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Implementation of a training program aimed at oncology resident physicians to assist in the management of oncologic pain at a referral hospital

Implementação de um programa de capacitação direcionado a médicos residentes em oncologia para auxiliar no manejo da dor oncológica em um hospital de referência

Layra Minuncio Nogueira[1,3], Maria Salete de Angelis Nascimento[3], Juliana Beraldo Ciorlia[3], Sarita Nasbine Frassetto[3], Carlos Eduardo Paiva[1,2,3], Bianca Sakamoto Ribeiro Paiva[1,2,3]

[1]Barretos School of Health Sciences, Dr. Paulo Prata, Barretos, São Paulo, Brazil

[2]Teaching and Research Institute, Barretos Cancer Hospital, Barretos, São Paulo, Brazil

[3]Research Group on Palliative Care and Health-Related Quality of Life (GPQual) - Barretos Cancer Hospital, Barretos, São Paulo, Brazil

ABSTRACT

Introduction: Cancer pain is the most prevalent symptom reported by patients. However, pain management can be a failure in medical training **Aim:** To develop and implement a training program to improve pain management strategies for oncology residents. **Material and Methods:** Before and after-intervention study involving 18 residents from different oncology specialties. In the first phase, the "EducaDor" program was developed, offering information on pain assessment, doses and opioid rotation. Evaluation instruments, including a sociodemographic questionnaire and another with 45 questions on pain management and previous training, were developed. In the second phase, the residents took part in the "EducaDor" program, 30 days after the initial questionnaires, through distance learning on the Moodle platform. The third phase evaluated the effectiveness of the program. **Results:** The program was developed and is currently available for use at HCB. In stage 2, an improvement in residents' knowledge was identified after the program and contact with the questionnaires, with the following being statistically significant: "Breakthrough pain does not have an identifiable cause or precipitating event. Relatively rapid onset and short duration" ($p = 0.003$), "Addiction to morphine or other opioids is rarely observed in patients" ($p = 0.016$), "The use of underdoses of morphine is the main reason for persistent pain" ($p = 0.008$), "Morphine-induced mild drowsiness is only a temporary problem and will disappear with continued use of morphine" ($p = 0.002$), "In chronic pain, morphine should be administered on a regular schedule every four hours" ($p = 0.016$). **Conclusion:** Residents positively evaluated the program and suggested its incorporation into medical residency. Future randomized studies are recommended to evaluate the impact of the program and the residents' practical experience over time.

Keywords: Cancer pain, distance education, medical education, oncology, pain management, program development.

RESUMO

Introdução: Dor oncológica é o sintoma mais prevalente relatado pelos pacientes. No entanto, o manejo da dor pode ocorrer por falha na formação médica. **Objetivo:** Desenvolver e implementar um programa de capacitação para aprimorar as estratégias de manejo da dor para os médicos residentes de oncologia. **Material e Métodos:** Estudo pré e pós-intervenção envolvendo 18 residentes de diferentes especialidades oncológicas. Na primeira fase foi desenvolvido o programa "EducaDor", oferecendo informações sobre avaliação da dor, doses e rotação de opioides. Instrumentos de avaliação, incluindo um questionário sociodemográfico e outro com 45 perguntas sobre manejo da dor e formação prévia, foram elaborados. Na segunda fase, os residentes participaram do programa "EducaDor", após 30 dias dos questionários iniciais, através de educação à distância na plataforma Moodle. A terceira fase avaliou-se a eficácia do programa. **Resultados:** O programa foi desenvolvido e atualmente encontra-se disponível para uso no HCB. Na etapa 2 identificou-se o aprimoramento do conhecimento dos residentes após a aplicação do programa e o contato com os questionários, sendo estatisticamente significante: "A Breakthrough pain não tem uma causa identificável ou um evento precipitante. Início relativamente rápido e duração breve" ($p = 0.003$), "A adicção em morfina ou demais opioides é raramente observada nos pacientes" ($p = 0.016$), "O uso de subdoses de morfina é a principal razão para a dor persistente" ($p = 0.008$), "A sonolência leve induzida pela morfina é apenas um problema temporário e desaparecerá com o uso continuado da mesma" ($p = 0.002$), "Na dor crônica, a morfina deve ser administrada em um esquema regular a cada quatro horas ($p = 0.016$). **Conclusão:** Os residentes avaliaram positivamente o programa e sugeriram sua incorporação à residência médica. Estudos futuros randomizados são recomendados para avaliarem o impacto do programa e a experiência prática dos residentes ao longo do tempo.

Palavras-chave: Desenvolvimento de programas, dor do câncer, educação à distância, educação médica, manejo da dor, oncologia.

INTRODUCTION

Cancer is the leading cause of death worldwide, and a 63% increase in its incidence is projected over the next 20 years, particularly in developing countries. In Brazil, it is estimated that 998,000 people will be diagnosed with cancer by 2040, according to data from the International Agency for Research on Cancer (IARC), affiliated with the World Health Organization (WHO)[1].

Pain is a common symptom in cancer patients, affecting 30% to 85% of them, either due to the disease itself or its treatments[2]. In patients with advanced cancer, pain is particularly prevalent, affecting 70% to 90% of cases. In addition to pain, other frequent symptoms include fatigue, sleep problems, discomfort, and depression. Issues such as dysphagia, loss of appetite, poor nutritional status, taste alterations, lack of social support, and a sense of dependence are also observed[3].

The WHO has developed a three-step algorithm for pain management, which involves the use of opioids[4]. However, despite this strategy, the assessment and treatment of pain in cancer patients have not yet reached optimal levels. Reports indicate that up to one-third of patients do not receive adequate analgesia based on the intensity of their pain[5,6].

In 1979, the International Association for the Study of Pain (IASP) defined pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage. In 2020, the IASP revised this definition, describing pain as "an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage." This new definition is applicable to both acute and chronic pain, encompasses all pain conditions, and emphasizes the individual's perspective experiencing it[7-9]. Untreated or inadequately treated pain can adversely affect the physical and mental health of patients, negatively impacting their quality of life, mobility, sleep, social interaction, and professional performance[10-13]. Severe pain can even lead to reluctance to take prescribed medications and a desire not to continue living[5].

Several barriers related to healthcare professionals contribute to inadequate management of oncologic pain. Many professionals lack proper education and training during their formation, resulting in misconceptions about pain and opioid analgesics[14-16]. These barriers are further exacerbated by insufficient continuing education, a lack of interest among physicians in addressing pain, and the absence of palliative care education during medical and other healthcare training programs[17-19]. Pain assessment is crucial for effective control, but many physicians resort to informal approaches due to the lack of adequate training. Traditional medical education traditionally emphasizes physiology and anatomy at the expense of pain concepts and treatments, even in fields where pain is prevalent, such as oncology[20-23]. Additionally, there is a mistaken perception that cancer-related pain is inevitable and should be endured by patients[24,25].

A study conducted in the United States examined the effectiveness of an intervention aimed at improving pain management by oncologists. Participants, including physicians and patients, were divided into two groups: the intervention group, which received the study intervention, and the control group, which did not undergo any intervention. At the end of the study, a significant difference was observed in analgesic prescriptions and in the reduction of pain intensity reported by patients in the intervention group compared to the control group. This indicates that the intervention had a positive impact on how oncologists manage pain[26].

A literature review highlighted the importance of professional education, which should be an integral part of clinical practice, and the establishment of guidelines for best practices. Educational interventions targeted at physicians can improve their knowledge and attitudes regarding pain management[27,28]. It is important to highlight that despite pain being part of the curriculum, there are gaps in the education on pain and palliative care in medical undergraduate programs in Brazil. The difficulties of students in translating theoretical knowledge into professional practice are demonstrated, such as insecurity in managing pain, especially when it comes to the use of opioids[29].

Currently, in the clinical oncology practice, there are still observed shortcomings in pain management by the medical residents at the reference hospital for oncology in Brazil. Pain is a highly prevalent symptom in the clinical picture of cancer patients, and medical interventions to alleviate this

symptom are of fundamental importance in promoting control and improving the quality of life of patients. It is expected that these professionals have a certain degree of expertise in the proper management of pain, considering the correct use of opioids, necessary combinations of therapeutic classes for effective control, recognition of side effects, as well as opioid optimization and rotation.

Therefore, the objective of this study was to develop, implement, and evaluate a pain management training program to enhance the skills of medical residents in clinical oncology, surgical oncology, radiation therapy, and hematology.

MATERIAL AND METHODS

This was a Before and after intervention study, registered and published in the Brazilian Clinical Trials Registry (ReBEC) under the number RBR-2fzkjtx.

The study was conducted at Unit I of the Barretos Cancer Hospital

Eligibility criteria

A total of 20 residents were selected for convenience, 8 from clinical oncology, 9 from surgical oncology, 1 from radiotherapy and 2 from hematology. These residents began their program as R1 (resident 1) in March 2022.

Development of the EducaDor Program and Data Collection Instruments

We developed an oncologic pain management training program for physicians in the distance education (EAD) format, focusing on the basic principles of oncologic pain management, assessment and management of cancer-related pain, and the fundamental principles of oncologic pain management. For the development of the program, three steps were followed:

Step 1 - Development of theoretical content for classes: The organization and planning of the theoretical content, as well as the slides developed for each module, were discussed and prepared by the researchers, with the approval of the guest lecturer for each module. Three modules were developed: I - Concept of Pain and Classification (1 hour); II - Assessment and Management of Cancer-related Pain (1 hour); and III - Basic Principles of Oncologic Pain Management (3 hours). The classes were recorded, and the instructors specialized in Palliative Care and had significant experience in the treatment of oncologic pain. The slide templates were based on the formatting suggested by the Cancer Education Center (CEC) and Distance Learning (DL) department of the hospital. The classes remained accessible on the distance education platform for an average of 7 days in the first two modules and 15 days in the last module.

Step 2 - Content validation and adaptation of the pain and pain management knowledge questionnaire: The questionnaire was developed based on a literature review. In order to identify the clarity and relevance of the questions, a content validation was conducted by a committee of experts consisting of four professionals: a nurse pursuing a doctorate with knowledge of palliative care and pain, and experience in developing and administering assessment questionnaires; a palliative care physician with a master's degree in questionnaire validation and a doctorate in palliative care; an oncologist with experience in oncologic pain treatment and a doctorate in palliative care and prognosis; and finally, a psychologist with expertise in questionnaire development and administration, pursuing a doctorate in palliative care. These experts assessed all questionnaire items for clarity (ease of understanding) and relevance (importance of the item to the questionnaire). Each question was scored on a Likert-type scale (graded from 1 to 5), as follows: 1- strongly disagree; 2- disagree partially; 3- indifferent; 4- agree partially; 5- strongly agree[30].

The average scores from 1 to 5 for each expert were calculated, both regarding clarity and relevance. A consensus meeting with the participation of the researchers in this study (LMN and BSRP) was conducted to identify questions with the lowest percentages and suggestions for modification. Subsequently, the questionnaire was adapted, with only one question being excluded, and considered the final version for application.

In addition to the program, a pre- and post-assessment knowledge questionnaire for residents was developed as part of the EducaDor program and evaluated for

clarity and relevance[28,29].
Sociodemographic data, including gender, age, marital status, and educational level, were also collected.

Step 3 - Evaluation of the knowledge of medical residents regarding the management of oncologic pain 6 months after the program application: To assess the residents' knowledge, the questionnaire used in stage 2 was re-administered, identifying the knowledge acquired after completing the educational program. In addition, residents evaluated the program regarding the faculty's training, module content, the quality and duration of video lectures, aiming to enhance the EducaDor program.

Recruitment and Data Collection Process

Prior to commencing their medical residency training at the Barretos Cancer Hospital, oncology residents undergo an orientation process, which familiarizes them with the hospital's services and introduces them to the various clinical teams. This orientation served as an opportunity to invite the residents to participate in this research. Residents were individually approached and provided with explanations regarding the research objectives. Once they agreed to participate, they signed an Informed Consent Form (ICF) and completed the data collection instruments. It was ensured that their identities would not be disclosed in the questionnaires or within the databases.

The "EducaDor" program was administered 30 days after the completion of the data collection instruments. To assess the knowledge acquired by the residents after participating in the "EducaDor" program, the questionnaires were administered once again.

Statistical Analysis

The data were tabulated, and descriptive statistics, including median, 25th and 75th percentiles, mean, and standard deviation (SD), were computed for quantitative data. Frequency tables were generated for qualitative data. The effect of the intervention on the scores was assessed using the Paired T-test (or Wilcoxon) after verifying normality using the Kolmogorov-Smirnov test. Data were stored on the REDCap platform[31] and analyzed using SPSS software version 21.0, with a significance level of 5%.

Ethical aspects

This research received approval from the Research Ethics Committee of the Barretos Cancer Hospital under protocol number 4.622.147. In compliance with Resolution 466/12 of the National Health Council, which deals with research involving human subjects, medical residents in clinical oncology, surgical oncology, hematology, and radiation therapy were informed about the research objectives. After agreeing to participate, they signed the Informed Consent Form (ICF).

RESULTS

In this study, 18 medical residents participated, with an average age of 29 years, comprising 9 (50%) males and 9 (50%) females. Furthermore, 16 (89%) were single in terms of marital status, 7 (39%) originated from the state of São Paulo, and 17 (94%) had completed postgraduate education (Lato Sensu). Nine (50%) of the participants had prior experience in medical residency in internal medicine, and the average duration of their medical training was 5 years.

Concepts and Classification of Pain

After oncology residents attended the EducaDor Program lectures, an evaluation of their knowledge revealed a notable enhancement in their overall understanding. This improvement was particularly evident in several areas. Firstly, it was found that participants demonstrated improved comprehension of adjuvant co-analgesics (anticonvulsants or antidepressants) being more effective than opioids (p=0.039). Additionally, their knowledge regarding visceral nociceptive pain, characterized by poor localization, diffuseness, and descriptors like stabbing sensations, a feeling of heaviness, and cramping, also improved significantly (p=0.039). Furthermore, residents displayed a better grasp of breakthrough pain, recognizing that it lacks an identifiable cause or precipitating event, has a relatively rapid onset, and is of brief duration (p=0.003) (Table 1).

Table 1. Concepts and classification of pain.

When it comes to neuropathic pain, some adjuvant co-analgesics (anticonvulsants or antidepressants) are more effective than opioids.		After			
		I have complete knowledge about this	I know more or less about this	Total	
		n (%)	n (%)	N (%)	P valor
Before	I have complete knowledge about this	5 (83.3)	1 (16.7)	6 (100.0)	**0.039**
	I know more or less about this	8 (66.7)	4 (33.3)	12 (100.0)	
	Total	13 (72.2)	5 (27.8)	18 (100.0)	

Visceral nociceptive pain is poorly localized, diffuse, and is described as stabbing, heaviness and cramps.		After			
		I have complete knowledge about this	I know more or less about this	Total	
		n (%)	n (%)	N (%)	P valor
Before	I have complete knowledge about this	4 (66.7)	2 (33.3)	6 (100.0)	**0.039**
	I know more or less about this	10 (83.3)	2 (16.7)	12 (100.0)	
	Total	14 (77.8)	4 (22.2)	18 (100.0)	

Breakthrough pain has no identifiable cause or precipitating event. Relatively rapid onset and short duration.		After			
		I have complete knowledge of this	I know more or less about this	I don´t have knowledge about this	Total
		n (%)	n (%)	n (%)	N (%)	P valor
Before	I have complete knowledge of this	0 (0)	2 (100.0)	0 (0)	2 (100.0)	**0.003**
	I know more or less about it	0 (0)	2 (100.0)	0 (0)	2 (100.0)	
	I don´t have knowledge about this	5 (35.7)	7 (50.0)	2 (14.3)	14 (100.0)	
	Total	5 (27.8)	11 (61.1)	2 (11.1)	18 (100.0	

In relation to this module, items 7. somatic nociceptive pain is well localized, worsens with movement, improves at rest and is described as aching, stabbing, penetrating and bothersome; 8. neuropathic pain occurs due to tumor compression or infiltration, or destruction of the peripheral nervous system or central nervous system, and also due to chemical injury or radiation, or after surgery. Neuropathic pain occurs due to tumor compression or infiltration, or destruction of the peripheral nervous system or central nervous system, and also due to chemical injury or radiation, or after surgery; 9. Allodynia is pain resulting from stimuli that do not normally cause pain, such as touch and movement; and 10. Opioids are indicated for pain with nociceptive characteristics. In neuropathic pain, opioids are not the first treatment option, and were not statistically significant.

Opioids and Pain Assessment

Following the participation of residents in the EducaDor program lectures, significant improvements were observed in several key aspects related to opioids and pain assessment. Notably, there were significant changes in the understanding of the Behavior Pain Scale (BPS), the addition of morphine and opioids, the use of subdoses of morphine to manage persistent pain, and the occurrence of morphine-induced drowsiness. The significance values for these improvements were recorded as p=0.050, p=0.016, p=0.008, and p=0.002, respectively (Table 2).

Pharmacological treatment of pain

In this particular module, a total of 12 questions were prepared. Significant results were observed regarding the regular use of morphine in chronic pain and the rescue dose varying between 10 and 20% of the total daily dose used regularly. The significance values were recorded as p = 0.016, p = 0.056, respectively (Table 3).

Residents' knowledge as opioid prescribers

When we asked residents about their competence in prescribing opioids (six items), their ability to rotate opioids, their ability to assess the characteristics of pain, their belief in the pain experience reported by patients, their training in pain during graduation and their knowledge about the potential adverse effects of opioids, we identified a clear need to provide them with more guidance, additional studies or practical opportunities. This is essential if these residents are to improve their competence in this crucial role within the field of oncology. In essence, contributing to the development of these young doctors' ability to prescribe drugs, including those related to pain relief, is one of the main objectives of the medical residency program.

The "EducaDor" Program and Its Applicability in Clinical Practice

Table 4 presents the results of the evaluation conducted by residents regarding the EducaDor program and its applicability. It was observed that the variable "instructor" received highly positive ratings, with 100% of the residents rating it as "excellent" or "good." Similarly, aspects such as "Content," "Quality of video lectures," and "Acquired knowledge" were assessed very favorably, with 94.4% of residents rating them as "excellent" or "good." Additionally, 88.9% of the residents considered the "Online Distance Education format," the "Virtual Learning Environment," and the "Duration of each module" to be "excellent" or "good."

Regarding the evaluation of the "EducaDor" program, as presented in Table 5, 15 (83.3%) of the residents reported that the program's contents contributed significantly to improving their clinical practice in oncology. Furthermore, 9 (50%) of the residents expressed that the program would be highly beneficial if integrated into the residency curriculum. Concerning the support offered, 15 (83.3%) participants indicated that having a link for clarifying doubts would be of utmost importance. Finally, 12 (66.7%) residents stated that they remembered the program's content to some extent six months after its completion.

Two open questions were asked regarding the evaluation of the EducaDor program. The answers were then analyzed, categorized and presented quantitatively, as shown in Table 6.

Figures 1 and 2 show the evaluation of the residents' knowledge of pain before and after the intervention with the "EducaDor" program.

Table 2. Opioids and pain assessment.

The Behavior Pain Scale (BPS) is a scale used to assess pain in sedated and unconscious patients under mechanical ventilation. It assesses three aspects: facial expression, body movements and tolerance to mechanical ventilation.		After			Total	
		I have complete knowledge about this	I know more or less about this	I don´t have knowledge about this		
		n (%)	n (%)	n (%)	N (%)	P valor
Before	I have complete knowledge about this	1 (100.0)	0 (0)	0 (0)	1 (100.0)	**0.050**
	I know more or less about this	1 (14.3)	6 (85.7)	0 (0)	7 (100.0)	
	I don´t hav knowledge about this	0 (0)	5 (50.0)	5 (50.0)	10 (100.0)	
	Total	2 (11.1)	11 (61.1)	5 (27.8)	18 (100.0)	

Addiction to morphine or other opioids (drug abuse or psychological dependence) is rarely observed in patients.		After		Total	
		I have complete knowledge about this	I know more or less about this		
		n (%)	n (%)	N (%)	P valor
Before	I have complete knowledge about this	1 (100.0)	0 (0)	1 (100.0)	**0.016**
	I know more or less about this	7 (41.2)	10 (58.8)	17 (100.0)	
	Total	8 (44.4)	10 (55.6)	18 (100.0)	

The use of underdoses of morphine is the main reason for the persistent pain.		After		Total	
		I have complete knowledge about this	I know more or less about this		
		n (%)	n (%)	N (%)	P valor
Before	I have complete knowledge about this	8 (100.0)	0 (0)	8 (100.0)	**0.008**
	I know more or less about this	8 (100.0)	2 (20.0)	10 (100.0)	
	Total	16 (88.9)	2 (11.1)	18 (100.0)	

Mild drowsiness induced by morphine is only a temporary problem and will disappear with continued use.		After				
		I have complete knowledge of this	I know more or less about this	I don´t have knowledge about this		
		n (%)	n (%)	n (%)	N (%)	P valor
Before	I have complete knowledge of this	2 (100.0)	0 (0)	0 (0)	2 (100.0)	**0.002**
	I know more or less about this	5 (62.5)	3 (37.5)	0 (0)	8 (100.0)	
	I don´t have knowledge about this	0 (0)	7 (87.5)	1 (12.5)	8 (100.0)	
	Total	7 (38.9)	10 (55.6)	1 (5.6)	18 (100.0)	

Table 3. Pharmacological treatment of pain.

In chronic pain, morphine should be administered on a regular schedule every four hours.		After			
		I have complete knowledge about this	I know more or less about this	Total	
		n (%)	n (%)	N (%)	P valor
Before	I have complete knowledge about this	10 (100.0)	0 (0)	10 (100.0)	**0.016**
	I know more or less about this	7 (87.5)	1 (12.5)	8 (100.0)	
	Total	17 (94.4)	1 (5.6)	18 (100.0)	

The dose of the rescue opioid should vary between 10 and 20% of the total daily dose used regularly		After				
		I have complete knowledge of this	I know more or less about this	I don´t have knowledge about this		
		n (%)	n (%)	n (%)	N (%)	P valor
Before	I have complete knowledge of this	5 (83.3)	1 (16.7)	0 (0)	6 (100.0)	0.056
	I know more or less about it	6 (66.7)	2 (22.2)	1 (11.1)	9 (100.0)	
	I don´t have knowledge about this	3 (100.0)	0 (0)	0 (0)	3 (100.0)	
	Total	14 (77.8)	3 (16.7)	1 (5.6)	18 (100.0)	

DISCUSSION

In this study, an online educational program for pain management, named "EducaDor", was developed with the aim of providing continuous and annual training for residents joining the Barretos Cancer Hospital. The program was designed to meet the specific needs of these physicians and was implemented in the distance education (DE) format, in collaboration with the Cancer Education Center (CEC) and experienced palliative care physicians specializing in oncology pain.

The interactive methodology of the "EducaDor" program included slide presentations and real clinical cases to highlight the topics covered and demonstrate the practical application of pain management strategies. The DE approach is widely used in the healthcare field, aiming to empower a large number of professionals according to their availability[29,32].

The "EducaDor" program addressed crucial aspects of pain management, including pain assessment, determination of appropriate opioid doses, adverse effects associated with these medications, the inclusion of adjuvants, opioid rotation strategy, and the importance of continuous reevaluation of pharmacological therapy. A pre- and post-intervention study in Canada utilized the ECHO (Extension for Community Healthcare Outcomes) Project with weekly 2-hour videoconferences, featuring expert presentations followed by real-case discussions. The results demonstrated a significant improvement in participants' knowledge regarding pain assessment, treatment practices, and opioid prescription[33].

The assessment instruments used were developed based on questions from two previous

Table 4. Evaluation of the educational program by the resident doctor.

Variable	Category	n (%)
Professor	Very good	12 (66.7)
	Good	6 (33.3)
	More or less	0 (0)
	Bad	0 (0)
Content	Very good	10 (55.6)
	Good	7 (38.8)
	More or less	1 (5.6)
	Bad	0 (0)
Online course format, by Distance Education	Very good	10 (55.6)
	Good	6 (33.3)
	More or less	2 (11.1)
	Bad	0 (0)
Quality of video lessons (subjects covered)	Very good	10 (55.6)
	Good	7 (38.8)
	More or less	1 (5.6)
	Bad	0 (0)
Virtual learning environment	Very good	8 (44.4)
	Good	8 (44.4)
	More or less	2 (11.2)
	Bad	0 (0)
Length of each module	Very good	8 (44.4)
	Good	8 (44.4)
	More or less	2 (11.2)
	Bad	0 (0)
Knowledge acquired	Very good	7 (38.8)
	Good	10 (55.6)
	More or less	1 (5.6)
	Bad	0 (0)

studies, which were combined and reformulated by the researchers[28,34,35]. The process of adapting this questionnaire followed criteria for clarity and relevance[28,29] for each question or item, ensuring methodological consistency. The primary objective of this questionnaire was to evaluate the knowledge and practices of oncology residents in relation to cancer-related pain management. The formulation of items and responses was carefully carried out to allow for the precise assessment of the desired construct, namely, residents' knowledge of oncologic pain management.

The program's stratification into modules, as well as the evaluation of residents before and after the program, allowed for the identification of the main knowledge needs of these professionals.

In the "EducaDor" Program, in the "concepts and classification of pain" topic, residents reported having somewhat limited knowledge of the subject initially. However, after participating in this program, items related to this topic were answered in a way that indicated improved knowledge. A study conducted in China revealed that continuous medical education had a positive impact on the quality of oncologic pain treatment in participating hospitals. The program consisted of a one-hour lecture and a practical demonstration conducted by on-site experts and was held annually for physicians in all cancer diagnosis and treatment hospitals in Beijing. The educational content was developed by the Beijing Pain Management Control and Improvement Center,

Table 5. Evaluation of the "EducaDor" program by resident doctors.

Variable	Category	n (%)
Contents facilitated the performance of oncology clinical practice	Totally facilitated	15 (83.3)
	More or less facilitated	3 (16.7)
	Did not make it easier	0 (0)
The program would be most useful in the residency grid	Totally useful	9 (50.0)
	More or less useful	5 (27.8)
	Wouldn't be useful	4 (22.2)
A link to answer questions would be important	Totally important	15 (83.3)
	More or less important	3 (16.7)
	Not important	0 (0)
After 6 months of the program you can remember the contents of the modules	I totally remember	6 (33.3)
	I remember more or less	12 (66.7)
	Don't remember	0 (0)

focusing on specific areas and evaluation criteria related to oncologic pain treatment. This approach was found to be effective in enhancing the quality of pain treatment[35].

In the evaluation of the topic on opioids and pain assessment, residents demonstrated an improvement in their understanding of the Behavioral Pain Scale (BPS), an essential tool for assessing pain in non-communicative patients. There was also an increase in knowledge that the use of underdoses of morphine is one of the main reasons for the persistence of pain. In addition, residents recognized that the mild drowsiness induced by morphine is a temporary inconvenience that tends to diminish with continued use of the medication. These results indicate that residents are better prepared to deal with the side effects of opioids, which contributes to more effective patient care. This improvement reflects a significant advance in medical training and quality of care, representing an important step in improving healthcare.

With regard to the pharmacological treatment of pain, the residents faced significant challenges when answering 12 questions related to the use of morphine, its action, dosage, the appropriate form of rescue administration and treatment optimization. The results indicated that the residents had substantial difficulties in understanding these essential concepts, and even after participating in the "EducaDor" program, their progress in knowledge remained limited.

The results highlight the need for additional, targeted educational actions to improve understanding of the essential concepts related to opioid prescribing. These concepts are fundamental to ensuring safe and effective treatment of cancer pain, as well as preventing errors in opioid administration. Identifying these knowledge gaps offers a valuable opportunity to improve resident training and, consequently, raise the quality of pain care and promote the responsible use of opioids.

With regard to residents' knowledge as opioid prescribers, it was observed that most of them rate their level of experience in prescribing opioids as variable. In addition, the amount of training received during medical school or postgraduate courses is also perceived as variable. Their skills in conducting rotations involving opioids and assessing pain characteristics also vary, as does their knowledge of the adverse effects caused by opioids.

There are some limitations to this study. The survey relies on residents' self-assessment, which can lead to biased responses as participants may want to appear more positive about the program, as well

Table 6. Evaluation of the "EducaDor" program by resident doctors.

Variable	Category	n (%)
How satisfied you were with the educational program?	Quite satisfied	13 (72.2)
	Satisfied, I would like it to be more about real cases	1 (5.6)
	I was satisfied, I would like more theoretical and practical lessons	1 (5.6)
	I was satisfied	1 (5.6)
	I can't say	1 (5.6)
	No answer	1 (5.6)
In your opinion, what changes would improve the educational program?	Shorter lessons	4 (22,2)
	More time to attend classes	2 (11.2)
	More practical approach to opioid rotation	2 (11.2)
	Nothing different	2 (11.2)
	It should be part of the residency curriculum because knowledge of it is essential in a cancer hospital	1 (5.6)
	Apply to all residents	1 (5.6)
	Apply right at the start of the residency program	1 (5.6)
	Apply right at the start of the residency program Examples of complex real-life cases with the need to associate adjuvants, interaction with the lecturer for questions. Live class with chat or in person.	1 (5.6)
	Longer follow-up time in the Palliative Care Unit	1 (5.6)
	More classes	1 (5.6)
	Be more continuous throghout the year	1 (5.6)
	No answer	1 (5.6)

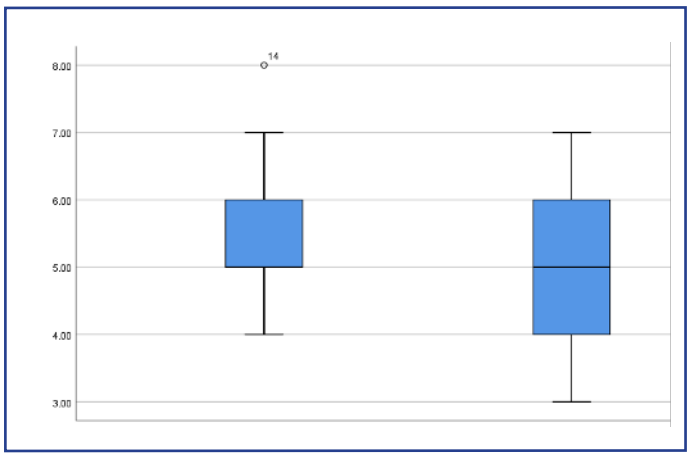

Figure 1. Evaluation of knowledge about pain before answering the questionnaire x after answering the questionnaire.

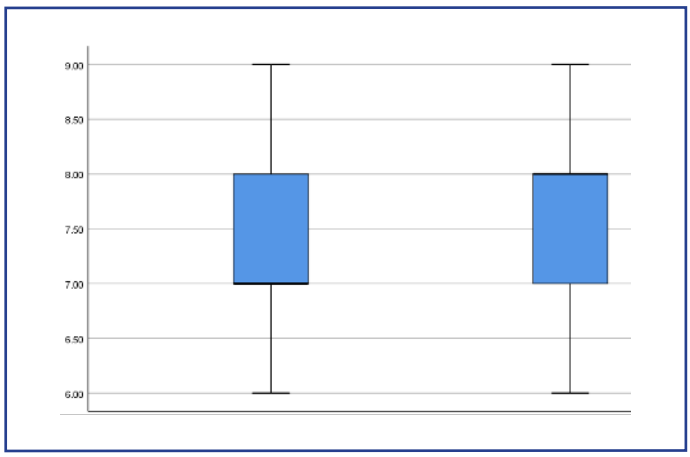

Figure 2. Evaluation of knowledge about pain after application of the program before answering the questionnaire x after answering the questionnaire.

as the absence of a control group limiting the ability to attribute improvements in residents' knowledge exclusively to the program, since other external factors can influence it. Although the research looked at knowledge retention after six months, it would be useful to carry out longer follow-ups to better understand how learning is maintained over time. Although the research was carried out in just one center, it is possible that the program could be generalized to other oncology institutions, especially in Brazil, given that it is an easily accessible distance learning program.

CONCLUSION

- The EducaDor Program was developed to improve pain management strategies for medical residency teams in clinical and surgical oncology, radiotherapy and hematology. The program has theoretical content, divided into modules and using distance learning technology, an effective and systematic learning environment for all participants;
- The assessment instruments developed in this research underwent a process of content validity, respecting international guidelines based on the clarity and relevance of the assessment items;
- Residents' knowledge increased significantly after the intervention with the program. However, attention should be drawn to knowledge about the pharmacological treatment of pain, where residents had substantial difficulties in understanding these fundamental concepts, and even with participation in the EducaDor program, the progression of knowledge was still limited;
- As for the applicability of the EducaDor Program, the residents gave a very positive evaluation to the teachers, the content of the classes, the format of the course (virtual environment) and the duration of each module, thus demonstrating its relevance for initial training and preparation of oncology residents. They also suggested that the program could be fully incorporated into the medical residency curriculum;

Future randomized studies are needed, mainly to evaluate the knowledge of residents exposed or not to the content of the EducaDor Program, as well as other evaluations over time, with the aim of measuring the effect of the program as well as the practical experience that residents acquire during their residency.

REFERENCES

1. IARC. https://www.iarc.fr/news-events/global-cancer-statistics-2018-globocan-estimates-of-incidence-and-mortality-worldwide-for-36-cancers-in-185-countries/.
2. van den Beuken-van Everdingen MH, Hochstenbach LM, Joosten EA et al (2016) Update on prevalence of pain in patients with cancer: systematic review and meta-analysis. J Pain Symptom Manag 51:1070–1090
3. FREIRE MEM; SAWADA, NO; et al. Qualidade de vida relacionada à saúde de pacientes com câncer avançado: uma revisão integrativa Rev Esc Enferm USP 2014; 48(2):357-67
4. WHO (1996). Cancer pain relief: with a guide to opioid availability [Online]. Geneva: World Health Organisation.
5. Greco MT, Roberto A, Corli O, Deandrea S, Bandieri E, Cavuto S, Apolone G (2014) Quality of cancer pain management: an update of a systematic review of undertreatment of patients with cancer. J Clin Oncol 32(36):4149–4154
6. Van Riet Paap J, Vissers K, Iliffe S, Radbruch L, Hjermstad MJ, Chattat R, Vernooij-Dassen M, Engels Y, research team IMPACT (2015) Strategies to implement evidence into practice to improve palliative care: recommendations of a nominal group approach with expert opinion leaders. BMC Palliat Care 14:47
7. Raja SN, Carr DB, Cohen M, Finnerup NB, Flor H, Gibson S, et al. The revised International Association for the Study of Pain definition of pain: concepts, challenges, and compromises. Pain. 2020;23. doi: 10.1097/j.pain.0000000000001939. Online ahead of print.
8. https://sbed.org.br/wp-content/uploads/2020/08/Defini%C3%A7%C3%A3o-revi-sada-de-dor_3.pdf.
9. Jornal Dor (Publicação da Sociedade Brasileira para o Estudo da Dor - Ano XVIII - 2° Trimestre de 2020 - edição 74, 11-8.
10. Deng D, Fu L, Zhao YX, et al. The relationship between cancer pain and quality of life in patients newly admitted to Wuhan Hospice Center of China. Am J Hosp Palliat Care. 2012;29(1):53–59.
11. Ovayolu N, Ovayolu Ö, Serçe S, Tuna D, Pirbudak Çöçelli L, Sevinç A. Pain and quality of life in Turkish cancer patients. Nurs Health Sci. 2013;15(4):437–443.
12. Kim YS, Do H, Lee JW, et al. Patient reporting pain intensity immediately after surgery can be associated with underlying depression in women with breast cancer. Psychooncology. 2016;25(3):308–315.
13. Oliveira KG, von Zeidler SV, Podestá JR, et al. Influence of pain severity on the quality of life in patients with head and neck cancer before antineoplastic therapy. BMC Cancer. 2014;14(1):39.

14. Rich BA. An ethical analysis of the barriers to effective pain management. Camb Q Healthc Ethics. 2000;9(1):54–70.
15. Kress HG, Ahlbeck K, Aldington D, et al. Managing chronic pain in elderly patients requires a CHANGE of approach. Curr Med Res Opin. 2014;30(6):1153–1164.
16. Manchikanti L, Falco FJ, Boswell MV, Hirsch JA. Facts, fallacies, and politics of comparative effectiveness study: part 2-implications for interventional pain management. Pain Physician. 2009;13(1): E55–E79
17. Human Rights Watch – Global State of Pain Treatment. Access to Palliative Care as a Human Right. [cited February 20, 2017]. Available from: https://www.hrw.org/sites/default/files/reports/hhr0511W.pdf.
18. Pastrana T, Centeno C, De Lima L (2015) Palliative Care in Latin America from the Professional Perspective: A SWOT Analysis. J Palliat Med 18 (5): 429 – 437
19. Silbermann M, Arnaout M, Daher M, Nestoros S, Pitsillides B, Charalambous H, Gultekin M, Fahmi R, Mostafa KA, Khleif AD, Manasrah N, Oberman A (2012) Palliative care against cancer in Middle Eastern countries: achievements and challenges. Ann Oncol 23 (Supplement 3): 15 – 28
20. Kerns RD, Otis J, Rosenberg R, Reid MC. Veterans' reports of pain and associations with ratings of health, health-risk behaviors, affective distress, and use of the healthcare system. J Rehabil Res Dev. 2003;40(5):371–9.
21. Franck LS, Bruce E. Putting pain assessment into practice: why is it so painful? Pain Res Manag. 2009;14(1):13–20.
22. Miaskowski C. Outcome measures to evaluate the effectiveness of pain management in older adults with cancer. Oncol Nurs Forum. 2010;37:27–32.
23. Herr K, Titler M, Fine P, Sanders S, Cavanaugh J, Swegle J, et al. Assessing and treating pain in hospices: current state of evidence-based practices. J Pain Symptom Manag. 2010;39(5):803–19.
24. Li YX, Yu JQ, Tang L, et al. Cancer pain management at home: voice from an underdeveloped region of China. Cancer Nurs. 2013;36(4): 326–334
25. RAVAUD, A. et al . A survey in general practice about undergraduate cancer education: results from Gironge (France). J Cancer Edu., v.6, n.3, p.153-57, 1991.
26. Trowbridge R, Dugan W, Jay SJ, Littrell D, Casebeer LL, Edgerton S, Anderson J, O'Toole JB. Determining the effectiveness of a clinical-practice intervention in improving the control of pain in outpatients with cancer. Acad Med. 1997 Sep;72(9):798-800. doi: 10.1097/00001888-199709000-00016. PMID: 9311323.
27. Bennett MI, Flemming K, Closs SJ. Education in cancer pain management. Curr Opin Support Palliat Care. 2011 Mar;5(1):20-4. doi: 10.1097/SPC.0b013e328342c607. PMID: 21157351.
28. Elliott TE, Elliott BA. Physician attitudes and beliefs about use of morphine for cancer pain. J Pain Symptom Manage. 1992 Apr;7(3):141-8. doi: 10.1016/s0885-3924(06)80005-9. PMID: 16967581.
29. Moura ERF, Bezerra CG, Oliveira MS, Damasceno MMC. Validação de jogo educativo destinado à orientação dietética de portadores de diabetes mellitus. Revista APS. 2008;11(4):435-43.
30. Pasquali L. Instrumentação psicológica: fundamentos e práticas. Porto Alegre: Artmed; 2010.
31. Torrez MNFB. Educação à distância e a formação em saúde: nem tanto, nem tão pouco. Trab Educ Saúde 2005; 3(1):171-186.
32. Fullerton JT, Ingle HT. Evaluation Strategies for Midwifery Education Linked to Digital Media and Distance Delivery Technology. J Midwifery Womens Health 2003; 48(6):426-436.
33. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. Journal of biomedical informatics. 2009;42(2):377-81.
34. Breuer B, Fleishman SB, Cruciani RA, Portenoy RK. Medical oncologists' attitudes and practice in cancer pain management: a national survey. J Clin Oncol. 2011 Dec 20;29(36):4769-75. doi: 10.1200/JCO.2011.35.0561. Epub 2011 Nov 14. PMID: 22084372

CORRESPONDING AUTHOR
Bianca Sakamoto Ribeiro Paiva
bsrpaiva@gmail.com

Programa de Pós-graduação em Oncologia.
Rua Antenor Duarte Villela, 1331- Barretos – São Paulo, Brasil.
CEP 14784-400. Telefone: 17 3321 6600 (ext. 6786).

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