

The use of concept mapping in data analysis: a phenomenology study of family members' experiences in taking care of people with cancer[†]



Original article

Merry Andriani^a, Titan Ligita^{b,*}

^aDepartment of Chemotherapy, General Hospital of Doctor Soedarso Pontianak, Pontianak, West Kalimantan 78124, Indonesia

^bDepartment of Medical Surgical Nursing, School of Nursing, Faculty of Medicine Universitas Tanjungpura, Pontianak, West Kalimantan 78124, Indonesia

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Abstract: **Objective:** To explain the use of concept mapping in a study about family members' experiences in taking care of people with cancer. **Methods:** This study used a phenomenological study design. In this study, we describe the analytical process of using concept mapping in our phenomenological studies about family members' experiences in taking care of people with cancer. **Results:** We developed several concept maps that aided us in analyzing our collected data from the interviews. **Conclusions:** The use of concept mapping is suggested to researchers who intend to analyze their data in any qualitative studies, including those using a phenomenological design, because it is a time-efficient way of dealing with large amounts of qualitative data during the analytical process.

Keywords: cancer • concept mapping • data analysis • family • phenomenology

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1. Introduction

The development of concept mapping to use in an academic setting, including research, is of interest because dealing with research data to describe concepts is time-consuming, necessitating a simple method.¹ Concept mapping is defined by Novak¹ as “a tool to represent conceptual/propositional frameworks, either derived from clinical interviews or constructed by

the learners in our studies” (p.175). The aim of using a concept map is to visualize the data during analysis of the study.² In addition, concept mapping can help the researchers to illustrate ideas when their study's aim is to develop a theory.¹ Kinchin³ emphasized the dynamism of using concept maps, in which the structure of the knowledge component in the concept map can

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* Corresponding author.

E-mail: titan.ligita@ners.untan.ac.id (T. Ligita).

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be changed, along with the production of progressive concept mapping. In addition, concept mapping can be used to solve a problem when learning about a subject such as science.⁴

Many research studies have used concept mapping in nursing education,⁵ where the use of concept maps has been shown to be effective in encouraging critical thinking and self-reflection, to facilitate clinical reasoning and to link theory with practice. Concept mapping is also a strategy for teaching nursing students about evidence-based practice (EBP), and nursing students learning EBP through concept mapping showed increased confidence in using EBP and provided improved quality of care.⁶

The use of concept mapping varies in the academic setting and research studies. In the academic setting, concept mapping can be used to clarify a topic for students,⁷ and concept maps can be applied in either classroom or online teaching mode for facilitating the learning process at a school or university.³ Meanwhile, in a research study, concept mapping can be utilized at different stages: collecting data, analyzing the data, and presenting the findings.⁸ Moyo et al.⁹ used concept mapping for data collection in a study involving research activities including brainstorming, prioritizing, and clustering. In addition, concept mapping may be used as a research method, especially in qualitative study. Wilson et al.¹⁰ explained that their use of concept mapping was to visualize their data in a creative way, and thus, a participant's learning experience as a phenomenon of a study can be better understood. However, no explicit description exists of the use of concept mapping as an analytic tool and of data presentation in a study of phenomenology. Thus, it is necessary to show the steps in using concept mapping from the development of codes until the emergence of the core themes.

2. Methods

According to Novak,⁴ a good concept map needs to have concepts (labelled events or objects) and linking words between the connected concepts. During the development of concept maps, this study used the framework method of analysis by Gale et al.¹¹ The steps include

1. transcribing the interviews,
2. familiarization with the interview material,
3. developing codes,
4. developing an analytical framework,
5. applying the analytical framework,
6. charting the data into the framework matrix, and
7. interpreting the data.

The use of concept mapping in this study started from step number 3—developing codes. To develop the codes, we labelled the meaningful phrases or sentences in the raw data (interview transcripts). We also used R package for Qualitative Data Analysis (RQDA) software and Bubbl.us application to help us in managing the developed codes and categories. Before developing the concept maps, we constructed a matrix for the codes, categories, sub-themes, themes, and the core theme. In the stage of data charting, we used Excel to group the sub-themes from the categories into themes and finally the core theme. Data visualization through concept maps was created during analysis of the data, from development of the codes until development of the core theme. We also made use of concept mapping in the final steps of this framework to interpret the data. Thus, the concept maps were developed with specific aims. First, we built concept maps when developing the codes. Then, we developed a concept map showing the progression from codes to categories. Once the categories were generated, we created sub-themes, also with a concept map. After that, a concept map connecting the sub-themes with themes was developed. Finally, a core concept map was created; it reflects the core that describes the experience of a family taking care of and fulfilling the needs of a person with cancer.

This method explains the use of concept mapping as an analytical process in the study by Ligita et al.¹² The study involved 9 family members who take care of people with cancer. A phenomenology study design was used to fulfil the aim of the study, which was to describe the experiences of those family members. Eleven interviews were undertaken with the 9 participants, including the interviews for data validation to maintain study rigor. Five themes were developed to support one core theme. The themes are “decisions to make,” “keeping up the good support,” “acknowledging others’ contributions,” “assisting my family to alleviate the disease,” and “adapting to the current situation.” Meanwhile, the core theme is “prioritizing the efforts: Being aware of the best we could do for our family.” This study was approved by the Faculty of Medicine (No. 4185/UN22.9/PG/2021) and Doctor Soedarso General Hospital (No. 09/RSUD/KEPK/V/2021).

3. Results

Concept mapping was used in various ways in this study. First, we used concept maps in analysis of the data by developing concepts from codes to the core theme. First, 112 codes were developed (see Figures 1 and 2). From these codes, 22 categories and 10 sub-themes were created (see Figures 3 and 4). Finally, we developed 5 themes and 1 core theme (Figure 5). Then, a concept

map was used to validate the data. In validating the data, we also created narrative writing to be distributed to the participants in our second stage of data collection. Together with the narrative writing, a diagram (the final concept map) that explained the core theme and

the supported 5 themes was displayed. The participants were asked to look at the final concept map and to read the narrative writing. After that, the participants explained whether the narrative writing reflected their experiences as family caregivers in taking care of and fulfilling the

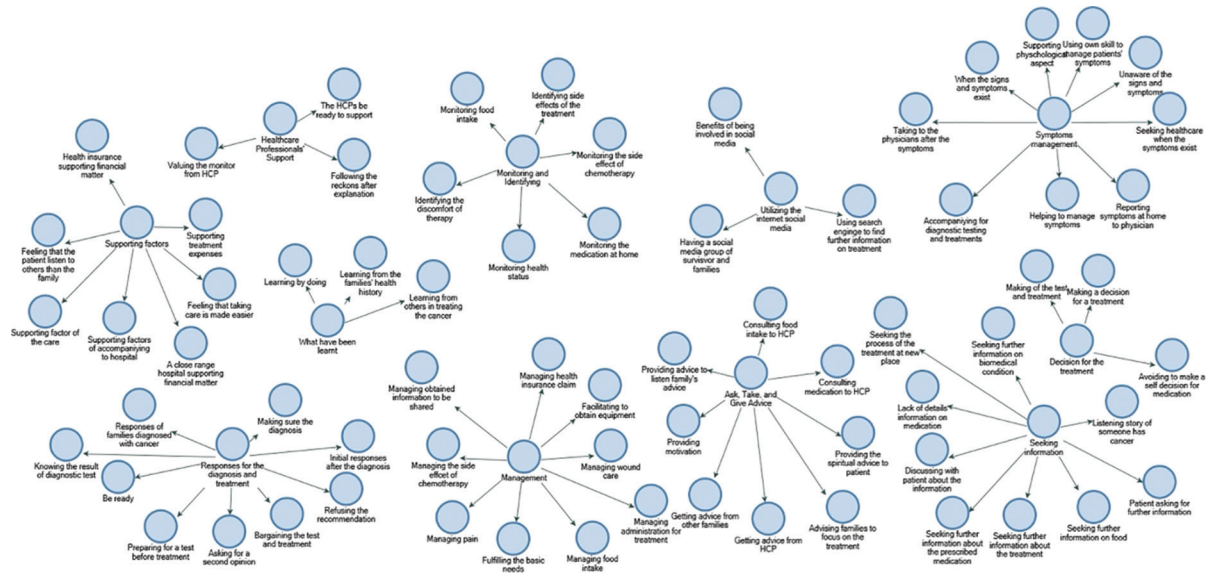


Figure 1. Developing the first category until the tenth category (generated from NVivo).

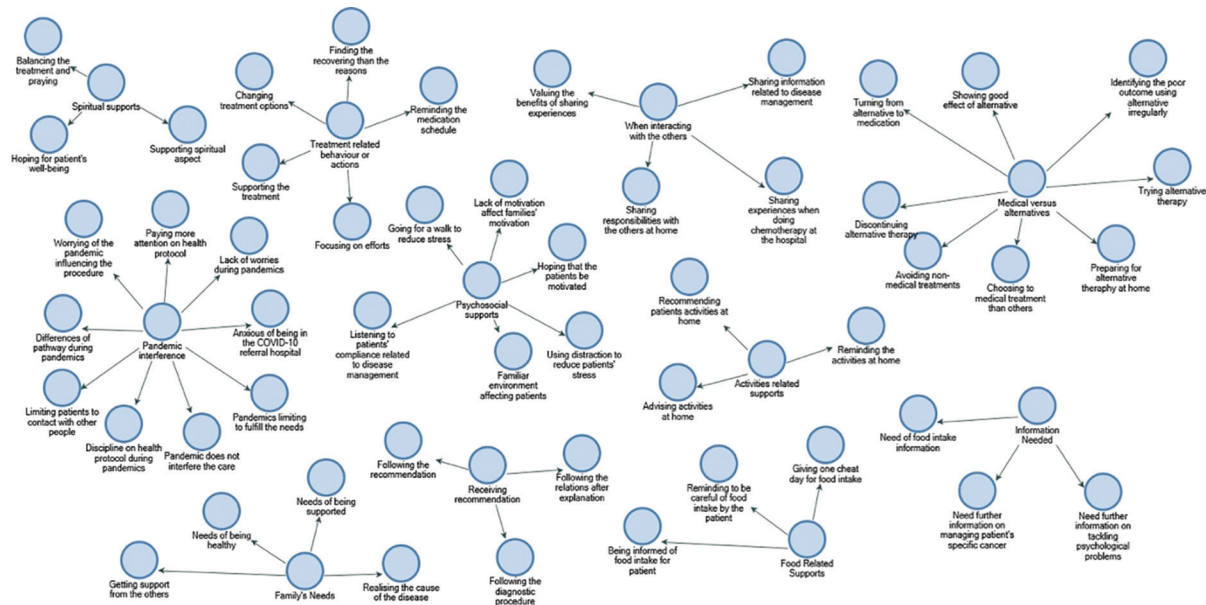


Figure 2. Developing the eleventh category until the twenty second category (generated from NVivo).

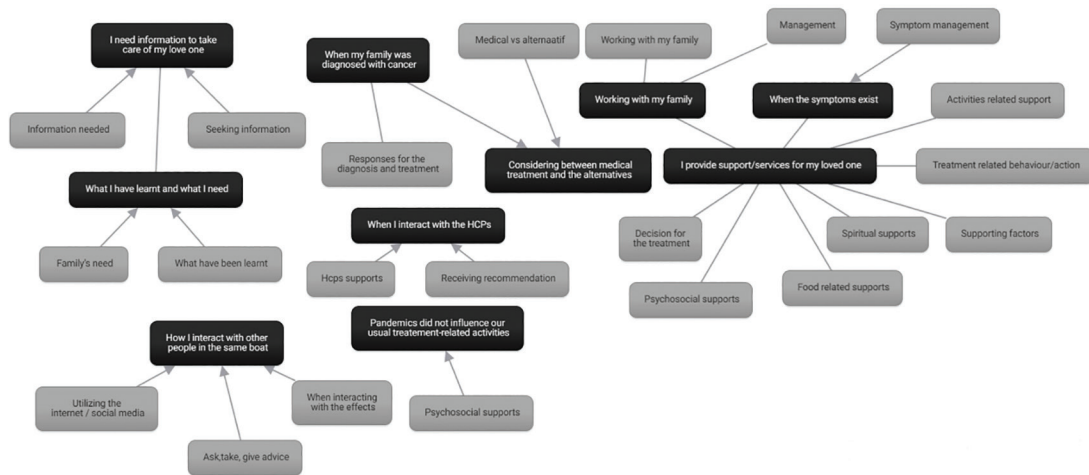


Figure 3. Concept map showing categories and linking sub-themes.



Figure 4. The 10 sub-themes and the five developed themes.



Figure 5. The final concept map showing the emerged core theme reflecting the experience of a family in taking care of a person with cancer.

needs of the patients. Likewise, concept mapping can be used to build an interactive relationship with the reader as it shows visual images of the concepts,¹⁰ in this case, the participants during the process of data validation.

4. Discussion

The use of concept mapping as tools in collecting and analyzing data has become more popular in qualitative research studies. The scope of employing concept maps includes collecting graphics during data collection to represent participants' views and experiences.¹³ Researchers may call them diagram, graphics, mind maps, or concept maps. However, these tools have advantages to visualize participants sharing their experiences and viewpoints in a distinctive way.¹³

In this study, the concept mapping was used as an analytical tool to help researchers when analyzing their collected data. The final form of the concept map was visualized to the research participants along with the narrative writing to ensure that the findings reflect the participants' experience of taking care of people with cancer. Involving participants in the process of analysis strengthens the study rigor as the findings were shown to the participants before the researchers decide the final conclusion of the study. Buckley and Waring¹⁴ highlighted the use of visual tool to assist concept refinement as the individuals participating in the study may communicate ideas to the others. Researchers and the participants in a qualitative study may also co-construct the conceptual work by which the participants may represent their life and experience through concepts.¹⁵

Åhlberg¹⁶ identified two dimensional types of concept mapping: conceptual components that have named links or unnamed links and concept maps with or without pictures. In this study, the concept maps have unnamed links that connect codes, categories, sub-themes, and themes. Additionally, we did not provide pictures for in-concept maps as the phrases in the boxes clearly describe the codes, categories, sub-themes, and themes. The researchers should be wise to appropriately use any tools in the process of analysis, and it depends on the context they intend to explore.¹⁷ The flexibility of using the tools helps the researchers in interpreting their data (such as in the form of interview transcripts) to develop codes, categories, and themes. Analyzing qualitative data can be challenging, especially when dealing with a plenty of textual data. Daley¹⁸ identified the most frequent challenge when performing qualitative study is dealing with the data analysis process. Dealing with qualitative data can be challenging as it involves fluid process and multifaceted approach.¹⁹

In the analysis of qualitative data, diverse elements play a role, not only the research team but also the methods in the analysis, the research sites and tools to be employed as well as the tasks¹⁷ including the coding process. Thus, the use of concept mapping can help the researchers in creating important components of qualitative data. These components include codes, categories, and themes, which are generated from the analytical process in the study.^{8,18}

Most concept maps are created and used as a tool in the nursing education, especially for teaching strategies to help the nursing students become more active learners²⁰ and to increase their self-confidence because of its practical use.²¹ Nevertheless, concept mapping may also assist analysts in nursing research studies especially qualitative types of nursing research in all stages of the process, including data collection, analysis, and presentation. Researchers can use concept mapping in one of the stages or in all 3 stages.⁸ Likewise, this study used concept mapping in two stages, namely during data analysis and for data presentation in the research publication. Concept mapping is also used to represent any ideas that the research team members interpret during the analytical process.²²

The strength of this study is the researchers who are intended to generate a qualitative type of study that may use a concept map as a tool facilitating their process of analysis. The concept map used can be in any form, electronic or non-electronic, which is also an advantage when working in a team consisting of more than one person. However, the limitation is that not every person understands better when working with visual tools such as a concept map. Also, the final concept may be inadequate if the researchers do not provide narrative writing. Therefore, the narrative writing that explains the developed concept map can be useful to explain the study findings featured by the codes, categories, and concepts from the map.

5. Conclusions

Concept mapping has been used and is popular among academics and researchers for its assistance in teaching topics/lessons in schools and to visualize data in research studies. Concept mapping can be used by researchers who intend to perform qualitative study, especially phenomenology. The use of concept mapping also facilitates visualization of data where there is abundant raw data in the form of interview transcripts. Thus, this strategy may make the process of data analysis more efficient regarding time.

In this study, the final concept map, which reflects the study aim to describe people's experiences of the

phenomenon being studied, is a unique data presentation that distinguishes the results of this study from other studies.

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Conflicts of interest

All contributing authors declare no conflicts of interest.

References

1. Novak JD. Human constructivism: a unification of psychological and epistemological phenomena in meaning making. *Int J Personal Construct Psychol*. 1993;6:167–193.
2. Ligita T, Nurjannah I, Wicking K, Harvey N, Francis K. From textual to visual: the use of concept mapping as an analytical tool in a grounded theory study. *Qual Res*. 2022;22:126–142.
3. Kinchin IM. Concept mapping and the fundamental problem of moving between knowledge structures. *J Educ Teach Train*. 2012;4:96–106.
4. Novak JD. Concept maps and how to use them. *Insight*. 2004;6:15–16.
5. Daley BJ, Morgan S, Black SB. Concept maps in nursing education: a historical literature review and research directions. *J Nurs Educ*. 2016;55:631–639.
6. Ahmed AI, Mohamed RA. Undergraduate nursing students' experience in studying evidence-based practice by application of concept map. *Am J Nurs Res*. 2019;7:437–444.
7. Gyeong JA. A qualitative content analysis of experiences on concept mapping for pathophysiology in nursing students. *J Korean Biol Nurs Sci*. 2015;17:356–362.
8. Conceição SCO, Samuel A, Biniecki SMY, Carter J. Using concept mapping as a tool for conducting research: an analysis of three approaches. *Cogent Social Sci*. 2017;3:1–8.
9. Moyo N, Jones M, Cardwell R, Gray R. What are the core competencies of a mental health nurse? Protocol for a concept mapping study. *Nurs Rep*. 2020;10:146–153.
10. Wilson J, Mandich A, Magalhães L. Concept mapping: a dynamic, individualized and qualitative method for eliciting meaning. *Qual Health Res*. 2016;26:1151–1161.
11. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med Res Methodol*. 2013;13:117.
12. Ligita T, Andriani M, Hazwani H, Fransiska EA, Aulya S. Prioritizing the efforts: lived experiences of family when taking care of people with cancer. *Front Nurs*. 2023;10:315–322.
13. Wheeldon J, Faubert J. Framing experience: Concept maps, mind maps, and data collection in qualitative research. *Int J Qual Methods*. 2009;8:68–83.
14. Buckley CA, Waring MJ. Using diagrams to support the research process: examples from grounded theory. *Qual Res*. 2013;13:148–172.
15. Williams S, Keady J. Centre stage diagrams: a new method to develop constructivist grounded theory – late-stage Parkinson's disease as a case exemplar. *Qual Res*. 2012;12:218–238.
16. Åhlberg MK. Concept mapping as an empowering method to promote learning, thinking, teaching and research. *J Educ, Teach Train*. 2013;4:25–35.
17. Liu J, Eagan J. ADQDA: a cross-device affinity diagramming tool for fluid and holistic qualitative data analysis. *Proc ACM Hum-Comput Interact*. 2021;5:1–19.
18. Daley BJ. Using concept maps in qualitative research. In: *First International Conference on Concept Mapping*. Pamplona, Spain: Universidad Publica de Navarra; 2004.
19. Schmieder C. Qualitative data analysis software as a tool for teaching analytic practice: towards a theoretical framework for integrating QDAS into methods pedagogy. *Qual Res*. 2020;20:684–702.
20. Khrais H, Saleh A. The outcomes of integrating concept mapping in nursing education: an integrative review. *Open J Nurs*. 2017;7:1335–1347.

Ethical approval

The ethic approval was obtained from two ethics committee boards at the General Hospital of Dr Soedarso Pontianak (number 070/3621/RSDS/PGB-b/2021) and the Faculty of Medicine Universitas Tanjungpura Pontianak (number 4185/UN22.9/PG/2021).

Author contributions

Study Design: Titan Ligita; Data Collection: Merry Andriani Titan Ligita; Data Analysis: Merry Andriani Titan Ligita; Manuscript writing: Merry Andriani Titan Ligita.

21. Heidari H, Mardani-Hamooleh M. Nursing students' attitudes toward and satisfaction with concept map in Shahrekord University of Medical Sciences: a mixed method study. *Educ Res Med Sci*. 2019;8:e88794.
22. Smith F, Gunnarsdóttir KÁ, Genell A, et al. Evaluating the implementation and use of the regional cancer plan in Western Sweden through concept mapping. *Int J Qual Health Care*. 2019;31: 44–52.