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The Evolution of a Coding Schema in a Paced Program of Research

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A major task involved in the management, analysis, and integration of qualitative data is the development of a coding schema to facilitate the analytic process. Described in this paper is the evolution of a coding schema that was used in the analysis of qualitative data generated from online forums of middle-aged women with chronic conditions who participated in a computer support intervention in the rural west. The coding schema evolved over three phases of the research project and included coding tree nodes based on study-driven categories and nodes that arose from the data and changes in conceptual thinking. This paper provides researchers with information about a potential approach that can be used when coding large amounts of qualitative data from a multi-phased study. *Key Words: Qualitative Data Analysis, Coding Trees, and Chronic Illness*

Introduction

Background

The management, analysis, and integration of qualitative data are complex and challenging processes (Creswell, 1994; Denzin & Lincoln, 2000). One of the major tasks involved is the development of the codes and the coding schema that facilitate organization and interpretation of qualitative data. A systematic procedure for managing and analyzing the data gathered is required in order to make sense out of what can be an overwhelming volume of data that needs to be condensed and organized in some way so that the riches that dwell within it can be teased out and examined for themes, links, and relationships.

In recent years, specialist software has been increasingly used to organize and facilitate the process by which large amounts of text data are managed and coded for analysis. A coding tree developed for use by the research analysts in categorizing the data is integral to the process. The development of a coding tree involves: (a) identifying general data categories, often derived from the conceptual framework of the research study and its aims (deductive), (b) gaining an understanding of the "themes" and details found in the raw data, and, (c) from these themes and details, determining more specific coding categories (inductive; Thomas, 2003). Irrespective of the specific tradition within which the data are gathered, such as phenomenology (van Manen, 1990), grounded theory (Strauss & Corbin, 1990), or, as is used in this report, a more general inductive approach (Thomas), a well-designed, clear, and comprehensive coding structure promotes the quality of the analysis. Introspective qualitative data coding is foundational to the analysis process that enables the research to make an original contribution to the literature (Miles & Huberman, 1994).

Purpose

The development of a coding tree was a task faced by the research team of a telehealth intervention that began in 1995 as an avenue for providing chronically ill rural woman access to health information and peer support via the computer (Weinert, Cudney, & Winters, 2005). A significant portion of the intervention was delivered via asynchronous online forums where the women shared feelings, concerns, advice, health-related issues, and strategies for living with chronic illness in a rural setting. These exchanges among the women generated a large amount of qualitative data that required processing and analysis. The purposes of this paper are to describe the conceptual frameworks guiding the analysis process and the evolution of the coding schema used in the analysis of the qualitative data.

Description of the Research Project

Context

The Women to Women (WTW) computer outreach project has provided social support and health education for more than 15 years to rural women with long-term illnesses in an effort to enhance their potential to more successfully adapt to their chronic conditions. The authors are nurses, members of the WTW research team, and faculty of the College of Nursing at Montana State University, a land-grant university in the rural west.

History of Women to Women

The overall goal of the WTW project was to enhance rural women's ability to adapt to and manage their chronic health conditions. The research project was a paced program that evolved through three phases. Although the design of the intervention changed slightly from phase to phase, the population of interest remained constant -- chronically ill rural women, 35 to 65 years of age, living on farms, ranches, and in small towns at least 25 miles from a town of 12,500 or more people in the western United States (U.S.). Participants were required to be able to read, write, and speak English, and possess the physical dexterity to use a computer. Verbal and written consent was obtained from the women after they were assured that their privacy would be protected. The study was approved by the University Institutional Review Board for the Protection of Human Subjects.

Design

The project has been described in other publications (Cudney & Weinert, 2000; Cudney, Winters, Weinert, & Anderson, 2005): therefore, only a brief description will be provided here. The WTW project used a mixed methods design and was carried out in three phases. In Phase One of the project (1995-2000), participants were randomized into computer groups and non-computer groups. Those in the computer groups participated in a 5-month participant-focused online support group and a nurse-led interactive online health education program. The women could post messages asynchronously to the online support group and health education forums at any time of the day or night. Women in the non-computer groups had no online access. In Phase Two of the project (2002-2005), participants were randomized to intense intervention computer groups (online health teaching units with World Wide Web [WWW] access, expert-facilitated discussion of health teaching units, and a virtual social support group); less intense intervention computer groups (online health teaching units with WWW access without expert intervention, and no social support group); and control groups (without computer access). The intervention was streamlined for Phase Three (2006-2010) and just two groups were utilized: the computer intervention group (online independent-study health teaching units and virtual social support group) and a non-computer control group.

Method of Inquiry

A mixed method approach utilizing qualitative and quantitative data was used for the study. A general form (Thomas, 2003) of content analysis was utilized to analyze the online conversations among the women. It consisted of three stages: deductive, inductive and integrative. Deductively the data were coded according to the conceptual framework and the aims of each phase of the project. Inductively, the themes that emerged from the online interchanges were added to the coding schema. Quantitative data, including demographic information and completed surveys to measure psychosocial outcomes, were collected from all groups from Phases One, Two, and Three and analyzed using the Statistical Package for the Social Sciences (SPSS, 2001). In the integrative stage of data analysis, the qualitative and quantitative data were examined for linkages and relationships among the themes and organized into a meaningful conceptual scheme related to the management of chronic illness in the rural environment.

Recruitment of Participants

Recruitment of the study participants was accomplished through newspaper advertisements, word of mouth, and contacts with health professionals and voluntary agencies (Cudney, Craig, Nichols, & Weinert, 2004). In all, 662 women completed the three phases of WTW.

Data Collection

Qualitative data. Qualitative data were obtained from the online exchanges between the women who participated in the computer interventions. Each exchange was cleaned of identifying information, stored in the end-user database, then downloaded into QSR NUD*IST (Phases One and Two) and NVivo (Phase Three; Qualitative Solutions & Research PTY LTD., 1997) to aid data management and analysis.

Quantitative data. Because disease may coexist with health in individuals, management of disease and health promotion are important health maintenance activities. Healthy psychosocial processes are thought to positively influence health maintenance (Stuifbergen, Seraphine, & Roberts, 2000). Scores for instruments used to measure these psychosocial concepts constituted the quantitative data for the WTW study. The measures used -- perceived social support, self-esteem, empowerment, self-efficacy, stress, depression, and loneliness -- were selected based on the strength of their psychometric properties, prior use in research with chronic illness, conceptual fit, and evidence that they can change based on an intervention of support and education. Paper and pencil surveys were completed by all participants at set time intervals for all three phases of the project. A software program (SPSS, 2001) was used to manage the quantitative data.

Conceptual Foundation of the Project

The conceptual foundation that provides the context for examining the phenomena of rural women's ability to adapt to and manage their chronic illnesses has grown from the single concept of social support to the more complex "Conceptual Model for Adaptation to Chronic Illness." This model forms the current organizing framework of the third phase of the research project.

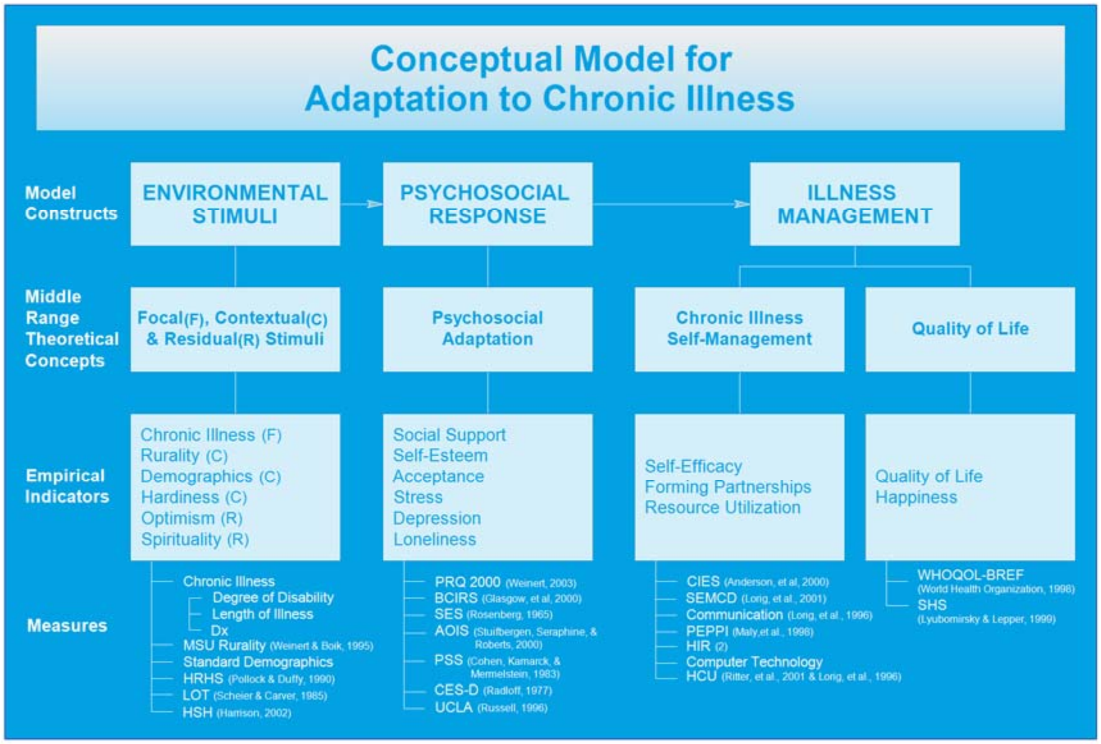
In Phase One, social support was conceptualized as the provision of attachment/intimacy, facilitation of social integration, opportunity for nurturing behavior, reassurance of self-worth as an individual and in role accomplishments, and the availability of informational, emotional, and material assistance (Weiss, 1969). The research design for Phase One was based on the premise that components of the telecommunication supportive intervention would provide aspects of social support. Additionally, assumptions were made that social support is a critical factor in health management of long-term illness (Leino-Kilpi, Luoto, & Katajisto, 1998), and can be mobilized by participation in self-help groups and maintained via computer linkages (Brennan, Moore, & Smyth, 1995). The intent of the first phase was to measure the impact of the supportive intervention on social support.

The conceptual framework for Phase Two was derived from the findings from Phase One and a further literature review that suggested the need for a broader, overreaching conceptual base. As a result, "adaptation to chronic illness" (Pollock, 1993) was determined to be the overarching conceptual framework for the project. The indicators of adaptation that were measured included psychological status (social support, self-esteem, empowerment, self-efficacy, depression, stress and loneliness), computer literacy skills, and health knowledge.

Phase Three of the project is currently underway. The findings from Phase Two suggested that participation in the computer-based intervention had positive impacts on the specified psychological indicators of adaptation to chronic illness, and thus the "Conceptual Model for Adaptation to Chronic Illness" evolved. The model includes the ingredients and processes of psychosocial adaptation, and indicates the potential for positive influences affecting illness self-management and quality of life, prerequisites to sustained behavioral change in the management of chronic illness.

The conceptual model draws from the adaptation literature and the findings of the project. It is anticipated that the current research will further strengthen and refine the model, advance the state of the science regarding adaptation to chronic illness, provide guidance for expanding intervention research related to chronic illness across diagnoses, and is sensitive to the particular issues associated with living in a rural area (see Figure 1).

Figure 1. The Women to Women Conceptual Model for Adaptation to Chronic Illness



Evolution of Coding Trees

The research team was challenged with an overwhelming volume of qualitative data -- in this case, the large number of messages exchanged among the women in the computer intervention groups over extended periods of time. Our goals were to develop a coding tree; establish clear links between the research objectives and the qualitative findings; and eventually integrate those findings with the results from the quantitative analysis to develop a preliminary model or theory describing psychosocial adaptation to chronic illness. To approach the task of analyzing the qualitative data, the research team opted to use the QSR NUD*IST (Qualitative Solutions & Research PTY LTD., 1997) computer package designed to aid users in handling non-numerical and unstructured data. This program required the development of a coding schema or tree that could be used to help process the data into manageable, retrievable categories.

The development and nature of the coding trees for the project are reflective of the qualitative descriptive design which can be considered the least theoretical of qualitative approaches and is “typically an eclectic but reasonable and well-considered combination of sampling, data collection analysis, and re-presentational techniques” (Sandelowski, 2000). Although eclectic in nature, the descriptive approach may reflect hues, tones and textures (Sandelowski) characteristic of more specific methodological frameworks. As noted earlier, in the earliest phase of the project the concept of social support became the major deductive component of the coding tree. In Phase Two, the initial conceptual base of social support was subsumed under the broader umbrella of adaptation to chronic illness with a focus on illness self-management as the vehicle of adaptation; in addition, psychosocial factors (e.g., stress, were adopted as indicators of adaptation, thus requiring a concomitant adjustment to the coding tree). With the emergence of the “Conceptual Model for Adaptation to Chronic Illness” used in Phase Three, the previous coding tree organizational foci of social support and self-management have been engulfed, and the model has become the organizing framework for the coding tree.

Processes for Coding, Analysis, and Rigor

In the project, the general approach to analyzing the content of the messages was to read each message to discern a gestalt of the themes contained within it. The message was then re-examined to determine which of the deductive themes found in the conceptual framework and research objectives were represented as well as the presence of new themes yet unidentified (inductive). When a potentially new theme was detected, it was flagged and discussed with a second analyst, and sometimes with other members of the research team. A decision was made as to which existing category (if any) it was related and whether it merited adding a new category or segment of a category to the coding scheme. Thus, the findings were derived from both the research objectives and the analysis of the raw data (Thomas, 2003). As can be seen in the tables below, the initial coding trees were the product of a combination of deductive (start list) and inductive (ground up) thinking that evolved from the simultaneous collection and analysis of data, both mutually shaping the other (Bradley, Curry, & Devers, 2007; Sandelowski, 2000).

Phase one.

The qualitative data from the first phase of the project were produced from two online asynchronous forums — “Conversation” and “Health Chat ”— each assigned separate, but related, coding trees. In “Conversation,” the women provided social support for one another by exchanging feelings, concerns, advice and ideas. The more structured “Health Chat” was a series of interactive educational discussions centered on the women’s health promotion and maintenance. These interactions constituted the qualitative data used for analysis (Cudney & Weinert, 2000). The deductive codes were associated with the major conceptual underpinning of the study (social support; rural setting); factors identified in the literature to influence adaptation (spirituality, self-management, and psychological outcomes); statements of interest to the research team (attitudes toward the intervention) and good quotes (comments that explicitly captured the content of the exchanges). The remainder of the codes was generated inductively and arose through reflexive and interactive content analysis as the research team analysts gained new insights about the data (Sandelowski, 2000) and added new codes accordingly (see Table 1).

Table 1. Phase One Coding Tree for "Conversation"

Note: 1.0 Base Data (e.g., demographics) page precedes these pages.
e.g. = First and last item in the categories listed
Bolded = Deductive codes (start list); Not bolded = Inductive codes (ground up)

- **2.0 Social Support**
  - **2.1 Provided**
    - **2.1.1 Informational**
    - **2.1.2 Emotional**
  - **2.2 Received**
    - **2.2.1 Informational**
    - **2.2.2 Emotional**
  - **2.3 Sought**
    - **2.3.1 Informational**
    - **2.3.2 Emotional**
- **3.0 Rural**
- **4.0 Spirituality**
- **5.0 Psychological Outcomes**
  - 5.1 Psychological Adjustments
  - 5.2 Quality of Life
- **6.0 Illness Management**
  - 6.1 Emotions
    - (e.g.) 6.1.1 Anger
    - 6.1.15 Courage
  - 6.2 Self-Image
  - 6.3 Pain
  - 6.4 Physical adaptation/limitation
  - 6.5 Impact on relationships
  - 6.6 Taking action
- **7.0 Attitude Toward Intervention**
  - 7.1 Emotions
    - (e.g.) 7.1.1 Excitement
    - 7.1.4 Importance
  - 7.2 Expectations
    - (e.g.) 7.2.1 Learning
    - 7.2.4 Regret Losing
- **8.0 Free Nodes**
  - 8.1 Family
  - 8.2 Health Care System
- **9.0 Good quotes**

The codes for the "Health Chat" messages were identical to those of "Conversation" except that the coding tree was applied in relation to each health topic, e.g., "Helping Yourself," "Combating Stress," and "Fighting Fatigue," etc., and the numbering system used in the coding tree adjusted accordingly.

Phase One was a period of learning for the two data analysts — one took the lead and coded all the messages and a second coded ten percent of the messages until at least 80% agreement was reached. As the definitions for the codes became more refined and the analysts became more immersed in the data, more than 90% agreement was achieved.

Phase two. In Phase Two, the two discussion groups were retained, but with new names: "Koffee Klatch" (online support) and "Health Roundtable" (internet-based health teaching units). Rather than using different coding trees for each forum as was done in Phase One, a decision was made to use one coding tree after a trial-coding period found one tree to be satisfactory for both discussion groups.

Because a greater focus was being placed on illness self-management in Phase Two, it was decided that the coding tree should be altered to reflect this progression in thinking. The deductive codes were based on the aims of the study, the psychosocial indicators of adaptation that were being measured, e.g., social support, and stress, and concepts from the literature on illness self- management. The inductive codes that were being added continued to evolve from the data (e.g., physical and emotional condition).

A search of the illness self-management literature revealed several models that provided direction for the revisions made to the coding tree used in Phase Two. The structure for revisions made to the code segments/sub-segments was based on the following: "Dimensions of Self-care for Health Promotion Model" (Leenerts, Teel, & Pendleton, 2002); "The Shifting Perspectives Model of Chronic Illness" (Paterson, 2001); "Knowledge-Attitude-Behavior Model," (Contento, Balch, Bronner, Lytle, Maloney, Olson, et al., 1995); and "Nursing Theories" (George, 1995). Additions to the tree also came from inductively-based codes, such as "Family" and "Health Care System," and were designated as code segments/sub-segments and assigned coding numbers. To foster consistency in coding, definitions of the codes, derived from the literature and consensus among the analysts, accompanied the tree and were indicated in italics. On Table 2 is presented an abridged version of the coding tree.

Phase three. In Phase Three, the number of discussion groups was downsized from two to one in an effort to simplify the study design and make it more amenable to eventual clinical application. "Sharing Circle" has become the sole discussion group where the women exchange social support as well as comment upon issues associated with the health-teaching units. These messages constitute the qualitative data for Phase Three.

Having moved in our conceptual thinking from a single concept (social support) in Phase One, to an overarching framework for adaptation to chronic illness in Phase Two, to a full-blown model (Conceptual Model for Adaptation to Chronic Illness) in Phase Three, the coding tree was again revised to reflect the concepts deduced from the model. Three constructs -- environmental stimuli, psychosocial response, and illness management -- have become the major categories in our revised coding tree. The previous code segments used in Phases One and Two have been collapsed or reorganized beneath them in code segments that are consistent with the project's conceptual model (see Figure 1 and Table 3).

Table 2. Phase Two Coding Tree for Koffee Klatch and Health Roundtable Showing Level One and Level Two Coding Only

Note: 1.0 Base Data page precedes these pages.
Bolded = Deductive codes (start list); Not bolded = Inductive codes (ground up)

- **2.0 Internal and external environment (*relationship with self and others; influencing conditions*)**
  - **2.1 Social Support** (same as Phase One)
  - **2.2 Self-concept**
  - **2.3 Overall goals *(general desired outcomes in caring for self/managing illness*)**
  - **2.4 Motives for self-care/illness management (*inner urge that drives people to action)***
  - **2.5 Images of health (*one's own view and definition of one's health*; h*ealth can coincide with illness/symptoms if they can be managed or controlled; understands limitations yet still able to cope*)**
  - 2.6 Physical condition (*ability to engage in activities of self-care/illness management)* (similar to Phase One)
  - 2.7 Emotional condition (similar to Phase One)
  - 2.8 Role
  - 2.9 Family
  - **2.10 Cultural context (*culture-based influences on health and health practices*)**
  - **2.11 Health Care System**
- **3.0 Self-care ability (*readiness to care*)**
  - **3.1. Consciousness (*awareness of opportunity to act on perceived influences on the body*)**
  - **3.2. Self-efficacy (*setting goals in the belief that one can make changes to improve health*; *belief in one's capability*; *resolve to organize and initiate self- care*)**
  - **3.3. Independence (*ability to care for personal needs, may include assistance; autonomy of thought)***
  - **3.4. Problem solving (*ability to consider and prioritize options for action; reframing)***
  - **3.5. Relating (*gaining cooperation and support; interdependence and interaction to promote health)***
  - **3.6. Reconciliation (*ability to transcend what cannot be changed)***
  - **3.7. Influencing conditions** (see "Internal and External Environment)
- **4.0 Self-care activity (*repertoire in caring/illness management*; *self- management skills*)**
  - **4.1. Health-deviation self-care *(illness)***
  - **4.2. Healthy life-style *(adopting healthy lifestyle habits, e.g., positive attitudes, sleep hygiene, ideal weight, exercise, social relationships, stress management)***
- **5.0 Outcomes (*promotion of health [while dealing with chronic illness]; adaptation to chronic illness*)**
  - **5.1. Connectedness (*deepened relational connections)***
  - **5.2. Transcendence *(self-transcendence beyond illness; planning for the future)***
  - **5.3. Resource use (*e.g., finding health information on internet*; *efficient health service utilization)***
  - **5.4. Well-being (*learning to live with the effects of pathologic conditions in a life-style that promotes continued personal development; effective self-management skills & subsequently improved health status and quality of life)***
- 6.0 Attitude Toward Intervention (*impact of computer support and health education)*
  - 6.1 Emotions (similar to Phase One with 4 additions in Phase Two)
  - 6.2 Expectations (same as Phase One)

Table 3. Phase Three Coding Tree for Sharing Circle

Bolded = Deductive codes (start list); Not bolded = Inductive codes (ground up)

- **1.0 Environmental Stimuli**
  - **1.1 Focal: Chronic Illness**
    - 1.1.1 Physical condition (*ability to engage in activities of self-care/illness management*)
      - 1.1.1.1 Fatigue/Sleep difficulty/Decreased energy level
      - 1.1.1.2 Pain
      - 1.1.1.3 Has physical limitations
      - 1.1.1.4 Has adapted to physical limitations
      - 1.1.1.5 Has no physical limitations
  - **1. 2 Contextual**
    - 1.2.1. Demographics
    - 1.2.2. Role
      - 1.2.2.1 Family
        - 1.2.2.1.1 Responsibilities
        - 1.2.2.1.2 Problems
        - 1.2.2.1.3 Relationships
      - 1.2.2.2 Work
      - 1.2.2.3 Social
    - 1.2.3 Community
    - 1**.2.4 Rurality**
    - **1.2.4.1 Context/Geography/Place** *(farm, ranch, vast areas; factors in the physical setting affecting the lived experience of chronic illness)*
        - 1.2.4.1.1 Distances (*from health care; costs of travel; toll on energy pool; workplace outside home; lack of transportation; physical isolation*)
        - 1.2.4.1.2 Travel limitations *(inclement weather; hazardous road conditions)*
        - 1.2.4.1.3 Health hazards *(environmental [e.g., pesticides, pollen]. Physical [demands of physical labor, consequences of overexertion]; accidents/injuries [immediate and long-term effects])*
      - 1.2.4.2 Social/cultural environment *(impact of values, customs, and interdependent relationships*)
        - 1.2.4.2.1 Personal *(rewards [satisfaction of gardening, enjoying animals-pets, livestock, wildlife; peacefulness of rural setting, access to outdoor recreation, walks]; emotional isolation/loneliness [loss of friends through moving or death]; insider/outsider; physical limitations; self-isolation)*
        - *1.2.4.2.2* Family relationships *(family farming disputes; sharing of workload; loss of workforce [children/other family members leave the farm]; privacy issues [not airing family laundry])*
        - 1.2.4.2.3 Farm/ranch priorities take precedence over women's health care
        - 1.2.4.2.4 Finances *(effects of weather [e.g., lack of moisture] on all aspects of rural living; crop/animal losses; fluctuating farm economy; governmental regulations and relationships)*
        - 1.2.4.2.5 Community *(interdependence--helping/getting help from community involvement [volunteering at local fairs, banquets, fund-raisers, church and school activities]; responding to community efforts/emergencies [harvesting, branding, wild fires])*

- 1.2.4.3 Nature of women's work (*gender-related activities and tasks performed; related issues)*
  - 1.2.4.3.1 Ranch/farm activities (*caring for animals, gardening, canning, driving trucks/farm equipment, bookkeeping, meal preparation for family and work crews, assisting with seeding and haying)*
  - 1.2.4.3.2 Work outside the home/ranch *(lack of employment opportunity outside the home; loss of ill women's contribution to work of farm)*
  - 1.2.4.3.3 Work/gender related issues *(excessive community expectations of self-sufficiency; overload on women [expectations of self and from others to complete tasks]; emotional cost [sense of loss related to physical inability to contribute to farm/ community work; loss of sense of self-sufficiency])*
- 1.2.4.4 Accessibility/quality of health care (o*pportunities and barriers to health services and health education [availability, acceptability, costs]).*
  - 1.2.4.4.1 Factors affecting accessibility/quality of health care *(lack of providers [rapid turnover of health care providers; lack of specialists]); distance; financial [costs of travel to health care, insurance/lack of insurance; costs of care]*
  - 1.2.4.4.2 Strategies for overcoming barriers to health care (*making efforts to maintain health and balance; using alternative means of accessing health care info [internet, telephone]; pre-planning/scheduling [combining dr. appointments; combining purpose of trips to town]; willingness to travel long distances; seeking complementary forms of health care)*

1.2.5 Hardiness

1.3 Residual
- **1.3.1 Optimism**
- **1.3.2 Spirituality**

2.0 Psychosocial Response
- **2.1 Social support** (same as Phases One and Two)
- 2.2 Emotional condition (similar to Phases One and Two)
  - 2.2.18 Happiness (added in Phase Three)
- **2.3 Self-esteem** (similar to "Self-concept" in Phase Two)

3.0 Illness Management
- **3.1 Self-management**
  - **3.1.1 Motives for self-care/illness management (*inner urge that drives people to action)***
    - **3.1.1.1 Minimize symptoms**
    - **3.1.1.2 Enhance quality of life**
    - **3.1.1.3 Other**
  - **3.1.2 Self-Efficacy in self-management of a chronic illness: ADAPTER**
    - **3.1.2.1 Adopts positive Attitude *(toward problem and ability to solve it.*)**
    - **3.1.2.2 Defines and Determines goal(s).**
    - **3.1.2.3 Generates Alternatives (*for overcoming obstacles and achieving goal)***
    - **3.1.2.4 Prepares action Plan *(predicts consequences, negative and positive, for alternatives and chooses the one that will best achieve goal)***
    - **3.1.2.5 Tries out (carries out) action plan (*makes life style changes*)**
    - **3.1.2.6 Evaluates action plan**
    - **3.1.2.7 Rewards Self**
  - **3.1.3. Images of health** (Similar to Phase Two)
  - **3.1.4 Resource Utilization**

            3.1.4.1 Seeking and securing health care assistance
            3.1.4.2 Seeking new knowledge about health
            3.1.4.3 Source of Information
                3.1.4.3.1 Internet
                3.1.4.3.2 Health care provider
                3.1.4.3.3 Family members
                3.1.4.3.4 Friends
                3.1.4.3.5 Printed materials (books, magazines, etc.)
                3.1.4.3.6 Visual materials (TV, videos, etc.)
                3.1.4.3.7 Voluntary associations (MS Society, Arthritis Foundation, etc.)
        3.1.5 Partnering with Health Care Provider/Health Care System: Communicating with health care provider (similar to "Health Care System," Phase Two)
    3.2 Quality of life
        3.2.1 QOL in relation to physical health
        3.2.2 QOL in relation to psychological health
        3.2.3 QOL in relation to social relationships
        3.2.4 QOL in relation to environment
4.0 Attitude Toward Intervention (similar to Phase Two)
5.0 Good quotes

Upon inspection of Tables 2 and 3, one can see that the major change in the coding tree was in the "Environmental Stimuli" category with lesser, primarily organizational, changes seen in the "Illness Management" category. Under "Environmental Stimuli" (contextual), the code structure associated with the code segment "Rurality" was inductively expanded, based entirely upon Phase Two women's rich descriptions of rural life (Winters, Cudney, Sullivan, & Thuesen, 2006). A deductive addition to the same category (derived from the conceptual model and the literature) was "hardiness." The previous code segments associated with health and self-care, e.g., motives for self-care, self-efficacy, images of health, self-care ability, self-care activity, resource utilization, were distilled and/or regrouped under the major category of "Illness Management" resulting in a cleaner, more streamlined coding structure. Although comparison of the coding trees for Phases One and Two will reveal other changes, the above named are the most significant.

With Phase Three of project underway, we are gaining experience with the newly revised coding tree. We continue to engage in a process described (Richards & Richards, 1995) as "the discovery and ordering of ideas and themes; and the storing of growing understandings, the linking of ideas to data, cross-referencing, sorting and clarifying" (p. 80).

Summary\Reflections

Initially, in our quest to mine the rich qualitative data that were embedded in the messages exchanged in the online forums of the computer outreach project, our goals were to develop a coding tree for the raw text data; establish clear links between the research objectives and the qualitative findings; and integrate these findings with the results from analysis of the quantitative data to develop a model or theory to describe the psychosocial adaptation to chronic illness.

Our effort to develop a coding tree to assist in the analysis of the raw text data paralleled the three phases of the research project. In Phase One, the coding tree was relatively straightforward with eight major categories (social support, rural, spirituality, psychological outcomes, illness management, attitude toward intervention, family, and health care system). In Phase Two, our thinking expanded beyond social support to the overarching concept of adaptation to chronic illness and the notion of self- management as a means of achieving optimal adaptation. Consistent with these ideas, the coding tree was enhanced to include five categories: internal and external environment (with sub-categories of self-concept, motives for self-care/illness management, images of health, cultural context, and health care system); self-care ability; self-care activity; adaptation outcomes; and attitude toward intervention, along with definitions of each. These changes made for a very complex coding tree that required significant amounts of coding time. In Phase Three, a somewhat less complex coding tree is being used with three guiding theoretical constructs as major coding categories (environment, psychosocial adaptation, and illness management). While unknown at this point in data analysis, it is possible that the detailed sub-concepts of our present coding tree could be made more parsimonious by combining sub-concepts, sub-themes, and categories (Thomas, 2003). Additionally, the responsibilities of the qualitative analysis team involved in the coding process have changed, and the team members are in the process of validating the operational definitions of the codes so that they can be applied consistently. Obviously, our efforts to develop a functional coding tree continue to be a work in progress.

More specifically, as we proceed, we will need to remind ourselves of where we have been and where we are going in this process. Borrowing from Richards and Richards (1995), our trajectory might be described as: (a) developing data-driven categories arrived through inductive analysis; (b) coding bits of data as particular categories to support the processes of theory emergence as well as exploring the links between categories; (c) exploiting the fact that categories offer the potential for a conceptual structure; (d) categorizing richly and coding liberally, e.g., a message may contain reference to twenty issues — coding should reflect each of them; and (e) critically examining and reporting the indexing process to achieve validation.

Conclusion

The qualitative analysis process and coding schema have been described in detail in this paper. The analysis process involved the careful application of the general inductive approach using a well-conceived and constructed coding tree to ferret out the important themes embedded in the raw data contributed by those who live with chronic illness on a day-to-day basis. The description of the process will provide researchers with information about a potential process to use when coding large amounts of data from a project spanning several years. The research team gained information that will further strengthen and refine the "Conceptual Model for Adaptation to Chronic Illness" that will advance the state of the science regarding adaptation to chronic illness, provide guidance for expanding intervention research related to chronic illness, and will be sensitive to the particular issues associated with living in a rural area.

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