Impact of educational strategies on pain control quality indicators at a tertiary hospital

Impacto de estratégias educativas nos indicadores de qualidade do controle de dor em um hospital de alta complexidade

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DOI 10.5935/2595-0118.20200197

ABSTRACT

BACKGROUND AND OBJECTIVES: Pain management by the multidisciplinary team remains a challenge in the health field. The aim of this study was to analyze the impact of educational strategies for the implementation of pain as the fifth vital sign and its management in a highly complex hospital.
METHODS: An interventional non-controlled study analyzed three different sequential educational processes: Pain training week (PW), educational visits by the pain nurse to guide professionals in relation to pain management and e-learning. The impact of the educational strategy was assessed through pain as the 5th vital sign and adequate pain management.
RESULTS: For pain as the 5th vital sign, the audit previous to PW showed a median of compliance of 46.4% at the inpatient unit, 53.1% at the maternity ward and 16.7% at the emergency room. In the evaluations after PW, the median of compliance at the inpatient unit was 78.4%, at the maternity ward 79.62% and at the emergency room 32.9% ($p<0.05$). There was an improvement in pain management in all hospital sectors after subsequent training ($p<0.05$).
CONCLUSION: The implementation of a continuing education program has improved pain care assistance and increased compliance to the institutional pain protocol.
Keywords: Education continuing, Pain, Quality management, Signs and symptoms

RESUMO

JUSTIFICATIVA E OBJETIVOS: O manejo da dor pela equipe multidisciplinar continua como um desafio na saúde. O objetivo deste estudo foi analisar o impacto de estratégias educacionais para efetivação da dor como 5º sinal vital e seu gerenciamento em um hospital de alta complexidade.
MÉTODOS: Estudo não controlado de intervenção por meio de análise de três diferentes estratégias educativas sequenciais: Semana de treinamentos sobre Dor (SD), visitas educacionais pelo enfermeiro da dor para orientar os profissionais em relação à dor e treinamento eletrônico virtual de revisão. A análise do impacto das estratégias educativas foi realizada por meio de indicadores em relação à dor como 5º sinal vital e tratamento adequado da dor.
RESULTADOS: Na avaliação da dor como 5° sinal vital, a auditoria prévia à SD mostrou mediana de conformidade de 46,4% na unidade de internação, de 53,1% na maternidade e de 16,7% no Pronto Socorro. Nas avaliações após a SD, a mediana de conformidade na unidade de internação foi de 78,4%, na maternidade de 79,62% e no pronto atendimento de 32,9% ($p<0,05$). Houve melhora no tratamento da dor em todos os setores após avaliações subsequentes aos treinamentos ($p<0,05$).
CONCLUSÃO: A implantação de um programa de educação continuada se mostrou efetivo em promover melhora na assistência no cuidado ao paciente com dor e dos resultados dos indicadores assistenciais em relação ao protocolo de dor institucional.
Descritores: Dor, Educação continuada, Gestão da qualidade, Sinais e sintomas.

INTRODUCTION

Problems related to the quality of health care and pain treatment result in damages that could be avoided and unnecessary increase in costs. Actions that seek to address these challenges and improve the management of pain in health care institutions should be more promoted and disseminated as validated tools[1].
Initiatives that aim to improve health care and the patient's safety frequently end up generating limited and not sustainable changes, which are not easy to replicate specially in diverse organizational contexts. The main barriers for the effective handling of pain are related to the health professionals, as well as to the system and processes of health care. The flaws in defining protocols and processes of pain treatment inside institutions, as well as the

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Submitted on June 3, 2020.
Accepted for publication on August 17, 2020.
Conflict of interests: none – Sponsoring sources: none.

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lack of technical expertise of health professionals and integrated multidisciplinary approach, have a decisive impact on the adequate care of patients with pain, even in developed countries[2,3].
Quality improvement of pain management is characterized by changes that directly or indirectly produce better and lasting health outcomes, encompassing standardized technical concepts and favoring interaction of processes and actions within a multidisciplinary context[4]. Pain control and the relief of suffering are the responsibility and commitment of the health professional. Due to the lack of knowledge in regard to effective doses, action time of the analgesics, available analgesic techniques and also the apprehension regarding respiratory depression, chemical dependence and other adverse effects, pain is not prioritized and treated adequately. The education about pain as a process oriented to the capacitation of the individual is capable of changing conducts and promoting actions committed to human care and well being. The handling of pain by a multidisciplinary team is still a challenge and the assessment of the impact of educational strategies is a tool for improving institutional pain protocols in an effective and lasting way.
The objective of this study was to analyze the impact of educational strategies in the enhancement of pain treatment and the establishment of pain as a fifth vital sign.

METHODS

A non-controlled, before-and-after, intervention study, conducted from May 2019 to April 2020 in a highly complex tertiary hospital in the southern part of São Paulo. After identifying weaknesses in institutional pain control from May to August 2019, three sequential educational strategies were implemented to establish pain as the 5th vital sign and improve the institutional process of pain control. The first educational strategy was the creation of the Week of Pain (WP), held in August 2019 and featuring a week of training for the health professionals of the institution: doctors, nurses, nursing technicians and physiotherapists, with a theoretical-practical focus. Ten training sessions/day were distributed in three shifts with 25 members in each.
Each 75-minute training was divided into 5 practical stations related to the inclusion of pain as the 5th vital sign, analysis of the analgesic ladder for pain treatment, pain measurement scales, adequate register in pain control chart and video about timings managed in the protocol and patient-centered care, comprising a total of 1187 health professionals.
In all stations the following were highlighted: routine pain intensity assessment for all patients using a verbal numeric scale (VNS); documentation of the occurrence of pain and its intensity for all patients; documentation of planned interventions for treatment and control of pain, as well as the period determined for reassessment.
The second strategy for improving the adherence to the pain protocol after WP was to establish daily visits by the pain nurse in the hospital unit, in order to evaluate patients that developed pain and guide professionals in relation to the management of pain and its assessment as 5th vital sign, the adequacy of pain assessment and reassessment of pain after medication.
Every week, each nursing team received at least one visit from the pain nurse for educational purposes. The nurse's visit in each hospital unit lasted approximately 3 hours and could be repeated depending on the individual assistance needs of each sector. This educational strategy was initiated immediately after the WP and lasted throughout the period of the study.
The third adopted strategy was the creation of a virtual electronic review training, available on all computers of the institution in January 2020, followed by a post-test in the tool itself, for knowledge evaluation by the professionals who conducted the training. The topics addressed in the review training were the same as those discussed in WP. This strategy was promoted four months after WP and included the same professionals. The post-test consisted of 10 multiple choice questions.
During the planning of the institutional pain protocol, all the monthly result indicators were displayed on information boards in the admission unit, keeping the teams aware of the process evolution.
The analysis of the impact of the educational strategy was carried out by the institution through process indicators, which began to be collected in May 2019 and obtained by means of a monthly audit of medical records. Regarding the pain indicator as the 5th vital sign, it was determined that the evaluation of this parameter by the VNS should be performed with all evaluations of the other vital signs, according to the periodicity of measurement in each different sector of the hospital. For the calculation of this indicator, the number of patients with pain evaluation as the 5th vital sign was considered in all performed measurements of vital signs divided by the number of patients included in the sample. For the indicator of adequate pain treatment, the evaluation process included characteristics of the registered pain, namely: type, location and intensity, timing of analgesic medication and time for pain reassessment after finishing the analgesic administration, as described in the institutional protocol. All these aspects were evaluated in order to assess compliance (Figure 1). In order to calculate this indicator, the numerator was considered as the

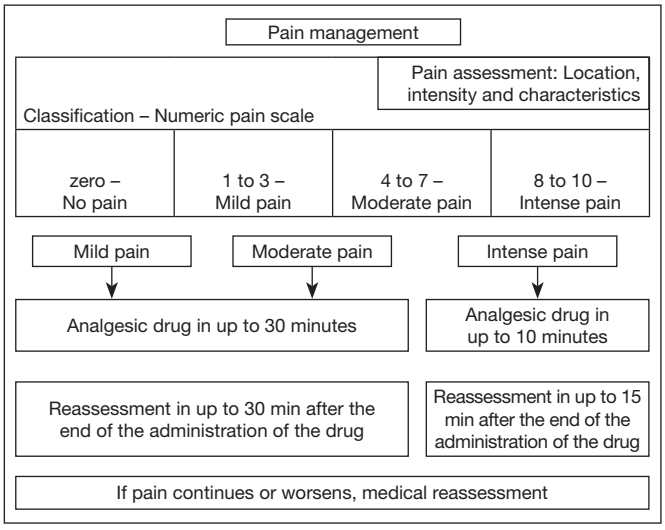

Figure 1. Instructions provided during training of the step's management for the pain protocol: timing for medication administration after pain assessment by visual numeric scale and timings for pain reevaluation according to intensity.

number of patients compliant with all the above-mentioned criteria divided by the number of patients included in the sample. The medical records audits were performed in the inpatient unit, maternity ward and emergency room.

The present research complies with the parameters of the Resolution No. 466 from December 12, 2012, of the *Conselho Nacional de Saúde / Ministério da Saúde* (Brazilian National Health Council / Ministry of Health) which regulates research involving human beings. This research was approved by the Institutional Research Ethics Committee (Opinion Number: 4,177,841; CAAE: 35498720.8.0000.0087).

Statistical analysis

To calculate the sample required for each indicator, a pilot study was conducted with 25 health professionals from the inpatient unit, who received training on the same topics covered in WP. The compliance rate for pain as the 5th vital sign/treatment one week before the training was 40% and, one week later, 63%. Considering a test power of 85% and alpha level of 0.05, the obtained sample was of 84 patients/month for each indicator. Thus, the pain indicator as the 5th vital sign was obtained with a monthly sample of 84 medical records divided equally between maternity, inpatient unit and emergency room. For the pain treatment indicator, the sample of 84 opportunities of pain treatment was considered, taking into account evaluation, timing for medication and reassessment for each opportunity in patients who presented pain. After analysis of distribution on the normality curve, the measure of central tendency and dispersion for the monthly indicators analyzed in the historical series was the median and percentiles 25-75%. The educational strategies were compared through the median of the pre and post implementation monthly indicators of pain quality. The Kruskal-Wallis analysis of Variance was used for multiple comparisons between the study periods delimited by the educational interventions that were performed, followed by the Dunn post-hoc test in the case of p-value <0.05. A confidence interval of 95% and p-value <0.05 were adopted as criteria of statistical significance. Statistical analysis was performed using the Statistical Package for Social Sciences 20.0 Mac (SPSS 20.0 Mac, SPSS Inc., Chicago, Illinois, USA).

RESULTS

The evaluation of pain compliance as 5th vital sign and treatment of pain after the WP showed a positive ascension in all sectors analyzed (Figure 2). In the evaluation of pain as the 5th vital sign, the audit previous to the WP in the 4 months preceding its event showed a compliance median of 46.41% in the inpatient unit, 53.1% in the maternity and 16.7% in the emergency room. In the evaluations after the WP, the compliance median was 78.4% in the inpatient unit, 76.6% in the maternity and 32.9% in the emergency room, with a significant statistical difference in all sectors one week after the WP.

In the evaluation of pain treatment, including pain assessment, medication timings and re-assessment, the inpatient unit showed a median of compliance of 38% before WP and 82% after (p<0.05). In the maternity ward, the median of compliance before WP was 49.4% and 78.4% after (p<0.05). In the emergency room, the compliance median was 42.04% in WP and 56.8% after (p<0.05). Comparing the period before the WP and the period after the electronic training, there was a statistically significant difference. However, comparing the period after WP and the period after the electronic training, there was no statistical difference in the percentage of compliance of the analyzed indicators (Table 1). The post-test notes performed at the end of the electronic training showed a median (25-75%) of 100 points (80-100) in the inpatient unit, 100 points (80-100) in the maternity and 80 points (65-100) in the emergency room, with statistically significant difference between the sectors (emergency room < inpatient/maternity; p<0.05) (Figure 3).

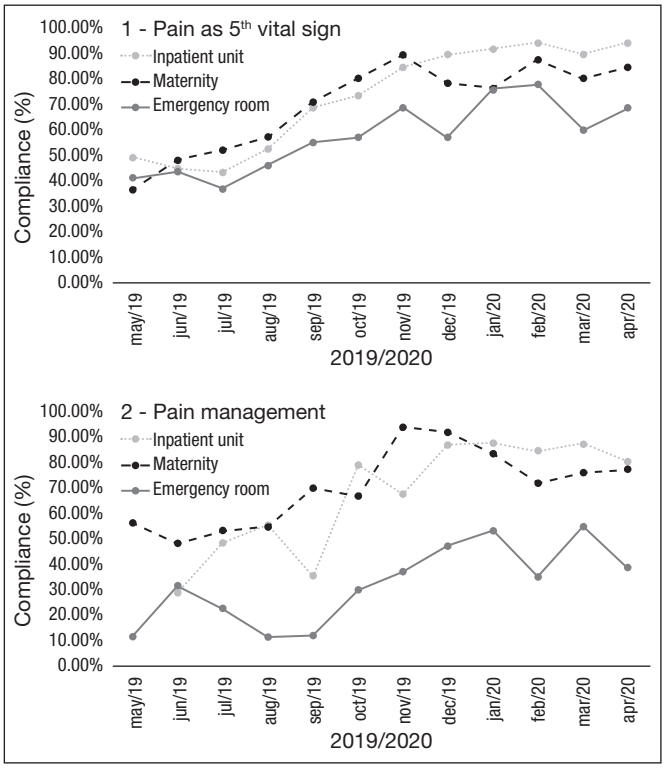

Figure 2. Compliance of pain as the 5th vital sign and of pain treatment

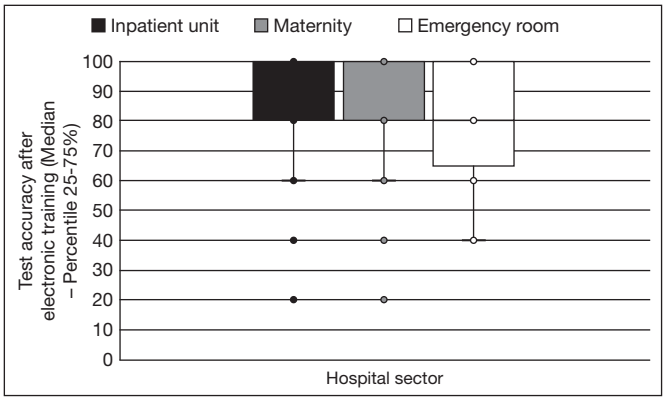

Figure 3. Boxplot: Median (25-75% percentile) of scores obtained in the multiple-choice test after electronic training

Analysis of Variance: (p=0,001) – Inpatient unit (100 [80-100]) = Maternity (100 [80-100]) > Emergency room (80 [65-100]).

Table 1. Compliance of indicators on 5th vital sign and pain treatment for the analyzed unit in each period

Inpatient unit		
Analysis period (A-B-C)	Pain 5th vital sign	Treatment of pain
Evaluation before WP (A)	46.4% (43.93-49.55)	38.0% (27-49)
Evaluation after WP (B)	78.4% (71.59-85.23)	82.0% (75-85)
Evaluation after electronic training (C)	92.0% (90.34-93.18)	84.0% (82-85)
p-value	p<0.001; C>A. B>A	p=0.02; C>A. B>A
Maternity		
Analysis period (A-B-C)	Pain 5th vital sign	Treatment of pain
Evaluation before WP (A)	53.1% (51.10-54.27)	49.4% (44.80 -52.57)
Evaluation after WP (B)	79.6% (68.13-90.97)	78.4% (75.57-81.82)
Evaluation after electronic training (C)	75.6% (73.96-77.69)	81.8% (78.41-84.66)
p-value	p=0.003; C>A. B>A	p<0.001; C>A. B>A
Emergency room		
Analysis period (A-B-C)	Pain 5th vital sign	Treatment of pain
Evaluation before WP (A)	16.7% (11.11-24.36)	42.0% (39.17-43.75)
Evaluation after WP (B)	32.9 (24.94-38.86)	56.8% (56.25-59.66)
Evaluation after electronic training (C)	45.3 (37.23-52.84)	71.8% (65.91-75.57)
p-value	p<0.001; C>A	p<0.001; C>A. B>A

Each analysis period comprised four months. Values expressed in median and percentiles 25-75%; WP = Week of pain.

DISCUSSION

The Health Care Improvement Science has gain prominence in the recent years and is described as a field of studies devoted to the development and evaluation of interventions for improvement of care, as well as explaining how these actions are developed and which factors are associated to the success of implementation and production of expected results[5-7].

This study showed that the implementation of a continuing education program, started during the WP, followed by the continuous education in the areas of care and periodic support through virtual training, followed by a test of knowledge, proved to be effective in promoting improvement in the care of patients with pain and in the results of the care indicators in relation to the institutional pain protocol, either considering the inclusion of pain as the 5th vital sign or the adequacy of pain treatment. Quality improvement projects that value the conception and implementation of incremental changes and the knowledge acquired are fundamental for the consolidation of care processes, which goes beyond technical-scientific knowledge. Such projects feature a broader scope, revealing a dynamic process of adjustments until the goal is achieved. A gradual shift in health education has been going on over the years, from a passive learning approach to a more active and interactive approach. To strengthen the environment of knowledge acquisition, educators need to be aware of different learning styles and thus adapt pedagogical strategies and methodologies that improve the learning process of each individual[8].

This research showed that educational strategies combined with the promotion of interactive training during WP, exhibition of flows and posters in strategic locations, in addition to the discussion about pain during the practice of care on an ongoing basis by the pain nurse, proved effective in improving the adherence of the care team to apply the pain protocol to its full extent.

The use of interactive dialogues, such as those held by the pain nurse with the care teams in the inpatient units, is a teaching dynamic which has been cited as a promising strategy for the development of competencies within a process of continuing education[9]. In this type of approach, the main focus is the dialogue between the facilitator and the professional in training. Moreover, the active participation of the health professional is valued[9]. The learning strategies occupy a significant space in cognitive psychology, especially in the theory of information processing. This is because cognitive theory has changed the concept of the teaching-learning process by no longer considering students as subjects who passively memorize what is presented by the instructor, and by understanding learning as an active process that occurs within the learner and that can be influenced by him[10]. In that sense, the results of strengthening the culture of adequate pain management are no longer dependent only on the information transmitted, but also on how the health professional processes this information and includes the acquired knowledge, improving the care provided by him/her. In this line of thought, the WP by itself might not have had the expected impact if the continuing education strategies had not been adopted in the areas of care on a continuous basis by the pain nurse.

Regardless of the adopted strategy model, be it in person or virtual, it's possible to imply that the virtual electronic training is effective due to several advantages of flexibility and in minimizing the time and costs, which the training in person can't achieve because of its limitations. Virtual training or e-learnings provide the professional with a study that is more individualized and adapted to his/her rhythm, providing flexibility of time and crossing geographical barriers, because the professional chooses when and where to carry out his/her training.

E-learning in the health field provides optimization and flexibility of the time spent in training and points to the importance of using new tools in nursing education, which adjust to the learning dynamics of each individual, being a fast and efficient modality of professional training and qualification[11,12].

The management of pain in the emergency service is complex due to its subjectivity and remains a challenge. The safe and effective quality of care will avoid complications that are secondary to the prolonged duration of pain, as well as provide the patient with greater comfort inside these institutions. Although pain is one of the main occurrences in the emergency room and the existence of scales that assess its intensity, few professionals use these tools during care[13].

A study that evaluated nurses' knowledge on pain showed that 73.3% never participated in training and that their knowledge on pain management was moderate[14]. This highlights the importance of the nursing professional having skills that allow

for a complete assessment of complaints, without devaluing the pain referred by the patient, which can often be indicative of the severity of the condition[15]. All patients have the right to express their pain and receive treatment for this complaint, and the nurse and multi-professional team should implement effective strategies for pain relief, avoiding deleterious effects resulting from this symptom and providing patients with a humanized assistance[15,16].

The study[17] showed that the educational weaknesses of the care teams are relevant aspects for the lack of adherence to effective pain control in the hospital environment. Another issue observed in relation to the performance of health professionals in pain management is the lack of empathy and welcoming of the patient with pain, which also impacts aspects related to the patients' perception of the care that is being provided. Therefore, the treatment of pain goes beyond technical aspects and must also include the sensibility of the professionals in regard to pain and in psychosocial consequences. In the present study, the training, the incorporation of the learning by the professionals and the promotion of discussion about pain in a continuous manner in all sectors showed important improvements in pain control.

The study[18] showed that even with the implementation of pain as the 5th vital sign, weaknesses are still found in nursing records related to the assessment of pain, which impacts the continuity of care, in addition to a flaw in the criteria standardization for the preparation of medical prescriptions.

In the present study, the failure to adopt systematic pain assessment as a vital sign impacted the results of pain treatment in all studied hospital units.

Pain control is a global challenge. Even in developed countries, pain is still not effectively considered as the fifth vital sign, which impacts adequate treatment[19]. The present study evidenced the emergency room as the unit with the greatest challenges in pain treatment, considering the dynamics of the sector, increased demand at specific times, variability of patients and teams and other structural aspects related to internal processes.

As for the flow of service in the emergency room, an institutional model makes the patient go through a linear path inside the institution, never returning to the waiting room. After the medical assessment, the patient is sent to the medication room, for exams and/or, if necessary, to a specialist. At the end, another doctor reviews the information obtained in the previous steps in order to determine discharge or hospitalization. Within this model, the service is fast, but it's clear that it's a challenge to engage the whole team in a homogeneous manner focused on the patient with pain in all stages of assistance, guaranteeing an adequate reevaluation.

In addition to that, the patient goes through assessments performed by several professionals, which ensure more safety and effectiveness in the process, improving the patient's experience in the assistance for pain. The results of this research showed that, if training and knowledge about pain for the entire care team is promoted, the linear model of care allows for promising strategies for the proper management of pain.

A relevant issue regarding the performance of the emergency room in the analyzed indicators may also be related to poorer test performance after electronic training, indicating that focused educational approaches better adapted to the profile of a specific sector are essential for understanding the process of different hospital sectors. Although the process of pain management is unique, it presents peculiarities that need to be differentiated and analyzed in each sector, identifying weaknesses and promoting training that is better adapted and has better reach for those specific professionals, developing a unique educational process.

A study showed that although intensive care units present an adequate pain assessment process, including the adherence to pain as the 5th vital sign, the flows of assistance for pain treatment are still fragile, with unconsolidated implementation[20]. Considering this context, the strategies to be employed in educational initiatives must favor solidary and collaborative relationships that bring inclusion, acceptance and respect for the patient with pain, optimizing the production of new meanings on health care oriented to the patient's needs and based on the interaction of the care team, ensuring that the linear model of care is enhanced.

In institutions that consider pain as the 5th vital sign, nursing professionals are sensitive to pain relief, nevertheless, only offering training on pain assessment instruments, however important it may be, is not sufficient to achieve continuity of care and relieve the pain of the hospitalized patient[18]. In these studies, the adoption of continuous and multimodal educational strategies were effective in improving processes related to pain treatment.

One of the present study's limitations was not being able to independently evaluate the effect of the virtual training without the influence of other already implemented strategies that had effectively improved processes. Nonetheless, the strategies, from a practical point of view, will always be relevant to the process of learning for the health professional and to the strengthening of the culture of improved pain management. The strategy may be understood as a single action divided in different implementation steps that result in lasting, relevant, and effective results, as is the case for pain treatment when comparing the period prior to the adopted strategies and their aftermath.

CONCLUSION

Continuing educational strategies in the studied care sectors presented a positive, relevant and lasting impact on the processes related to the inclusion of pain as the 5th vital sign, as well as in the management of pain, with a relevant improvement of the analyzed indicators and in the quality of patient care.

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