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Evidence-Based Pressure-Ulcer Practice: The Ottawa Model of Research Use

Jo Logan, Margaret B. Harrison, Ian D. Graham, Kathy Dunn, and Janice Bissonnette

L'élaboration, dans divers cadres de soins de santé, d'une pratique infirmière fondée sur les résultats de recherche constitue un certain défi dans le contexte de la restructuration actuelle dans le domaine de la santé. Le présent article porte sur l'application du modèle d'application de la recherche d'Ottawa visant à accroître la pratique fondée sur les résultats de recherche dans trois contextes de soins de santé, dans une période marquée par de multiples changements structurels. Cette initiative s'inscrivait dans le cadre d'un projet-pilote provincial visant l'établissement de centres d'excellence en soins infirmiers voués à l'amélioration du suivi des soins dans le milieu de la santé. Trois organismes d'Ottawa œuvrant dans le domaine de la santé formaient l'une des quatre entités participant au projet panprovincial de pratique infirmière, une initiative d'une durée de trois ans financée par le ministère de la Santé de l'Ontario. L'objectif du site Ottawa-Carleton consistait à augmenter la fréquence des prises de décision fondées sur les résultats de recherche, particulièrement en ce qui a trait aux plaies de pression. L'article décrit les obstacles rencontrés, le soutien obtenu et les stratégies employées dans la poursuite de cet objectif, dans le contexte des soins communautaires, tertiaires et de longue durée. De multiples approches en matière d'intégration de la recherche ont été employées, avec un accent sur l'éducation. Le consensus parmi les personnes chargées de la mise en œuvre du projet et les réussites obtenues dans le cadre de celui-ci viennent confirmer l'utilité du modèle d'application de la recherche d'Ottawa à titre de guide d'application des résultats de la recherche dans les cadres de soins de santé susmentionnés.

Developing evidence-based nursing practice among diverse health-care settings is a particular challenge in the face of current health-care restructuring. This paper describes application of the Ottawa Model of Research Use (OMRU) to increase evidence-based practice across 3 health-care settings during a time of multiple restructuring changes. The

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Jo Logan, R.N., Ph.D., is Associate Professor, Faculty of Health Sciences, University of Ottawa, Ontario. Margaret B. Harrison, R.N., Ph.D., is Principal Investigator, Clinical Epidemiology Unit, Loeb Health Research Institute, and Clinical Associate, University of Ottawa. Ian D. Graham, Ph.D., is Assistant Professor, Faculty of Medicine, University of Ottawa, and Principal Investigator, Clinical Epidemiology Unit, Loeb Health Research Institute. Kathy Dunn, R.N., M.N., is Chief – Nursing & Professional Practice, Ottawa Hospital, Civic Campus. Janice Bissonnette, R.N., M.Sc.N. (cand.), is Coordinator, PWNP, Ottawa Participating Complex, Ottawa Hospital, Civic Campus.

initiative was part of a provincial demonstration project to develop centres of nursing excellence with a view to improving continuity of care across the health continuum. Three Ottawa health-care agencies formed one of 4 participating sites in the Province-Wide Nursing Project (PWNP), a 3-year initiative funded by the Ontario Ministry of Health. The goal of the Ottawa-Carleton site was to increase evidence-based decision-making with a focus on pressure ulcers. The barriers and supports encountered, and the strategies used, in striving to meet this goal in a community-care, tertiary-care, and long-term-care setting are described. Multiple research transfer approaches were used, with an emphasis on education. Implementor consensus and achievements of the project support the OMRU's utility as a guide to implementing research findings in these health-care settings.

Introduction

Estabrooks (1998) refers to the research utilization dilemma as a gap between what is known and what is done. Barriers to evidence- or research-based nursing practice as an issue were first described in the early work of Miller and Messenger (1978). At that time the most frequently identified obstacle was lack of access to research findings in a specific area of interest. Limited access to research, and issues related to the practice setting and the individuals who might use the findings, continue to be identified as obstacles (Funk, Tournquist, & Champagne, 1995; Kajermo, Nordstrom, Krusebrant, & Bjorvell, 1998; Logan & Davies, 1995; Walczak, McGuire, Haisfield, & Beezley, 1994).

To gain a better understanding of the barriers to research-based practice, investigators have looked at the attitudes of nurses and administrators as a predictor of research use (Bostrom & Suter, 1993; Bostrom, Malnight, MacDougall, & Hargis, 1989; Champion & Leach, 1989; Rizzuto, Bostrom, Suter, & Chenitz, 1994). One consistent finding is that the following factors correlate to nurses' limited use of research: lack of awareness of the innovation; negative attitudes towards the specific innovation, and towards evidence-based practice and change more generally; lack of skills to interpret the evidence or to carry out the new innovation; and lack of ongoing administrative resources. Cavanagh and Tross (1996) cite nurses' perceived lack of time as the greatest barrier to research utilization. Additional barriers include nurses' lack of participation in research activities, lack of familiarity with the research process, and limited experience and motivation. Funk et al. (1995) identified key barriers to nursing research use related to the work environment. The obstacles included lack of authority, limited time, and lack of support from administrators and colleagues. It appears all these obstacles play a role in the tendency of nurses to not use research evidence.

Given the longstanding existence of numerous barriers to research use, diverse models have been suggested to facilitate the process of implementing research (Logan & Graham, 1998; Stetler, 1994; Titler et al., 1994; White, Leske, & Pearcy, 1995). This paper describes how application of a research-use model guided implementation of a pressure-ulcer project in three health-care agencies.

The Ottawa Model of Research Use

The Ottawa Model of Research Use (OMRU) (Logan & Graham, 1998) consists of six key elements interconnected through the process of evaluation (Figure 1). These elements address the central components in the process of utilizing research: the practice environment, the potential research adopters (administrators and clinical staff), the evidence-based innovation (the research intended for use in practice), strategies for transferring the innovation into practice, adoption/use of the evidence, and health and other outcomes. The term "innovation" is used to mean something that is new to the potential adopter but not necessarily to others (Rogers, 1995).

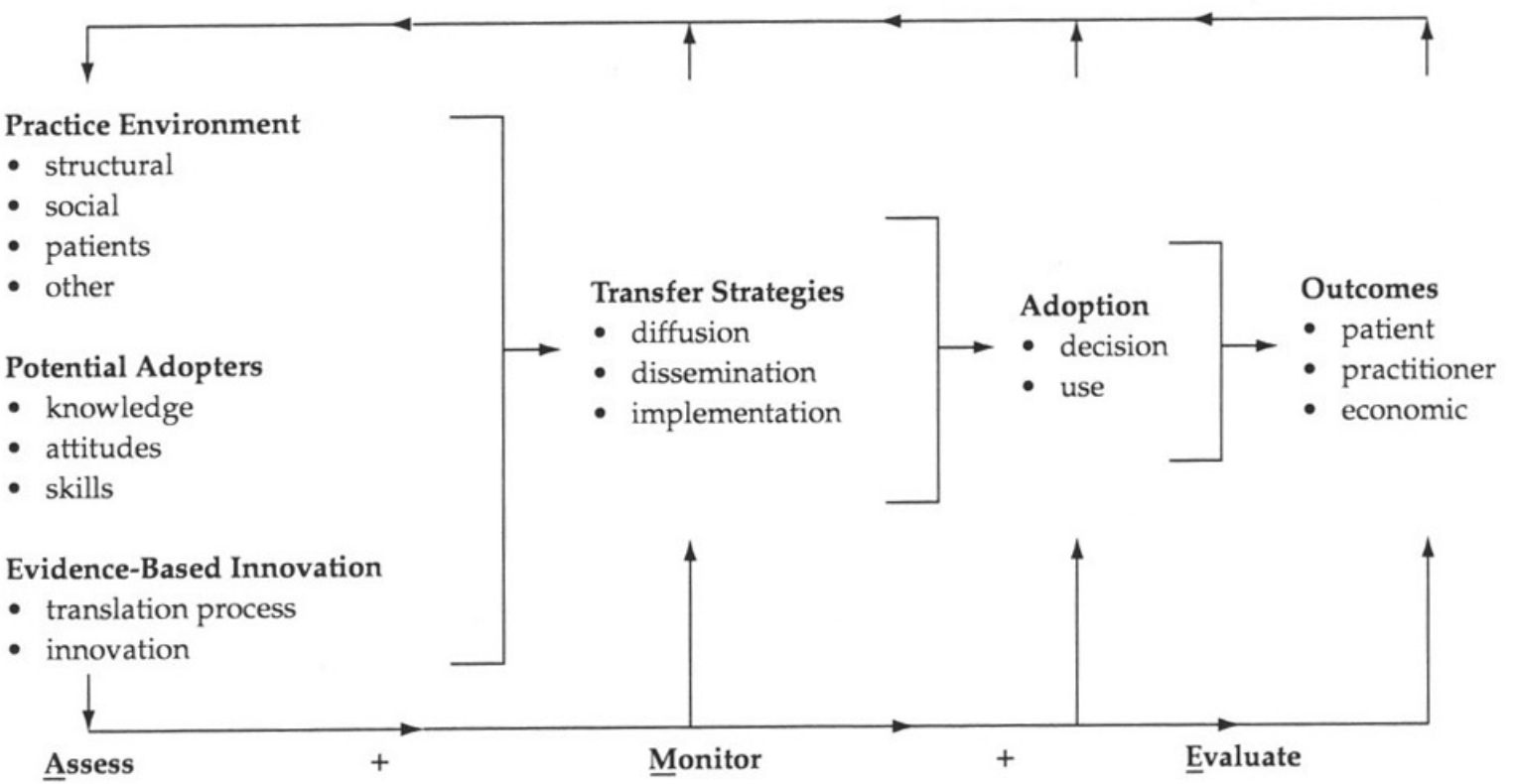
Integral to the OMRU is the systematic assessment, monitoring, and evaluation (AME) of the state of each of the six elements prior to, during, and following any research transfer effort. These data can serve three functions: (1) to identify a profile of potential barriers to and supports for research use related to the practice environment, potential adopters, and the evidence-based innovation; (2) to provide direction for selecting and tailoring transfer strategies to overcome the identified barriers and enhance the supports; and (3) to evaluate the use of the evidence-based innovation and its impact on the outcomes of interest (Logan & Graham, 1998).

Profiles of the practice environment, the potential research adopters, and the evidence-based innovation may be made concurrently or in sequence according to some rationale based on the clinical topic selected, available resources, or the nature of the setting.

The "practice environment" directs attention to the assessment of such factors as: decision-making structure; beliefs and values within the organization; norms; practices and rules and policies; social cohesion; support and pressure; resources; economic and other incentives; and politics and personalities. These factors may constitute either barriers to or supports for adoption of research evidence.

Nurses are the "potential adopters" of the research-based innovation. The knowledge, attitudes, skills, current practices, and demo-

Figure 1 *The Ottawa Model of Research Use*



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graphic characteristics of the nursing group may be described to create a profile of potential barriers to and supports for research use. For example, negative attitudes towards change are likely to act as a barrier, knowledge of research methods as a support.

Perceptions about attributes of the "evidence-based innovation" may constitute a barrier or a support. These can concern the process by which the research evidence was translated into some evidence-based innovation (e.g., the process by which a practice guideline was developed) or the innovation itself (e.g., the actual guideline). Negative perceptions of the innovation will serve to delay its diffusion throughout the system (Rogers, 1995).

"Research transfer strategies" are strategies for getting evidence-based innovations to potential adopters and promoting their adoption and use. Strategies for transferring the evidence and facilitating its use are selected and tailored based on the specific barriers and supports described in the profile assessment. Lomas (1993) divides research transfer into three conceptually distinct processes: diffusion, dissemination, and implementation. He describes "diffusion" as a passive, uncontrolled process — for example, publication of findings in a professional journal. "Dissemination" is a more active concept that involves targeting and tailoring, such as mailing an evidence-based innovation to the membership of a specific nursing organization. Finally, "implementation" is the process by which dissemination is coupled with systematic efforts, such as nursing-education workshops, to remove barriers to the adoption and use of the evidence-based innovation.

The last two elements of the OMRU are "research adoption and use" and "outcomes." The former represents the decision to use and the behavioural change of making full use of the innovation as the best course of action (Rogers, 1995). Evaluation of adoption and use will determine whether the innovation is being used as it was intended. This assessment is necessary, since the outcome of research use will depend to some extent on *how* it was used. "Outcomes" relates to patients and their families, practitioners, and economic dimensions (Titler et al., 1994).

Application of the OMRU

The OMRU guided the implementation of evidence-based pressure-ulcer practice as part of a larger project. The Ontario Ministry of Health established a Province-Wide Nursing Project (PWNP) in 1994 with the

goal of developing a process for improved continuity of care by establishing centres of nursing excellence. The PWNP focused on four pillars of nursing practice: clinical decision-making, evidence-based practice, continuous quality improvement, and primary nursing. Ottawa-Carleton, as one PWNP site, comprised a tertiary-care hospital, a long-term-care setting, and a community nursing agency that serves a unique blend of urban-rural communities in a bilingual, multicultural environment. This collaborative triad offers a range of services provided by both registered nurses and registered practical nurses. The OMRU was used to focus the activities of the Ottawa-Carleton PWNP site.

Profile Development: Research Evidence, Practice Environment, Potential Adopters

The profile assessment of the research evidence included regional pressure-ulcer study data and local pressure-ulcer prevalence and incidence data, along with published research reports (Fisher et al., 1996; Harrison, Wells, Fisher, & Prince, 1996). The profile data on the practice environment and potential adopters were collected through focus groups and interviews with key informants, as well as through feedback during and following workshops offered by the agencies. Focus-group volunteers were selected according to each agency's method of having staff attend in-service education sessions.

Assessing the research evidence. Skin care reflects the overall quality of care a client receives in tertiary, community, or long-term care (Harrison, Logan, Joseph, & Graham, 1998). Because each setting had previously engaged in individual projects to address skin care, we selected this issue as our PWNP clinical focus for research utilization and improved continuity of care.

Studies reported in the past decade provide estimates of pressure-ulcer prevalence ranging from 4.7% (Allman et al., 1986) to 9.2% (Meehan, 1990) to 29.5% (Oot-Giromini et al., 1989). While there is limited published information on prevalence in Canadian hospitals, the first comprehensive and relevant report documented an overall prevalence rate of 25.7% for 2,384 patients in eight Ontario and Quebec facilities (Foster, Frisch, Denis, Forler, & Jago, 1992). The second Canadian study, from two large tertiary-care sites (n = 1,020), found that the percentage of acute-care patients with a pressure ulcer increased with age, particularly in those patients over 80 years old (Fisher et al., 1996; Harrison et al., 1996). A single hospital study found a pressure-ulcer

prevalence rate of 29.7%, which reinforced the size and importance of pressure ulcers as a clinical problem (Harrison et al., 1996). The studies to date have mostly focused on the institutional sector. No Canadian community prevalence or incidence studies were found in the literature. In studies from the United States, pressure-ulcer prevalence was found to be 19% in one small sample ($n = 40$) (Langemo et al., 1990) and 29% in a study using a convenience sample ($n = 103$) of a county health department in New York (Oot-Giromini, 1993). The previously documented size of the clinical problem acted as a support for the project.

We found two sets of clinical-practice guidelines on pressure ulcers to be useful and very credible sources of evidence-based recommendations (Agency for Health Care Policy and Research, 1992, 1994). These guidelines established a current standard for evidence-based practice (Brunt, 1993). Two of the participating settings had already adopted the Agency for Health Care Policy and Research (AHCPR) guidelines. This acceptance was a significant support for the implementation of evidence-based practice.

The assessment profile of the available evidence on the clinical topic and its applicability across the three settings was primarily positive. From this sound evidence base, we decided to use pressure-ulcer prevalence studies in several ways to further the project. Consistent with OMRU practices, prevalence study data were used to assess the size of the problem prior to any change in practice. Involving the clinical staff in data collection, and later in using the data findings to plan changes in care, served to increase knowledge and ownership of the process of using evidence. The surveys provided further useful evidence to help nursing staff understand sources of evidence and interpret them for use in practice.

The prevalence-survey methodology developed in the tertiary-care hospital was adapted for use in the long-term-care setting. Local investigators, clinicians, and a methodologist developed a feasible and scientifically sound method for conducting the prevalence survey in the community, in part by defining the prevalence point as 1 week rather than the 1 day used in the other agencies. Using similar methods for data collection and analysis in the future will provide ease of documenting ongoing problems and planning integrated interventions across the health-care continuum.

Assessing the practice environment. Because the university-affiliated tertiary-care hospital had more resource expertise, it was selected as the lead institution for the local PWNP. During the previous

5 years, the hospital had undertaken a large research utilization effort focused on pressure ulcers. The credibility and strength of the skin-care program made it a perfect point from which to form collaborative links with other health-care agencies. In order to concentrate resources, each health-care setting restricted the number of clinical units that could participate in the project. The hospital chose its oncology and neuroscience units because these specialties had a reasonable nursing research base; nurses who acquired skills in research use would have other sources of evidence to use as a basis to change practice.

The second participating setting comprised a number of long-term, nursing-home, chronic-care, and rehabilitative units from which four sites were chosen: a geriatric rehabilitation facility, a chronic-care unit, and two nursing homes. This setting used the AHCPR clinical-practice guidelines as a foundation for skin-care protocols and monitored processes through its quality-improvement programs. Nursing staff used the Braden Scale and Staging classification as part of their practice (Braden & Bergstrom, 1994). This setting had done considerable educating in skin care.

The community-nursing agency had a number of dedicated wound specialists and enterostomal therapists (ETs) who had developed an active community consultation service for wound, skin-care, and pressure-ulcer management. They regularly provided wound-care classes to staff and consulted with individual nurses and clients. Clients for their prevalence study were drawn from four inner-city districts. The major diagnostic groups were oncology-related.

The profile developed for the practice environments was both positive and negative. Previous work with pressure ulcers in all agencies strongly supported the implementation of evidence-based initiatives. Nurses were familiar with the current information on pressure ulcers. We thought that familiarity with the clinical topic would free nurses to focus on the process and skills necessary for using evidence. We found administrative support and encouragement for evidence-based practice in all settings. This type of support has been reported as a key facilitator of research use by nurses (Funk, Champagne, Wiese, & Tournquist, 1991). The many barriers existing within the three settings were also similar to those previously reported (Funk et al., 1995). Throughout the course of the project all of the agencies were in the midst of health-care restructuring. At various times in the 3-year PWNP each participating setting underwent changes in their nursing model, bed closures, re-allocation of services, lay-offs, and early-retirement buy-outs. Practice envi-

ronments were assessed to be overwhelmingly influenced by the political, professional, and personal impact of the restructuring process. Clinical and administrative staff were transferred to unfamiliar areas of practice and, often, temporary positions, and these disruptions were associated with a perceived lowering of staff morale. This turmoil was a constant throughout the course of the project and served as the key ongoing barrier to evidence-based practice in the three settings.

Assessing potential adopters. The potential adopters' profile was mixed. Clinical staff experienced job insecurity and the predictable stress associated with it. They perceived that they had little time for thinking beyond the day-to-day demands of their practice. Yet despite this major barrier, we identified potential adopters who wished to participate. Interviews with staff revealed that they were interested in the project and in research use but were struggling with the changes brought about by restructuring. Fortunately, administrators and most clinicians had positive attitudes towards research use, and while they were not enthusiastic about what they perceived to be yet another skin-care project, they were very interested in improving care.

Few members of the staff had baccalaureate preparation, thus little previous knowledge concerning research or the research process could be assumed. This barrier proved to be the focus of our interventions, since it was one barrier that was within the scope of the project's control.

Strategies to Enhance Evidence-Based Nursing Practice

The selection and timing of strategies were guided by Rogers's (1995) innovation-decision process as adapted by the OMRU and integrated with the literature on research utilization and research transfer (e.g., the work on diffusion, dissemination, and implementation by, among others, Davis & Taylor-Vaisey, 1997; Davis, Thomson, Oxman, & Haynes, 1995; Grimshaw et al., 1995; Lomas, 1993, 1994; Oxman, Thomson, Davis, & Haynes, 1995).

The innovation-decision process consists of five stages that potential adopters may go through before an innovation is established. These are: (1) *awareness* of the innovation, (2) development of positive *attitudes* towards the innovation, (3) cognitive *intention to use* the innovation, (4) *use* of the innovation, and (5) *continued use* of the innovation. Brett (1987) demonstrates that nurses move through this process.

We targeted implementation strategies to the potential adopters' stage in the innovation-decision process as set out by Logan and Graham (1998). Prior to initiating the project with clinical staff, we met with them to introduce it. Awareness sessions were repeated during the pretest data-collection procedure. Information sessions and news briefs were directed to the policy-makers in the settings and several mass-media approaches were used to raise city-wide awareness. These diffusion and dissemination strategies were aimed at the first two stages in the innovation-decision process and were intended to increase knowledge of the project and positive attitudes towards it (Logan & Graham; Rogers, 1995).

We used multiple implementation strategies to address the final three stages in the innovation-decision process, as multiple approaches are considered to be more effective (Grimshaw et al., 1995; Oxman et al., 1995). The first strategy involved the use of pressure-ulcer prevalence surveys. In all three settings, we provided a workshop for the clinical staff who volunteered to be surveyors — all of whom were registered nurses familiar with the clinical areas. They used the same data-collection instruments and similar procedures for comparing findings.

The Evidence-Based Nursing Practice Workshops marked the second strategic phase. The workshops, attended by 75 people over a 4-week period in November, were very successful. One was repeated in May of the following year with 33 attending. The participants were administrators, educators, nurse specialists, nurse researchers, registered clinical nurses, and registered practical nurses.

The first workshop was directed to nurses in formal leadership positions, to ensure their understanding of and support for the project. It guided the nurses through evidence-based decision-making and its relationship to practice. Workshop content included: the barriers and facilitators to evidence-based practice, methods for critiquing qualitative and quantitative research, development of clinical-practice guidelines, and establishment of a plan to support the staff in carrying out the project and to network with peers from the other participating agencies.

A 2-day workshop for clinical registered nurses shared the objectives of the first but with an emphasis on establishing a procedure for diffusion, dissemination, and implementation of clinical guidelines to peers. Kirchhoff (1982) notes that rallying the support of nurses who are considering a change to evidence-based practice to motivate others may facilitate the process of research utilization. We taught workshop participants the notion of "idea champion" and challenged them to return

to their units and assume that role with regard to evidence-based practice. The second day covered the pressure-ulcer prevalence data. Content included pressure-ulcer staging and classification, early intervention, prevention, and assessment of risk using the Braden Tool (Braden & Bergstrom, 1994). A treatment expert reviewed a wide variety of treatment modalities available for management of pressure ulcers at the sites. A number of stations allowed for hands-on evaluation of the products, including video and slide previews. During the workshop phase, the Nurse Consultant from the Ministry of Health visited the agencies and attended workshops at various times. She assumed a role of influence akin to that of opinion leader (Rogers, 1995). A 1-day workshop for registered practical nurses focused on the pressure-ulcer guidelines.

A final set of Evidence-Based Practice workshops for the clinical registered nurses was aimed at the process of accessing evidence and disseminating completed evidence-based clinical projects. More than 55 staff members attended and rated the final workshops as highly as the earlier offerings. The workshop facilitator noted that participants had more positive attitudes and seemed more knowledgeable about evidence-based practice and its link to professional nursing. The workshops provided an excellent opportunity for nurses across health-care settings to meet with colleagues and discuss issues of common concern. This is a foundation for nurses to guide the process of research transfer into practice on other clinical issues.

A third implementation strategy consisted of follow-up activities. We directed this approach to the final stage in the innovation-decision process, "continued use of the innovation." As a secondary workshop focus, we identified what participants felt the PWNP could provide as continuing support to help staff meet the PWNP objectives. Much discussion revolved around the support and access of research. As a result, we have established two initiatives. Members of the Clinical Epidemiology Unit (CEU) of the Loeb Health Research Institute have actively facilitated and supported the pressure-ulcer prevalence studies. In continuing support, the CEU maintains a database of studies related to pressure ulcers. A review and retrieval system was initiated, and this is updated every 6 months. We circulated key articles to the project settings. A research paper to review and share with colleagues is sent to participants every 6 weeks. In addition, project funds were used to purchase a subscription to a research-based nursing journal, selected by the Unit staff relevant to their focus of care.

Project Outcomes

While the findings of prevalence surveys had the potential to provide evaluation data, we were reluctant to allow the success of the PWNP to hinge on this outcome, because we were unable to guarantee that agencies would continue to conduct annual prevalence studies during the process of restructuring. In addition, pressure ulcers are considered to be a multidisciplinary problem and there was much activity over which we had no control.

Although we were able to assess and monitor various steps in the project from the local perspective, we were limited by the PWNP assignment of the evaluation to a university in a different city. Before-and-after survey methods were used for that evaluation. The final report is in progress (Ontario Ministry of Health, in progress). Preliminary results from the evaluation portion of that report indicate that nurses at the Ottawa-Carleton site reported an increase in knowledge about evidence-based practice and skin care. They also show an increase in reading of research articles. Comments about the workshops were generally favourable. There were a few negative comments about research and the time or money required to support the application of new knowledge.

Since initiation of the PWNP, we have noted substantive local change in attitudes and organizational culture to support the use of evidence at both the practitioner and organizational levels. For example, while planning a skin-care workshop, practitioners insisted on incorporating the latest evidence. Among sites, there is continued collaboration on skin-care projects and on new evidence-based projects. Independently, sites have initiated projects learned of through the PWNP network. Sites are using similar strategies to implement changes in practice, such as bowel-habit regimes and leg-ulcer management. Thus far, the community-nursing group has made the greatest strides, possibly because it had the fewest available resources at the outset. We are also very encouraged by the number of nurses involved in the project who are now pursuing baccalaureate and master's degrees. Several M.Sc.N. students have a skin-care research focus.

At the organizational level, the clinical guidelines on which the project was based have been adopted at the policy level. Examples include the adoption of a computer-based wound-assessment program in the long-term-care setting; the community agency continues to train nurses other than their ETs in the staging of pressure ulcers; and the tertiary-care setting is significantly changing its practice for assessing and

documenting skin-integrity problems. In addition, the tertiary-care site has been awarded a dedicated wound-care nursing fellowship and the long-term-care setting plans to establish a nursing fellowship integrating research use.

Conclusion

In undertaking the PWNP in our region, the OMRU provided the conceptual basis to design and implement interventions promoting evidence-based nursing practice. We noted both strengths and limitations in applying the OMRU. We found the OMRU useful because it addressed the key elements in the process of research use. This directed our focus, which was essential due to the complexity and short timeline as we worked across the very diverse health-care settings. The model was particularly helpful in determining existing barriers to and supports for the use of research, and thus permit the tailoring and timing of implementation interventions. In using the model, we gained invaluable direction in assessing the evidence common to our three agencies and drawing attention to the similarities and differences among the settings and the various practitioners. Because the model was intended to be used from multiple perspectives — for example, from the perspective of policy-makers, practitioners, and researchers — it met the needs of the various team members. Clearly, the resources available through the PWNP supported the use of the model.

Despite the overall value derived from the OMRU application, we were particularly challenged by the lack of succinct, reliable, and valid instruments designed to assess the barriers and supports related to the practice environment and potential adopters, and to understand perceptions regarding the evidence-based innovation. Short, precise tools are necessary for complex projects in the rapidly changing settings of busy practitioners and administrators. Our greatest limitation in using the model was the instability of assessments due to a rapidly changing practice environment. Finally, we were limited by the lack of available research testing the model. There is much work to be done in testing and refining the model. Locally, investigators are involved in several projects to do this.

In addition to the implications for research, we will continue to promote evidence-based practice related to skin care and other clinical problems. Notwithstanding the above shortcomings, we concluded that applying the OMRU to this complex nursing project helped achieve the goals of the project. We believe the OMRU has the potential to guide research use within and among other health-care agencies.

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Correspondence and reprint requests should be directed to: Dr. Jo Logan, University of Ottawa, Faculty of Health Sciences, School of Nursing, Roger Guindon Hall, 451 Smyth Road, Ottawa, ON K1H 8M5. Telephone: 613-562-5800, ext. 8415. E-mail: jlogan@uottawa.ca