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Fostering Evidence-Based Practice to Improve Nurse and Cost Outcomes in a Community Health Setting

A Pilot Test of the Advancing Research and Clinical Practice Through Close Collaboration Model

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Although evidence-based practice (EBP) improves health care quality, decreases costs, and empowers nurses, there is a paucity of intervention studies designed to test models of how to enhance nurses' use of EBP. Therefore, the specific aim of this study was to determine the preliminary effects of implementing the Advancing Research and Clinical practice through close Collaboration (ARCC) model on nurses' EBP beliefs, EBP implementation behaviors, group cohesion, productivity, job satisfaction, and attrition/turnover rates. A 2-group randomized controlled pilot trial was used with 46 nurses from the Visiting Nurse Service of New York. The ARCC group versus an attention control group had stronger EBP beliefs, higher EBP implementation behaviors, more group cohesion, and less attrition/turnover. Implementation of the ARCC model in health care systems may be a promising strategy for enhancing EBP and improving nurse and cost outcomes. **Key words:** *cost*, *evidence-based practice*, *nursing*, *nurse turnover*, *randomized controlled trial*

EVIDENCE-BASED PRACTICE (EBP) is a problem-solving approach to the delivery of care that integrates the best evidence from well-designed studies with a clinician's expertise and patient preferences and values.[1,2] As an established method of improving clinical care, EBP has been shown to improve health, safety, and cost-effectiveness of patient care as well as decrease patient morbidity and mortality.[3–9] Evidence-based practice also has been described as "essential for nurses to establish who they are, what they do, and what effect they have on patient outcomes."[4]

Although federal agencies, national organizations, health care leaders, and recent EBP and health care professions' education summits have promoted its widespread use among health care professionals, only a small

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percentage of clinicians consistently use an EBP approach to care.[10-13] Aside from our 2 prior feasibility studies,[14] there have been no rigorous randomized controlled trials reported in the literature that tested the efficacy of interventions to promote the use of EBP among nurses. Therefore, the specific aim of this randomized controlled pilot study was to evaluate the effects of implementing the Advancing Research and Clinical practice through close Collaboration (ARCC) model[15] on nurse and cost outcomes.

BACKGROUND AND SIGNIFICANCE

The positive effects of EBP on patient outcomes and health care costs have been described in the literature for years. For example, nursing practice based on evidence has been found to improve patient outcomes by 28%.[16] In addition, nursing and health care services based on the best currently available evidence have been shown to decrease costs.[7,17,18] As a result, third party payers are now providing incentives to health care providers to base their practices on best evidence. From an administrative standpoint, improved cost-effectiveness and improved ability to negotiate with payers also are important outcomes of EBP.[9] Evidence-based practice also leads to greater consistency in care provided, greater patient satisfaction due to improved outcomes, and improved health care provider satisfaction.[12]

Despite the substantial benefits of EBP, there is a paucity of studies that have tested theoretically driven, reproducible interventions to enhance EBP in nurses. In addition, the relationships among EBP and job satisfaction as well as intent to remain in nursing and its related outcomes (eg, turnover rates) are largely unknown. Multiple studies have shown that while most nurses are typically committed to their profession, they are highly dissatisfied with their work environments.[19] High nurse turnover rates are very costly to the health care system and negatively impact patient outcomes, with the cost of replacing a single medical-surgical nurse estimated at $92 442.[20] Although the recession's impact on the registered nurse workforce seems to be temporarily easing nursing workforce shortages,[21] the long-term need for nurses is critical as a 40% registered nurse vacancy rate is expected by 2025.[22] Therefore, it is important to develop and test intervention strategies to empower nurses and enhance job satisfaction and improve the quality of patient care.

Little has been written regarding nurses' satisfaction when an EBP model is incorporated into clinical practice. Furthermore, strategies to incorporate research findings into nursing practice have not been evaluated in terms of staff nurse outcomes. The existing literature, however, reports that clinicians who utilize research evidence in their practices are more satisfied with their role and their patients have better clinical outcomes.[23,24] Research also has shown that nurses' use of EBP improves patient outcomes[25,26] Therefore, it is likely that fostering EBP could lead to improvements in both patient and nurse outcomes.

While our prior feasibility studies provide some evaluative evidence about using the ARCC model in hospital settings, there are no studies that document the outcomes of implementing an EBP model in a community/home care setting. Thus, the present study extended our acute care feasibility work and gathered preliminary evidence about the effects of the ARCC model on improving nurse and cost outcomes in a home care setting.

THEORETICAL FRAMEWORK

The ARCC is a systemwide model of EBP implementation and sustainability that was first conceptualized in 1999.[15] The key component in the ARCC model is that of an EBP mentor, an advanced practice nurse who (*a*) assists nurses and other clinicians in honing their EBP knowledge and skills as well as implementing EBP projects to improve patient care and outcomes and (*b*) implements

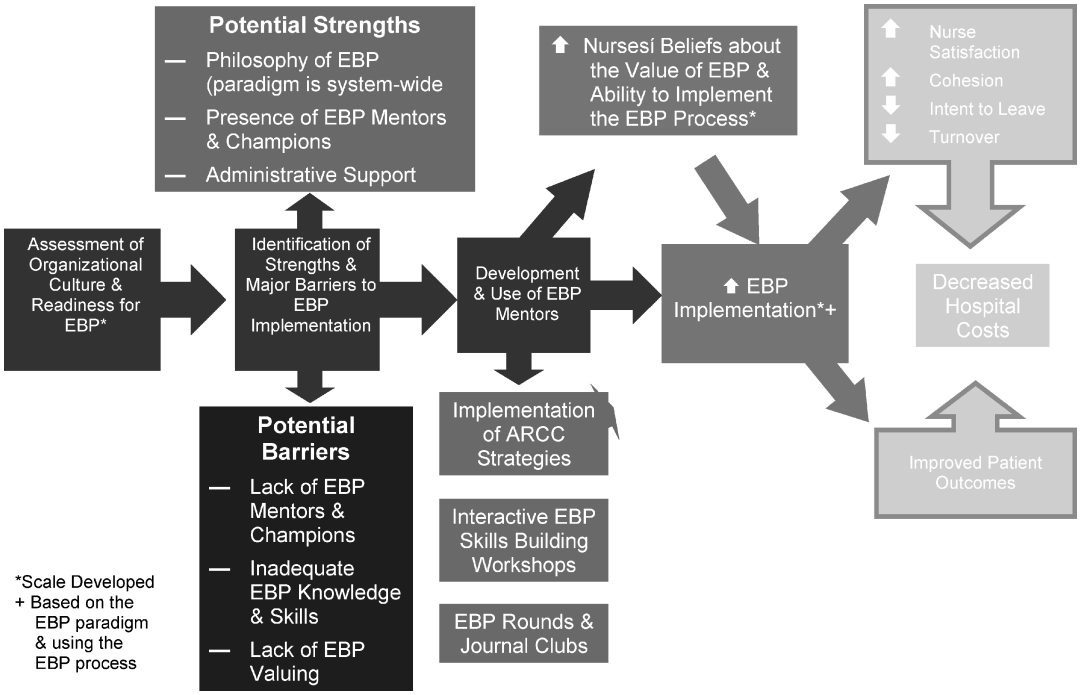

Figure 1. Melnyk and Fineout-Overholt's Advancing Research and Clinical practice through close Collaboration (ARCC) model. EBP indicates evidence-based practice.

strategies to overcome barriers in the health care environment in building a culture of EBP (see Figure 1). The ARCC model is driven by Control Theory,[27,28] which contends that a discrepancy between a standard or goal (eg, consistent implementation of EBP) and the current state (eg, infrequent use of EBP) should facilitate behaviors by individuals to achieve their standard or goal. However, barriers exist (eg, lack of EBP knowledge and skills; inadequate resources, lack of an EBP mentor) that interfere with an ability to implement EBP behaviors to obtain the goal. The model also is guided by cognitive-behavioral theory, which contends that an individual's behaviors are in large part determined by the way he or she thinks or his or her beliefs.[29,30] Therefore, ARCC strategies (eg, use of an EBP mentor; EBP skills-building workshops), which are based on control theory and cognitive-behavioral theory, are designed to remove the barriers to EBP implementation so that nurses have stronger beliefs about the value of EBP and more confidence in their ability to implement it consistently.[31] Prior studies have indicated that when nurses have stronger beliefs about EBP, they implement EBP to a greater extent than when beliefs are weak.[32]

PURPOSE AND RESEARCH QUESTIONS

The primary purpose of this pilot study was to evaluate the preliminary effects of implementing the ARCC model on nurse and cost outcomes in a community health setting. Specific questions posed for this pilot study were as follows: What is the effect of implementing the ARCC model on (*a*) nurses' beliefs about EBP; (*b*) nurses' implementation of EBP; (*c*) nurses' perceptions of group cohesion; (*d*) nurses' job satisfaction; (*e*) nurses' productivity; and (*f*) nurse turnover rate? In addition, the reliability of 2 newly developed scales was evaluated, the EBP Beliefs Scale and the EBP Implementation Scale.[33]

METHODS

Design, setting, sample

A 2-group randomized controlled pilot trial with a repeated-measures design was used. Nurse participants were recruited from 3 regions (the boroughs of Queens, the Bronx, and Manhattan) of the Long Term Home Health Care Program (LTHHCP) of the Visiting Nurse Service of New York (VNSNY). The regions were randomly assigned to experimental (ie, ARCC) and attention control groups.

The VNSNY is the largest nonprofit home health care agency in the nation and has the expertise and capabilities to provide for a person's total home health care needs. The agency's 2200 highly skilled registered and advanced practice nurses, 675 rehabilitation therapists (physical, occupational, and speech), 600 social workers, and 4350 home health aides provide the care patients need to stay at home. The LTHHCP services patients who need ongoing care for chronic health problems and has offices in 4 of the 5 boroughs of New York City—Manhattan, Bronx, Queens, and Brooklyn.

Nurses meeting the following criteria were eligible for study participation: (*a*) age 21 years or older, (*b*) ability to read and speak English, and (*c*) a full-time or part-time employee of the VNSNY. Of the 70 nurses who attended recruitment sessions and met inclusion criteria, 46 agreed to participate and formed the initial sample. Of these 46 nurses, 22 comprised the experimental group and 24 comprised the control group. The sample was entirely female. Most were African American (58.7%) and had at least a bachelor's degree (69.6%). Both nurse managers (patient service manager) and visiting staff nurses (coordinator of care) were involved in the study groups. There were no significant differences between the ARCC and placebo attention control groups at baseline on major demographic variables. In addition, there were no significant differences in the final sample of nurses who remained in the study at the last data collection point (N = 27) and the characteristics of the initial sample. Table 1 presents characteristics for the initial sample by study group.

After receiving institutional review board approval, the investigators attended a regularly scheduled monthly meeting of the LTHHCP staff nurses to provide information on the study and request study participation. Queens' LTHHCP nurses comprised one study group, and LTHHCP nurses in the boroughs of Manhattan and the Bronx comprised the other. This strategy was used in an attempt to equalize the number of participating nurses in each study group as the Queens.

The LTHHCP in the Queens Region has 8 nursing teams with about 6 nurses on each team (42 in the region) compared with the Bronx and Manhattan, which have only 2 or 3 teams each with about 6 nurses on each team (12-18 in each region). The regions were then randomly assigned to the ARCC (Queens) and attention control (Manhattan and Bronx) study groups. Baseline demographic information and questionnaires (eg, The EBP Beliefs Scale, the EBP Implementation Scale) were collected at the start of the study, before implementation of the intervention programs.

The ARCC model intervention program

Nurses in the ARCC model intervention program were provided (*a*) didactic content on EBP basics through live presentation by an advanced practice nurse with expertise in EBP; (*b*) an EBP Toolkit, which included narrative text on the content presented in the presentations; (*c*) environmental prompts (eg, posters that encourage the nurses to use EBP); and (*d*) an EBP mentor who was available on site and by e-mail for consultation. The EBP educational intervention phase lasted 16 weeks, including a 4-week training period followed by an EBP mentor on site 2 hours 1 day a week for 12 weeks. The 4-week training period consisted of 4 1-hour classes to introduce the following basic concepts of EBP:

Table 1. Frequencies and Percentages of Sample Demographic Information Regarding Nurses by Group at Baseline (N = 46)

	Experimental Group (N = 22), n (%)	Control Group (N = 24), n (%)	Total (N = 46), N (%)
Gender			
Female	22 (47.8)	24 (52.2)	46 (100.0)
Ethnicity			
African American	13 (28.3)	14 (30.4)	27 (58.7)
White	5 (10.9)	3 (6.5)	8 (17.4)
Native American	2 (4.3)	1 (2.2)	3 (6.5)
Hispanic	0 (0.0)	1 (2.2)	1 (2.2)
Other	1 (2.2)	1 (2.2)	2 (4.3)
Ethnicity not reported	1 (2.2)	4 (8.7)	4 (8.7)
Highest educational degree			
Diploma	0 (0.0)	1 (2.2)	1 (2.2)
Associate degree	4 (8.7)	4 (8.7)	8 (17.4)
Bachelor's degree	10 (21.7)	10 (21.7)	20 (43.5)
Master's degree	7 (15.2)	5 (10.9)	12 (26.1)
Doctorate	0 (0.0)	0 (0.0)	0 (0.0)
Not reported	1 (2.2)	4 (8.7)	5 (10.9)

(*a*) definition of EBP and rationale for use in clinical decision making; (*b*) developing focused, searchable clinical questions; (*c*) finding the evidence; and (*d*) basic concepts of a systematic review, specifically reading and critically appraising a meta-analysis. During the following 12-week project intervention period, the EBP mentor met with ARCC nurses to facilitate their work and serve as an informal teacher of how to implement EBP concepts as part of their daily practice. The EBP project addressed a clinical problem related to the nurses' practice. These sessions were prescheduled for 1 and $1^1/_2$ hours each week at the regional office. Nurses in the attention control group did not receive the mentorship intervention or any content that was covered in the "EBP basics" part of the ARCC program. Instead, they received didactic content of adult physical assessment that was comparable in length to the "EBP basics" sessions. Both the attention control and ARCC intervention information sessions were delivered in live sessions by experts in the field.

OUTCOME MEASURES

Beliefs about EBP

Beliefs about EBP were measured using Melnyk and Fineout-Overholt's[34] 16-item EBP beliefs scale. Participants indicate agreement with each item (eg, "I believe that EBP results in the best clinical care for patients") on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Item scores are summed with a range of scores from 16 to 80, with higher scores indicating stronger beliefs about EBP. Construct validity of the EBP beliefs has been supported through factor analysis. Internal consistency reliability of this scale with prior samples of nurses has consistently been more than 0.85.[33]

Implementation of evidence-based practice

The actual implementation of EBP was measured with the Evidence-Based Practice Implementation Scale by Melnyk and Fineout-Overholt.[35] This 18-item 5-point scale asks

nurses to complete questions about how often they have performed specific EBPs in the previous 8 weeks (eg, used evidence to change my clinical practice; critically appraised evidence from a research study). Participants respond to each question by answering 0, meaning "0 times" to 4, meaning ">8 times." Item scores are summed with a range of scores from 0 to 72. Higher scores indicate greater EBP implementation. Construct validity has been supported through factor analysis and internal consistency reliability of the scale has been more than .85 in prior samples of nurses.[33]

Group cohesion

Group cohesion was measured by the Group Cohesion Scale, developed and tested by Good and Nelson.[36] The 6 items on the scale comprise 2 subscales (attractiveness and cohesion) using a 7-point response scale. This instrument has been used in prior research on work environment issues to evaluate attributes that characterize a cohesive functioning group: productivity, efficiency, feelings of belongingness, and morale. Lower scores indicate greater cohesion. Item scores are summed with a range of scores from 6 to 42. In studies by nursing systems researchers, internal consistency reliability estimates ranged from 0.73 to 0.83.

Nurses' job satisfaction

Nurses' job satisfaction was measured with the Index of Work Satisfaction (IWS).[37] This is a 44-item, 7-point Likert-type scale for measuring nurses' general satisfaction with their work. The scale includes subscales for the work components of autonomy, pay, interactions, task requirements, organizational policies, and professional status. Content validity was supported by an extensive literature review and evaluation by a panel of experts. Construct validity was supported by factor analysis, which produced the subscales. Internal consistency reliability was supported by the Cronbach αs for the subscales ranging from 0.80 to 0.90.

Nurse productivity

Productivity ratings were calculated by the VNSNY as follows: the number of home visits made by a nurse during 1 week divided by the number of days worked that week.

Nurse attrition/turnover rates

Nurse attrition/turnover data were accessed through the VNSNY Human Resources data base.

Manipulation checks on the intervention

The manipulation check to ensure that nurses processed the content of their experimental intervention was accomplished using a learning questionnaire that consisted of 18 multiple-choice items. Nine of the items assessed facets of EBP, and 9 of the items assessed knowledge of physical assessment. While each item had 4 possible answers, only 1 of them was correct. Scores on each of the subscales of the Learning Questionnaire had a possible range of 0 to 9.

DATA COLLECTION PROCEDURE

Data were collected from the participating nurses by research assistants at the following time points: (*a*) baseline, (*b*) after completion of the intervention protocol (ie, the 4 educational sessions and the mentored intervention), and (*c*) after implementation of the EBP project (phase II of the project). Subjects completed scales that tapped their beliefs about EBP, EBP implementation behaviors, job satisfaction, and group cohesion. Nurse productivity data for the ARCC intervention and placebo-controlled groups were collected in a confidential manner by VNSNY. In addition, a learning questionnaire that served as a manipulation check to ensure processing of EBP content was administered to all participating nurses before and after the 4-week educational sessions. The EBP beliefs scale was readministered after the 4-week training session. This completed phase I of the study.

In phase II of the study, ARCC project specific patient outcomes were determined by the experimental group when they chose their clinical problem and developed a related evidence-based protocol. A description of the nurse-designed EBP project and the patient outcome results of the project implementation phase will be reported separately.

DATA ANALYSIS

- The nurse team was the unit of analysis for determining nurse outcomes. SPSS version 11 (IBM, Somers, New York) was used for data analysis. Descriptive statistics, effect sizes, χ^2, *t* tests, and analysis of variance with repeated measures were the statistical procedures used to analyze nurse data. All outcome measures were assessed at 3 time points, baseline (Time 1), after nurses completed the 16-week educational and mentored intervention period (Time 3), and after completion of the nurse-designed EBP implementation project (Time 4, ie, 9 months after Time 3). One measure, EBP beliefs, was assessed at 4 time points: Times 1 and 2 (after the 4-week didactic sessions), and Times 3 and 4. Where the results of analysis of variance testing did not reach the .05 level of significance but approached it, effect sizes were ascertained using Omega squared. Chi-square (χ^2) or *t* tests were used to compare the demographic profiles of nurses in the experimental and placebo-controlled groups.

RESULTS

EBP beliefs

Nurse participants' scores on the EBP beliefs scale were analyzed at times 1, 2, 3, and 4. Results demonstrated statistically significant improvement in ARCC nurses' EBP beliefs at times 3 and 4, compared with the attention control group. There was a main effect for group ($F_{1,15} = 33.105$, $P < .001$), a quadratic main effect of time ($F_{1,15} = 7.335$, $P = .016$), and a significant interaction between group and time ($F_{3,45} = 16.342$, $P = .001$). Regarding the quadratic effect of time, scores for the placebo-control group increased from times 1 to 2 but then decreased steadily at times 3 and 4. At time 4, the attention control group's score on the EBP beliefs scale was lower than that at baseline. The ARCC group's scores increased steadily from times 1 to 3 with a slight decrease to time 4 (see Figure 2).

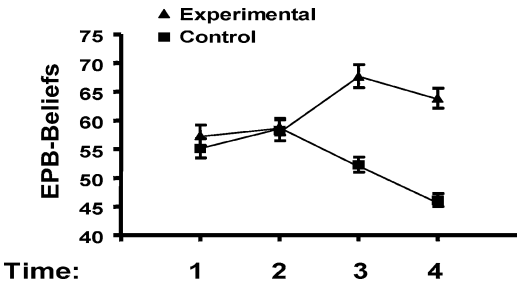

Figure 2. Mean evidence-based practice (EBP) beliefs scores for the advancing research and clinical practice through close collaboration and attention control groups at 4 time points.

EBP implementation

There was a main effect for experimental group on EBP implementation ($F_{1,15} = 10.39$, $P = .006$). The overall mean score of the ARCC group ($M = 29.52$) on the EBP implementation was significantly greater than that of the attention control group ($M = 10.44$). Therefore, nurses in the experimental group demonstrated greater implementation of EBP at times 3 and 4 (see Figure 3). There was also a main effect of time ($F_{2,30} = 5.85$, $P = .007$). In fact, there was a significant quadratic effect of time ($F_{1,15} = 12.40$, $P = .003$) such that there was a significant increase in EBP implementation scores from time 1 ($M = 12.89$) to time 3 ($M = 28.14$) in the experimental ARCC group.

Finally, there was a significant time × group status interaction ($F_{2,30} = 3.625$, $P = .039$). At time 1, there was a small difference between experimental and control groups with the experimental group showing a slightly higher

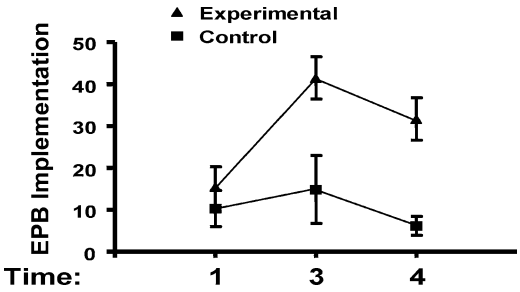

Figure 3. Mean evidence-based practice (EBP) implementation scores for the advancing research and clinical practice through close collaboration and attention control groups at 3 time points.

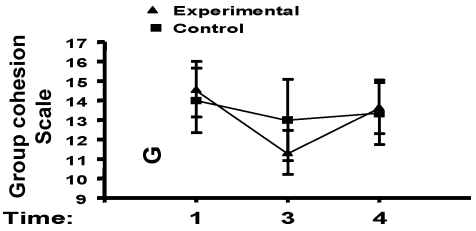

Figure 4. Mean group cohesiveness scores for advancing research and clinical practice through close collaboration and attention control groups at 4 time points. Lower scores indicate a more positive feeling of cohesiveness.

mean (15.40 vs 10.33) on EBP implementation. While both groups indicated relatively low implementation of EBP at time 1, this difference widened and became significant at time 3 with the ARCC group increasing to a mean reflecting better than average usage ($M = 41.46$, possible range of 0-72) and those of the attention control group staying at low usage ($M = 14.83$). At time 4, the scores of both groups decreased. However, the experimental group continued to demonstrate significantly greater ($M = 31.64$) implementation of EBP than the control group ($M = 6.17$).

Group cohesion

Scores on the Group Cohesion Scale were examined according to time and group as well as time × group interaction. No main effect was found for group $F_{1,16} = 0.016$, $P = .502$), time ($F_{2,32} = 2.50$, $P = .098$), or group × time interaction ($F_{2,32} = 0.824$, $P = .448$). A lower score on this scale reflects perceptions of greater group cohesion. Preliminary analysis at time 3 found that there was a main effect of time ($F_{1,21} = 5.580$, $P = .028$) (ie, the mean score of the ARCC group was significantly lower on the group cohesion scale, which means that they had more group cohesion at time 3 than at time 1; see Figure 4). This resulted in an effect size of 1.5, which is considered a large effect size when using omega squared.

Index of Work Satisfaction

Scores on the IWS were examined according to time (time 1 vs time 3) and group as well as by the interaction of time and group. Results of this analysis demonstrated no main effect of group ($F_{1,22} = 0.057$, $P = .814$). That is, the overall mean score of the experimental group ($M = 161.20$) was not significantly different from that of the placebo-controlled group ($M = 158.83$). Neither was there a main effect of time ($F_{1,22} = 0.016$, $P = .900$). Therefore, the overall mean score at time 1 ($M = 159.39$) did not differ significantly from the mean score at time 3 ($M = 160.64$). In addition, there was no significant time × group status interaction ($F_{1,31} = 0.392$, $P = .537$). Since possible scores on the IWS range from 44 to 220 (with a midpoint of 132) and high scores reflect more satisfaction, nurses in all conditions reported mildly positive satisfaction.

Productivity

Productivity ratings were examined according to regional group location (Queens, Manhattan, and Bronx) as well as differentiating between nurses who were in the study and those who were not in the Queens region. There was no main effect of group ($F_{3,52} = 0.422$, $P = .738$), indicating that the overall mean productivity rating of the experimental group in Queens ($M = 4.70$) was not significantly different from those of the Manhattan ($M = 4.77$) and Bronx comparison teams ($M = 4.54$) of nurses. Neither was there a

Table 2. Nurse Attrition Rates in the Participating Regional Offices of the Long Term Home Health Care Program

Group	n (%) 2004	2005
Queens[a]	5 (11)	3 (5.7)
Manhattan	3 (18.9)	2 (11.8)
Bronx	2 (15.4)	3 (25)

[a]Experimental advancing research and clinical practice through close collaboration group.

main effect of time ($F_{1,52} = 2.799$, $P = .100$). Thus, the overall mean productivity rating at time 1 ($M = 4.59$) did not differ significantly from that at time 3 ($M = 4.77$). Analysis of the interaction of time and group location also demonstrated no significant time × group status interaction ($F_{3,52} = 0.243$, $P = .866$).

Nurse attrition/turnover

Comparisons were made between the year in which the pilot study was completed and the previous year. Table 2 provides descriptive statistics according to each regional office of the LTHHCP involved in the study. The attrition/turnover rate for nurses in the ARCC group was reduced by almost 50% from 11% to 5.7%, while the attention control group had no reduction in its turnover rate; rather, they continued to have an attrition/turnover rate of approximately 35%.

Manipulation check

The Learning Questionnaire was given on 2 occasions (times 1 and 2). The ARCC nurses answered a greater number of EBP questions correctly than the nurses who received the physical assessment content, which indicated that they processed the EBP content. The difference, however, between the ARCC and control groups was not statistically significant.

The number of items that the experimental group had correct on the physical assessment portion of the manipulation check, however, significantly increased from time 1 ($M = 3.75$, SD = 1.23) to time 2 ($M = 4.69$, SD = 1.01), while that of the nurses in the comparison group significantly decreased from time 1 ($M = 5.00$, SD = 1.73) to time 2 ($M = 4.12$, SD = 1.90), despite the fact that the comparison group nurses received the educational sessions related to these subscale questions.

Evaluation of EBP implementation

Themes emerging from the focus group data indicated that nurses experienced a greater sense of professionalism, increased cohesiveness among the working group, and an increased ability to see their managers as collaborators and colleagues rather than as supervisors.

Instrument reliability

The coefficient alphas of all instruments were computed at each of 3 time points: times 1, 3, and 4. Coefficient alphas for the EBP beliefs scale were computed at all 4 time points in the study. The results were within a few percentage points at each of these times. Therefore, mean alphas were computed for each of the following 4 instruments as follows: EBP Beliefs = 0.88; EBP Implementation Scale = 0.95; Group Cohesion Scale = 0.83; and, IWS = 0.83.

DISCUSSION WITH IMPLICATIONS

Nurses' EBP beliefs and implementation behavior

Results of this pilot study demonstrated that implementation of the ARCC model improved nurse outcomes of believing in the value of EBP and their ability to implement it as well as increasing their reported use of EBP implementation behaviors. The significant differences in EBP beliefs and implementation behaviors in the experimental group occurred after a 16-week mentoring period during which the mentor met with participating nurses on a weekly basis and helped them focus on their clinical problem, access and critically appraise relevant evidence, and

develop a protocol to test their innovative EBP.

Important to note is that providing didactic sessions alone did not significantly improve scores on knowledge of EBP. The results of the manipulation check; however, showed that the experimental group did answer a greater number of EBP questions correctly than the attention control group, although this difference was not statistically significant. The ARCC group, however, significantly improved their scores on the physical assessment questions over time, even though they did not receive instruction in this content. Perhaps this was due to the increased focus on critical thinking about how to improve practice in the ARCC group, which was reflected in all aspects of their practice.

The presence of an EBP mentor over the 16 weeks fostered assimilation and application of the information presented in the 4 weeks of didactic sessions into their daily practices. Although the sample was small, these significant differences emerged in the analyses, which indicate that the intervention effect was substantial. Thus, the use of an advanced practice nurse as an ARCC EBP mentor may be a very promising strategy to enhance EBP beliefs and implementation in nurses. Findings from prior descriptive studies and a recent systematic review indicated that mentoring of health care professionals results in increased productivity and career satisfaction, an ability to integrate research into practice, and less job-related stress.[38-40] Therefore, hiring advanced practice nurses as EBP mentors may be key in not only enhancing the quality of health care and increasing clinician job satisfaction, but sustaining the implementation of EBP in health care systems.[41]

Important to realize is that the division or specialty unit administrator was supportive of this study. She allowed the nurses the time ($1\frac{1}{2}$ hours per week) to engage in the study and its concomitant work. In addition, she consistently praised the nurses verbally and to the agency's administration for being involved in the project. In addition, the ARCC nurses were rewarded with certificates of merit and a $50 American Express Gift Certificate at an annual staff meeting. These rewards were not unique to this project as the human resources department of the agency sponsors these awards for all outstanding contributions to the VNSNY. This supports recent research on knowledge translation[42] in which organizational factors such as staff development, opportunity for nurse-to-nurse collaboration, and staffing and support services were significant factors predicting research utilization by nursing staff.

Group cohesion

The quantitative findings regarding group cohesion are puzzling and do not coincide with anecdotal and/or observational data from the ARCC group. Although preliminary findings reported showed that ARCC participants indicated increased feelings of group cohesion during and after the 16-week mentorship period, no significant differences were found at time 4 (after implementation of the EBP project, which the nurses developed and implemented). Initially, some staff nurses reported that they were less than comfortable being in a workgroup with managers, since they had never been in a collegial group with them before the study. In fact, 2 of the nurses stated that during the first couple of meetings, they felt "intimidated" and were hesitant in giving their opinion about the project. After realizing that all contributions to the group were equally valued and were aimed toward a common goal, they felt more confident in expressing their ideas in the group. Eventually, 3 of the staff nurses took leadership roles in championing the practice innovation to the other nurses in their regional office who had not participated in the study. Perhaps a larger sample with increased power would demonstrate statistical significance between the experimental and attention control groups on this variable. Another piece of the puzzle to consider is that during the period times 3 and 4, the mentor was not present on a consistent basis as she was between times 1 and 3. In addition, the ARCC group of nurses did not

meet together on a regular basis with or without the mentor. Bringing EBP teams or groups of nurses on a regular basis may need to continue beyond the initial mentorship period of helping the group develop an EBP project.

Work satisfaction

One of the purposes of a pilot is to determine the fit of instruments for measuring the desired concept. For this study, the IWS may not have captured the concept of overall satisfaction that the investigators intended to measure. The reason for this notion is that the qualitative data reported by participants in the experimental group seems inconsistent with results regarding work satisfaction. Partially, this could have been due to the multiple subscales within the IWS. The other possibility is that there was no difference in work satisfaction between the experimental and attention control groups. Further studies will include a more general measure of job satisfaction as well as the IWS to determine whether one instrument is more sensitive to overall satisfaction.

Productivity

Regarding productivity, the finding that no significant differences existed between the experimental and control groups was extremely positive. Nurse productivity in home health care converts directly into reimbursement dollars. These results demonstrate that nurses are able to spend time and effort integrating EBP into their daily practice without loss of revenue to the organization. This finding also was theoretically consistent with the findings of Estabrooks and colleagues[43] that emotional exhaustion is a significant individual variable in predicting research utilization. Nurses in the experimental ARCC group were given the time to participate in the study and its work and shown appreciation for their participation. They qualitatively reported that they felt energized and had an increased sense of professionalism through their participation in the study. The 2 EBP scales also performed well with excellent internal consistency reliability.

Attrition/turnover

Also important to note is the greater attrition from the agency in the attention control group. This attrition was reflected in the greater loss of participants from this group as well. Although the numbers were much too small to run a statistical analysis in this pilot, this is a finding worth considering. Looking at this nurse outcome variable in future studies of this kind with larger samples and in different types of health care agencies would be worthwhile. Future research needs to consider the relationships among using an ARCC EBP mentor, implementing evidence-based care, patient outcomes, and nurse outcomes, particularly attrition/retention rates.

Reliability of the EBP beliefs and implementation scales

The results presented earlier indicate that both of these newly developed scales demonstrated high reliability (internal consistency above 0.85) at every time point in which they were used to collect data in this study. These results are consistent with previous findings of Melnyk et al.[33] Both of these instruments have promise for widespread use in clinical practice for evaluating nurses' beliefs about and use of an EBP approach to nursing practice.

Implementation of the ARCC model across health care settings

Although this study was conducted in a home care setting, some of the lessons learned about how to enhance the methods were learned from a feasibility study, which was conducted in a hospital setting.[14] The ARCC intervention strategies that were used in both the hospital and home care systems are similar across settings (eg, administrative support for the initiative, scheduled time for the EBP teams to engage in their work, and an experienced mentor who has excellent working knowledge of EBP and practice improvement processes to work with the EBP teams to develop, implement, and evaluate their practice improvement efforts).

Similar positive findings associated with implementation of the ARCC model in an acute care research-intensive setting were recently generated.[44]

LIMITATIONS

Given that this was a pilot study with a small convenience sample, there are some limitations to consider. First, the findings should not be generalized to other home care settings. The purpose of a pilot study is to test the feasibility and preliminary effects of the intervention and study protocol. Our findings indicate that the intervention and study protocol used was feasible and acceptable to the participating nurses and the agency administration. Second, the principal investigator for the study was also the EBP mentor to the experimental group and may have personally influenced how the nurses responded on the study's instruments. Third, and most important, the administrator in charge of the setting in which this study took place was very supportive of the idea and of her staff. She gave participants the time and recognition to participate in the study. They were seen as the "pioneers" or "special task force" who were going to participate in an endeavor to improve practice in their region. This does, however, highlight the importance of administrative support, which has been reported as a facilitator to the implementation of EBP.[12]

CONCLUSIONS

This pilot study demonstrated that implementation of the ARCC model that includes an EBP mentor is feasible in home health care settings and provides preliminary efficacy for the positive benefits of the mentor in enhancing nurses' beliefs about and implementation of EBP. Data from this study also support prior work in that education alone does not seem to result in changes in EBP implementation and that the use of an EBP mentor is the key strategy for enhancing clinicians' EBP beliefs and implementation. Use of an ARCC EBP mentor also may lead to less attrition rates in health care systems, which may be significant in lieu of the most severe nursing shortage that the United States will ever face.

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