

Investigating a framework to prioritize sources for updating the evidence base informing cancer symptom triage and management knowledge tools: a secondary data analysis

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Abstract

Purpose:

To identify an efficient approach for updating evidence in cancer symptom triage and management knowledge tools.

Methods:

We analyzed evidence sources in four pan-Canadian Oncology Symptom Triage and Remote Support (COSTaRS) practice guides. Two team members independently appraised quality of clinical practice guidelines (CPGs) using AGREE II rigour domain. We created a prioritization framework for selecting evidence sources and investigated changes that would have been missed if the update was limited to prioritized sources.

Results:

The 56 new and 3 existing evidence sources (38 CPGs + 21 systematic reviews with meta-analysis) were for diarrhea ($n = 8 + 1$), constipation ($7 + 0$), fatigue ($7 + 14$), mouth sores ($9 + 6$) and immune checkpoint inhibitors ($10 + 0$). Systematic reviews were typically cited once and did not contribute novel evidence beyond what was reported in CPGs. Of 38 CPGs, 29 were identified by hand searching organizations with CPGs, 3 in database searches alone, and 6 in both. CPGs were cited 1 to 40 times (median 15) in a practice guide. The AGREE II rigour scores were 6% to 100% (median 77%). Applying the prioritization framework, all 21 systematic reviews and 7 CPGs could be removed with three missed items (acupuncture for constipation, assessing mouth sores if diarrhea, nystatin for oral candida).

Conclusion:

The prioritization framework applied to four COSTaRS practice guides demonstrated it was possible to use a more efficient targeted process, without compromising the integrity of the evidence base. Future COSTaRS updates could be more efficient by limiting evidence sources to hand searching organizations that produce multiple, higher quality CPGs.

Introduction

Knowledge tools and products are designed to present research evidence in user-friendly formats to meet the information needs of patients and healthcare professionals and facilitate the application of knowledge in healthcare decisions [1, 2]. To minimize biased decisions, quality evidence to inform these tools and products is based on systematic reviews, and where possible, with meta-analysis. In cases where there are many treatment or management strategies, often a single systematic review is inadequate to provide full evidence coverage or include research conducted in the varied clinical contexts in which care is provided [3]. Alternatively, a more rigorously developed clinical practice guideline (CPGs) presents systematically developed statements about a specific clinical situation based on one or more systematic reviews [4].

The pan-Canadian Oncology Symptom Triage and Remote Support (COSTaRS) practice guides are a set of knowledge tools for informing cancer symptom triage and management decisions [5]. Each of the 18 COSTaRS practice guides presents evidence-based guidance for nurses and other healthcare professionals to: a) assess symptom severity; b) triage decisions for the level of healthcare based on symptom severity; and c) for non-severe symptoms, review medications and discuss self-care strategies to support symptom management [6]. A randomized controlled trial showed that compared to usual care, when nurses used COSTaRS practice guides for telephone symptom triage, patients had decreased symptom severity, improved quality of life, and were more likely to use self-care strategies for symptom management [7]. In another study, an after-hours nurse-led telephone service using COSTaRS with patients from 74 ambulatory oncology programs (over 20,000 calls/year) had reduced emergency department visits with an annual cost savings of \$3.8 million and high-level patient satisfaction [8]. COSTaRS practice guides are recommended in Cancer Care Ontario's (CCO) oncology nursing tele practice standards [9], and endorsed by the Canadian Association of Nurses in Oncology [10].

Released in 2012, the first set of 15 COSTaRS practice guides was created by a team of researchers and nurses (including managers and educators) from eight of ten Canadian provinces [5]. The original set and subsequent updates involved searches in medical databases for systematic reviews and CPGs, combined with a grey literature search of known developers of CPGs. Recent evidence updates have become more laborious and resource-intensive due to significant increases in database search findings, mainly driven by a rapid rise in published systematic reviews. For example, the number of citations requiring screening increased substantially from 237 citations screened in 2016 for 15 COSTaRS practice guides to 557 in 2020 for 17 practice guides (including adding evidence from immune checkpoint inhibitors [ICI]) and to 17,618 in 2024 for 18 practice guides [5, 11, 12]. Concurrently, our continued commitment to ensuring updated effective evidence-informed knowledge tools has influenced their widespread use across Canada and internationally (e.g., Turkey, China, the USA); underscoring their reach and applicability to diverse cancer care settings [7, 8, 13]. Similar knowledge tools are currently in development and evaluation for guiding patients in triaging and managing symptoms of chronic kidney disease [14].

The purpose of this study was to determine an efficient and sustainable approach for updating these evidence-informed COSTaRS practice guides and maintain their continued credibility as trustworthy cancer symptom triage and management knowledge tools. The research objectives were to: a) identify specific high-quality evidence sources that informed the 2024 changes; b) determine if systematic review evidence contributed unique novel evidence beyond that reported in CPGs; and c) evaluate a framework to prioritized evidence sources for future updates.

Methods

Study Design

This is a secondary analysis of evidence sources reported in the 2024 systematic review to update the four COSTaRS practice guides. Methods are summarized below with full details available in the original review [12].

Search strategy and selection process. In the original review, a comprehensive search was conducted in electronic databases (i.e., MEDLINE, CINAHL, Embase, PsycINFO) and hand-searches of websites for known cancer CPG developers in May and June 2023 [12]. Two team members independently screened all citations for eligibility. We included all CPGs and systematic reviews with meta-analysis plus GRADE evidence ratings relevant to a specific cancer symptom. Any differences were resolved through discussions with a third team member to reach consensus.

Eligibility criteria

For this secondary analysis, eligible evidence sources were the CPGs and systematic reviews that were used in the COSTaRS practice guides for diarrhea, constipation, fatigue and mouth sores.

Data extraction. In the original review, findings from eligible evidence sources were extracted in duplicate and synthesized by symptom using a standardized data extraction form [12]. The data extraction form documented the specific evidence sources linked to the content in each COSTaRS practice guide and this is indicated by superscript citations in each practice guide [15]. For this secondary analysis, quality appraisal was conducted for eligible CPGs focused on the four targeted symptoms (e.g., diarrhea, constipation, fatigue, mouth sores) and ICI that informed content of multiple COSTaRS practice guides. For quality appraisal of CPGs, two reviewers (SG, GB) independently used the eight items for the AGREE II rigour domain with each item rated on a scale of 1 strongly disagree to 7 strongly agree (see Supplementary Table 1). Any differences in ratings were resolved by discussion and/or involved a third author (MC, DS). The AGREE II instrument has proven reliability and validity for assessing the quality of CPGs and ratings are good predictors of outcomes associated with guideline implementation [4]. Eligible CPGs were tracked to determine they were if identified in electronic databases, hand searching or both.

Procedures for analyzing the data prioritization framework. The research team drafted a data prioritization framework to systematically guide the selection of evidence sources. Evidence sources were analyzed by each symptom (e.g., diarrhea, constipation, fatigue, mouth sores). Given that CPGs about ICI were used across multiple symptoms, they were grouped separately. To test the prioritization framework, the first step was to determine if it was possible to exclude the database search findings and only include CPGs identified by hand searching. Evidence from newly identified systematic reviews with meta-analysis in the database search was mapped against the evidence included in eligible CPGs to determine if any original evidence was solely

identified in systematic reviews. CPGs identified in the database search were investigated to determine if they could be found in hand searching. Second, the team tested if it was possible to prioritize CPGs created by cancer CPG developers known to develop CPGs for various symptoms and exclude developers of one CPG. Third, the team tested if it was possible to only include CPGs with a minimum quality AGREE II rigour threshold score defined as those scoring ≥ 40 out of 100. When evidence sources were removed, changes were documented.

Findings from the analysis for one symptom (diarrhea) were reviewed by the research team to reach consensus on the agreed upon priority evidence sources for subsequent updates of this COSTaRS practice guide. Then the prioritization framework was tested on three other symptoms (constipation, fatigue, and mouth sores).

Findings

In the COSTaRS practice guides (v2024) for diarrhea, constipation, fatigue, and mouth sores, there were 56 new and 3 existing evidence sources [16–18]. Of the 59 sources, 38 were CPGs and 21 were systematic reviews with meta-analysis (see Table 1; Supplement). For the 38 CPGs, 28 were identified by hand searching known organizations that develop CPGs, 5 in electronic database searches alone, and 5 identified in both (see supplement Table 1). Of the ten CPGs identified in electronic database searches, six CPGs were endorsed by an organization, and four were produced by a group of authors. All systematic reviews were identified in the electronic database search (see supplement Table 2).

Table 1
Evidence sources used for the secondary analysis

Topics	CPGs*	Systematic reviews
Diarrhea	8	1
Constipation	7	0
Fatigue	7	14
Mouth Sores	9	6
Immune Checkpoint Inhibitors (ICI)	10	0
Total unique evidence sources	38	21

* Counts are not mutually exclusive; some CPGs informed more than one topic.

Eligible systematic reviews (n = 21) were identified for three of the COSTaRS practice guides (diarrhea, fatigue, and mouth sores) (see Table 1; supplementary table 2). Each systematic review was cited once in a COSTaRS practice guide except for one systematic review that was cited twice. The only new evidence added to the content of the COSTaRS practice guides was use of low-level laser therapy for mouth sores identified in three systematic reviews; but use of this therapy was also identified in CPGs for target populations (e.g., patients with hematopoietic cell transplantation and head and neck cancers).

Of 12 organizations that produced CPGs, 10 developed multiple CPGs for various symptoms and 2 developed only one CPG (i.e., AGIHO, SITC) (see Table 2). Each CPG was cited in a COSTaRS practice guide from 1 to 40 times (median 15 times). The AGREE II rigour scores for the 38 CPGs ranged from 6% to 100% (median 77%).

Table 2
Characteristics of CPGs cited in COSTaRS practice guides

CPG source	Country	Diarrhea		Constipation		Fatigue		Mouth sores		ICI	
		Rigour of 100	Cited (n)	Rigour of 100	Cited (n)	Rigour of 100	Cited (n)	Rigour of 100	Cited (n)	Rigour of 100	Cited* (n)
AGIHO	Germany	58%	10								
AHS [19–21]	Canada			40%	19			98%	14	100%	12 constipation 5 fatigue
ASCO [22–24]	USA					100%	2			100%	7 fatigue 1 mouth sores
BC Cancer [25–29]	Canada	88%	29	88%	38	88%	27	88%	40	88%	12 diarrhea 1 constipation 5 fatigue
CCO [16, 30–34]	Canada	46%	27	42%	33	50%	23	46%	36	42%	15 diarrhea
								46%	37		4 fatigue
ESMO [23, 35–37]	Europe	50%	28	83%	24	83%	17			60%	15 diarrhea 6 fatigue
Hryniewicki [17]	USA									35%	9 diarrhea 1 constipation 2 fatigue
Lam [38]	Hong Kong			79%	7						
MASCC [39]	multiple	100%*	4					100%*	2		
NCCN [40, 41]	USA					83%	30			79%	10 fatigue 18 diarrhea 22 constipation 3 mouth sores
NCI [42–44]	USA	63%*	20	63%*	25	81%	21	94%	11		
NICaN [45, 46]	Ireland	8%*	22					8%*	23	6%	1 mouth sores 15 diarrhea
ONS [47–50]	USA	75%	19	88%	16			75%	15	75%	7 diarrhea
Rau [51]	Taiwan					96%	20				
SITC [52]	USA									65%	9 diarrhea 1 mouth sores

* CPG used for more than one COSTaRS practice guide; Grey shade were cut in prioritization framework; AHS = Alberta Health Services; ASCO = American Society of Clinical Oncology; BC = British Columbia; CCO = Cancer Care Ontario; ESMO = European Society for Medical Oncology; ICI = immune checkpoint inhibitor; MASCC = Multinational Association of Supportive Care in Cancer; NCCN = National Comprehensive Cancer Network; NCI = National Cancer Institute; NICaN = Northern Ireland Cancer Network; ONS = Oncology Nursing Society; AGIHO = Infectious Diseases Working Party of the German Society of Haematology and Medical Oncology; SITC = Society for Immunotherapy of Cancer

CPG source	Country	Diarrhea		Constipation		Fatigue		Mouth sores		ICI	
		Rigour of 100	Cited (n)	Rigour of 100	Cited (n)	Rigour of 100	Cited (n)	Rigour of 100	Cited (n)	Rigour of 100	Cited* (n)
Steinmann [53]	Germany							75%	1		
* CPG used for more than one COSTaRS practice guide; Grey shade were cut in prioritization framework; AHS = Alberta Health Services; ASCO = American Society of Clinical Oncology; BC = British Columbia; CCO= Cancer Care Ontario; ESMO = European Society for Medical Oncology; ICI= immune checkpoint inhibitor; MASCC = Multinational Association of Supportive Care in Cancer; NCCN = National Comprehensive Cancer Network; NCI = National Cancer Institute; NICaN = Northern Ireland Cancer Network; ONS = Oncology Nursing Society; AGIHO = Infectious Diseases Working Party of the German Society of Haematology and Medical Oncology; SITC = Society for Immunotherapy of Cancer											

When we tested the prioritization framework, evidence could be removed from all 21 systematic reviews and 7 unique CPGs (Table 2 grey shaded CPGs), and there would only be 3 unique content items missed. The NICaN (2022) guideline recommended assessing for mouth sores in people with diarrhea and using Nystatin medication for oral candida. The Lam (2019) CPG recommended acupuncture for constipation. Without compromising the integrity of the evidence base, it was possible to limit the evidence in the four COSTaRS practice guides to: a) evidence that was only identified by hand-searching; b) CPGs developed by organizations that produced multiple CPGs; and b) CPGs with AGREE II rigour scores $\geq 40\%$.

Discussion

Our secondary analysis demonstrated that it was possible to prioritize evidence sources for subsequent evidence updates for the four COSTaRS practice guides without compromising the quality of the evidence base. The systematic search of electronic databases did not identify any unique evidence that was not already identified in targeted hand searching of websites for CPG developers. Restricting the inclusion of evidence sources to CPGs only was feasible and would eliminate the need to conduct systematic searches in electronic databases. It was also feasible to limit the search to CPG developers that produce multiple CPGs and those with higher AGREE II rigour scores. Our findings lead us to the following points of discussion.

Knowledge tools are proven to be effective but given their use to inform decisions and management in clinical practice, it is important to have a well-tested framework to ensure a quality evidence base [2]. Interestingly, the systematic reviews did not contribute new evidence beyond what was reported in the CPGs. This may be due to rigorously developed CPGs being based on one or more systematic reviews of the evidence and translating that evidence into comprehensive recommendations for clinical practice [4]. It may also reflect that the evidence for cancer symptom management has been relatively stable over the years except for the emerging evidence about symptoms specific to ICI immunotherapy that was added into the 2020 version of COSTaRS [11, 54]. This newer type of cancer treatments requires several symptoms to be triaged more urgently given their potential to progress quickly to being more severe and life-threatening [11]. Otherwise, there have been fewer changes to symptom management since COSTaRS practice guides were originally released in 2012 [5, 11, 12].

When there are more efficient approaches that could be used, continuing with comprehensive searches for evidence contributes to research waste. Research waste was defined as research that does not produce value because of avoidable inefficiencies in the design, conduct, reporting, or dissemination of research, resulting in wasted time, effort, and resources [3]. For COSTaRS evidence updates, continuing with comprehensive evidence searches requires working with an academic librarian to update the search strategy and conduct the search. But more importantly, this last update required hours for research team members to screen over 17,000 citations and add 175 new evidence sources across 18 COSTaRS practice guides [12]. Another waste was extracting data from 21 systematic reviews relevant to three symptoms when no novel evidence was identified. Future updates of these four COSTaRS practice guides could use this more efficient approach, unless there is knowledge of rapidly emerging research that should be considered.

Future research should test the framework to prioritize evidence sources on the other 14 COSTaRS practice guides and consider investigating a more restrictive prioritization framework. One CPG developer suggested endorsing recommendations in CPGs when the AGREE II rigour domain scores are at least 50% [55]. However, using a more restrictive approach has the potential of reducing

the generalizability of the COSTaRS practice guides that are currently being used in multiple countries [7, 8, 13]. Hence, our team did not proceed with further evaluating a more restrictive prioritization framework.

There are some strengths and limitations to consider when interpreting the findings. The COSTaRS research team has carefully tracked all evidence sources added to the COSTaRS practice guides with a rich database to conduct this type of secondary analysis. Each of the CPGs was quality appraised for AGREE II rigour domain by two team members with consensus. An important limitation is that the AGREE II appraisal was done on available information about the guideline development process. Many guideline developers transparently report the details in their CPGs or in a supporting guidance document; whereas some provided little detail. Hence, the actual quality scores need to be interpreted with caution. Although the prioritization framework showed ways of being more efficient with these four cancer symptoms, it is not clear if the same prioritization will demonstrate similar efficiencies with the remaining 14 COSTaRS practice guides. Another potential limitation is applying this prioritization framework to a symptom for which there is rapidly evolving evidence (e.g., COVID-19) or introduction of novel therapies (ICI). These situations may require a comprehensive search tailored to the topic.

In summary, the prioritization framework applied to four COSTaRS practice guides demonstrated it was possible to use a more efficient, systematic and sustainable process for updating the evidence. Subsequent updates of the diarrhea, constipation, fatigue, and mouth sores COSTaRS practice guides could focus on hand searching for CPGs from known developers using higher quality methods and avoid conducting searches of electronic databases. Future research should replicate this analysis to investigate if the prioritization framework can be applied to evidence updates of other common COSTaRS practice guides and for other types of knowledge tools that require ongoing evidence updates.

Declarations

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