

Evaluation of a Partnership Model of Care Delivery Involving Registered Nurses and Unlicensed Assistive Personnel

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Abstract

The employment of unlicensed personnel in Canadian acute care hospitals has been undertaken without clear evidence of outcomes for patients, caregivers, and hospital organizations. This quasi-experimental evaluation study was completed in a metropolitan Toronto acute care hospital to examine the effects of a new nursing care delivery system which included unlicensed assistive personnel.

Most of the expected benefits of the newly implemented nursing care delivery system did not materialize leading to the conclusion that the employment of unlicensed assistive personnel in acute care hospital systems may not offer additional benefits for patients, caregivers, or hospital organizations. The processes and results of this study provide useful information for nurse administrators who are seeking effective and innovative care delivery systems that are designed to optimize patient, caregiver, and hospital outcomes.

Introduction

As health care providers, we are challenged with the need to balance productivity, quality of care, and fiscal efficiency. A major trend

in patient care is the introduction of unregulated or unlicensed assistive personnel (UAP). There are a variety of practice models described in the literature which include UAP health care personnel but there are, however, few evaluation studies of the outcomes of such models on the patient, the caregiver, and the health care organization. Thus, the purpose of this study was to evaluate specific patient, caregiver, and hospital outcomes associated with the implementation of a partnership model of care delivery involving Registered Nurse and UAP teams of personnel in one acute care Toronto area hospital.

Review of the Literature

Krapohl and Larson (1996) reviewed the research literature between the years 1988 and 1994 to evaluate the use of UAP models of care delivery. Findings from this review of nineteen studies were categorized into four broad categories of outcomes: nurse satisfaction, patient satisfaction, cost, and quality. It was found that few studies actually addressed all of these variables simultaneously and that the scientific merit of the studies varied greatly, thus, limiting generalizability. In addition, the myriad of titles attributed to models of care delivery that included UAP led the authors to categorize each study by the type of model used; clinical, non-clinical or integrated models. The clinical model was characterized by the UAP being involved in direct patient care activities and working under the direction of a Registered Nurse. It is this clinical model that is similar to the model of care delivery being evaluated in this study.

Studies that described a clinical or integrated model used a variety of measures and study designs to evaluate the outcomes of the UAP model. Lengacher and Mabe (1993) evaluated the outcomes of staff turnover, patient satisfaction, physician satisfaction, staff satisfaction, cost, and productivity associated with using a UAP partnership model of care delivery. The preliminary results indicated that there were no differences between the pilot and control groups

on all measures. Yet, three years later, Heinemann, Lengacher, VanCott, Mabe, and Swymer (1996) found that patients cared for on units that employed a partnership model of care delivery led by a Registered Nurse reported higher levels of satisfaction with care than patients who were not cared for within a partnership model of care delivery. After introducing a partnership model of care delivery, Garfink, Kirby, Bachman and Starck (1991) reported no change in nurse satisfaction and that the introduction of UAP was associated with Registered Nurse perceptions that their workload had increased. Although some cost savings were found, this lower cost per patient day was attributed to the lower average wage of UAP. A high turnover of UAP in the first two years was also found and was explained as being related to the poor selection criteria for UAP.

Powers, Dickey and Ford (1990) described the implementation of an RN-coworker model consisting of a UAP-RN pair. The RN-patient ratio changed from 1 RN for 4 patients before implementation of the new model to a ratio of 1 RN for 7 patients with the new model and was accompanied by an increase in the use of overtime, on-call time, and sick time. Nurses expressed concern that they had less time to spend with patients and to complete necessary documentation. As well, the decrease in quality monitoring scores assessed through documentation after implementation of the new model of care delivery was believed to be related to Registered Nurses requiring additional support and assistance in time management and delegation.

Eastaugh (1990) used an economic productivity perspective to analyse outcomes from twenty- nine hospitals that used a variety of UAP care delivery models and found that hospitals using between 5 and 7 UAP per 10 RN were the most efficient and productive compared with hospitals employing all RN staff. However, it was also recognized that outcomes such as the level of quality of care needed to be examined as UAP were introduced.

Using the nursing unit in a large teaching

hospital as the unit of analysis, Blegen, Goode, and Reed (1998) examined the relationships among total hours of nursing care, RN proportion to total nursing personnel, and the adverse patient outcomes of medication errors, patient falls, patient complaints, infections, and mortality. They found that higher total hours of care delivered by all categories of nursing personnel were associated with higher incidences of adverse patient outcomes. However, they also found a curvilinear relationship between the RN proportion of total nursing care and rates of adverse patient outcomes; the adverse outcome rates decreased up to 87.5 percent RN mix of nursing personnel but increased above 87.5 percent RN staffing. This finding was replicated by Blegen and Vaughn (1998) in a multi-site study of hospitals and patient adverse occurrences.

Bostrom and Zimmerman (1993) evaluated the impact of redesign of a nursing care delivery system involving the introduction of nurses' aides to a primarily RN staff in a 600 bed tertiary care hospital. The following outcomes were studied: alignment of tasks across job categories as measured through work sampling, costs of nursing care, patient satisfaction as measured by a six item survey, and quality of patient care measured by the number of incidents reported. Overall, they found substantial shifts from the RN to the nurses' aide in non-professional patient care activities such as patient hygiene, patient movement, and clerical work. They also found a significant increase in the proportion of time the RN spent engaged in treatments, procedures, documentation, and communication with others. Patient and staff quality indicator results remained stable. The authors concluded that the new care delivery system was successful in reducing costs by shifting work from Registered Nurses to nurses' aides without adverse effects on the quality of care or patient satisfaction.

Some studies have investigated the perceptions that nurses have about working in acute care hospitals with UAP. Orne, Garland, O'Hara, Perfetto, and Stielau (1998) interviewed

twelve acute care Registered Nurses to illuminate their experiences of working with unlicensed assistive personnel and found that only two of the twelve participants viewed their experiences positively. The other ten nurses either opposed the use of UAP or expressed strong reservations about the UAP in acute care settings. Common themes identified were that nurses perceived that both the UAP and RN were experiencing role confusion, that UAP had uneven attitudes and work ethics, that workload and responsibility for Registered Nurses had increased, that patient care and safety was being compromised, and that the nurses themselves were experiencing feelings of resentment, frustration, powerlessness, and anger. Barter, McLaughlin, and Thomas (1997) completed a descriptive cross-sectional survey of 171 Registered Nurses from three California hospitals to understand their perceived satisfaction with UAP in acute care settings. Nurses reported that they had increased responsibility and less time for direct patient and family care with the introduction of UAP. They consistently reported communication issues involving the receipt of accurate and pertinent patient information from the UAP and expressed dissatisfaction with the ability of UAP to perform delegated tasks.

Theoretical Framework

The Patient Care System conceptual model developed by O'Brien-Pallas (1994) was used to guide this evaluation study. This model conceptualizes the patient care process as a system consisting of specific inputs, outputs, and throughput variables that moderate the effects of the inputs on the outputs of care. As a system model, changes in inputs or throughput variables are expected to result in output changes. Staff, patient and facility are the model inputs. Staff variables include staff mix, as well as staff training and experience. Patient inputs include patient characteristics. Facility inputs consist of any of the characteristics of the health care facility involved in providing patient care. The throughput variables that may act within the system consist

of the acuity of patients and the intensity of nursing response to that acuity, the complexity of decisions required in the patient care situation, the environment, and other organizational factors. There are three categories of outputs in the Patient Care System model: patient, caregiver, and system outputs. Patient outputs include mortality, morbidity, satisfaction, and quality of care. Caregiver outputs are satisfaction, perceived effectiveness of care, caregiver turnover, and role specificity. System outputs identified in the model are patient length of stay, cost per case, and nursing unit cost per case. O'Brien-Pallas notes that additional or alternative outcomes should be selected based on the research question.

The choice of outcomes and their indicators for this study evolved from the review of the literature, the Patient Care System conceptual model (O'Brien-Pallas, 1994), and the issues and experiences within the study hospital. Patients' knowledge of their intravenous therapy, intravenous therapy adverse outcomes, patient falls, medication incidents, and call bell usage were selected as indicators of patient outcomes. Caregiver output indicators selected were nursing job activity analysis and nursing job satisfaction. Nursing cost was the only system output indicator selected for this study. The introduction of UAP into this hospital was done with the expectation that the UAP role would promote a shift in the RN role away from routine patient activities of daily living to increased activities related to patient education, care and discharge planning, and providing support to patients and their families. Thus, we investigated whether this expected shift in RN activities occurred after the introduction of UAP.

Previous intravenous therapy audits in this hospital indicated that patients did not consistently have adequate knowledge of their intravenous therapy and that there were many incidents of adverse intravenous therapy occurrences. Nurses claimed that they did not have adequate opportunity to teach their patients about their intravenous therapy nor adequate surveillance time

for patient intravenous therapy. With the use of UAP, Registered Nurses were expected to engage their patients consistently in learning about their intravenous therapy and to promptly assess and intervene with their patients' intravenous therapy.

Patients, families, and nurses in the hospital often complained about the intrusion and frequency of nurse call bells. As well, patients reported that because they did not always see their nurses when needed, they resorted to summoning their nurse via the nurse call system. Nurses reported that they could not always be available for patient care because they were busy caring for another patient, often assisting patients with their activities of daily living. It was believed that call bell usage by patients was related to their levels of satisfaction with care and was chosen as an indicator of patient satisfaction.

O'Brien-Pallas's conceptual model illustrates how changes in staff mix, a Patient Care System input, can result in changes in any of the Patient Care System outputs. However, understanding the true nature of the changes in outputs resulting from a change in inputs is a complex undertaking because other changes in the Patient Care System inputs or throughput variables may also result in output changes. Understanding the effects of the intervention involving a change in staff mix can best be measured if those extraneous variables, the inputs and throughput variables, are held constant. In this evaluation field study, the researchers were unable to hold extraneous variables constant but attempted to monitor and explain these variables.

Research Question

The research question in this evaluation study is what effect does the implementation of a UAP-RN partnership nursing care delivery model have on the following patient, caregiver, and system outcomes: intravenous therapy outcomes, patient fall rate, medication incident rate, frequency of nurse call bell initiation by patients, nursing job activities, perceived nurse job satisfaction, and average cost per required hour

of nursing care.

Hypotheses

The following hypotheses were tested:

1. The percentage of positive responses related to intravenous therapy patient knowledge indicators will increase on the experimental units after the implementation of the treatment, from pretest to posttest time periods.
2. The percentage of positive responses related to intravenous therapy adverse clinical outcome indicators will decrease on experimental units after the implementation of the treatment, from pretest to posttest time periods.
3. The patient fall rate will decrease on experimental units after the implementation of the treatment, from pretest to posttest time periods.
4. The medication incident rate will decrease on experimental units after implementation of the treatment, from pretest to posttest time periods.
5. Initiation of the nurse call system by patients on one experimental unit will decrease after implementation of the treatment, from pretest to posttest time periods.
6. Registered Nurses working in the experimental units will spend less percentage of their time engaged in nursing care activities of daily living after implementation of the treatment, from pretest to posttest time periods.
7. Registered Nurses working in the experimental unit will spend a greater percentage of their time engaged in discharge planning, providing emotional support to patients and families, and providing teaching to patients and their families after implementation of the treatment, from pretest to post-test time periods.
8. Registered Nurses in the experimental units will report less dissatisfaction with their work after implementation of the treatment, from pretest to posttest time periods.
9. The cost per required patient hour will decrease within experimental units after implementation of the treatment, from pretest to posttest time periods.

Study Setting & Background

This study was conducted at a 258 bed acute care community hospital in metropolitan Toronto. The Patient Services division at the hospital sought innovative, creative, and collaborative ways to redesign patient care delivery and in January 1996, redesign planning began. The goals for redesigning the care delivery system were to improve the quality of care, to realize cost savings, and to improve nurse satisfaction with care provided. The implementation team involved nursing staff, physicians and other interdisciplinary team members. Focus groups, formal meetings involving staff and management, and informal patient care unit meetings were planned for the "unfreezing" phase of the project and to involve staff in the actual redesign of the care delivery system. The guiding principle was to provide the right care, by the right person, in the right place, and at the right time.

In the new model, the RN was responsible for managing overall patient care. The role of the UAP, called Personal Support Assistant (PSA) in this hospital, was to assist the RN in performing care activities related to activities of daily living and preparation of the patient environment. Minimal judgement and decision making was required of the PSA. The RN continued to manage and implement care for those patients who were unstable and at high risk, required the specialized knowledge and skill of an RN, had uncertain or unpredictable outcomes, required patient teaching, needed more than objective and simple assessment, and required care that is a controlled act, as defined by the Regulated Health Professions Act (1993), Province of Ontario, Canada.

Methods

Design and Sample

A quasi-experimental design using an untreated control group (except for the variables

Table 1
Description of Patient Care Unit

Characteristic	Experimental 1	Experimental 2	Control
General Type/ Specialty	General Medicine/ Surgical	Medicine/Geriatric Rehabilitation	Post-Coronary
Bed Capacity	57	70	38
Staff Mix	RN only	RN / RPN	RN only
RN / Patient Ratio (day shift)	1 to 6	1 to 10	1 to 6
Care Model	Total Patient Care	Modular	Total Patient Care
Average Length of Stay (April 95 - March 1996)	7.4	22.8	7.2
Average Patient Acuity (required hours per patient day in July 1996)	4.41	4.13	4.44

nurse call bell and nursing job activity analysis) with a pretest and two posttests was used in this evaluation study (Cook & Campbell, 1979, p. 103). Three medical-surgical patient care units were included in the study. In August 1996, two patient care units received the treatment of the partnership model of care delivery while the third unit, the control unit, did not change the care delivery method. The bed capacity, clinical specialty, and staff mix on each of these units were not equivalent throughout the study. Table 1 describes the characteristics of each of the three study units at pretest time.

Outcome data were collected at the pretest time period (June - July 1996), six months after implementation of the treatment (January - February 1997), and 12 months after the treatment was implemented (July - August 1997). This design allowed for evaluation of the stability of outcomes as well as the investigation of outcomes that may take longer to develop, such as nurse satisfaction. As well, focus groups with Registered Nurses who had experienced both care delivery systems were conducted two years after implementation of the treatment. The purposes of the focus groups were to seek feedback about the adequacy, usefulness, and efficiency of the new care delivery system; to elicit ideas for improvement; and to evaluate the integrity of the implementation of the new model of care delivery as planned. Focus group data were also expected to be helpful in understanding the context of the study findings.

The Treatment

The partnership model consisted of a team of two Registered Nurses and one PSA on the day and evening shifts. On the day shift, the team cared for an average of fourteen patients. On the evening shift, the team's patient assignment increased to an average of seventeen patients. Registered Nurses and Personal Support Assistants all reported directly to the nurse manager though the PSA was expected to accept direction from the RN. PSAs did not have a patient assignment but

were assigned specific tasks by RNs.

Planning and development of the partnership model included an initial survey in spring 1995 to full and part-time Registered Nurses in the study units to elicit feedback on the perceptions of the RN professional role when working with unlicensed health care providers. The survey consisted of 45 dichotomous (yes/no) questions about the potential appropriate tasks for delegation to the PSA role and was developed by a core group of members of the Nursing Practice Committee. Eighty-eight surveys were received with a response rate of about 70 percent. The survey responses reflected RN perception of the need to remain responsible for total patient care though they supported the delegation of specific simple tasks to PSA. Discussion groups were also carried out to validate the survey results and to assess learning needs for the development of an educational program to prepare for the implementation of the new care delivery system.

Information from the local community colleges and the College of Nurses of Ontario was gathered to develop the position descriptions for the new PSA and redesigned RN roles. The PSA was expected to have the minimum requirements of a Health Care Aide certificate, current basic rescuer, cardiopulmonary resuscitation certification, and strong interpersonal skills. A skills checklist and a unit specific orientation checklist were developed to guide the orientation and transition of the new roles. Self-learning packages for RNs and PSAs were developed and distributed to each RN and to those hired into the PSA positions.

Mandatory education sessions were held during a one week period in July 1996. Education sessions were four hours in length and consisted of topics such as: the reasons for changing the care delivery system, the basic principles of change theory, a review of the Regulated Health Professions Act, the Province of Ontario (1993), accountability in nursing practice, the objectives and content of the self-learning package, and the role of the Registered Nurse in assigning,

delegating, and supervising. Small group work was included to allow for application and practice of learned principles.

The model of care delivery before treatment implementation on the surgical unit and throughout the study on the control unit consisted of all RN nursing staff who provided patient care. On the medical experimental unit, Registered Nurses and Registered Practical Nurses (RPN) provided patient care with about 70 percent of nursing staff being Registered Nurses. In this model, RPNs had a patient assignment and worked collaboratively with RNs.

Measurement and Data Collection

A variety of data collection procedures were used to measure patient, caregiver, and hospital outcomes. To measure the caregiver-related dependent variables of nursing job activity analysis and nurse job satisfaction, all nursing staff in the study patient care units were invited to participate in two data collection activities during the pre and post-testing time periods; time ladders and questionnaire response. All data were submitted and collected anonymously. Volunteering to complete time ladder assessments and returning the questionnaires were considered demonstration of consent to participate. A description of the specific outcome measures follows.

Intravenous Therapy Outcomes

Outcomes associated with intravenous therapy were measured for all patients in the three study units at all three data collection periods on randomly selected days. Two broad categories of intravenous therapy outcomes were assessed: patient knowledge and adverse clinical outcomes. The patient knowledge indicators assessed were whether the patient knew: the purpose of the intravenous therapy, how to ambulate with the intravenous, what to do if the intravenous site became painful, and what to do if blood was noted in the intravenous tubing. Adverse clinical intravenous indicators consisted of the presence of drainage, leakage, edema, phlebitis, or bruising

at the intravenous insertion site. To strengthen data reliability, all intravenous assessments were completed by the same nurse who had completed these assessments twice yearly for the previous four years.

Results were calculated as a percentage of the number of positive or "yes" assessments to the total number of assessments completed. For patient knowledge indicators, a higher percentage of "yes" responses was desirable. For the adverse clinical indicators, a lower percentage of "yes" responses was desirable. As well, an average of "yes" responses was calculated for each of the two broad categories of intravenous therapy indicators.

Patient Falls

Patient fall data was collected and compared during the three data collection periods for each patient care unit. The patient falls per patient day per unit was calculated as the total number of falls reported in the hospital incident reporting system compared to the actual number of patient days in that patient care unit over the data collection period.

Medication Incidents

Medication incidence rates were calculated for each unit for the three data collection periods directly from the medication incident reporting system. Medication incident rates for each unit were calculated as the ratio of actual medication incidents over the total number of prescriptions for that time period.

Call Bell / Nurse Call

The call bell system on one of the experimental patient care units was capable of compiling a log of all calls placed by patients over any 24 hour period. In the calculation of the ratio of patient initiated calls per patient day, a patient call consisted of any time the patient actually pressed the button, whether or not the initial call had yet been responded to by nursing staff.

Nursing Job Activity Analysis

Job activity analysis is a method used to describe behaviours and activities performed by occupants of the job and can be completed through either of two major approaches, both of which have strengths and weaknesses (Harvey, 1990). The first approach, an industrial engineering technique, consists of trained individuals observing the amount of time required to complete various activities. Drawbacks of this approach include both the high cost and the difficulty external observers have in identifying aspects of nursing activities which are less observable such as the mental processes of problem solving and care planning. A second approach is the use of "time ladders" or time logs which rely on the nurse to self report the amount of time spent in various activities. The major drawback of this approach is the question of accuracy of the data. However, it is believed that anonymous data collection which was used in this study reduced this source of bias (Savin, 1993).

In this study, "time ladders" were chosen to evaluate job activities over a one week period during the pre and posttest time periods into the following nineteen activities: assisting with activities of daily living, admissions and admission assessment, break time, care planning or chart review, communicating with team members, carrying out a treatment or procedure, discharge planning, documenting, providing patient or family emotional support, engaging in workload measurement activities, providing indirect care such as transcribing orders, participating in in-service education, participating in interdisciplinary care rounds, administering medication, problem solving or conflict management, receiving or giving report, patient or family teaching, assessing vital signs, and other. The categories used in the time ladders were developed and agreed upon by a panel of experienced Registered Nurses in the hospital. Participant RNs identified which of the nineteen activities were being completed in ten minute intervals throughout their shifts. To strengthen inter- and intra-rater reliability, time ladder completion education was provided to

nurses. Job activity results were calculated as a percentage of the total time spent in any one category of activity compared to the total amount of time engaged in all activities. All nurses working on all shifts in each of the treatment units during each data collection period were invited to participate in time ladder completion. A one week time period for each data collection period was agreed upon as being long enough to facilitate adequate data collection but not too long as to be perceived by nurses as tedious to complete.

Nurse Job Satisfaction / Dissatisfaction

The level of satisfaction of health team members is known to be affected by many organizational factors and it was expected that the change to a new care delivery would effect the perceived level of job satisfaction among nurses. Registered Nurse satisfaction / dissatisfaction was measured using the Job Satisfaction Index refined by Munson and Heda (1974). Munson and Heda reported that this tool can measure nurse satisfaction / dissatisfaction as either an organizational or an individual variable. In this study, the tool was used to measure nurse job satisfaction / dissatisfaction on patient care units. The index consists of items that reflect intrinsic, extrinsic, interpersonal, and involvement aspects of nurse job satisfaction and is based on the theory that there are three elements that constitute job satisfaction: the amount of a particular satisfier the nurse perceives as being available in the work situation, the yardstick by which the nurse judges the adequacy of that satisfier in the work situation, and the relative importance the nurse attaches to that satisfier in the work situation. The index prompts the respondent to comment on the existence of a satisfier (rating range of 1 [none at all] through 7 [the maximum]), the amount of the satisfier desired (rating range of 1 [not at all] through 7 [the maximum]), and the importance of obtaining that satisfier (rating range of 1 [least important] through 5 [most important]). A mathematical calculation of the scores provides a measure of the level of dissatisfaction with job

conditions as well as a measure of the perceived deficiency in the current job conditions. The higher the calculated score, the higher is perceived job dissatisfaction. Munson and Heda reported the split-half reliability as 0.74 and the mean item reliability as 0.44. All nurses employed in each study unit over each data collection period were invited to participate in responding to the Job Satisfaction Index.

Cost

The average cost per required hour of nursing care was measured by calculating the unit producing or direct care provider salary cost per time period within each patient care unit and dividing that total salary cost by the total number of required hours of nursing care in that unit over the same period of time. Cost data was extracted directly from the hospital management information system. The average required hours of nursing care was extracted from the GRASP (trademark) nursing workload information management system, which had been validated one year prior to this study. This cost measure was selected because it controls for the important cost driver of patient acuity. Differences in patient acuity necessitate different levels of staffing which in turn affects the cost per patient day.

Data Analysis

The unit of analysis in this study is the patient care unit. Because the number of sample patient care units is only three, the use of inferential statistics is generally not appropriate to analyse data within or between experimental conditions. However, because of the large number of sampled elements in each patient care unit on the variables of nursing job activity and overall nurse dissatisfaction, an analysis of variance was used to test for differences within and between groups using SPSS (1997). No power analysis was undertaken as participation was being solicited from the eligible population. All other analyses consisted of descriptive statistics and

clinical or practical differences and trends are examined and discussed.

Results

Intravenous Therapy Outcomes

A summary of the intravenous therapy outcomes is presented in Table 2. The overall percentage of positive responses related to patient knowledge increased from pre-test (27 percent) to posttest time periods (50 and 79 percent). This same pattern of results was not evident in the control group. Hypothesis 1 was supported. Patient knowledge related to intravenous therapy improved with the introduction of the partnership model of care delivery.

The overall percentage of reported adverse intravenous therapy outcomes in the experimental group decreased from pre-test (9 percent) to posttest (0 and 3 percent). However, the same pattern of results was observed for the control group. Though the experimental group results support hypothesis 2, the similarity in results between the experimental and control groups suggests that there may indeed be alternate explanations for the results. It may not be the treatment that made the difference but other variables such as increasing nurse skill at initiating intravenous may have influenced these results.

Patient Falls

The summary of patient fall results is presented in Table 3. The experimental units experienced a decrease in patient falls at the first posttest time period after treatment implementation but the rate increased one year later at the second posttest time period. The control group experienced a continued decline in patient fall rate from the pretest through to both posttest time periods. Hypothesis 3 was not supported. There was no evidence that the implementation of the partnership model of care delivery was associated with a decline in the patient fall rate.

Table 2: Intravenous Therapy as Percentage of "YES" (Patient Knowledge) or Incidence (Adverse Outcomes)

Patient care unit	EXP			CTRL		
	Pre n=29*	# 1 Post n=35*	# 2 Post n=35*	Pre n=18*	# 1 Post n=23*	# 2 Post n=24*
IV purpose explained	43	97	85	62	72	64
Ambulation teaching	19	47	75	75	65	56
Painful IV site teaching	19	44	75	67	59	44
Blood in IV teaching	25	13	80	64	43	27
Teaching Mean %	27	50	79	67	60	48
Drainage @ site	0	0	0	0	0	0
Leakage @ site	0	0	0	14	0	6
Edema @ site	0	0	0	14	0	6
Phlebitis @ site	13	0	0	14	7	0
Bruising @ site	33	0	11	21	0	12
Adverse Outcome	9	0	3	13	1	5
Mean %						

* n is the total number of patient intravenous assessments for each group at each time period

Medication Incidents

The summary of results related to the ratio of reported medication incidents to the total number of prescriptions is summarized in Table 4. In the experimental groups, the rate of medication incidents increased after implementation of the treatment at the first posttest time period, but one year later at the second posttest period, the rate of medication incidents declined to a level below that of the pretest. However, a similar trend was observed

on the control unit. Although the results lend some support to hypothesis 4, the similar trend in medication rates for the control unit suggests that there may be alternative explanations besides the treatment for the decline in medication incidence rates in all the groups one year after implementation of the treatment in the experimental units.

Call Bell / Nurse Call

Call bell data was available only on one of

Table 3: Patient Falls as Incidence per Patient Census Day

	Pretest	# 1 Post Test	# 2 Post Test
Experimental Units	0.0065	0.004	0.006
Control Unit	0.013	0.006	0.002

Table 4: Ratio of Medication Incidents to Prescriptions

	Pre Test	# 1 Post Test	# 2 Post Test
Experimental Units	0.004	0.005	0.003
Control Unit	0.0	0.002	0.0

the experimental units. There was no comparison group. Six months after implementation of the treatment on this experimental unit, there was a dramatic drop in the average number of patient initiated call bells per patient per day (from 21 to 7). However, one year later at the second posttest, the average number of patient initiated call bells had increased to 20 per day, almost the same rate of call bell initiation as at pretest time. Hypothesis 5 is partly supported. However, the results suggest that the treatment might have been successful for a short period of time to decrease the average number of patient initiated calls but that the effect was not sustained one year later. Perhaps, the Hawthorne effect or the novelty of the new care delivery model could account for the initial dramatic decrease in patient initiated calls.

Nursing Job Activity Analysis

Only the results related to Registered Nurse activities in the four categories for which hypotheses were developed are discussed; activities of daily living, discharge planning, providing emotional support, and patient / family teaching. Nursing job activity analysis data was not collected on the control unit. Because there are no comparison groups, analysis can only be made through examination of the outcomes on the experimental units between time periods. This lack of comparison data weakens the internal validity of the findings. A summary of the job activity analysis results is shown in Table 5.

The reported percentage of time spent by Registered Nurses on experimental units in patient activities of daily living decreased from the pretest to the first posttest time period (17.68 to 9.48 percent). At the second posttest time period one

year after the implementation of the partnership model, the percentage of time Registered Nurses spent in patient activities of daily living (11.15 percent) still remained lower than the pretest percentage of time but had increased from the first to the second posttest time periods. An analysis of variance demonstrated a statistically significant difference in percentages of time spent by Registered Nurses completing activities of daily living between time periods ($p = 0.000$). Post hoc Scheffe tests showed that the percentages of time spent in activities of daily living at both posttest time periods were significantly different from the pretest time period ($p = 0.000$) but not significantly different from each other. These results support hypothesis 6. As expected, the implementation of the partnership model of care delivery was associated with a decrease in time spent by Registered Nurses in assisting patients with their activities of daily living.

Registered Nurse participation in patient discharge planning increased from 0.15 percent to 0.42 percent of time six months after implementation of the partnership model.

Table 5: Nursing Job Activity Analysis

Test Period	Exp		
	Pre n=214*	#1 Post n=129*	#2 Post n=162*
ADL	17.68	9.48	11.15
Discharge Planning	0.15	0.42	0.24
Emotional Support	2.79	1.67	2.05
Teaching	1.72	1.68	1.09

* n is the number of shifts included in the job activity analysis

One year after implementation of the treatment, the reported time spent by Registered Nurses in discharge planning fell to 0.24 percent. No statistically significant differences were found in the percentage of time spent by Registered Nurses in discharge planning between time periods. Hypothesis 7 was not supported.

The reported percentage of time Registered Nurses participated in the provision of emotional support to patients and families decreased six months after implementation of the partnership model from 2.79 to 1.67 percent. At the second posttest time period one year after implementation of the new model, the reported percentage of time spent by Registered Nurses in providing emotional support had risen to 2.05 percent. Though this represented an increase from the first posttest to the second posttest time period, it was still below the percent of time spent providing emotional support at the pretest time period. A statistically significant difference in the percentage of time spent by Registered Nurses providing emotional support ($p = 0.003$) was found. Post hoc Scheffe tests indicated a statistically significant difference only between the pretest and the first posttest time period ($p = 0.003$). The provision of emotional support to patients and families six months after implementation of the partnership model decreased rather than increased as expected. Hypothesis 7 was not supported. There was no evidence that implementation of the treatment was associated with an increase in time spent by Registered Nurses in providing emotional support to patients and families.

The reported percentage of time spent by Registered Nurses teaching patients and families decreased slightly from the pretest (1.72 percent) to the first (1.68 percent) and second (1.09 percent) posttest time periods. A statistically significant difference in percentages of time spent engaged in patient teaching was found among data collection periods ($p = 0.038$). Post hoc Scheffe tests indicated that there was a statistically significant difference in percentage of time spent by Registered Nurses in teaching between the

pretest and second posttest time periods ($p = 0.043$). One year after implementation of the new care delivery model, Registered Nurses reported spending significantly less time teaching patients than before the implementation of the partnership model. These findings do not support hypothesis 7. There was no evidence that the implementation of the partnership model of care delivery resulted in Registered Nurses spending more time teaching patients and families.

Overall Nurse Job Dissatisfaction

The summary of overall reported levels of dissatisfaction by Registered Nurses in the experimental and control groups is reported in Table 6. At pretest time, the reported average level of dissatisfaction among the experimental group nurses was 23.61. Six months after implementation of the partnership model, the average reported level of dissatisfaction among Registered Nurses decreased to 21.87. One year after implementation of the treatment, the reported average level of dissatisfaction had risen to 22.37. In the control group, the average reported level of dissatisfaction among Registered Nurses was 18.50. Control group level of dissatisfaction rose to 22.19 at the first posttest time period six months after implementation of the treatment. One year later, at the second posttest time period, the average level of dissatisfaction had decreased to 18.58, which is almost the same level of dissatisfaction in the control group at the pretest time period. An analysis of variance detected no statistically significant differences among or between experimental and control groups, nor over time ($p = 0.211$). Hypothesis 8 was not supported. There was no evidence that the implementation of the partnership model of care delivery effected the level of dissatisfaction of Registered Nurses.

Cost

The cost per required patient hour for the experimental group was the same at both the pretest time period and six months later at the first posttest time period (\$28). One year after

Table 6: Overall Nurse Job Dissatisfaction

Experimental			Control		
Pretest	#1 Post Test	#2 Post Test	Pretest	#1 Post Test	#2 Post Test
n=57*	n=45*	n=38*	n=19*	n=27*	n=24*
23.61	21.87	22.37	18.50	22.19	18.58

* n is the number of nurses who completed the Job Satisfaction Index at each time

treatment implementation, at the second posttest time period, the experimental group cost per required hour had increased to \$33. In the control group, the cost per required patient hour increased slightly from \$30 at the pretest time period to \$31 at the second posttest time period. In a similar pattern to the experimental group, the cost per required patient hour had increased to \$37 at the second posttest time period. Average salary rates remained stable over all three data collection periods, though many staff received experience or salary step increases during the study. Salary step increases occurred similarly in both the experimental and control groups. Hypothesis 9 was not supported. There is no evidence that the implementation of the partnership model of care delivery resulted in decreased patient care costs.

Focus Group Results

In June 1998, fifteen Registered Nurses from the experimental units who had worked with both care delivery systems before and after implementation of the partnership model participated in three different focus group sessions. Focus groups took place over the lunch period and participants were asked the following questions: How do you feel about the PSA and RN roles in our hospital? What suggestions do you have for change? How appropriate are (a list of specific tasks) for delegation to PSA? What other things would you like to talk about concerning the partnership model we are using here?

Several dominant themes emerged. A number of problems were perceived with the partnership model of care delivery. Most of these perceived problems were believed to impede

patient care and contribute negatively to the care environment. Registered Nurse participants believed that their workload had increased with the implementation of the new care delivery model. They reported doing far more nursing work with less assistance and support.

Inadequate communication between the RN and PSA seemed to be at the core of many perceived problems. Participants claimed that the PSA often did not wait for, seek, or even accept delegation from the RN and that they sometimes chose their own assignments, set their own priorities and their own agendas. The PSA was described as sometimes behaving as if having a patient assignment when in fact they actually had a nurse assignment. However, participants commented that they and other Registered Nurses were often not adequately skilled at delegating effectively and clearly to the PSA. They reported that some RNs tended to over-delegate while others under-delegated or did not provide clear explicit instructions to the PSA.

The PSA was seen to require considerable supervision and education, yet they were reported to receive little of either. Participants reported that PSAs often had significant performance issues that were not being addressed because of inadequate direct supervision. Many PSAs were perceived as not adequately completing the requirements of the position and sometimes were believed to go to considerable lengths to avoid work.

Participants had several concrete suggestions to improve patient care ranging from termination of the partnership model of care delivery to staff education. Almost all participants expressed a preference to return to a care delivery

model more like the old system, though they were cognizant that the old system was imperfect. Participants felt that the limited capabilities of the PSA, particularly related to the assessment and surveillance requirements of acutely ill patients, limited their consistent usefulness in this acute care setting. The following suggestions were made by focus group participants if the partnership model of care delivery was to remain:

- Educate and re-educate about the specific role of the PSA, as well as about effective and appropriate communication within the workplace.
- Have each PSA report directly to a Registered Nurse who would be responsible for hiring, providing feedback, disciplining, and terminating employment as appropriate.
- Provide education and guided practice opportunities to Registered Nurses about supervision of and delegation to PSA.

Discussion

In this hospital, the implementation of a partnership model of care delivery which included Registered Nurses and UAP did not achieve the expected outcomes. Only two hypotheses were supported. First, patient knowledge related to intravenous therapy improved for those patients cared for within the new model of care delivery. Second, the reported percentage of time spent by Registered Nurses in assisting patients with their activities of daily living did decrease within six months of implementation of the new model and remained decreased one year after implementation. None of the other hypotheses were supported. The findings of no effects or those findings where outcomes were found in an unexpected direction may be explained in at least two ways; the implementation of the partnership model was not effective in resulting in the outcomes hypothesized or the true effects were not detected because of any number of threats to study validity.

It may indeed be that the implementation of this new model of care delivery could not result

in decreases in patient fall rates, medication errors, nurse calls by patients, levels of nurse dissatisfaction, and cost, nor could result in increases in the amount of time spent by Registered Nurses in discharge planning, providing emotional support, and teaching patients and their families. These findings are similar to those of Lengacher and Mabe (1993) who found that the introduction of UAP was not associated with increased patient satisfaction nor with decreased costs. Garfink, Kirby, Bachman and Stark (1991) also found that the introduction of UAP did not result in changes in RN satisfaction and that Registered Nurses perceived an overall increase in their workload. As well, Powers, Dickey, and Ford (1990) found that Registered Nurses reported an increased workload with the introduction of the UAP role. Our focus group participants also reported increased workload with the introduction of the UAP role.

Registered Nurses in this study did not increase the percentage of their time they spent in discharge planning activities, providing emotional support to patients and their families, or in patient and family teaching. It was expected that the introduction of UAP would liberate the RN to attend to these complex needs of the acute care patient. Although it was found that Registered Nurses were spending significantly less time in assisting patients with their activities of daily living, we found that nurses were engaging in other activities besides direct care with this liberated time. Our focus group findings are consistent with those of Barter, McLaughlin, and Thomas (1997) who found that Registered Nurses were spending more time seeking adequate patient information and completing some of the tasks that should have been delegated to UAP. Focus group participants reported having less time for patient care and requiring more time for communication and conflict management issues. Many reported that often it was just easier and better for the patient if they completed particular tasks themselves rather than delegate these tasks to UAP.

Limitations

Alternate explanations for the results must also be considered because of threats to the statistical conclusion, internal, and external validities of this study. Low statistical power and a lack of reliability of the implementation of the treatment weaken statistical conclusion validity (Cook & Campbell, 1979). With a sample of three patient care units, the low statistical power increases the likelihood of making a type II error or incorrectly concluding that the treatment made no difference on the dependent variables. Questions about the reliability of the treatment implementation were confirmed through focus group discussions. It is possible that the partnership model of care delivery was implemented differently among and within patient care units, despite the extensive education and planning for the treatment implementation.

Measurement of two of the outcome variables, patient falls and medication incidents, relied on nurse reports. The rigour and accuracy of reports by nurses and other health care providers are believed to be inconsistent within and between hospitals. The actual rate of adverse incidents that rely on reports may indeed differ from the reported rate (Bates, Leape, & Petrycki, 1993). Study findings relying on reports by health care providers are only as trustworthy as the consistency and accuracy of the reports.

A further study limitation relates to the design of the study. As no control or comparison group data were collected on the variables of nursing job activity and nurse call bell, the study design used to evaluate these outcomes was reduced to a one-group pretest-posttest design (Cook & Campbell, 1979, p. 99). For these variables, because comparisons cannot be made with a control group that did not receive the treatment and because comparisons can only be made within the experimental group between time periods, the quasi-experimental design is weaker as the design was unable to control for many threats to validity such as history and statistical regression.

The internal validity of the study was weakened because of history and selection threats. During the study period, significant restructuring was occurring within the Province of Ontario health care system. This hospital had been targeted for merger and possible closure. Consequently, some nursing staff left the hospital and were replaced with new staff who often held temporary positions. These concurrent historical events may have effected or obscured the true impact of the treatment on the outcomes. The selection of the three units by non-random methods may have impacted the findings because the patient care units were not equivalent throughout the study. Any differences might account, in part, for the findings.

The findings from the focus groups suggested that the partnership model of care delivery may not have been implemented as planned. The PSAs were expected to take direction from Registered Nurses and Registered Nurses were expected to consistently delegate appropriate tasks to PSAs. This was not always the case. Sometimes PSAs did not take direction from RNs and sometimes RNs did not delegate appropriate tasks to the PSA. Some RNs had difficulty with effective delegation and understanding the PSA role, and despite the education opportunities provided, role confusion may have existed. With the implementation of the partnership model of care delivery, most of the RPN positions in the experimental units were eliminated. Those RPN incumbents in eliminated positions were allowed to apply into the new PSA positions. This decision eventually became problematic because RPNs had a level of nursing knowledge and skill exceeding that required for a PSA position. This resulted in role confusion for those RPNs in PSA positions as they tended to perform in their new PSA role as they had in their RPN role. Role conflict and tension among RNs and PSAs may have resulted in the implementation of a partnership model that was not planned. This possible lack of intervention integrity may have threatened the validity of conclusions about the

effectiveness of the partnership model of care delivery (Sidani & Braden, 1998).

Recommendations and Conclusions

This study contributes to the body of knowledge about outcomes associated with the use of UAP in contributing to nursing care for patients in acute care hospitals. The results of this study suggest that there may be few benefits to implementing such a care delivery model and again raise the question, is there a role for UAP in acute care hospital settings? Our experiences have been that the implementation of this new model added more change to an already stressed hospital system. Furthermore, this change to a partnership model of care delivery did not result in the expected outcomes.

We recommend that further research in this area be carried out that controls for some of the threats to validity we were unable to control by incorporating strategies such as increasing the sample size of the patient care units to strengthen the power of the study, ensuring that the treatment is implemented consistently as planned, and using sampling procedures that ensure a representative sample. In acute care hospital situations where a UAP role is utilized in the care delivery model, the study findings demonstrate that role confusion and conflict are potential threats to the implementation of the model. We concur with Huston (1996) in suggesting that a system is needed to ensure competency of all unlicensed assistive personnel in all aspects of their role, including effective and pertinent communication. Ongoing evaluation of the role mastery of all care providers might strengthen the implementation of the care delivery system. As well, appropriate and effective learning with feedback opportunities might strengthen nursing practice within such a model of care delivery.

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