficient supplies and human resources supports; reasonable and flexible work schedules; leadership and accessibility of supervisor; positive relations with physicians; and ongoing support for education. A synthesis of the literature in this area suggested that work pressures, job security, workplace safety, violence in the workplace, support by managers and colleagues, support for education and development, professional identity, control over practice, control over scheduling, nursing leadership, remuneration, and recognition and rewards were key nursing work life issues.

## IDENTIFYING THE KEY WORK LIFE ISSUE

Based on the reports in the literature, a list of key nursing work life issues was prepared as a guide for the nurse executives, facilitators, and data collectors from the study sites. This list served as the basis for their identification of the key work life issue that would form the basis of the intervention in this study. A meeting was held at the University of Toronto with all of the site personnel and the study investigators to determine the work life issue that would be the target of the intervention. A decision-making process was used to narrow the focus of selection of the issue that involved a multi-voting technique. For the purposes of this study, an intervention related to a change in practice. A set of criteria were developed by the group for selection of the issue including: feasibility within the hospital budget, acceptable to stakeholders (e.g., nurses), importance of the intervention, feasibility within the union contract, and consistency with the strategic direction of hospital. The key issues identified for consideration included: workload, staffing issues, leadership, recognition or valuing of the nurse, control and autonomy, supports, safety, job security, and education or professional development.

Participants were broken into groups and each group rank ordered the work life issues using the criteria outlined. Each group came to a consensus on the top three issues for their group and shared these with the remaining participants. The worksheets were tallied to determine the highest ranked work life issue. The process was repeated dropping the lowest ranked item each time, until one item was ranked the highest. At the end of the process, the key nursing work life issue selected by this group as the focus for the intervention at all sites was "workload", as it was universally identified as both relevant and high priority. Nurse executives also identified "leadership education" as a priority, and it was agreed that this could be addressed informally and concurrently through the project work rather than as a separate issue.

## INTERVENTION DESCRIPTION

Based on the results of the consultation sessions with nurse executives and staff in phase one of the study, an intervention was developed to help staff nurses learn to design and evaluate small tests of change to improve the quality of their work environment, with a particular focus on improving nurses' workload. The experience of nursing teams that applied the intervention framework in their practice setting is outlined.

### Intervention Framework

The intervention framework that was developed for this study was adapted from three different frameworks: the Clinical Value Compass model proposed by Nelson, Mohr, Batalden, and Plume (1996), the organizational systems framework (Nadler & Tushman, 1980), and a participatory action research framework.

Nelson, Mohr, Batalden, and Plume (1996) developed the "serial V" model, which provides teams with a structured framework for team-driven improvement work. The premises of the "serial V" model are that improvement can be achieved through small incremental tests of change; that when making change, clinicians need to balance four categories of outcome information: clinical, functional, satisfaction, and cost; and that feedback with benchmarking motivates change. The "serial V" model has been used successfully for clinical improvement with a variety of patient populations (Cox, Wilcock, & Young, 1999; Nelson et al., 1996). The framework that was developed to guide the intervention in this project utilized the concepts from the Clinical Value Compass Model, but adapted these to work environment improvement. For example, the intervention framework adopted the notion of incremental small tests of changes as the focus for the teams' workload improvement strategies. The framework utilized the idea of a balanced set of outcomes that included patient outcomes, quality work environment outcomes for nurses, and cost outcomes. The Intervention Framework enabled teams to use quality improvement methods to identify factors that were affecting nursing workload, to choose a priority focus, to analyze work processes specific to the focus, and then implement small tests of change in an attempt to modify the issue.

Nadler and Tushman's (1980) framework was instrumental in assisting teams to understand and differentiate between inputs and processes that impacted the perceived workload issues. The framework identifies inputs external to the system, in this case the work unit, that provides opportunities or threats to change. These include inputs such as technology, human resources, potential patients, and the hospital's strategic priorities. The framework identifies four

transformation processes that are internal to the work unit – the people, the work, the formal work processes (e.g., policies and procedures), and the informal work processes (e.g., leadership style). Interventions designed to improve nurses' workload could involve changes in one or more of these internal transformation processes. The framework identifies outputs that are the product of the people and work within the unit. The outputs in this study could include healthy patients and satisfied nurses.

The participatory action research methodology involved nurses in identifying ideas for change, designing the change, implementing, and evaluating the change. Trained facilitators guided the nurses and served as expert resources. Facilitators learned not only the Intervention Framework, but also tools and techniques that would enable team members to be active participants in identifying potential projects and to take ownership for project implementation and evaluation. The facilitators received training in quality improvement methods, group dynamics, and effective problem-solving.

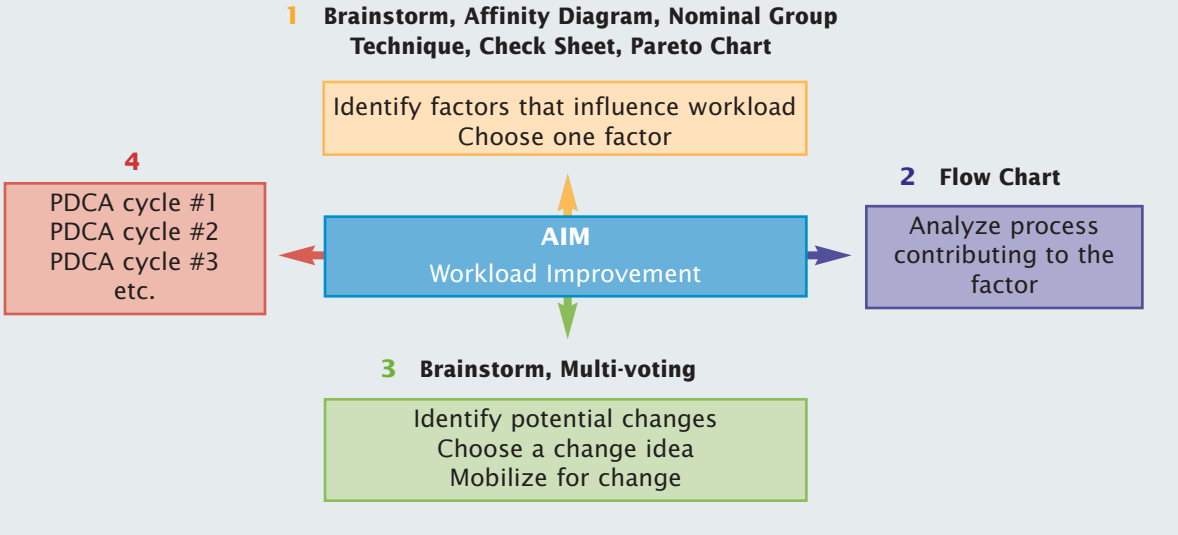
## Intervention

A total of 16 work groups, one from each medical and surgical unit from within the eight acute care hospitals participated in the intervention. The intervention included a cognitive component and a behavioural component.

## Cognitive Component

The cognitive component began with a 2-day workshop that was hosted at the University of Toronto. The first half-day was attended by managers from the 16 participating units and the 8 facilitators, and focused on the study purpose and methodology and the intervention framework (see Figure 2).

**Figure 2.** Intervention Framework



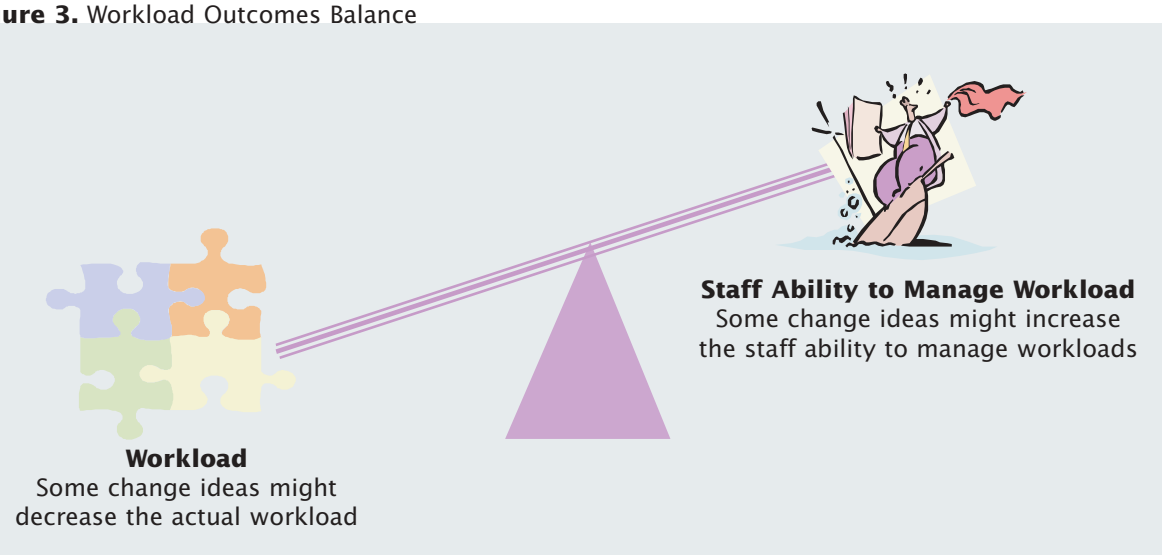

The remaining sessions were attended by facilitators, at which they were instructed in the specific tools and techniques for quality improvement to be used at their sites. The goal of the

workshop was to prepare participants to facilitate the implementation of site-specific projects related to the study. The workshop objectives were to assist facilitators to develop knowledge and understanding of: (1) factors within the literature that contribute to workload; (2) selected data analysis tools for identifying workload issues; (3) decision-making tools that can be used to select workload improvement ideas/projects; (4) how workload processes contribute to workload issues; (5) methods for identifying change ideas; (6) how to plan and conduct small tests of change; (7) the tools for workload improvement through simulation exercises; (8) the principles of team mobilization and group dynamics; (9) the ability to mobilize hospital-based nursing project teams to develop and implement a project to address nursing workload; and (10) how to identify sources of support as the workload project was implemented.

### Behavioural Component

The behavioural component involved the application of quality improvement methods in a "real life" issue from the team's work environment. The facilitators were asked to mobilize small groups of nurses on the identified units, and to support these project teams as they followed a prescribed process to identify nursing workload issues, and then plan, implement, and evaluate small changes that were designed to either reduce the workload or to improve the nurses' abilities to manage their workload. These changes could be in either system inputs or work processes. Participants were encouraged to think about improving nursing workload by either making changes that could result in a reduction in the workload or by enhancing nurses' ability to manage their workload. The notion of balancing workload reduction with workload management is illustrated in Figure 3.

**Figure 3.** Workload Outcomes Balance




### Intervention Resources

In addition to the initial workshop, several types of project-specific resources were made available to facilitators throughout the intervention. A binder of print materials and handouts developed specifically for this intervention was provided. Each facilitator was also provided with a copy of Memory Jogger II (Brassard & Ritter, 1994), a pocket-sized book of practical details about how to use multiple quality improvement tools and methods. Access to a graduate

research assistant or coordinator who communicated regularly by telephone, email, periodic site visits and one-on-one meetings was provided. An electronic listserv was established with membership restricted to the site facilitators and members of the research team. Print and electronic materials were made accessible in response to facilitators' feedback during the project. The topics that facilitators requested resources for included managing change, managing resources, organizational performance, quality improvement, group process, and job satisfaction. Three one-day "facilitator forums" were hosted by a co-investigator on the study at the University of Toronto approximately every 2 months to provide an opportunity for sharing experiences and for collaborative problem-solving. Each forum included a learning component prepared by the research team about a topic that was chosen after reviewing the issues and the learning needs identified by the facilitators. At the request of the sites, each team was invited to send a staff nurse to accompany the facilitator to two of the forums. This was expected to increase team synergy and knowledge, and was seen by some as positive reinforcement and valuing the perspectives of study participants. During the forum, there were both joint sessions for all of the facilitators and their staff nurse representatives, as well as break-out sessions for the two groups. Several facilitators also accessed their own resource materials through the hospital library or colleagues in other departments in response to their own learning needs. Some chose to collaborate with each other to prepare for initial meetings with project groups.

### Intervention Time Frame

The facilitators were expected to mobilize teams on the study units and to support the teams as they planned, implemented, and evaluated one or more changes. They were encouraged to maintain regular contact with the nurse executives and managers at their site as appropriate. It was anticipated that the entire process would occur over a 6-month period.

### Characteristics of the Facilitators

The facilitators reported that they had worked at their respective hospitals for a mean of 6.9 years (range=less than 1 year to 20 years). Four of the eight reported that they had no familiarity with the participating units, while two reported being familiar with one of the two units. The remaining two were known to both units.

Facilitators were asked to rate their knowledge and skill in areas such as group leadership and facilitation, quality improvement, and electronic data management skills. These ratings were done using a 5-point Likert-type scale. A composite score of 9 indicated that they reported very limited knowledge in each area, whereas a composite score of 45 indicated that they considered themselves to be experienced in all areas and comfortable helping others to learn about or use the named skill. The facilitators' overall scores ranged from 14 to 35. This demonstrated a wide range of knowledge and skills among facilitators. This information helped to inform the workshop content as well as describe the scope and nature of resources that were made available to the facilitators. Five of the eight facilitators had been involved with hospital accreditation projects.

### Teams' Descriptions

Two teams from each of eight acute care hospitals participated in the project. Teams held an average of 11 meetings each, with a range of 5-30 meetings resulting in approximately 19 hours of meetings per team (e.g., ranged from 6 to 80). The size of each team varied from 4 to 13

nursing staff. Managers were not invited to be members of the teams. A number of hospital-based colleagues were consulted by the teams. These included the nurse educator, unit manager, senior nursing management, purchasing, pharmacy, central supply, biomedical engineering, environmental services, informatics, discharge planning, physiotherapy, director nursing research, nursing workload coordinator, and colleagues from other units. Mechanisms used to promote the project within the settings included hospital newsletters, professional practice events, and displays during Nurses' Week.

### Team Mobilization and Ongoing Communication

Team mobilization and communication proved to be one of the more complex and time-consuming challenges for the facilitators who used a variety of formal and informal strategies to raise awareness about the project and to mobilize project teams. These included distributing information packages about the project, attending staff meetings, one-on-one conversations, inviting staff to nominate team members anonymously, snowball invitations, power point presentations, as well as posters on units, medication carts, and in washrooms. Some facilitators visited units during evening, night, or weekend shifts in order to share information about the opportunity to join the intervention team. The facilitator's work was made easier if the study data collector's presentations about the project had been well presented and well received. Members of 10 of the 16 project groups were compensated or replaced on their unit for an initial 3–4 hour planning meeting. Some sites facilitated coverage for staff to attend ongoing meetings, but this was not consistent. Channels and vehicles for ongoing communication within teams included bulletin boards with project updates, message books, flyers in mail slots, voicemails, email, direct mailings by hospital Human Resources department to nurses' homes, as well as personal contact by team members and the facilitators.

### Intervention Meeting Attendance

Facilitators reported that staff nurses often attended meetings on their own time, before or after shifts, on days off, and in at least one situation, during a leave of absence. Other facilitators reported that it was challenging to find convenient meeting times and attendance was inconsistent, and this contributed to limited decision-making or group activities. In groups where the majority of members worked on the same unit team or rotation, the facilitators reported more consistency of attendance at meetings due to fewer scheduling conflicts. The disadvantage of having the majority of group members being on the same schedule was that it was more challenging to communicate change ideas with non-group members. Teams lost and gained members during the course of the group work. Reasons for leaving the groups included leaves of absence, not interested in the focus that was chosen after several options were considered, and unable to get coverage on the unit to enable attendance. Three people resigned for unknown reasons.

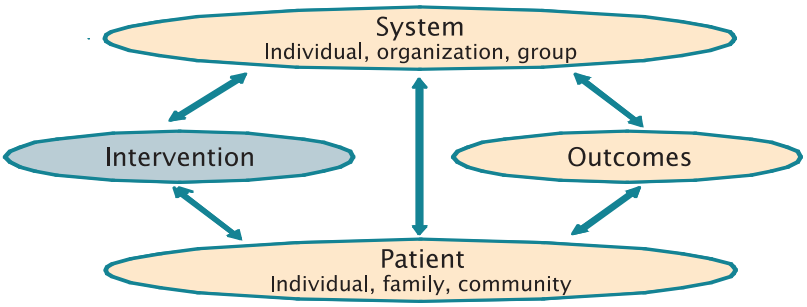
### Working Group Experiences

Each group of nurses selected either one or two foci for workload improvement and designed specific change projects to address these. At one hospital, the two groups began their work independently, but later worked together selectively due to the commonalities between their projects. The information in Table 3 was collated from reports that were prepared by the facilitators identifying the workload improvement projects that formed the interventions in the study sites.

**Table 3: Workload Improvement Projects**

| Specific Issue | Change Implemented | Comment |
|---|---|---|
| **Enhance Supply and Access to Resources for Care** | | |
| Nurses spend too much time looking for linen, managing soiled linens; unit pays for unusable linen | Adjust stock linen order; change location of soiled linen hampers; change linen control system | Staff learned a great deal about the linen management process at the macro-level |
| Disorganized supply room impacted work flow | Evaluate standard stock; reorganize location of supplies commonly used | Changes implemented but not formally evaluated |
| Medication delays impacted nurses' time | Implement stock medication system; design form to track medication delays | Tracking form was not implemented when issue became less of a priority |
| Nurses spend too much time ordering and waiting for meds from pharmacy | Negotiate new quantity and scope of stock medications on unit | A change in ward stock was implemented |
| Clinical assessment equipment and infusion pumps were not always available and operational | Create "Vital Signs Stations"; make manual BP equipment available; develop an equipment repair log; develop an equipment loan process and log | The nurses were pleased with changes, but some issues related to electronic BP equipment were unresolved, necessitating use of manual equipment |
| Non-operational, misplaced, or insufficient equipment (stretchers, thermometers, flashlights, BP cuffs, oxymeters) impacted nursing workload | Track amount of nursing time spent looking for specific equipment; extrapolate data to calculate nursing FTEs used inappropriately; communicate issue to middle and senior management who increased equipment supply | The change project resulted in increased equipment and supplies for the unit. The senior management found it very helpful to have the data on time spent searching for equipment and were able to use the data to justify the need to purchase more equipment |
| Inadequate supply of some equipment made admission process too time-consuming | Increase number of wheel chairs and oxymeters | Evaluation in process when study ended |
| **Improve Team Communication and Documentation** | | |
| Too many/inappropriate patient transfers from another unit at shift change | Identify scope of issue; plan communication strategy with other unit | The environment changed with the closure of beds and thus this first issue the team identified changed in importance |
| Incomplete communication and expectations by other unit, often led to increased workload when receiving patients | Create and distribute list of "things to consider" for use by other unit prior to transfer; list based on data collected about frequency of the issues that contributed to communication problems, extent of issues | The data collection identified additional data, input and communication needs that need to be address among all stakeholders in order to improve the transfer process |
| Report at shift change was perceived as time-consuming and not effective | Develop new process and new tool for report, less narrative, more tick boxes, optimize time spent on priority issues | Length of report decreased by 10-15 minutes per shift |
| Clinical issues not consistently communicated or effectively addressed | Design and implement a Clinical Issue Communication Tracker | New communication vehicle enabled prompt solutions to clinical issues |

| Specific Issue | Change Implemented | Comment |
|---|---|---|
| **Improve Team Communication and Documentation** (continued) | | |
| Narrative charting was perceived as too time-consuming | Conduct a small-scale trial of a "check mark" format | New process saved approximately 24 minutes/nurse on a 12-hour shift; planned to identify a tool that was better suited to specific clinical population |
| Nurse charting seen as time-consuming, with some duplication | Move flow sheets from nursing station to patients' rooms; re-design selected forms to eliminate redundancies | All changes proposed by the team were approved, and were being phased in |
| Delays in obtaining physician information on admission, difficulty accessing the information that was available | Increase number of kardexes; initiate new Treatment Order Form; create process for physicians to have forms available in their offices for completion prior to hospital admission | Changes were not uniformly adopted, but project was ongoing; plan to assess and improve nursing admission database across multi-site hospital |
| Charting of meds needed to meet both hospital's requirements as well as College standards; workload measurement tool did not accurately reflect time for aerosol treatments | Clarify documentation process to ensure that it met requirements of employer and of regulatory body; redesign workload measurement tool to more accurately reflect time to administer aerosol therapy | Changes were implemented |
| **Clarify Roles and Responsibilities of Care Providers** | | |
| Checking charts could be done by RPNs instead of RNs | Plan and conduct a workshop to help RPNs learn how to check charts for medical order follow-up, update Kardexes | Nurses satisfied with change |
| **Enhance Nursing Skill Competencies for Technologically Intensive Care** | | |
| Insufficient number of nurses highly skilled at range of procedures, leading to complexity in patient assignment and frequent interruptions to help colleagues | Plan and conduct inservices to develop clinical nursing skills | Nurses improved knowledge, teaching and mentoring skills; leadership development |
| **Improve Workload Assignment to Promote Balance** | | |
| Some nurses perceived as having disproportionately heavy workloads | Implement a patient acuity scale as one component of patient assignment | The team designed a new patient assignment tool, which was going to be refined following the initial pilot test |
| Acuity and unit geography both needed to be considered when creating patient assignment | Develop new process to monitor patient acuity, and test new geographic room assignments | New system worked well only when at full staff on day shift, pointing to the need to address issues that contribute to staffing shortage |
| **Improve the Work Environment** | | |
| Unpleasant locker room atmosphere | Re-design area to decrease unpleasant odours | In progress when study ended |

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# Chapter Four: Intervention: Evaluation

## ASSESSMENT OF THE INTERVENTION

Semi-structured interviews with nurses were scheduled to take place at each of the eight participating sites upon completion of the 6-month study intervention. The interviews were intended for staff nurses from hospital units on which the intervention was implemented. The overall purpose of these interviews was to explore the nurses' experience with and perception of the intervention. The ultimate goal was to identify factors that influenced the implementation of the intervention on the participating units.

A total of 78 nurses initially indicated an interest in participating in the interviews. Despite these earlier indications of interest, when nurses were approached later in the study regarding the semi-structured interviews, response rates were much lower than expected. This may be a result of the planning of the semi-structured interviews which coincided with the end of the summer, therefore vacation and preparation for the coming school year may have been an obstacle to participation. The research team proceeded with two of the on-site semi-structured interviews and one interview was carried out through a conference call. In one site, none of the nurses approached about the interview were able to volunteer for participation and interviews at four sites had to be cancelled because there were insufficient numbers. The unit nurses who did participate were situated in three different hospitals located in three different cities in the province. The number of staff nurses who attended the semi-structured interviews varied between two and six. They worked in either a surgical or a medical unit. Most of the participants were registered nurses and few were registered practical nurses. All participants were actively involved in the discussion and validated the points raised.

## INTERVIEW PROCEDURE

The interview discussion focused on identifying: (1) the extent of staff nurses' participation in the intervention; (2) the issues addressed and the subsequent changes made; (3) the barriers to implementation; (4) factors that facilitated implementation; (5) the impact of this intervention on the quality of nursing care; and (6) the staff nurses' perception of the intervention. The same investigator led the three semi-structured interviews. The investigator used the same format across the sessions where the general question pertinent to each topic was asked and followed through with prompting for clarification and elaboration on the points or ideas presented. The investigator made sure that all topics of interest were covered in each session, and that all attendees participated in the discussion. A research coordinator was also present at each interview session. The research coordinator assumed an observer role and took notes on the main points of discussion.

## ANALYSIS OF SEMI-STRUCTURED INTERVIEWS

The discussion was tape-recorded and transcribed verbatim. The investigator and the research coordinator analyzed the content of the transcripts according to a series of steps. Each individually read the transcripts carefully to get a general understanding of the points or ideas discussed. Each reviewed the transcripts and assigned codes to the ideas presented. The codes consisted of terms or phrases used by the participants. The investigator and the research coordinator met to compare the codes each used. Differences were discussed until agreement was reached. Working together, the investigator and the research coordinator examined the codes and developed categories that reflected the themes describing the staff nurses' experience with

the intervention. The individual coding was constantly compared and those that indicated similar ideas were grouped into a category. The codes comprising the different categories were reviewed to ensure that those grouped into one category represented a common theme and those grouped into different categories represented different themes. The results of this content analysis are described in relation to the following aspects of the staff nurses' experience with the intervention: (1) extent of staff nurses' participation; (2) issues addressed in the work environment; (3) factors that facilitated implementation; (4) factors that hindered implementation; (5) impact on the quality of nursing care; 6) staff nurses' perception; and (7) staff nurses' suggestions of strategies to improve the intervention implementation.

## EXTENT OF STAFF NURSES' PARTICIPATION IN THE INTERVENTION

The participants described the extent of the staff nurses' involvement in the intervention in terms of the nature of their involvement and the characteristics of the staff nurses who participated in it, and provided reasons for staff nurses' participation or non-participation. Nurses clarified that only a *small group* of the staff nurses on their respective units were actively involved in planning the intervention. This group of staff nurses assumed the responsibility of identifying and selecting the issues that affected the quality of their environment, and of designing strategies aimed at changing relevant aspects of their work in order to address the selected issues. The work of these groups was guided by the continuous quality improvement intervention in which the facilitators were instructed. The participants also explained that all staff nurses on their respective units were involved in implementing the changes.

Participants described the staff nurses who formed the small group responsible for planning the intervention as *volunteers*, who represented "those who want to change things", and they "worked on the intervention on their own time" and "found the time to participate". Although all nurses on the unit were eligible to participate in the small groups, it was reported in the interviews that nurses who worked on a part-time basis on the units were not involved in the changes. The primary reason for involvement in the process was nurses' motivation to enhance the quality of their work environment and the quality of patient care on their respective units. Specifically, they wanted to improve the efficiency of their work. They believed that through their active involvement in making changes in their work environment, they would feel better about themselves and about their work. They considered accomplishing these changes a goal so important that they did not mind working toward it on their own time, as reflected in this quote: "getting things done matters more than working on our own time on the intervention".

The interview participants provided several *reasons for the non-participation of some unit staff nurses* in planning the intervention. The reasons included a lack of interest, previous experience and personal attitude towards the intervention. Some nurses expressed lack of interest in the intervention: "[They] don't want to be bothered with the intervention and with the involvement [in it]". This lack of interest appeared to be related to the nurses' experience on the unit and previous experience with change. Nurses reported an arduous workload, where they have too much to do on a shift or day. This heavy workload limited the time they may have to work on the intervention during their regularly scheduled shift. In addition, nurses have other commitments, such as family responsibility, that prevent them from getting actively involved in either planning or implementing the intervention after their regular shift, on their own time.

Further, the staff nurses' initial experience with the intervention, which required additional paperwork to be completed, contributed to their decision to not participate in the intervention. The participants clarified that the completion of the "required paperwork had to be done after the regular shift", which increased the work and the time on the project. Participants also explained that some staff nurses' experience with previous initiatives to make changes on the units influenced their decision not to participate in the current project. Some had once felt they had control or a say in their work environment and attempted to change some aspects of it. However, these attempts at change were not well received by the unit management, and, as a consequence, they developed unfavourable attitudes toward change.

In summary, a small group of staff nurses were actively involved in planning the intervention. This group of nurses was motivated to initiate changes in their work environment aimed at improving the efficiency of their work and the quality of patient care. They worked on the intervention on their own time. All staff nurses were involved in implementing the changes in the work environment, on their respective units.

## ISSUES IN THE WORK ENVIRONMENT ADDRESSED BY THE INTERVENTION

The participants at the interviews identified several issues in their work environment that affect the quality of nursing care. They also explained the process they used to select the issues they addressed throughout the project period. Further, they described in detail, the issues selected and changes initiated. The specific issues in the work environment that were identified as interfering with the staff nurses' ability to provide high quality care varied. These issues were related to patient acuity, staff nurse skills, workload, and unit atmosphere which influenced the quality of nursing care directly and indirectly, as well as independently and interdependently.

The *condition of patients* admitted to the medical and surgical units participating in the intervention had an indirect effect on the quality of nursing care, mediated by the nurses' workload and the need for additional staff and equipment. This high level of acuity and instability increased the workload of the staff nurses, which in turn, had a negative impact on the effectiveness of the nursing care provided to patients. Concurrently, this increased the need for a larger number of staff with the "right nursing skills", which would enable them to provide the care necessary to manage the patients' condition appropriately. As well, it highlighted the availability of equipment and materials required to provide care promptly. The issues related to staff nurses pertained to the *nursing skills* required to manage a patient's condition. The interview participants reported that staff nurses not only lacked the skills but also the experience to work with acutely ill patients. They elaborated that some nurses did not have the certification needed to work in a specialized area and did not seek additional training, while others have "no interest in working with acutely ill patients". They explained that these nurses do not have access to senior, experienced nurses, who could help them learn the required skills. Inadequate skills interfere with the nurses' ability to provide the appropriate quality nursing care required to manage the patients' condition.

The participants emphasized that *workload* is an important issue that negatively influences the quality of nursing care. They identified factors in their work environment that increase the staff nurses' workload including the shortage of nurses, unavailability of equipment and supplies, and involvement in non-nursing tasks. Having an *inadequate number of staff nurses* to manage the condition of patients admitted to the units increases the workload of nurses. Nurses have to

provide care for a large number of patients, which jeopardizes the safety of patient care. In many instances, staff nurses find themselves in situations where the *equipment and supplies they need to provide patient care are not readily available on the unit.* As a result, nurses spend their time either looking for them, or waiting for them to be delivered to the unit. The time and effort spent locating equipment increases the nurses' workload, as they have to re-prioritize their work and patient care, leading to a delay in giving the required care. Such a delay jeopardizes the safety and quality of nursing care. For instance, when faced with a shortage of linen on a unit with a high number of incontinent patients, nurses had to keep patients in chairs for a longer period of time, until they found the linen and changed the bed. Most often, staff nurses are unable to wait for the required equipment and material or for non-nursing tasks to be completed by other personnel, because such waiting delays the provision of care and reduces the quality and effectiveness of care. Therefore, staff nurses perform non-nursing tasks in order to get the work done on time: "[Nurses] do the work even though it isn't their responsibility", and "[nurses] do the work that others can't do". Involvement in these non-nursing tasks increases the staff nurses' workload and frustration. The interview participants pointed out that the *atmosphere* prevalent on the units influenced the quality of nursing care. The unit atmosphere was characterized with tension among nurses and between the nurses and management. Tension among nurses prompted them to work independently and in isolation, which limited any collaborative effort to provide appropriate patient care. The nurses felt that they were not being appreciated and that management mandated things, rather than worked things out with them, which limited their ability to provide what they considered to be the best care.

In conclusion, the high acuity and instability of the patients' condition, coupled with the lack of adequate numbers, skills, and experience of staff nurses, and the unavailability of equipment and materials on the units, increased the nurses' workload and involvement in non-nursing tasks. In turn, increased workload, within a unit atmosphere of increased tension, interfered with the staff nurses' ability to deliver high quality care to patients.

## PROCESS FOR SELECTING THE WORK ENVIRONMENT ISSUES

Although various issues in the work environment were identified as interfering with the quality of nursing care, the interview participants said that one or two issues encountered in each unit were selected as a target for the intervention during the project period. They described two different processes that were used to select the issues. The first process involved teamwork, where a small group of nurses in each unit assumed the responsibility of selecting the issues, in collaboration with staff nurses on their respective units. The process consisted of the small group of nurses conducting a survey, where they asked the staff nurses on their respective units to identify the work environment issues that need to be changed. Following this, issues were prioritized and one or two issues were chosen to be addressed. Finally, the staff nurses discussed the selected issues and agreed on one or two issues to be addressed. An alternate process was followed on the medical and surgical units located in one participating institution where the facilitator decided on the work environment issue and imposed it on the unit staff nurses. With both processes, the selection of the issues to be addressed was guided by the principles that the issues could be managed by the staff nurses within the project period of 6 months, and the changes to be made in the work environment could also be accomplished by the staff nurses with the available resources and within the project period.

## DESCRIPTION OF THE ISSUES SELECTED

The staff nurses on the participating units chose to address similar work environment issues that interfered with their ability to provide the best care. The selected issues were derived from those identified earlier as influencing the quality of nursing care and included issues related to the availability of equipment and supplies, the arrangement of supplies, and timing of new admissions to the unit. Staff nurses working on several medical and surgical units chose to address the issue of the *unavailability of equipment and supplies* on their respective units. This issue has two dimensions. The first dimension relates to the short supply of equipment and supplies and the second addresses the condition of the existing equipment and supplies. The amount of equipment and supplies available on a unit may not meet the demand for providing care to all patients. This short supply occurs when the allotment to each unit is not adequate. This problem is exacerbated when the patients' condition changes, requiring alteration in the care plan, and often an increased use of equipment and supplies. The end result is that the demand is higher than the supply, leading to an acute deficit. For instance, some medications prescribed to manage an emerging patient problem are not available on the unit. The linen available on the unit may not be enough to change beds for an increasing number of patients who experience incontinence, vomiting, or bleeding. Another reason for the short supply is that the equipment, such as wheelchairs and thermometers, may not be returned to the usual storage area after usage, leaving the impression that it has disappeared from the unit. The second issue of unavailability of equipment and supplies relates to the *condition* they are in. Some of the equipment is not well maintained, which renders it inappropriate for use when needed. The short supply and the poor function limit the staff nurses' access to them when needed. Nurses spend much time and effort locating equipment and supplies. This additional time spent searching increases the nurses' workload, delays patient care delivery, and decreases the quality of care provided. Staff nurses on two participating units reported that the *distribution of supplies* on their respective units was an issue that needed to be addressed in order to enhance the quality of their work environment. Some explained that the supplies are not stored in an organized way, which makes it difficult for nurses to find what they want right away. Others indicated that the supplies are not always put in the right place, as labeled on the shelves, which increases the chance of committing errors.

*The timing of new admissions* was selected as an intervention focus by staff nurses working on one participating unit. It stems from an increasing number of patients in the emergency room waiting to be admitted. In order to free up the emergency room, the emergency room staff send patients to the unit without informing the unit staff nurses. Therefore, the patients are sent at an inappropriate time, when the unit staff are not ready for the admission. This happens, for instance, when the unit staff nurses are busy giving the shift report, or when the bed has not yet been cleaned in preparation for the new admission. Consequently, the unit staff nurses can't manage the new admission promptly, which increases the nurses' frustration and jeopardizes patient safety.

In summary, staff nurses identified various issues in their work environment that interfere with the provision of high quality care. The issues were associated with the increased acuity and instability of the patients' condition; the limited number, skills, and experience of staff nurses; the unavailability of equipment and supplies; the nurses' involvement in non-nursing tasks; and

the atmosphere of tension prevalent on the units. Of these, staff nurses selected issues that could be managed within the resource and time constraints of the project. The selected issues entailed unavailability of equipment and supplies, distribution of supplies, and timing of new admissions. The staff nurses devised strategies and implemented changes in their work environment to address these issues and consequently, to improve the quality of nursing care. The implementation of the changes was not smooth, affected by several factors that facilitated and hindered the implementation of the intervention.

## FACTORS THAT FACILITATED IMPLEMENTATION OF CHANGES

The interview participants identified various factors that facilitated the implementation of changes in the work environment. The facilitating factors were classified as those pertaining to the nature of the issue, the characteristics of the staff involved in the implementation of changes, the management's support, the process used to implement the changes, and the results of the changes. Some of the interview participants indicated that the work environment issue that was selected for management on their unit during the intervention was of major concern to the unit staff nurses. As well, the solution reached to address the issue was relevant, and the changes were introduced at the "right time". Thus, the *nature of the issue,* solution, and timing of introducing changes enhanced the staff nurses' interest in and willingness to implement the changes.

The interview participants commented on the *characteristics of the facilitators and the staff nurses* who were actively involved in planning the intervention (i.e., the staff nurses who formed the group responsible for selecting the issue to be addressed and the solution or changes to be made). Several staff and facilitator characteristics were identified as important to aiding the process of selecting the issue, deciding on the changes to be made, and implementing the changes on the respective units. For the intervention to be successful it was suggested that the facilitator be selected from the same unit in which the intervention is implemented as they will be familiar to the staff nurses. This familiarity increases the level of comfort of the staff nurses in working with the facilitator, that is, the staff nurses do not perceive the facilitator as a threat. This sense of comfort increases the staff nurses' level of motivation and extent of collaboration to implement the changes. Collaboration among staff nurses on the intervention promotes a sense of fulfillment and the perception of increased ability to achieve a common goal. Alternately, having a facilitator from outside of the unit was also considered by some as an advantage, as they can act as a liaison between the nursing department and the departments being dealt with, and are able to have a better rapport because they are not directly on the floor. A facilitator who was energetic and enthusiastic was thought to be better able to involve staff nurses in the intervention and get feedback from the nurses thus promoting their participation in the intervention. *Staff nurses* who actively participated in the intervention and contributed to the success of the implementation of the desired changes on their respective units were usually "dedicated to the intervention", interested in the change, individuals who had a positive attitude, and those who worked with and supported each other. The interview participants emphasized that having a facilitator whose sole responsibility is to "address the issues" who "had the time to work on the issues and to collect the data"; and having a group of staff nurses working on the intervention and "being paid to do the work on the intervention", were very important facilitators that "make things flow easier".

*Management support for the initiative* and for the staff nurses involved, whether at the unit or hospital level, was considered to be essential for facilitating the implementation of the changes in the work environment. The staff nurses working on the intervention appreciated the receptivity of nursing management (i.e., unit manager and vice president of nursing) to the intervention, and respect given to nurses' decisions. In a few institutions, nursing management assisted the small group of nurses in designing and implementing the changes. Specifically, the nursing management "understood" and "realized the importance and impact" of the work environment issue to the quality of nursing care; participated in "finding an appropriate solution" for the issue; and gave the small group of nurses feedback on the work accomplished. This assistance and support rendered the nurses' work easier and contributed to the achievement of the desired goals.

The *process used throughout the intervention* was perceived as helpful in implementing the changes in the work environment. In particular, three dimensions of this process facilitated the implementation of changes – communication of information, participation of staff nurses, and collaboration. Open communication about the intervention between the nurses spearheading the changes and the unit staff nurses and nursing management was frequently mentioned as a factor facilitating the implementation of changes. Participants explained that successful involvement of unit staff nurses in implementing the changes in their respective units was achieved by maintaining an open communication and dialogue with the staff nurses. The communication entailed providing the staff nurses with information about the work environment issues to be addressed, making them "aware" of the issues and their impact on nurses' work life, informing the staff nurses of the strategies or steps undertaken to address the issues, informing the staff nurses that the "work can be done" (i.e., the changes are feasible) and that those changes will "lead to results" (i.e., the changes will yield the desired outcomes), and keeping the staff nurses "in the loop", that is, informed of what has been accomplished at different points in time. Keeping staff nurses informed about the issue, the strategies, and the progress made was perceived to instill a "feeling of indirect participation in the changes". The open communication with nursing management involved informing managers of the issue, sharing with them the data pertinent to the issue, which were collected by the small group of nurses spearheading the intervention, and discussing strategies to address the issue. The interview participants explained that sharing the data with managers was very useful; it made the managers "aware of the issue" and "helped them make their case" to senior hospital managers in order to ensure the support and resources necessary to implement the changes.

Participants emphasized the importance of *involving all unit staff,* including RNs, RPNs, and other employees, in making the changes in the work environment. Unit staff nurses were involved in determining the issues to be addressed, in implementing the changes, and in collecting data on the issue of interest. Two factors contributed to the unit staff nurses' participation in the intervention. The first factor related to maintaining an open communication with the unit staff nurses, about "what the changes are about" and "what are the outcomes or the expected results of these changes". The second factor was conveying to the unit staff nurses that by implementing the changes, they can "help give the best results". *Collaboration among staff* nurses, other departments, and nursing management on designing and implementing the changes was essential to the success of the intervention. The collaboration among staff nurses

was enhanced by group decision-making which involved examining the reasons underlying the work environment issue, discussing alternative strategies to manage it, and selecting the most appropriate strategies. Teamwork consisted of having groups of nurses' work together on making the changes. The collaboration occurred on the same unit or between different units within the same institution, working on similar work environment issues. This was necessary to implement the changes that required input and cooperation from personnel in the other departments, such as delivering additional linen without delay to meet the unit's demands, or having a stock of medications available on the unit. *Collaboration with other departments* was enhanced by providing the personnel in these departments with information about the work environment issue and eliciting their input to find an appropriate solution to the issue. The facilitator, serving as a liaison between the unit staff nurses and other departments, promoted the collaborative effort. *Collaboration also took place with nursing management* who facilitated the implementation of changes such as additional resources or modification in the staff mix or nurses' job responsibility. This entailed informing nursing management about the issue and involving them in finding a solution.

As well, the interview participants identified a number of other factors that contributed to the successful implementation of the changes including forming small groups comprised of 4 to 5 nurses who worked on an issue, facilitating the unit's ability to address different issues simultaneously. As well, collecting data on an issue for staff helped to clarify it and provide the empirical evidence that nursing management needed to request resources and to support the implementation of the change. For instance, the data collected on one unit showed the amount of time staff nurses spend looking for equipment. These data were utilized by the nurse executive to build a case to the senior executive team for additional equipment funds.

The interview participants explained that seeing the *results of the changes* implemented and showing these results to other unit staff nurses increased the latter group of nurses' willingness to participate in the intervention. In summary, several factors were perceived as important contributors to the successful implementation of the changes aimed at improving the quality of the work environment and of nursing care. These factors included (1) addressing an issue of concern to the unit staff nurses; (2) having a familiar, energetic facilitator serve as a liaison with other departments and work diligently with the unit staff nurses on implementing the changes; (3) having groups of nurses dedicated to the intervention and supportive of the unit staff nurses in their efforts to make the changes; (4) having managers who were receptive and supportive of the changes; (5) communicating information about the issue and the changes to unit staff nurses, management, and other departments; (6) encouraging unit staff nurses to participate in the different phases of the intervention; (7) collaborating with unit staff nurses, management, and other departments on implementing the changes; (8) collecting data on the work environment issue to be addressed; and (9) sharing the results of the implemented changes.

## FACTORS THAT HINDERED IMPLEMENTATION OF CHANGES

The interview participants identified several factors that hindered the implementation of changes to address the work environment issue. The factors were grouped into categories similar to those used to classify the factors that facilitated the implementation of changes. Although the labels of the categories were the same, the nature of the specific factors listed under the categories was different. The work environment issue addressed in the intervention, that was perceived as "not important" by the unit staff nurses reduced their motivation to implement the changes. Similarly, the changes that were considered "inappropriate, inadequate, and inefficient" were not implemented. Specifically, the process to identify and choose the work environment issue to be addressed at times yielded to the selection of an "unimportant" issue. When unit staff nurses were surveyed to identify the issues of concern, "not all nurses participated in the survey due to increased paperwork". The nurses who did not complete the survey may have had issues of concern other than those identified and selected. When discussing the issues, a "controversy among nurses as to the issue to be addressed" emerged. The discussion was "dominated by the RNs", which prevented reaching an agreement among all discussants.

Various *staff characteristics* were found to interfere with their participation in the intervention. The unit staff nurses' knowledge, skills, and attitudes were believed to hinder implementation of changes. Unit staff nurses were described as lacking the knowledge needed to initiate the process for making the changes nor the necessary skills and experience to initiate and implement the changes. This resulted in the use of inadequate and improper strategies to achieve the desired changes in the work environment. As well, a number of unfavourable attitudes of unit staff nurses may have hindered the implementation of the intervention including: (a) a sense of powerlessness and of isolation: "nurses don't have power", "nurses feel that they don't have a voice", feeling of "not being heard", and feeling that "nurses are not taken seriously"; (b) lack of agreement among the staff nurses, where nurses perceive that "we're [our own] worst enemies" as "nurses are task-oriented" and "won't learn new skills"; (c) feeling "uncomfortable" with and "suspicious" of management; (d) lack of willingness to engage in the intervention and opposition to change related to previous experience with change interventions. Nurses have not seen the changes needed to improve their work, which resulted in staff nurses expressing discouragement and a lack of confidence in their ability to make changes. These attitudes are generally reflective of the nurses' skepticism about things being changed in the system, making it difficult to convince the nurses of the importance of "taking steps to solve the problems of collecting data", "voicing their concerns", and implementing the changes aimed at improving the quality of their work environment. Interview participants explained that a facilitator who "is not from the same unit as the staff nurses", is not "familiar" with the nurses and their work environment issue. This limited the facilitator's ability to "get them motivated" to work on the issue and implement the changes.

Aspects of the *process that some teams selected to use to implement the intervention* negatively influenced their perceived success. For example, some teams did not engage staff nurses and the manager in the identification of the work environment issues to be addressed and the selection of appropriate strategies to manage it was noted as a problem. One team who conducted a survey to obtain staff input, did not follow through. As well, failure to use the results of the survey to determine the issue to be addressed, and instead imposing the target issues on the unit staff nurses was described. Finally, by not informing other departments of the issues and the changes to be made, it limited their understanding of the suggested changes, resulting in a lack of cooperation and collaboration.

In addition, a number of *organizational factors* interfered with the implementation of the intervention including "low staffing ratios" and "heavy workload" which prevented the unit staff nurses from working on the issues during their regular shift, rather they had to work on it on their own time. This proved to be "time consuming", and it was particularly "hard to get the group together". Participants identified a lack of funding available to implement some of the changes that they were interested in making, as well as an unwillingness by other departments to "bend their rules" in order to facilitate the changes being made. In summary, the nurses' lack of knowledge and skill in initiating change, a sense of skepticism about instituting change, lack of collaboration, a low nurse staffing ratio, and high workload hindered the implementation of the interventions designed to improve the nurses' work environment.

## IMPACT OF THE INTERVENTION ON THE QUALITY OF NURSING CARE

The interview participants discussed the impact of the changes implemented on the staff nurses and on the nurses' work. On some units, the impact was positive, while on others it was negative. The *positive impact* of the changes on the staff nurses was manifested in the nurses' knowledge, feelings, and sense of well being. The staff nurses' involvement in the intervention made them aware of the conditions under which they worked and of areas requiring improvement, and increased their knowledge of the process or ways to address issues and get results. The nurses' participation in implementing the changes and seeing the results reduced the nurses' level of anger, stress, and frustration related to workload issues. The *negative impact* of the changes appears to be related to the staff nurses' perception that the issues addressed were not important to them. The modifications implemented were not useful and resulted in decreased work efficiency. In summary, most interview participants indicated that the intervention implemented made a difference in their work conditions, and that it was rewarding to see the change. This improved the nurses' sense of accomplishment, the relationships among the nurses, and the efficiency of the work on the unit.

## STAFF NURSES' PERCEPTION OF THE INTERVENTION

Although the majority of the interview participants reported that the interventions were useful, a small number indicated that they were not useful for some types of work environment issues, and others said they were not useful at all. The participants who *perceived the intervention as useful* explained that the process provided "the right framework to make the changes". In particular aspects of the process considered as most helpful related to gathering the data about the issues to be addressed which validated the presence and the extent of the issue. As well, the notion of selecting one or very few issues to work on at a time provided a manageable focus. The participants also explained that the intervention was useful in promoting "professional work" and a "sense of control" among unit staff nurses. The process of collecting data and working with management and other staff to initiate and implement the changes in the work environment led to feelings of increased "respect" for staff nurses, which was a positive change on the unit. Nurses identified that involvement in research work is "rewarding", and expanded the professional skills and career of staff nurses. They experienced an increased sense of "autonomy" and "control", where unit staff nurses viewed that they can "voice their concerns" and that their "rights are being heard and respected". In addition, showing the results of the intervention to other staff on the

unit increased the nurses' respect for the work being accomplished and for each other, which enhanced their willingness to participate in implementing the changes.

The participants who *perceived the intervention as not useful* worked on a unit where the changes implemented entailed the re-organization of the supplies in the storage room. They reported that following this re-organization, it was difficult to find things. This resulted in an increased time spent searching for supplies which decreased their work efficiency. The participants concluded that although the intervention had a good intention, the implementation of it was inadequate and inefficient. Overall, the staff nurses were receptive of the intervention, and found it useful in addressing work environment issues. The application of the process, which consists of collecting data on the issue and presenting the data to other staff and management, helped in initiating and implementing the changes. It also induced a sense of professionalism, respect, control, and promoted collaboration among staff nurses.

## STRATEGIES TO IMPROVE THE IMPLEMENTATION OF THE INTERVENTION

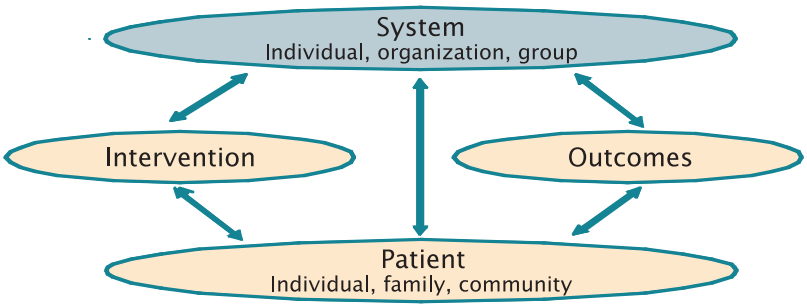
Although the interview participants perceived the intervention to be, in general, useful in making changes in the unit staff nurses' work environment, they commented that the process for implementing the changes was not always well applied. Several strategies to improve the process in future interventions included ensuring that the facilitator was available as needed to address the issues that emerged. As well, participants suggested that the facilitator should be a full-time position in order to get the work done, to maintain continuity and address issues that are similar across units. For the most part, a facilitator chosen from the same unit in which the changes are implemented was thought to be able to encourage collaboration between the facilitator and the staff nurses. The importance of involving nursing management in the intervention was noted as critical for making changes in the work environment and promoting teamwork among unit staff nurses. Finally, it was suggested that releasing time for a group of unit staff nurses to work on the intervention was needed since the implementation requires a lot of time, which nurses do not have on a regular shift.

## CONCLUSIONS

Overall, the staff nurses described their experience with the intervention positively. They perceived the process of collecting data on the work environment issues, sharing the results with management and other staff, involving management and staff in finding appropriate solutions to address the issues, and implementing changes to resolve the issues as useful and rewarding. The process was helpful in addressing problems in the work environment over which nurses have control and helpful in revealing strategies to enhance their control. Examples of the issues that were addressed in the intervention are: unavailability of equipment and supplies to meet the unit's demands, disorganized arrangement of supplies in the unit storage room, and improper timing of new admissions to the unit. These issues decreased the efficiency of staff nurses' work and increased their workload, which jeopardizes the quality of nurses' work life, as well as the quality and safety of patient care.

Following the identification of the work environment issues to be addressed, the staff nurses, assisted by the facilitator, devised strategies to manage the issues. The strategies consisted of changes in certain aspects of the work environment. Most staff nurses were involved in implementing the changes on their respective units. The extent to which the changes were implemented varied across participating units. Several factors facilitated the implementation of the changes including: (1) addressing an issue of concern to the unit staff nurses; (2) having an energetic facilitator serve as a liaison with other departments and work diligently with the unit staff nurses on implementing the changes; (3) having groups of nurses dedicated to the intervention and supportive of the unit staff nurses in their efforts to make the changes; (4) having managers who are receptive and supportive of the changes; (5) communicating information about the issue and the changes to unit staff nurses, management, and other departments; (6) encouraging unit staff nurses to participate in the different phases of the intervention; (7) collaborating with unit staff nurses, management, and other departments on implementing the changes; (8) collecting data on the work environment issue to be addressed; and (9) sharing the results of the implemented changes. In contrast, the nurses' lack of knowledge and skills in initiating change, a sense of skepticism about instituting changes, lack of collaboration, low staff ratio, and high workload hindered the implementation of changes to improve the nurses' work environment.

The changes implemented made a difference in the nurses' work conditions. The nurses reported that it was "rewarding to see the changes". The changes improved the nurses' sense of accomplishment, the relationships among the nurses, and the efficiency of the work on the unit. Consequently, the staff nurses found the intervention useful in addressing work environment issues. The application of the process, which consists of collecting data on the issue and then presenting the data to other staff and management, helped in initiating and implementing the changes. It also induced a sense of professionalism, respect, and control, and promoted collaboration among staff nurses.




# 5

# Chapter Five: System

## Description of the Study Sample

## DESCRIPTION OF THE STUDY SAMPLE

The sample consisted of 16 unit managers, 980 nurse questionnaires and 1,137 patients who met the study inclusion criteria. This includes registered nurses and registered practical nurses employed on medical and surgical units in a random sample of eight hospitals in Ontario. As well, the sample includes patients on those medical and surgical units.

### Nurse Characteristics

The majority of nursing participants (83%) were registered nurses, while 16% were registered practical nurses, and less than 1% were newly graduated nurses (see Table 4). Less than 1% of the respondents did not indicate whether they were registered nurses or registered practical nurses. The pattern of responses from each of the nursing provider groups was relatively constant throughout the first three points of data collection, T1 to T3. However, at the final point of data collection, registered practical nurse involvement in the study declined, and registered nurse participation increased. Data collectors indicated that a number of reasons contributed to this change in involvement in the study including: (1) the repetitive nature of the four points of data collection; (2) heavy workload and lack of time; (3) disinterest; and (4) decreasing numbers of nursing staff on the units.

**Table 4: Nurse Response Rates**

| | Pre-Test[1] Number (%) | Post-Test[2] Number (%) | Post-Test[3] Number (%) | Post-Test[4] Number (%) | Totals |
|---|---|---|---|---|---|
| RN | 272 (81) | 179 (82) | 166 (81.8) | 200 (89) | 817 (83) |
| RPN | 61 (18) | 38 (17) | 36 (17.7) | 21 (9) | 156 (16) |
| Grad RN | 1 (0.3) | 0 (0) | 0 (0) | 0 (0) | 1 (0.3) |
| Missing data | 0 (0) | 2 (1) | 1 (0.5) | 3 (1.5) | 6 (0.7) |
| Total | 334 (100) | 219 (100) | 203 (100) | 224 (100) | 980 (100) |

### Registered Nurses and Registered Practical Nurses

A stratified random sampling process was used to recruit the unit quota required to provide an adequate sample of nurse respondents for this study. A total of 980 completed questionnaires were returned over the duration of the study, ranging from 334 at baseline to 219 at T2, 203 at T3, and 224 at T4. Overall, an average of 51% of the available unit nurses responded to the study, with a range of 36 to 67% of the nurses from each unit responding (see Table 5). The sampling requirements for the study overall were met and the sample can be considered representative of all hospital sites in the study.

| Table 5: Response Rates of Nurses by Study Site | | | | | |
|---|---|---|---|---|---|
| | Pre-Test [1] Participants/ nurses on unit (%) | Post-Test [2] Participants/ nurses on unit (%) | Post-Test [3] Participants/ nurses on unit (%) | Post-Test [4] Participants/ nurses on unit (%) | Totals |
| Site 1 | 38 / 78 (49) | 26 / 74 (35) | 18 / 75 (24) | 23 / 62 (37) | 105 / 289 (36) |
| Site 2 | 49 / 77 (64) | 28 / 82 (34) | 23 / 80 (29) | 28 / 70 (40) | 128 / 309 (41) |
| Site 3 | 59 / 72 (82) | 35 / 57 (61) | 50 / 76 (66) | 38 / 65 (58) | 182 / 270 (67) |
| Site 4 | 31 / 74 (42) | 26 / 72 (36) | 31 / 32 (97) | 19 / 28 (68) | 107 / 206 (36) |
| Site 5 | 48 / 56 (86) | 34 / 49 (69) | 25 / 47 (53) | 38 / 65 (58) | 145 / 217 (67) |
| Site 6 | 12 / 58 (21) | 7 / 67 (10) | 3 / 29 (10) | 10 / 12 (83) | 32 / 166 (26) |
| Site 7 | 39 / 44 (89) | 20 / 40 (50) | 13 / 40 (33) | 19 / 47 (40) | 91 / 171 (53) |
| Site 8 | 58 / 85 (68) | 43 / 88 (49) | 40 / 68 (59) | 49 / 64 (77) | 190 / 305 (62) |
| Totals | 334 / 544 (61) | 219 / 529 (41) | 203 / 447 (45) | 224 / 413 (54) | 980 / 1933 (51) |

Attrition rates were calculated by examining the number of nursing surveys returned at each of the time intervals in the study, in relation to the number of nurses enrolled in the study at baseline. Table 6 demonstrates that the attrition rate was 15% throughout this study, and overall an average of 46% of the available unit nurses responded to the study, with a range of 18 to 65% of the nurses from each unit responding. The attrition rate is greatly impacted by Site 6, which closed one of the study units between Time 2 and Time 3 of the study, resulting in a decline in the number of possible participants from that site. If Site 6 were excluded from the calculation, the attrition rate would range from 34 to 65%.

| Table 6: Attrition Rates of Nurses by Study Site | | | | | |
|---|---|---|---|---|---|
| | Pre-Test [1] Participants/ nurses on unit (%) | Post-Test [2] Participants/ nurses on unit (%) | Post-Test [3] Participants/ nurses on unit (%) | Post-Test [4] Participants/ nurses on unit (%) | Totals |
| Site 1 | 38 / 78 (49) | 26 / 78 (33) | 18 / 78 (23) | 23 / 78 (29) | 105 / 312 (34) |
| Site 2 | 49 / 77 (64) | 28 / 77 (36) | 23 / 77 (30) | 28 / 77 (36) | 128 / 308 (42) |
| Site 3 | 59 / 72 (82) | 35 / 72 (60) | 50 / 72 (69) | 38 / 72 (53) | 182 / 288 (63) |
| Site 4 | 31 / 74 (42) | 26 / 74 (35) | 31 / 74 (42) | 19 / 74 (26) | 107 / 296 (36) |
| Site 5 | 48 / 56 (86) | 34 / 56 (61) | 25 / 56 (45) | 38 / 56 (68) | 145 / 224 (65) |
| Site 6 | 12 / 58 (21) | 7 / 58 (12) | 3 / 29 (10) | 10 / 29 (35) | 32 / 174 (18) |
| Site 7 | 39 / 44 (89) | 20 / 44 (45) | 13 / 44 (30) | 19 / 44 (43) | 91 / 176 (52) |
| Site 8 | 58 / 85 (68) | 43 / 85 (51) | 40 / 85 (47) | 49 / 85 (58) | 190 / 340 (56) |
| Totals | 334 / 544 (61) | 219 / 544 (41) | 203 / 515 (39) | 224 / 515 (43) | 980 / 2118 (46) |

## Age of Nurse Participants

Demographic data examined included general biographical data, and data pertaining to educational preparation and work arrangements. Overall, an average of 95% were female, and 5% were male. The age range of participants is fairly balanced for nurses under the age of 50 years. Overall, 23% ranged in age from 20 to 29 years, 28% were between 30 and 39 years of age, 25% ranged in age from 40 to 49 years, 15% were between 50 and 59 years of age, and 7% were over 60 years of age (see Table 7).

**Table 7: Age of Nurse Participants in the Study**

| Age (years) | Pre-Test [1] Number (%) | Post-Test [2] Number (%) | Post-Test [3] Number (%) | Post-Test [4] Number (%) | Totals |
|---|---|---|---|---|---|
| 20-29 years | 84 (25) | 58 (26) | 39 (19) | 49 (22) | 230 (23) |
| 30-39 years | 103 (31) | 61 (28) | 52 (26) | 62 (28) | 278 (28) |
| 40-49 years | 79 (24) | 50 (23) | 59 (29) | 61 (27) | 249 (25) |
| >50 years | 48 (14) | 33 (15) | 33 (16) | 36 (16) | 150 (15) |
| Did not say | 20 (6) | 17 (8) | 20 (10) | 16 (7) | 73 (8) |
| Totals | 334 (100) | 219 (100) | 203 (100) | 224 (100) | 980 (100) |

## Educational Preparation of Nurse Participants

Table 8 demonstrates that on average the majority of participants (76 %) in this study were prepared at the level of diploma or certificate education, while 22% had baccalaureate preparation, and 1.4% held a Masters degree. This pattern of educational preparation remained constant throughout the four points of time in data collection.

**Table 8: Educational Preparation of Study Nurse Participants**

| Level | Pre-Test [1] Number (%) | Post-Test [2] Number (%) | Post-Test [3] Number (%) | Post-Test [4] Number (%) | Totals |
|---|---|---|---|---|---|
| Diploma/ certificate | 250 (75) | 166 (76) | 158 (78) | 169 (75) | 743 (76) |
| Baccalaureate | 77 (23) | 48 (22) | 44 (22) | 51 (23) | 220 (22) |
| Masters | 5 (2) | 2 (1) | 1 (0.5) | 3 (1) | 11 (1.4) |
| No response | 2 (0.6) | 3 (1) | 0 (0) | 1 (0.9) | 6 (0.6) |
| Totals | 334 (100) | 219 (100) | 203 (100) | 224 (100) | 980 (100) |

On average, few nurse participants in this study were furthering their education (9%) (see Table 9). Of those, an average of 7% were pursuing Baccalaureate studies while 2% were completing a Masters degree.

**Table 9: Educational Pursuits of Study Nurse Participants**

| Level | Pre-Test [1] Number (%) | Post-Test [2] Number (%) | Post-Test [3] Number (%) | Post-Test [4] Number (%) | Totals |
|---|---|---|---|---|---|
| No response | 309 (93) | 194 (88) | 186 (92) | 199 (89) | 888 (91) |
| Baccalaureate | 18 (5) | 19 (9) | 13 (6) | 18 (8) | 68 (7) |
| Masters | 7 (2) | 6 (3) | 4 (2) | 7 (3) | 24 (2) |
| Totals | 334 (100) | 219 (100) | 203 (100) | 224 (100) | 980 (100) |

## Experience of Nurse Participants

Table 10 indicates that on average over a quarter of the study respondents have less than 5 years of experience (29%), with another 13% having between 5 and 9 years of experience. The range of experience is more evenly distributed (10-13%) for each 5 year interval from 10 to 25 years. The most senior nurses in the study, those with over 25 years of experience, represented almost a quarter of participants (20%).

**Table 10: Experience of Study Nurse Participants**

| Experience (years) | Pre-Test [1] Number (%) | Post-Test [2] Number (%) | Post-Test [3] Number (%) | Post-Test [4] Number (%) | Totals |
|---|---|---|---|---|---|
| <5 years | 100 (30) | 64 (29) | 51 (25) | 65 (30) | 280 (29) |
| 5-9 years | 43 (13) | 26 (12) | 30 (15) | 32 (15) | 131 (13) |
| 10-14 years | 43 (13) | 30 (16) | 29 (14) | 28 (10) | 130 (13) |
| 15-19 years | 50 (15) | 28 (13) | 23 (11) | 27 (13) | 128 (13) |
| 20-24 years | 29 (8) | 21 (10) | 22 (11) | 26 (11) | 98 (10) |
| >25 years | 62 (19) | 43 (20) | 46 (23) | 44 (21) | 195 (20) |
| Missing data | 7 (2) | 7 (2) | 2 (1) | 2 (1) | 18 (2) |
| Totals | 334 (100) | 219 (100) | 203 (100) | 224 (100) | 980 (100) |

## Employment Status of Nurse Participants

Table 11 indicates that on average the majority of nurses participating in this study (72%) were employed full-time, while one-quarter (25%) were employed part-time, and (3%) held casual positions.

**Table 11: Employment Status of Study Nurse Participants**

| Employment Status | Pre-Test [1] Number (%) | Post-Test [2] Number (%) | Post-Test [3] Number (%) | Post-Test [4] Number (%) | Totals |
|---|---|---|---|---|---|
| Full-time | 224 (68) | 158 (72) | 151 (74) | 170 (76) | 703 (72) |
| Part-time | 99 (30) | 54 (25) | 41 (20) | 48 (21) | 242 (24) |
| Casual | 8 (2) | 5 (2) | 11 (6) | 6 (3) | 30 (3) |
| Missing data | 3 (1) | 2 (1) | 0 (0) | 0 (0) | 5 (0.5) |
| Totals | 334 (100) | 219 (100) | 203 (100) | 224 (100) | 980 (100) |

The majority of respondents (91%) indicated that their employment status had been chosen by them (see Table 12).

**Table 12: Choice of Employment Status of Study Nurse Participants**

| Employment Status | Pre-Test [1] Number (%) | Post-Test [2] Number (%) | Post-Test [3] Number (%) | Post-Test [4] Number (%) | Totals |
|---|---|---|---|---|---|
| My choice | 297 (90) | 198 (90) | 184 (91) | 208 (93) | 887 (91) |
| Not my choice | 34 (10) | 21 (10) | 18 (9) | 16 (7) | 89 (9) |
| Missing data | 3 (1) | 0 (0) | 1 (0.5) | 0 (0) | 4 (0.4) |
| Totals | 334 (100) | 219 (100) | 203 (100) | 224 (100) | 980 (100) |

Participants were asked what types of changes they would like to have made to their employment status and 8% indicated that they wanted to work less, while a similar number (8%) indicated that they wanted to work more (see Table 13).

**Table 13: Preferred Change in Employment Status of Study Nurse Participants**

| Employment Status Preference | Pre-Test [1] Number (%) | Post-Test [2] Number (%) | Post-Test [3] Number (%) | Post-Test [4] Number (%) | Totals |
|---|---|---|---|---|---|
| No response | 273 (82) | 188 (86) | 171 (84) | 194 (87) | 826 (84) |
| Work more | 35 (11) | 19 (9) | 12 (6) | 10 (4) | 76 (8) |
| Work less | 26 (8) | 12 (5) | 20 (10) | 20 (9) | 78 (8) |
| Totals | 334 (100) | 219 (100) | 203 (100) | 224 (100) | 980 (100) |

Table 14 shows that close to one-third of the participants indicated that they worked between 40 and 44 hours a week (30%). An additional 9% identified that they worked over 45 hours per week.

**Table 14: Average Hours Worked Weekly by Study Nurse Participants**

| | Pre-Test[1] | Post-Test[2] | Post-Test[3] | Post-Test[4] | |
|---|---|---|---|---|---|
| Hours | Number (%) | Number (%) | Number (%) | Number (%) | Totals |
| Up to 40 hrs/wk | 197 (59) | 135 (61) | 113 (56) | 138 (62) | 583 (59) |
| 40-44 hrs/wk | 93 (28) | 63 (29) | 67 (33) | 68 (30) | 291 (30) |
| >45 hrs/wk | 36 (11) | 17 (8) | 22 (11) | 17 (7.6) | 92 (9) |
| No response | 8 (2) | 4 (2) | 1 (0.5) | 1 (0.4) | 14 (2) |
| Totals | 334 (100) | 219 (100) | 203 (100) | 224 (100) | 980 (100) |

## Unit Characteristics

Almost half (48%) of the units involved in this study utilized a staff mix comprised of RNs and RPNs. Close to a third (32%) of units in this study utilized a staff mix model comprised of RNs and unregulated workers (URWs), while a small number (19%) employed an all RN staff (see Table 15).

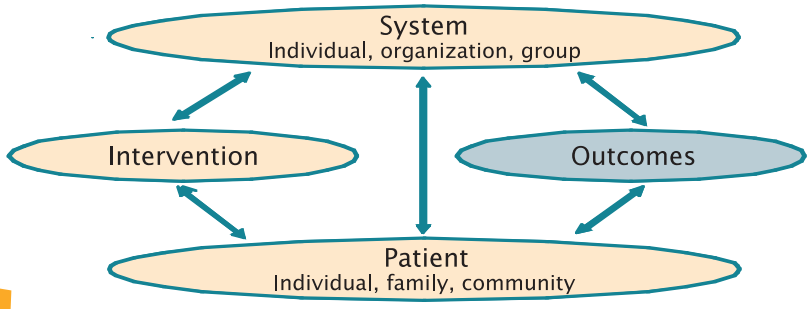
**Table 15: Unit Staffing Model**

| | Pre-Test[1] | Post-Test[2] | Post-Test[3] | Post-Test[4] | |
|---|---|---|---|---|---|
| | Number (%) | Number (%) | Number (%) | Number (%) | Totals |
| RN Only | 3 (19) | 3 (19) | 3 (20) | 3 (20) | 12 (19) |
| RN/RPN | 8 (50) | 8 (50) | 7 (47) | 7 (47) | 30 (48) |
| RN/URW | 5 (31) | 5 (31) | 5 (33) | 5 (33) | 20 (32) |
| Totals | 16 (100) | 16 (100) | 15 (100) | 15 (100) | 62 (100) |

The majority of units utilized a total patient care delivery model (60%), while less than one third used team nursing (30%). Very few units utilized a primary nursing care delivery model (10%) as demonstrated in Table 16.

**Table 16: Unit Care Delivery Model**

| | Pre-Test[1] | Post-Test[2] | Post-Test[3] | Post-Test[4] | |
|---|---|---|---|---|---|
| | Number (%) | Number (%) | Number (%) | Number (%) | Totals |
| Primary | 3 (19) | 1 (6) | 1 (7) | 1 (7) | 6 (10) |
| Team | 6 (38) | 5 (31) | 4 (27) | 4 (27) | 19 (30) |
| Total Patient Care | 7 (43) | 10 (63) | 10 (66) | 10 (66) | 37 (60) |
| Totals | 16 (100) | 16 (100) | 15 (100) | 15 (100) | 62 (100) |




# 6

# Chapter Six: Outcomes

**Nurse Outcomes**

**Factors Influencing Nurse Outcomes**

## Study Sample

As Table 17 shows that half (49%) of the study respondents on average came from medical units while the remaining half (51%) came from surgical units. Two of the study hospitals were teaching hospitals, while the remaining six were community settings.

**Table 17: Nurse Response Rates by Unit Type**

| | Pre-Test [1] Number (%) | Post-Test [2] Number (%) | Post-Test [3] Number (%) | Post-Test [4] Number (%) | Totals |
|---|---|---|---|---|---|
| Medical | 166 (49.7) | 108 (49.3) | 105 (51.7) | 103 (46.0) | 482 (49.1) |
| Surgical | 168 (50.3) | 111 (50.7) | 98 (48.3) | 121 (54.0) | 498 (50.9) |
| Totals | 334 (100) | 219 (100) | 203 (100) | 224 (100) | 980 (100) |

On average, close to one third (31.9%) of the respondents came from teaching hospitals and the remaining two thirds (68.1%) came from community settings (see Table 18).

**Table 18: Nurse Response Rates by Hospital Type**

| | Pre-Test [1] Number (%) | Post-Test [2] Number (%) | Post-Test [3] Number (%) | Post-Test [4] Number (%) | Totals |
|---|---|---|---|---|---|
| Teaching | 108 (32.3) | 63 (28.8) | 73 (36.0) | 69 (30.8) | 313 (31.9) |
| Community | 226 (67.7) | 156 (71.2) | 130 (64.0) | 155 (69.2) | 667 (68.1) |
| Totals | 334 (100) | 219 (100) | 203 (100) | 224 (100) | 980 (100) |

## Mean Scores for Nurse Outcomes

As Table 19 shows, the mean scores for work quality, nursing job satisfaction and perceptions of the quality of care increased from Time 1 to Time 4. In contrast, the mean scores for perceptions of unit nursing leadership and role tension decreased.

The work quality observations showed a modest increase from Time 1 ($\bar{x}$=4.0; SD=0.9) to Time 4 ($\bar{x}$=4.3; SD=0.88). Job satisfaction scores also increased from Time 1 ($\bar{x}$=2.8; SD=0.58) to Time 4 ($\bar{x}$=3.0; SD=0.59). Perceptions of the quality of care increased slightly from Time 1 ($\bar{x}$=3.6; SD=0.71) to Time 4 ($\bar{x}$=3.7; SD=0.66). Finally, the mean scores for job stress increased from Time 1 ($\bar{x}$=11.9; SD=10.24) to Time 4 ($\bar{x}$=13.4; SD=12.0). In contrast, the mean score for perceptions of unit nursing leadership showed a slight decline from Time 1 ($\bar{x}$=3.2; SD=0.71) to Time 4 ($\bar{x}$=3.1; SD=0.74). As well, role tension mean scores declined somewhat from Time 1 ($\bar{x}$=3.0; SD=0.65) to Time 4 ($\bar{x}$= 2.9; SD=0.65).

| Table 19: Mean Scores on Nurse Outcomes | | | | |
|---|---|---|---|---|
| | Pre-Test [1] $\bar{X}$ (SD) | Post-Test [2] $\bar{X}$ (SD) | Post-Test [3] $\bar{X}$ (SD) | Post-Test [4] $\bar{X}$ (SD) |
| **Work Quality Index** ( Scale Range 1-7) | 4.0 (0.9) | 4.0 (0.9) | 4.0 (1.0) | 4.3 (0.8) |
| Teaching Hospitals | 4.4 (0.7) | 4.4 (0.8) | 4.6 (0.8) | 4.7 (0.6) |
| Community Hospitals | 3.9 (0.9) | 3.8 (0.9) | 3.7 (1.0) | 4.1 (0.9) |
| **Job Satisfaction** (Scale Range 1-5) | 2.8 (0.5) | 2.9 (0.5) | 2.9 (0.6) | 3.0 (0.5) |
| Teaching Hospitals | 3.1 (0.5) | 3.1 (0.6) | 3.1 (0.6) | 2.7 (0.5) |
| Community Hospitals | 2.8 (0.6) | 2.8 (0.6) | 3.1 (0.5) | 2.8 (0.6) |
| **Nursing Leadership** (Scale Range 1-5) | 3.2 (0.7) | 3.1 (0.7) | 3.1 (0.8) | 3.1 (0.7) |
| Teaching Hospitals | 3.5 (0.7) | 3.4 (0.7) | 3.3 (0.7) | 3.2 (0.6) |
| Community Hospitals | 3.1 (0.7) | 3.0 (0.7) | 2.9 (0.8) | 3.0 (0.7) |
| **Role Tension** (Scale Range 1-5) | 3.0 (0.6) | 3.0 (0.6) | 3.0 (0.6) | 2.9 (0.6) |
| Teaching Hospitals | 2.9 (0.6) | 2.9 (0.6) | 2.7 (0.5) | 2.8 (0.4) |
| Community Hospitals | 3.1 (0.7) | 3.1 (0.7) | 3.0 (0.7) | 3.0 (0.6) |
| **Quality of Care** (Scale Range 1-5) | 3.6 (0.7) | 3.6 (0.6) | 3.6 (0.7) | 3.7 (0.6) |
| Teaching Hospitals | 3.7 (0.6) | 3.7 (0.7) | 3.7 (0.7) | 3.8 (0.4) |
| Community Hospitals | 3.5 (0.8) | 3.6 (0.7) | 3.5 (0.7) | 3.5 (0.7) |
| **Job Stress** (Scale Range 0-54) | 11.9 (10.24) | 12.5 (10.9) | 12.9 (12.0) | 13.4 (12.0) |
| Teaching Hospitals | 13.7 (9.4) | 16.0 (10.8) | 16.0 (11.4) | 15.3 (11.8) |
| Community Hospitals | 11.0 (10.5) | 11.1 (10.7) | 11.3 (12.1) | 12.6 (12.1) |

After examining linear, quadratic and cubic trends over time using orthogonal polynomial contrast techniques, many of the nurse outcome variables were only found to display significant differences between Time 1 and Time 4. If this occurred, only these two time points were included in the model.

### Change in Responses Following the Intervention

To explore the impact of the intervention on nurse outcomes, the data collected from nurses who participated in the study at all four points in time were analyzed further. Close to one third (28.4%) of these came from teaching hospitals and the remaining two thirds (71.6%) came from community settings. Power calculations were conducted to ensure the sample had sufficient power ($\beta$=.80, $\alpha$=.05, difference=.20). All of the units had power over .85.

Repeated measures multiple analysis of variance (MANOVA) was conducted to determine whether there were significant changes in the scores on the dependent variables between Time 1 and Time 4. For each of the dependent variables, linear models were constructed which assessed the effects of *time* (Time 1 vs. Time 4), *hospital type* (community hospital vs. teaching hospital), *unit type* (medical vs. surgical) and *individual hospital site* as well as the interactions between time and each of hospital type, unit type and individual hospital site.

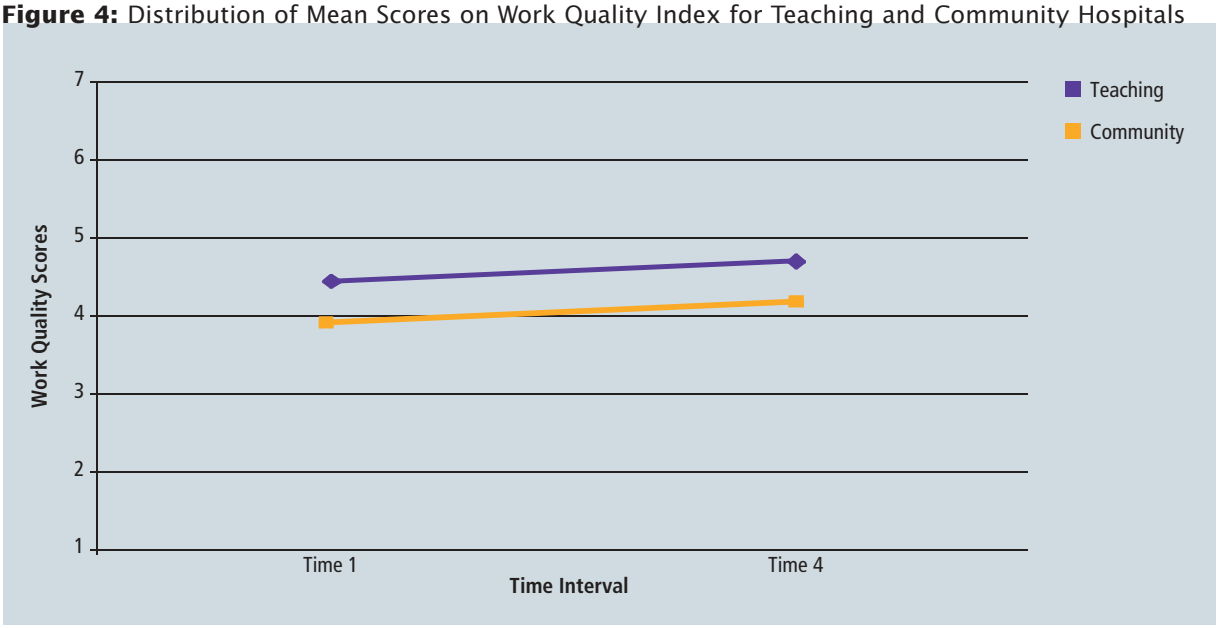
The effect of *individual hospital site* and the interaction between *individual hospital site* and *time* are not of substantive interest, but were modeled to control for these effects and remove them from the error terms of the models. We therefore do not discuss these effects but simply note those instances where they were found to be significant.

### Work Quality

On average, the mean scores for work quality were right at the midpoint of this scale at the first three points of data collection, and increased at the fourth and final point of data collection. The authors of this scale suggest that higher responses on the scale indicate higher perceptions of the quality of the work and work environment. This suggests that prior to the study intervention, the nurses were neither satisfied nor dissatisfied with their work environment, and reported somewhat neutral responses. However, six months following participation in the intervention, nurses in this study reported higher perceptions of their work and work environment (e.g., professional work environment, autonomy of practice, work worth to self and others, professional relationships, professional role enactment and benefits). This suggests that the intervention may have had something to do with the change in nurses' perceptions. The impact of this change was seen across all hospitals, but differed by type of hospital with nurses in teaching hospitals reporting higher perceptions of the quality of the work and work environment than their colleagues in community hospitals.

There were significant differences in work quality scores between Time 1 and Time 4 ($F[1,121]=6.97$, $p=.0097$). As Figure 4 shows, nurses' work quality scores were higher six months after completing the intervention than they were prior to participating in the intervention at baseline. Hospital type was also found to be statistically significant ($F[1,121]=25.00$, $p<.0001$) with nurses from teaching hospitals reporting higher work quality ratings than those from community hospitals. There were no significant differences in scores according to type of hospital unit ($F[6,121]=1.47$, $p=.1935$).

**Figure 4:** Distribution of Mean Scores on Work Quality Index for Teaching and Community Hospitals



## Job Satisfaction

On average, the mean scores for job satisfaction were close to the midpoint of the scale at all four points of data collection, and no significant change was observed over time. The authors of this scale suggest that higher responses on the scale indicate higher job satisfaction. This suggests that regardless of the intervention, the nurses were neither satisfied nor dissatisfied with their jobs, and reported somewhat neutral responses. Mean score differences between teaching and community hospitals were noted with nurses in teaching hospitals reporting higher levels of job satisfaction than nurses in community hospitals. It is possible that nurses in teaching hospitals have access to more resources and opportunities, because of the location of their work, leading to their higher perceptions of satisfaction. As well, nurses on medical units in this study reported higher levels of job satisfaction than their colleagues on surgical units. Patients on medical units are often in hospital longer, which might contribute to these findings.

There were no significant differences in job satisfaction between Time 1 and Time 4, suggesting that the intervention had no impact on nurses' job satisfaction in this study. However, scores did vary significantly according to hospital type ($F[1,123]=15.77$, $p=.0001$) with nurses from teaching hospitals reporting higher levels of job satisfaction than those from community hospitals (see Figure 5).

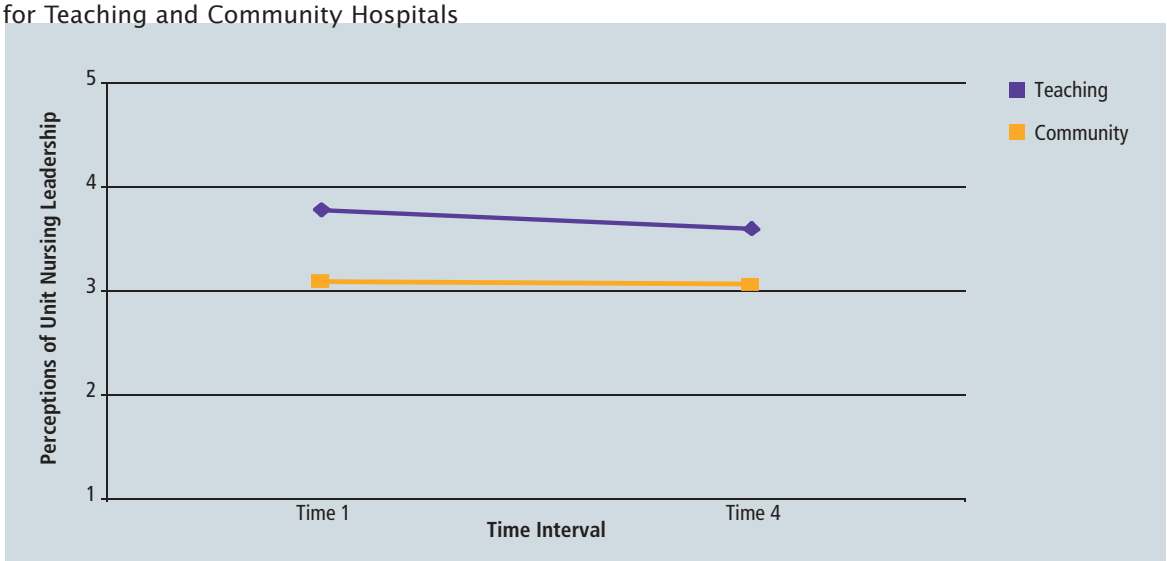
**Figure 5:** Distribution of Mean Scores for Job Satisfaction for Teaching and Community Hospitals


## Nursing Leadership

The mean scores for nurses' overall perceptions of unit leadership were close to the midpoint of the scale at all four points of data collection, and decreased at the fourth point of data collection. The authors of this scale suggest that higher responses on the scale indicate higher perceptions of nursing unit leadership. Responses differed by type of hospital with nurses in teaching hospitals reporting higher perceptions of nursing unit leadership than their colleagues in community hospitals. These findings indicate that prior to the study intervention, the nurses were neither satisfied nor dissatisfied with the nursing unit leadership, and reported somewhat neutral responses. Perceptions

of nursing leadership were found to vary significantly between Time 1 and Time 4 ($F[1,121]=5.88$; $p=.0168$), with the scores decreasing in both teaching and community settings over the duration of this study. However, this change can not be attributed to the intervention, but perhaps to other factors in the nursing work environment during this study. As well, nurses from teaching hospitals reported statistically significant higher perceptions of nursing unit leadership than those from community hospitals ($F[1,121]=26.45$; $p<.0001$) (see Figure 6).

**Figure 6:** Distribution of Mean Scores for Nursing Unit Leadership for Teaching and Community Hospitals

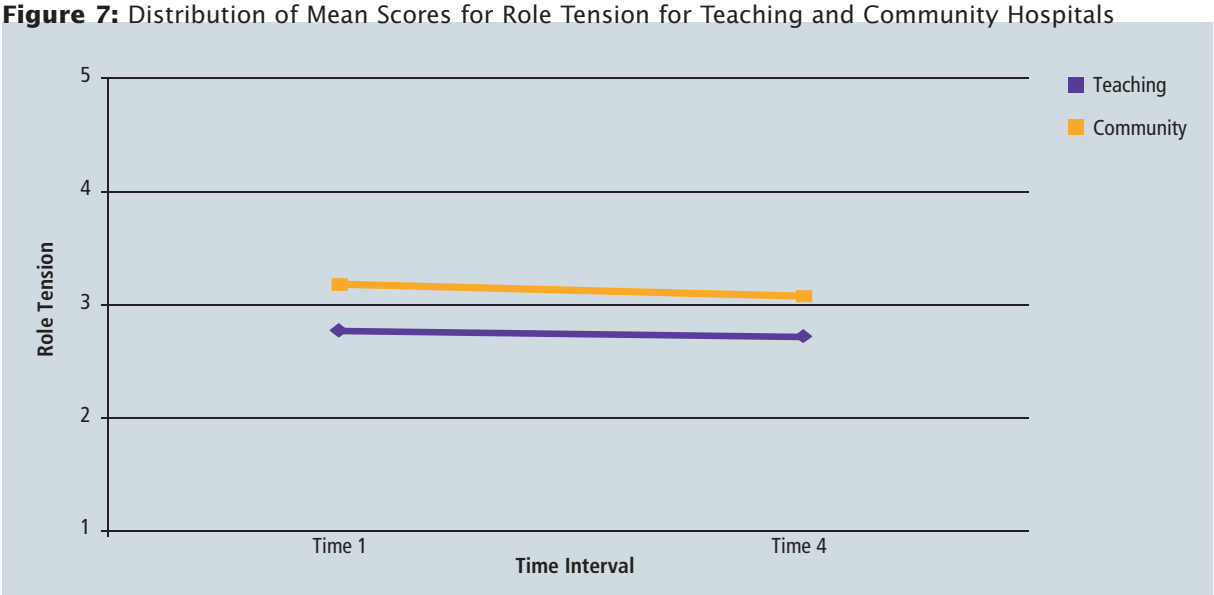



## Role Tension

The mean scores for nurses' role tension were close to the midpoint of the scale at all four points of data collection, and decreased at the fourth point of data collection. The authors of this scale suggest that higher responses on the scale indicate higher levels of role tension. These findings indicate that prior to the study intervention the nurses sometimes experienced role tension. However, six months following participation in the intervention, nurses in this study reported a modest decline in role tension. This suggests that involvement in the intervention may have had something to do with the change in role tension. The impact of this change was seen across all hospitals, but differed by type of hospital with nurses in teaching hospitals reporting higher levels of role tension than their colleagues in community hospitals.

There was a statistically significant interaction between time and hospital type ($F[6,121]=2.80$; $p=.0138$) with the scores related to role tension showing a slight decrease over time in this study (see Figure 7). Hospital type was also statistically significant ($F[1,121]=11.93$; $p=.0008$), with nurses from teaching hospitals reporting lower levels of role tension than those from community hospitals.

**Figure 7:** Distribution of Mean Scores for Role Tension for Teaching and Community Hospitals

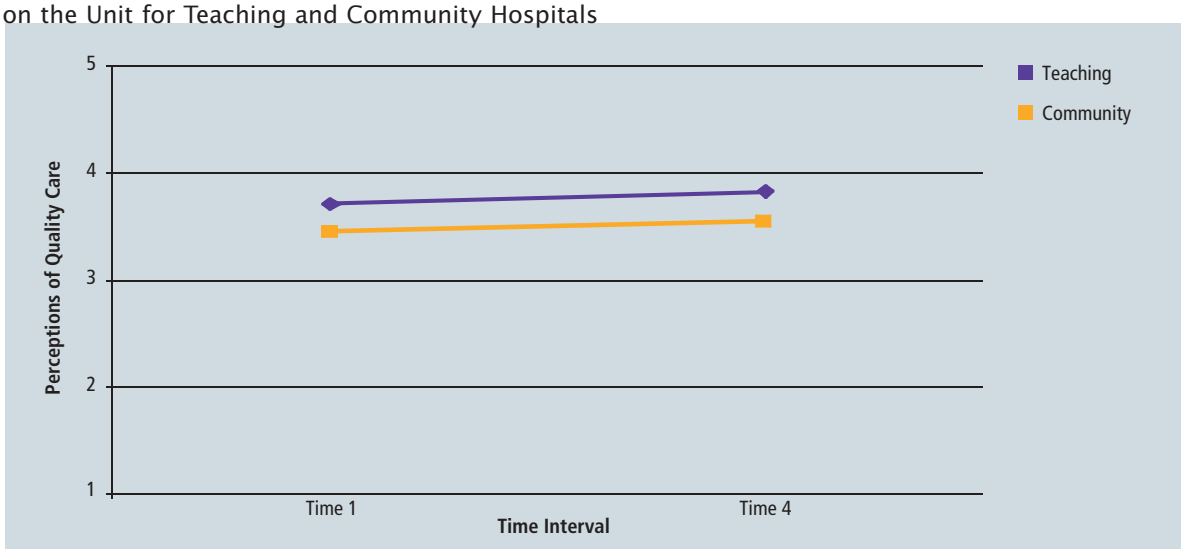



## Quality of Care

On average, the mean scores for work quality were above the midpoint for this scale at the first three points of data collection, and increased at the fourth and final point of data collection. The authors of this scale suggest that higher responses on the scale indicate higher perceptions of the quality of care and teamwork on the unit. This suggests that prior to the study intervention the nurses had favorable impressions of the quality of care provided on their units. However, six months following participation in the intervention, nurses in this study reported higher perceptions of the quality of care and teamwork on their units. This suggests that the intervention may have had something to do with the change in nurses' perceptions. The impact of this change was seen across all hospitals, but differed by type of hospital with nurses in teaching hospitals reporting higher perceptions of the quality of care than their colleagues in community hospitals.

Nurses from teaching hospitals reported statistically significant higher perceptions of the quality of care provided on their units than those from community hospitals ($F[1,123]=4.97$; $p=.0276$). The mean quality of care scores for teaching hospitals was 3.88 compared to 3.64 for community hospitals as Figure 8 illustrates.

**Figure 8:** Distribution of Mean Scores for Perceptions of Quality of Care on the Unit for Teaching and Community Hospitals

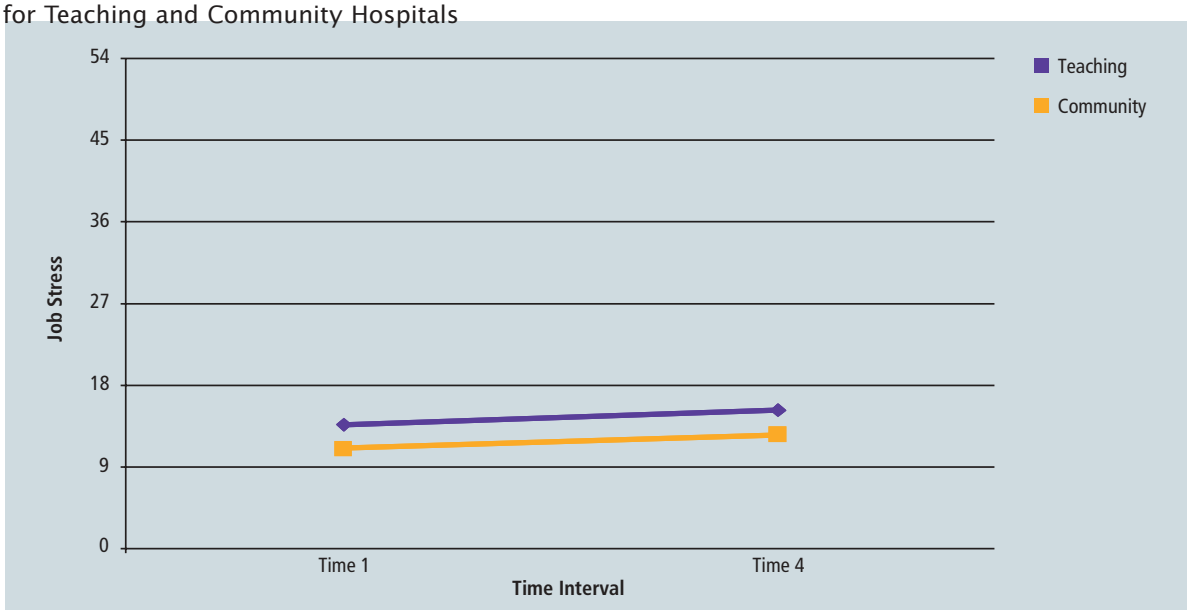



## Job Stress

On average, the mean scores for job stress were below the cutoff point for this scale at all four points of data collection, and increased somewhat at the fourth and final point of data collection. The authors of this scale suggest that lower scores on this scale indicate higher levels of job stress. This suggests that prior to the study intervention, the nurses had substantially high levels of job stress, and the intervention did not lead to a significant change in these scores. Job stress differed by type of hospital with nurses in teaching hospitals reporting substantially higher levels of job stress.

There were no significant differences in job stress scores between Time 1 and Time 4. However, scores did vary significantly according to hospital type ($F[1,123]=15.77$, $p=.0001$) with nurses from teaching hospitals reporting higher levels of job stress than those from community hospitals (see Figure 9).

**Figure 9:** Distribution of Mean Scores for Job Stress on the Unit for Teaching and Community Hospitals



## FACTORS INFLUENCING NURSE OUTCOMES

To understand the impact of the intervention on outcomes, hierarchical linear modeling was conducted to determine if nursing demographic variables or hospital and unit characteristics influenced the nurse outcomes. Table 20 shows that a number of these demographic variables had an impact on these outcomes.

**Table 20: The Influence of Hospital and Nurse Characteristics on Nurse Outcomes**

| | Work Quality | Job Satisfaction | Nursing Leadership | Role Tension | Quality of Care | Job Stress |
|---|---|---|---|---|---|---|
| **Intervention Effect** | | | | | | |
| Time (change) | 0.0214* | 0.1732 | 0.1611 | 0.1841 | 0.5282 | 0.1626 |
| **Individual Nurse Characteristics** | | | | | | |
| Age | 0.1615 | 0.1217 | 0.0069* | 0.3872 | 0.0737 | 0.1433 |
| Gender | 0.0149* | 0.4947 | 0.5078 | 0.5461 | 0.4372 | 0.4744 |
| Highest Education | 0.2396 | 0.3694 | 0.0492* | 0.7104 | 0.4394 | 0.0491* |
| Work Status | 0.5532 | 0.0443* | 0.3150 | 0.1992 | 0.4079 | 0.3038 |
| **Hospital Characteristics** | | | | | | |
| Hospital Site | 0.1101 | 0.0928 | 0.3312 | 0.1661 | 0.1518 | 0.3934 |
| Teaching or Community Site | 0.0018* | 0.0016* | 0.0005* | 0.0008* | 0.1214 | 0.1354 |
| **Unit Characteristics** | | | | | | |
| Bed Size | 0.8500 | 0.9193 | 0.8065 | 0.2636 | 0.7903 | 0.9450 |
| Patient Age | 0.4441 | 0.0916 | 0.9665 | 0.4782 | 0.7831 | 0.3474 |
| Patient ALOS | 0.8907 | 0.2384 | 0.6343 | 0.9278 | 0.3862 | 0.3360 |
| Patient Gender | 0.9587 | 0.7844 | 0.1176 | 0.6098 | 0.6159 | 0.7022 |
| Medical or Surgical Unit | 0.7995 | 0.0718 | 0.1114 | 0.2477 | 0.0001* | 0.1766 |
| Proportion of RN | 0.4126 | 0.4811 | 0.6102 | 0.2871 | 0.7274 | 0.8264 |
| Care Delivery Model | 0.3071 | 0.2719 | 0.4401 | 0.8943 | 0.0134* | 0.2362 |
| % Full time RNs | 0.8492 | 0.1844 | 0.1306 | 0.4433 | 0.1115 | 0.3147 |
| % Part time RNs | 0.5580 | 0.0164* | 0.0828 | 0.2837 | 0.1975 | 0.6059 |
| % Casual RNs | 0.5697 | 0.1504 | 0.7826 | 0.6468 | 0.6510 | 0.4697 |
| RN Age | 0.0218* | 0.3238 | 0.0358* | 0.3294 | 0.7451 | 0.0038* |
| RN Gender | 0.6460 | 0.2383 | 0.3644 | 0.5249 | 0.4216 | 0.1139 |
| RN Experience on Unit | 0.8616 | 0.8179 | 0.2037 | 0.1185 | 0.9489 | 0.8295 |
| RN Experience in Hospital | 0.3332 | 0.6631 | 0.4756 | 0.7476 | 0.0248* | 0.8577 |
| RN Highest Education | 0.6971 | 0.9304 | 0.4680 | 0.6211 | 0.2056 | 0.6428 |
| RN Baccalaureate | 0.7259 | 0.2804 | 0.0328* | 0.2592 | 0.9682 | 0.1241 |
| RN Resignations | 0.5208 | 0.1898 | 0.9250 | 0.0379* | 0.6640 | 0.6051 |
| RN Vacancies | 0.3988 | 0.0467* | 0.4512 | 0.1424 | 0.9438 | 0.9040 |
| RN Hires | 0.8793 | 0.8435 | 0.3163 | 0.6095 | 0.7554 | 0.3793 |
| Nurse-patient Ratio | 0.0302* | 0.2987 | 0.0201* | 0.1336 | 0.0788 | 0.0439* |
| Absenteeism | 0.8460 | 0.4617 | 0.2877 | 0.9823 | 0.8557 | 0.9263 |
| Education Hours | 0.5708 | 0.5744 | 0.8628 | 0.5303 | 0.5659 | 0.1435 |
| Orientation Hours | 0.8545 | 0.3197 | 0.4225 | 0.8900 | 0.8440 | 0.9456 |
| Agency Hours | 0.6671 | 0.3808 | 0.8618 | 0.6025 | 0.5713 | 0.7859 |
| Staff Effectiveness | 0.6347 | 0.0716 | 0.0827 | 0.5745 | 0.4703 | 0.8537 |

* significant $p$=0.05

### Work Quality

A number of variables were found to be predictive of nurses' perception of the quality of their work and their work environments in this study. First, time was found to be statistically significant ($p$=.0214), with an increase in work quality ratings from Time 1 of data collection at baseline to Time 4 of the data collection, six months after the intervention had been implemented. At the individual level, the gender of nurses was found to have a statistically significant positive influence on nurses' perceptions of work quality ($p$=.0149). This indicates that male nurses reported higher ratings of work quality than female nurses. At the unit level, the age of nurses was found to have a statistically significant negative influence on nurses' perceptions of work quality ($p$=.0218). Thus, the higher average age of registered nurses on the unit, the lower the perceptions of work quality. Hospital type ($p$=.0018) was found to be predictive of nurses' perceptions of work quality with nurses in teaching hospitals reporting more positive perceptions of work quality and the work environment than nurses in community hospitals. Finally, the nurse-patient ratio had a statistically significant negative influence on nurses' perceptions of work quality ($p$=.0302). This indicates that the higher the nurse-patient ratio, the lower nurses' perceptions of work quality.

### Job Satisfaction

At the individual level, nurses' work status had a statistically significant positive influence on nursing job satisfaction ($p$=.0443). This indicates that casual nurses reported higher levels of job satisfaction than either full-time or part-time workers. At the unit level, the percentage of part-time nurses on the unit had a statistically significant positive influence on job satisfaction ($p$=.0164), as did the number of vacancies ($p$=.0467). This suggests that the more part-time nurses were employed on a unit, the higher the average ratings of job satisfaction. As well, as the number of vacancies on the unit rises, the average ratings for job satisfaction on the unit increase. Hospital type ($p$=.0016) was found to be predictive of nurses job satisfaction with nurses in teaching hospitals reporting higher job satisfaction ratings than nurses in community hospitals. None of the unit characteristics were predictive of nurses' job satisfaction.

### Nursing Leadership

At the individual level, the age of nurses ($p$=.0069) and level of education attained ($p$=.0492) had a statistically significant positive influence on the perceptions of unit nursing leadership. Specifically, as the average age of nurses on the unit increases, the more positive the perceptions of the leadership on the unit. As well, as the level of higher education of nurses on the unit increases, the more positive their perceptions of the nursing unit leadership. At the unit level, age ($p$=.0358) and experience ($p$=.0237) were found to have a statistically significant positive influence on perceptions of unit nursing leadership while education ($p$=.0328) had a statistically significant negative relationship. This indicates that as the average age of nurses on the unit increases, the more positive the perceptions of the leadership on the unit. As well, the greater the number of Baccalaureate nurses on a unit, the more positive the perceptions of the nursing unit leadership. Finally, as the average years of nurses' experience on the unit increases, the more positive the perceptions of nursing unit leadership. Hospital type ($p$=.0005) was found to be predictive of nurses' perceptions of unit nursing leadership with nurses from teaching hospitals reporting higher perceptions of unit nursing leadership than their colleagues in

community hospitals. Finally, the nurse-patient ratio had a statistically significant negative influence on nurses' perceptions of unit leadership ($p$=.0302). This indicates that the higher the nurse-patient ratio, the lower nurses' perceptions of nursing unit leadership.

### Role Tension

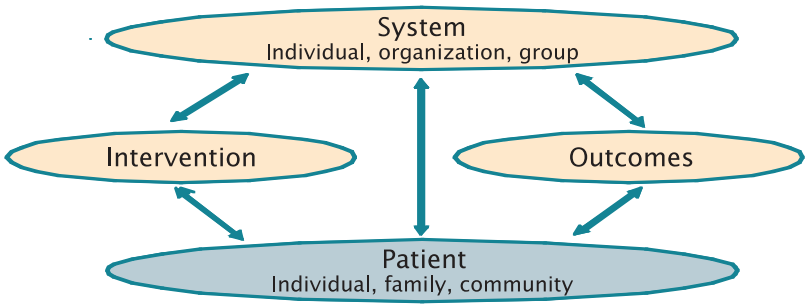
None of the individual or unit-level nurse characteristics were predictive of nurses' role tension. Hospital type ($p$=.0008) was found to be predictive of nurses' role tension with nurses in teaching hospitals reporting higher role tension ratings than nurses in community hospitals. The number of registered nurse resignations ($p$=.03791) was also predictive of nurses' role tension. Specifically, as the number of registered nurse resignations increased on the unit, nurses' perceptions of role tension declined.

### Quality of Care

None of the individual level nursing characteristics were predictive of nurses' perceptions of the quality of care provided on the unit. One unit level nursing characteristic, registered nurse experience in the hospital, had a statistically significantly positive influence on nurses' perceptions of the quality of care ($p$=.0258). That is, the greater the number of years of nurses' experience in the hospital, the higher the average nurses' perceptions of the quality of care. Two unit characteristics were found to be related with the type of unit, whether medical or surgical ($p$=.0001), and type of patient care delivery model ($p$=.0134) both having a statistically significantly positive relationship to nurses' perceptions of the quality of care. In two of these sites, nurses on medical units reported higher perceptions of the quality of care than nurses on surgical units. As well, nurses on units that provide team nursing report higher perceptions of the quality of care provided on the unit than nurses working on units utilizing a total patient care delivery model.

### Job Stress

At the individual level, the level of education attained by the nursing staff ($p$=.0491) had a statistically significant positive influence on nurses' perceptions of job stress. That is, registered nurses with a Baccalaureate degree reported higher levels of job stress than registered nurses with diploma preparation ($p$=.0058). At the unit level, the age of nurses was found to have a statistically significant positive influence on nurses' job stress ($p$=0.0038). This indicates that as the age of nurses on the unit increases, so does the level of nurses' job stress. Finally, the nurse-patient ratio had a statistically significant negative influence on nurses' job stress ($p$=.0439). This indicates that the higher the nurse-patient ratio, the higher the job stress experienced by nurses on the unit.




# 7

# Chapter Seven: Patients

**Patient Characteristics**

**Gender of Patient Participants**

**Mean Scores for Patient Outcomes**

**Change in Responses Following the Intervention**

**Factors Influencing Patient Outcomes**

**Patient Judgments of Hospital Quality**

**Perceived Health Benefit of Nursing Care**

**Therapeutic Self-Care**

**Activities of Daily Living**

## Patient Characteristics

A random quota sampling process was also used to recruit the number of patient respondents required for each unit in this study. A total of 1,137 completed questionnaires were returned over the duration of the study, ranging from 304 at baseline to 303 at T2, 269 at T3, and 261 at T4. Overall, an average of 89% of the available unit patients were recruited into the study, with a range of 82% to 95% of the eligible patients from each unit responding (see Table 21). The sampling requirements for the study overall were met and the sample can be considered representative of all hospital sites in the study.

**Table 21: Response Rates of Patients by Study Site**

| | Pre-Test [1] Participants/ nurses on unit (%) | Post-Test [2] Participants/ nurses on unit (%) | Post-Test [3] Participants/ nurses on unit (%) | Post-Test [4] Participants/ nurses on unit (%) | Totals |
|---|---|---|---|---|---|
| Site 1 | 38 / 78 (49) | 26 / 74 (35) | 18 / 75 (24) | 23 / 62 (37) | 105 / 289 (36) |
| Site 1 | 41 / 40 (103) | 40 / 40 (100) | 40 / 40 (100) | 40 / 40 (100) | 161 / 160 (14) |
| Site 2 | 30 / 40 (75) | 34 / 40 (85) | 28 / 40 (70) | 32 / 40 (80) | 124 / 160 (11) |
| Site 3 | 43 / 40 (108) | 41 / 40 (103) | 46 / 40 (115) | 38 / 40 (95) | 168 / 160 (15) |
| Site 4 | 40 / 40 (100) | 42 / 40 (105) | 40 / 40 (100) | 42 / 40 (105) | 164 / 160 (14) |
| Site 5 | 41 / 40 (103) | 40 / 40 (100) | 40 / 40 (100) | 40 / 40 (100) | 161 / 160 (14) |
| Site 6 | 29 / 40 (73) | 39 / 40 (98) | 18 / 40 (45) | 14 / 40 (35) | 100 / 160 (9) |
| Site 7 | 40 / 40 (100) | 27 / 40 (68) | 17 / 40 (43) | 15 / 40 (38) | 99 / 160 (9) |
| Site 8 | 40 / 40 (100) | 40 / 40 (100) | 40 / 40 (100) | 40 / 40 (100) | 160 / 160 (14) |
| Totals | 304 / 320 (95) | 303 / 320 (95) | 269 / 320 (84) | 261 / 320 (82) | 1137 / 1280 (89) |

## Gender of Patient Participants

Demographic data examined showed that overall 56% were female, and 43% were male (see Table 22).

**Table 22: Gender of Patient Study Participants**

| Gender | Pre-Test [1] Number (%) | Post-Test [2] Number (%) | Post-Test [3] Number (%) | Post-Test [4] Number (%) | Totals |
|---|---|---|---|---|---|
| Female | 179 (59) | 172 (57) | 137 (50) | 151 (58) | 639 (56) |
| Male | 124 (41) | 129 (43) | 128 (48) | 109 (42) | 490 (43) |
| Missing data | 1 (0.3) | 2 (0.4) | 4 (2) | 1 (0.3) | 8 (0.7) |
| Total | 304 (100) | 303 (100) | 269 (100) | 261 (100) | 1137 (100) |

The age range of patients shows that increasingly, patients being cared for in hospitals are older (see Table 23). Overall, 7% ranged in age from 20 to 29 years, 9% were between 30 and 39 years of age, 14% ranged in age from 40 to 49 years, 17% were between 50 and 59 years of age, 20% were between 60 and 69 years of age, 17% were between 50 and 59 years of age, 20% were between 60 and 69 years of age, 21% were between 70 and 79 years of age, 9% were between 80 and 89 years of age, and 0.8% were over 90 years of age.

**Table 23: Age of Patient Study Participants**

| Age (years) | Pre-Test[1] Number (%) | Post-Test[2] Number (%) | Post-Test[3] Number (%) | Post-Test[4] Number (%) | Totals |
|---|---|---|---|---|---|
| 20-29 years | 26 ( 8) | 10 (4) | 10 (4) | 28 (10) | 74 (7) |
| 30-39 years | 32 (10) | 29 (9) | 19 (7) | 24 (9) | 104 (9) |
| 40-49 years | 37 (12) | 46 (15) | 45 (17) | 34 (13) | 162 (14) |
| 50-59 years | 46 (15) | 58 (19) | 46 (17) | 46 (18) | 196 (17) |
| 60-69 years | 60 (20) | 62 (20) | 61 (23) | 44 (17) | 227 (20) |
| 70-79 years | 66 (22) | 68 (23) | 53 (20) | 57 (22) | 244 (21) |
| 80-89 years | 30 (10) | 24 (8) | 28 (10) | 26 (10) | 108 (9) |
| >90 years | 3 (1.2) | 3 (1) | 2 (1) | 1 (0.5) | 9 (0.8) |
| Did not say | 4 (1.8) | 3 (1) | 5 (1) | 1 (0.5) | 13 (1) |
| Total | 304 (100) | 303 (100) | 264 (100) | 261 (100) | 1137 (100) |

As Table 24 shows 46% of the study patient respondents came from medical units while the remaining half (54%) came from surgical units.

**Table 24: Patient Response Rates**

| | Pre-Test[1] Number (%) | Post-Test[2] Number (%) | Post-Test[3] Number (%) | Post-Test[4] Number (%) | Totals |
|---|---|---|---|---|---|
| Medical | 143 (47) | 155 (51) | 118 (44) | 111 (43) | 527 (46) |
| Surgical | 161 (53) | 148 (49) | 151 (56) | 150 (57) | 610 (54) |
| Total | 304 (100) | 303 (100) | 269 (100) | 261 (100) | 1137 (100) |

Two of the study hospitals were teaching hospitals, while the remaining six were community settings. Approximately one quarter (26%) of the respondents came from teaching hospitals and the remaining (74%) came from community settings (see Table 25).

**Table 25: Patient Response Rates by Teaching and Community Hospital Status**

| | Pre-Test[1] Number (%) | Post-Test[2] Number (%) | Post-Test[3] Number (%) | Post-Test[4] Number (%) | Totals |
|---|---|---|---|---|---|
| Teaching | 74 (24) | 75 (25) | 74 (28) | 70 (37) | 293 (26) |
| Community | 230 (76) | 228 (75) | 195 (72) | 191 (73) | 844 (74) |
| Total | 304 (100) | 303 (100) | 269 (100) | 261 (100) | 1137 (100) |

## Mean Scores for Patient Outcomes

As Table 26 shows, mean scores for three of the patient outcome variables, therapeutic self-care, perceived benefit of nursing care, and activities of daily living increased from Time 1 to Time 4. In contrast, mean scores for patient judgments of hospital quality decreased.

The therapeutic self-care observations showed a modest increase from Time 1 ($\bar{x}$=4.01; SD=0.74) to Time 4 ($\bar{x}$=4.14; SD=0.66). Perceived health benefit scores also increased from Time 1 ($\bar{x}$=4.02; SD=0.91) to Time 4 ($\bar{x}$=4.13; SD=0.72). Perceptions of activities of daily living increased slightly from Time 1 ($\bar{x}$=1.89; SD=1.79) to Time 4 ($\bar{x}$=1.91; SD=1.85). In contrast, the mean score for patients judgments of hospital quality showed a slight decline from Time 1 ($\bar{x}$=2.05; SD=0.85) to Time 4 ($\bar{x}$=1.91; SD=0.74).

**Table 26: Mean Scores on Patient Outcome Scales**

| Instrument | Pre-Test [1] $\bar{X}$ (SD) | Post-Test [2] $\bar{X}$ (SD) | Post-Test [3] $\bar{X}$ (SD) | Post-Test [4] $\bar{X}$ (SD) |
|---|---|---|---|---|
| PJHQ | 2.05 (0.85) | 1.93 (0.72) | 1.92 (0.72) | 1.91 (0.74) |
| Therapeutic Self Care | 4.01 (0.74) | 4.01 (0.75) | 4.00 (0.83) | 4.14 (0.66) |
| Perceived Health Benefit | 4.02 (0.91) | 4.15 (0.73) | 4.17 (0.70) | 4.13 (0.72) |
| Katz ADL | 1.89 (1.79) | 1.73 (1.84) | 2.15 (2.01) | 1.91 (1.85) |

## Change in Responses Following the Intervention

To explore the impact of the intervention on patient outcomes, the data collected from patients who participated in the study at all four points in time were analyzed further. A total of 1,137 patients participated in the study over the four points of time.

## Factors Influencing Patient Outcomes

To understand the impact of the intervention on patient outcomes, general linear modeling was conducted to determine if hospital and unit characteristics influenced the patient outcomes. Table 27 shows that a number of the nursing demographic variables and unit characteristics had an impact on these outcomes.

**Table 27: The Influence of Hospital and Unit Characteristics on Patient Outcomes**

| | Patient Judgments of Hospital Quality | Perceived Health Benefit | Therapeutic Self-Care | Activities of Daily Living |
|---|---|---|---|---|
| **Intervention Effect** | | | | |
| Time (change) | 0.8307 | 0.5740 | 0.1658 | 0.6569 |
| **Hospital Characteristics** | | | | |
| Hospital Site | 0.4797 | 0.4455 | 0.2283 | 0.1084 |
| Teaching or Community Site | 0.0043* | 0.0099* | 0.1340 | 0.0001* |
| **Unit Characteristics** | | | | |
| Bed Size | 0.5413 | 0.8858 | 0.3911 | 0.3124 |
| Patient Age | 0.4693 | 0.4310 | 0.8214 | 0.1967 |
| Patient ALOS | 0.0934 | 0.5820 | 0.5138 | 0.8480 |
| Patient Gender | 0.3683 | 0.7057 | 0.7874 | 0.0377* |
| Medical or Surgical Unit | 0.0147* | 0.5967 | 0.0081* | 0.0184* |
| Proportion of RN | 0.5733 | 0.9117 | 0.7838 | 0.0473* |
| Care Delivery Model | 0.8175 | 0.6811 | 0.6568 | 0.1230 |
| % Full time RNs | 0.1822 | 0.8962 | 0.7969 | 0.1474 |
| % Part time RNs | 0.5004 | 0.1369 | 0.9557 | 0.2659 |
| % Casual RNs | 0.5103 | 0.0509* | 0.6902 | 0.8251 |
| RN Age | 0.8360 | 0.3833 | 0.3462 | 0.7028 |
| RN Gender | 0.9100 | 0.9627 | 0.1661 | 0.3374 |
| RN Experience on Unit | 0.2765 | 0.2866 | 0.6723 | 0.4083 |
| RN Experience in Hospital | 0.5555 | 0.8482 | 0.0212* | 0.9631 |
| RN Highest Education | 0.7772 | 0.2484 | 0.9488 | 0.1744 |
| RN Baccalaureate | 0.6576 | 0.1700 | 0.1135 | 0.6483 |
| RN Resignations | 0.7419 | 0.7314 | 0.5601 | 0.4678 |
| RN Vacancies | 0.4423 | 0.7483 | 0.4879 | 0.7793 |
| RN Hires | 0.3950 | 0.0998 | 0.8454 | 0.0607 |
| Nurse-patient Ratio | 0.5893 | 0.9032 | 0.8790 | 0.4062 |
| Absenteeism | 0.3425 | 0.2988 | 0.3519 | 0.3625 |
| Education Hours | 0.5802 | 0.7791 | 0.3826 | 0.1721 |
| Orientation Hours | 0.5710 | 0.3452 | 0.4318 | 0.9304 |
| Agency Hours | 0.7046 | 0.8951 | 0.7291 | 0.6712 |
| Staff Effectiveness | 0.3588 | 0.4265 | 0.1951 | 0.1089 |

* significant $p$=0.05

### Patient Judgments of Hospital Quality

Two variables were found to be predictive of patients' judgments of hospital quality in this study. First, hospital type ($p$=.0043) was found to be predictive of patients' judgments of hospital quality with patients in teaching hospitals reporting more positive perceptions of quality than patients in community hospitals. Finally, the type of unit, whether medical or surgical ($p$=.0147) had a statistically significantly positive relationship to patients' judgments of hospital quality, with patients on medical units reported higher judgments of the quality of care than patients on surgical units.

### Perceived Health Benefit of Nursing Care

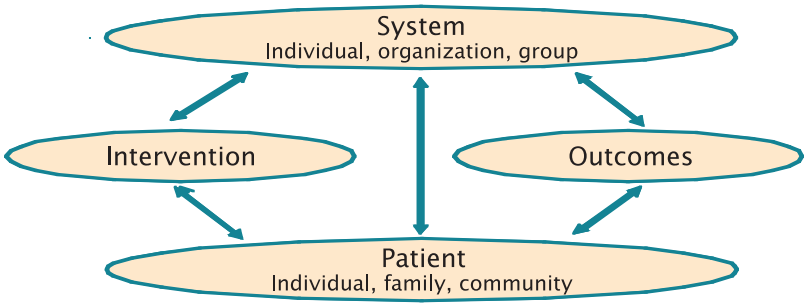
Two variables were found to be predictive of patients' perceptions of the health benefit of nursing care in this study. First, hospital type ($p$=.0079) was found to be predictive of patients' perceptions of the health benefit of nursing care with patients in teaching hospitals reporting more positive perceptions than patients in community hospitals. Finally, nurses' work status had a statistically significant positive influence on patients' perceptions of the health benefit of nursing care ($p$=.0509). This indicates that patients reported higher perceptions of the health benefit of nursing care on units that employed a higher percentage of casual registered nurses than units that employ a higher percentage of either full-time or part-time registered nurses.

### Therapeutic Self-Care

Two variables were noted to explain patients' knowledge and ability to assume self-care in this study. These were the type of unit ($p$=.0081) and the experience level of RNs on the unit ($p$=.0212). In this study, patients on surgical units had higher ratings related to their self-care ability than patients on medical units. As well, patients reported higher ratings of their self-care ability on units that had more experienced RNs.

### Activities of Daily Living

Four variables were predictive of patients' independence in activities of daily living in this study. First, hospital type ($p$=.0001) was found to be predictive of patients' independence in activities of daily living with patients in teaching hospitals experiencing higher levels of independence than patients in community hospitals. Patient gender ($p$=.0377) also predicted patients' independence in activities of daily living with female patients reported as having higher levels of independence than male patients in this study. The type of unit ($p$=.0184) was indicative of patients' levels of independence, with patients on surgical units reported as having higher levels of independence than patients on medical units. Finally, nurse staffing was predictive of patient level of independence, with patients on units that employed higher proportions of RNs reported to have higher levels of independence in activities of daily living.




# 8

# Chapter Eight: Discussion and Conclusions

## DISCUSSION AND CONCLUSIONS

The ultimate purpose of this study was to contribute to the field of nursing administrative research by conducting one of the first studies in Canada examining the impact of an intervention designed to enhance the quality of work life for nurses on outcomes. While the literature provides examples of quality work life issues being experienced by nurses today, there is limited research evaluating interventions to improve the nursing work environment. The Quality Work Environments for Nursing (QWEN) study set out to (1) assist nurse executives to develop interventions that enhance the quality of work life for nurses in a sample of hospitals in Ontario; and (2) to evaluate the impact of those interventions on nurse, system quality, and patient outcomes.

## THE WORKLOAD INTERVENTION AND NURSE OUTCOMES

### Work Quality

Prior to the study intervention, the nurses were somewhat neutral in their descriptions of the work environment, indicating that they were neither satisfied nor dissatisfied with the work environment. Following participation in the intervention, nurses in this study reported statistically significant higher perceptions of their work and work environment, suggesting that the intervention may have had something to do with the change in nurses' perceptions. Nurses in teaching hospitals reported higher perceptions of the quality of the work and work environment than their colleagues in community hospitals.

The work environment of nurses was impacted by a number of individual nurse characteristics in this study. For example, older nurses reported lower ratings of the quality of their work and work environment, which may imply that as nurses age, their expectations related to the work environment may also rise.

Unit characteristics were also found to have an impact on the work environment. Specifically, as nurse-patient ratios climbed higher, nurses reported lower perceptions of the quality of work and work environment on the unit.

### Job Satisfaction

The intervention did not appear to have an impact on nurses' job satisfaction, although nurses in teaching hospitals report higher levels of job satisfaction than nurses in community hospitals. It is possible that nurses in teaching hospitals have access to more resources and opportunities, because of the location of their work, leading to their higher perceptions of satisfaction. As well, nurses on medical units in this study reported higher levels of job satisfaction than their colleagues on surgical units. Patients on medical units are often in hospital longer, which might contribute to these findings.

Job satisfaction of nurses was affected by a number of individual nurse characteristics in this study. For example, in the individual level data, casual nurses reported higher levels of job satisfaction than either full- or part-time workers. This finding is not surprising as casual nurses have the greatest flexibility in their work schedule, with the capacity of choosing when they will work a shift. Similarly, at the unit-level, the more part-time nurses employed on a unit, the higher the average ratings of job satisfaction. Part-time nurses have greater work flexibility than full-time nurses, and have the ability to control the shifts they work and the amount of time that

they work. As well, as the number of RN vacancies on the unit rises, the average ratings for job satisfaction on the unit increase. While this is perplexing, it is plausible that nurses on the unit feel a greater sense of job security, when vacancies arise.

### Nursing Leadership

The intervention did not have a significant impact on nurses' perceptions of unit leadership, although nurses in this study reported a decline in their perceptions of the nursing unit leadership throughout the study. Nurses in teaching hospitals reported higher perceptions of nursing unit leadership than their colleagues in community hospitals.

Nurses' perceptions of the unit nursing leadership was impacted by a number of individual nurse characteristics in this study. For example, both at the individual level of data collection as well as at the unit level, as the average age of nurses on the unit increases, the more positive the perceptions of the leadership on the unit. As well, the higher the level of education of nurses on the unit (e.g., Baccalaureate), the more positive their perceptions of the nursing unit leadership. Furthermore, as the average years of nurses' experience on the unit increases, the more positive the perceptions of nursing unit leadership. All of these variables suggest that as nurses age and gain more experience and education, their perceptions of nursing unit leadership grow more positive.

Finally, unit characteristics were found to have an impact on perceptions of the nursing unit leadership. Specifically, the higher the nurse-patient ratio, the lower nurses' perceptions of nursing unit leadership.

### Role Tension

The intervention did not have a significant impact on nurses' role tension although following participation in the intervention, nurses in this study reported a decline in role tension. Nurses in teaching hospitals reported higher levels of role tension than their colleagues in community hospitals.

The only unit characteristic that had an impact on role tension was nurse resignations. As the number of RN resignations increased on the unit, nurses' perceptions of role tension declined. While this may be somewhat unusual, it is possible that nurses on the unit feel that turnover is needed, to decrease some of the role tension being experienced. As well, it could imply that nurses did not need to worry about job security when vacancies existed.

### Quality of Care

The intervention did not have a significant impact on nurses' perceptions of the quality of care, although following participation in the intervention, nurses in this study reported higher perceptions of the quality of care and teamwork on their units. Additionally, nurses in teaching hospitals reported higher perceptions of the quality of care than their colleagues in community hospitals.

The quality of care provided by nurses was impacted by a number of unit characteristics in this study. For example, as the average years of nurses' experience on the unit increases, the more positive the perceptions of the quality of care. Similar to other outcomes in this study, this suggests that as nurses gain more experience their perceptions grow more positive. In addition,

nurses on medical units reported higher perceptions of the quality of care than nurses on surgical units. This may be a reflection of the type of patient that is on medical units, and their learning and teaching needs from nurses. As well, nurses on units that provide team nursing report higher perceptions of the quality of care provided on the unit than nurses working on units utilizing a total patient care delivery model. This may suggest that nurses prefer to work as a group or team to meet the needs of patient care better.

### Job Stress

The intervention did have a significant impact on nurses' job stress, although nurses in teaching hospitals reporting substantially higher levels of job stress.

The job stress of nurses was impacted by a number of individual nurse characteristics in this study. For example, registered nurses with a Baccalaureate degree reported higher levels of job stress than registered nurses with diploma preparation. This may reflect the added knowledge and understanding that comes with degree education and the greater sense of accountability for one's work. As well, as the age of nurses on the unit increases, so does the level of job stress. This suggests that as nurses age, they may not be able to handle the complex nursing work environment in the same way they could when they were younger.

Finally, unit characteristics were found to have an impact on perceptions of job stress. Specifically, the higher the nurse-patient ratio, the higher the job stress experienced by nurses on the unit.

## THE WORKLOAD INTERVENTION AND PATIENT OUTCOMES

### Patient Judgments of Hospital Quality

The intervention did not have a significant impact on patients' judgments of hospital quality in this study. Hospital and unit characteristics were the only variables to have an affect on patients' judgments of hospital quality with patients in teaching hospitals reporting more positive perceptions of quality than patients in community hospitals. As well, patients on medical units reported higher judgments of the quality of care than patients on surgical units.

### Perceived Health Benefit of Nursing Care

The intervention did not have a significant impact on patients' perceptions of the health benefit of nursing care in this study. Hospital and unit characteristics affected the results, with patients in teaching hospitals reporting more positive perceptions than patients in community hospitals. As well, patients reported higher perceptions of the health benefit of nursing care on units that employed a higher percentage of casual registered nurses.

### Therapeutic Self-Care

The intervention did not have a significant impact on patients' knowledge and ability to assume self-care in this study. Hospital and unit characteristics affected the results with patients on surgical units reporting higher ratings related to their self-care ability than patients on medical units. As well, patients reported higher ratings of their self-care ability on units that had more experienced RNs.

### Activities of Daily Living

The intervention did not have a significant impact on patients' independence in activities of daily living in this study. Hospital and unit characteristics did have an affect, with patients in teaching hospitals reporting higher levels of independence than patients in community hospitals. Also, female patients reported as having higher levels of independence than male patients in this study. Patients on surgical units reported higher levels of independence than patients on medical units. Finally, patients on units that employed higher proportions of RNs were reported to have higher levels of independence in activities of daily living.

## CONCLUSION

It is evident from this study that the intervention had an impact on nurses' perceptions of their work and the work environment, but had little impact on any of the other nurse or patient outcomes. A number of individual nurse characteristics were found to impact on the study outcomes including gender, age, work status, education and experience. As well, a number of hospital or unit characteristics affected the outcomes including hospital type (e.g., teaching or community), unit type (e.g., medical or surgical), number of RN resignations, number of RN vacancies, care delivery model, and proportion of RNs.

This study highlights some important differences between teaching and community hospitals that were evidenced with both nurses and patients. Teaching hospitals are affiliated with academic health science centers and often provide care for the most complex patients in the health care system. Approximately two thirds of nurse respondents in this study work in community hospitals, while the remaining third work in teaching hospitals. Nurses working in teaching hospitals reported higher levels of job stress and role tension, yet their perceptions of the quality of work, the work environment, nursing unit leadership, quality of care and teamwork, and levels of job satisfaction were higher than their colleagues in the community sites involved in this study. In addition, patients in teaching hospitals reported higher judgments of hospital quality, perceptions of the health benefit of nursing care, and higher levels of independence in activities of daily living. Further work is needed to understand what factors in teaching hospitals may contribute to these outcomes, and how they would fit with the community hospital environment.

Distinctions between the work on medical and surgical units were evidenced by nurses and patients in this study. Nurse in medical units reported higher levels of job satisfaction, and higher perceptions of the quality of care and teamwork. Patients on surgical units reported greater knowledge and ability to assume self-care, and independence in activities of daily living while those in medical units reported higher judgments of hospital quality. This may be a reflection of the function of the type of unit. Medical patients typically have longer stays in hospital and may have time to reflect and develop a sense of hospital quality. On the other hand, surgical patients are often in the hospital for a specific procedure, and their knowledge and self-care ability about their health state may be a primary focus for them.

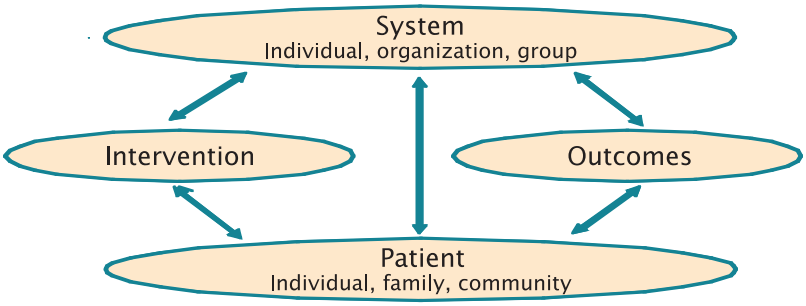
Individual nurse characteristics were found to be an important factor to consider when studying the nursing work environment and nurse and patient outcomes. These individual nurse characteristics underscore the importance of considering variables such as nurses' work experience, education, work status and age in health human resource planning for nursing.

In this study, the experienced nurses demonstrate more positive perceptions of nursing unit leadership and patients rate them highest in terms of their abilities to promote patient self-care activities. Retention efforts should be directed at acknowledging and giving credit to these senior knowledgeable and skilled members of the nursing workforce. As well, this study demonstrates that older nurses experience the most job stress and concern with the quality of their work and work environment, yet they continue to support the unit-based nursing leadership. Workplace initiatives should be directed at determining the sources of the job stress and work environment concerns, and working with this older caveat of nurses, to create a more balanced work environment and sustain their support in the nursing unit management. A high level of stress was described by nurses with Baccalaureate degrees, yet they continued to support their unit nursing leader. It is important to further our understanding of this phenomenon, to determine what it is that is causing stress for this category of nurses, and to develop retention initiatives to correct it. In this study, casual nurses reported a high degree of job satisfaction, and they were judged by patients to be the most likely to assist them during the hospital stay. It would appear that while these nurses may not work full-time, they work to their full capacity from the patient's perspective.

Unit characteristics can affect nurse and patient outcomes. While a number of different unit characteristics were found to affect nurse and patient outcomes, one of these was more prevalent. One of the most consistent unit characteristics to have a negative affect on nurse outcomes was the nurse patient ratio, with high nurse patient ratios having a negative impact on nurses' perceptions of work and the work environment, nurses' perceptions of unit-based nursing leadership, and nurses' job stress. It is clear that of the unit variables examined in this study, this one stands out as a major concern for nurses that should be addressed in hospital organizations.

A number of nurse staffing variables were explored in this study, yet only one was linked to patient outcome achievement. Specifically, a higher proportion of RNs was linked to patients achieving a higher level of independence related to activities of daily living. A number of recent studies have demonstrated a link between RN staffing and patient outcomes and this study confirms those earlier study results.

The majority of the findings in this study underscore the importance of understanding the factors in the environment in which nurses work that can have an affect on the outcomes that nurses experience, as well as outcomes for patients. Future research should include work environment variables to better understand their influence on patient and nurse outcomes.


System
Individual, organization, group
Intervention
Outcomes
Patient
Individual, family, community

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