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Development and refinement of Rel@x: A training in hypnosis-derived communication for pediatric nurses to prevent procedural pain

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**Abstract**

**Introduction:** Studies in pediatric oncology have shown that hypnosis effectively reduces patients’ pain and distress during painful procedures. This remains underutilized in the healthcare system due to the staff cost and availability of hypnotherapists. To develop the use of hypnosis-derived communication, we aimed to train nurses to use hypnosis-derived communication while they perform painful procedures. **Objectives:** This study aimed to (1) develop a brief training in hypnosis-derived communication for pediatric nurses named Rel@x, (2) pretest the training with experienced pediatric oncology nurses and (3) refine the training based on nurses’ suggestions. **Methods:** The Rel@x training consists of two 4-hour sessions: one related to relational aspects and another one presenting one of two selected hypnotic communication techniques ("pleasant place" or "magic glove"). Rel@x makes use of manuals, cue card reminders, visual aids, videos and an e-learning platform. To refine Rel@x, a complete training cycle was conducted with seven female pediatric oncology nurses. A mixed method study with an evaluation questionnaire and a post-training focus group interview was conducted. **Results:** Quantitative data showed that nurses overall positively rated the training program: relevance and acceptability (median average of 5.4/6); use of hypnotic communication (median average of 5.2/6); expected effects (median average of 5.4/6); program implementation (5.6/6). Two general themes emerged from the qualitative data: perceptions of hypnotic communication and the evaluation of the Rel@x training program. Based on nurses’ suggestions, Rel@x was refined by adding more practical components, more time for practice, more time between the two sessions and additional tools (cue card reminders, keywords, virtual e-learning recap module). **Conclusion and clinical implications:** The use of hypnosis-derived communication during painful procedures and the Rel@x training were viewed favourably amongst pediatric nurses. Rel@x offers a complete training in hypnosis-derived communication for pediatric nurses. This training fosters the optimal use of hypnosis-derived communication during care and may significantly reduce children’s procedural pain and distress.

**Keywords:** Procedural pain, Distress, Pediatrics, Hypnosis-derived communication, Cancer
1. Introduction

Whether for undergoing medical diagnostic tests or for receiving treatment, children with chronic conditions undergo numerous procedures associated with significant levels of pain and distress.\(^1\) Previous negative and painful medical experiences can greatly affect how children experience subsequent procedures\(^2\), sometimes leading to important fears and avoidance\(^3\). In oncology, past experiences may also lead to pediatric medical traumatic stress\(^4,5\). Procedural pain and distress management is thus of utmost importance in pediatric healthcare settings.

In pediatrics, a combination of pharmacological and non-pharmacological (i.e. psychological and physical) interventions now allows for effective procedural pain management\(^6,7\). Although pharmacological interventions are usually effective, they are sometimes associated with side effects, limitations, contra-indications and cautions\(^6\). This is why refined non-pharmacological approaches are needed. These include various types of interventions, such as distraction techniques or tools, and even virtual reality\(^8-10\). Some non-pharmacological interventions require expensive technology needing updates or have a limited duration of use.

Among empirically supported non-pharmacological interventions, hypnosis and hypnosis-derived communication can relieve children’s physical and psychological discomfort\(^11\). Based on a therapist's suggestions for change, hypnosis can lead to changes in a patient's sensation, perception, cognition, affect, mood or behaviour\(^12\). Hypnosis-derived communication consists of using communication techniques derived from clinical and medical hypnosis without inducing an altered state of consciousness in the patient like formal hypnosis\(^13\). Hypnosis and hypnosis-derived communication mainly rely on the child's imagination and the healthcare professional’s adapted language without requiring any additional support materials. This makes them applicable in a wide range of settings and unplanned situations (e.g., emergency units).
Previous studies in pediatric oncology have shown that hypnosis and hypnosis-derived communication are effective in reducing young patients’ pain\textsuperscript{14-25}, distress\textsuperscript{14, 17-22, 25}, anxiety\textsuperscript{14, 15, 17-22, 24, 26} and fear\textsuperscript{16} during painful medical procedures. Typically, these were small-medium scale quantitative studies (n=18-80, with or without control groups). These were limited as they did not provide a formal evaluation (i.e., standardized tool) of behaviours and skills demonstrated by professionals. Additionally, hypnosis and hypnosis-derived communication have been used in different medical settings in pediatrics as well as during various medical procedures: burn care procedures\textsuperscript{27}, transesophageal echocardiography\textsuperscript{28}, noninvasive positive pressure ventilation\textsuperscript{29}. Interestingly, they were beneficial to both the patients\textsuperscript{27, 29} and the procedure routine (e.g., time and anesthesia)\textsuperscript{28, 29}.

Most studies in pediatrics involve two professionals, with a professional providing the “hypnosis talk” while a healthcare professional performs the procedure. For organizational reasons, this is not easily implemented in pediatrics and is not feasible as the system lacks highly trained professionals to provide the “hypnosis talk”. As nurses have a variety of important roles, including providing care and acting as a resource for their young patients and families, it would be highly beneficial if nurses could implement simple hypnotic communication techniques while performing medical procedures.

A previous feasibility study showed that, following a brief twenty-hour training, pediatric nurses developed a good mastery of hypnosis-derived communication.\textsuperscript{30} Interestingly, another analysis showed that these communication behaviours were associated with a decrease in patients’ pain and distress.\textsuperscript{25} The results were promising but the satisfaction study conducted with the nurses who participated in the hypnotic communication training also stressed the need for changes in the
content (e.g., learning only one or two techniques) and format (e.g., shorter training with role-
playing and videos).\textsuperscript{30}

Based on this experience, we wished to simplify and refocus this training. We developed a
preliminary version of \textit{Rel@x} and led a refining study, in line with current guidelines in program
development.\textsuperscript{31} Our specific aims were: (1) to develop a focused and shorter training in hypnosis-
derived communication for pediatric nurses; (2) to pretest the training in hypnosis-derived
communication with experienced pediatric oncology nurses; (3) to refine the training based on a
systematic collection of nurses’ suggestions.

\textbf{2. Methods}

The study was conducted at Sainte-Justine University Hospital Centre (Sainte-Justine
UHC) in Montreal, Quebec, Canada. Ethical approval (#2019-2205) was obtained from the Sainte-
Justine UHC Research Ethics Committee. All participants provided written informed consent.

\textbf{2.1 Training development: Rel@x}

The \textit{Rel@x} training program was designed to train hypnotic communication skills to be
directly applicable to nurses’ daily practice. The training was adapted from the one previously
studied by our research team\textsuperscript{25, 30, 32, 33}. It was developed from the literature on clinical hypnosis: a
book on the practice of hypnosis in pediatrics\textsuperscript{34} and a guide on hypnotic metaphors and
suggestions\textsuperscript{35}. Key concepts were selected by the research team with a special input by the second
author (DO, psychologist and hypnotherapist, member of the Quebec Hypnosis Society).

In order to offer the same content uniformly across all trainees, to promote the training
systematization and to allow its subsequent dissemination, the program was manualized (current
manuals available here: \url{http://hdl.handle.net/1866/25349}). The \textit{Rel@x} training consists of two
parts: one related to relational aspects and another one presenting two selected hypnotic communication techniques whose efficacy is supported by the evidence (“pleasant place” or “magic glove”)\(^{34,36}\). In its current version, participants may choose one of the two techniques they wish to be trained in first and -pending on organizational and budget constraints- they may follow an additional module to learn the second technique. The training is highly interactive and calls for role-play as well as viewing and criticizing videos. The training includes two 4-hour sessions: one session on the introduction to hypnotic communication and the relational aspects, and one specialized session on the chosen technique. If a second technique is taught, this adds 4 hours, i.e., a 12-hour training globally. For this refinement study, in order to collect feedback on the whole training material, we offered training in both techniques (“pleasant place” and “magic glove”) to the group and thus added one additional session (12 hours in total, see Figure 1).

**Figure 1.** Rel@x training program: hypnotic communication techniques training sessions content

The relational session is theoretical and practical. Its objectives are to familiarize participants with the definition of hypnotic communication, the notion of synchronization, reframing techniques as well as direct and metaphorical suggestions derived from clinical hypnosis (see Appendix of the previous report\(^{32}\)). At the end of the session, two techniques are presented: (1) the “pleasant place”, which consists of suggesting that the child visit a pleasant place using his or her five senses and imagination\(^{34}\) and (2) the “magic glove”, which consists of suggesting to the child that his or her arm is being protected by an imaginary protection\(^{34, 37}\).

The first relational part of the training is a prerequisite for the technical part which has two main learning objectives: learning simple language derived from clinical hypnosis and learning
how to detect cues of the desired effects in the patient. The second technical part allows for the learning of the techniques’ scenarios and their application in daily practice. 

Rel@x uses tools and videos: (1) manuals, (2) cue card reminders, (3) visual aids (PowerPoint) and (4) videos illustrating how both hypnotic communication techniques are used by nurses in practice. At the end of the training, it is possible for participants to view a synthesized version online via an e-learning platform available through our healthcare centre (https://enseignement.chusj.org/fr/Formation-continue/Autoformations-(e-Learning)/Liste-des-cours-offerts/Rel@x).

Two trainers are necessary to ease with role-play and practical exercises. Both trainers hold a background in psychology, the senior is a psychologist and hypnotherapist (DO) while the junior is a doctoral graduate student trained in clinical and medical hypnosis (JA).

2.2 Training pretest and improvement

To refine Rel@x, we conducted a complete training cycle with voluntary experienced nurses from Sainte-Justine UHC’s pediatric Hematology-Oncology Department.

2.2.1 Participants

The study protocol and the training program were presented during a meeting between the research team and Sainte-Justine UHC’s Hematology-Oncology Department nursing staff supervisors. Following this meeting, the supervisors informed the nursing staff of the opportunity to receive a training in hypnotic communication to develop their skills to reduce their patient's pain and distress. Seven nurses volunteered to take part in this refinement study. To participate in the study, nurses had to: (1) have routine clinical activity involving venipuncture with children, and (2) have no prior training in hypnosis or hypnosis-derived communication.
2.2.2 Procedure

This study design is a mixed method based on an evaluation questionnaire and a post-training focus group interview to assess the acceptability and satisfaction of the training for pediatric nurses. Firstly, nurses took part in the training sessions which occurred in July 2019 (relations aspects and pleasant place technique) and February 2020 (magic glove technique). Seven (7) nurses completed the relational session. Two of them were not available to complete all of the training sessions due to work schedules. Six (6) participated in the “pleasant place” training session and five (5) completed the “magic glove” session.

The 5 nurses who completed all the sessions were invited to respond to an evaluation questionnaire. They were also invited to take part in a one-hour semi-structured focus group interview to collect their feedback on the training content, format and materials as well as their suggestions for improvement. The focus group was audio-recorded and fully transcribed for further analysis.

2.2.3 Measures

Evaluation questionnaire: We collected participants’ age, level of education, number of years of clinical experience, number of years of clinical experience in pediatrics, and professional curriculum. To evaluate the training program, the research team developed a questionnaire adapted from previous studies\(^3^8\) (see Supplementary File 1). This 16-item questionnaire explored 4 domains: relevance and acceptability (5 questions), use of hypnotic communication (5 questions), expected effects (5 questions) and suitability for implementation in hospital settings (1 question).
Responses were provided on a 6-level scale: "1" strongly disagree and "6" strongly agree. Space was also available after each category to allow nurses to provide additional comments.

*Focus group interview:* At the end of the study, a semi-structured focus group interview was conducted with the nurses to discuss the seven following topics: (1) their motivation to participate in the training, (2) the use of hypnotic communication, (3) their perceived personal benefits, (4) the training program’s relevance and acceptability, (5) their training satisfaction and training assessment (positive and negative aspects), (6) their suggestions for improvement (content, format, materials) as well as (7) the integration of hypnotic communication in hospitals.

### 2.2.3 Analyses

Quantitative data were analyzed using descriptive statistics in *IBM SPSS Statistics 26*. For the qualitative data from open-ended questions (*evaluation questionnaire*) and the focus group, we used emergent thematic analyses. The first two authors followed these steps: (1) transcript coding by two authors separately (JA, DO), (2) first meeting to discuss the list of themes and reach a consensus on themes selection and description, (3) transcript recoding based on this consensus and (4) second meeting to discuss themes and reach the final coding structure. For the sake of brevity, we will use quotes when they add to the understanding of themes. When presenting the results, participants will be identified using alphanumeric codes (N1 to N7).

### 3. Results

#### 3.1 Participants
The five nurses who followed the whole program all had a bachelor’s degree in nursing and, on average, were 27.2 ± 1.3 years old and had 5.9 ± 2.3 years of clinical experience (all in pediatrics). Two nurses (N3 and N5) were unable to complete the whole program.

3.2 Quantitative data

In regards to the training program evaluation questionnaire, ratings were overall positive. Items pertaining to relevance and acceptability were rated positively (median average of 5.4/6), although they found the manuals to be moderately easy to use (4.2). In general, nurses positively rated the use of hypnotic communication (median average of 5.2), even though they moderately agreed that the intervention would be simple to use in their daily practice (4.2) and that it is easily integrated for a layperson (4.0). Nurses also positively evaluated the expected effects for patients (median average of 5.4), though they moderately agreed that hypnotic communication allows for a better control of their own emotions during procedures (4.4). Finally, nurses thought it would be beneficial to extend this practice in a hospital setting (5.6) (Table 1). Although these results are encouraging, we found far more detailed information for future refinements in the qualitative data.

Table 1. Average score of nurses’ responses to the Rel@x training program evaluation questionnaire (5 nurses participated in the entire pre-test)

3.3 Qualitative data

The qualitative data presented below stem from the focus group conducted with the nurses and their written comments in the evaluation questionnaire. Two central themes emerged from the focus group’s verbal material and the open-ended commentaries section: perceptions of hypnotic communication and evaluation of the Rel@x training program. The verbatims reported in the
following lines are all from the focus group. Full thematic trees from the emergent thematic analysis are available in Figure 2.

**Figure 2a.** Theme 1: Perceptions of hypnotic communication

**Figure 2b.** Theme 2: Evaluation of the Rel@x training program

### 3.3.1 Perceptions of hypnotic communication

#### 3.3.1.1 Perceived benefits and inconveniences for patients

Nurses reported several benefits for patients but did not mention any inconvenience. In general, they believed that hypnotic communication would provide an alternative to the medications, which they said they frequently use in their practice, and be beneficial for patients and their families (e.g., brings calmness to the patient, beneficial for patients’ quality of life, improves parents' experience, etc.). Participants mentioned that this style of communication would allow patients to relax, and that this could help reduce their pain. Additionally, nurses mentioned that hypnotic communication could improve patients’ anxiety at different levels, including direct anxiety, anticipatory anxiety, and traumatic anxiety. Some nurses also expressed that hypnotic communication allows for the child’s creativity.

“I think it will have benefits other than pain because by doing this with the patients you will bring them to be able to be mindful and then they will be able to become fully aware, they will be happier in their life and more positive.” (N2, focus group)

#### 3.3.1.2 Perceived benefits and inconveniences for nurses

In general, nurses noted several benefits for themselves. They highlighted multiple positive changes in their nursing practice such as having an additional tool that allows for the management
of patients' procedural pain and distress, more reflection, changes in the words used with patients:

“I am more careful with my words...not to use negative words” (N7, focus group). Nurses also expressed several additional benefits for the nursing personnel. Some nurses mentioned that hypnotic communication allows for the management of their own anxiety since they used hypnotic techniques, such as breathing techniques, for themselves. Hypnotic communication also allowed some nurses to develop their patience and improve the collaboration with the patient. Some participants reported that hypnotic communication broke the existence of this nurse-patient repetitive routine since the training allowed them to become aware of the fact that they have a routine that tends to trivialize certain medical acts that may in fact be traumatic for young patients. Nurses mentioned that telling stories as part of the hypnotic techniques had an impact on their own personal well-being. They expressed that with hypnotic communication, they felt that they could play at work, despite the oncology setting. The use of hypnotic communication allowed their work to be more enjoyable: “when we bring our patients into the imaginary, we often have better days...” (N1, focus group). In contrast, one participant did not notice any difference in herself, and another mentioned an inconvenience regarding the anxiety-provoking effect she felt during role-plays.

3.3.1.3 Use of hypnotic communication in nursing practice

Overall, nurses reported that such communication practice will be pertinent, and beneficial for patients. Some mentioned the effect would primarily be on anxiety or anticipatory anxiety. They mentioned that all nurses in hematology-oncology should be trained to uniformly support patients. The idea to train all healthcare professionals and expand this practice in other pediatric settings was also mentioned in the focus group. They underlined the impact of this form of communication on their work experience. Hypnotic communication was described as enjoyable,
feasible (although it could be time-consuming at times), simple to use and easy to integrate in
one’s practice. They underlined the pleasure of learning relational aspects. Interestingly, some
nurses realized after the training that they had naturally been using some similar techniques. Nurses
also expressed that it seemed feasible to perform a procedure alone while using hypnotic
communication techniques, and that they would feel comfortable doing so in their future practice.
Participants mentioned that, before the training, there were disagreements in the group about the
magic glove’s efficacy. Following the training sessions, they reported that the magic glove would
be faster and easier to master than the pleasant place. Nurses also agreed that using hypnotic
communication would require a high level of technical skills so that the nurse’s attention could be
primarily focused on communication and not on the technical aspects of the care. Though, they
reported it would be positive to expose young nurses even though they may have difficulties using
these communication techniques. Reservations expressed by participants dealt with the fact that
they needed practice to integrate this form of communication in their toolbox and that some
participants were not convinced it could be used when performing complex procedures that require
all their attention, especially if the child is young. In these complex situations, two nurses could
be required, one providing the hypnotic communication talk while the other would perform the
technical procedure. Nurses also expressed having difficulty assessing the unique effect of
hypnosis-derived communication on children’s pain as compared to anxiety or other aspects.

“I think that the rest of the team really needs to be sensitized... (...) we're like eighty nurses
in hematology-oncology. We're seven trained nurses (...) it's all good if we do it, but the rest of
the time when it's other practitioners who do the interventions and who don't have these tools, I
think it can remain (...), if we do it and the next time it's someone else who doesn't have the tools
to reuse the technique, it's going to be traumatic again.” (N1, focus group)
3.3.2 Evaluation of the Rel@x training program

3.3.2.1 Positive perceptions

Overall, nurses were satisfied with the training that met their expectations. They specified that both hypnotic techniques they learned were important, and felt that the magic glove was more adapted for their younger patients. Importantly, they mentioned they would not need additional training sessions but would be happy staying in contact with the trainers to get some quick support if needed. They judged the training as adequate for training pediatric nurses in hypnotic communication. Participants reported that the training had enough theoretical elements and that examples were essential, as were role-play and live practising. They felt that trying the hypnotic communication techniques allowed them to be more receptive. Participants also expressed a preference for live interactions and exercises during the training sessions. They were satisfied with the progressive nature of the training since it allowed them to break down the techniques. The training format introducing relational principles before techniques that took place in distinct sessions was also positively judged. They globally found the number of sessions was sufficient and appreciated that the training would take place over separate days (at least 2) as this allowed to practise between sessions. Both techniques were also evaluated as useful and complementary. They found the tools simple, useful, and pertinent, specifically the paper manual and the video recordings. Finally, nurses also raised several elements related to the practical aspects of the training, appreciating working in a small group in a supportive non-judgmental environment. They specified that a maximum of 7 to 10 participants would be adequate for future sessions.
“I think it was facilitating. That allowed us to like...take the time to listen to others how they were doing, take the time (...) with you, interact and see what we were doing right and what we were doing wrong versus if we had been a bigger class, I think we would have had less time to take that kind of attention (...).” (N1, focus group)

3.3.2.2 Negative perceptions

As for the content of the training, several nurses found that the pleasant place technique took too much time to be easily implemented in practice and that it could be difficult to feed the imaginary process. Some participants found that suggested written scenarios were a bit long, and that some videos were not fully realistic (indeed some videos used for training involved actors). Nurses also expressed that the manuals were not the training’s most significant aspect. Finally, some participants reported they found little use for the manual itself and the suggested verbal scenarios, recognizing these could be useful to others though.

“I am a person who has imagination in life, but there comes a time when in the pleasant place there was nothing that came to my mind!” (N2, focus group)

3.3.2.3 Suggestions for improvement

When asked about improvements for the Rel@x training, nurses suggested a series of measures. A table summarizes their suggestions for improvement and the subsequent modifications made to the training. In rare cases the research team decided not to follow these suggestions (Table 2).

Table 2. Nurses’ suggestions for the Rel@x training program’s improvement
In summary, participants expressed the need for cue card reminders in a small format to help them when they are at their patients' bedside. For some, this could even replace the paper manuals. The nurses also insisted on having keywords attached to or replacing the verbal scenarios, as these may be easier to integrate, and perhaps include words and suggestions to use and others to avoid. All participants also wished the training to have even more role-plays, demonstrations, and exercises, and some involving the two trainers, as these would be more engaging and give them ideas on how to proceed with the use of the techniques. They wished to have some kind of supervision when implementing the techniques with patients. They also suggested rearranging when and how the videos are used. These should be discussed after a technical presentation and be sectioned by steps. They also suggested that videos should exemplify real interactions and that they could participate in building additional training material involving nurse-patient interactions.

As for the existing videos, nurses suggested that the camera should zoom in when the professional puts the magic glove on the child's arm. Suggestions were also made on having more time between sessions on relational aspects and the hypnotic technique (2 to 4 weeks ideally) to offer more opportunities to practise the relational principles. Finally, some nurses suggested that the training should provide counter-examples: “(...)...it could even include counter-examples (...) you see in this situation it didn't work. (...).” (N4, focus group).

Following these suggestions, a series of changes were made to the training to improve its pertinence, acceptability, and use in practice. In summary, we decided to add more practical components to the training program (e.g., exercises, examples, role-plays, etc.) as well as dedicate more time for practice. We also provided additional tools to participants (cue card reminders, keywords, virtual e-learning recap module) and more time was added between relational and technical sessions (at least two weeks).
This led to the revised version of the Rel@x training being currently pilot-tested in our centre. The training manual (French and English versions) and additional supporting material are available here: http://hdl.handle.net/1866/25349.

When comparing results from the quantitative and qualitative data, we observed that some quantitative low scores are now explained by concrete constructive criticism. For example, nurses’ assessment of the manuals’ ease of use can be explained by the fact that some nurses found little use for the manuals themselves and their content (i.e., the suggested verbal scenarios). Also, nurses moderately agreed that hypnotic communication was simple to use and easily integrated for a layperson. This can be explained by the fact that nurses mentioned that the pleasant place technique was somewhat complex to integrate in their clinical practice. Additionally, nurses moderately agreed that hypnotic communication benefits them when performing medical procedures. This can be explained by the fact that some nurses mentioned benefits while others did not.

4. Discussion

This study aimed to develop a preliminary version of Rel@x, a training in hypnosis-derived communication for pediatric nurses to prevent children’s procedural pain and distress as well as lead a refining study. Specifically, this study aimed to develop a brief training in hypnosis-derived communication for pediatric nurses, to pretest the training with experienced pediatric oncology nurses and refine the training based on nurses’ suggestions.

Regarding the development of Rel@x, the training focuses on relational aspects and two hypnotic communication techniques. We refined the training through quantitative and qualitative evaluations that led to changes based on nurses' suggestions. The final version of Rel@x resulting
from this study is thus a collaborative effort between our research team and the end-users. Additionally, the training is rather inexpensive being a group training, and relying on an e-learning module: costs are limited to the teaching staff (one hypnotherapist and one assistant) and time compensation of participants.

As in our feasibility study, nurses generally rated the training positively. This similarity between our two studies may be explained by participating nurses' openness to using non-pharmacological interventions and their desire to develop new skills in pediatric procedural pain management.

The focus group and the open-ended questions shed light on nurses' perceptions of hypnosis-derived communication. Regarding the perceived benefits and inconveniences for patients, nurses felt that patients could only benefit from the use of this non-pharmacological intervention, which is consistent with the fact that findings on adverse effects related to hypnotic interventions for pediatric procedural pain management are rare. In line with the literature on the use of hypnosis with children, our study also shows that nurses noticed that this non-pharmacological intervention is beneficial for the parents of sick children. Seeing their children undergo painful procedures can be difficult for parents and affect their ability to support and protect them. It is also possible that the nurses' previous experience when caring for sick children and their families raised the need to use such pain-targeted interventions that can address both children's pain and parents' experience.

Regarding the perceived benefits and inconveniences for nurses, the focus group highlighted several changes in the nursing practice, such as the addition of a tool for pain and distress management and the development of communication competencies (e.g., changes in the words used, use of positive words). Our study showed that hypnosis-derived communication also...
could benefit nurses' quality of life at work and their well-being, as our participants reported several additional benefits for themselves. Working in pediatric oncology can be challenging for nurses as they are exposed to many stressors and are at risk of suffering from various psychological disorders such as compassion fatigue and burnout. It would appear that the use of hypnosis-derived communication in their clinical practice has the potential to improve their quality of life at work. This result was found in anesthesia departments, where healthcare professionals practising hypnosis were shown to be less prone to suffer from burnout. It would be interesting for future studies to explore the impact of using hypnosis-derived communication on pediatric nurses' mental health.

In regards to the use of hypnosis-derived communication, participants reported that this intervention is simple to use, enjoyable, feasible, easily integrated (especially the magic glove) and that they would be comfortable using it in their practice. Other research teams have studied the successful implementation of physician and nurse-led complementary and alternative medicine, such as hypnosis, in pediatric healthcare settings. For several years, some authors have believed that hypnotic interventions should be used by all nurses and that if these interventions were medications, they would be part of the standard care. Our focus group revealed that nurses also shared this perception and believed that all healthcare professionals should use hypnotic communication in their practice.

Participants' feedback is crucial when developing new non-pharmacological interventions. The focus group showed that nurses were satisfied with the training and that it was adequate for training pediatric nurses. Participants mentioned that they appreciated all the practical components (e.g., examples, role-plays, live practising) and the progressive learning as well as having the opportunity to learn both techniques. Considering that nursing students and licensed nurses learn
effectively by engaging in simulations\textsuperscript{49}, it is very likely that this type of training, is adapted to nurses’ needs and learning styles, as it allows both to visualize and to practice these techniques among colleagues. Role-playing is a commonly used strategy in nursing and healthcare education.\textsuperscript{50, 51} However, nurses expressed that the pleasant place technique was more complex to use (e.g., took too much time and imagination) and mentioned that some tools were less adapted (e.g., scenarios were too long, unrealistic videos). It is possible that nurses’ professional experience had an influence on their perception of the pleasant place technique. As pediatric nurses, they have to take on multiple roles challenging their attentional capacities\textsuperscript{52} and they may prefer quicker and easier techniques.

An important aspect that emerged from the focus group and the open-ended questions were the suggestions for improvement, particularly in terms of practical aspects, the materials used and the time allocated between the different sessions. On the one hand, the suggestions for improvement showed the nurses’ interest in wishing to master the hypnotic skills by suggesting adding more practical components and time between sessions to allow for practice. On the other hand, it also may underline the need to adapt the materials so that nurses can master the techniques in their own way. Using keywords or cue card reminders rather than a pre-set scenario allows nurses to make the hypnotic techniques their own and, more importantly, to be able to adapt these techniques to each patient easily and quickly.

Some limitations must be recognized and considered when interpreting the results. First, the sample was limited. We recognize that refining such complex training is an ongoing process. It is possible that a larger sample size might have revealed complementary perceptions of the training and additional suggestions for improvement. We aimed to reproduce the actual context of the training sessions in order to obtain their evaluation on the program as it would be taught.
Furthermore, this study was conducted in a single site based in a French-speaking province of Canada as well as in a single department. The evaluation and suggestions for improvement may differ from one hospital to another as well as from one department to another. Future studies should address these gaps by collecting feedback in other settings. Current pilot data are being collected in other settings than oncology in our centre (emergency wards, general pediatrics).

5. Conclusion

In conclusion, we developed a manualized training named Rel@x in hypnosis-derived communication for pediatric nurses to manage children’s pain and distress during painful medical procedures. We pre-tested the training with a group of nurses and collected their feedback. They globally reported positive experiences and judged the training as pertinent and acceptable. They suggested improvements for future versions. Based on their suggestions we developed the current version of Rel@x incorporating more exercises and role play, making available cue card reminders, and offering an e-learning program to support skill retention. The current version of Rel@x is currently being pilot-tested in our pediatric centre aiming at assessing trainability, determining the size of outcomes following training, and build intervention capacity for future efficacy trials. To further evaluate this training and study its effects, we will need to build capacity in several departments and across institutions. We plan to offer the revised training in a number of partnering institutions as part of this evaluation process.

Acknowledgments
The authors wish to thank all the nurses who took part in this study and helped improve the Rel@x training program as well as the authors and nurses who participated in the previous feasibility study.

Declaration of interests

The authors declare no conflict of interests.
References


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38. Ogez D, Bourque C-J, Péloquin K, et al. Definition and improvement of the concept and tools of a psychosocial intervention program for parents in pediatric oncology: a mixed-methods


Figure 1. Rel@x training program: hypnotic communication techniques training sessions content

Session 1
- Introduction to hypnotic communication
  - Non-verbal aspects
  - Verbal aspects
  - Presentation of both techniques

Session 2
- Learning the technique’s hypnotic language and hypnotic phenomena
- Using the hypnotic communication technique during a medical procedure

Choice of a technique

(1) Pleasant place
- Hypnotic communication definition
- Training in the synchronization technique
- Training in reframing techniques as well as direct and metaphorical suggestions
- Presentation of both techniques: (1) Pleasant place and (2) Magic glove

(2) Magic glove
Table 1. Average score of nurses’ responses to the Rel@x training program evaluation questionnaire (5 nurses participated in the entire pre-test)

<table>
<thead>
<tr>
<th>Themes</th>
<th>M</th>
<th>(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Program relevance and acceptability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequate</td>
<td>5.4</td>
<td>(0.55)</td>
</tr>
<tr>
<td>Enough sessions</td>
<td>5.4</td>
<td>(0.55)</td>
</tr>
<tr>
<td>Enough theoretical elements</td>
<td>5.2</td>
<td>(0.45)</td>
</tr>
<tr>
<td>Enough practical exercises</td>
<td>5.6</td>
<td>(0.55)</td>
</tr>
<tr>
<td>Easy-to-use manuals</td>
<td>4.2</td>
<td>(1.10)</td>
</tr>
<tr>
<td>2. Hypnotic communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suitable for painful procedures</td>
<td>5.4</td>
<td>(0.55)</td>
</tr>
<tr>
<td>Simple to use in my daily practice</td>
<td>4.2</td>
<td>(0.84)</td>
</tr>
<tr>
<td>Easily integrated for a layperson</td>
<td>4</td>
<td>(0.71)</td>
</tr>
<tr>
<td>Improved my practice</td>
<td>5.2</td>
<td>(0.45)</td>
</tr>
<tr>
<td>Should be used in all pediatric hospitals</td>
<td>5.6</td>
<td>(0.55)</td>
</tr>
<tr>
<td>3. Expected effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foster the relationship with the child</td>
<td>5.4</td>
<td>(0.89)</td>
</tr>
<tr>
<td>Reduce the child’s pain</td>
<td>5.2</td>
<td>(0.84)</td>
</tr>
<tr>
<td>Reduce the child’s distress</td>
<td>5.6</td>
<td>(0.55)</td>
</tr>
<tr>
<td>Reduce the child’s anticipatory anxiety</td>
<td>5.6</td>
<td>(0.55)</td>
</tr>
<tr>
<td>Reduce my own emotions during the procedure</td>
<td>4.4</td>
<td>(1.34)</td>
</tr>
<tr>
<td>4. Program implementation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has its place in a project in a hospital setting</td>
<td>5.6</td>
<td>(0.55)</td>
</tr>
</tbody>
</table>

*Total score out of 5. Responses were provided on a 6-level scale: “1” strongly disagree and “6” strongly agree.
**Figure 2.**
Full thematic trees

**Figure 2a.**
Theme 1: Perceptions of hypnotic communication
Theme 2: Evaluation of the Rel@x training program

2.1 Positive perceptions

Training in general
- Satisfied with the training
- Training adequate for nursing personnel
- Appreciated both communication techniques
- No need for additional sessions
- Enough theoretical elements, appreciated examples
- Appreciated practical exercises more than theory
- Practice makes participants more receptive to the techniques
- Future supervisors could benefit untrained nurses

Specific session content
- Relational aspects
  - Manual on relational aspects perceived as pertinent
- Magic glove
  - Satisfied with the technique
  - Easily applicable

Training format
- Group and training room
  - Small group adequate
  - Familiarity among healthcare professionals
  - Comfortable with a training group with their unit supervisors
  - Group size: maximum 7 to 10 participants
  - Group conviviality allowed them to share their experience
  - Adequate size of the training room
- Sessions
  - Enough sessions
  - Appreciated that the training took place in distinct sessions
- Practice, exercises and role-plays
  - Appreciated trying hypnotic techniques
  - Preferred live interactions/exercises
  - Satisfied with the progressive practice of hypnotic communication techniques
  - Used to practice among participants, role-plays
  - Appreciated changing partners in role-plays
- Material
  - Material used is simple
  - Videos are relevant
  - Manuals are adequate and useful (depending on the participant's preferred learning method)
  - Written scenarios are useful
- Time
  - Appreciated time between sessions (relational aspects and hypnotic techniques) to allow for practice
  - Appreciated taking time and not being in a hurry

2.2 Negative perceptions

Specific session content
- Pleasant place technique
  - Difficult to find what to say
  - Time for induction is too long
  - Difficult to implement in practice

Training format
- Scenarios are too long
- Videos may not be realistic and cause skepticism
- Too little time between sessions
- Manuals are not the significant aspects of the training
- Manuals and scenarios are not perceived as essential tools

2.3 Suggestions for improvement

Training in general
- Develop cue card reminders as complementary or an alternative to manuals
- Keywords could be used instead of the scenarios to ease implementation
- Exercises, examples and role-plays
  - Increase the use of role-plays (between trainers and between a trainer and a nurse) as an alternative to videos
  - More role-plays and few exercises
  - More examples, scenarios and demonstrations
- Clinical supervision and demonstrations
  - Offer clinical supervision after the sessions
  - Trainers could conduct demonstrations with patients
- Videos
  - Show videos during the session
  - Videos should be sectioned by steps
  - Videos should be more realistic; nurses would be willing to be recorded for future demonstrations

Specific session content
- Pleasant place
  - Offer more content to ease implementation
  - Include more practice and visualization
- Magic glove
  - “Zoom in on the video when the professional puts the magic glove on the child

Training format
- Time between sessions
  - More time between sessions to allow for more opportunities to practice, e.g., 2 to 4 weeks
- More concise and eco-friendly manuals
- Provide counter-examples (when techniques are not used properly, when techniques do not work)
Table 2. Nurses’ suggestions for the Rel@x training program’s improvement

<table>
<thead>
<tr>
<th>Themes</th>
<th>Nurses’ suggestions for improvement</th>
<th>Modifications and/or decisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General comments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercises, examples and role-plays</td>
<td>Add role-plays between the trainers as well as between a trainer and a nurse</td>
<td>Role-plays were added to each training session. Each technique session now includes 3.5 hours of role-play and demonstrations.</td>
</tr>
<tr>
<td></td>
<td>Add more role-plays between participants and live exercises</td>
<td>Role-plays between the nurses were added to each training session. Additional time was added to the live exercises in each technique training session to allow for more practice (Session 2).</td>
</tr>
<tr>
<td></td>
<td>Add more examples, scenarios and demonstrations</td>
<td>Additional examples, scenarios and demonstrations were added to each training session according to participants’ questions:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Session 1: when learning about verbal aspects as well as direct and metaphorical suggestions;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Session 2: when learning about the technique’s hypnotic language and when using the technique during a simulated medical procedure.</td>
</tr>
<tr>
<td>Clinical supervisions and demonstrations</td>
<td>Offer clinical supervisions</td>
<td>The training now offers the possibility of following an additional e-learning module that serves as a recap. Participants may also contact the trainers by e-mail for additional questions.</td>
</tr>
<tr>
<td></td>
<td>The trainers could conduct demonstrations with patients.</td>
<td>The training now offers the opportunity for the nurses to observe the trainers conduct demonstrations with actor-patients if requested.</td>
</tr>
<tr>
<td>Counter-examples</td>
<td>Provide counter-examples</td>
<td>Each training session now provides complex situations where hypnotic communication is not used properly.</td>
</tr>
</tbody>
</table>
2. Tools

<table>
<thead>
<tr>
<th>Tools</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cue card reminders</strong></td>
<td>Provide cue card reminders</td>
<td>Cue card reminders were added for each hypnotic communication technique.</td>
</tr>
<tr>
<td><strong>Keywords</strong></td>
<td>Have keywords instead of a scenario</td>
<td>To facilitate the integration and implementation of hypnotic communication in nurses’ clinical practice, all verbatims were kept in the manuals. Keywords are now used in the cue card reminders available to nurses.</td>
</tr>
<tr>
<td><strong>Videos</strong></td>
<td>Preferable not to show the videos before the session</td>
<td>Videos are now shown during the training sessions.</td>
</tr>
<tr>
<td></td>
<td>Have videos sectioned by steps</td>
<td>Current videos were modified and are now sectioned by steps.</td>
</tr>
<tr>
<td></td>
<td>Offer more realistic videos</td>
<td>More realistic videos with nurses and patients are currently being produced and will be inserted in the final training version.</td>
</tr>
<tr>
<td><strong>&quot;Pleasant place&quot; training session</strong></td>
<td>Add more content, practice and visualization</td>
<td>The &quot;pleasant place&quot; training session now offers more theoretical content as well as more opportunities to practise and visualize the hypnotic technique being used.</td>
</tr>
<tr>
<td><strong>&quot;Magic glove&quot; training session</strong></td>
<td>In the video, zoom in when the professional puts the &quot;glove&quot; on the child.</td>
<td>No modifications were made to the video since the focus is actually on the words used by the professional, not how he puts the &quot;magic glove&quot; on the child’s arm.</td>
</tr>
</tbody>
</table>

3. Format

<table>
<thead>
<tr>
<th>Format</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time between sessions</strong></td>
<td>Add more time between sessions (relational and technical aspects)</td>
<td>Additional time was added (2 to 4 weeks) between relational and technical sessions.</td>
</tr>
<tr>
<td><strong>Concise and eco-friendly manuals</strong></td>
<td>Offer more concise and eco-friendly manuals</td>
<td>The training now offers cue card reminders as well as a virtual e-learning recap module.</td>
</tr>
</tbody>
</table>
Rel@x training program evaluation

Participant ID: __________________________

☐ Post-training questionnaire

Since you have followed the Rel@x training program, please report your perception of the training by completing the following questionnaire. Place your response on the grid to the right: "1" means you strongly disagree and "6" means you strongly agree.

### I. Program relevance and acceptability

*Overall, the training program ...*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) is adequate to train a nurse in hypnotic communication.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2) has enough sessions to learn hypnotic communication.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3) proposes enough theoretical elements to learn hypnotic communication.</td>
<td></td>
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<tr>
<td>4) proposes enough exercises to practice hypnotic communication.</td>
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</tr>
<tr>
<td>5) offers easy-to-use manuals.</td>
<td></td>
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</tr>
</tbody>
</table>

*Comments regarding the program’s relevance and acceptability:*
II. Hypnotic communication

According to you, the practice of hypnotic communication ...

1) is suitable for painful procedures.
2) is simple to use in your daily practice.
3) is easy to integrate for a layperson.
4) improved your practice considerably.
5) should be used in all pediatric hospitals.

III. Expected effects

According to you, the practice of hypnotic communication is likely/has allowed you ...

1) to foster the relationship with the child during the procedure.
2) to reduce the child's pain.
3) to reduce the child's distress.
4) to reduce the child's anticipatory anxiety.
5) to reduce your own emotions during the procedure.
Comments regarding the program's effects:

Additional comments on the program:
As you have completed this training, do you need any additional supervision or support? If so, how much? Please explain.
IV. Program implementation

In your opinion, regarding the program’s implementation,...

1) This training is appropriate in a university hospital setting.

Comments regarding the program’s implementation:

We thank you sincerely for your participation!