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Pain Management in the Context of a Nursing Help Line: Identification of Needs, Development of a Continuing Education Activity, and Evaluation of its Impact Gestion de la douleur en contexte d'intervention infirmière téléphonique : identification des besoins, conception et évaluation des effets d'une activité de formation continue

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Résumé de l'article

Introduction : La gestion de la douleur par des infirmières dans un contexte d'intervention téléphonique est une activité complexe. La formation continue (FC) est une stratégie potentiellement efficace pour assurer le développement de cette compétence. Objectif : Cette étude avait pour but de concevoir et d'évaluer une activité de FC personnalisée en gestion de la douleur par et pour les infirmières d'un service téléphonique d'information en santé. Méthodes : Un devis mixte convergent en 3 phases a été utilisé : identification des besoins et des préférences en termes de stratégies éducatives, conception de l'activité de FC, évaluation. Basée sur une approche participative, l'activité de FC a été conçue en réponse aux attentes et besoins des participants. Elle comportait deux volets : 1) journée de FC et 2) soutien clinique individuel. Une étude quasi-expérimentale à séries temporelles uniques a été utilisée pour évaluer l'activité de FC sur les connaissances et croyances des participants à propos de la gestion de la douleur et leurs perceptions de leurs activités infirmières en gestion de la douleur. Les données ont été recueillies au moyen de groupes de discussion et de questionnaires. Résultats : Les connaissances des participants se sont améliorées après la journée de FC et sont demeurées stables après 3 mois. Aussi, les participants rapportent une augmentation d'une variété d'activités infirmières en gestion de la douleur. Discussion et conclusion : Cette étude illustre l'importance de l'implication des infirmières dans la conception d'une activité de FC et soutient ses bénéfices potentiels en contexte d'intervention téléphonique.

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Pain Management in the Context of a Nursing Help Line: Identification of Needs, Development of a Continuing Education Activity, and Evaluation of its Impact

**Gestion de la douleur en contexte d'intervention infirmière
téléphonique : identification des besoins, conception et évaluation des
effets d'une activité de formation continue**

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Keywords

continuing education;
phone help line;
pain management;
needs assessment;
mixed-method design

Abstract

Introduction: Pain management by nurses in the context of a phone help line is a complex task. Continuing education (CE) is a potentially effective strategy to ensure development of this competence. **Objective:** The main objective of this study was to develop and evaluate a customized pain management CE activity by and for nurses working at a phone help line providing health information. **Methods:** A three-phase convergent mixed-method design was used: needs and preferred educational strategies assessment, conception of CE activity, evaluation. Based on a participatory approach, the CE activity was developed to meet participants' expectations and needs. It included two components: 1) CE day and 2) individual clinical support. A quasi-experimental study with a single time series was used to evaluate the CE activity regarding participants' knowledge and beliefs about pain management and their perceptions of their pain management activities. Data collection was performed using focus groups and questionnaires. **Results:** Participants' knowledge about pain management increased after the CE day and remained stable after three months. Also, participants reported an increase in various patient-centered pain management nursing activities. **Discussion and conclusion:** This study illustrates the importance of involving nurses in designing a CE activity and supports its potential benefits in the context of a phone help line.

Résumé

Introduction : La gestion de la douleur par des infirmières dans un contexte d'intervention téléphonique est une activité complexe. La formation continue (FC) est une stratégie potentiellement efficace pour assurer le développement de cette compétence. **Objectif :** Cette étude avait pour but de concevoir et d'évaluer une activité de FC personnalisée en gestion de la douleur par et pour les infirmières d'un service téléphonique d'information en santé. **Méthodes :** Un devis mixte convergent en 3 phases a été utilisé : identification des besoins et des préférences en termes de stratégies éducatives, conception de l'activité de FC, évaluation. Basée sur une approche participative, l'activité de FC a été conçue en réponse aux attentes et besoins des participants. Elle comportait deux volets : 1) journée de FC et 2) soutien clinique individuel. Une étude quasi-expérimentale à séries temporelles uniques a été utilisée pour évaluer l'activité de FC sur les connaissances et croyances des participants à propos de la gestion de la douleur et leurs perceptions de leurs activités infirmières en gestion de la douleur. Les données ont été recueillies au moyen de groupes de discussion et de questionnaires. **Résultats :** Les connaissances des participants se sont améliorées après la journée de FC et sont demeurées stables après 3 mois. Aussi, les participants rapportent une augmentation d'une variété d'activités infirmières en gestion de la douleur. **Discussion et conclusion :** Cette étude illustre l'importance de l'implication des infirmières dans la conception d'une activité de FC et soutient ses bénéfices potentiels en contexte d'intervention téléphonique.

Mots-clés

formation continue;
intervention téléphonique;
gestion de la douleur;
évaluation des besoins;
méthodes mixtes

INTRODUCTION

The most common reason why Canadians seek health care is pain (Lynch, 2011). In a review on epidemiology of pain, Henschke, Kamper and Maher (2015), mention that pain is considered a major health problem across all ages, affecting a substantial proportion of the world population, with a monthly prevalence ranging from 1.0% to over 60.0%. Left untreated, pain can have many and varied consequences in different spheres of a person's life over the short, medium and long term (Dueñas, Ojeda, Salazar, Mico, & Failde, 2016). As outlined by Henschke et al. (2015, p.143), "[pain] interferes considerably with everyday activities, is associated with depressive symptoms, and dramatically and negatively affects relationships and interactions with others". Persistent pain may also cause various changes in physiology leading to pain sensitization and a condition of chronic pain (Feizerfan & Sheh, 2015). In Canada, the prevalence of chronic pain among adults age 18 and over is about 19% (Schopflocher, Taenzer, & Jovey, 2011; Steingrimsdottir, Landmark, Macfarlane, & Nielsen, 2017). One of the reasons for this high prevalence is that pain is not managed properly. Health-care professionals underestimate it or do not think that managing it is a priority (Seers, Derry, Seers, & Moore, 2018).

According to the Registered Nurses' Association of Ontario (RNAO), nurses are among the health-care professionals in the best position to work with people suffering from pain (RNAO, 2013). Their role in pain management encompasses detection and assessment, education and intervention as well as follow-up, in collaboration with other health-care professionals (RNAO, 2013). The variety and multidimensional nature of health problems, along with pain, complicate the intervention. Pain management is even more complex in a phone help line service (e.g., *Info-Santé*, TeleHealth, HealthLink). Nurses working in such a context must evaluate the person's condition without any visual pointers nor the possibility of doing a physical examination.

Despite the recognition that nurses play a leading role in optimal pain management, nurses often lack the relevant knowledge (Brant, Mohr,

Coombs, Finn, & Wilmarth, 2017; Latina et al., 2015; Willens, 2014), which results, for example, in misconceptions about dependence on opiates and their depressive effect on the central nervous system (Furjanic, Cooney, & McCarthy, 2016; Samarkandi, 2018; Schreiber et al., 2014). In a study by Bergeron, Bourgault and Gallagher (2015), nearly three out of four nurses working in doctors' offices felt their practice regarding pain management was limited. Among obstacle to optimal pain management, they identified ignorance about what interventions to apply. These shortcomings could be due to a lack of continuing education (CE) about pain management (Furjanic, Cooney, & McCarthy, 2016; Watt-Watson & Murinson, 2013). Moreover, CE adapted to phone help line context appears to be non-existent. CE is known to help update professional knowledge and skills in various intervention fields (Bonkowski, De Gagne, Cade, & Bulla, 2018; Devonshire & Nicholas, 2018). Many authors maintain, however, that it is necessary to evaluate nurses' learning needs prior to a CE activity in order to obtain positive outcomes and lasting changes in practices (Gallagher, 2007; Griscti & Jacono, 2006; Holloway, Arcus, & Orsborn, 2018; Hudson et al., 2018).

OBJECTIVES

Considering the complexity of nurses' pain management interventions in a help line context, the harmful consequences of this health problem, and the lack of studies documenting customized CE in help line contexts, the main objective of this study was to develop and evaluate a pain management CE activity by and for nurses working at a help line providing health information. The three specific objectives were to:

- 1) Identify specific CE needs and preferred educational strategies
- 2) Develop a customized pain management CE activity
- 3) Evaluate the participants' knowledge and beliefs about pain management and their perceptions about their pain management nursing activities before and after the CE activity and three months later.

METHODS

RESEARCH DESIGN

A three-phase convergent mixed-method design (Creswell, 2015) was used to collect and analyze quantitative and qualitative data. The data were merged to gain a better understanding of participants' CE needs, their preferred educational strategies, and impact of the CE activity. Both forms of data provided "different insight, their combination [contributed] to seeing the problem from multiple angles..." (Creswell, 2015, p. 36-37). Table 1 outlines the structure of this design. In phase 1, using a qualitative approach inspired by Thorne's work (2008) we focused on uncovering shared perspectives for identifying pain management CE needs and preferred educational strategies (obj. 1). In phase 2, the research team and participants developed the CE activity (obj. 2). It included two components: CE day and individual clinical support. In phase 3, we performed an evaluation of the impact of the CE activity (obj. 3). We used a quasi-experimental study with a single time series: before and after the CE day and three months later. We evaluated the impact it had on: 1) participants' knowledge and beliefs about pain management and 2) perceptions about their pain management nursing activities.

SAMPLING, RECRUITMENT AND ETHICAL CONSIDERATIONS

The target population consisted of all the 31 nurses that were working at the phone help line providing health information in Quebec (*Info-Santé*) at the time of the study (January 2012). Given this relatively small number of potential participants, we choose a convenience sample so as to obtain the maximum heterogeneity of pain management experiences. The first author met the nurses to describe the study and invite them to participate. To be eligible, the nurses had to meet the following criteria: 1) have taken the training for new nurses joining the help line, 2) hold a position or be a long-term replacement on the help line, and 3) not have a graduate certificate (diploma) in pain management. The first author informed the nurses of the disadvantages of participating in the study, namely the time spent on research and the

potential fear of being judged by their peers in focus groups. Free and informed written consent was obtained. The research team maintained confidentiality throughout the study and anonymity when publishing the results. The Research Ethics Committee of the CIUSSS de l'Estrie-CHUS (2012-07/B.G.-BOISVERT) approved the research protocol.

PHASE 1. NEEDS AND PREFERRED EDUCATIONAL STRATEGIES ASSESSMENT

In May and June 2012, three focus groups were conducted to allow as many nurses from the help line as possible to participate in evaluating their CE needs and preferred educational strategies (T0).

The focus group method is widely accepted as a valuable way to gather participants' opinions, perspectives and ideas (Krueger & Casey, 2015). The participants first expressed their CE needs with respect to pain management. Next, they each rated and prioritized five needs by allocating them between 1 and 5 points. The second part of the focus groups consisted of open-ended questions about their preferred educational strategies as well as facilitators and obstacles to their participation in a CE activity. During the first part of the focus groups, the nominal group technique (NGT) was used to identify the participants' CE needs with respect to pain management. By giving each participant a voice and the opportunity to contribute, the NGT generates many ideas and enables a substantial amount of data to be obtained in a relatively short period of time (Harvey & Holme, 2012). The first author, who has experience working at the *Info-Santé* help line, conducted the focus groups with two other members of the research team (FG, PB). His interventions, laced with a touch of humour, were effective in fostering a discussion-friendly environment characterised by symmetrical power relations within the group, thus encouraging everyone to express themselves and co-construct their perspective on the CE activity. The three focus groups took place during working hours at the help line center. They were digitally recorded and lasted 2 hours 15 minutes.

Table 1*Structure of the mixed-method design*

Research process	Study phases		
	1. Needs and preferred educational strategies assessment	2. Conception of pain management CE activity	3. Evaluation of pain management CE activity
Meetings	T ₀		T ₁ (end of CE day), T ₂ (3 months post CE day)
Data collection	Three focus groups (NGT and open-ended questions) Questionnaire TPMI-F Questionnaire PMAQ-F	-----	Two focus groups (T ₂) (open-ended questions) Field notes taken during individual clinical support meetings Questionnaire TPMI-F (T ₁ , T ₂) Questionnaire PMAQ-F (T ₂)
CE activity	-----	Planification and resources	Two CE days and individual clinical support
Analysis	Qualitative: thematic analysis (Miles, Huberman, & Saldaña, 2014) Quantitative: quantification of the qualitative data from NGT (Creswell, 2015) Integration of the qualitative and quantitative data (Creswell, 2015)	Triangulation based on CE needs expressed by nurses, <i>Info-Santé</i> normative framework, pain management best practices and guidelines on medications with depressive effect on the central nervous system	Qualitative: thematic analysis (Miles, Huberman, & Saldaña, 2014) Quantitative: differences between means (Wilcoxon signed-rank test) Integration of the qualitative and quantitative data (Creswell, 2015)
Results	CE needs Preferred educational strategies	CE day Individual clinical support	Knowledge and beliefs about pain management Perception of pain management nursing activities

Legend: CE: Continuing education; NGT: Nominal group technique; PMAQ-F: Pain Management Activities Questionnaire-French; TPMI-F: Toronto Pain Management Index-French

The results of phase 1 informed the development of the pain management CE activity. For example, one of the learning objectives of the CE day specifically targeted three pain management CE needs expressed by the participants.

PHASE 2. CONCEPTION OF CE ACTIVITY

The research team developed the CE activity based on four information sources: the needs and preferred educational strategies expressed by the participants during phase 1, the normative framework of the *Info-Santé* help line (MSSS, 2007), pain management best practices (RNAO, 2002, 2007), and clinical supervision guidelines about the potential depressive effect of medications on the central nervous system (OIIQ, 2009). The educational strategies used during the CE day were taken from evidence-based literature on pain management teaching (Griscti & Jacono, 2006; Svinicki & McKeachie, 2014) and reflected the participants' preferences regarding their favorite learning and teaching strategies.

In addition to the CE day, the first author offered personalized individual clinical support based on the Association for Medical Education in Europe (AMEE) Guide for effective educational and clinical supervision (Kilminster, Cottrell, Grant, & Jolly, 2007), a widely recognized medical education model. Participants who wished to take advantage of this additional support could discuss a challenging clinical situation and be supported addressing it. Using strategies such as reflective practice and positive feedback, the participants were encouraged to acknowledge what they could have done differently in the clinical situation discussed. Field notes included duration of meetings, cases discussed, and quotations.

PHASE 3. EVALUATION

The pain management CE activity was evaluated first by measuring two dependent variables: 1) participants' knowledge and beliefs about pain management and 2) their perceptions of their pain management activities. Knowledge and beliefs were measured after the first focus groups (T0), at the end (T1) and three months after the CE day (T2) using the French version of the Toronto Pain Management Index (TPMI) (Watt-

Watson, 1997), i.e., the TPMI-F (Bergeron, Bolduc, Michaud, Lapré, & Bourgault, 2018). We measured participants' perceptions of their pain management nursing activities after the first focus groups (T0) and three months after the CE day (T2) using the Pain Management Activities Questionnaire (PMAQ) (Dalton et al., 1995), translated into French (PMAQ-F) and adapted to primary care context (Bergeron, Gallagher, & Bourgault, 2014).

The TPMI-F contained eight questions on sociodemographic characteristics and 19 items with visual analog scales, each ranging from 0 to 100 (possible total score of 1900) evaluating participants' knowledge and beliefs about pain management including pain assessment (3 items), analgesia (5 items), use of opiates (4 items), clients' experiences of and responses to pain (4 items), colleague support (1 item), perception of adequate pain management knowledge (1 item) and feeling of competence (1 item). Minor changes were made to the questionnaire to reflect the particular aspect of managing pain in a help line context. Three pain management and community care experts validated the final version of the questionnaire. For example, we added a question about nurses' employment status and another about their work experience at *Info-Santé* help line and we removed all the questions pertaining to nursing practice in doctors' offices. The psychometric properties of the TPMI-F adapted for a primary care practice context (Bergeron et al., 2015) included an intraclass correlation coefficient of 0.59 for test-retest reliability at a two-week interval (Bergeron et al., 2018). The content validity of this version was verified by six pain management and community health experts.

The PMAQ-F evaluated the participants' perceptions of 17 pain management nursing activities, for example therapeutic relationship with patient and family, evaluation of client's adherence to treatment, and personalized education for client. Participants were asked to report how many times they performed each activity during their last five shifts of work. They were also questioned about the number of calls involving a potential pain assessment and barriers to pain management activities (i.e. workload, lack of knowledge or resources about pain

management). Content validity of the original PMAQ was assessed by Bergeron et al. (2014) in a study involving 70 nurses. A kappa coefficient of 0.46 (CI: 0.17- 0.74) showed moderate test-retest reliability (Landis & Koch, 1977). As for the TPMI-F, we adapted the PMAQ-F to a phone help line context and thus we made minor changes to it in collaboration with four pain management and community care experts.

In addition to the questionnaires, we held two focus groups (T2) to gather information about participants' knowledge and beliefs, their feeling of competence and their pain management nursing activities (e.g., pain assessment, pharmacological and non-pharmacological approaches). The focus groups took place three months after the CE day during working hours at the help line center and lasted about 2 hours, including the completion of the PMAQ-F and TPMI-F questionnaires. A semi-structured interview guide facilitated the discussions that were digitally recorded. The first author conducted the focus groups assisted by two other members of the research team (FG, PB).

DATA ANALYSIS

The quantitative and qualitative data related to pain management CE needs and preferred educational strategies were analyzed separately, then combined as proposed by Creswell (2015) in order to generate results that could be used to develop the CE activity. Quantitative analysis was performed to obtain a score for each pain management CE needs previously identified and rated by participants to the first focus groups (T0). The qualitative data from the first focus groups (T0) (discussions related to open-ended questions) were transcribed and three team members (MB, FG, PB) analyzed the data according to Miles, Huberman and Saldaña's method (2014). Assigning predetermined (i.e., factors encouraging participation in CE activities, barriers to participation, favorite educational strategies) and emerging codes (i. e., preference for individual clinical support, case studies, interactive teaching) to the raw data, we were able to perform data condensation. Discussions between the research team members allowed to confirm drawing conclusions by returning to raw data and through collective analysis.

The total scores for the multiple response times on the PMAQ-F and TPMI-F underwent a non-parametric test, the Wilcoxon signed-rank test, on the difference between the means of two dependent variables. The significance level was set at $p < 0.05$ for all the statistical tests, except for the analysis of knowledge and beliefs, for which a significance level of $p < 0.017$ was set because of the Bonferroni correction applicable when there are multiple comparisons (Bland & Altman, 1995). Data from the last focus groups (T2) and individual clinical support meeting were analyzed using the qualitative method proposed by Miles et al. (2014), as described above. We then closely examined quantitative and qualitative results for a more thorough evaluation of the CE activity (Creswell, 2015). The qualitative results complemented the statistical results. For example, we were able to link some answers to the PMAQ-F concerning barriers to pain management activities, namely the limited access to pain management resources, with testimonies about the usefulness of the checklist for pain management given during the CE day.

RESULTS

SAMPLE

Of the 31 nurses working at the help line center targeted by the study, 30 were asked to participate by the first author (one nurse was not available at the time of recruitment). Twenty-three nurses agreed to take part but three could not participate in identifying CE needs and preferred educational strategies. Figure 1 charts the flow of participants in the study: 20 participants attended the initial focus groups and were divided into three groups ($n_1=7$, $n_2=8$, $n_3=5$). Thirteen participants attended one of the two CE days ($n_1=7$, $n_2=6$), including answering the TPMI-F questionnaire, and 10 met with the first author for an individual clinical support meeting, among which three participants required two separate meetings. Three participants didn't request individual clinical support because they felt confident about pain management. Finally, 13 participants joined the last two focus groups ($n_1=7$, $n_2=6$).

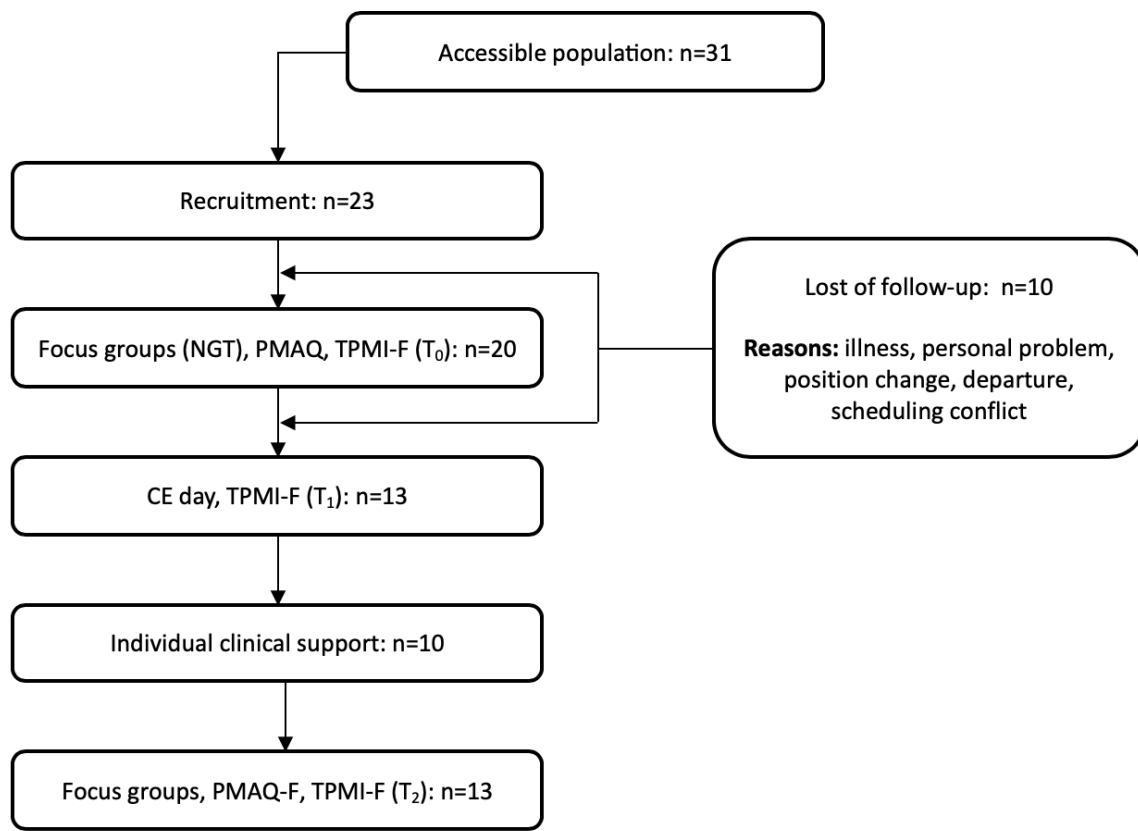


Figure 1. Flowchart of participants

Legend: NGT: Nominal group technique; FG: Focus groups; CE: Continuing education; PMAQ-F: Pain Management Activities Questionnaire-French; TPMI-F: Toronto Pain Management Index-French

Table 2 shows the sociodemographic characteristics of the participants. Their mean age was 41 (SD 12 years) and 84.2% were women. Nearly one in two participants had a bachelor's or master's degree. Just under half had over 10 years of nursing experience and just over half had been working at the help line center for up to two years.

PHASE 1: PAIN MANAGEMENT CE NEEDS AND PREFERRED EDUCATIONAL STRATEGIES

The 20 participants in the initial focus groups shared a common interest in a CE activity adapted to their reality. They initially identified 36 pain management CE needs. These needs were clarified, categorized and then prioritized by assigning them a score. Seven needs remained:

1. comprehensive pain assessment

2. assessment of abdominal pain
3. assessment of pain at different ages
4. neurophysiology of pain
5. non-pharmacological approaches
6. pharmacological approaches
7. chronic pain

The formulation of three learning objectives for the CE day took these needs into account. The objectives were to describe and apply:

- 1) basic principles of pain assessment by phone
- 2) specific phone assessment of abdominal pain, post-operative pain and pain at different ages
- 3) pharmacological and non-pharmacological pain management adapted to a help line context.

Table 2

*Sociodemographic characteristics of the participating nurses (n=19)**

Characteristics	n (%)
Gender	
Male	3 (15.8%)
Female	16 (84.2%)
Highest level of education completed	
College	7 (36.8%)
University certificate	3 (15.8%)
Bachelor's degree	8 (42.1%)
Master's degree	1 (5.3%)
Work experience	
0–5 years	4 (21.1%)
6–10 years	6 (31.6%)
11–20 years	3 (15.8%)
21–30 years	2 (10.5%)
31+ years	4 (21.1%)
Work experience in <i>Info-Santé</i> help line	
<1 year	6 (31.6%)
1–2 years	4 (21.1%)
3–4 years	1 (5.3%)
5+ years	8 (42.1%)
Previous pain management education	
Continuing education (CE)	5 (26.3%)
Academic education	11 (57.9%)

* One nurse participated in the first focus group but withdrew from the study before answering the first series of questionnaires.

The participants also expressed a desire for varied educational strategies, such as a lecture component with frequent interactions, combined with exercises such as clinical vignettes. They did not want role-play exercises but asked for a visual support and a tool that they could keep for future use. This first phase of the study was really appreciated by the participants who felt engaged in the CE process: “The fact that you assessed our needs made us feel involved in the process and mainly the fact that it was not imposed by the managers”.

PHASE 2: PAIN MANAGEMENT CE ACTIVITY

The pain management CE day is summarized in Table 3. The CE day was held twice in January and February 2013 to enable the participation of a larger number of nurses. The following educational strategies were used during the CE day: interactive presentation, video, clinical vignettes, association exercise, adapted forum theatre. During the individual clinical support meetings, participants were invited to discuss challenging clinical situations. For example, situations involving the management of fibromyalgia, back pain and abdominal pain were raised several times. Duration of the meetings ranged from 45 to 90 minutes, depending on the number of clinical situations addressed (between 2 and 6).

PHASE 3: EVALUATION OF PAIN MANAGEMENT CE ACTIVITY

Knowledge and beliefs about pain management. Comparison of the results obtained with the TPMI-F at the three measurement times is illustrated in Figure 2. The weighted total scores improved by 8.1% between T0 and T1 ($p=0.006$) and this increase was maintained over time ($+7.3\%$), rising from 63.7% to 71.0% ($p=0.016$) between T0 and T2. However, when the individual scores on each of the TPMI-F's 19 questions were analyzed, only three questions showed a significant change across the three measurement times, namely belief concerning potential dependence on opiates, perception of adequate pain management knowledge, and feeling of being competent to manage pain. These changes are presented in Table 4.

These results were corroborated by the thematic analysis of data from the last focus groups and field notes taken during individual clinical support meetings (see Table 5). For example, regarding difficulties encountered in relieving pain, lack of knowledge was mentioned 10 times during the first focus group (T0) and only twice during the last (T2). A participant mentioned that: “The pathophysiological process learned during the CE day helped us understand the reasoning behind our interventions”. Similarly, potential dependence on opiates among the people treated was mentioned only in the first

focus group as a consequence of chronic pain management. Finally, out of the 10 participants who met with the first author for an individual clinical support meeting, five readily expressed that they felt more competent to manage pain following the CE activity.

In addition, the participants reported an increase in the average number of evaluations of people's expectations regarding treatments to relieve their pain (11.2 vs 29.4; $p=0.032$). Furthermore, participants mentioned that the CE activity "gave them a method to evaluate [pain]".

Table 3

Summary of the pain management CE day

Learning objectives resulting from nurses' needs assessment	CE day content	Educational strategies
Describe and apply basic principles of pain assessment by phone	Nurse's role Systematic assessment Main concepts defined (types of pain, neurophysiology, etc.)	Interactive presentation Clinical vignettes
Describe and apply specific phone assessment of abdominal pain, post-operative pain and pain at different ages	Specific types of pain (abdominal pain, post-operative pain, pain at different ages)	Video Association exercise Adapted forum theater
Describe and apply pharmacological and non-pharmacological pain management approaches	Current state of knowledge on pain management nursing interventions Pharmacological approaches (medication and co-analgesics, for different types of pain) Non-pharmacological approaches (physical and psychological, for different types of pain)	Interactive presentation Clinical vignettes

Legend: CE: Continuing education

Perception of pain management nursing activities. Changes in PMAQ-F between T0 and T2 regarding participants' perceptions of their pain management nursing activities during their last five shifts of work are presented in Table 6. At the first measurement time (T0), the results showed that the most frequent activity was pain detection with 35.6 interventions on average per participant.

Three months (T2) after the CE day, therapeutic relationship with the client dominated nursing activities with 52.2 interventions on average per participant. The mean number of therapeutic relationships with the client doubled between T0 and T2 ($p=0.015$). Indeed, speaking about the added value of a therapeutic relationship, one participant said: "I never thought that listening, taking time and being there for the patient would be so beneficial" (Table 5).

During the last focus groups, they also mentioned a better assessment of behavioral symptoms suggestive of pain at different ages: "I was able to assess a child's pain [...] using signs of facial frown", and the integration of referred abdominal pain as part of their evaluation: "In regards to abdominal pain, I keep in mind the concept of referred pain in order to clearly define the pain I have to deal with" (Table 5). Perceived uses of non-pharmacological approaches also increased from 16.3 interventions to 36.8 on average ($p=0.003$), as one participant mentioned in the last focus groups: "It's crazy how I wasn't relying enough on non-pharmacological approaches. They're really helpful". The perception of managing the side effects of pharmacological approaches increased from 6.7 to 18.1 interventions on average ($p=0.015$).

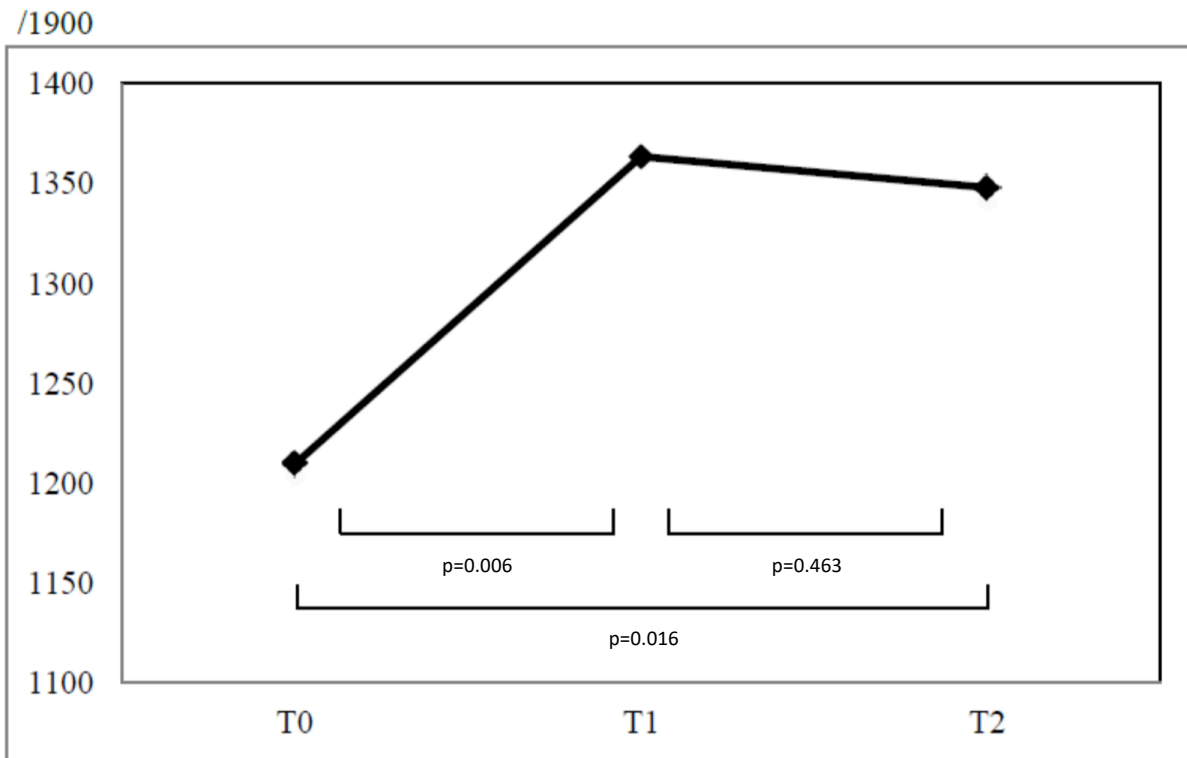


Figure 2. Comparison of weighted total scores on the TPMI-F between measurement times
Wilcoxon signed-rank test

Table 4

Significant changes on participants' knowledge and beliefs about pain management (TPMI-F) between T_0 and T_1 and between T_0 and T_2

Questions	T_0 n = 19	T_1 n = 13	p^*	T_2 n = 13	p^*
	% (SD)	% (SD)		% (SD)	
Question 9: What percentage of people treated become dependent on opiates to relieve pain?	22.2 (21.1)	5.7 (5.4)	0.011	6.7 (5.6)	0.013
Question 26: How adequate do you think your current pain management knowledge is?	57.8 (18.8)	82.8 (9.9)	0.006	82.5 (7.6)	0.002
Question 27: How competent do you feel to manage the pain of the people you treat effectively?	55.1 (17.8)	80.8 (12.6)	0.006	82.5 (9.9)	0.001

* Wilcoxon signed-rank test

Legend: TPMI-F: Toronto Pain Management Index-French

Table 5

Thematic analysis of data from the last focus groups (T₂) and individual clinical support meetings

Theme: Knowledge and beliefs	
<ul style="list-style-type: none"> • Knowledge acquired during the CE activity (e.g.: pain pathways, physiopathology) • Utility of knowledge (examples) • Belief in potential dependence on opiates (mentionned/not mentionned) • Bridging the gap between theory and practice 	
Theme: Pain management nursing activities	
<ul style="list-style-type: none"> • Difficulties encountered (examples) • Improved pain management interventions • Feeling of satisfaction towards their interventions (examples) • Feeling competent to manage pain • Activities <ul style="list-style-type: none"> ○ Therapeutic relationship with patient ○ Evaluation of expectations ○ Pain assessment method ○ Pain detection <ul style="list-style-type: none"> ▪ Age: child, adult, elderly ▪ Type (e.g. : abdominal, referred) ○ Pain management checklist (utility) ○ Pharmacological and non-pharmacological approaches (perceived use) 	

Table 6

Participants' perceptions of their pain management nursing activities during their last five shifts of work (PMAQ-F)

Pain management nursing activities	T ₀	T ₂	p*
	Mean number of activities (SD)		
Pain detection as 5 th vital sign	35.6 (29.0)	50.3 (26.4)	NS
Detailed assessment with standardized tools	27.2 (26.6)	44.6 (24.7)	NS
Continuous assessment	18.1 (27.0)	8.3 (13.0)	NS
Systematic documentation of pain	29.1 (26.6)	48.3 (30.1)	0.028
Therapeutic relationship with client	26.1 (23.8)	52.2 (21.0)	0.015
Therapeutic relationship with family	12.7 (18.0)	14.2 (11.7)	NS
Evaluation of client's expectations regarding treatment	11.2 (13.9)	29.4 (27.7)	0.032
Contribution to pharmacological approaches	18.6 (18.7)	34.8 (28.0)	NS
Use of non-pharmacological approaches	16.3 (17.2)	36.8 (24.0)	0.003
Management of side effects of pharmacological approaches	6.7 (7.1)	18.1 (12.3)	0.015
Evaluation of client's response to treatment	13.6 (13.5)	28.2 (27.3)	NS
Evaluation of client's adherence to treatment	15.2 (15.6)	29.3 (24.1)	NS
Evaluation of client's satisfaction with treatment	20.4 (19.8)	27.3 (28.9)	NS
Collaboration with client's family	8.6 (10.4)	13.7 (10.8)	0.036
Personalized education for client	28.6 (25.2)	50.7 (26.2)	NS
Personalized education for family	12.7 (16.8)	19.3 (17.5)	NS
Verification of client's satisfaction with follow-up in general	31.5 (29.2)	33.7 (37.8)	NS

* Wilcoxon signed-rank test

Legend: NS: Not significant; PMAQ-F: Pain Management Activities Questionnaire-French

As showed in Table 5, participants also repeatedly expressed a feeling of satisfaction with their interventions: “I feel satisfied following difficult calls. We feel like we responded well to the call with our new knowledge”. Similar feelings were also expressed concerning the individual clinical support, stating it helped them improve their pain management interventions by bridging the gap between theory and practice: “Clinical support is interesting. It enables me to integrate theory into practice”.

According to data collected with PMAQ-F at the first measurement time (T0), the perception of the number of callers with pain during the last five shifts, was 29.2 (SD 24.8) per participants. At the last measurement time (T2), the participants thought they answered more callers with pain than before the CE day. During their last five shifts, they estimated that they intervened with 48.3 (SD 26.6) callers on average. Despite the marked increase in the number of cases reported, this change was not statistically significant. Also, no significant change was found in the perceived barriers to the management of acute pain between the two measurement times (i.e. workload, lack of knowledge or resources about pain management).

In summary, the results of the PMAQ-F point towards an increase in various patient-centered pain management nursing activities such as therapeutic relationship, evaluation of expectations and beliefs regarding therapeutic measures, and also an increased use of non-pharmacological approaches.

DISCUSSION

This study produced two major findings, namely that 1) pain assessment is a priority need of pain management CE among nurses working at a help line, and 2) customized CE is a promising strategy to ensure the development of nurses' knowledge and an increase in patient-centered pain management nursing activities. According to the participants questioned during phase 1, the three main priorities of pain management CE target the assessment of pain, i.e., in order of importance: comprehensive pain assessment, assessment of abdominal pain, and assessment of

pain at different ages. To date, no study had explicitly determined pain management CE needs among nurses working at a help line. However, it is not surprising that pain assessment is a CE priority for these nurses because, in addition of being the first step in managing pain, it is a reserved nursing activity that constitutes the bedrock of nursing practice (OIIQ, 2016). Furthermore, the help line context requires advanced evaluation skills because there are no visual pointers for the assessment and it is impossible to do a reliable physical examination of the people treated (MSSS, 2007; OIIQ, 1998). Therefore, the pain management CE needs identified by participants in this study are consistent with the main assessment functions of nurses working at a help line (MSSS, 2007; OIIQ, 1998).

The original contribution of the present study is the prior identification of pain management CE needs by participants. This is an essential step according to many authors on CE (Gallagher, 2007; Griscti & Jacono, 2006; Holloway, Arcus, & Orsborn, 2018; Hudson et al., 2018). In addition to increasing participants' motivation, this identification enabled the development of a customized CE activity aimed at increasing their pain management knowledge addressing what they feel they really need to improve. In fact, after the CE activity, significant changes found on the TPMI-F and nurses' testimonies during individual clinical support meetings showed that they thought they felt competent and had sufficient knowledge to manage pain properly. These results are consistent with those of Lapré, Bolduc and Bourgault (2011), who observed an improvement in the feeling of competence and knowledge about pain management following a CE activity on pain management and mentoring. That improvement could result from the feedback they received during the individual clinical support sessions, which they said it helped them to enhance their pain management skills. Other studies found that pain management CE had a positive effect on nurses' knowledge (Abdallah, Majali, Stomberg, & Bergbom, 2011; AlReshidi, Long, & Darvill, 2018; Keen et al., 2017; Machira, Kariuki, & Martindale, 2013; Marceau, 2009; McNamara, Harmon, & Saunders, 2012). For example, a recent systematic review of the impact of educational programs on

nurses' post-operative pain management for children (AlReshidi, Long, & Darvill, 2018) found nine studies showing a significant improvement of nurses' knowledge, with eight of them demonstrating good evidence. The content of those educational programs was reported inconsistently across the studies. Nonetheless, they share similar characteristics with the CE activity developed in this study, namely the use of clinical vignettes and individual clinical support as teaching strategies.

Also, a study by Marceau (2009) evaluating traumatology CE needs and involving a CE activity with nurses working in an emergency context showed that CE increased knowledge and maintained it over time, even in a complex care environment. The CE needs assessment and variety of teaching methods used by Marceau (2009) underscored the effectiveness of customized CE. In light of these comparisons, it may be assumed that the effectiveness of CE for pain management knowledge and beliefs lies in the prior identification of the participants' needs, the varied and desired educational strategies, and the adaptation of the CE activity to nursing practice in the particular setting, founded on pain management evidence-based results.

The improved perception of knowledge and feeling of competence found on the TPMI-F may also be associated with the participants' reduced misconceptions about the use of opiates. More specifically, the participants' belief in the percentage of callers likely to develop a dependence on opiates declined immediately after the CE day. The participants also perceived they had increased their use of non-pharmacological approaches. Using these approaches was deemed important in their responses to the PMAQ-F, their comments during the individual clinical support meetings and the last focus groups. The recommendation of implementing non-pharmacological approaches to manage pain is supported by a high level of scientific evidence according to the pain management guidelines of the Registered Nurses' Association of Ontario (RNAO, 2013). Because non-pharmacological approaches can be initiated autonomously, many of the participants mentioned how the acquired knowledge about those interventions had been

useful during their phone interventions. In this respect, the results of our study corroborate those of other research showing that CE helps to increase the use of non-pharmacological approaches in the treatment of pain (Lin et al., 2008; Heinrich, Mechea, & Hoffmann, 2016). This also supports one of the recommendations of Bergeron et al. (2015) suggesting that pain management CE could mitigate the lack of use of non-pharmacological approaches to treat pain.

STRENGTHS AND LIMITATIONS

The strength of this study lies in its originality. It is one of the few studies on the subject of CE in a context of help line practice and the only one found that used a mixed-method design. The use of three focus groups in the first phase of the study enabled more nurses to participate, therefore increasing the likelihood of a CE activity well tailored to their needs. Group homogeneity stemming partly from their shared interest for a CE activity adapted to their reality, combined with symmetrical power relations within the group, played a major role in ensuring effective focus groups (Krueger & Casey, 2015). However, the design used involves some limitations with respect to the assessment of the impact of CE on the participants' knowledge and beliefs since there was no control group. On the other hand, triangulation of the data collection methods (focus groups, questionnaires, field notes) and combination of quantitative and qualitative results increase its credibility. Also, the loss of participants during the study from 19 to 13 reduces the statistical power of the analyses. The intraclass correlation coefficient of the TPMI-F for test-retest reliability is slightly below the threshold of 0.60 considered to be the minimum standard for the reliability of an instrument used for research purposes (Kottner et al., 2011). However, some authors question the use of test-retest reliability for the validation of questionnaires and argue that low test-retest reliability is not necessarily indicative of poor reliability (Fawcett & Garity, 2009). Future research should focus on documenting pain management nursing activities using field observations or patient-reported outcome measures for a more detailed portrait of when, how and why these activities are carried out.

CONCLUSION

This study shows that it is possible to develop customized CE activity and supports its potential benefits for nurses working at a help line. It paves the way for the development of CE activities adapted to this context. In addition, CE that incorporates individual clinical support is an interesting aspect that might reinforce the effective knowledge transfer into practice.

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