

Perspectives in Practice



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An Introduction to Qualitative Research for Food and Nutrition Professionals

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ABSTRACT

The purpose of this article is to define qualitative research, explain its design, explore its congruence with quantitative research, and provide examples of its applications in dietetics. Also, methods to ensure validity, reliability, and relevance are addressed. Readers will gain increased knowledge about qualitative research and greater competency in evaluating this type of research. The hope is that food and nutrition professionals will be inspired to conduct and publish qualitative research, adding to the body of peer-reviewed dietetics-related qualitative publications. This type of research must be methodically planned and implemented with attention to validity, reliability, and relevance. This rigorous ap-

proach boosts the probability that the research will add to the scientific literature and qualify for publication.

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To many food and nutrition professionals the term *research* elicits thoughts of data, numbers, measurement, controls, controlled environments, reliability, randomized clinical trials, interventions, and outcomes. Epistemologists refer to this as quantitative research (1-3). It is well suited to testing the effectiveness of interventions, evaluating outcomes, mining statistical associations, and elucidating the effects of risk factors. When phenomena are not easily measured, processes must be evaluated, knowledge is limited about a culture, or reasons must be discerned for outcomes a different approach is warranted.

Epistemologists acknowledge that the best approach to the aforementioned situations is qualitative research, which is particularly relevant to the applied science of dietetics (1-3). Figure 1 contains terms and definitions important to qualitative research. To completely understand nutrition and food-related phenomena, an appreciation of qualitative research is essential. As with quantitative research, qualitative research requires meticulous attention to elements such as research questions, objectives, study design, sample selection, methodology, outcomes, and conclusions to be valid, reliable, and relevant. The purpose of this article is to define qualitative research, explain its design, examine its congruence with quantitative research, and provide examples of its applications in dietetics.

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CHARACTERISTICS OF QUALITATIVE RESEARCH

Qualitative research produces findings not derived from standard statistical procedures or other means of quantification. It is defined as a naturalistic approach that seeks to understand phenomena in uncontrolled, context-specific settings (1,4). For example, suppose a clinical trial using a university-based cardiovascular risk reduction program tailored for African-American men was highly effective in reducing risk factors. When the pro-

Term	Definition
Epistemology	Study of theories of knowledge or ways of knowing, particularly in the context of the limits or validity of the various ways of knowing. An epistemologist studies the acquisition of knowledge (3).
Qualitative research	Approach that produces findings not derived from standard statistical procedures or other means of quantification. Defined as a naturalistic approach that seeks to understand phenomena in uncontrolled, context-specific settings, in which data are not numbers, but text, audio, or visual (1,2,4).
Quantitative research	Approach in which findings are derived from standard statistical procedures and other means of quantification. Experiments are conducted under controlled conditions in which data are numbers. The gold standard for this type of research is the randomized, controlled, clinical trial (1,2,4).
Induction	Method of study that begins with observation and is followed by derivation of conclusions (4).
Deductive	Method of study that collects data to determine if they are consistent with predetermined assumptions and hypotheses (4).
Ethnography	Research method that observes social systems, cultures, and social life, including activities of daily life (4,5).
Grounded theory	Systematic examination of qualitative data (eg, transcripts of interviews or protocols of observations) aiming at the generation of theory (3,4,5).
Phenomenology	Study of peoples' first-hand emotions, attitudes, thoughts, meanings, perceptions, and bodily experiences as or after they have experienced a phenomenon (3,4,5).
Symbolic interaction	Investigation of how people create meaning based on social interactions. Qualitative methods are used such as participant observation to observe relationships between people and the nature of social interaction in a setting (3,4,5).
Narrative	Life histories or biographies are collected to understand a phenomenon (3,4,5).
Participatory action research	Approach that involves planning and implementing an action and then observing the effect, taking into consideration the setting, characteristics of the community, culture, interveners, materials used, methods used, and other important factors to get a complete understanding of the effect of the intervention. Qualitative version of a clinical trial (3,4,5).
Case study	Meticulous investigation of individuals, groups, institutions or other social units. A subsequent report is written describing the unit (3,4,5).
Purposive sampling	Intentional sample selection based on a specific characteristic or characteristics (1,4,5,11).
Maximum variation sampling	Purposeful selection of a wide variety of participants to get a balanced perspective (1,4,5,11).
Extreme case sampling	Selection of participants who are extremes for the purpose of comparing and contrasting the extremes (1,4,5,11).
Homogeneous sampling	Selection of like participants to study their culture and experiences of phenomena (1,4,5,11).
Criterion sampling	Definition of a variety of criteria a participant must meet to be included in the sample for specificity of examination (1,4,5,11).
Theoretical sampling	Selection of participants based on the possession of a given theoretical concept characteristic or characteristics (1,4,5,11).
Snowball sampling	Purposeful selection of participants who identify others who would be interesting to add to the sample to best understand a phenomenon. Those individuals, in kind, are asked to identify more people until participant saturation has been reached and there are enough participants for the purpose of the study (1,4,5,11).
Focus group	Collection of seven to 12 individuals by purposive sampling who are asked questions relevant to general research questions and prompted to respond freely (13,19).
Delphi Technique	Method for reaching group consensus on any issue or phenomenon (4,19).
Field notes	Real time written or typed descriptions of sounds, interactions, settings, behaviors, processes, and activities (4,5,19).
Personal notes	Written or typed personal impressions, reactions, and memories (16).
Methodology notes	Writings about methods used, reasons for using those methods, and changes in methods (16).
Theoretical notes	Writings about emerging concepts, interrelationships, and hypotheses (16).
Content analysis	Approach to data collection that involves organizing, classifying, and summarizing qualitative data; writing a cohesive description of the setting, context, and people; discovering patterns and themes; determining the meaning of phenomena to participants; summarizing what has been learned as it relates to the research questions; conceptualizing hypotheses and theories; and deciding what to report to others (17,19).
Coding	Method in which classification codes are created either before or during qualitative data analysis to organize the data (4).
Triangulation	Method of data validation that involves multiple methods, sources, and/or investigators to promote cross comparison of results (19,23).
Respondent validation	Results are presented to the community of respondents and their comments are solicited on the accuracy of the conclusions. Respondents can confirm or disconfirm the accuracy of the results as well as comment on the methodology. This is also referred to as a member check (3,5,10).
Mixed methods research	Qualitative and quantitative research methods are combined in a single study to gain a fuller understanding of a phenomenon (24).
Constant comparison	Initial coding schemes are developed and as data are collected coding schemes are modified as the data warrants (17).
Practice-based research	Systematic inquiry into the systems, methods, policies, interventions, and programmatic applications in dietetics practice. Conducted in practice-oriented settings (36).

Figure 1. Key terms and definitions relevant to qualitative research.

gram is offered to African-American men, in a real-life community setting, it is only moderately effective. Qualitative research can be conducted to explore why the program was less effective in the naturalistic, community setting.

An individual researcher is the measuring instrument in qualitative research (1,4). She or he observes behavior in settings, conducts interviews with groups or individuals, takes notes, observes videotapes, evaluates documents, and/or analyzes interactions between people. In addition, the researcher analyzes textual, audio, and visual data and determines themes, concepts, meanings, emotions, and interaction patterns. She/he also links themes and concepts.

Words, sounds, and pictures are the data elements in qualitative research (1,4). These are captured in transcripts, audiotapes, videotapes, field notes, photographs, memos, and personal documents. Direct quotations are often presented as data.

Rather than definitive outcomes, processes are examined, including possible reasons for outcomes (1,4). An outcomes-oriented quantitative study might be supplemented by a qualitative approach that discovers the reasons for the outcomes. Suppose a feeding study comparing the effectiveness of a vegan diet to a typical Western diet in modifying inflammatory markers (eg, C-reactive protein) reveals no difference. Interviews with participants might reveal that those receiving the vegan diet did not enjoy its flavors and consumed animal products thus compromising the vegan diet. The reason for no effect was poor compliance to the vegan diet.

Qualitative research tends to be inductive (1,4). Theoretical positions and predefined hypotheses often drive quantitative research. Often, in qualitative research, data are collected and analyzed with the intention of generating theory and hypotheses.

A qualitative researcher is concerned with meaning, participant perception, and culturally specific language and symbols (1,4). He or she is not necessarily concerned whether research education is offered in dietetics education programs, but how program directors perceive this subject area and view the barriers and benefits to implementation. In the same way, nutrition policy experts might believe it is essential to have supermarkets in inner cities, but qualitative researchers are concerned with food companies' perceptions about urban areas and why they do not build them there.

A qualitative research study may not have all these characteristics, but will contain most.

Qualitative research is labor-intensive because of the necessity of detailed data gathering and the amount of observation that must be done. Also, similar to excellent quantitative research, superior qualitative research involves research questions, thorough planning, and methodical implementation, with special attention to validity, reliability, and relevance.

PURPOSES OF QUALITATIVE RESEARCH

The purpose of qualitative research is to discern the meanings people give to their experiences (5). It is of utmost importance to understand phenomena from the perspective of research participants.

Determine Causal Explanations of Phenomena in Their Natural Settings

A qualitative researcher might use qualitative methods to determine why politicians in Myanmar did not admit or distribute food supplies to their people after the spring 2008 cyclone. Investigators, through interviews with a sample of reliable Myanmar informants, determine the culturally specific reasons for the barriers to food assistance. Qualitative methods are used to identify situation-specific causes for phenomena.

Study the Process or Natural History of a Phenomenon

A clinical nutrition manager might use participant observation to study the natural history of the implementation of the Nutrition Care Process (NCP) in his or her facility (6). By examining memos and official documents from upper administration, field notes written as staff members are observed talking about the process, observations of in-service education sessions, and patient records this investigator can write a narrative of the implementation of the NCP. Lessons learned from this study can be used to improve implementation. If rigorous enough, this research may help food and nutrition professionals at similar clinical settings to introduce the NCP. Ways to ensure rigor will be addressed later in this article.

Understand the Culture, Traditions, Symbols, Perception, Emotions, Language, and Meaning of Phenomena to Participants

Suppose a nutrition support dietitian works in a hospital that serves a Latino community. She or he understands there is variation in how different cultures cope with end-of-life situations in their families. She or he believes it would be beneficial to study the meaning of the process of death in this community. She or he could use qualitative methods to study the ways in which people make decisions about nutrition support and hydration in end-of-life situations based on their cultural norms. This could help nutrition support practitioners effectively assist in this decision-making process.

Qualitative research is also used to understand the perceptions and emotions of people about an issue. These methods could be used to study physicians and their perceptions and emotions related to referring patients to food and nutrition professionals. Focus groups and interviews with physicians could be done to understand these perceptions and emotions with the intent of promoting strategies to improve relationships between food and nutrition professionals and physicians.

Describe the Context of Phenomena

Qualitative methods are used to understand the role of context in human life as it relates to food, dietary issues, and health behaviors (4,5). Instructors for an inner-city weight management program might find motivated participants are not engaging in the prescribed physical activity. Instructors convene focus groups of obese community members to determine environmental barriers to physical activity associated with their community. An understanding of the neighborhoods of weight management program participants might lead to the development of innovative approaches to physical activity.

Complement Quantitative Research

Qualitative research is complementary to quantitative research. This understanding is essential in applying a research approach that fully explores a phenomenon. This purpose is discussed in a subsequent section.

Generate Tentative Theories and Hypotheses

Through surveys it might be evident in particular school systems that foodservice directors are resistant to changing their menus to offer more health-promoting food choices. Through participant observation, interviews, focus groups, and document analysis, food and nutrition professionals devise a theory about foodservice directors' propensity to favor less health-promoting foods over those that are more so. Hypotheses are developed and tested using quantitative methods.

Describe an Unfamiliar Community or Culture

These methods are ideal for studying unfamiliar populations. For instance, food and nutrition professionals might find it a challenge to be person-centered with Orthodox Jews. A food and nutrition professional working in an Orthodox Jewish community would find it valuable to understand the food-related rules, traditions, and perceptions to effectively implement medical nutrition therapy. A non-Orthodox food and nutrition professional who chooses to participate or live in an Orthodox community could write a narrative describing the community so others can benefit from an understanding of the culture.

Validate Theory

Like quantitative research, qualitative research is helpful in theory validation. Theory-driven hypotheses can be tested using qualitative methodology to determine to what degree study evidence is consistent with the theory. Qualitative evidence can strengthen or weaken the usefulness of a theory. A qualitative approach could be used to validate the Health Belief Model as an explanation for human behavior (7). For example, factory workers are observed and interviewed to examine their consumption of fruits and vegetables. Evaluation of their perceptions of benefits, barriers, susceptibility to disease, and severity of disease related to fruits and vegetables could determine how well the Health Belief Model explains consumption. To what degree the evidence supports this model can confirm or disconfirm its usefulness.

Formative Evaluation

Qualitative methods are used to conduct formative program evaluation (1,4,5). Data from these methods are used in the process of accreditation of dietetics education programs by the Commission on Accreditation for Dietetics Education (8). Dietetics program faculty and site-visitors convene focus groups, conduct interviews, and observe activities to evaluate a dietetics education program.

QUALITATIVE METHODOLOGY

There are four components of qualitative research methodology: qualitative research strategies, methods of sampling, data sources and collection, and data analysis.

Qualitative Research Strategies

Qualitative investigators employ a variety of strategies. These strategies reflect an investigator's overall approach to addressing the research questions being studied. Within the framework of each strategy a variety of sampling and data collection methods are used. The most common strategies are ethnography, grounded theory, phenomenology, symbolic interaction, narrative, participatory action research, and case study (3,4).

Ethnography. Ethnography is the study of a social system, culture, social life, and activities of daily life, through observation. Often, an investigator will engage in cultural immersion to describe the culture. For instance, a food and nutrition professional working with the Special Supplemental Nutrition Program for Women, Infants, and Children serving an inner-city Hmong community studies the dietary habits of cultural Hmong. This professional lives in the Hmong community and participates in community events. She or he might live with a variety of Hmong families and participate in daily life. By immersing herself or himself in the Hmong community she or he can develop trust and be a first-hand observer of culture. Not only could she/he document her or his experience among the Hmong population, but interview informants about the foodways of the culture. In this way she or he develops a rich narrative of the culture and the daily life of Hmong individuals. With information derived from this approach the Special Supplemental Nutrition Program for Women, Infants, and Children may better serve this community.

Grounded Theory. This approach involves a research setting and asking the general question, "What is going on here?" or "What are the problems here?" but sometimes asking more specific questions such as, "How do parents of adolescent girls with anorexia nervosa cope?" Through the use of interviews, focus groups, and document analysis, an investigator allows the data to inform her/him. Rather than use pre-existing theory to structure the research, a researcher constructs situation-specific theory from the data. After the investigator derives concepts and themes from existing data, new data are analyzed and the concepts and themes are modified. The theory evolves as more cases are collected and eventually the theory is constructed. For instance, food and nutrition professionals could use existing research on generalized coping to help parents of young people with anorexia cope. However, the question arises, "Is the general coping theory appropriate for parents of people with anorexia?" It can be of practical value to construct coping theory specific to parents of people with anorexia to effectively promote healthful coping. Honey and Halse (9) conducted this kind of study. The grounded theory approach yields theory and hypotheses that warrant further testing in similar and diverse settings.

Phenomenology. Phenomenology attempts to understand people's emotions, attitudes, thoughts, meanings, perceptions, and bodily experiences as or after they have experienced a phenomenon. Suppose a food and nutrition professional wants to understand the experience of food stamp users in her/his community. Through the use of qualitative methods she/he could describe their thoughts, emotions, and perceptions. Whereas ethnographies focus

on describing a culture, phenomenologies focus on experiences of individual people. The goal is to determine themes about the perceptions of people about a phenomenon.

Symbolic Interaction. Symbolic interaction investigates people's creation of meaning through social interactions. Qualitative methods like participant observation are used to observe relationships between people and the nature of social interaction. The relationships, interactions, and meanings are described by investigators. For instance, a food and nutrition professional may find it useful to examine the relationships and interactions between people with bulimia in an inpatient eating disorder treatment program. She or he examines how the interactions facilitate progress or regression in treatment. Also, she or he studies the interaction patterns between parents and patients during individual counseling sessions to characterize the interactions that maintain the disorder.

Narratives. Narratives involve collecting life histories or biographies to understand a phenomenon. Suppose a food and nutrition professional in private practice specializing in people with celiac disease is interested in looking for themes related to food, family background, family history, human development, and disease history to increase the effectiveness of treatment and early detection. This professional could use a narrative approach. Through interviews, she or he compiles life histories of the study participants then analyzes the text for common themes and trends to understand these patients.

Participatory Action Research. Participatory action research is the qualitative version of a clinical trial. Investigators plan and implement an action and then observe the effect, taking into consideration the setting, characteristics of the community, culture, interveners, materials used, and methods to get a complete understanding of the effect of the intervention. Suppose a food and nutrition professional working on a college campus wants to develop a Web site for student athletes to improve knowledge, attitudes, and practices related to eating and hydration. He or she convenes focus groups of athletes, coaches, sports nutritionists, and athletic directors to develop the Web site. After development, the Web site is evaluated by these same constituents. Once the Web site is implemented for athletes the investigator collects qualitative data to assess the effectiveness of the Web site, reasons for effectiveness or lack thereof, and the thoughts, attitudes, and feelings of the constituencies. Also, quantitative data are collected in a mixed methods approach. (See Figure 1 for a definition of mixed methods approach.) This iterative process is intended to improve the Web site. Often qualitative action research is implemented parallel to quantitative methods in a clinical trial to gain the benefits of both approaches.

Case Studies. These can be conducted on individuals or communities. A sample of like individuals is assembled and data are compiled into a community case. Describing several like cases has more validity than studying one individual. Treatment approaches and interventions are also recorded. Suppose a sports nutritionist studies the eating and training practices of older female triathletes with osteoporosis and tibial microfractures. She or he identifies as many triathletes as possible. With physicians' help she or he collects biochemical data, and con-

ducts a nutrition assessment, including lifestyle, training, food, and supplement data. Also, using interviews, she or he asks questions about the triathlete experience. She or he also documents the dietary and medical treatments for each and their progress. The sports nutritionist then examines the data for common and differing personal characteristics, treatment approaches, reactions to treatment, compliance, and treatment response. Finally, she or he writes a report describing emerging observations and themes.

A setting or geographical site can be treated as an individual case. A foodservice manager implements a program in her or his facility to promote good citizenship behaviors among the employees. This manager, based on observation, describes the facility and employees before the program. She or he describes the nature of the intervention, and the employees' reaction to it. Finally she or he describes through observation and interviews the effect of the program on the site. This is written as a case study of this foodservice operation. The overlap between this case study approach and action research is apparent.

Methods of Sampling

The term "sampling" conjures up concepts like probability sampling, stratified random sampling, and simple random sampling. In quantitative research the goal of sampling is a representative sample; that is, one that can represent a whole population. Then the results from the sample can be generalized to the larger population from which the sample was taken. In qualitative research probability sampling is used, but purposive sampling is more prevalent.

Purposive sampling is an intentional selection of a sample based on some characteristic (1,10). This sampling is done in a methodical way to find specific research participants. Sometimes the sample is chosen with a potential to generalize the results to the larger population of like individuals, but more often not. Patton (11) has identified 16 types of purposive sampling. The most common are described here: maximum variation, extreme case, homogeneous, criterion, theoretical, and snowball (11,12).

Maximum Variation Sampling. Maximum variation sampling is the purposeful choice of a wide variety of participants to get a balanced perspective of a phenomenon. An undergraduate didactic dietetics program director might choose students with varying grade point averages to have a sample representing all levels of academic achievement to gain the best perspective of dietetics students about pursuing graduate training.

Extreme Case Sampling. Extreme case sampling entails selecting participants who are extremes for the purpose of comparing and contrasting them. For instance, an investigator selects exemplary and poor dietetics instructors to compare and contrast their teaching attitudes, approaches, and perceptions. The intention is to examine both best and worst practices in teaching to design interventions to improve teaching.

Homogenous Sampling. In homogenous sampling, an investigator chooses like participants to study their culture and experiences. Inner-city Hmong people is a homogenous sample. A subcategory of homogenous is criterion sampling. In this case, the investigator defines a variety

of participant criteria for the sample. Each sample member must meet the criteria. The example given previously about triathletes illustrates this. They were included in the sample if they were older women and had osteoporosis and tibial fractures.

Theoretical Sampling. In theoretical sampling participants are chosen based on the possession of a given theoretical concept characteristic/s. For example, a sample could be chosen with an external locus of control to determine its response to action research using motivational interviewing in nutrition counseling. The sample is chosen based on possessing a theoretical construct, external locus of control.

Snowball Sampling. In snowball sampling one participant is selected and asked to identify other like individuals who could be added to the sample to understand a phenomenon. Those recruited individuals are asked to identify more people until there are enough participants to understand a phenomenon. Say an investigator is interested in studying gay food and nutrition professionals. Such a sensitive issue must be handled with care and confidentiality. One individual may be identified and asked to identify others. In a subsequent step, those food and nutrition professionals would be asked to identify others. Snowball sampling is used when it is initially difficult to identify participants.

Sampling in qualitative research is not haphazard. It is purposeful and methodically planned. Sampling must be based on well-defined, predetermined research questions. Though the resulting purposive samples are often not representative of a broader population, they serve an essential purpose.

Data Sources and Collection

Qualitative data are collected by a variety of methods. The following are used: focus groups, interviews, observation, documents inspection, photograph inspection, the Delphi Technique, and Internet methods (1-5). Field notes are drafted from these methods. Field notes are discussed in detail later in this section.

Focus Groups. A focus group is seven to 12 individuals assembled by purposive sampling who are asked questions associated with the research questions and prompted to respond freely (13). Sessions are videotaped or audiotaped. Videotaping is used to gain insights from body language. Tapes are transcribed to have a written record of responses. Facilitators of groups maintain control and specify ground rules so that all members feel free to respond. Often multiple focus groups are conducted to obtain data from a variety of constituents and have enough responses to make meaningful conclusions. The chance to observe group interactions and behaviors, attitudes, and beliefs is an advantage over individual interviews. A limitation is the risk of biasing the focus group to obtain a desired response. Standardized methodology and rigorous attention to objectivity are essential.

Interviews. Interviews are conducted with individuals (14). Each member of a sample is interviewed to obtain detailed data. Interviews can vary in their structure. They can be structured, semistructured, or in-depth. The distinguishing factor between approaches is the use of open- or close-ended questions. In the structured inter-

view, questions are scripted and require a limited answer. For semistructured interviews there is an interview guide with open-ended questions, but answers are constrained by a limited list of topics. Free exploration of an issue is somewhat limited. In-depth interviews involve asking very general questions to prompt unbounded exploration of an issue. Follow-up questions are spontaneously created based on the answers of each participant. The best approach in qualitative research is the in-depth interview because the data are detailed, comprehensive, more representative of the phenomenon, and less biased. Interviews are videotaped or audiotaped and transcribed.

Observation. Observation involves the presence of the researcher in the naturalistic setting (15). Observational data are used to describe settings, people, processes, activities, interactions, and meanings of phenomena from the perspective of the participants. Observation leads to greater depth of understanding than focus groups or interviews because phenomena can be observed in context. Spontaneous discussions are more enlightening about reality than discussions in organized environments. A researcher can fully participate in the environment or be an observer. Members of the setting may not know they are being studied. Covert observation can pose ethical dilemmas, but a discussion of that is beyond the scope of this article. It is vital that observers record field notes at intermittent times to document the observations.

Internal and External Documents. Internal and external documents are valuable sources of qualitative data. Policy and procedure manuals, daily planners, memos, e-mail messages, personnel files, employee evaluations, mission statements, diaries, newspaper accounts, and accreditation documents are examined for data. Patterns and themes are discovered. For instance, memos circulated between diabetes course instructors may document frequent malfunctions of a vital diabetes education Web site. This information may generate hypotheses related to the ineffectiveness of a diabetes education program. Also, marketing materials and advertisements provide information about the way an institution projects itself.

Photograph Inspection. Photographs provide interesting snapshots of company or environmental activities. Photographs of a foodservice operation kitchen may reveal unsanitary conditions, which may contribute to possible foodborne outbreaks. Also, photographs may reflect the context of a phenomenon. Suppose an investigator is concerned about a rapid rise in the prevalence of obesity in a village in Chile. Photos from 5 years ago reveal no presence of quick-service establishments, but recent photographs show them lined up one after another along the main boulevard. This could be a contributor to the rise in obesity in the village.

Delphi Technique. The Delphi Technique is a group interviewing approach with the goal of having participants arrive at consensus on a given issue (4). Group members are solicited anonymously for their opinions or perspectives. Responses are circulated among members and prompts are given for them to rank the responses. Ranked responses are then circulated in a series of rounds. In each round lowest ranked responses are eliminated. Participants must rank an ever-shrinking list of responses until consensus is reached on a response or set

of responses. This represents the response of the group. For example, this technique could be used to determine the diabetes care issues of highest priority to Pima Indians with type 2 diabetes mellitus.

Internet Methods. Internet-based listservs, blogs, e-mail, and Web sites can be used to collect data. Professional listservs are used to pose questions to a delimited group of people. For example, an investigator could pose a question to the Dietetic Educators of Practitioners listserv about best teaching practices among dietetics educators and gather data about teaching strategies that could improve dietetics education. As with any method of gathering qualitative data, it is vital that an investigator using Internet methods do so within the context of systematic and methodical planning of the research study.

The data derived from these methods are typewritten or handwritten notes, called field notes. Field notes are descriptions of sounds, pictures, documents, interactions, settings, behaviors, processes, and activities (1,2,4,5). For example, a foodservice director studying citizenship behaviors observes employees over an extended period of time and writes field notes about friendliness, empathy, customer interactions, and encouragement or criticism. Transcripts from video or audiotapes from focus groups and interviews are also called field notes. There are three additional types of notes that are recorded: personal, methodology, and theoretical (16). Personal notes are personal impressions, reactions, and memories. Methodology notes are explanations for using certain methods, and descriptions of changes in methods. Theoretical notes are about emerging concepts, interrelationships, and hypotheses. In addition to field notes, these notes will be used during data analysis. So the outcomes of qualitative methods are written field, methodology, theoretical, and personal notes. Note taking technique is beyond the scope of this article, but technique and strategy must be planned before the data collection in alignment with predetermined research questions. For those interested studying note taking refer to Bernard (16).

A variety of methods exist for gathering qualitative data. Methods chosen are limited by funding, time the investigator can devote to the study, and number of staff members available to assist with data collection. If a team of individuals is required to gather data, they will need training so data are collected in a reliable and valid way. Training can be expensive and time consuming. In addition, the research questions influence the choice of method.

Data Analysis

Data analysis involves organizing, classifying, and summarizing qualitative data; writing a cohesive description of the setting, context, and people; discovering patterns and themes; determining the meaning of phenomena to participants; summarizing tentative answers to the research questions; conceptualizing hypotheses and theories; and deciding what to report to others. This process is called content analysis (17). The goal of content analysis is summarized as providing knowledge and understanding of the phenomenon under study. Data analysis often goes on simultaneously with data collection. In contrast,

Software	Web site
ATLAS.ti	www.atlasti.com/index.php
MAXQDA	www.maxqda.com
NVIVO 8	www.qsrinternational.com
QDA Miner 3.0	www.provalisresearch.com/QDAMiner/QDAMinerDesc.html
Qualrus	www.ideaworks.com/qualrus/index.html
Transana	www.transana.org

Figure 2. Select qualitative data analysis software and corresponding Web sites. NOTE: Information from this figure is available online at www.adajournal.org as part of a PowerPoint presentation.

in quantitative research data are gathered first and then analyzed. As data are collected in qualitative research they are analyzed so that research questions and methods can be refined or altered.

To identify themes and patterns qualitative researchers create classification codes either before or during the analysis to organize the data (4). These codes are derived from the research questions or key words or phrases that frequently appear in the text. For instance, if the study involves organizational citizenship behaviors among employees in a foodservice operation there could be codes for each of the five citizenships behaviors (18). Codes could be represented as ALT for altruism, CRT for courtesy, CV for civic virtue, CON for conscientiousness, and SPORT for sportsmanship. Every time words or phrases related to these concepts appear in the text, sentences or paragraphs containing them are bracketed and the code written next to the bracket. In this way text can be organized based on the codes. In addition, codes are derived from categories and subcategories suggested by the data. In some instances a method called constant comparison is used to analyze qualitative data (19,20). Initial coding schemes are developed and as data are collected coding schemes are modified as the data warrants. After the data are organized by codes, a description of the data is written and themes and interrelationships are synthesized. Ultimately tentative answers to research questions are given, and meanings and themes are described.

During analysis, connections with existing theories are described, theories are modified, or new theories offered. If the sample is appropriate, findings can be generalized to other similar settings and populations. For example, findings about citizenship behaviors in a suburban community hospital foodservice in a middle-income area may be able to be applied to other hospital foodservices with similar characteristics.

Considering the laboriousness of the process, computer software can expedite data analysis. Many software packages are available that can analyze qualitative data. Figure 2 provides a list of the commonly used software packages and their Web sites. Lewins and Silver (21) have published a review of such software. Software can assist with creating codes, organizing and summarizing data, searching for interrelationships between codes, and suggesting themes.

ENSURING VALIDITY, RELIABILITY, AND RELEVANCE

Specific strategies are employed in qualitative research to ensure validity, reliability, and relevance (10,20,22). Criticism and bias against publishing qualitative research are produced when there is lack of attention to these issues.

Long-term intensive involvement by an observer in a research setting increases the chances that participants' real behaviors, perceptions, and attitudes will be revealed because they trust their observer. In addition, enduring involvement allows an observer to make observations in a variety of contexts. This enables an investigator to capture the complexity of the phenomenon and modify methodologies to better capture meanings and perspectives. Longer duration of observation is associated with a more detailed and accurate perception of the phenomenon.

Detailed note taking enables investigators to present a rigorous description of the situation and capture the complexity of the interrelationships. Investigators keep detailed field, methodology, personal, and theoretical notes to have a set of data for fully examining the settings, people, and context. Validity has to do with approximating real phenomena, and richer data increases the probability of this.

Describing exception cases and integrating them into the discussion of results can balance investigator bias. For instance, a food and nutrition professional studies breastfeeding among rural Hispanics and the participants generally do not breastfeed. The study examines the reasons for this general trend. However, suppose a subgroup of rural Hispanics does breastfeed and those people are advocates of the practice. It would be vital in reducing bias to describe this exceptional situation and integrate it into the discussion of breastfeeding. It is also important to propose hypotheses about this exception.

Triangulation is used to increase the validity of a qualitative study (23). This entails using multiple methods, sources, and/or investigators to promote cross-comparison and validation of results. The validity of the conclusions of one method such as focus groups is strengthened if confirmed by another such as participant observation. Also, if different investigators examine the notes and other documents and arrive at similar conclusions this increases both validity and reliability. For instance, a food and nutrition professional studies how consumers make food choices during grocery shopping. To practice triangulation, she or he conducts a number of focus groups with different community members and also intermittently observes their shopping practices.

Another validity confirmation method is respondent validation (10). This is rarely used in quantitative research, but in some circumstance such as survey research would be a helpful practice to promote validity. Results are presented to the respondents, and they comment on the accuracy of the results. Respondents can confirm or disconfirm the accuracy of the results as well as comment on the methodology. If participants' perspective and meaning is to be represented, they are the best ones to say whether the results and conclusions have captured them appropriately. However, if there is incongruence between the findings and the reaction of the participants this is documented in field notes. An investigator may

still be convinced that a given finding is true and may speculate about the reasons for the incongruity.

In the pursuit of validity, comparison of results with similar qualitative studies can be done to search for consistency and discrepancies. Also, results are compared with existing theory derived from both qualitative and quantitative studies. Again, both consistencies and discrepancies are noted. The validity of a study is enhanced if results are consistent with other studies and, in the case of inconsistency, the discrepancies can be explained.

A clear, detailed exposition of methodology promotes validity. A narrative is drafted detailing the research strategy, sampling method, data sources, data collection methods, and data analysis. The narrative is written so that another investigator could repeat the study. Also, an investigator documents his or her prestudy biases so they are considered as readers interpret the results. In addition, auditors can be used to review the methods and data to ensure appropriate methods were used, and the data treated fairly.

In addition to validity, reliability is a concern. One way to ensure reliability is to use more than one person to analyze the data. Two or three trained analyzers of the data can evaluate the data independently and later compare results and interpretations to look for consistency. Greater consistency of results from different analyzers increases the chances that the findings are reliable. Multiple bouts of listening to audiotapes, reading transcripts, and viewing videotapes by the same person or different people can promote more consistency in results and interpretations. Note that even though reliability may be high, systematic bias may be present in the interpretation of data and that is why ensuring validity is important. Methods to ensure validity may uncover this systematic bias.

An investigator must document the potential usefulness of the results and establish their relevance within the context of the field of study. Can the results promote the development of food safety education strategies that can increase food safety practices in the setting or one like it? Will results about resistance to the NCP increase receptivity to it? The results may also advance the research about a phenomenon by offering hypotheses to be tested. In addition, a new theory may be suggested or existing theory modified to create a foundation for future research.

QUANTITATIVE VS QUALITATIVE RESEARCH

In some professional circles qualitative research is not considered valid research and therefore not publishable. Quantitative research is deemed the only approach to knowledge discovery. By others, qualitative research is considered an inferior approach compared to quantitative research and represents the lowest level of research. More recently, a perspective has been offered that considers quantitative and well-conducted qualitative research to be complementary (24-27). Figure 3 contrasts the characteristics of quantitative and qualitative research. The weaknesses in one can be compensated by the strengths of the other and vice versa (1,2,4). In fact, they should be used in concert to gain a complete picture of a phenomenon.

By understanding this complementary relationship,

Quantitative	Qualitative
Deductive	Inductive
Studies well-known phenomena	Often studies unknown or little-known phenomena
Testing of hypotheses and theories	Development of hypotheses and theories
Conducted in controlled settings	Conducted in naturalistic settings
Large number of subjects	Smaller number of targeted participants
Standardized numerical data collection	Textual, audio, and visual data collection
Data gathered first, then analyzed	Data gathering and analysis occur simultaneously
Statistical analysis	Content (text, audio, and video) analysis
Explore outcomes due to treatments, manipulations and outcomes	Explore complex issues and interactions between humans, reasons for outcomes, and processes

Figure 3. Contrasting characteristics of quantitative and qualitative research. NOTE: Information from this figure is available online at www.adajournal.org as part of a PowerPoint presentation.

progressive epistemologists have encouraged the use of mixed methods research in an attempt to achieve greater reliability and validity (24). Mixed methods research combines quantitative and qualitative research approaches in a single study. Mendlinger and Cwikel (24) describe five purposes for mixed methods research: corroboration of findings across different methods, one method enhancing or clarifying specific findings of the other, using results from one method to assist in the design of methods for the other, highlighting conflicting findings and paradoxes, and extending the breadth of a study.

In mixed methods research qualitative methods can be used before, after, or simultaneously with quantitative methods (24). Frequently qualitative methods are used to enhance questionnaire development for subsequent quantitative research. Also, focus groups are used to develop strategies for successfully selecting, recruiting, and retaining members of a target population for a quantitative study. With clinical trials, qualitative methods can be used simultaneously with quantitative methods to document the application of treatments, and determine the reasons for treatment effectiveness or ineffectiveness. Qualitative research might follow quantitative research to explore with greater depth a phenomenon once a problem or issue is identified by quantitative research.

Quantitative and qualitative research are complementary. Well-conducted qualitative research should not be considered second-rate to quantitative research. Qualitative research can be methodically planned and systematically designed to produce valid, reliable, and relevant results. Progressive journals are publishing more qualitative research (27). Food and nutrition professionals could add value to the field by conducting carefully designed qualitative research using mixed methods research.

APPLICATIONS TO THE FIELD OF DIETETICS

Dietetics is a promising and relevant field for the conduct of qualitative research. Combining qualitative and quantitative research can provide a more complete exposition of a phenomenon, especially in dietetics where human behavior and behavior change play an important role. The field of dietetics could be enriched by food and nutrition professionals publishing well-designed qualitative studies. Practitioners are encouraged to design and conduct the best qualitative studies possible within their natural settings. Studies of highest quality are those that are carefully planned with attention to research questions, appropriate strategies and methods, and systematic analysis of data. Attention to reliability, validity, and relevance is of utmost importance.

Figure 4 presents a list of applications of qualitative methods and associated examples of dietetics-related research questions. There are many dietetics-related issues that are amenable to study through the use of qualitative methods. Result from dietetics-related qualitative research will improve clinical, community, and foodservice practice.

Conducting excellent qualitative research requires that an investigator carefully plan the study. Well-conceived research questions must be developed and presented. Strategies and methods appropriate for the research problem must be chosen and documented. Systematic steps and procedures for data collection and analysis must then be devised. Methods for data collection related to behaviors, attitudes, and perceptions should be standardized. Observers, interviewers, and data analyzers must be properly trained to fulfill their duties. Strategies must be planned to ensure validity and reliability are implemented for approximating truth in naturalistic settings. Before conducting the study investigators must be confident that the research is relevant. When appropriate, relevant theory and testable hypotheses will have been developed or modified from analysis of the data. Theory-driven qualitative research must be conducted where relevant. Research results are likely to be published if attention is paid to these details.

Poorly designed qualitative research is at greater risk of rejection by reviewers than poor quality quantitative research because of historical bias and the perceived subjectivity of the approach. A natural or practice-oriented environment provides no excuse for haphazard, poorly planned qualitative research. To be receptive to reviewing and publishing qualitative research, investigators and authors must convince reviewers that every effort was taken to ensure reliability, validity, and relevance. Reproducibility remains a valued feature of successful research even in the process-oriented domains. Rigorous qualitative research will bring it to a new level of respect that will encourage publication in peer-reviewed journals. The prevailing attitude of the inferiority of qualitative research can only be shed if investigators and authors can carefully describe and articulate the design and methodology employed with the most objective approach to subjective outcomes possible. To better receive such manuscripts, journals need to provide specific author and reviewer guidelines that promote fair treatment of qualitative research. The *Journal of the American Dietetic Association* and its Board of Editors are in the process of

Application	Research question
Decision-making processes	How do food and nutrition professionals make decisions about discontinuing tube feedings?
Sociocultural factors that affect food and nutrition-related behaviors	What are motivators and barriers to urban African Americans consuming fruits and vegetables?
Reasons for a dietetics-related phenomenon	Why did a technology-based, interactive diabetes education program not improve diabetes self-management compared to a traditional diabetes education program?
Teaching effectiveness in dietetics	Which are best practices among dietetics educators who have been identified as excellent in their field?
Consumer and employee behavior, attitudes, and perspectives in foodservice	What are the behaviors, attitudes, and perspectives related to food safety among community hospital foodservice workers?
Exploring unfamiliar cultures regarding their mores, traditions, and beliefs related to food and nutrition	What mores, traditions, and beliefs promote obesity among Pima Indians?
Evaluation of dietetics education programs	What is the process used by a particular dietetic internship to educate their students?
Task-related processes	To what degree is the Nutrition Care Process applied in community and clinical environments?
Theory development and modification	To what degree does Social Learning Theory apply in explaining the choice between soda and milk?

Figure 4. Applications of qualitative methods and associated dietetics-related research questions. NOTE: Information from this figure is available online at www.adajournal.org as part of a PowerPoint presentation.

developing such guidelines and are prepared to publish meritorious qualitative research studies as warranted.

CONCLUSIONS

In this article, we address qualitative research as a complement to quantitative research. There are quality resources that can elaborate on qualitative research, including those by Maxwell (5), Bernard (16), and Denzin and Lincoln (28). Also, *Research: Successful Approaches* (29), published by the American Dietetic Association, has an informative chapter on qualitative research. Excellent examples of dietetics-related qualitative research studies are provided in the References section of this article (30-35). Done properly, qualitative research facilitates the study of processes and the reasons associated with a specific behavior or other phenomenon. In the field of dietetics, the process and applied behaviors involved in successful delivery of patient care, effective provision of community programs, and competent management of foodservice are important and especially relevant. There is a great need for carefully designed and conducted qualitative research that merits publication because of its reliability, validity, and relevance despite the subjective nature of its outcomes.

Some professionals have mistakenly treated the terms qualitative research and “practice-based research” synonymously. Practice-based research is applied research conducted in natural or practice-oriented settings, rather than research-oriented settings such as research universities (36). For example, a community hospital may examine postsurgical blood glucose data in patients undergoing cardiovascular care to determine the percentage of hypoglycemic bouts and percentage of patients with blood glucoses in a tight control target range to determine the effectiveness of their new postsurgical blood glucose regulation protocol. This is practice-based research. In contrast, a research hospital associated with a major univer-

sity may recruit subjects for various groups who will have cardiovascular surgery and will receive a variety of post-surgical blood glucose regulation protocols using expensive experimental medications. Staff will have as their sole responsibility the management of that study. This research may be funded by a federal grant. This is not practice-based research. Practice-based research can either be qualitative or quantitative in nature. Practice-based research, whether qualitative or quantitative, can be a valued asset to enhance and facilitate the field of dietetics, but if poorly designed, will not add effectively to the dietetics literature. Investigators are encouraged to set standards high. This article is meant to be instructive and encouraging to food and nutrition professionals intending to conduct and publish qualitative research with the intention that the research be based on specific research questions, and systematic and well-planned methodology. It is advisable that food and nutrition professionals desiring to conduct qualitative research consult with a seasoned qualitative researcher to obtain methodological guidance and advice.

References

1. Hoepfl M. Choosing qualitative research: A primer for technology education researchers. *J Technol Educ.* 1997;9:1-16.
2. Greenhalgh T. How to read a paper: Papers that go beyond numbers (qualitative research). *BMJ.* 1997;315:740-743.
3. Carter S, Little M. Justifying knowledge, justifying method, taking action: Epistemologies, methodologies, and methods in qualitative research. *Qual Health Res.* 2007;17:1316-1328.
4. Neutens J, Rubinson L. Qualitative research. In: *Research Techniques for the Health Sciences*. 3rd ed. San Francisco, CA: Benjamin Cummings; 2002:163-192.
5. Maxwell J. *Qualitative Research Design: An Interactive Approach*. 2nd ed. Thousand Oaks, CA: Sage; 2005:15-32.
6. Lacey K, Pritchett E. Nutrition care process and model: ADA adopts road map to quality care and outcomes management. *J Am Diet Assoc.* 2003;103:1061-1072.
7. Strecher VJ, Rosenstock IM. The Health Belief Model. In: Glanz K, Lewis FM, Rimer BK, eds. *Health Behavior and Health Education*:

- Theory, Research, and Practice*. 2nd ed. San Francisco, CA: Jossey-Bass; 1997:41-59.
8. Eligibility Requirements and Accreditation Standards 2008. Commission on Accreditation for Dietetics Education Web site. http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/CADE_16149_ENU_HTML.htm. Accessed August 16, 2008.
 9. Honey A, Halse C. The specifics of coping: Parents of daughters with anorexia nervosa. *Qual Health Res*. 2006;16:611-629.
 10. Barbour R. Checklists for improving the rigour in qualitative research: A case of the tail wagging the dog? *BMJ*. 2001;322:1115-1117.
 11. Patton M. *Qualitative Evaluation and Research Methods*. 2nd ed. Thousand Oaks, CA: Sage; 1990:169-183.
 12. Mays N, Pope C. Qualitative research: Rigor and qualitative research. *BMJ*. 1995;311:109-112.
 13. Kitzinger J. Qualitative research: Introducing focus groups. *BMJ*. 1995;311:299-302.
 14. Britten N. Qualitative research: Qualitative interviews in medical research. *BMJ*. 1995;311:251-253.
 15. Mays N, Pope C. Qualitative research: Observational methods in health settings. *BMJ*. 1995;311:182-184.
 16. Bernard HR. *Social Research Methods: Qualitative and Quantitative Approaches*. Thousand Oaks, CA: Sage; 2000:355-365.
 17. Hsiu-Fang H, Shannon S. Three approaches to qualitative content analysis. *Qual Health Res*. 2005;15:1277-1288.
 18. Decktop J, Mangel R, Cirka C. Getting more than you pay for: Organizational citizenship behavior and pay-for-performance plans. *Acad Mgmt J*. 1999;42:420-428.
 19. Pope C, Mays N. Qualitative research: reaching the parts other methods cannot reach: An introduction to qualitative methods in health and health services research. *BMJ*. 1995;311:42-45.
 20. Pope C, Ziebland S, Mays N. Qualitative research in health care: Analyzing qualitative data. *BMJ*. 2000;320:114-116.
 21. Lewins A, Silver C. *Using Software in Qualitative Research: A Step-By-Step Guide*. Thousand Oaks, CA: Sage; 2007.
 22. Mays N, Pope C. Qualitative research in health care: Assessing quality in qualitative research. *BMJ*. 2000;320:50-52.
 23. Farmer T, Robinson K, Elliot S, Eyles J. Developing and implementing a triangulation protocol for qualitative health research. *Qual Health Res*. 2006;16:377-394.
 24. Mendlinger S, Cwikel J. Spiraling between qualitative and quantitative data on women's health behaviors: A double helix model for mixed methods. *Qual Health Res*. 2008;18:280-293.
 25. Dixon-Woods M, Agarwal S, Jones D, Young B, Sutton A. Synthesizing qualitative and quantitative evidence: A review of possible methods. *J Health Serv Res Policy*. 2005;10:45-53.
 26. Johnson R, Onwuegbuzie A. Mixed methods research: A research paradigm whose time has come. *Educ Res*. 2004;33:14-26.
 27. Voils C, Sandelowski M, Barroso J, Hasselblad V. Making sense of qualitative and quantitative findings in mixed research synthesis studies. *Field Methods*. 2008;20:3-25.
 28. Denzin N, Lincoln Y. *The Sage Handbook of Qualitative Research*. Thousand Oaks, CA: Sage; 2005.
 29. Achterberg C, Arendt S. The philosophy, role, and methods of qualitative inquiry in research. In: Monson E, Van Horn L, eds. *Research: Successful Approaches*. 3rd ed. Chicago, IL: American Dietetic Association; 2008:65-78.
 30. Auld G, Boushey C, Bock M, Bruhn C, Gabel K, Gustafson D, Holmes B, Misner S, Novotny R, Peck L, Pelican S, Pond-Smith D, Read M. Perspectives on intake of calcium-rich foods among Asian, Hispanic, and white preadolescent and adolescent females. *J Nutr Educ Behav*. 2002;34:242-251.
 31. Neumark-Sztainer D, Story M, Perry C, Casey M. Factors influencing food choices of adolescents: Findings from focus group discussions with adolescents. *J Am Diet Assoc*. 1999;99:929-934, 937.
 32. Neumark-Sztainer D, Haines J, Thiel L. Addressing weight-related issues in a elementary school: What do students, parents, and school staff recommend? *Eating Disord*. 2007;15:5-21.
 33. Felton T, Nickols-Richardson S, Serrano E, Hosig K. African-American students' perceptions of their majors, future professions, and the dietetics major and profession: A qualitative analysis. *J Am Diet Assoc*. 2008;108:1192-1197.
 34. Engler-Stringer R, Berenbaum S. Exploring food security with collective kitchens participants in three Canadian cities. *Qual Health Res*. 2007;17:75-84.
 35. Strolla L, Gans K, Risica P. Using qualitative and quantitative formative research to develop tailored nutrition intervention materials for a diverse low-income audience. *Health Educ Res*. 2006; 21:465-476.
 36. Potter M, Quill B. *Demonstrating Excellence in Practice-Based Research in Public Health*. Washington, DC: Association of Schools of Public Health; 2006:1-16.