

Using web-based training to optimize pediatric palliative care knowledge transfer

by Marie-Charel Nadeau, Karine Bilodeau, and Lysanne Daoust

INTRODUCTION

Nurses play a central role in delivering palliative care, given their influence on the quality of care provided (Montgomery, Sawin, & Hendricks-Ferguson, 2016). They are professionals of choice when it comes to assessing disease symptoms or psychological distress, ensuring symptoms are managed effectively, as well as accompanying patients and families through the decision-making process regarding both adult and pediatric care (Contro, Larson, Scofield, Sourkes, & Cohen, 2004). Optimal palliative care practices can prevent or alleviate the suffering of patients of all ages at the end of life, particularly if the care includes the assessment of symptoms and provides the patient and his or her family with psychological and social support (Qaseem et al., 2008). Although the majority of patients receiving palliative care are adults, more than 4,000 children in Canada have an incurable disease for which they will require quality palliative care (Widger, Cadell, Davies, Siden, & Steele, 2012). However, a number of studies carried out with nurses have revealed that they experience anxiety with regard to the pediatric palliative care (PPC) they deliver (Mullen, Reynolds, & Larson, 2015) and difficulties communicating with families of patients (Montgomery et al., 2017), as well as managing their emotions when they attend to a child who is at the end of life (Roberts & Boyle, 2005). Based on the first hypothesis suggested by Contro et al. (2004), such behaviour can be explained by a lack of knowledge regarding PPC.

Furthermore, the literature shows that the tools used to synthesize and transfer knowledge concerning PPC do not allow nurses to learn quickly and efficiently (Arenella, Yox, Eckstein, & Ousley, 2010; Contro et al., 2004; Morgan, 2009; Wiener et al., 2015). The impression of not being properly equipped results in feelings of anxiety and inadequacy among nurses (Contro et al., 2004; Kenny, Cargil, Hamilton, & Sales, 2016; Mullen et al., 2015; Smith & Gordon, 2009). This leads to staff nurses losing

confidence in their ability to provide PPC, which can affect the quality of care offered (Montgomery et al., 2016). Giving access to training and clinical tools can increase their confidence in this regard (Contro et al., 2004), but professional training is generally geared towards adult at the end of life and not children (Canadian Hospice Palliative Care Association, 2006). Having access to a knowledge transfer (KT) strategy adapted to the context of PPC could allow nurses to build the confidence necessary to provide high-quality palliative care. One strategy is web-based healthcare training, as it appears flexible, accessible and an appropriate method for transferring information to nurses. The meta-analysis by Arenella, Yox, Eckstein, and Ousley (2010) showed that the use of information technologies (e.g., videos, webinars, online learning) is a very efficient strategy for improving the knowledge, competence, and behaviour of health professionals. No study on that strategy has been carried out with PPC nurses specifically, but the work of Morgan (2009) shows that 66% of nurses working in hospitals prefer to learn through videos. As such, Ruiz, Michael, and Leipzig (2006) and Wiener, Weaver, Bell, and Samson-Daly (2015) add that the advantage in using information technologies is that the learning process can be personalized and offer a flexible learning formula, thus allowing nurses to learn at their own pace and make connections to their own experiences. Wiener et al. (2015) suggest to make the knowledge easily accessible, for example, by sharing it on a web platform. Video training makes it possible to translate knowledge into practice by showing how to apply it. Another advantage of video training is its accessibility over a hospital's intranet.

During an internship under the Master's of Science in Nursing program, we developed a web-based training program using a knowledge transfer approach. This article presents the development and pilot test of the web-based PPC training developed for staff nurses working in a pediatric oncology unit.

FRAMEWORK: INTEGRATED KNOWLEDGE TRANSFER (KT) APPROACH

To create quality, evidence-based training, we used a knowledge transfer approach (Figure 1) derived from the KT model developed by the Registered Nurses' Association of Ontario (RNAO) in 2012 and inspired by the work of Graham et al. (2006). The model, which supports an organized intervention (i.e., the web-based training), stresses the importance of synthesizing and adapting knowledge to develop an efficient KT strategy, while taking into account the resources available in the care setting, as well as the positive and negative factors of using that knowledge. The triangle at the centre of the model emphasizes the importance of the input of nurses in the creation of tailored training. In their study, Grimshaw et al. (2001) corroborate the importance of nurse participation, specifying that the more learners are involved

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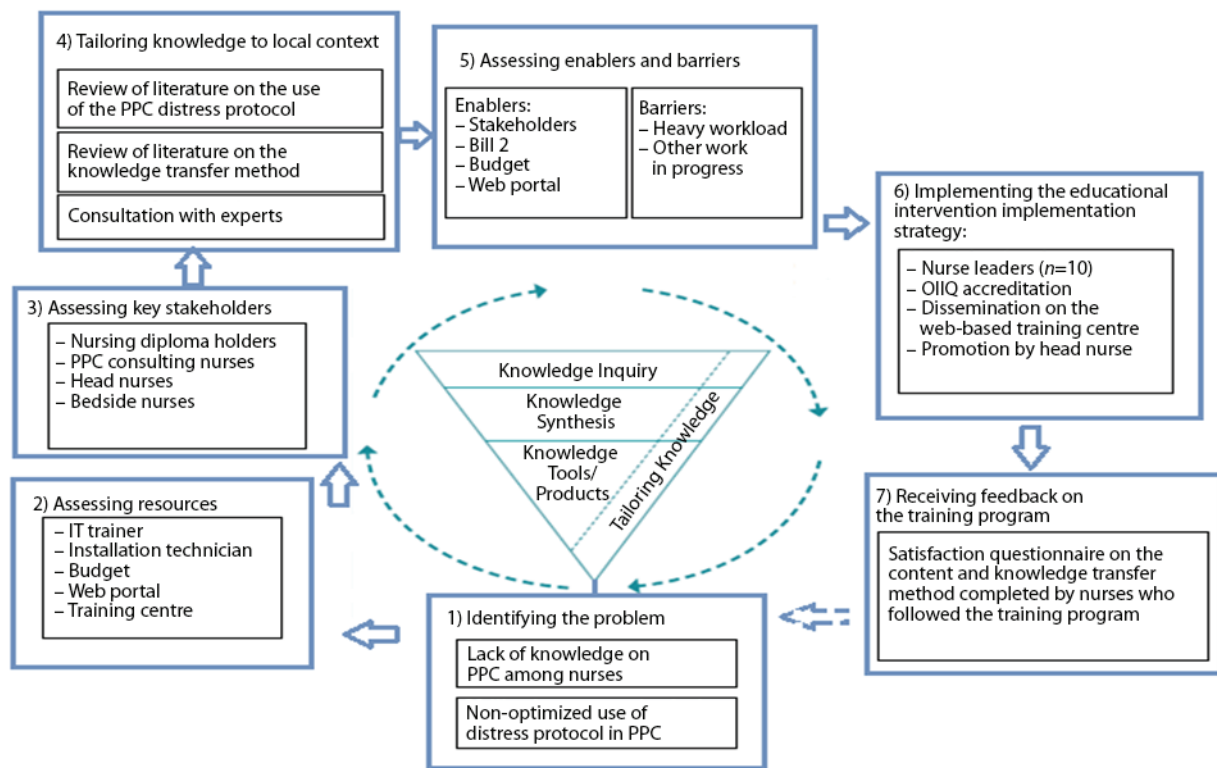


Figure 1. Knowledge Transfer Approach applied to the development of a web-based training

in a project, the more their interest increases. Several activities based on the model were carried out in order to complete the project: (1) identifying the problem, (2) assessing the available resources, (3) assessing the key stakeholders, (4) tailoring knowledge to local context, (5) assessing enablers and barriers to knowledge use, (6) implementing a knowledge transfer strategy, and (7) receiving feedback on the strategy (web-based training).

METHODOLOGY

Care settings, participants and recruitment

The internship project was developed in collaboration with the pediatric palliative care unit at Centre hospitalier universitaire (CHU) Sainte-Justine, in Montreal (Quebec, Canada). As nurses in the oncology sector provide more PPC than in other units, the program targeted that specific sector. The nurses participated in the project voluntarily, according to their availability ($n = 30$). The partners involved in the development and testing of the web-based training project were pediatric palliative care nurses ($n = 2$), head oncology nurses ($n = 2$), palliative care specialists ($n = 2$), head palliative care nurses ($n = 1$), and an executive oncology consultant, as well as the hospital's nursing directorate.

Development of the online training program using a KT approach

Step 1) Identifying the problem. First, as suggested in the RNAO model of 2012, with the help of a number of nurses in the field, a more specific problem with regard to a lack of knowledge in PPC among nurses was ascertained. To come to

that realization, two steps were carried out: explore the training required and target what is needed as a priority.

Exploring training needs. First, consultations with nurses (e.g., consulting nurses, unit heads) were held in order to explore PPC training needs. Shadowing was also part of the procedure, which made it possible to meet with various professionals and observe interactions with pediatric patients. These exchanges were key in bringing to light topics pertaining to PPC, such as respiratory distress management, the use of distress protocol, end-of-life signs and symptoms, introducing families to palliative care, the coexistence of curative and palliative care and the transition from curative to palliative care. These themes are consistent with the evidence available on the knowledge of PPC to be developed (see Table 1).

Determining priorities regarding training needs. A survey was later emailed to nurses working in the oncology unit of hospitals. The survey, which concerned all three nursing work shifts as well as oncology outpatient care, asked them to rate on a five-point Likert scale, the training needs previously established, with 1 representing "high priority" and 5 "low priority." Of the 32 nurses who participated in the survey, 67% agreed that the application of a PPC distress protocol was of high priority, with 64% agreeing that patients and their families should be followed up closely. More than 67% of the nurses who completed the survey had more than five years of experience.

Steps 2) and 3) Assessing resources and key stakeholders. An assessment of the various resources available in the field of caregiving was carried out. One of the facility's IT trainers

Themes	Content	Strategies	Evidence
1) Protocol relevancy	<ul style="list-style-type: none"> - Relevancy of distress protocol - Purpose of distress protocol - Overview of guidelines – Distress protocol - Presentation of the web-based training program 	<ul style="list-style-type: none"> - Pictures - Written information - Sound effect - True or false 	Bidet et al. (2016), NICE (2017)
2) Identifying pediatric distress	Various forms of distress: <ul style="list-style-type: none"> - Severe dyspnea - Intense pain not relieved with basic pain medication - Severe or acute anxiety - Massive hemorrhage 	<ul style="list-style-type: none"> - True or false - Sound effect - Pictures - Real-life situations - Written information 	Bidet et al. (2016), Pickstock (2017), Brennan & Mazanec (2011), INESSS (2017)
3) Medication used	<ul style="list-style-type: none"> - Midazolam - Hydromorphone or morphine - Scopolamine or glycopyrrolate 	<ul style="list-style-type: none"> - True or false - Pictures - Written information 	Brennan et al. (2011), Wilson et al. (2015), Smothers & Beck (2012), NICE (2017)
4) Route of administration	<ul style="list-style-type: none"> - Slow intravenous push - Subcutaneous injection (with or without Insuflon) - Oral transmucosal delivery 	<ul style="list-style-type: none"> - Video demonstrations 	INESSS (2017)
5) Nurse's roles	<ul style="list-style-type: none"> - Observing - Assessing - Documenting 	<ul style="list-style-type: none"> - Pictures - True or false - Written information 	Bidet et al. (2016), Bloomer et al. (2015), Bobb (2016), INESSS (2017)

participated in the project by adding an interactive component to the web-based training program, i.e., sound effects, images and video demonstrations. In addition, the hospital's nursing directorate and the PPC unit allotted a budget for the project.

Step 4) Tailoring knowledge to local context. The use of the PPC distress protocol was reviewed in order to design an evidence-based training scenario. To make that possible, a literature review strategy was developed in collaboration with health science librarians, head oncology and clinical PPC nurses in order to pinpoint the most pertinent elements to the practice. The searches were mainly done on CINAHL, with an additional search on Google Scholar and Pubmed using the following search words: nursing, best practices, distress protocol, palliative care, pediatrics. The evidence review was used to create the web-based training program and organize it under five key themes (see Table 1). Furthermore, the content was approved by three expert professionals in the field of PPC (material available in the field, consistency with existing practices, feasibility). The web-based training program also integrates pedagogical strategies such as the use of images, sound effects, video demonstrations and real-life professional situations. Based on Mayer's study (2003), learners are better able to remember messages when words are supported by pictures. In addition, Tomey (2003) suggests that students learn better through activities that require active participation, such as real-life situations, reflection or problemsolving.

Step 5) Assessing enablers and barriers. Several enablers helped to deliver the educational intervention. First, the collaboration of several important stakeholders in the project, such as head nurses, bedside nurses, and the nursing directorate, as well as a team of PPC consultants, helped in developing and

promoting a valid and reliable product adapted to care setting. Furthermore, the budget the institution allotted for the intervention ensured the creation of a quality product. Since the *Act respecting end-of-life care* came into force, healthcare institutions have been required to implement measures offering optimal palliative care. Last, a web portal equipped with an online training centre was already accessible to nurses. Given that the main barrier was the heavy workload of staff nurses, the training program had to be short. A tab entitled "Palliative Care" was created in the hospital's intranet, which allowed nurses to find the training program easily during any work shift.

Step 6) Implementing the knowledge transfer strategy. Head oncology nurses were asked to watch the training, so they could promote the program to nurses in their respective departments. Nurse managers can positively influence individuals and their organization by using the results derived from the research (Rycroft-Malone et al., 2002). In addition, 10 nurse leaders, known as "champions" in the hospitalization and oncology outpatient care units, were selected to participate in the training program. The purpose of the strategy was to foster the transmission of the knowledge acquired to their co-workers and promote the web-based training program. Note that a final strategy contributed to the KT: the accreditation of the training program by the Ordre des infirmières et infirmiers du Québec (OIIQ) for one hour of continuing education credits. Straus, Tetroe, and Graham (2013) support the strategy, stating that accreditation is a positive factor in the KT process.

Step 7) Receiving feedback on the web-based training program. A short feedback questionnaire was integrated into the end of the training (see Table 2). The questionnaire, specifically designed for the project, has not been validated, is made

Questions	Number of participants who answered "Yes"	Example of comments
Do you feel that this training program will help you to adequately inform parents about the distress protocol guidelines?	4	"I would have liked more information on the protocol for families."
Do you feel that this training program will help you to adequately identify pediatric distress?	5	"It gave me a better understanding of various situations and showed me how to apply the distress protocol."
Do you feel that this training program will help you to know when you should implement the distress protocol?	5	"This is a good review of the distress protocol for experienced nurses and a good training for new nurses."
Do you feel that this training program will help you to know better the different routes of the distress protocol?	5	"I didn't know all the routes for the distress protocol."
Which aspect(s) of the training program struck you the most?	N/A	"The protocol requires very good clinical judgment on the part of nurses." "Assessing distress symptoms and implementing the protocol." "How important it is to document properly." "That one should not hesitate to provide quick relief."
Do you feel that the format of the training program was conducive to learning?	5	"A few technical issues, but very enjoyable overall."
Other comments/suggestions	N/A	"I liked how quizzes were used to assess comprehension during the training program."
Legend: N/A=not applicable		

up of closed questions (yes or no answers) and has a box after each point for comments or suggestions. The results will be used to determine whether the web-based training program is an efficient way to transfer knowledge for future projects related to palliative and oncology care.

RESULTS

In total, 10 nurses working in the hospitalization and oncology outpatient care departments followed the web-based training program. However, only five of those nurses completed the questionnaire on their satisfaction. After viewing the program, all of them said they felt more prepared to inform parents of the distress protocol and able to recognize distress and apply the protocol in a timely and correct manner. Regarding the training format, the five nurses confirmed that the method used was appropriate for learning about PPC. Three participants said that they were particularly struck by the part on applying the distress protocol in the event of death rattles from a child, a stressful situation for the child, his or her family as well as for health professionals. Most of the nurses also appreciated that myths were debunked regarding injecting a child in distress with morphine. The comments showed that several of the myths surrounding PPC were debunked in the video and that the majority of nurses would like more information on PPC.

DISCUSSION

Changes in practices

After the pilot test of the training program, whose purpose was to transfer knowledge on PPC to nurses, the participating nurses said they felt better prepared to recognize distress and determine when and how to apply the protocol. It is noteworthy that roughly one in every three children in palliative care will experience episodes of dyspnea and intense pain, which places those symptoms among the most common in pediatrics palliative care (Vollenbroich et al., 2016). Those symptoms cause suffering for the child and have a long-lasting impact on the child's family (Lützu et al., 2012; Vollenbroich et al., 2016). Episodes of distress tend to accentuate a nurse's feeling of helplessness and anxiety about the conditions of a sick child, in particular when the nurse is unsure about the care to be provided (Deffner & Bell, 2005). This knowledge directly influences the quality of care offered; it has been shown that more anxious nurses limit contact with patients and families, which detrimentally affects the assessment and management of distress symptoms (Mullen et al., 2015). Acquiring knowledge on the subject could, therefore, alleviate feelings of anxiety and incompetence regarding PPC and, consequently, optimize the quality of care provided. It is important for nurses to be aware of their roles in accompanying families when the distress protocol is applied, hence the importance of their acquiring more knowledge on the subject. This knowledge represents only a small part of what is required for nurses to be confident in delivering PPC; the training program aims to be a trigger in this regard.

Comments were then provided on the various myths presented in the training program. The majority of nurses confirmed that the training program allowed them to demystify the belief that the distress protocol accelerated death. Based on

the study by Bidet et al. (2016), 54% of respondents of a survey on the use of distress protocols believe that current protocols are not optimal, as they, at times, precipitate death. In addition, according to the nurses in that same study, the three main barriers to the protocol are the fear of going against the patient's or family's will, precipitating death, and poorly assessing the patient's distress. The web-based training program addresses the two latter barriers for no other reason than to ensure children and families receive the best quality palliative care.

Nurses satisfaction regarding the training program

The improvement of PPC nursing practices through the appropriate use of the distress protocol can be explained by the fact that the nurses acquired knowledge through the various pedagogical methods used in the training program. According to the answers from participants, the web-based training program is a useful learning tool and a flexible method for transferring knowledge, which allowed them to make concrete links with their clinical practice. They also added that they appreciated the program's accessibility, since it was available at any time during any work shift, as well as its 35-minute duration. Given the time constraints inherent to their work, it was even more important to find a training format optimized to their work environment. Generally speaking, the participants seem satisfied with the knowledge they acquired through KT.

Even though 10 participants followed the training program, only five of them took the time to answer the feedback questionnaire, which is likely due to an excessive workload and lack of time. The training program was done during work hours.

Strengths of the web-based training program

The program was found to have many strengths. With regard to the co-creation process and program pilot testing, the use of the RAO's KT model (2012) helped to organize the educational intervention and develop a product tailored to the needs of caregivers. The various steps outlined in the model helped to define the overarching issue, which is a lack of knowledge on PPC among nurses. In addition, the collaborative work with nurses led to a training program tailored to a specific care setting. A similar project was carried out at Stanford Hospital in California, fostering the enhancement of nurses' knowledge and an improvement of their attitude and overall competence regarding the delivery of palliative care. The impacts noted included an increase in the quality of care and a decrease in the feeling of helplessness among parents (Petersen et al., 2016).

The selected video format is also positive: the use of information and communication technologies improves learning environments by creating a link between theory and practice, even in cases of distance learning (Dunn, 2000; Hall, 2009; Laferrière & Gervais, 2008). For nurses, it is a good way to learn at their pace (Wiener et al., 2015), is considered more flexible and accessible, and fosters the integration of information and communication technologies in learning and teaching (Brown, Kirkpatrick, Mangum, & Avery, 2008).

Finally, among the strengths is the training program's interactive dimension. In the field of teaching, all educative strategies other than lectures are often considered innovative.

However, innovation is also mentioned where the teaching strategy is based on interactivity between the user and an information system in situations whose purpose is to improve the learner's learning experience (Dubois & Giroux, 2012). In the context of interactive educational interventions, authentic content is presented, thus encouraging the learner to listen and engage in the learning process (Tinio, 2002). According to Cabana et al. (1999), lack of motivation is an obstacle when it comes to changing behaviour regarding healthcare. Professionals need to be informed, motivated and trained to use evidence in their daily work (Grol & Wensing, 2004). Web-based training programs must include various strategies (e.g., assertions to rectify, real-life situations, video demonstrations) to create interactivity and allow for a connection between learning and practice (Arenella et al., 2010).

The limits of web-based training

First, although data records have been validated with various experts in the field of PPC, no such action has been taken with staff nurses. Consulting staff nurses would have been an asset in the development of the educational intervention and would likely have encouraged more nurses to participate. Since this study was an internship project, the timeline and program objectives restricted evaluation and, thus, only a few nurses were surveyed about their satisfaction with the training program. It would be relevant to conduct a formal assessment of the training program's effects on nurses' learning and on their practice in the field of PPC.

The use of only one KT method (not combined with another method) may hinder KT. The combination of several KT interventions may cover a wider spectrum of learning styles, which is a practice more likely to be efficient than isolated interventions (Bastable, 2014; Sinclair, Kable, & Levett-Jones, 2015). According to the results of the systematic review by Sinclair et al. (2015), a multimodal intervention may be necessary in KT, and preferable to a sole invention, in order to reduce the rate at which professionals require reminders. In addition, although useful through its flexibility and accessibility, a web-based training program is not the best strategy for including reflections and coaching. Personal reflections and team debriefings would ensure professional attendance and emotional coping (Anneser, Kunath, Krautheim, & Borasio, 2014). For example, the learning process could have been reinforced had the program been accompanied by a follow-up with nurses in the form of reflection on the subject presented. Discussion with other professionals, which at times brings about the realization that some perceptions, feelings or experiences are actually shared, helps change behaviour or attitudes, fostering a feeling of cohesion and reduced isolation (Bastable, 2014).

IMPLICATIONS FOR NURSING PRACTICES AND TRAINING

This web-based PPC training program could affect nursing practices and training at the institution in several ways. In addition to meeting training needs, the project could reduce anxiety related to PPC (Mullen et al., 2015), facilitate communication in palliative care (Montgomery et al., 2017), and

contribute to emotional management (Roberts & Boyle, 2005) while ensuring quality palliative care. Web-based training seems to be a concrete tool for ensuring the transfer of theoretical knowledge to clinical practice (Sinclair et al., 2015) while allowing for the development of an evidence-based professional practice. Although this project represents only a part of the required training in PPC, it allows staff nurses to acquire independence and confidence when confronted by an episode of distress in a child at the end of his or her life. It can render it easier to provide care to a patient and his or her family and offer a better quality of nursing care.

CONCLUSION

This study highlights how research-based knowledge can be used to advance nursing care. Web-based training is a flexible and accessible means of informing oneself on a sensitive

subject such as PPC. Nurses, who play a vital role in providing pediatric palliative care, appear to experience anxiety when it comes to delivering that type of care. To be recognized, nurses are required to update their knowledge on the proven practices in pediatric palliative care. They can, as such, promote those practices, thus ensuring patients and patients' families are receiving the best possible care.

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