

# Critical appraisal of the scientific literature

## PALLIATIVE CARE

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## Why is important?

- The mere fact that an article is published is not synonymous of validity:
  - Peer-review method helps in the first critical appraisal of the article.
  - Being a reviewer does not guarantee a real methodological training.

## Why is important?

- Biomedical journals can condition:
  - Clinical practice
  - Health related projects
- They are, therefore, a **pillar** of enormous importance for the **health of any society**, and can cause **harm to patients**.
- We must be **cautious** in accepting what is published as valid.

## CRITICAL APPRAISAL (CA)

- The process of **evaluating** and **interpreting** the evidence provided by the scientific literature, systematically **considering the results** it presents, their **validity** and **relevance** to the work itself.
- Critical reading enables the reader:
  - to **take a position** on what the text says.
  - to discover the implicit **assumptions**, the **strengths** and **weaknesses** of the arguments.
  - to **propose other approaches** beyond what the author says.

## CA

- The objectives are:
  - **Identify** the **strengths** and **weaknesses** of scientific publications.
  - **Recognize reliable scientific publications**, which expose knowledge acquired through rational thinking and learning.
  - **Make enlightened decisions** about appropriate care rather than relying on traditional practices or intuition.
  - **Share** with other health professionals in our sector the value and relevance of the results.

## CA

- The **components** are:
  - INTERPRETATION of what we read.
  - JUDGEMENT to differentiate valid and relevant information.
  - PROPOSAL of alternatives to improve the article.

## CA

- Reading critically helps us to:
  - Distinguish valid scientific evidence and make "**evidence-based" decisions** in everyday practice.
  - **Update** our knowledge.
  - **Improve our understanding** of the scientific literature.
  - **Plan** and **design** our own studies.
  - **Contribute** to the development of scientific evidence.

## General Recommendations for CA

- **Take note** of any **comments or doubts** that arise during the various readings of the article.
- **Consult** these **doubts** with someone who is an expert on the subject.
- It is **advisable to form a small group** with colleagues interested in developing critical reading and discuss each other's analysis as a group.
- Do not try to understand the article word for word.
- Do not worry if you do not understand part or all of the article on the first reading. Start by understanding some of the main ideas.

## 6 Recommended steps

### Recommended steps

#### 1. A **quick review** of the article:

- Read the names of the authors
- Look at the year and journal it was written
- Interpret the title of the article
- Identify the sections into which it is divided
- Look at the graphs, tables or images
- Look at the bibliography, if it is recent and related to the topic

## Recommended steps

### 2. Read the **abstract** of the article:

- Try to understand it as much as possible
- Identify the central argument of the article
- Read the conclusions

## Recommended steps

### 3. Give it a **quick first reading**:

- Mark all the concepts and technical words that you do not understand.
- At the end of the first reading, reflect and make notes on what you understood as well as any doubts that have arisen.

## Recommended steps

4. **Look for those words** that you did not understand and that you think are **fundamental to understanding** and critiquing the main ideas of the article.

## Recommended steps

5. **Read the article a second** time. This time **carefully** and being familiar with the scientific terminology of the subject matter:
  - Take note of any questions that arise.
  - Summarize the ideas and main conclusions.
  - Try to answer the guiding questions during the second or third reading of the article.

## Recommended steps

### 5. Guiding questions in Step 5

- What are the main **research questions**?
- What is the **hypothesis** that the study seeks to test?
- What are the **objectives** of the article?
- What research **has been done** on the topic before?
- What were the **methods** used in the research?
- What are the **sources of information** used in this article?
- What are the data presented as evidence in this article?
- What are the **main conclusions** of the article?
- How does this article **contribute** to the discipline?

## Recommended steps

### 6. **Reflect critically** on the article read:

- Test the validity of the article.
- Analyse the key parts accurately.
- Use the critical questions as a guide.



## Recommended steps

### 6. Critical questions in step 6:

- What is the importance or relevance of the research?
- Do you agree with the way in which the author conducted the research?
- How appropriate are the research procedures and techniques used by the author?
- To what extent does the evidence presented support the author's arguments?
- Was sufficient evidence presented to judge the results of the research for oneself?
- Are the findings presented applicable to other observations?
- Were you able to detect any patterns or contradictions in the data that the author did not mention?
- Do the findings adequately represent the population under study?

## Recommended steps

### 6. Critical questions in step 6

- Do you agree with the conclusions?
- Do the conclusions over-generalise or are they sufficiently careful?
- Do the interpretations and reflections used in the article seem to respond to any particular interest of the authors?
- To the best of your knowledge, are the data presented sound and recognized by peers?
- Does the article succeed in meeting its original intended objectives?
- Review some literature on the topic of the article. Do you feel that the author has cited the most important works on the topic?
- How does this article affect your earlier impressions of the topic?
- Do you think the article is clear and well written?

## Checklist by sections

- Is the article well distributed in sections?
- Are sections well organized?
  
- Title
- Abstract
- Introduction + objectives
- Methods
- Results
- Discussion
- Conclusion

## TITLE- Checklist by sections

- Describes accurately what the study entails
- It has a simple structure:
  - Atractive
  - Gives information about
    - Sample (groups)
    - Characteristics of the group
    - Scope of the study

<b>TITLE</b>
<b>Describes accurately what the study entails</b>
<b>It is clear, easy to understand</b>
<b>It is concise (aproximately ≤15 words)</b>
<b>It identifies the key words of the study</b>
<b>There are no acronyms</b>

<b>AUTHORSHIP</b>
<b>The relationship between the complexity of the article and the number of authors is consistent</b>
<b>The researchers are specialists in the area of knowledge of the subject area</b>
<b>The authors have published other studies related to the topic</b>
<b>Other publications of the authors are not redundant on the topic</b>

## ABSTRACT

- Abbreviated expression reduced to precise and essential terms of the most important ideas and concepts of the article.
- Article's business card to the reader
  - Independent
  - Self-explanatory
  - Autonomous
- Purpose: To identify the content of the document quickly and accurately
- Length: 150-250 words
- Style: clear, precise, concise, simple and impersonal

## Structure of abstract

1. Rationale/main objectives of the study
2. Methodology
  - Study design or type of study
  - Context: place, time, setting
  - Participating subjects or patients
  - Interventions
  - Type of analysis
3. Main results or findings with precise numerical values
4. Main conclusions of the study

## Abstract

**Does it reflect the content of the article?**

**Does it underline the most relevant facts of the research?**

**Is it coherent?**

**Would it be enough to understand and explain the study?**

**Could the abstract data be included in a review or meta-analysis?**

## INTRODUCTION

- It describes the **elements of the conceptual phase** of the research.
- It describes the **basic concepts** necessary for the understanding of the original article (theoretical framework).
  - A system of ideas from previous experience and knowledge, which provide the foundation for the study.
  - It is the conceptual support of the research.
- It serves as a **transition between the reader's world and the author's world**, preparing the reader to read with attention and reflection.
- It **answers the what and why** of the research.
- It justifies the measures to be carried out throughout the research.
- Knowing the current state of the problem, its background and the most recent existing knowledge about it (bibliographic review).
- To arouse the **reader's interest** in knowing the rest of the article.

## INTRODUCTION- structure

1. List the general issues that cover the problem (theoretical framework).
2. Review of the background to the problem.
3. Definition of the research problem (question).
4. Enunciation and location of the variables (predictor and outcome) to be considered in relation to the problem.
5. Formulation of the objectives of the study

## INTRODUCTION- wording of the objectives

- An objective is a specific and intended outcome to be achieved through descriptive research.
- It states an unambiguous, precise, feasible and measurable result to be obtained at the end of the study.
- It defines a quantifiable state or situation in a specific place and time.
- The objective corresponds to the research question whose answer will be the conclusion of the study.

## INTRODUCTION- redaction style

- Narrative
- Conversational
- Objective
- Logical
- To create in the reader a growing sense of discovery and interest
- Present tense
- Objectives are written in the infinitive

## INTRODUCTION- references

- Be relevant to the research topic and problem
- Be sufficiently up to date (5-10 years)
- Be sufficient to support the initial phase of the research without being exhaustive
- Be rigorous in citation

## Introduction

**Does the literary review summarize the current state of knowledge?**

**Does it clearly reflect what is known about the topic and the existing gaps?**

**Does it explain the study, its objective and the approach of the methodological design?**

**Does it clearly identify the objectives and/or hypotheses of the research?**

## Methods

- Adequacy to the research question specified in the objectives
- Accuracy, which is increased by decreasing confounder-induced variability
- Power- detect real differences
- Absence of biases that produce distortions in the results



## Methods- structure

1. Type of design
2. Subjects included (sample selection criteria)
3. Sources of information
4. Description of the intervention
5. Instruments and measurement procedures
6. Definition of covariates and variables included in the study
7. Data analysis

## Methods- Palliative sample characteristics

- Different populations
  - Oncology and non-oncology
  - With advanced disease or last days of life
- Functional impairment
- Frailty
- Limited life expectancy
- Impairment of higher functions such as cognitive function
- Need for well-defined sample

## Methods

**Do the authors identify the type of study conducted and the sources of their data?**

**Is the design adequate to answer the question posed?**

**Is a number of patients defined according to the objective of the study?**

**Have the variables studied and the types of measures used been described?**

**Are the questionnaires and scales used explained and their validity indicated?**

**Is the data collection process detailed?**

**Would I be able to repeat the same data collection in my environment?**

**Have the statistical methods used been described?**

**Do all the steps of the methodology have results?**

**Could the research be reproduced with the description of the methodology?**

## RESULTS

- What was found in the research?
- What are the main findings, resulting from the methodology used?
- Description of the study population
- Sufficient technical detail to be understood by the reader
- Selects, arranges and presents the findings by means of
  - Text
  - Textual aids
    - Tables
    - Graphs
    - Figures
    - Diagrams
    - Images

## RESULTS- How should the text be written?

- Clear, precise and limited to what is necessary
- Use an appropriate succession of paragraphs
- Use headings and/or subheadings only to add clarity to the categorisation
- Cite all tables and figures
- Express yourself in the past tense
- Does not repeat what is described in the material and methods section

## RESULTS- Tables and figures

- Self-explanatory
- Simple and easy to understand
- Short and clear title
- Indicate scales and units of measurements
- Balance simplicity with clarity and functionality
- Add information, does not duplicate

Results
<b>Are the results clearly expressed?</b>
<b>Do they follow a logical and parallel sequence to the methodology?</b>
<b>Is there evidence of missing data and loss of patients?</b>
<b>Do all the results correspond to the methodological steps used?</b>
<b>Is the sample described?</b>
<b>Are the statistics used correct?</b>
<b>Are the comparisons consistent and justified?</b>
<b>Are all tables and figures necessary?</b>
<b>Are the tables and figures and graphs self-explanatory?</b>
<b>Are the results of the tables repeated in the text?</b>
<b>Is it avoided to interpret results in this section?</b>
<b>Are dates defined?</b>

## DISCUSSION

- What is the significance of the study findings?
- Highlight new and relevant aspects of the study and the main conclusions.
- Analysis and interpretation of the research data
- To provide a concrete answer (conclusion) to the research question (objective).

## DISCUSSION - structure

1. Commenting on one's own results
2. Corroborating the reliability and validity of the research
3. Interpret unexpected findings
4. Compare the research data with other similar research data
5. Acknowledge the limitations of the study and self-critique the study honestly
6. Discuss the theoretical and/or practical implications of the study
7. Suggest further concrete studies on the research problem. Identify future lines of research

## DISCUSSION - style

- Argumentative style (debate and controversy).
- Differentiate between what is certain and what is probable and what is merely speculative.
- Verbal tense:
  - Present tense for references to other authors
  - Past tense for references to one's own research

## CONCLUSIONS

- It represents the researcher's answer (supported by the interpretation of the results obtained) to the research question posed in an objective manner.
- Most common errors:
  - Conclusions are not justified as they are not supported by the results of the study.
  - Conclusions are not in line with the objectives
  - Conclusions are not understood

Discussion / Conclusion
<b>Are the claims made and discussed based on the results?</b>
<b>Are differences between findings and expectations valued?</b>
<b>Do the conclusions answer the research questions and objectives?</b>
<b>Are the results discussed comparing them with other investigations?</b>
<b>Do the authors detail the contributions of the research?</b>
<b>Are hypotheses generated for future research mentioned?</b>
<b>Are possible limitations of the study noted?</b>
<b>Is there any conclusion and/or any practical recommendation?</b>

## REFERENCES

- Presented in the Journal 's standard style.
- Up to date
- Should help the reader to explore the topic further.

### REFERENCES

**Are the references made according to the standards of the journal?**

**Are the sources current and relevant?**

**Are all relevant references from previous research included?**

**Are well written (Vancouver, APA...)**

## ETHICAL ISSUES

### ETHICAL ISSUES

**Does the design or objective of the study require any kind of ethical assessment?**

**Has the study protocol been approved by the research ethics committee?**

**Has informed consent been obtained from patients?**

## ATTENTION SHOULD BE PAID...

- ...to any declared conflict of interest or grant.

## LANGUAGE

LANGUAGE
Is the article well written?
Is the wording adequate?
Does it use clear, simple, precise and understandable language?
Is it easily understood in its different sections?
Are logical arguments used?



## What have we seen?

- General CA for articles
- There are specific guides depending on the method
- CASP

## Exercise

- Temel et al., 2010
- CA individually and complete worktable - 30min
- Discuss sections with your colleagues
- All together

STRUCTURE	
Is the article well distributed in sections?	Yes. Abstract, Introduction, Methods, Results, Discussion-conclusion section is in the end of discussion
Are sections well organized?	Yes
Title	
Describes accurately what the study entails	Early palliative care (what) for patients with metastatic non small cell lung cancer (who)
Is clear, easy to understand	Yes
Is concise (aproximately ≤15 words)	Yes (12 w.)
Identifies the key words of the study	Yes. Early palliative care; patients; metastatic non cell lung cancer
There are no acronyms	No

Authorship	
The relationship between the complexity of the article and the number of authors is consistent	12 authors
The researchers are specialists in the area of knowledge of the subject area	Yes, They work in hospital and Palliative medicine
The authors have published other studies related to the topic	Yes 13. Temel JS, Jackson VA, Billings JA, et al. Phase II study: integrated palliative care in newly diagnosed advanced non-small cell lung cancer patients. J Clin Oncol 2007;25:2377-82. 15. Jackson VA, Jacobsen JC, Greer J, et al. Components of early intervention outpatient palliative care consultation in patients with incurable NSCLC. J Clin Oncol 2009; 27:Suppl:20635. 23. Temel JS, Greer JA, Admane S, et al. Code status documentation in the outpatient electronic medical records of patients with metastatic cancer. J Gen Intern Med 2010;25:150-3. 27. Pirl WF, Temel JS, Billings A, et al. Depression after diagnosis of advanced non-small cell lung cancer and survival: a pilot study. Psychosomatics 2008;49: 218-24.
Other publications of the authors are not redundant on the topic.	In reference number 15 they explore the components of early intervention outpatient PC which is related but is not redundant.

Abstract	
Does it reflect the content of the article?	Yes,
Does it underline the most relevant facts of the investigation?	Yes, explains the most important ideas and concepts of the article, self-explanatory, precise
Is it coherent?	Yes, there is a justification of the research, objectives are explained, the sample, methods (including instruments), Results (with statistical values), conclusions are related to the objectives.
Would it be enough to understand and explain the study?	Yes, they explain the process conducted and results precisely
Could the abstract data be included in a review or meta-analysis?	Yes, the results are presented precisely

Introduction	
Does the literary review summarize the current state of knowledge?	Yes, they explain what is the current state of the problem -Debate of quality of care and use of services - Comprehensive oncological care is beneficial - Palliative care - Late PC vs. Early PC
Does it clearly reflect what is known about the topic and the existing gaps?	-MNSCL Cancer high symptom burden , low QoL -Early PC feasible and acceptable
Does it explain the study, its objective and the approach of the methodological design?	No
Does it clearly identify the objectives and/or hypotheses of the research?	The <b>goal</b> of the current study was to examine the effect of early palliative care integrated with standard oncologic care on patient reported outcomes, the use of health services, and the quality of end-of-life care among patients with metastatic non-small-cell lung cancer.  We <b>hypothesized</b> that patients who received early palliative care in the ambulatory care setting, as compared with patients who received standard oncologic care, would have a better quality of life, lower rates of depressive symptoms, and less aggressive end-of-life care.

Methods	
Do the authors identify the type of study conducted and the sources of their data?	Yes, "From June 7, 2006, to July 15 2009 we enrolled ambulatory patients with newly diagnosed metastatic non-small-cell lung cancer in a nonblinded, randomized, controlled trial of early palliative care integrated with standard oncologic care, as compared with standard oncologic care alone (page 734)".
Is the design adequate to answer the question posed?	Yes,  This design compares the effect of the intervention differentiating intervention group vs. control group.
Is a number of patients defined according to the objective of the study?	Yes,  "The primary outcome was the change in the score on the TOI from baseline to 12 weeks. We estimated that with 120 patients, the study would have 80% power to detect a significant between-group difference in the change in the TOI score from baseline to 12 weeks, with a medium effect size of 0.5 SD. The protocol was amended in August 2008 to allow for the enrollment of an additional 30 participants in order to compensate for the loss of any patients to follow-up (page 735)".
Have the variables studied and the types of measures used been described?	Yes, "Patient-reported measures" section in page 735.

Methods	
Are the questionnaires and scales used explained and their validity indicated?	Yes, "Patient-reported measures" section in page 735  The validity is not explained but the articles about validity are referenced.
Is the data collection process detailed?	Yes, "Data Collection" section in page 735
Would I be able to repeat the same data collection in my environment?	Yes, is it well explained.
Have the statistical methods used been described?	Yes, statistical analysis is deeply explained in "Statistical Analysis" section (page 735, 736)  Descriptive, Fisher, Chi-square, t- student, regression analysis.
Do all the steps of the methodology have results?	Yes,  -Patients Description, patient-reported measure (QoL, mood), measures of health care use (in the last days), data collection (respondent, losses..)
Could the research be reproduced with the description of the methodology?	Yes,

Results	
Are the results clearly expressed?	Yes, they are divided in sections and are clearly expressed.
Do they follow a logical and parallel sequence to the methodology?	Yes,  Baseline characteristics of the patients, palliative care visits, quality of life and mood, end of life care.
Is there evidence of missing data and loss of patients?	The authors explain:  "The protocol was amended in August 2008 to allow for the enrollment of an additional 30 participants in order to compensate for the loss of any patients to follow-up"  "Another strength of our trial was the low rate of loss to follow-up and the high percentage of participants who completed the study assessments"
Do all the results correspond to the methodological steps used?	Yes
Is the sample described?	Yes, Table 1.
Are the statistics used correct?	Yes,

Results	
Are the comparisons consistent and justified?	Yes, all the information is compared between the 2 groups. This comparison is justified considering the aim and the design of the study.
Are all tables and figures necessary?	Yes  -Groups characteristics and statistical differences of the characteristics  -Differences in QoL and mood
Are the tables and figures and graphs self-explanatory?	Yes, also the text below them helps.
Are the results of the tables repeated in the text?	No
Is it avoided to interpret results in this section?	Yes
Are dates defined?	This information appears in the methodological section (June 7 2006-December 1, 2009)

Discussion / Conclusion	
Are the claims made and discussed based on the results?	Yes,
Are differences between findings and expectations valued?	Results fulfilled the expectations of the study
Do the conclusions answer the research questions and objectives?	<p>Objectives: The goal of the current study was to examine the effect of early palliative care integrated with standard oncologic care on patient reported outcomes, the use of health services, and the quality of end-of-life care among patients with metastatic non-small-cell lung cancer.</p> <p>Conclusion: Early integration of palliative care for patients with metastatic non-small-cell lung cancer is a clinically meaningful and feasible care model that has effects on survival and quality of life that are similar to the effects of first-line chemotherapy in such patients.<sup>28,38,39</sup> As compared with the study participants who received standard care, those who were assigned to early palliative care had improved mood, more frequent documentation of resuscitation preferences, and less aggressive end-of-life care.</p>
Are the results discussed comparing them with other investigations?	Yes

Discussion / Conclusion	
Do the authors detail the contributions of the research?	"...the results nonetheless offer great promise for alleviating distress in patients with metastatic disease and addressing critical concerns regarding the use of health care services"
Are hypotheses generated for future research mentioned?	No
Are possible limitations of the study noted?	<p>Yes, page 741</p> <ul style="list-style-type: none"> <li>- Single, tertiary care site</li> <li>- Lack of diversity with respect to race and ethnic group</li> <li>- Patients be aware of study assignments</li> <li>- Standar group patients who need PC were analyzed with the data from their assigned study group</li> </ul>
Is there any conclusion and/or any practical recommendation?	<p>Yes</p> <p>Early palliative care is a great promise for alleviating distress in patients with metastatic disease and adressing critical concerns regarding the use of health care services</p>

REFERENCES	
Are the references made according to the standards of the journal?	Yes
Are the sources current and relevant?	Yes
Are all relevant references from previous research included?	Yes
Are well written (Vancouver, APA...)	Yes, Vancouver

ETHICAL ISSUES	
Does the design or objective of the study require any kind of ethical assessment?	Yes
Has the study protocol been approved by the research ethics committee?	Does not specify
Has informed consent been obtained from patients?	Yes All participants provided written informed consent.

## REFERENCES

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