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## Methodological quality of Grounded Theory research with families living with chronic illness



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### ABSTRACT

**Aim:** The aim of this study was to assess the methodological quality of Grounded Theory (GT) studies related to families living with chronic illness, and the extent to which the common methodological elements of GT are being attended to by researchers.

**Method:** Systematic review. Four databases were searched for GT studies, published between 2010 and 2015. To assess the methodological quality of the studies, seven elements of rigor were identified: constant comparative analysis, coding process, theoretical sampling, theoretical data saturation, memos, diagram and central category/theoretical model.

**Results:** Of the forty-seven articles included, twenty-four (51.0%) were classified as excellent, fifteen (31.9%) as fair and eight (17.1%) as poor. Most articles used the constant comparative analysis (93.5%), coding process (91.3%), theoretical data saturation (85.0%) and the development of central category or theoretical model (80.7%). However, only thirty-four studies (72.3%) presented diagrams, thirty-three (70.2%) used theoretical sampling, and thirty studies (63.7%) reported having used memos.

**Conclusion:** This review updates the state of the art about the methodological quality of GT research with families living with chronic illness and it highlights the need for consensus regarding the methodological elements to be described in GT studies in family nursing.

### 1. Introduction

Expanding knowledge of families living with chronic illness and its intersections with the processes of health, illness, suffering, and well-being has become a growing demand in the field of nursing research, education and practice (Northouse, Williams, Given, & McCorkle, 2012). This reflects the current and rising number of nurses who routinely investigate in family nursing, particularly with families in the context of chronicity (Contador, Fernández-Calvo, Palenzuela, & Ramos, 2012; Hsiao & Tsai, 2014; Kowal et al., 2012). A variety of research methodologies have been used to explore families' responses to chronic illness. In qualitative research, Grounded Theory (GT) has been identified as a method of choice for nurses to conduct research with families (Garcia-Vivar et al., 2010; Lanzoni et al., 2011; Segaric & Hall, 2015). This might be because GT allows developing substantive theories to explain social phenomena through people interactions (Glaser & Strauss, 1967).

Certainly, outstanding Grounded Theory studies are making important contributions to nursing knowledge to understand better the

family experiences and processes when adapting to the new routines and responsibilities. Theoretical examples of this understanding have been analyzed and compiled in various *meta*-synthesis that add to the body of nursing knowledge (Coffey, 2006; Duggleby et al., 2010; Kang, Li, & Nolan, 2011; Morton, Tong, Howard, Snelling, & Webster, 2010). Besides knowing the substantive theories emerged from GT research with families living with chronic illness, it is critical to investigate how the research is conducted in a rigorous manner and how this is demonstrated in the final research report. This is important to ensure quality, reliability, credibility and contextual suitability to results (Baggio & Erdmann, 2011). In fact, authors from different disciplines, such as nursing (Lazenbatt & Elliott, 2005) or psychology (Weed, 2009) have highlighted the importance of quality for GT research. In this respect, qualitative researchers (Baggio & Erdmann, 2011; Cheer, MacLaren, & Tsey, 2016; Cooney, 2011; Garcia-Vivar et al., 2010; Lanzoni et al., 2011; Silva, Moreira, Leite, & Stipp, 2011), including Strauss and Corbin (1994), agree to highlight the importance of the adequate use of the approach to ensure credibility of GT research.

Now, only reviews that bring particular knowledge on the

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appropriateness of GT research in fields of music therapy (O'Callaghan, 2012) or sport and exercise psychology (Weed, 2009) are available in the literature. However, no family nursing review has been found on the quality of GT research, neither in the field of chronic illness. Therefore, the aim of this study was to assess the methodological quality of GT research with families living with chronic illness, and the extent to which the common methodological elements of GT are being attended to by researchers. Prior to address this, a brief review of the common elements of GT is presented.

### 1.1. Grounded Theory research: Elements of methodological quality

Grounded Theory, which was originally developed by the American sociologists Glaser and Strauss in the 1960s to study the experience of dying, is a method used in qualitative research for investigating social phenomena in natural settings (Glaser & Strauss, 1967). Grounded Theory has been used widely in Social Sciences as a means to develop theories about the social and psychological processes of individuals undergoing major life changes, such as families living with chronic illness (Garcia-Vivar et al., 2010; Mauserth & Hjälmhult, 2016).

Grounded Theory is an inductive approach, in that the resulting substantive theory emerges from the data through a process of rigorous and organized analysis (Strauss & Corbin, 1998). The approach is based on symbolic interactionism (Milliken & Schreiber, 2012), which permits understanding of how individuals define a phenomenon via their social interaction. It is then in social interaction that individuals become a rational being and, through social interaction, they develop the meanings of events (Silva et al., 2011).

Since Glaser and Strauss first introduced in 1967, *The Discovery of Grounded Theory*, different approaches of the methodology have been presented in the literature. Some authors described GT as an interpretative style of qualitative research in the post-positivist paradigm, in that the processes and outcomes are not judged on the basis of traditional scientific criteria (Glaser, 1992). In the 1990's, various texts were published showing differing opinions of the co-creators of the GT, Glaser and Strauss, in relation to issues of induction-deduction, ways of analyzing data, and format of theory generation (Heath & Cowley, 2004). In a more recent view, GT has been located within the constructivist paradigm (Charmaz, 2006). Despite divergence of GT approaches, all authors agree that the methodology requires the investigator to interpret meanings, experiences, events, and social realities for deeper understanding of social phenomena. Furthermore, authors agree that to ensure rigor in data collection and analysis, core methodological elements common to each approach should be addressed (Cooney, 2011; Garcia-Vivar et al., 2010; Harris, 2015). However, while recognizing that there are different schools of thought within GT, the focus of this paper is on the most conservative and traditionalist approaches (versus constructivist approach), in which the following methodological elements of GT are described as essential:

- **Constant comparative analysis:** consists of collecting, coding and analyzing data systematically, simultaneously and continuously throughout the research process. Incidents, categories, code properties and assumptions arising during data collection and analysis are compared, resulting in the development of categories (Strauss & Corbin, 1998).
- **Coding process:** the analytical method of comparing data with emerging categories, comparing emerging categories with new categories, and finally comparing interconnectivity between categories entails following a nonlinear coding process. The researcher breaks the data into small fragments, which can occur line-by-line, sentence-by-sentence, or any other criteria used, in order that the analysis unit has meaning in itself, allowing the interpretation. Strauss and Corbin (1998) pointed out the importance of formulating questions to the data such as who, how, why, when, and what, in order to allow theoretical coding, which is described as an

ability to select data that can bring new light to the development of the emerging theory.

- **Theoretical sampling:** is concerned with the selection of participants on theoretical grounds in order to explore categories emerging from data and to develop, explain, and test theory as data analysis progresses (Strauss & Corbin, 1998).
- **Theoretical data saturation:** in Grounded Theory, the researcher cannot accurately anticipate the number of participants required for the study because the sample size is a matter of theoretical saturation (Strauss & Corbin, 1998).
- **Theoretical sensitivity:** refers to the attribute of having insight, the ability to give meaning to data, the capacity to understand and capability to separate the pertinent from that is not (Glaser, 1978). According to Strauss and Corbin (1998), theoretical sensitivity is the ability "to see the research situation and its associated data in new ways and to explore the data's potential for developing theory" (p.44).
- **Memos:** are sources of written information that takes the form of theoretical or methodological or observational notes, which facilitate reflection and understanding of the phenomenon under study. Memoing started in the beginning of the research and continued in parallel with data collection and analysis and writing-up of the substantive theory. That is why memoing captures the different aspects of the theory that emerged from the data (Strauss & Corbin, 1998).
- **Diagrams:** diagrams are unwritten visual memos. Although diagrams are not a mandatory requirement in GT, they help representing the relationships between concepts and categories. Therefore, they are useful because they throw additional light on the textual content and they facilitate the mapping of the emerged categories and subcategories of the GT research (Strauss & Corbin, 1998).
- **Central category or theoretical model:** the ultimate goal of a GT study is to develop explanatory substantive theories of human behavior (Glaser & Strauss, 1967). Constructing a theory implies that the findings of the research are presented as a set of interrelated concepts in statements that have been validated and can be used to understand a particular social and cultural phenomenon (Strauss & Corbin, 1998).

Corbin and Strauss (1990) and Weed (2009) highlighted these methodological elements as necessary conditions to assess GT studies in terms of quality and rigor. Consequently, to meet quality standard of GT research, all methodological elements should be applied in research, including in studies with families living with chronic illness.

## 2. Methodology

To address the aims of this paper, a systematic review was conducted following Joanna Briggs Institute protocol for supporting evidenced-based practice in nursing (Joanna Briggs Institute, 2015; Munn, Tufanaru, & Aromataris, 2014; Porritt, Gomersall, & Lockwood, 2014; Robertson-Malt, 2014). This protocol recommends conducting the systematic review in seven steps: 1) Approach with the topic, formulation of the research question and elaboration of the review protocol. To guide this systematic review, the following guiding question was formulated: how has the methodological elements of GT been used in studies with families living with chronic illness? 2) Definition of the information that would be evaluated in the articles; 3) Selection of databases and descriptors which would be used; 4) Selection of studies based on previously established criteria; 5) Critical analysis of the accuracy and quality of the texts to be included in the review study; 6) Collection and registration of the information of the articles that were considered for review in a specific instrument developed by the authors, according to the aims; 7) Analysis, synthesis and presentation of the data that were collected in the previous stage (Joanna Briggs Institute, 2015). In this systematic review, all steps were followed and are best

**Table 1**  
Inclusion criteria and rational analysis.

Criterion	Rational analysis
Articles published from January 2010 to June 2015	Scientific evidence is more current. In addition, a greater concentration of reviews that evaluate the methodological accuracy of GT studies until the end of the 2000 s has been found in different areas of knowledge (Becker, 1993; Lazenbatt & Elliott, 2005; Weed, 2009)
Available electronically and full text papers Languages: English, Portuguese and Spanish	Budget constraints prevented the purchase of texts The authors of this review are fluent in these three languages. Budget constraints prevented the translation of texts in other languages. Moreover, these are some of the most used scientific languages worldwide
Grounded theory studies focusing on families living with a chronic illness of one of their members Studies published in nursing journals	Research based on Grounded Theory should have been conducted with family members and not only with patients or healthcare professionals The focus was on family nursing. Although we acknowledge that there are studies on family and GT published in different journals of social and health sciences, the aim of this review was to provide visibility of the methodological quality of studies published in nursing journals
Peer-reviewed journals	This preliminary screening sought to select only reports that were assessed for quality

described throughout the following sections.

### 2.1. Inclusion and exclusion criteria of articles

In order to answer the research question, the following inclusion criteria for the selection of the sample were listed: original articles published between January 2010 and June 2015; available electronically and in full text; published in international peer reviewed nursing journals; articles in English, Portuguese or Spanish; primary empirical research on families' perceptions and experiences with chronic illness; studies reporting information by family members; and that used Grounded Theory as the methodology. Articles were excluded if they were published in health care journals others than nursing or presented results in which the family was not the source of information (see Table 1).

### 2.2. Search strategies

The collection of articles was held and critically assessed by the authors in August 2015. For the search, the following keywords (MeSH) and combinations were used: family OR relative OR caregiver OR spouse AND "Grounded Theory". A librarian was also approached to promote the rigor of the search process. Four indexed databases were used: American Psychological Association (APA), specifically PsycINFO; Cochrane Library, Cumulative Index to Nursing & Allied Health Literature (CINAHL) and Medical Literature Analysis and Retrieval System Online (MEDLINE).

### 2.3. Selection of articles

Using the descriptors, 397 articles were found (two in PsycINFO, two in Cochrane, 133 in CINAHL and 260 in MEDLINE). After exclusion of 104 articles (95 papers were repeated and nine were available in other languages, six in Korean and three in German), the reading of 293 abstracts was performed. Of these, 243 were rejected (11 were not field research, in 36 only health professionals were interviewed, in 15 only the patients were interviewed, four did not use Grounded Theory, one interviewed formal and informal caregivers and 176 did not involve families living with chronic illness). Thus, of 397 articles, only 50 fit the inclusion criteria and answered the guiding question, but three articles were not found in full-text, even after requesting them to the authors. The final sample consisted of 47 articles (see Fig. 1).

To guarantee the rigor of this study, two independent researchers (MSB, CGV) participated in all aspects of this review, including the search strategy, data extraction, and quality assessment. Disagreements were resolved by discussion with a third author (SSM).

### 2.4. Data extraction and quality assessment

The included articles were read and reviewed to systematically

extract and record the data in a specific instrument developed by the authors and that included the following categories: authors, year of publication, country of development of the research, number of participants, and description of the methodological elements of GT.

To facilitate the process of analysis, and following recent recommendations about methodological rigor in GT (Cooney, 2011; Garcia-Vivar et al., 2010; Harris, 2015; Lazenbatt & Elliott, 2005) we grouped the methodological elements of GT into seven categories: constant comparative analysis; coding process; theoretical sampling; theoretical data saturation; use of diagram; writing memos; and development and presenting the central category or theoretical model (see Table 2).

Quality assessment of the articles was performed using the developed instrument and examining whether the methodological elements of GT were used and described in the included studies. Although Weed (2009) considered that the absence of one of the methodological elements is enough to doubt about the quality of a GT study, in the present review, the articles were classified into three strata: excellent (for articles that reported having used the seven methodological elements of GT or six methodological elements and excluding the use of diagram), fair (for articles that reported having used from four to six principles of GT), and poor (for articles that reported having used three or fewer methodological elements of GT).

In order to identify if each of the seven methodological elements were used and described in the final research reports, critical reading of the texts, particularly in the methodology and findings sections, was conducted by two authors (MSB, CGV). The absence of explicit information about the use of an element was considered as unused. It should be noted that on occasions it was difficult to demonstrate whether memos, the constant comparative analysis and the coding process had been used in the research because some articles did not report explicitly this information. In these cases, a panel composed by two of the authors of this review (MSB, CGV) and an external researcher who was expert in GT, was convened to reach agreement to include or not these methodological elements.

As each article was assessed and consensus was agreed, the authors determined the number of methodological elements used in each study and subsequently classified the article according to the three identified strata (excellent, fair or poor).

### 2.5. Ethical considerations

Ethical approval was not required because the study was a review of published and electronically available papers.

## 3. Results

Among all articles, nineteen (40.3%) were published in the years 2012 and 2013 and twenty-three (49.0%) were developed in America. Chronic diseases most often experienced by families were related to

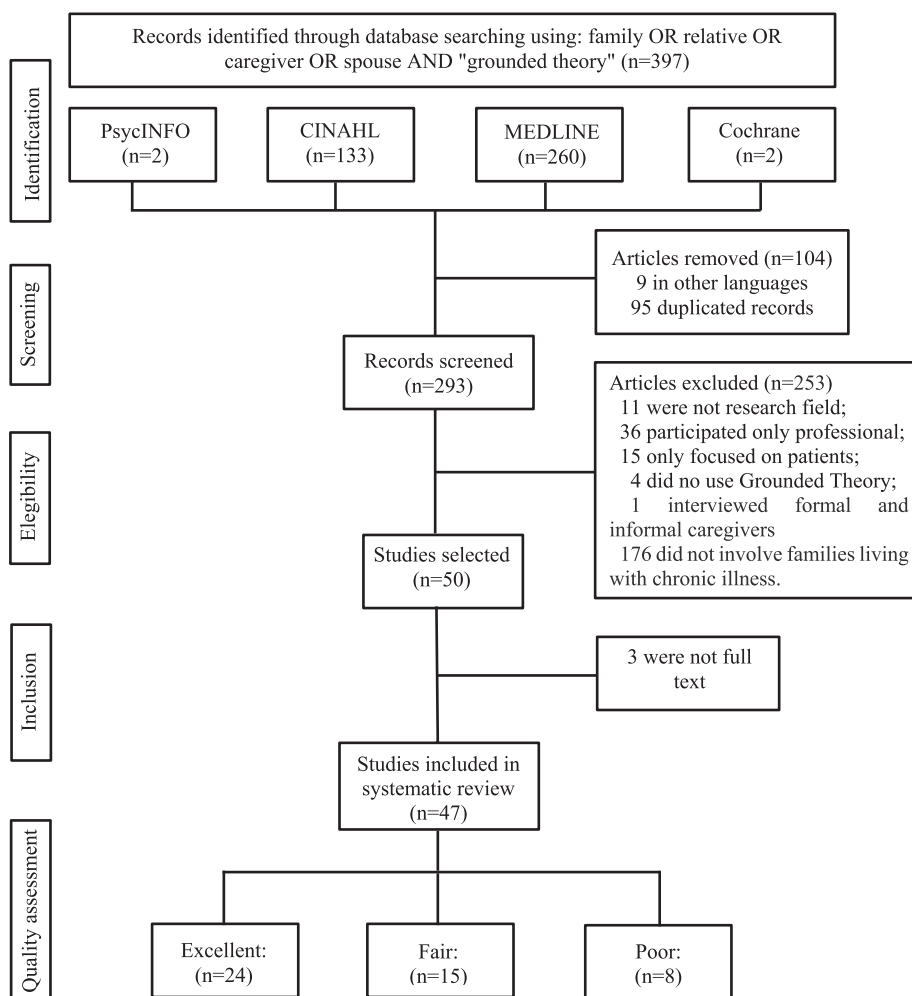


Fig. 1. Flowchart of the methodological steps undertaken in the systematic review.

cancer, dementia, and cardiac and cerebrovascular diseases. Most studies (70.2%) did not use theoretical framework although when it was present, Symbolic Interactionism was the most employed in eleven cases (23.4%) (See Table 3).

Regarding the methodological quality of the 47 studies included in this review (Table 3), twenty-four records (51.0%) were classified as excellent as they described the seven elements of GT or six elements with the exception of diagrams. Fifteen records (31.9%) described the use of four to six methodological elements and were classified as fair, whereas eight studies (17.1%) were classified as poor as they only described the use of up to three methodological elements.

Besides, most of the articles used the constant comparative analysis (93.5%), coding process (91.3%), theoretical data saturation (85.0%) and the development of central category or theoretical model (80.7%). However, only thirty-four studies (72.3%) presented diagrams, thirty-three (70.2%) used theoretical sampling, and thirty studies (63.7%) reported having used memos during the process of collecting and analyzing information and refinement of categories.

#### 4. Discussion

The high number of articles included in the analysis is a result itself. It brings reflection on the current and growing concern given by nursing publishers to GT research involving families living with chronic illness. Besides, it brings evidence on the fact that today the family has more central focus on qualitative research in nursing, as other authors

have also highlighted (Östlund & Persson, 2014). That is the reason why the number of published articles on this subject has dramatically increased in recent years (Miloni et al., 2011). However, besides considering the findings that these studies can bring to family nursing knowledge, it is also necessary to understand how the GT methodology has been used, and to identify aspects that necessarily deserve attention of researchers so that qualitative research guarantees reliability, confirmability and transferability.

The present systematic review brings new knowledge by updating the state of the art about the methodological quality of GT research with families living with chronic illness. Besides, it brings direction by identifying areas of improvement to guide future nursing researchers to strengthen the quality of GT reports in family nursing. Particularly, this review shows that published GT studies in nursing journals do not explicitly report in details the common elements of the methodology. These findings are in agreement with a recent systematic review of sixteen articles that analyzed the use of GT in studies of nurses and midwives' coping processes, and that concluded that most articles did not clarify their epistemological and theoretical perspectives (Cheer et al., 2016). This might be because many authors seem to equate GT with other qualitative research methods, and might not identify the distinctive characteristics of Grounded Theory approaches (Benoliel, 1996).

A major finding of this review, also identified by Benoliel (1996), is the volume of articles (49% of the studies were classified as fair or poor) that lacked to fully describe the use of core GT methodological

**Table 2**  
Quality assessment of the included studies according to the methodological elements of Grounded Theory.

N	Author (year)	Country	Participants	Constant comparative analysis	Coding process	Theoretical sampling	Theoretical data saturation	Memo	Diagram	Central category or Theoretical model	Total*
1	Mehta, Cohen, Carnevale, Ezer, and Ducharme (2010) [34]	Canada	24 family members	✓	✓				✓	✓	4
2	Kuo and Shuy (2010) [35]	Taiwan	10 family members (3 wives, 3 daughters, 3 adopted daughters and 1 son)	✓	✓	✓	✓	✓	✓	✓	7
3	Wakimizu, Fujioka, and Yoneyama (2010) [36]	Japan	20 mothers				✓		✓	✓	3
4	Garcia-Vivar et al. (2010) [37]	Spain	15 patients; 13 family members and 14 nurses	✓		✓	✓		✓	✓	3
5	Lee and Mok (2010) [38]	China	15 family members	✓	✓	✓	✓	✓	✓	✓	6
6	Mossin and Landmark (2011) [39]	Norway	8 wives	✓	✓	✓	✓	✓	✓	✓	5
7	Mehta, Cohen, Ezer, Carnevale, and Ducharme (2011) [40]	Canada	24 family members	✓	✓	✓	✓	✓	✓	✓	5
8	Holtslander, Bally, and Steeves (2011) [41]	Canada	10 bereaved family members	✓	✓	✓	✓	✓	✓	✓	7
9	Cuesta-Benjumea (2011) [42]	Spain	23 family members	✓	✓	✓	✓	✓	✓	✓	7
10	Haugstvedt, Graff-Iversen, Bechensteen, and Hallberg (2011) [43]	Norway	17 parents	✓	✓	✓	✓	✓	✓	✓	6
11	Banerjee et al. (2011) [44]	Canada	25 parents	✓	✓		✓				3
12	Edwards, Olson, Koop, and Northcott (2012) [45]	Canada	5 patients with cancer, 3 family caregivers, 9 bereaved family members	✓	✓	✓	✓	✓	✓	✓	7
13	Penrod, Hupcey, Shipley, Loeb, and Baney (2012) [46]	United States	46 family caregivers	✓	✓	✓	✓	✓	✓	✓	5
14	Bjuresäter, Larsson, and Athlin (2012) [47]	Sweden	12 family members	✓	✓	✓	✓	✓	✓	✓	7
15	Abendroth, Lutz, and Young (2012) [48]	United States	20 family caregivers	✓	✓	✓	✓	✓	✓	✓	7
16	Stalkrantz, Broström, Wiberg, Svanborg, and Malm (2012)	Sweden	12 caregivers	✓	✓	✓	✓	✓	✓	✓	6
17	Cuesta-Benjumea, Donet-Montagut, and Cádiz (2012)	Spain	17 caregivers	✓	✓	✓	✓	✓	✓	✓	6
18	Botsford, Clarke, and Gibb (2011)	United Kingdom	13 family members	✓	✓	✓	✓	✓	✓	✓	7
19	Stewart, Pyke-Grimm, and Kelly (2012)	United States	15 parents and 13 children with cancer	✓	✓	✓	✓	✓	✓	✓	7
20	Feyh, Levine, and Clay (2012)	United States	9 grandmothers or uncles/aunts of children with cancer	✓	✓	✓		✓	✓	✓	5
21	Arber, Hutson, Vries, and Guerrero (2013)	United Kingdom	22 family caregivers	✓	✓	✓	✓	✓	✓	✓	6
22	Egerod and Overgaard (2012)	Denmark	7 family members	✓	✓		✓	✓	✓	✓	6
23	Schultz (2013)	United States	7 parents	✓	✓	✓	✓	✓	✓	✓	6
24	Cormier (2012)	United States	16 parents	✓	✓	✓	✓	✓	✓	✓	7
25	Kita and Ito (2013)	Japan	18 families	✓	✓	✓	✓	✓	✓	✓	6
26	Helgesen, Larsson, and Athlin (2013)	Norway	12 family members	✓	✓	✓	✓	✓	✓	✓	7
27	Rempel, Ravindran, Rogers, and Magill-Evans (2013)	Canada	25 parents (15 mothers, 10 fathers, 17 grandmothers and 11 grandfathers)	✓	✓	✓	✓	✓	✓	✓	7
28	Daly, McCarron, Higgins, and McCallion (2012)	Ireland	21 family caregivers and 10 social workers	✓	✓	✓	✓	✓	✓	✓	7
29	Rosenberg-Yunger et al. (2013)	Canada	29 single parents and two social workers	✓	✓	✓	✓	✓	✓	✓	3

(continued on next page)

Table 2 (continued)

N	Author (year)	Country	Participants	Constant comparative analysis	Coding process	Theoretical sampling	Theoretical data saturation	Memo	Diagram	Central category or Theoretical model	Total <sup>a</sup>
30	Creasy, Lutz, Young, Ford, and Martz (2013)	United States	17 family caregivers	✓	✓		✓	✓	✓		5
31	Dalleg, Benzein, Sandgren, Fridlund, and Malm (2014)	Sweden	12 patients with atrial fibrillation and their spouses	✓	✓	✓	✓	✓	✓	✓	7
32	Bally et al. (2014)	Canada	16 parents	✓	✓	✓	✓	✓	✓	✓	7
33	Umberger, Martsolf, Risko, Calabro, and Patterson (2013)	United States	30 adolescents	✓	✓	✓	✓	✓	✓	✓	6
34	Torgé (2014)	Sweden	Nine couples	✓	✓		✓				3
35	Kraijó, Leeuw, and Schrijvers (2014)	Holland	14 spouses	✓	✓		✓				3
36	Vieira, Bevilacqua, Ferreira, and Dupas (2014)	Brazil	32 participants of nine families	✓	✓						2
37	Hicks, Litwin, and Maliski (2014)	United States	17 children	✓	✓			✓			2
38	McCarthy, Andrews, and Hegarty (2015)	Ireland	35 family members	✓	✓	✓	✓	✓	✓	✓	7
39	Costa and Castro (2014)	Brazil	11 family caregivers	✓	✓		✓		✓	✓	4
40	Shaw and Oneal (2014)	United States	13 parents and 7 children	✓	✓	✓	✓	✓	✓	✓	7
41	Long, Marsland, Wright, and Hinds (2015)	United States	30 siblings	✓	✓	✓	✓	✓	✓	✓	5
42	Senden et al. (2014)	Belgium	32 patients and 19 family members	✓	✓	✓	✓	✓	✓	✓	6
43	Broome, Lutz, and Cook (2015)	United States	20 children's parents	✓	✓	✓	✓	✓	✓	✓	4
44	Ward-Griffin et al. (2015)	Canada	32 nurses who also took care of their family members	✓	✓	✓	✓	✓	✓	✓	6
45	Forsund, Skovdahl, Kiik, and Ytrehus (2014)	Norway	10 spouses	✓	✓	✓	✓	✓	✓	✓	7
46	Agard, Egerodi, Tønnesen, and Lomborg (2015)	Denmark	18 patients and their spouses	✓	✓	✓	✓	✓	✓	✓	6
47	Humbbeck et al. (2015)	Belgium	25 parents of 22 adults with cancer	✓	✓		✓		✓	✓	5

Legend: ✓ means that the methodological element of GT is used and reported in the study, <sup>a</sup> Sum of the GT elements that are included in the article.

**Table 3**  
Distribution of the characteristics of the included studies.

Characteristic	Poor		Fair		Excellent		Total	
	n	%	n	%	n	%	n	%
<i>Year of publication</i>								
2010–2011	3	6.4	3	6.4	5	10.6	11	23.4
2012–2013	1	2.1	6	12.7	12	25.5	19	40.3
2014–2015	4	8.7	6	12.7	7	14.9	17	36.3
<i>Continent</i>								
America	4	8.7	10	21.2	9	19.1	23	49.0
Europe	3	6.4	4	8.7	13	27.5	20	42.6
Asia	1	2.1	1	2.1	2	4.2	4	8.4
<i>Main theme</i>								
Cancer	4	8.7	7	14.9	6	12.7	17	36.3
Dementia	2	4.2	2	4.2	8	17.1	12	25.5
Cardiac and cerebrovascular diseases	–	–	2	4.2	3	6.4	5	10.6
Other chronic conditions	2	4.2	4	8.5	7	14.9	13	27.6
<i>Sources of data collection<sup>†</sup></i>								
Interview	8	17.1	15	31.9	24	51.0	47	100.0
Field diaries	–	–	5	10.6	9	19.1	14	29.7
Focus group	–	–	2	4.2	1	2.1	3	6.4
Medical records	–	–	–	–	1	2.1	1	2.1
Ecomap	–	–	1	2.1	–	–	1	2.1
<i>Context of data collection</i>								
Home	4	8.5	9	19.2	10	21.3	23	49.0
Health service	1	2.1	1	2.1	3	6.5	5	10.7
University/Workplace	–	–	1	2.1	2	4.2	3	6.3
Home and Health service	–	–	1	2.1	1	2.1	2	4.2
Data collection by telephone	–	–	1	2.1	1	2.1	2	4.2
Does not specify	3	6.5	2	4.2	7	14.9	12	25.6
<i>Theoretical framework</i>								
Did not use	7	14.9	9	19.2	17	36.2	33	70.2
Symbolic Interactionism	1	2.1	3	6.4	7	14.9	11	23.4
Other <sup>‡</sup>	–	–	3	6.4	–	–	3	6.4
<i>Respect for the elements of GT<sup>§</sup></i>								
Constant comparative analysis	6	12.7	14	29.8	24	51.0	44	93.5
Coding process	6	12.7	13	27.6	24	51.0	43	91.3
Theoretical data saturation	5	10.6	11	23.4	24	51.0	40	85.0
Central category or theoretical model	1	2.1	13	27.6	24	51.0	38	80.7
Diagram	1	2.1	14	29.8	19	40.4	34	72.3
Theoretical sampling	2	4.2	7	14.9	24	51.0	33	70.2
Memos	1	2.1	5	10.6	24	51.0	30	63.7

Legend: <sup>†</sup>More than one answer is admitted; <sup>‡</sup>Theory of Social Constructivism (01), Family Systems Theory (01) Self-care Theory (01); <sup>§</sup>GT: Grounded Theory.

elements. This could be accounted for by the difficulty to document qualitative research in peer-reviewed journals due to the length limitation of the manuscript. However, in order to meet quality standards of GT and to allow researcher to critically assess published GT studies, it is imperative to adequately document the methodological elements used in GT research (Corbin & Strauss, 1990; Cutcliffe, 2005; Weed, 2009).

Most of the articles reported the use of the constant comparative analysis (93.5%), coding process (91.3%) and theoretical data saturation (85%) and a large number of studies (70.2%) reported using theoretical sampling to collect data. Since the end of the 1990s and the beginning of the year 2000, due to worries of accuracy in studies using GT, publications have aimed to help other researchers, particularly novels, to understand the process of codification and GT data analysis techniques (Backman & Kyngäs, 1999; Eaves, 2001). However, current literature shows that there are still inconsistencies regarding the use of coding and theoretical sampling in GT studies. A systematic review of 136 articles published between 2010 and 2014 in three nursing journals found that although a high percentage (86%) of the articles described an iterative process of data collection and analysis, only half of them used theoretical sampling (McCrae & Prussel, 2016). This means that

intentional sampling was often used in detriment of theoretical sampling that is characteristic of the Grounded Theory methodology. These findings are in agreement with the present review which has found that the description of the use of theoretical sampling in the included articles was superficial, not revealing how the sample groups through the research process were identified (i.e., no clarification from which hypotheses the new participants were selected). According to Becker (1993) the lack of clarification between theoretical and purposeful sampling may influence the replication process of the studies and the validation of emerging theoretical models grounded on data.

Further, when analyzing the diagrams and memos, percentages reached lower levels, 72.3% and 63.7% respectively. However, it should be pointed out that these two tools help understanding emerging concepts, which, when not valued and used, can divert the researcher's look from what actually emerges from the data (Glaser & Strauss, 1967). Therefore, the use and description of these methodological elements must be carefully considered in light of the interpretation of GT findings. Particularly, regarding the use of diagrams, Strauss and Corbin (1998) noted that these are analytical tools that help researchers to distance themselves from data, raising the level of theoretical abstraction and conceptualization. Charmaz (2006) also recommended the use of diagrams during data analysis and before written up. However, although researchers can use diagrams throughout the research to support the ongoing data analysis, this is not a mandatory criterion. This is because for some researchers using written data may be more comprehensible than diagramming (Buckley & Waring, 2013). That is why in this systematic review the quality of the studies was assessed as adequate even though they did not include diagrams.

Finally, it is noteworthy that involving the family as a research or intervention unit, as much as it is necessary and has been occurring, is still challenging for nurses. This because it requires changing concepts and paradigms, so that one might *think family* and act with the family in a qualified and effective way (Northouse et al., 2012). Thus, in order to achieve a higher degree of quality and rigor in research with families and chronic illness, the methodological framework of Grounded Theory is, by its characteristics and methodological elements, a way to produce detailed and reliable information about family dynamics, beliefs and experiences. In addition, according to this review, GT has been mainly applied in family nursing research in different situations (cancer, dementia, and cardiac and cerebrovascular diseases) and different contexts, particularly in North America and Northern Europe. However, in recent years, publications have also been growing in South America and Southern Europe, addressing different topics such as: children's/ youth health; health / nursing management; collective health and women's health (Baggio & Erdmann, 2011; Garcia-Vivar et al., 2010; Lanzoni et al., 2011; Silva et al., 2011). Thus, considering the increasing GT publications on families and chronic illness, it seems important to guarantee quality of GT research for adequate findings translation to health services.

#### 4.1. Limitations

This systematic review has several limitations that need to be considered in future research. First, despite the large number of articles included in the review, there was a lack of inclusion of GT studies published in journals of social and health sciences different than nursing. This was because the goal of this review was to provide visibility of the methodological quality of studies published in nursing journals, as others have done in different fields such as music therapy (O'Callaghan, 2012) or sport and exercise psychology (Weed, 2009). However, the authors acknowledge that this decision has prevented identification of outstanding GT studies in family nursing. Therefore, complementary reviews are advised to illustrate the standards of quality in GT research published in different areas of knowledge. Second, the lack of access to three articles (6,38%) in full-text (despite contacting the authors) as well as the lack of potentially useful papers

published in languages other than English, Portuguese or Spanish could have constrained from identifying GT studies on families and chronic illness. Third, the non-inclusion of unpublished studies and “grey literature” is a constraint of this review. According to Song et al. (2010), these types of limitations are common biases when disseminating and publishing research findings.

## 5. Conclusions

Based on the results of this review, we recommend that family nursing researchers document with rigor and responsibility the core methodological elements of GT, so that the findings of qualitative research can be more rigorously interpreted and transferred to nursing education and practice. Although it is not possible to say that the quality of theories drawn from the assessed studies has been compromised by not following the elements of the traditionalist approach of GT, we recommend the development of a meta-synthesis of GT studies to compile and analyze the different substantive theories on families living with long-term conditions, and how such theories may guide health professionals to assist families’ management of chronic illness in daily life.

Finally, our findings bring to light the need for consensus to be reached regarding the core methodological elements to be described in GT studies published in nursing journals.

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## Conflict of interest

The authors no have conflict of interest.

## Ethical approval details

Ethical approval was not required because the study was a review of published and electronically available papers.

## Authors’ contributions

MSB: the conception, design, analysis and interpretation of data; drafting the article; and approval of the version to be published.

CGV: analysis and interpretation of data; revising it critically of the text; and approval of the version to be published.

SSM: the conception, design and interpretation of data; revising it critically of the text; and approval of the version to be published.

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