Canadian Journal of Nursing Research, 1995, Vol. 27, No. 4, 51-71

Factors Affecting Acute-Care Nurses' Use of Research Findings

Colleen Varcoe and Ann Hilton

La présente étude décrit la perception qu'ont les infirmières soignantes du soutien que l'hôpital manifeste pour la recherche, et ses attentes par rapport à la recherche. On traite aussi des relations entre les facteurs organisationnels, les facteurs individuels et l'utilisation de la recherche que font les infirmières soignantes. Pour divers groupes d'infirmières, on a comparé ces facteurs entre le niveau de formation et la taille de l'hôpital. On a obtenu d'une association provinciale d'infirmières un échantillonnage aléatoire stratifié de 450 infirmières. Cent quatre-vingt trois infirmières ont rempli le sondage envoyé par courrier. L'utilisation de conclusions de recherches spécifiques a été reliée aux facteurs organisationnels et était conforme aux études précédentes. La perception qu'ont les infirmières de leur utilisation générale de la recherche a été liée aux caractéristiques individuelles telles que l'intérêt pour la recherche et les attentes qu'on a de l'utilisation de la recherche. Cette perception atteint un niveau élevé, quelle que soit la formation. La perception qu'ont les infirmières du soutien organisationnel et de ce qu'elles en attendent, était très différente, dépendamment de la taille de l'hôpital. L'étude montre que le contexte organisationnel a son influence mais que la valeur que les infirmières accordent à l'utilisation de la recherche, l'intérêt qu'elles lui portent et leurs attentes par rapport à celle-ci peuvent modifier cette influence. Pour accroître la pratique fondée sur la recherche, il faudra prêter attention au contexte organisationnel de la pratique.

This study describes staff nurses' perceptions of hospital support for research and their expectations for research; and relationships between organizational factors, individual factors, and staff nurses' use of research. These factors were compared for groups of nurses by education level and hospital size. Stratified random sampling of 450 nurses was obtained from a provincial nurses' association. The mailed survey was completed by 183 nurses. Use of specific research findings was related to organizational factors and was congruent with earlier studies. Nurses' perceptions of their general use of research were related to individual characteristics such as interest in research and expectations to use research, which scored high regardless of educational level. Nurses' perceptions of organizational support and expectations differed significantly according to hospital size. This study suggests that the organizational context is influential, but nurses' value of, interest in, and expectations to use research may mediate this influence. Enhancing research-based practice will require attention to the organizational context of practice.

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Nursing research aims to improve the quality and cost-effectiveness of patient care. Research-based nursing practice is essential for professionalism, accountability, the delivery of quality care, and cost-effectiveness (Bircumshaw, 1990). If nursing is to become research-based, the factors that influence research use must be understood. Studies of these factors have focused on the quality of available research and on the characteristics of individual nurses. The results are inconclusive, but the studies suggest that the organizations in which nurses work may be influential. If this is the case, then strategies for organizational change must be added to those for improving the quality of research and for improving the individual nurse's ability to use research. An understanding of the influence of organizational support and expectations about research use will assist the nursing profession in developing appropriate organizational strategies. The purpose of this study was to describe staff nurses' perceptions of hospital support and expectations for research, and to examine relationships between nurses' perceptions of these factors, individual characteristics, and nurses' reported use of research in practice.

Theoretical Framework

A framework developed and modified by Crane (1989) specifies that organizational and individual factors influence the use of research, and it suggests that there are relationships among these factors (Figure 1). Crane suggests that the characteristics of research-based knowledge, and the personal and professional characteristics of the nurse, contribute to the likelihood that the nurse will change (individual change factors). The organization's propensity for change (organizational change factors), which is influenced by the context, impacts in turn on the use of research to the extent that organizational change factors can overwhelm individual change factors.

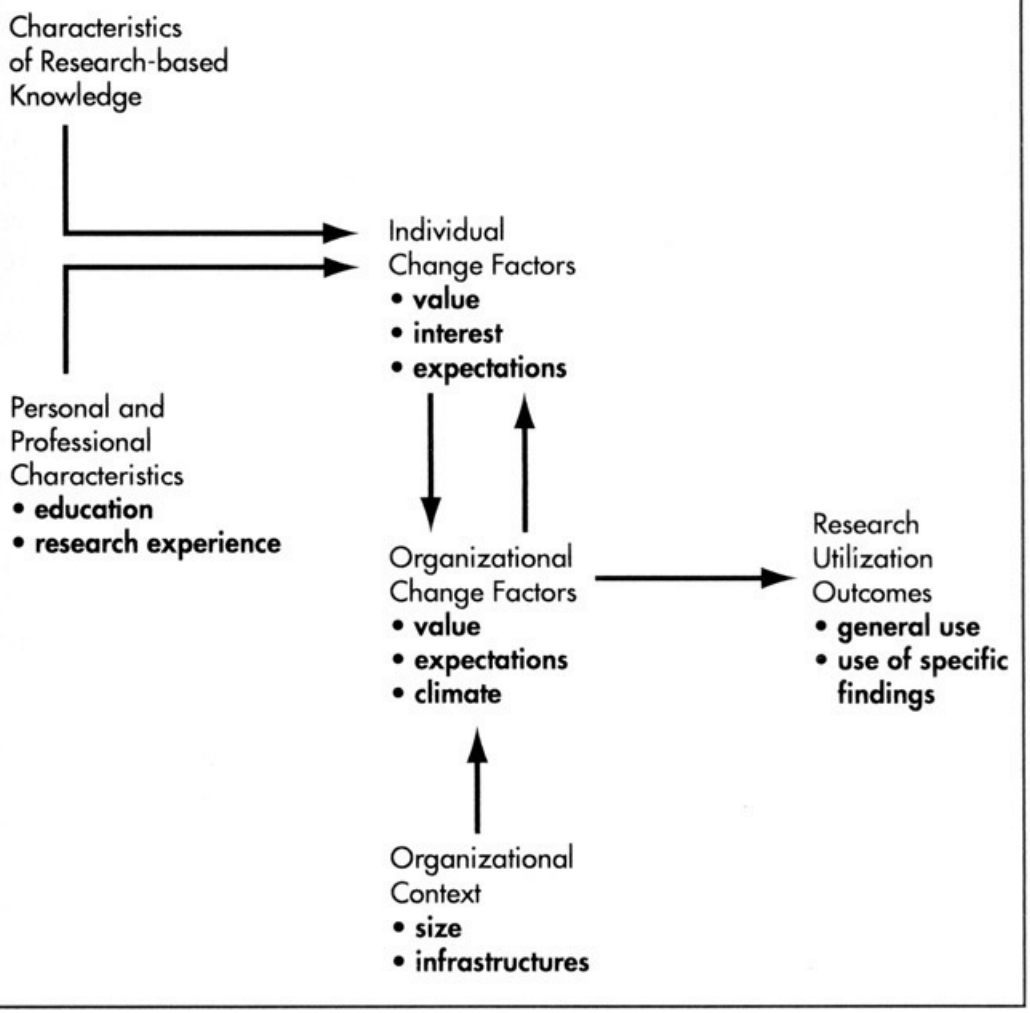
The organizational context variables considered in this study were hospital size and research-related infrastructures such as policies, resources, and personnel. Organizational change factors included nurses' perceptions of what key nursing personnel expected from research-based practice, how the organization values research, and the research climate. Individual characteristics included the nurses' education and research experience and demographic variables. Finally, the individual change factors included how the nurses themselves value research, their research interest, and their expectations in using the research. Using Crane's framework, these variables were viewed as predictors of research utilization outcomes (Figure 1). The outcomes con-

sidered were nurses' views of their own general use of research and their use of 10 specific findings identified in earlier studies (Brett, 1987; Coyle & Sokop, 1990).

Literature Review

Each element in Crane's framework has been investigated. Studies of the characteristics of research-based knowledge suggest that availability of findings, methods of communicating the findings, and the type of journals read significantly influence research use (Brett, 1986, 1989; Champion & Leach, 1989; Coyle & Sokop, 1990; Linde, 1989; Miller & Messenger, 1978). However, some studies (Brett, 1987; Coyle & Sokop; Kirchoff, 1982) show that knowing about research does not determine

Figure 1
Current Study Variables (bold) within the Conceptual Framework



its use, and that some nurses use research findings without being persuaded of their value; the nature and dissemination of knowledge are therefore insufficient to explain research use.

Most studies of research use in nursing focus on the individual characteristics of nurses. Three Canadian studies of attitudes toward research found supportive attitudes toward research, in Ontario among staff nurses (Alcock, Carroll, & Goodman, 1990), and in British Columbia among key people responsible for research in hospitals (Clarke, 1992) and faculty in nursing schools (Clarke & Joachim, 1993). In the only reported study of the effect of attitude, attitude toward research related significantly to self-reported use of research findings (Champion & Leach, 1989). In addition, findings of various levels of persuasion about the usefulness of innovations (Brett, 1987; Coyle & Sokop, 1990) suggest that attitudes about research are important.

The educational background of nurses has received considerable attention. No significant relationships have been found between use of research and the nurse's type of education or number of degrees held, participation in continuing education or research courses, or whether currently working toward a degree (Brett, 1987; Coyle & Sokop, 1990; Crane, 1989; Ketefian, 1975; Kirchoff, 1982; Winter, 1990). Attending conferences, having research responsibilities at work, and reading specific journals relate significantly to the use of findings (Brett, 1987; Coyle & Sokop; Crane; Kirchoff). However, the importance of these findings is obscured by conflicting results regarding the influence of the source of knowledge (Winter) and the amount of time spent reading (Brett, 1987; Coyle & Sokop; Kirchoff), as well as the finding that less than 71% of nurses are interested in reading (Alcock et al., 1990).

Other individual characteristics, such as years of nursing experience (Champion & Leach, 1989; Coyle & Sokop, 1990; Winter, 1990), professional membership (Kirchoff, 1982), experience of change, urban orientation, influence over others (Crane, 1989), age, socioeconomic status, and clinical specialty (Winter) were not significantly related to research use. Clearly, individual characteristics do not sufficiently explain the use of research in nursing.

Nurses have identified organizational factors as the greatest barriers to using research (Funk, Champagne, Wiese, & Tornquist, 1991). The influence of organizational factors on research use has been studied, but most such inquiry has been limited to secondary consideration within studies of the characteristics of individual nurses (eg., Brett, 1986; Champion & Leach, 1989; Coyle & Sokop, 1990; Crane, 1989; Funk et al.; Kirchoff, 1982; Linde, 1989). Hospital size (Brett, 1987; Kirchoff); and

research support mechanisms (Brett, 1989; Crane) have been studied, but results are inconclusive. Other studies (Champion & Leach; Coyle & Sokop; Funk et al.; Linde) each consider different organizational variables, thereby making comparison difficult. Perception of unit policy is the only organizational characteristic consistently shown to influence the use of research (Brett, 1986; Coyle & Sokop; Kirchoff). Perception of the existence of a policy on a specific practice correlated with use of that practice, regardless of whether an actual policy did exist.

Recent Canadian studies (Alcock, et al., 1990; Clarke, 1992; Clarke & Joachim, 1993) describe organizational infrastructures and expectations for research from various perspectives. Alcock et al. surveyed staff nurses regarding research climate and found that only 41% of nurses thought they were encouraged to question practice, while 44% thought the nursing administration was supportive and 48% thought they were encouraged to develop effective and efficient practice. Clarke found that personnel responsible for research in health-care agencies perceived greater support by their organizations. For example, 96% of research personnel in hospitals thought that staff nurses were encouraged to question practice. However, infrastructures and support strategies for research-related activities received low ratings from respondents in all settings. To date, no research on the influence of these organizational factors on research-based practice has been reported. This study therefore examined the relationship of organizational support and expectations for research to the use of research findings from the perspective of staff nurses.

Research Questions

The following questions were posed:

1. What are the nurses' values for, interests in, and experiences with research?
2. What are the nurses' expectations of themselves for using research findings?
3. What are the perceived organizational expectations to use research findings?
4. What is the perceived organizational support for using research findings?
5. What is the reported level of research use?
6. What are the differences between perceived organizational expectations and staff nurses' expectations of themselves for using research findings in nursing?

7. What are the relationships between perceived organizational expectations and staff nurse expectations of themselves and the use of research findings?
8. What is the relationship between the nurses' perceptions of organizational support for research utilization and use of research findings?

Method

A stratified random sample (n = 450) of registered nurses was selected from all 7,772 staff nurses working in medical/surgical and critical-care areas of acute-care hospitals British Columbia. The Registered Nurses Association of B.C. (RNABC) database was stratified by education level and by hospital size, and a random sample was drawn. The nurses were surveyed by mail and consent to participate was assumed by their returning the completed survey. Anonymity was assured because the RNABC selected the sample and mailed the survey packages. Following two reminders, 183 nurses (42%) had responded.

The Research Use in Nursing Practice instrument designed by Alcock et al. (1990) and modified by Clarke (1991) was used. The instrument was modified by adapting the wording for use by staff nurses and adding appropriate demographic questions. Personal and professional characteristics assessed included the nurse's level of education and whether the nurse had had 18 research-related experiences, such as completing questionnaires, collecting data, or taking research courses. Individual change factors were measured by levels of agreement/disagreement with six statements about their value for research, 10 statements about their interest in research, and six statements about their expectations of themselves to use research. The organizational context was addressed by asking about the existence of 27 research supports (e.g., research policies and committees, release time for research, research responsibilities in job descriptions) in addition to hospital size. Organizational change factors were measured by levels of agreement/disagreement with six statements about nurses' perceptions of the nursing department value for research, six statements about their perception of the expectations others hold of them to use research, and 11 statements about the research climate in their organization. The climate scale included statements about encouragement, support, and recognition for using research. Internal consistency of the above subscales ranged from .79 to .92.

Research use was measured in two ways. Nurses rated their general use of research on 10 statements, from "not at all" (1) to

"always" (4). Internal consistency was 0.87. Nurses rated whether they used 10 specific findings, from "never" (1) to "always" (3) – or "not applicable," if the finding was not appropriate for their area of practice. The items (e.g., mutual goal-setting, providing planned preoperative teaching, using the dorsogluteal injection site) had been used in earlier studies (Brett, 1987; Coyle & Sokop, 1990). Internal consistency was 0.87. Content validity of the total instrument was tested through peer review. The instrument was also pilot-tested and revised.

Descriptive statistics were used to describe the levels of each of the individual and organizational factors. *T*-tests were used to detect the differences between nurses' own expectations of themselves to use research and their perceptions of the expectations held by head nurses and directors of nursing. Multiple analysis of variance (MANOVA) was used to detect differences among groups by educational level and hospital size, and post hoc analysis (Tukey's) was carried out when differences were significant. Correlation coefficients were calculated to identify relationships between variables.

Results

The sample comprised 83 (45%) diploma nurses and 98 (54%) baccalaureate nurses (two nurses did not report their education level). The nurses also represented hospitals of different sizes: 59 worked in small hospitals (<250 beds), 67 in medium-sized hospitals (250-499 beds), 54 in large hospitals (>500 beds), and three did not report hospital size. There were therefore 25, 33, and 24 diploma nurses and 33, 33, and 30 baccalaureate (BSN) nurses, from small, medium, and large hospitals. The sizes of these groups were sufficiently similar to permit use of analysis of variance (Stevens, 1990).

Fifty-five (30%) of the nurses indicated that they worked in medical areas, 33 (18%) in surgical areas, 27 (15%) in medical/surgical areas, and 66 (36%) in critical-care areas. The sample was almost evenly divided between nurses who worked full time (49%) and those who worked part time (51%). The majority of the sample had graduated less than 10 years previously (56%), with the years since graduation ranging from 0 to 34 years (M = 13.9; SD = 9.3) for diploma nurses and from 0 to 36 years (M = 8.2; SD = 6.8) for BSN nurses. Diploma nurses tended to be older (M = 38 years; SD = 9.3) than BSN nurses (M = 34.5 years; SD = 6.8).

Although a random sample was used, comparison with other databases (Canadian Centre for Health Services and Policy Research, 1993;

Table 1

Summary of Descriptive Statistics and MANOVA for All Study Variables

	Education					Hospital Size						
	Diploma		BSN		*F* Ratio	Small		Medium		Large		*F* Ratio
Factor (possible range)	*M*	(*SD*)	*M*	(*SD*)	(*df*=1)	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	(*df*=2)
Individual Factors												
Research Experience (0-18)	4.2	(2.7)	7.1	(3.4)	40.05**	6.0	(3.5)	5.1	(2.3)	6.2	(3.0)	1.10
Value for Research (6-24)	19.7	(2.9)	20.7	(5.2)	5.11*	20.5	(3.1)	20.2	(2.9)	20.2	(3.0)	0.43
Interest in Research (10-40)	30.8	(5.2)	31.7	(5.2)	0.01	31.3	(4.0)	31.5	(5.4)	31.4	(5.0)	0.33
Expectations to Use Research (6-24)	18.3	(3.0)	18.8	(3.1)	2.01	18.9	(2.6)	18.4	(3.2)	18.2	(3.6)	0.66
Organizational Factors												
Infrastructure (0-27)	5.7	(5.6)	8.0	(6.5)	0.06	4.4	(6.2)	7.0	(5.6)	10.9	(6.8)	2.41**
Research Climate (11-44)	26.8	(7.0)	25.2	(6.7)	1.07	21.4	(6.4)	25.5	(6.2)	29.1	(5.8)	20.30**
Head Nurse Expectations (6-24)	17.8	(4.4)	17.7	(3.9)	0.59	16.8	(4.1)	18.5	(3.0)	12.8	(2.9)	3.03**#
Nursing Director Expectations (6-24)	17.8	(4.4)	17.7	(3.9)	0.45	15.9	(3.2)	18.1	(3.0)	18.6	(3.2)	5.20**
Nursing Department Value (6-24)	19.8	(3.1)	19.3	(3.6)	0.58	18.3	(3.9)	19.9	(2.9)	20.3	(3.1)	4.96**
Research Use												
General Use (10-40)	22.6	(4.9)	22.9	(4.9)	1.87	23.2	(5.7)	22.5	(4.9)	22.5	(4.0)	0.29
Use of Specific Findings (1.0-3.0)	2.2	(0.4)	2.2	(0.4)	0.06	2.1	(0.4)	2.1	(0.4)	2.2	(0.3)	2.40

* p = > 0.05; ** p = > 0.01; # significant interaction effect

Kazanjian, Pulcins, & Kerluke, 1992; Statistics Canada, 1991) revealed that stratification and differences between responders and non-responders led to a final sample that was more representative of BSN nurses, nurses who worked part time, and those who worked in medical/surgical areas than of the population of staff nurses in B.C. acute-care hospitals. BSN nurses tended to be younger, as we have seen, and to have graduated more recently than diploma nurses, but the sample was similar in gender and age to the underlying population.

The results will be reported in terms of each of the variables. The mean scores and results of analysis of variance are summarized in Table 1.

Individual Factors

The individual factors were comprised of nurses' education and research experience and the change factors of value for, interest in, and expectations to use research.

Research experiences, values, and interests. The nurses indicated that they had had from zero to 17 out of a possible 18 research experiences ($M = 5.8$; $SD = 3.3$). Completing questionnaires was the most common. The next top four experiences were attending conferences at which research findings were presented, attending research conferences, taking research courses, and taking statistics courses. The remaining 13 were indicated by less than 50% of the nurses. There was a significant difference by education ($F = 40.05$; $df = 1$; $p = .00$), with BSN nurses having more research experience for all but one category. There was no significant difference by hospital size and no interaction effect.

The scale of six statements about the value of research in the nursing profession ranged from six (strong disagreement with all value statements) to 24 (strong agreement with all statements). The scores ranged from 12 to 24 ($M = 20.3$; $SD = 2.99$). For the five statements regarding the value of research in enhancing nursing decisions, interventions, and public accountability, 89-98% of the nurses agreed or strongly agreed. The sixth statement, about the value of research in enabling nurses to use resources more efficiently, received less support, with only 77% of nurses agreeing. The value scores were significantly higher for BSN nurses than for diploma nurses ($F = 5.11$; $df = 1$; $p = .03$). There were no significant differences by hospital size and there was no interaction effect.

The nurses rated their level of agreement with 10 statements regarding their interest in research-related activities. The possible score

ranged from 10 (strong disagreement with all interest statements) to 40 (strong agreement with all statements). The scores ranged from 10 to 40, (M = 30.7; SD = 5.9). Very few nurses had a score of less than 24, suggesting agreement by most nurses. Most individual statements also received a high level of agreement. Interests directly related to nursing practice, such as finding answers to specific nursing problems and using research results to change practice, received the highest level of agreement. The least supported area was conducting research outside of work assignments. There were no significant differences in interest scores among the groups by hospital size or education.

Nurses' expectations for using research findings. The nurses were asked about their level of agreement with six statements concerning expectations they held regarding their own use of research in nursing. The possible score ranged from six (strong disagreement with all expectations) to 24 (strong agreement with all expectations). The range for the sample was 6-24 (M = 18.2; SD = 3.6). Levels of agreement varied among the six expectations. Most nurses agreed or strongly agreed that they themselves expected to "critically question the effectiveness of daily nursing practice" (90%) and to "apply research findings to clinical practice" (93%). "Promoting a climate that supports colleagues' research" received 85% agreement (agree/strongly agree), and collecting data for nursing research received 87% agreement. However, conducting research and being involved with collecting data for non-nursing research received less agreement – 50% and 56%, respectively. There was no significant difference in expectations of self by education or by hospital size.

Organizational Factors

The organizational context was described by hospital size and research infrastructure supports; organizational change factors were described by perceived expectations of key personnel, nursing department value for research, and research climate.

Perceived organizational expectations to use research findings. Organizational expectations were measured by asking nurses to express their level of agreement about the degree to which they thought their head nurse and nursing director held particular expectations. The statements were the same as those used to rate self-expectations. The nurses perceived the expectations of their head nurses (M = 17.8, SD = 3.4; range 6-24) and their director of nursing (M = 17.6; SD = 4.1; range 6-24) to be similar. There was a significant difference among the perceived

expectations of head nurses from hospitals of different sizes ($F = 3.03$; $df = 2$; $p = .05$) and an interaction effect between hospital size and level of education ($F = 3.39$; $df = 1$; $p = .04$), although no differences were found between educational levels. This demonstrates that BSN nurses in medium-sized and large hospitals thought that head nurses' expectations were higher than did BSN nurses in small hospitals, whereas diploma nurses in medium-sized hospitals thought head nurse expectations were higher than did diploma nurses in either small or large hospitals. For perceived expectations of nursing directors, a significant difference was seen among nurses from hospitals of different sizes ($F = 5.20$; $df = 2$; $p = .01$), but there was no interaction effect and no difference between educational levels.

Perceived level of organizational support for using research findings. Organizational support for research was measured in three ways. The nurses were asked to express their level of agreement with six statements about the value of research within the nursing department. They were asked to express their level of agreement with 11 statements regarding the research climate in their organization. They were also asked to identify the research-related supports available in their organization.

The statements regarding the value of research within the nursing department were the same as those that the nurses responded to when rating their own value for research. The scores ranged from 8 to 24 ($M = 19.5$; $SD = 3.3$). Most nurses agreed or strongly agreed with most statements. Scores were lower in small hospitals, higher in medium-sized hospitals, and highest in large hospitals, with a significant difference among hospital sizes ($F = 4.96$; $df = 2$; $p = .01$) but no difference between educational levels and no interaction effect.

The 11 statements regarding the research climate included questions about encouragement and recognition of nurses, and interest in research by others. The possible score ranged from 11 (strong disagreement with all statements) to 44 (strong agreement with all statements). The scores ranged from 11 to 44 ($M = 25.9$; $SD = 6.8$). Most were between 21 and 30. The climate scores were low for small hospitals, higher for medium-sized hospitals, and highest for larger hospitals, the differences being significant ($F = 2.41$; $df = 2$; $p = .00$), but there was no significant difference between educational levels and no interaction effect.

The nurses' perceptions of infrastructures for research were measured by asking them to identify which of 27 infrastructures were avail-

able in their hospitals. The possible score ranged from 0 (no supports) to 27 ("yes" to all supports). Over 33% of all responses were "don't know." The scores ranged from 0 to 27 ($M = 7.2$; $SD = 6.3$). Over half of the nurses identified fewer than six of the 27 possible infrastructures. The most frequently identified supports were library facilities and ethics committees, which were identified by 119 and 112 nurses, respectively. Ethics committees identified were not necessarily related to research, as only 64 nurses identified research review committees and only 18 nurses identified combined research and ethics committees. All remaining infrastructures were identified by fewer than half of the nurses. There was a significant difference in perceived number of infrastructures among hospitals of different sizes ($F = 2.41$; $df = 2$; $p = .00$), with larger hospitals having a significantly greater mean number (10.9) than medium-sized (7.0) or small ones (4.4). The BSN group tended to report a higher number of infrastructures ($F = 0.06$; $df = 1$; $p = .08$).

Reported Level of Research Utilization

Research utilization was measured in two ways: the nurses were asked first to rate their general use of research and then to rate their use of specific research findings. Each of 10 statements related to general use of research were rated on a four-point scale, from "not at all" to "sometimes" to "frequently" to "always." The possible score ranged from 10 ("not at all" for all statements) to 40 ("always" for all 10 statements). Scores ranged from 10 to 38 ($M = 22.7$; $SD = 4.91$). All statements were rated at least "sometimes" by at least 80% of the nurses. The most strongly supported statement regarded communicating concerns about the effectiveness of practices to colleagues. The least supported statement regarded the use of research articles to support questioning practice and the identification of hospital policies based on research. No significant differences were seen by education or hospital size.

The nurses were also asked to rate whether they used 10 specific findings – "never" = 1, "sometimes" = 2, "always" = 3, or "not applicable." Three of the findings were rated "not applicable" by over 30% of nurses, and these responses were excluded when percentage of use and the overall scores were calculated. The score for the use of specific findings was the average score of applicable practices (range 1 - 3). The mean score was 2.15 ($SD = 0.36$). Use varied with the specific finding. With one exception (catheter clamping), each finding was used at least sometimes by 50% of the nurses. Giving sensory information before diagnostic tests was used most frequently (at least sometimes by 96%

of the nurses to whom it applied). Mutual goal-setting and giving sensory information before surgical procedures were also used at least sometimes by 95% of nurses. An average of 77% of nurses used the findings at least sometimes. Use of specific findings was not significantly different by education or hospital size.

Difference between Perceived Organizational Expectations and Staff Nurses' Expectations

T-tests were used to test the difference between the nurses' expectations of themselves and their perceptions of the expectations of key individuals in the organization. Their expectations of themselves to use research were significantly higher than their perceptions of head nurses' expectations ($t = 2.381$; $p = .02$) and directors' expectations ($t = 2.60$; $p = .01$).

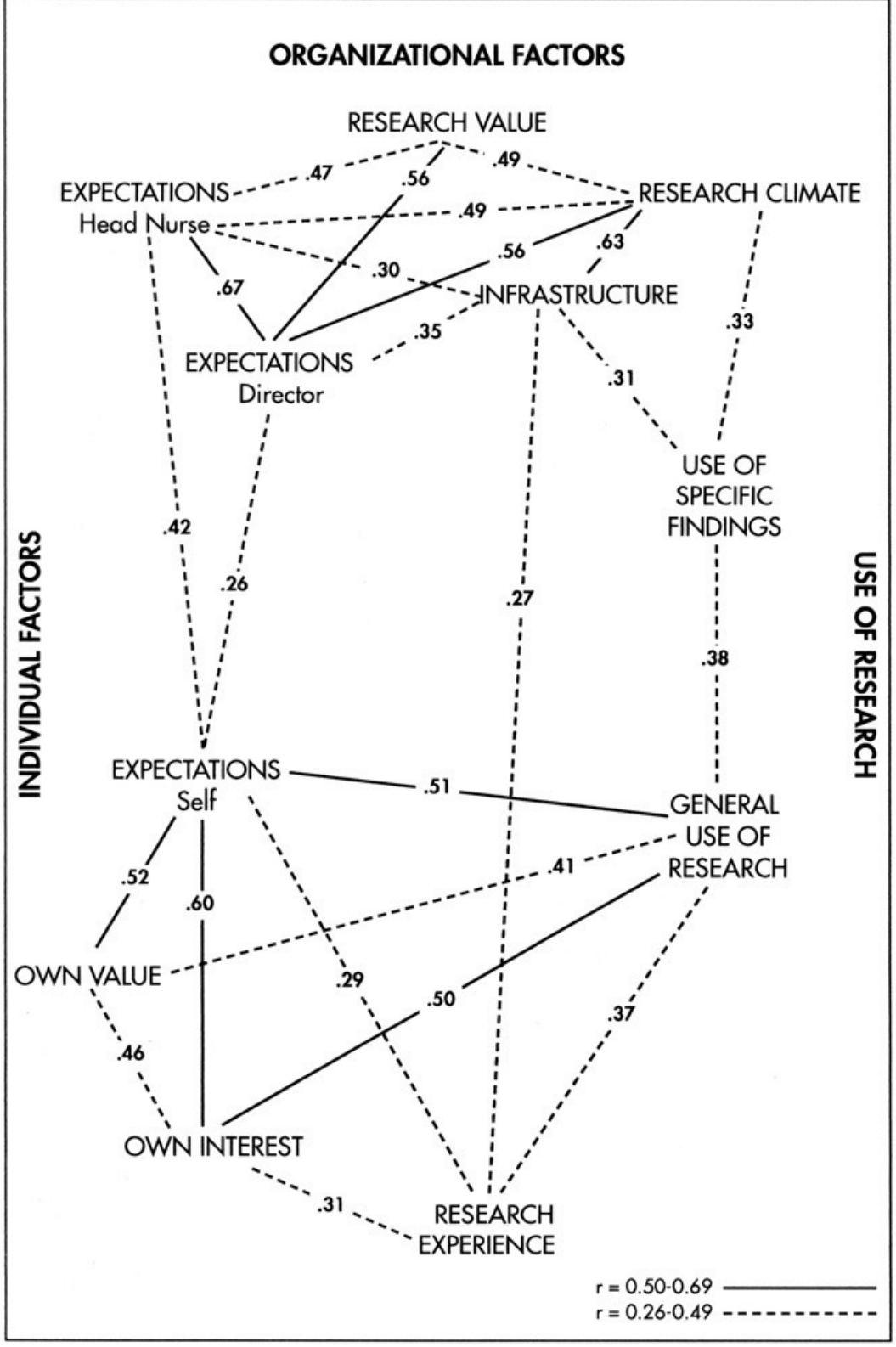
Relationships between Organizational and Staff Nurse Expectations and Use of Research

Pearson's Correlation Coefficients were calculated to describe relationships between expectations (of head nurse, director, and self) and use of research (general and specific). Munro and Page's (1993) classification was used to interpret the strength and to judge the practical significance of the correlations. They consider .26 - .49 a low correlation, .50 - .69 moderate, .70 - .89 high, and .90 - 1.00 very high. Correlations below .26 are not considered significant and thus were not included in the interpretation. All correlations above .26 were statistically significant at $p = .001$ or higher. The correlations are shown in Figure 2.

The relationship between perceived expectations of the head nurse and perceived expectations of the director was moderate ($r = .67$). The relationship of the nurse's own expectations to perceived head nurse expectations was moderate ($r = .42$), to perceived director expectations low ($r = .26$). The correlation between the nurses' reported general use of research and use of specific findings was moderate ($r = .48$). There was no significant correlation between the expectations perceived to be held by head nurses or nursing directors and the general use of research or the use of specific findings. The nurses' own expectations correlated moderately with their own reported general use of research ($r = .51$), but did not correlate with their reported use of specific findings.

Figure 2

Bivariate Correlations among Organizational and Individual Factors and Research Utilization Outcomes



Relationship between Nurses' Perceptions of Organizational Support and Use of Research

Correlations were also calculated to describe relationships between organizational support and the use of research. Two supports (climate and infrastructures) correlated with the use of specific findings (r = .33 and .31, respectively), but none correlated with general use.

In order to examine relationships within organizational and individual factors and research use, further bivariate relationships were explored. The individual change factors were interrelated (r = .46 - .60) and correlated with the general use of research as reported by the nurses (r = .41 - .51). The organizational factors (nursing department value for research, research climate, and infrastructures) were also interrelated (r = .47 - .67). The climate and infrastructures, which were correlated with the use of specific findings, were correlated with each other (r = .63) and with all of the other organizational characteristics (r = .49 - .56 and r = .29 - .56, respectively). The organizational factors were not related to individual factors except for a correlation between the nurses' own expectations and the perceived head nurses' expectations, and a correlation between research experience and reported infrastructures. Use of specific findings was related only to organizational factors, whereas general use of research was related only to individual factors. The two measures of research use were also correlated (r = .38).

Discussion

Both diploma and BSN nurses reported high values for research and interest in research, and high expectations of themselves to use research, although BSN nurses indicated significantly greater value for research. Although research experience was low for the entire sample and was not significantly different by hospital size, BSN nurses had significantly more research experience, especially in attending conferences and taking courses. The findings regarding individual factors of value for research and experience and interest in research were remarkably similar to those of previous studies (Bostrom, Malnight, MacDougall & Hargis, 1989; Clarke, 1992; Clarke & Joachim, 1993), although Alcock et al. (1990) found greater differences between educational levels. None of the individual characteristics or change factors was significantly different by hospital size.

In contrast, all of the organizational factors differed significantly by hospital size but not by education level. All organizational factors were reported higher according to hospital size, with the exception of views

of head nurses' expectations, which showed a significant interaction effect between hospital size and education level. The number of infrastructures for research identified was generally small, and the nurses' perceptions of the organizational research climate scored low. Nurses reported high expectations on the part of their head nurses and directors although the nurses perceived them to be significantly lower than their own expectations of themselves.

The reported levels of use of specific findings were comparable to or higher than those of previous findings (Brett, 1987; Coyle & Sokop, 1990; Winter, 1990), but were difficult to evaluate in terms of clinical importance. The use of specific findings varied with the specific practices, but on average 77% of the nurses used the practices at least "sometimes." As there is no standard, the adequacy of this level is difficult to judge.

The use of specific findings did not differ by education or hospital size. The strongest factors influencing the use of specific findings were organizational climate and infrastructures. This is congruent with earlier findings that perceptions of unit policy influence practice (Brett, 1986; Coyle & Sokop, 1990; Kirchoff, 1982). Other organizational factors, including expectations, were related to climate and infrastructures, but not directly to the use of findings. None of the individual factors was related to the use of specific findings, supporting the idea that organizational factors are more influential.

The levels of general use of research reported by nurses in this study were moderate, with no significant differences by hospital size or education. Nurses' perceptions of their general use of research have not been widely reported and were shown in this study to differ from the use of specific findings that has been commonly measured and, understandably, to relate to individual characteristics of research interest, value, experience, and expectations.

Consistent with previous studies (Brett, 1987; Crane, 1989; Coyle & Sokop, 1990; Ketefian, 1975; Miller & Messenger; 1978; Winter, 1990), this investigation found no difference in the use of specific findings between educational levels. The limited effect of education may indicate that the research education that nurses receive is insufficient to have an impact or that the methods of teaching and focus of research education have not been effective. It may also indicate that organizational factors limit the effectiveness of the individual nurse and his or her education.

The relationships between organizational and individual factors and research utilization outcomes were consistent with Crane's (1989) conceptual framework. The individual change factors were interrelated and correlated with nurses' reports of their general use of research. The organizational factors were also interrelated, and climate and infrastructures correlated with the use of specific findings. The organizational factors were not related to individual factors, except for a correlation between the nurses' own expectations to use research and the perceived head nurses' expectations, and between research experience and reported organizational infrastructures. These findings suggest that the head nurses' expectations may have some influence, and that research experience may increase awareness of research supports. The use of specific findings was related only to organizational factors, whereas the second measure of research use (general use of research) was related only to individual factors. The two measures of research utilization were also correlated. Although organizational factors varied by hospital size and correlated with the use of specific findings, the use of specific findings did not vary by hospital size: these findings were interpreted as suggesting that individual factors may mediate the influence of organizational factors. This interpretation departs slightly from Crane's conclusion that organizational factors overwhelm individual factors.

Conclusions

Although this study was limited by the low response rate of 42%, the fact that organizational factors were measured from the nurses' perspective, and the fact that research use was self-reported, the following conclusions may be reasonable. Nurses' interest in research and their expectations of themselves to know and use research findings transcend educational level and hospital size. Nurses are especially interested in learning about research results relevant to their area of work, finding answers to specific nursing problems, and using research results to change their own practice. Nurses expect to use research and to critically question their practice, as well as to apply the findings to their practice. BSN nurses seem to hold higher value for research and they have more research experience than diploma nurses. Nurses' values for, interests in, experiences with, and expectations to use research seem to influence their perceived general use of research. These characteristics do not appear to directly influence the use of specific findings, but may mediate the influence of the organization.

Educational level does not significantly influence the levels of general use of research or the use of specific findings.

Nurses perceive the organizational climate and support for research to be low, especially in small hospitals. They perceive the organizational expectations for the use of research to be fairly high, but this perception varies with hospital size and is lower than nurses' expectations of themselves. It appears that nurses think they are expected to use research, but do not think that they are supported in doing so.

Conclusions about the impact of the organizational context and change factors are not easily drawn. While organizational size does not seem to influence nurses' individual characteristics or use of research, organizational supports and expectations are greater in larger hospitals. Organizational climate and support do not appear to be related to general use of research, but are related to the use of specific findings. These were the only factors that correlated with the use of specific findings, suggesting that organizational climate and support are most influential.

Conclusions regarding research utilization outcomes are also difficult to reach. Nurses' general use of research relates to the values, interests, experiences, and expectations they hold regarding research. Their use of specific findings relates to organizational factors. Neither general use nor use of specific findings was rated as high as would be ideal for a profession that aspires to be research-based.

These findings have implications for the promotion of research-based nursing. Theories of research use need to focus on the implementation of findings, as well as on their generation, communication, and evaluation. Research-based practice is complex, multi-factorial, and influenced by the setting as well as by the individual. Nurses must be taught to use research. In addition to the recent emphasis on research utilization in baccalaureate education, practice-related research activities should be built into curricula at all levels, in a manner commensurate with expectations for each level of practice. Nursing environments need to promote research-based practice. As argued by Spence (1994), changes in education are unlikely to have an impact unless they are accompanied by changes in organizations. Research-related expectations could be built into clinical requirements. The low perceptions of climate and support for research could be countered, especially by smaller hospitals. The differences in perceived expectations suggests that organizations should communicate their explicit research-related expectations.

Nursing research should continue to strive to address relevant research questions. Further study is required to identify why high value, interest, and expectations do not result in research-based practice. Exploration of organizational factors might help to explain differences between nurses' individual characteristics and the levels of research use. The findings regarding the influence of education on research use warrant investigation, to determine why additional research experience and education about research did not result in differences in reported research use. Further study into specific approaches to research education is needed, and the impact of courses focusing on research use and models of integrated research education should be evaluated. Finally, development and testing of models to explain the use of research in practice is required. Findings in more specific areas of practice should be reviewed, to identify research that can serve as an estimate of research use. Methods of measuring the implementation of findings must be sought. Qualitative approaches would facilitate a deeper understanding of the complex factors that influence research-based practice.

This study focused on the relationship between organizational expectations and support for the use of research in nursing. While expectations were not shown to directly affect research use, organizational infrastructure and climate were found to be influential. The conceptual framework directed the study to consider the problem of research-based practice within an organizational context, but examined that context in a limited fashion. Further study of research-based practice should consider nursing within a broader context and explore the extent to which nurses control their practice and are empowered to use research findings in their work. Nurses will be able to implement the findings of nursing research only to the extent that they understand and take control of their practice.

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Acknowledgement

The authors gratefully acknowledge the contribution of Dr. Heather Clarke, Ms. Claire Kermacs, and the staff nurses who participated in the research.