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ORIGINAL ARTICLE

The impact of a simplified documentation method for the Edmonton classification system for cancer pain (ECS-CP) on clinician utilization

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Abstract
Purpose The use of standardized pain classification systems such as the ECS-CP can assist in the assessment and management of cancer pain. However, its completion has been limited due to its perceived complexity of decoding each feature. The objectives of this study were to determine the rate of clinician documentation and completion of the ECS-CP features after revision and simplification of the response for each feature.
Methods Electronic records of consecutive patient visits at the outpatient supportive care center seen by 12 palliative medicine specialists were collected at 6 months before (pre-interventional period), 6 and 24 months after (post-interventional period) the implementation of the simplified ECS-CP tool. Rate of ECS-CP documentation, completion, and analysis of patient and physician predictors were completed.
Results One thousand and twelve patients' documentation was analyzed: 343 patients, before; 341 patients, 6 months after, and 328 patients, 24 months after the intervention. ≥2/5 items were completed before the intervention, 6 months after the intervention and 24 months after intervention in 0/343 (0 %), 136/341 (40 %), and 238/328 (73 %), respectively ($p < 0.001$). 5/5 items were completed before the intervention, 6 months after the intervention and 24 months after intervention in 0/343 (0 %), 131/341 (38 %), and 222/328 (68 %), respectively, ($p < 0.001$). There were no patient or physician predictors found significant for successful documentation of ECS-CP.
Conclusion Our findings suggest that significant simplification and intensive education is necessary for successful adoption of a scoring system. More research is needed in order to identify how to adopt tools for daily clinical practice in palliative care.

Keywords Cancer pain · ECS-CP · Standardized pain classification system · Standardized pain score · Edmonton classification system for cancer pain

Introduction

Pain is one of the most common symptoms experienced by patients with advanced cancer during their disease trajectory [1, 2]. However, there is currently no standardized and universally accepted pain classification system for the assessment and management of cancer pain in both clinical practice and research studies [3]. The use of a standardized system would improve interpretation and comparison of study results, and potentially increase success of therapy [4, 5]. Appropriate assessment and documentation of pain has prognostic importance and help in the development of suitable strategies in managing pain. Simple assessment of pain intensity only may not be adequate on its own to provide good assessment of quality of care and can be affected by numerous extrinsic factors, such as commonly seen in patients who are chemically coping [6–10].

The Edmonton Staging System (ESS) was developed by Bruera et al. in an effort to address this issue [4, 11]. The ESS was limited because of difficulties in the interpretation of the definitions of the various features. An expert panel consisting

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of physicians and researchers at the Edmonton Regional Palliative Care Program later refined and renamed it to the revised Edmonton Staging System (rESS). Fainsinger et al. conducted a number of psychometric studies of the rESS and it was later renamed the Edmonton Classification System for Cancer Pain (ECS-CP) [12]. The ECS-CP has demonstrated value in predicting pain management complexity [6, 13, 14]. It is used to characterize pain complexity based on five prognostic features or indicators, namely, pain mechanism (neuropathic or nociceptive), presence or absence of incident pain, psychological distress, addictive behavior, and cognitive dysfunction [6, 12, 14]. Every one of the features has been found predictive of high pain complexity and difficulty in achieving adequate analgesia in such patients.

One limitation observed with documenting the ECS-CP features on a consistent basis was the perceived challenge in decoding the individual symbols representing the various features. It may take a new user considerable time to get used to the tool. Interest in its consistent use is felt to eventually diminish even for regular users. In an effort to circumvent this potential barrier and make it more feasible, our team developed a simpler revised method of documenting and reporting the various features, entitled the ECS-CP-s, with the goal of making it easier to complete and for succeeding clinicians to interpret during subsequent patient follow up visits. Another reason in not adopting a clinical tool may be taking more time in an already busy clinical setting [15]. The objectives of this study were to determine the rate of clinician documentation of the ECS-CP-s features, to measure the rate of total completion of the ECS-CP-s features, to compare the documentation rate of individual ECS-CP-s features, and to conduct an exploratory analysis of physician and patient predictors for successful clinician documentation of ECS-CP-s features, including patient and physician age, patient and physician gender, patient and physician ethnicity, physician years of clinical experience, cancer diagnosis, cancer stage, Memorial Delirium Assessment Scale (MDAS), pain, anxiety, depression, well-being scores, and history of alcohol and substance use.

Methods

Electronic records of consecutive patient visits at the outpatient supportive care center seen by 12 palliative medicine specialists were collected during three study periods, namely the 6 months before (pre-interventional period), 6 and 24 months after (post-interventional period) the implementation of the revised ECS-CP-s tool. All 12 physicians were board-certified palliative medicine specialists practicing in a group practice. After faculty meetings, it became clear that many physicians were unlikely to complete the standard version of the ECS-CP due to perceived complexity with the different identifiers of the tool. The intervention performed was simplifying the responses to the individual ECS-CP items from three or four choices to a "Yes" or "No" response (Fig. 1) Six months was chosen as an initial interventional period for the implementation of the revised tool at the center. This timeframe allowed the physicians to develop familiarity with it. Efforts to enhance awareness of the revised tool were made through visual presentations during fellow training rounds and grand rounds, written reminders through email outlining the much more streamlined way the tool is provided, the addition of ECS-CP-s as part of the dictation checklists, and reminder cards posted throughout dictation areas in the outpatient clinic. The authors were also accessible for clarification of any issues related to the use of the tool. Twenty-four months was chosen to further track completion rates correlated with increasing familiarity and adaptation of the revised ECS-CP-s to daily clinical practice.

For each study period, we gathered the following information: documentation of individual and total ECS-CP-s features, and demographic and clinical characteristics of patients and physicians. We then analyzed the percentage of overall ECS-CP-s documentation, the percentage of total ECS-CP-s completion, and the percentage of documentation of each ECS-CP-s feature.

Definition of ECS-CP-s documentation

This was defined as the documentation of ≥2/5 ECS-CP-s item per visit.

Definition ECS-CP-s completion

This was defined as the documentation of 5/5 ECS-CP-s items per visit.

Statistical considerations

A goal of 1080 patients was planned with 360 patients each study period for the 12 physicians. For each patient, the completion rate of a clinician documentation of the ECS-CP-s features (defined as number of completed items divided by the total number of items, 5, on the ECS-CP-s checklist) was calculated. The average completion rate of 30 patients before, 6 months after, and 24 months after the intervention were estimated for each physician. The overall change of the average completion rate was estimated. With 12 physicians, we have an 88 % power to detect a difference of 40 % (55 vs 15 %) in the average completion rate before and after intervention assuming a standard deviation of 0.4 using a two-sided paired t test with a significance level of 0.05.

At the end of the study, patients' demographic and clinical characteristics were analyzed and individual ECS-CP-s features were summarized. Summary statistics, such as mean, standard deviation, median, and range were used to present

CURRENT VERSION				
Mechanism of Pain	No	Nc	Ne	Nx
Incident Pain	Io	Ii	Ix	
Psychological Distress	Po	Pp	Px	
Addictive Behavior	Ao	Aa	Ax	
Cognitive Dysfunction	Co	Ci	Cu	Cx
SIMPLIFIED VERSION				
Mechanism of Pain				
A. Nociceptive	Yes		No	
B. Neuropathic	Yes		No	
Incident Pain	Yes		No	
Psychological Distress	Yes		No	
Addictive Behavior	Yes		No	
Cognitive Dysfunction	Yes		No	

Fig. 1 Current and simplified versions of Edmonton Classification System for cancer pain

the average completion rate and the change of it before and after the intervention over all patients for each physician and for all physicians. Generalized estimating equations were implemented to evaluate the effect of intervention and other factors such as age and gender of both patients and doctors, cancer diagnosis, cancer stage, pain, anxiety, depression, well-being scores, and history of alcohol and substance use, using the Cut-Down, Annoyed, Guilty, Eye Opener-Adapted to Include Drugs (CAGE-AID) questionnaire, on completion rate incorporating the correlation among patients under each physician into consideration, adjusting for patients demographic and clinical characteristics. Statistical analysis and all statistical tests were performed at a two-sided significance level of 5 % using SAS or S-Plus, as appropriate.

Results

A total of 1071 patients' documentation were reviewed and collected for the purpose of this study. Three hundred fifty seven patients before, 355 patients 6 months after the implementation of the revised ECS-CP-s, and 359 patients 24 months after the implementation of the revised ECS-CP-s. There were nine patients' short visits during the total study period. Fifty-nine patients were then excluded because of lack of pain syndrome. The final analysis was conducted in 1012 patients (343 patients before, 341 patients 6 months after, and 328 patients 24 months after the intervention). Majority of the patients were Caucasian, with advanced cancer, and were CAGE negative. The physicians had a median of 8 (IQR 4.5–24) years of clinical experience. Demographic and clinical descriptions of patients and the palliative medicine specialists are summarized in Table 1.

Before the intervention, 336/343 (98 %) patients' documentation showed 0/5 ECS-CP items completed with none having at least 2/5 items completed. 6 months post-intervention, 197/341 (58 %) had 0/5 items completed while 136/341 (40 %) had ≥ 2/5 items and 131/341 (38 %) with 5/5 items completed. 24 months post-intervention, 71/328 (22 %) had 0/5 items completed, 238/328 (73 %) had ≥ 2/5 items and 222/328 (68 %) had 5/5 items completed. Both increase in documentation and completion were found to be significant ($p < 0.01$ for both). Results are shown in Table 2.

Among individual ECS-CP-s features, there was a significant increase 6 months and 24 months post-intervention ($p < 0.01$ for both). The ECS-CP-s feature on pain mechanism (nociceptive and/or neuropathic) was found to have the highest completion rate among the five features (Table 2).

Regarding physician completion, there was an increase in documentation by all physicians during the 6 month post-intervention period while 10/12 physicians demonstrated increase in documentation from 6 to 24 months post-intervention (Fig. 2). As a whole, there was a significant increase in documentation from before to 6 months after ($p < 0.01$), before to 24 months after ($p < 0.01$), and 6 to 24 months post-intervention ($p = 0.02$).

There were no patient or physician predictors found to be significant for successful documentation of ECS-CP-s features.

Discussion

The adherence to ECS-CP completions as originally designed was very poor in daily clinical practice by palliative care specialists. A modification of the scoring system with an increasing simplicity into "yes" and "no" resulted in a significant improvement in completion rate. However, although significant, this was still quite low 6 months after the intervention with approximately 40 % documentation and completion rate. Only after multiple educational sessions did the adherence increase to acceptable clinical levels (approximately 70 % documentation and completion rate at 24 months). It was necessary to issue multiple reminders to reach the point of satisfactory documentation and completion. There are some physicians who are more reluctant or who need more training and not all the physicians evolved at the same rate as shown in Fig. 2. Our findings confirm that a simplified version and educational sessions helped result in improved adherence. Establishing psychometric properties of the revised simplified version compared to the current standard version and to other similar instruments will be an important next step in establishing the utility of this version. Furthermore, while

Table 1 Patient and physician characteristics

	Pre [*N* (%)]	6 months post [*N* (%)]	24 months post [*N* (%)]
Female gender	155 (45 %)	167 (49 %)	177 (54 %)
Ethnicity	232 (68 %)	235 (69 %)	224 (68 %)
Caucasian	46 (13 %)	32 (9 %)	33 (10 %)
African American	43 (13 %)	45 (13 %)	39 (12 %)
Hispanic	22 (6 %)	29 (9 %)	32 (10 %)
Others			
Cancer diagnosis	39 (11 %)	39 (11 %)	43 (13 %)
Breast	67 (20 %)	69 (20 %)	90 (27 %)
Gastrointestinal	11 (3 %)	25 (7 %)	40 (12 %)
Genitourinary	17 (5 %)	28 (8 %)	16 (5 %)
Gynecological	64 (19 %)	53 (16 %)	31 (10 %)
Head and neck	8 (2 %)	10 (3 %)	6 (2 %)
Leukemia/lymphoma	102 (30 %)	80 (24 %)	72 (22 %)
Thoracic	35 (10 %)	37 (11 %)	30 (9 %)
Others			
Cancer stage	280 (82 %)	295 (87 %)	282 (86 %)
Advanced	63 (18 %)	46 (13 %)	46 (14 %)
Early			
Physician gender, female	4 (33 %)		
Female			
Median physician age (IQR)	42, 38–55		
Median physician years of clinical experience (IQR)	8, 5–24		

simplification may allow for quicker completion, we have not tested this in the study. In further studies, documenting time to completion of the instrument will allow for analysis on whether a simplified version results in significantly quicker completion particularly in busy clinical settings.

Our data strongly suggests in 24 months, the physicians can be divided into 2 groups. 9/12 (75 %) physicians fully adopted the ECS-CP-s with a documentation rate that exceeded 80–90 % while 3/12 (25 %) physicians had a documentation rate below 20 %. Further improvement in the completion of these tools may need individualized counseling in those not willing to complete the questionnaire to ensure appropriate classification of pain takes place. Of the nine physicians who were interested in documenting pain syndrome, the

Table 2 Breakdown of Edmonton classification system for cancer pain documentation

Variable	Documentation		
	Pre [N (%)]	6 months post [N (%)]	24 months post [N (%)]
Number of ECS-CP items	336 (98 %)	197 (57.8 %)	71 (21.6 %)
0	7 (2 %)	8 (2.3 %)	19 (5.8 %)
1	0	2 (0.6 %)	2 (0.6 %)
2	0	2 (0.6 %)	2 (0.6 %)
3	0	1 (0.3 %)	12 (3.7 %)
4	0	131 (38.4 %)	222 (67.7 %)
5			
ECS-CP Items	7 (2 %)	144 (42.2 %)	257 (78.4 %)
Mechanism of pain	0	134 (39.3 %)	226 (68.9 %)
Incident pain	0	133 (39 %)	234 (71.3 %)
Addictive behavior	0	133 (39 %)	235 (71.6 %)
Cognitive dysfunction	0	133 (39 %)	235 (71.6 %)
Psychological distress			

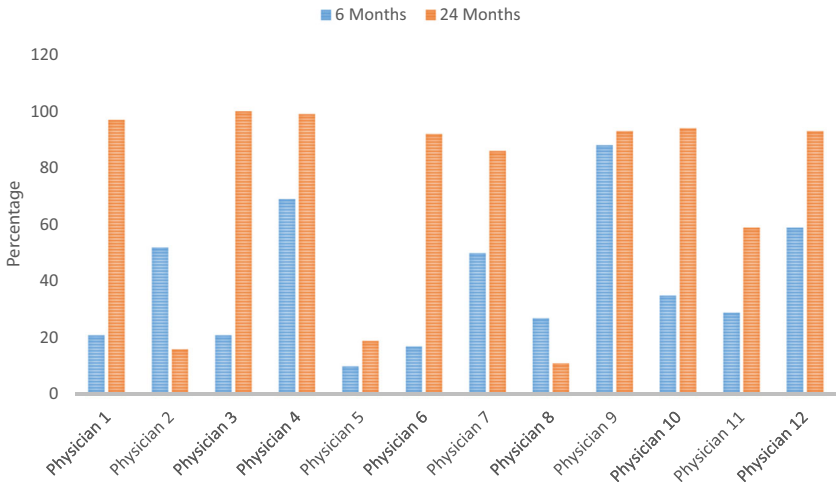

Fig. 2 Difference in completion rate between 6 and 24 months post-intervention per physician

previous documentation method appeared to be a barrier to documentation as shown in Fig. 2 where changes resulted in progressive completion. The lack of completion was due to poor adherence, rather than absence of information. The difference observed after simplifying the tool confirmed our hypothesis. After conversation with the physicians, simplification was helpful in increasing completion. However, simplification was not all that was needed to effect these improvements. Continued education and reminders through emails, checklists, and reminder cards also played a valuable role. Further research using formal surveys or interviews are needed to assess physician in experiences of using the modified tool, perspectives on reasons for increased completion rate, and barriers into its use.

It is important to emphasize that adoption of new methods is a slow process and takes multiple instructional sessions and reminders for it to fully be adopted as documented in 6 months with only 1/9 physician showing 80–90 % completion as compared to the other 8/9 physicians reaching it by 24 months. In a paper on adopting evidence-based practice, Innis and Berta described how new practices are adopted based on "absorptive" capacity, which can manifest as routines. Furthermore, training, time, and education have been found to be important factors in the implementation of a new practice [16]. In a review on quality improvement programs in colonoscopy services, Candas et al. reported that a longer experience and perception of a positive impact of a certain program may result in a positive influence on its implementation [17]. More research on stronger enhancements to adopt clinical and research tools should continue to take place.

The finding that the ECS-CP-s feature most completed is pain mechanism was not surprising. This may be partly explained that natural documentation of a pain syndrome involves describing mechanism of pain. However, other features such as psychological distress, addictive behaviors, and cognitive dysfunction, may not be a regularly documented or investigated aspect of pain management. Further research is needed in identifying and documenting these other features which may have use as predictors of complex cancer pain syndromes.

The ECS-CP features had been designed and analyzed into assisting in the management of pain [6, 18, 19]. We did not find that patient-reported pain and other symptom distress level were significant predictors of documentation of the ECS-CP-s features. Moreover, a history of patient CAGE positivity for alcohol abuse, which has been known as a predictor of chemical coping and aberrant drug use, also did not significantly result in documentation of ECS-CP-s features [7, 20, 21].

On the physician's side, the length of clinical experience was not found to affect documentation of the ECS-CP-s features. None of the other patient or physician factors were also found to be significant predictors into its documentation. Successful implementation of a scoring system may still hinge on periodic reminders, education and training on its use, irrespective of patient or physician characteristics. One possible concern in studies on the adoption of a new practice was observer bias that might affect the study results during the period of observation. The retrospective nature of our data after 24 months allowed us to obtain data that were less likely to be influenced by the physician's being aware that they were part of a research study. In our data, we were able to observe continued changes in at least two study periods, 6 and 24 months after intervention.

In summary, our findings suggest that significant simplification of the scoring system and intensive education are necessary for successful adoption of a scoring system. More research is needed in order to identify how to adopt tools for daily clinical practice in palliative care.

Given that this is the first study looking at the simplified version of the ECS-CP, further research is needed into assessing physicians' experiences and perspectives, including benefits and barriers, of using the simplified version of the ECS-CP through the use of formal surveys. In addition, obtaining psychometric data to support the modifications

that were introduced are needed to support its use clinically as it is mainly for research purpose at this time. Finally, further research comparing the current version with the simplified version of the ECS-CP through a prospective study would be needed.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest. We have full control over our data and allow the journal to review our data if requested.

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