



Qualitative Research in Healthcare: Data Analysis

Dasom Im^{1*}, Jeehee Pyo^{1,2*}, Haneul Lee², Hyeran Jung^{1,2}, Minsu Ock^{1,2,3}

¹Department of Preventive Medicine, Ulsan University Hospital, University of Ulsan College of Medicine, Ulsan, Korea; ²Ulsan Metropolitan City Public Health Policy's Institute, Ulsan, Korea; ³Department of Preventive Medicine, University of Ulsan College of Medicine, Seoul, Korea

Qualitative research methodology has been applied with increasing frequency in various fields, including in healthcare research, where quantitative research methodology has traditionally dominated, with an empirically driven approach involving statistical analysis. Drawing upon artifacts and verbal data collected from in-depth interviews or participatory observations, qualitative research examines the comprehensive experiences of research participants who have experienced salient yet unappreciated phenomena. In this study, we review 6 representative qualitative research methodologies in terms of their characteristics and analysis methods: consensual qualitative research, phenomenological research, qualitative case study, grounded theory, photovoice, and content analysis. We mainly focus on specific aspects of data analysis and the description of results, while also providing a brief overview of each methodology's philosophical background. Furthermore, since quantitative researchers have criticized qualitative research methodology for its perceived lack of validity, we examine various validation methods of qualitative research. This review article intends to assist researchers in employing an ideal qualitative research methodology and in reviewing and evaluating qualitative research with proper standards and criteria.

Key words: Qualitative research, Methodology, Validation

INTRODUCTION

Researchers should select the research methodology best suited for their study. Quantitative research, which is based on empiricism and positivism, has long been the mainstream research methodology in most scientific fields. In recent years, however, increasing attempts have been made to use qualitative research methodology in various research fields, either

combined with quantitative research methodology or as a stand-alone research method. Unlike quantitative research, which performs statistical analyses using the results derived in numerical form through investigations or experiments, qualitative research uses various qualitative analysis methods based on verbal data obtained through participatory observations or in-depth interviews. Qualitative research is advantageous when researching topics that involve research participants' in-depth experiences and perceptions, topics that are important but have not yet drawn sufficient attention, and topics that should be reviewed from a new perspective.

However, qualitative research remains relatively rare in healthcare research, with quantitative research still predominating as the mainstream research practice [1]. Consequently, there is a lack of understanding of qualitative research, its characteristics, and its procedures in healthcare research. The low level of awareness of qualitative research can lead to the denigration of its results. Therefore, it is essential not only for researchers

Received: November 15, 2022 **Accepted:** January 31, 2023

Corresponding author: Minsu Ock

Department of Preventive Medicine, Ulsan University Hospital,
University of Ulsan College of Medicine, 877 Bangeojinsunhwando-ro,
Dong-gu, Ulsan 44033, Korea

E-mail: ohohoms@naver.com

*Im & Pyo contributed equally to this work as joint first authors.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<https://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

conducting qualitative research to have a correct understanding of various qualitative research methods, but also for peer researchers who review research proposals, reports, and papers to properly understand the procedures and advantages/disadvantages of qualitative research.

In our previous review paper, we explored the characteristics of qualitative research in comparison to quantitative research and its usefulness in healthcare research [2]. Specifically, we conducted an in-depth review of the general qualitative research process, selection of research topics and problems, selection of theoretical frameworks and methods, literature analysis, and selection of research participants and data collection methods [2]. This review article is dedicated to data analysis and the description of results, which may be considered the core of qualitative research, in different qualitative research methods in greater detail, along with the criteria for evaluating the validity of qualitative research. This review article is expected to offer insights into selecting and implementing the qualitative research methodology best suited for a given research topic and evaluating the quality of research.

IN-DEPTH REVIEW OF QUALITATIVE RESEARCH METHODS

This section is devoted to the in-depth review of 6 qualitative research methodologies (consensual qualitative research, phenomenological research, qualitative case study, grounded theory, photovoice, and content analysis), focusing on their characteristics and concrete analysis processes. Table 1 summarizes the characteristics of each methodology.

Consensual Qualitative Research

Consensual qualitative research (CQR) was developed by Professor Clara Hill of the University of Maryland [3]. It emphasizes consensus within a research team (or analysis team) to address the problem of low objectivity being likely to occur when conducting qualitative research. This method seeks to maintain scientific rigor by deriving analysis results through team consensus, asserting the importance of ethical issues, trust, and the role of culture. In CQR, researchers are required to verify each conclusion whenever it is drawn by checking it against the original data.

Building a solid research team is the first step in conducting CQR. Most importantly, each team member should have resolute initiative and clear motivations for joining the research

team. In general, at least 3 main team members are needed for data analysis, with 1 or 2 advisors (or auditors) reviewing their work. Researchers without experience in CQR should first receive prior education and training on its procedures and then team up with team members experienced in CQR. Furthermore, as is the case with other types of qualitative research, CQR attaches great importance to ensuring the objectivity of research by sharing prejudices, pre-understanding, and expectations of the research topic among the team members.

CQR is performed in 4 sequential steps: the initial stage, intra-case analysis stage, cross-analysis stage, and manuscript writing stage [4]. First, in the initial stage, the pre-formed team of researchers selects a research topic, performs a literature review, develops an interview guideline, and conducts pilot interviews. Research participants who fit the research topic are recruited using inclusion and exclusion criteria for selecting suitable participants. Then, interviews are conducted according to the interview guideline, recorded, and transcribed. The transcripts are sent to the interviewees for review. During this process, researchers could make slight modifications to explore the research topic better.

Second, in intra-case analysis stage, domains and subdomains are developed based on the initial interview guideline. The initial domains and subdomains are used to analyze 1 or 2 interviews, and afterward, the domains and subdomains are modified to reflect the analysis results. Core ideas are also created through interview analysis and are coded in domains and subdomains. The advisors review the domains, subdomains, and core ideas and provide suggestions for improvement. The remaining interviews are analyzed according to the revised domains, subdomains, and core ideas.

Third, in the cross-analysis stage, the core ideas from the interview analysis are categorized according to the domains and subdomains. In this process, repeated team discussions are encouraged to revise domains and subdomains and place the core ideas that do not lend themselves well to categorization into a miscellaneous category. The frequency of occurrence of each domain is then calculated for each interview case. In general, a domain is classified as a general category when it appears in all cases, a typical category when it appears in more than half of the cases, and a variant category when it appears in fewer than half of the cases [5]. However, the criteria for frequency counting may slightly differ from study to study. The advisors should also review the results of the cross-analysis stage, and the main analysis team revises the analysis results

Table 1. Characteristics and key analytical approaches of each qualitative research methodology

Qualitative research methods	Key analytical approaches	Advantages	Limitation
Consensual qualitative research	<ul style="list-style-type: none"> - Four sequential steps: (1) initial stage (selecting a research topic, reviewing precedent works of literature, and developing an interview guideline); (2) intra-case analysis (creating domains and subdomains according to the initial guideline and coding core ideas); (3) cross-analysis (categorizing core ideas according to the domains and subdomains through repeated team discussions); (4) manuscript writing - Five steps based on the phenomenological attitude: (1) repeated data reading to comprehend the data and their meaning; (2) data categorization by meaning units; (3) writing in a descriptive, reflective, and hermeneutic manner by meaning units; (4) deduction of essential factors and themes during writing; (5) deduction of the essential experiential structure - Five steps: (1) research design (case selection, setting research question, and more); (2) data collection preparation (researcher qualification review, protocol development, candidate case screening, and more); (3) data collection (collecting case data such as documents, archival records, interviews, photos, videotapes, and more); (4) data analysis (detailed case description and topic analysis); (5) interpretation (reporting the meaning of the case) 	<ul style="list-style-type: none"> - Ensures objectivity by requiring consensus within a research team - Provides detailed and accessible procedural steps for novice researchers - Delivers the essence of experiences based on the phenomenological principle through perpetual reflections and interpretations - Comprehends the complexity of the case and identifies the process of change over time - Distinguishes the individuality of each case using the bound system 	<ul style="list-style-type: none"> - Unable to guarantee that different research teams would deliver similar conclusions - Influenced by the research team dynamic for conflict resolution - Emphasizes researchers' reductive and imaginative attitude toward the lived experience without offering a concrete research process - Requires an in-depth understanding of the complex bound system without a prescribed procedure
Phenomenological research	<ul style="list-style-type: none"> - Three stages: (1) open coding (deriving concepts via a line-by-line data analysis); (2) axial coding (schematizing categories in line with a paradigm); (3) selective coding (deriving core categories, describing a narrative outline, and presenting a theoretical model) 	<ul style="list-style-type: none"> - Generates a new theory via the inductive principle - Uses systematic research processes with an analytical framework 	<ul style="list-style-type: none"> - Confuses novice researchers, as different terms are used with the same or similar meanings among scholars
Grounded theory	<ul style="list-style-type: none"> - Nine steps: (1) recruiting stakeholders such as policymakers; (2) recruiting participants who have in-depth experience with a research topic; (3) informing and educating participants about the research and its ethical issues and potential risks; (4) obtaining participants' consent; (5) participants brainstorming to specify a research topic; (6) educating participants on camera techniques; (7) participants taking pictures of the specified research topic; (8) discussing photos and analyzing the data via photo selection, contextualization, and codifying; (9) presenting the results via a photo exhibiton, inviting the stakeholders 	<ul style="list-style-type: none"> - Highlights the experiences and perspectives of marginalized people via photos 	<ul style="list-style-type: none"> - Requires proactive engagement of participants throughout the entire study, which results in relatively frequent participant drop-out
Photovoice	<ul style="list-style-type: none"> - Six steps: (1) unitizing (classifying the data via scheme selection); (2) sampling (selecting a representative sample population); (3) recording/coding (preserving impermanent research materials); (4) reducing (simplifying the data for management); (5) abductively inferring (inferring and understanding the phenomenon during the data analysis); (6) narrating (presenting the results) 	<ul style="list-style-type: none"> - Uses both qualitative and quantitative methods to analyze data - Uses data coding to determine the extrinsic and intrinsic meanings of categories 	<ul style="list-style-type: none"> - Does not offer a concrete set procedure; instead, various processes are used by numerous scholars
Qualitative content analysis			

based on those comments.

Fourth, the intra-case analysis and cross-analysis results are described in the manuscript writing stage. It is essential to present a clear and convincing narrative to the audience [5], and it is thus recommended to revise and formulate the manuscript based on team discussions and advisor opinions. However, CQR does not guarantee that different research teams would reach similar conclusions, and the CQR research team dynamics strongly affect conflict-resolution issues during the consensus-building process [3].

As examined above, despite its limitations, the salient feature of CQR is its rigorous process for ensuring the objectivity of analysis results compared to other qualitative research methods. In addition, it is an accessible method for quantitative researchers because it explains the analysis results in terms of the frequency of domain occurrences. CQR can be a suitable research methodology to persuade researchers who are hesitant to accept the results of qualitative research. Although CQR is still rarely used in healthcare research, some studies have applied it to investigate topics of interest [6,7].

Phenomenological Research

Phenomenological research (PR) is, as its name suggests, qualitative research based on the phenomenological principle. The term “phenomenological principle” is based on Husserlian phenomenology, which seeks the essence (inner core) and the meaning of people’s lived experiences [8]. According to Husserl, it is necessary to go “back to the things themselves” (in German: *zurück zu den Sachen selbst*) and accurately explore the essence of experience. Diverse reflective attitudes based on the phenomenological principle are required to understand “*Sachen*” without expectations and prejudices [9]. Thus, the purpose of PR using Husserl’s phenomenological principle can be understood as an inquiry into the essence of experience.

The process of PR aiming to fulfill this purpose differs among various schools and scholars. The Husserlian, Heideggerian, and Utrecht schools had major impacts on PR [10]. Representative Husserlian scholars who further developed the PR process include Amedeo Giorgi and Paul Colaizzi. Giorgi, who pioneered the field of phenomenological psychology, collected data through in-depth interviews and divided the analysis process into 4 steps [11]. Colaizzi, who was one of Giorgi’s students, proposed a more complex process from data collection to analysis [12,13]. Representative Heideggerian scholars are

Patricia Benner, who introduced an interpretive phenomenological qualitative research method to the field of nursing on the subject of clinical placement of nursing students but did not fully clarify its specific procedure [14], and Nancy Diekelmann [15] and Nancy Diekelmann and David Allen [16], who emphasized the role of the team in the analysis process and proposed the 7-step method of analysis. Max Van Manen, a Dutch-born Canadian scholar, is a representative Utrecht School scholar who proposed a 6-step data collection and analysis process and emphasized the importance of phenomenological description [8]. As a scholar with no affiliation with any specific school, Adrian Van Kaam [17], an existentialist psychologist, developed an experiential PR method using descriptive texts. Despite differences in data collection and analysis processes, the common denominator of these approaches is a fundamentally phenomenological attitude and the goal of exploring the essence of experience.

In general, the process of phenomenological qualitative analysis can be divided into 5 steps based on the phenomenological attitude [18]: step 1, reading the data repeatedly to get a sense of the whole and gauge the meanings of the data; step 2, categorizing and clustering the data by meaning unit; step 3, writing analytically by meaning unit in a descriptive, reflective, and hermeneutic manner; step 4, deriving essential factors and thematizing while writing; and step 5, deriving the essential experiential structure by identifying the relationships between essential experiential factors. During the entire process, researchers must embrace the attitudes of “reduction” and “imaginative variation.” The term “reduction” reflects the thought of accepting the meaning of experience in the way it manifests itself [19]. An attitude of phenomenological reduction is required to recover freshness and curiosity about the research object through non-judgment, bracketing, and *epoché*, which assist to minimize the effects of researchers’ prejudices of research topic during the analysis process. An attitude of imaginative variation is required to diversify the meanings pertaining to data and view them as diametric opposites.

As described above, PR is characterized more by emphasizing the researcher’s constant reflection and interpretation/recording of the experience, seeking to explore its very essence, than by being conducted according to a concrete procedure. Based on these characteristics, PR in healthcare research has been applied to various topics, including research on the meaning of health behaviors such as drinking and smoking in various cultures since the 1970s [20,21], information and education

needs of patients with diabetes [22], pain in cancer patients [23], and the experiences of healthcare students and professionals in patient safety activities [24,25].

Qualitative Case Study

Although case studies have long been conducted in various academic fields, in the 1980s [26], they began to be recognized as a qualitative research method with the case study publications by researchers such as Merriam [27], Stake [28], Yin [29], and Hays [30]. Case studies include both quantitative and qualitative strategies and can also be used with other qualitative research methods. In general, a qualitative case study (QCS) is a research method adopted to understand the complexity of a case, derive its meaning, and identify the process of change over time [27]. To achieve these goals, a QCS collects in-depth data using various information sources from rich contexts and explores one or more bounded systems [31].

A case, which is the core of a case study, has delimitation [28], contextuality [29], specificity [30], complexity [32], and newness [27]. The definition of a case study differs among scholars, but they agree that a case to be studied should have boundaries that distinguish it from other cases. Therefore, a case can be a person, a group, a program, or an event and can also be a single or complex case [28]. The types of QCSs are classified by the scale of the bounded system and the purpose of case analysis. From the latter perspective, Stake [28] divided case studies into intrinsic and instrumental case studies.

A QCS is conducted in 5 steps [33]. Stage 1 is the research design stage, where an overall plan is established for case selection, research question setting, research time and cost allocation, and the report format of research outcomes [28]. Yin [33] noted that 4 types of case studies could be designed based on the number of cases (single or multiple cases) and the number of analysis units (holistic design for a single unit or embedded design for multiple units). These types are called single holistic design, single embedded design, multiple holistic design, and multiple embedded design. Stage 2 is the preparation stage for data collection. The skills and qualifications required for the researcher are reviewed, prior training of researchers takes place, a protocol is developed, candidate cases are screened, and a pilot case study is conducted. Stage 3 is data collection. Data are collected from the data sources commonly used in case studies, such as documents, archival records, interviews, direct observations, participatory observations, and physical artifacts [33]. Other data sources for case

studies include films, photos, videotapes, and life history studies [34]. The data collection period may vary depending on the research topic and the need for additional data collection during the analysis process. Stage 4 is the data analysis stage. The case is described in detail based on the collected data, and the data for concrete topics are analyzed [28]. With no prescribed method related to data collection and analysis for a case study, a general data analysis procedure is followed, and the choice of analysis method differs among researchers. In a multiple-case study, the meaning of the cases is interpreted by performing intra-case and inter-case analyses. The last stage is the interpretation stage, in which the researcher reports the meaning of the case—that is, the lessons learned from the case [35].

Compared to other qualitative research methods, QCSs have no prescribed procedure, which may prove challenging in the actual research process. However, when the researcher seeks an in-depth understanding of a bound system clearly distinguished from other cases, a QCS can be an appropriate approach. Based on the characteristics mentioned above, QCSs in healthcare research have been mainly conducted on unique cases or cases that should be known in detail, such as the experience of rare diseases [36], victims of medical malpractice [37], complications due to home birth [38], and post-stroke gender awareness of women of childbearing age [39].

Grounded Theory

Grounded theory (GT) is a research approach to gaining facts about an unfamiliar specific social phenomenon or a new understanding of a particular phenomenon [40]. GT involves the most systematic research process among all qualitative research methods [41]. Its most salient feature is generating a theory by collecting various data from research subjects and analyzing the relationship between the central phenomenon and each category through an elaborate analysis process. GT is adequate for understanding social and psychological structural phenomena regarding a specific object or social phenomenon, rather than framework or hypothesis testing [42].

GT was first introduced in 1967 by Strauss and Glaser. Their views subsequently diverged and each scholar separately developed different GT methods. Glaser's GT focused on the natural emergence of categories and theories based on positivism [40,43]. Strauss, who was influenced by symbolic interactionism and pragmatism, teamed up with Corbin and systematically presented the techniques and procedures of the GT pro-

cess [44]. Since then, various GT techniques have been developed [45]; Charmaz's GT is based on constructivism [43].

Researchers using GT should collect data based on theoretical sampling and theoretical saturation. Theoretical sampling refers to selecting additional data using the theoretical concepts encountered in collecting and analyzing data, and theoretical saturation occurs when no new categories are expected to appear [40]. Researchers must also possess theoretical sensitivity—that is, the ability to react sensitively to the collected data and gain insight into them [40]. An analysis is performed through the constant comparative method, wherein researchers constantly compare the collected data and discover similarities and differences to understand the relationships between phenomena, concepts, and categories.

Among the different types of GT research designs, the one proposed by Strauss and Corbin is divided into 3 stages. Stage 1 is open coding; the concepts are derived from the data through a line-by-line data analysis, and the initial categorization occurs. Stage 2 is axial coding; the interrelationships among the categories derived from open coding are schematized in line with the structural framework defined as a paradigm. The major components of the paradigm are causal conditions, context, intervening conditions, action/interaction strategies, and consequences. Stage 3 is selective coding; the core category is first derived, the relationships between subcategories and concepts are identified, and the narrative outline is described. Lastly, the process is presented in a visual mode, whereupon a theoretical model is built and integrated. In contrast, Glaser's analysis method involves theoretical coding that weaves practical concepts into hypotheses or theories instead of axial coding [46]. Currently, Strauss and Corbin's GT method is the most widely used one [47], and given that different terms are used among scholars, it is crucial to accurately understand the meaning of a term in context instead of solely focusing on the term itself [48].

The most salient features of GT are that it seeks to generate a new theory from data based on the inductive principle through its analytical framework. This framework enables an understanding of the interaction experience and the structure of its performances [40]. Furthermore, the above-described characteristics of GT widen the pathway of quantitative researchers to apply GT more than other qualitative research methods [43], which has resulted in its broader application in healthcare research. GT has been used to explore a wide range of research topics, such as asthma patients' experiences of disease management [48], the experiences of cancer patients or their fami-

lies [49,50], and the experiences of caregivers of patients with cognitive disorders and dementia [51].

Photovoice

Photovoice, a research methodology initiated by Wang and Burris [52], has been used to highlight the experiences and perspectives of marginalized people using photos. In other words, photos and their narratives are at the heart of photovoice; this method is designed to make marginalized voices heard. Photovoice, which uses photos to bring to the fore the experiences of participants who have lived a marginalized life, requires the active engagement of the participants. In other research methods, the participants play an essential role in the data collection stage (interview, topic-related materials such as diary and doodle) and the research validation stage (participants' review). In contrast, in photovoice research, which is classified as participatory action research, participants' dynamic engagement is essential throughout the study process—from the data collection and analysis procedure to exhibition and policy development [53].

Specifically, the photovoice research design is as follows [54,55]: First, policymakers or community stakeholders, who will likely bring about practical improvements on the research topic, are recruited. Second, participants with a wealth of experience on a research topic are recruited. In this stage, it should be borne in mind that the drop-out rate is high because participants' active involvement is required, and the process is relatively time-consuming. Third, the participants are provided with information on the purpose and process of photovoice research, and they are educated on research ethics and the potential risks. Fourth, consent is obtained from the participants for research participation and the use of their photos. Fifth, a brainstorming session is held to create a specific topic within the general research topic. Sixth, researchers select a type of camera and educate the participants on the camera and photo techniques. The characteristics of the camera function (e.g., autofocus and manual focus) should be considered when selecting a camera type (e.g., mobile phone camera, disposable camera, or digital camera). Seventh, participants are given time to take pictures for discussion. Eighth, a discussion is held on the photos provided by the participants. The collected data are managed and analyzed in 3 sub-steps: (1) participants' photo selection (selecting a photo considered more meaningful or important than other photos); (2) contextualization (analyzing the selected photo and putting the mean-

ings attached to the photo into context); and (3) codifying (categorizing similar photos and meanings among the data collected and summarizing them in writing). In sub-step 2, the “SHOWeD” question skill could be applied to facilitate the discussion [56]: “What do you See here? What’s really Happening here? How does this relate to Our lives? Why does this situation, concern, or strength Exist? What can we Do about it?” Ninth, the participants’ summarized experiences related to their respective photos are shared and presented. This process is significant because it provides the participants with an opportunity to exhibit their photos and improve the related topics’ conditions. It is recommended that policymakers or community stakeholders join the roundtable to reflect on the outcomes and discuss their potential involvement to improve the related topics.

Based on the characteristics described above, photovoice has been used in healthcare research since the early 2000s to reveal the experiences of marginalized people, such as the lives of Black lesbian, gay, bisexual, transgender and questioning people [57] and women with acquired immunodeficiency syndrome [58], and in studies on community health issues, such as the health status of indigenous women living in a remote community [59], the quality of life of breast cancer survivors living in rural areas [60], and healthy eating habits of rural youth [61].

Qualitative Content Analysis

Content analysis is a research method that can use both qualitative and quantitative methods to derive valid inferences from data [62]. It can use a wide range of data covering a long period and diverse fields [63]. It helps compare objects, identify a specific person’s characteristics or hidden intentions, or analyze a specific era’s characteristics [64]. Quantitative content analysis categorizes research data and analyzes the relationships between the derived categories using statistical methods [65]. In contrast, qualitative content analysis (QCA) uses data coding to identify categories’ extrinsic and intrinsic meanings. The parallelism of these aspects contributes to establishing the validity of conclusions in content analysis [63].

Historically, mass media, such as newspapers and news programs, played the role of the locomotive for the development of content analysis. As interest in mass media content dealing with particular events and issues increased, content analysis was increasingly used in research analyzing mass media. In particular, it was also used in various forms to analyze propa-

ganda content during World War II. The subsequent emergence of computer technology led to the revival of various types of content analysis research [66].

QCA is largely divided into conventional, directed, and summative [67]. First, conventional content analysis is an inductive method for deriving categories from data without using perceived categories. Key concepts are derived via the coding process by repeatedly reading and analyzing the data collected through open-ended questions. Categorization is then performed by sorting the coded data while checking similarities and differences. Second, directed content analysis uses key concepts or categories extracted from existing theories or studies as the initial coding categories. Unlike conventional content analysis, directed content analysis is closer to a deductive method and is anchored in a more structured process. Summative content analysis, the third approach, not only counts the frequency of keywords or content, but also evaluates their contextual usage and provides qualitative interpretations. It is used to understand the context of a word, along with the frequency of its occurrence, and thus to find the range of meanings that a word can have.

Since there is no concrete set procedure, the content analysis procedure varies among researchers. Some of the typical processes are a 3-step process (preparation, organizing, reporting) proposed by Elo and Kyngäs [68], a 4-step process (formulating research questions, sampling, coding, analyzing) presented by White and Marsh [69], and a 6-step process proposed by Krippendorff [66].

The 6-step content analysis research process proposed by Krippendorff [66] is as follows: Step 1, unitizing, is a process in which the researcher selects a scheme for classifying the data of interest for data collection and analysis. Step 2, sampling, involves selecting a conceptually representative sample population. In Step 3, recording/coding, the researcher records materials that are difficult to preserve, such as verbal statements, in a way that allows repeated review. Step 4, reducing, refers to simplifying the data into a manageable format using statistical techniques or summaries. Step 5, abductively inferring, involves inferring a phenomenon in the context of a situation to understand the contextual phenomenon while analyzing the data. In Step 6, narrating, the research outcomes are presented in a narrative accessible to the audience. These 6 steps are not subject to a sequential order and may go through a cyclical or iterative process [63].

As examined above, content analysis is used in several fields

due to its advantages of embracing both qualitative and quantitative aspects and processing comprehensive data [62,70]. In recognition of its research potential, the public health field is also increasingly using content analysis research, as exemplified by suicide-related social media content analysis [71], an analysis of children's books in association with breast cancer [72], and an analysis of patients' medical records [73].

VALIDATION OF QUALITATIVE RESEARCH

The validation of qualitative research begins when a researcher attempts to persuade others that the research results are worthy of attention [35]. Several researchers have advanced their arguments in many different ways, from the reason or justification for existence of the validity used in qualitative research to the assessment terms and their meanings [74]. We explain the validity of qualitative research, focusing on the argument advanced by Guba and Lincoln [75]. They emphasized that the evaluation of qualitative research is a socio-political process—namely, a researcher should assume the role of a mediator of the judgment process, not that of the judge [75]. Specifically, Lincoln and Guba [75] proposed trustworthiness as a validity criterion: credibility, transferability, dependability, and confirmability.

First, credibility is a concept that corresponds to internal validity in quantitative research. To enhance the credibility of qualitative research, a "member check" is used to directly assess whether the reality of the research participants is well-reflected in the raw data, transcripts, and analysis categories [76,77]. Second, transferability corresponds to external validity or generalizability in quantitative research. To enhance the transferability of qualitative research, researchers must describe the data collection and analysis processes in detail and provide thick data on the overall research process, including research participants and the context and culture of research [77,78]. Transferability can also be enhanced by checking whether the analysis results elicit similar feelings in those who have not participated in the study but share similar experiences. Third, dependability corresponds to reliability in quantitative research and is associated with data stability. To enhance the trustworthiness of qualitative research, it is common for multiple researchers to perform the analysis independently; alternatively, or if one researcher has performed the analysis, another researcher reviews the analysis results. Furthermore, a qualitative researcher must provide a detailed and transparent

description of the entire research process so that other researchers, internal or external, can evaluate whether the researcher has adequately proceeded with the overall research process. Fourth, confirmability corresponds to objectivity in quantitative research. Bracketing, a process of disclosing and discussing the researcher's pre-understanding that may affect the research process from the beginning to the end, is conducted to enhance the confirmability of qualitative research. The results of bracketing should be included in the study results so that readers can also track the possible influence [77].

However, regarding the validity of a qualitative study, it is necessary to consider the research topic, the target audience, and research costs. Caution should also be applied to the proposed theories because presentation methods vary among scholars and researchers. Apart from the methods discussed above, other methods are used to enhance the validity of qualitative research methods, such as prolonged involvement, persistent observation, triangulation, and peer debriefing. In prolonged involvement, a researcher depicts the core of a phenomenon while staying at the study site for a sufficient time to build rapport with the participants and pose a sufficient amount of questions. In persistent observation, a researcher repeatedly reviews and observes data resources until the factors closest to the research topic are identified, giving depth to the study. Triangulation is used to check whether the same results are drawn by a team of researchers who conduct a study using various resources, including individual interviews, talks, and field notes, and discuss their respective analysis processes and results. Lastly, in peer debriefing, research results are discussed with colleagues who have not participated in the study from the beginning to the end, but are well-informed about the research topic or phenomenon [76,78].

CONCLUSION

This review article examines the characteristics and analysis processes of 6 different qualitative research methodologies. Additionally, a detailed overview of various validation methods for qualitative research is provided. However, a few limitations should be considered when novice qualitative researchers follow the steps in this article. First, as each qualitative research methodology has extensive and unique research approaches and analysis procedures, it should be kept in mind that the priority of this article was to highlight each methodology's most exclusive elements that essentially compromise

the core of its identity. Its scope unfortunately does not include the inch-by-inch steps of individual methodologies—for this information, it would be necessary to review the references included in the section dedicated to each methodology. Another limitation is that this article does not concentrate on the direct comparison of each methodology, which might benefit novice researchers in the process of selecting an adequate methodology for their research topic. Instead, this review article emphasizes the advantages and limitations of each methodology. Nevertheless, this review article is expected to help researchers considering employing qualitative research methodologies in the field of healthcare select an optimal method and conduct a qualitative study properly. It is sincerely hoped that this review article, along with the previous one, will encourage many researchers in the healthcare domain to use qualitative research methodologies.

Ethics Statement

Approval from the institutional review board was not obtained as this study is a review article.

CONFLICT OF INTEREST

The authors have no conflicts of interest associated with the material presented in this paper.

FUNDING

None.

ACKNOWLEDGEMENTS

None.

AUTHOR CONTRIBUTIONS

Conceptualization: Ock M. Literature review: Im D, Pyo J, Lee H, Jung H, Ock M. Funding acquisition: None. Writing – original draft: Im D, Pyo J, Lee H, Jung H, Ock M. Writing – review & editing: Im D, Pyo J, Lee H, Jung H, Ock M.

ORCID

Dasom Im <https://orcid.org/0000-0002-5092-4397>
Jeehee Pyo <https://orcid.org/0000-0001-7644-8088>

Haneul Lee <https://orcid.org/0000-0001-9252-3738>

Hyeran Jung <https://orcid.org/0000-0002-3212-2446>

Minsu Ock <https://orcid.org/0000-0001-9949-9224>

REFERENCES

1. Chung J, Cho JJ. Use of qualitative research in the field of health. *J Korean Acad Fam Med* 2008;29(8):553-562 (Korean).
2. Pyo J, Lee W, Choi EY, Jang SG, Ock M. Qualitative research in healthcare: necessity and characteristics. *J Prev Med Public Health* 2023;56(1):12-20.
3. Hill CE, Thompson BJ, Williams EN. A guide to conducting consensual qualitative research. *Couns Psychol* 1997;25(4):517-572.
4. Hill CE. *Consensual qualitative research: a practical resource for investigating social science phenomena*. 1st ed. Washington, D.C.: American Psychological Association; 2012.
5. Hill CE, Knox S, Thompson BJ, Williams EN, Hess SA, Ladany N. Consensual qualitative research: an update. *J Couns Psychol* 2005;52(2):196-205.
6. Ock M, Han YJ, Choi EY, Pyo J, Lee W. Perceptions of medical students regarding career counseling in Korea: a qualitative study. *Int J Environ Res Public Health* 2020;17(10):3486.
7. Lee K, Lee SH, Park T, Lee JY. Stressors of Korean disaster relief team members during the Nepal Earthquake dispatch: a consensual qualitative research analysis. *J Korean Med Sci* 2017;32(3):507-513.
8. Van Manen M. *Researching lived experience: human science for an action sensitive pedagogy*. 2nd ed. New York: Routledge; 1997.
9. Husserl E. *Ideas: general introduction to pure phenomenology*. 1st ed. London: Routledge; 2012.
10. Lee N. *Phenomenology and qualitative research method*. Seoul: Hangilsa; 2014 (Korean).
11. Giorgi A. *The descriptive phenomenological method in psychology: a modified Husserlian approach*. Ann Arbor: Duquesne University Press; 2009.
12. Edward KL, Welch T. The extension of Colaizzi's method of phenomenological enquiry. *Contemp Nurse* 2011;39(2):163-171.
13. Colaizzi PF. Psychological research as the phenomenologist views it. In: Valle RS, King M, editors. *Existential-phenomenological alternatives for psychology*. New York: Oxford University Press; 1978.
14. Benner P. *From novice to expert: excellence and power in clinical*

- ical nursing practice. *Am J Nurs Sci* 1984;84(12):1480.
15. Diekelmann N. Narrative pedagogy: Heideggerian hermeneutical analyses of lived experiences of students, teachers, and clinicians. *ANS Adv Nurs Sci* 2001;23(3):53-71.
 16. Diekelmann N, Allen D. A hermeneutic analysis of the NLN criteria for the appraisal of baccalaureate programs. In: Diekelmann N, Allen D, Tanner CA, editors. *The NLN criteria for appraisal of baccalaureate programs: a critical hermeneutic analysis*. New York: National League for Nursing; 1989, p. 11-34.
 17. Van Kaam A. Existential foundations of psychology. *Philos Phenomenol Res* 1967;28(1):140-141.
 18. Kim Y, Jung S. *Qualitative research methods V: data analysis*. Seoul: Academy Press; 2017 (Korean).
 19. De Castro A. Introduction to Giorgi's existential phenomenological research method. *Psicol Caribe* 2003;(11):45-56.
 20. Larraya FP. Drinking as a cultural pattern of the Chaco aborigines. *Acta Psiquiatr Psicol Am Lat* 1976;22(1):21-45 (Spanish).
 21. Dhillon AZ, Doran T, Aggarwal VR. Perceptions of waterpipe smoking among young adults: a phenomenological study. *Dent J (Basel)* 2020;8(4):134.
 22. Bayked EM, Workneh BD, Kahissay MH. Thirst for information and needs reflections of type 2 diabetes patients receiving insulin treatment in north-east Ethiopia: a qualitative exploration. *J Prev Med Public Health* 2021;54(2):119-128.
 23. Erol O, Unsar S, Yacan L, Pelin M, Kurt S, Erdogan B. Pain experiences of patients with advanced cancer: a qualitative descriptive study. *Eur J Oncol Nurs* 2018;33:28-34.
 24. Lane AS, Roberts C. Phenomenological study of medical interns reflecting on their experiences, of open disclosure communication after medication error: linking rationalisation to the conscious competency matrix. *BMJ Open* 2020;10(5):e035647.
 25. Kim Y, Lee H. Nurses' experiences with disclosure of patient safety incidents: a qualitative study. *Risk Manag Healthc Policy* 2020;13:453-464.
 26. Merriam SB. *Qualitative research: a guide to design and implementation*. 3rd ed. San Francisco: Jossey-Bass; 2009.
 27. Merriam SB. *Qualitative research and case study applications in education*. 2nd ed. San Francisco: Jossey-Bass; 1998.
 28. Stake RE. *The art of case study research*. Thousand Oaks: Sage; 1995.
 29. Yin RK. Discovering the future of the case study: method in evaluation research. *Eval Pract* 1994;15(3):283-290.
 30. Hays PA. Case study research. In: deMarrais KB, Lapan SD, editors. *Foundations for research: methods of inquiry in education and the social sciences*. Mahwah: Lawrence Erlbaum; 2004, p. 217-234.
 31. Creswell JW. *Qualitative inquiry and research design: choosing among five approaches*. Thousand Oaks: Sage Publications; 2007.
 32. Punch KF. *Introduction to social research: quantitative and qualitative approaches*. 2nd ed. Thousand Oaks: Sage; 2005.
 33. Yin RK. *Case study research: design and methods*. 4th ed. Thousand Oaks: Sage; 2009.
 34. Marshall DC, Rossman GB. *Designing qualitative research*. 5th ed. Newbury: Sage; 2011.
 35. Lincoln YS, Guba EG. *Naturalistic inquiry*. Thousand Oaks: Sage; 1985, p.120.
 36. Woolston W, Connelly LM. Felty's syndrome: a qualitative case study. *Medsurg Nurs* 2017;26(2):105-109, 118.
 37. Pyo J, Ock M, Han YJ. Medical litigation experience of the victim of medical accident: a qualitative case study. *Int J Qual Stud Health Well-being* 2019;14(1):1595958.
 38. Meyer Y, Pehlke-Milde J, Muntwyler FS, Fleming V. Integrative power in Swiss home-like childbirths: a qualitative multiple case study. *Midwifery* 2019;78:97-103.
 39. Beal CC, Millenbruch J. A qualitative case study of poststroke sexuality in a woman of childbearing age. *J Obstet Gynecol Neonatal Nurs* 2015;44(2):228-235.
 40. Yoo K, Jung J, Kim Y, Kim H. *Qualitative research methods*. 2nd ed. Seoul: Park Young Story; 2018 (Korean).
 41. Creswell JW. *Educational research: planning, conducting, and evaluating quantitative and qualitative research*. Upper Saddle River: Pearson Education; 2002.
 42. Morse JM. Situating grounded theory within qualitative inquiry. In: Schreiber RS, Stern PN, editors. *Using grounded theory in nursing*. New York: Springer; 2001.
 43. Charmaz K. *Constructing grounded theory: a practical guide through qualitative analysis*. Thousands Oaks: Sage; 2006.
 44. Strauss AL, Corbin JM. *Basics of qualitative research: grounded theory procedures and techniques*. Newbury Park: Sage; 1990.
 45. Kim JE. Changes in Strauss & Corbin's grounded theory. *J Korean Acad Nurs* 2019;49(5):505-514 (Korean).
 46. Kim IS. Divergence of grounded theory: focused on the differences of Glaser and Strauss. *Korean J Soc Welf Stud* 2011;42(2): 351-379 (Korean).
 47. Choe KS. Grounded theory methodology – Strauss' version vs Glaserian version-. *J Korean Acad Psychiatr Ment Health Nurs* 2005;14(1):82-90 (Korean).
 48. Kim B, Kim O. The disease management experience of patients with asthma: grounded theory approach. *J Korean Acad Nurs*

- 2020;50(5):714-726 (Korean).
49. Choi HG, Yeom HA. Experiences of ego integrity recovery in elderly cancer patients: grounded theory approach. *J Korean Acad Nurs* 2019;49(3):349-360 (Korean).
 50. Waldboth V, Patch C, Mahrer-Imhof R, Metcalfe A. The family transition experience when living with childhood neuromuscular disease: a grounded theory study. *J Adv Nurs* 2021;77(4):1921-1933.
 51. Herron DL, Priest HM, Read S. Supporting people with an intellectual disability and dementia: a constructivist grounded theory study exploring care providers' views and experiences in the UK. *J Appl Res Intellect Disabil* 2020;33(6):1405-1417.
 52. Wang C, Burris MA. Empowerment through photo novella: portraits of participation. *Health Educ Q* 1994;21(2):171-186.
 53. Latz AO, Mulvihill TM. Photovoice research in education and beyond: a practical guide from theory to exhibition. New York: Routledge; 2017.
 54. Wang CC. Youth participation in photovoice as a strategy for community change. *J Community Pract* 2006;14(1-2):147-161.
 55. Wang C, Burris MA. Photovoice: concept, methodology, and use for participatory needs assessment. *Health Educ Behav* 1997;24(3):369-387.
 56. Wang CC. Photovoice: a participatory action research strategy applied to women's health. *J Womens Health* 1999;8(2):185-192.
 57. Graziano KJ. Oppression and resiliency in a post-apartheid South Africa: unheard voices of Black gay men and lesbians. *Cultur Divers Ethnic Minor Psychol* 2004;10(3):302-316.
 58. Teti M, Murray C, Johnson L, Binson D. Photovoice as a community-based participatory research method among women living with HIV/AIDS: ethical opportunities and challenges. *J Empir Res Hum Res Ethics* 2012;7(4):34-43.
 59. Moffitt P, Vollman AR. Photovoice: picturing the health of Aboriginal women in a remote northern community. *Can J Nurs Res* 2004;36(4):189-201.
 60. López ED, Eng E, Randall-David E, Robinson N. Quality-of-life concerns of African American breast cancer survivors within rural North Carolina: blending the techniques of photovoice and grounded theory. *Qual Health Res* 2005;15(1):99-115.
 61. Martin Romero MY, Jeitner EC, Francis LA. Visualizing perceived enablers of and barriers to healthy eating by youth in rural El Salvador. *J Nutr Educ Behav* 2019;51(3):348-356.
 62. Weber RP. Basic content analysis. Beverly Hills: Sage; 1985.
 63. Choi S, Jeong J, Jung SW. Concept and procedure of qualitative content analysis. *J Qual Inq* 2016;2(1):127-155 (Korean).
 64. Lee Y, Kim Y. Qualitative research in education. Seoul, Korea: Gyooyukwahaksa; 1998 (Korean).
 65. Riffe D, Lacy S, Fico FG. Analyzing media message: using quantitative content analysis in research. New York: Routledge; 1998.
 66. Krippendorff K. Content analysis: an introduction to its methodology. Beverly Hills: Sage; 2004.
 67. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res* 2005;15(9):1277-1288.
 68. Elo S, Kyngäs H. The qualitative content analysis process. *J Adv Nurs* 2008;62(1):107-115.
 69. White MD, Marsh EE. Content analysis: a flexible methodology. *Libr Trends* 2006;55(1):22-45.
 70. Lester P, Smith R. African-American photo coverage in life, Newsweek and Time, 1937-1988. *Journal Mass Commun Q* 1990;67(1):128-136.
 71. Benedikt T, Marlies B, Susanne G, Nikolaus R, Ewald S, Thomas N. Content analysis of suicide-related online portrayals: changes in contents retrieved with search engines in the United States and Austria from 2013 to 2018. *J Affect Disord* 2020;271:300-309.
 72. Huang X, Lee S, Hu Y, Gao H, O'Connor M. Talking about maternal breast cancer with young children: a content analysis of text in children's books. *J Pediatr Psychol* 2015;40(6):609-621.
 73. Rakic M, Escher M, Elger BS, Eckstein S, Pacurari N, Zwahlen S, et al. Feelings of burden in palliative care: a qualitative analysis of medical records. *J Palliat Care* 2018;33(1):32-38.
 74. Golafshani N. Understanding reliability and validity in qualitative research. *Qual Rep* 2003;8(4):597-607.
 75. Guba EG, Lincoln YS. Fourth generation evaluation as an alternative. *Educ Horiz* 1985;63(4):139-141.
 76. Lincoln YS, Guba EG. But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. *New Dir Program Eval* 1986;30:73-84.
 77. Creswell JW, Miller DL. Determining validity in qualitative inquiry. *Theory Pract* 2000;39(3):124-130.
 78. Korstjens I, Moser A. Series: practical guidance to qualitative research. Part 4: trustworthiness and publishing. *Eur J Gen Pract* 2018;24(1):120-124.