Rural Nursing: Searching for the State of the Science

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Abstract

Background: During the development of the strategic plan for the Rural Nurse Organization in 2009 a request was made for a comprehensive literature review regarding the state of the science of rural nursing. This request led to the collaboration on this project by doctoral students in the rural nursing program at Binghamton University.
Purpose: The purpose of this review was to identify the current state of the science of rural nursing, and the use of theoretical principles that guide this subcomponent of the discipline.
Methodology: An integrative review of the literature was conducted utilizing the methodology by Cooper (1998). Two hundred ninety five articles were identified with publication dates ranging from 1989 through 2010. From these, 107 were included in the review and analysis. Articles were evaluated for level of evidence and scientific merit. Data were categorized with sub-headings of rural definitions, theoretical frameworks, research focus, countries of origin and publication source.
Results: Forty-two percent of the articles reviewed provided no definition for the term rural. The remaining articles revealed no general agreement on the definition of rural. Although the majority of studies used some theoretical framework, the one prominent theory was rural nursing theory (Long & Weinert, 1989). Minimal testing of theory was evident in the literature. Disease management was the most common focus of research. There was a dearth of studies emanating from Asian and South American countries. The *Online Journal of Rural Nursing and Health Care* published the greatest number of articles included in this review.
Conclusions: There has been a proliferation of rural nursing research over the last two decades. The level of evidence revealed was low, predominantly level VI. The use of numerous and widely varied theories in the literature indicates that rural research is fragmented and lacks a solid theoretical foundation to guide research and practice. More robust research is needed to strengthen the body of knowledge and develop the specialty of rural nursing.

Keywords: Rural, Nurs*, Theory, Integrative Review, Research

Rural Nursing: Searching for the State of the Science

In April 2009, the Rural Nurse Organization (RNO) strategic plan called for a review of the literature on rural nursing to examine a variety of possible issues such as conditions in rural areas, recruitment and retention needs, educational desires, state of the science in rural nursing research and professional organization services. In September of that year Pamela Stewart Fahs, RN, DSN and RNO secretary proposed that this review be the basis of a project for doctoral students working on a PhD in Rural Nursing at Binghamton University. It was agreed that this review would be conducted and be peer reviewed for suitability for publication in the *Online Journal of Rural Nursing and Health Care*. Thus the idea was born for an integrative review into the rural nursing literature. The major purpose was to identify the current state of the science of rural nursing, and the use of theoretical principles that guide this subcomponent of the discipline. The project was conceptualized as a class project, where the search and identification of the literature to review would be done as part of class work. Evaluation of the individual articles was completed by each student utilizing a scoring grid to identify level of evidence and scientific merit. Once this information was gathered, it was entered onto a literature comparison chart for further analysis.

A systematic approach to analysis was performed as described by Cooper (1998). Cooper delineated the process of conducting a research review as encompassing a problem in stages, similar to the stages of conducting primary research, The key components are (a) problem formulation for the literature review, (b) literature search, (c) data evaluation; (d) data analysis; and (e) presentation. The initial stage of any review method is a clear identification of the problem that the review is addressing and the review purpose. Subsequently, the variables of interest and the appropriate sampling frame are determined. Having a well-specified review purpose and variables of interest facilitates all other stages of the review, particularly the ability to differentiate between pertinent and extraneous information in the data extraction stage. Data extraction from primary research reports can be complex because a wide range of variables will have been studied across multiple reports. Any integrative review can encompass an infinite number of variables; therefore, clarity of the review purpose is important. A well-specified research purpose and literature search strategy will facilitate the ability to accurately operationalize variables and thus extract appropriate data from primary sources regarding the state of the science of rural nursing. In any case, a clear problem identification and review purpose are essential to provide focus and boundaries for the integrative review process.

Methodology

Materials were gathered from a systematic review of electronic databases utilizing EBSCOHost. These included the Cumulative Index of Nursing and Allied Health Literature (CINAHL) and Medline to identify the state of the science of rural nursing. Key words used in the search included: nurs*, theory, and rural. Search delimiters were English language, available abstract and publication dates of 1989 to 2010. The beginning search date of 1989 was purposefully chosen in an effort to include a seminal article on rural nursing. The initial search yielded 294 items. A companion article to one of the original search articles was added using heritage method for a total of 295 items for review.

The initial review of titles and abstracts was performed collectively by the group, generating a list of articles for inclusion, exclusion and those for further evaluation. Any definition of rural was accepted. Articles were included for review if they: (a) discussed any

traditional rural concept, (b) provided a framework for rural nursing, (c) explored or generated theories of rural nursing, (d) discussed the meta-paradigm: health, nursing, environment, and person as it related to rural nursing, (e) examined relationships between rural nursing and practice environments or (f) discussed rural nursing as a specialty or sub-specialty of nursing.

All dissertations were excluded due to difficulty accessing electronic copies and prohibitive cost associated with obtaining copies for review. One article was excluded because of duplication in search results. Nine articles were judged to have low scientific merit based on the established scoring criteria. Major exclusion rationale included articles which were rural in setting only, 76; results that were not specific to rural nursing practice, 21; and one article which was excluded for both these reasons. Thus a total of 107 items met the inclusion criteria for review (Abrahams, Wood, & Jewkes, 1997; Allen, 2004; Anderko & Uscian, 2000; Anderko, Uscian, & Robertson, 1999; Andrews, Morgan, & Stewart, 2010; Annan, 2008; Appel, Giger, & Davidhizar, 2005; Barredo & Dudley, 2008; Bathum, 2007; Boucher, 2005; Boyd & Mackey, 2000a, 2000b; Breda et al., 1997; Brennan & Stevens, 1998; Brewer, Zayas, Kahn, & Sienkiewicz, 2006; Brodie et al., 2005; Buehler & Lee, 1992; Burman, 2001; Bushy & Kost, 1990; Cesario, Nelson, Broxson, & Cesario, 2010; Crigger et al., 2004; Cuellar, 2002; Davis & Droes, 1993; Day & Boynton, 2008; Drury, Francis, & Chapman, 2008; Eaves, 2006; Eisenhauer, Hunter, & Pullen, 2010; France, Fields, & Garth, 2004; Gibb, 2003; Gibb, Forsyth, & Anderson, 2005; Gobble, 2009; Green & Davis, 2005; Grubbs & Frank, 2004; Grzybowski, Kornelsen, & Cooper, 2007; Haegert, 2000; Hall et al., 2005; Hanna, 2001; Harrison, 1998; Heath, 1998; Hegney, 1997; Holt & Reeves, 2001; Howell, Nelson-Marten, Krebs, Kaszyk, & Wold, 1998; Hylton, 2005; Jervis, Shore, Hutt, & Manson, 2007; Juhl, Dunkin, Stratton, Geller, & Ludtke, 1993; Keller, 2008; Kelley, 2004; Keogh, 1997; Kim, Kim, Park, & Kim, 2010; Kulig, 2000; Lauder, Reel, Farmer, & Griggs, 2006; Lee & Winters, 2004; Lee, Arthur, & Avis, 2007; Leight, 2003; LeSergent & Haney, 2005; Lethbridge, 1989; Lo & Brown, 1999; Long & Weinert, 1989; Martin, Garcia, & Leipert, 2010; Mastaglia & Kristjanson, 2001; Mayne & Glascoff, 2002; McClune, 2009; McConigley, Kristjanson, & Morgan, 2000; McCoy, 2009; Meraviglia, 2004; Mills, Chapman, Bonner, & Francis, 2007; Mills, Francis, & Bonner, 2007a, 2007b, 2008a, 2008b; Modungwa, Poggenpoel, & Gmeiner, 2000; Molinari & Monserud, 2009; Morgan, Semchuk, Stewart, & D'Arcy, 2002; Mostafanejad, 2006; Nichols, 1999; Ostlund, 2010; Penz & Stewart, 2008; Price, Burkhart, Burkhart, & Islam, 1999; Prior, 2009; Pullen & Walker, 2002; Racher & Vollman, 2002; Racher, Vollman, & Annis, 2004; Reay, Patterson, Halma, & Steed, 2006; Schumacher, 2010; Scott-Findlay & Chalmers, 2001; Sellers, Poduska, Propp, & White, 1999; Shambley-Ebron & Boyle, 2006; Sizemore, Robbins, Hoke, & Billings, 2007; Sliep, Poggenpoel, & Gmeiner, 2001a, 2001b; Soltis-Jarrett, 1995; Sossong, 2007; Sullivan, Weinert, & Cudney, 2003; Takase, Maude, & Manias, 2005; Textor & Porock, 2006; van der Merwe, 1999; Weinert, Cudney, & Spring, 2008; Werle, 2004; White & Mortensen, 2003; Williams, 2001; Witte, Dm, & Steyn, 2008; Wittig, 2001; Woodhouse, 2009; Xiao, 2010; Yonge, 2007, 2009; Yurkovich, Buehler, & Smyer, 1997). Of these, 62 were qualitative, 25 quantitative, one was mixed methods and 19 were not data based. Figure 1 summarizes the search process.

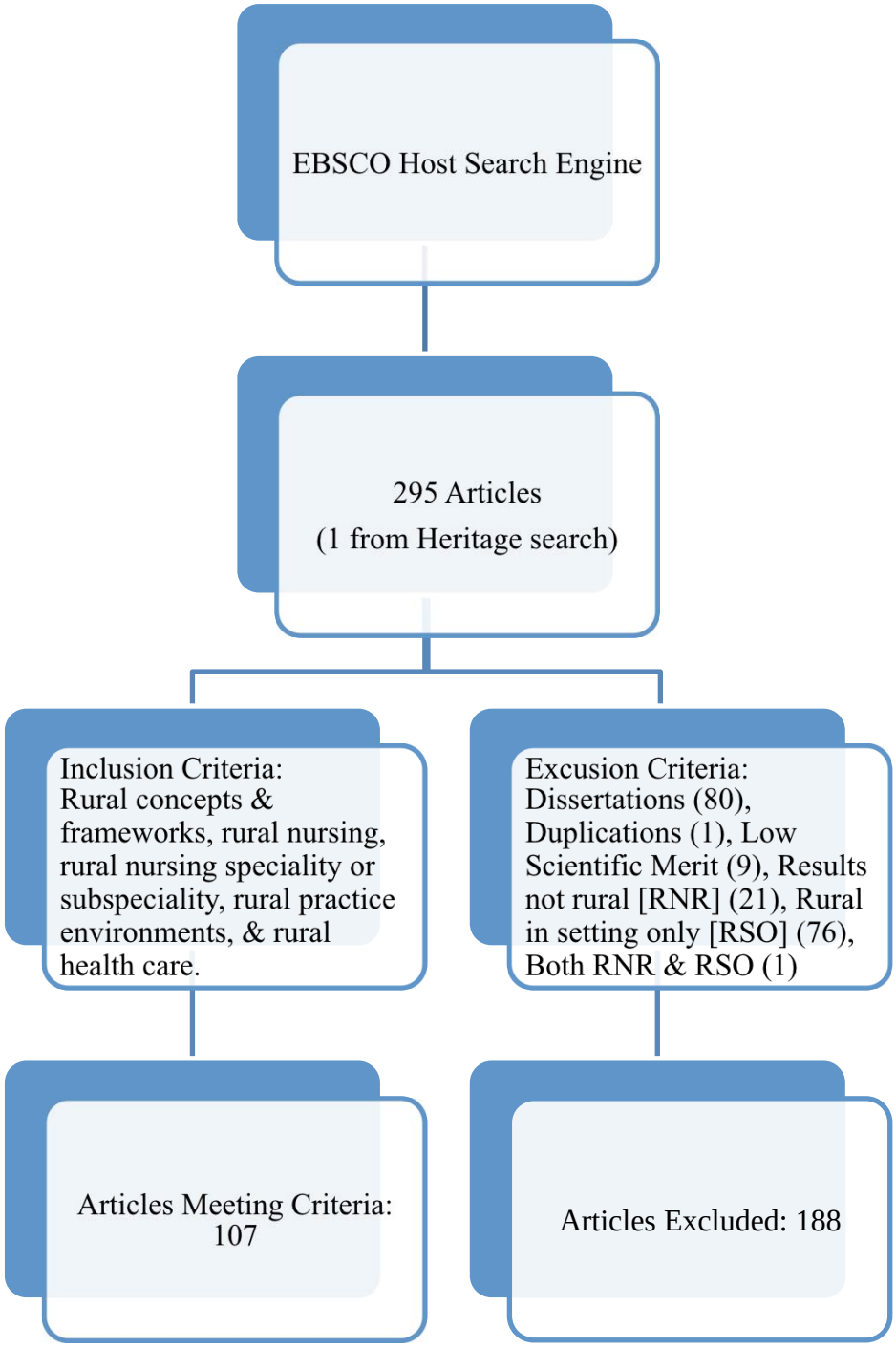

Figure 1. Results of literature search

Procedure

After the studies were identified, they were divided among the writing group members for systematic review and categorization according to a rating system for the critical appraisal of the

evidence, as defined by Fineout-Overholt and colleagues (Fineout-Overholt, Melnyk, Stillwell, & Williamson, 2010). The procedure used in this review also included identification of scientific merit for each research article (Association of Women's Health Obstetric and Neonatal Nurses [AWHONN], 2003).

Level of Evidence

Levels of evidence range from I to VII, see Table 1. The majority of the studies were non-experimental, descriptive correlational design, Level VI. While randomized controlled studies control best for bias, none were found during this review.

Table 1

Hierarchy of Evidence and Type of Article

Level of Evidence	Type of Article	Total
I	Systematic review or meta-analysis of randomized controlled trials	0
II	Randomized Controlled Trials	0
III	Non-randomized controlled trials	0
IV	Case control, cohort, or epidemiological studies	0
V	Systematic review from qualitative or descriptive studies	1
VI	Individual descriptive studies, either quantitative or qualitative	87
VII	Expert opinion, scientific standards, non-research based publications	19
		107

Adapted from (Melnyk & Fineout-Overholt, 2005)

Scientific Merit Scoring Criteria

Qualitative studies were evaluated for merit using a literature scoring grid adapted from Cesario et al., (2002) with a possible score of 30 points. Articles scoring 15 or less were deemed to have low scientific merit and were excluded. Quantitative studies were evaluated for merit using a literature scoring grid with a possible score of 24 points adapted from AWHONN (2003). Articles receiving a score less than 12 out of 24 based on this evaluation were not considered for review

Literature Comparison Grid

A literature comparison grid was developed to organize the data under the original subheadings of: reference, reviewer initials, rural definition, study-theoretical framework, research focus, sample methodology, instruments, dependent variables and findings. Group discussions led to the identification of which of these sub-headings provided the clearest picture of the state of the science of rural nursing. From this discussion a final table was generated that included: rural definitions, study theoretical frameworks, research focus, country of origin, publication source, level of evidence, and scientific merit. The focus of the research was summarized under major nursing topics such as professional and higher nursing education, disease management, cultural competence, workforce issues and mentoring. The grid assisted in the identification and organization of theories, models and frameworks reported in the literature. This comparison was especially beneficial in analyzing and categorizing the multiple ways rural was defined in studies. Finally, the results were synthesized into a summary of the state of the science of rural nursing.

Findings

Models, Theories, and Frameworks

Of the 107 inclusion articles reviewed, theories, models or frameworks were mentioned a total of 77 times. The most frequently cited, six times, was Rural Nursing Theory (Lee & Winters, 2004; Long & Weinert, 1989, 1999; McCoy, 2009; Sullivan et al., 2003; Weinert et al., 2008). This was closely followed by Leininger's Theory of Cultural Care Diversity and Universality (Holt & Reeves, 2001; Molinari & Monserud, 2009; Schumacher, 2010; Sellers et al., 1999; Wittig, 2001); Bandura's Social Cognitive theory (Anderko & Uscian, 2000; Cuellar, 2002; Hall et al., 2005; Kelley, 2004; Molinari & Monserud, 2009): and Self-Efficacy which is a component of other social theories (Cuellar, 2002; Hall et al., 2005; L. L. Lee et al., 2007; Molinari & Monserud (2009) and Price et al., (1999) were each cited five times. Nursing for the Whole Person Theory (Modungwa et al., 2000; Sliep et al., 2001a, 2001b); Watson's Theory of Human Caring (France et al., 2004; Green & Davis, 2005; Witte et al., 2008) and Ajzen-Fishbein Theory of Reasoned Action (Anderko & Uscian, 2000; Howell et al., 1998; Lo & Brown, 1999), were each mentioned three times. Knowles Adult Learning Theory (Bushy & Kost, 1990; Textor & Porock, 2006), and Lazarus Theory of Stress and Coping (Cuellar, 2002; LeSergent & Haney, 2005) were each cited two times. The remaining 45 models and theories were each cited only once.

The majority of the authors identified a theoretical basis for their work. Several articles provided solid examples of general theory testing. Molinari and Monserud (2009) successfully tested several aspects of Bandura's self-efficacy construct and parts of Leininger's theory of cultural care diversity and universality. In this study, self-efficacy increased the time, effort and persistence that individuals expend when challenged, and the authors concluded that nurses self-efficacy was related to job satisfaction scores.

The actual testing of rural theories or propositions was minimal. Studies often denoted the rural concepts (Winters & Lee, 2010) such as distance, isolation, familiarity, and professional concepts including autonomy, generalist, and role diffusion. However, these concepts are seldom used as study variables. A notable exception was a study of differences in autonomy and nurse-physician interactions (Penz & Stewart, 2008). One qualitative study (H. J. Lee & Winters, 2004) validated and expanded Long and Weinert's (Long & Weinert) original Rural Nursing Theory adding the concepts of choice of residence and the process of symptom action timeline symptom-action-time-line (SATL) and further clarified the definition of health; however concepts of outsider, old-timer, and newcomer were conspicuously absent. Some of the qualitative literature reinforced rural concepts, such as isolation (Mostafanejad, 2006), role diffusion and the related concept of professional boundary challenges as described by Yonge (2007, 2009).

Rural Definitions

The definition of rural is methodologically important, and holds considerable implications for ongoing development of rural nursing theory. Yet, 42% of the articles reviewed provided no definition for the term rural. The remaining 58% of the articles revealed a multitude of definitions, about which there was no general agreement. Of those articles that did define rural, two useful categories for classifying their definitions emerged. Authors generally described rural using either subjective terminology or demo-geographic terminology. Subjective definitions outnumbered demo-geographic definitions by nearly three to one; 46 articles (43%) defined rural in subjective terms, while the remaining 17 articles (15%) used demo-geographic terms.

The subjective definitions of rural generally described aspects of location pertinent to the phenomenon being studied. In many cases, the term rural was not described, but the reader could usually conclude the study was conducted in a rural setting based on some contextual information, for example, describing Appalachia as a "rugged mountainous region of the Eastern United States" (Gobble, 2009, p. 94) or describing regions of New York state as "extremely rural areas in the northern and southwestern parts of the state" (Brewer et al., 2006, p. 54). Thirty-four articles used distinguishing subjective terms such as, "small rural hospitals" (Gibb et al., 2005), "miles from an urban center" (Keogh, 1997), not urban or "outside of major metropolitan centres" (Mills, Francis et al., 2007b, p. 583), "who live in a certain rural village" (Modungwa et al., 2000, p. 64), or simply a "rural community" (Woodhouse, 2009, p. 22).

Demo-geographic definitions or taxonomies were primarily used by researchers to officially define a specific characteristic of a particular rural place. Those definitions included the US rural taxonomies such as Office of Management and Budget (OMB) (Anderko & Uscian, 2000; Juhl et al., 1993; Leight, 2003), Centers for Disease Control and Prevention (CDC) (Mash et al., 2008), and US Census Bureau (McCoy, 2009). Australian taxonomies such as Accessibility/Remoteness Index of Australia (ARIA) Rural, Remote and Metropolitan Areas (RRMA) (Drury et al., 2008, p. 784); and additional governmental designations set forth by Statistics Canada and Organization of Economic Cooperation and Development (OECD) (Kulig, 2000; Morgan et al., 2002; Penz & Stewart, 2008; Pullen & Walker, 2002; Scott-Findlay & Chalmers, 2001). Other demo-geographic definitions were unofficial population based, for example, four articles specifically cited Long and Weinert's (1989) sparsely populated areas as the way they described rural (Cuellar, 2002, p. 38; Davis & Droes, 1993, p. 159; H. J. Lee & Winters, 2004, p. 51; Long & Weinert, 1999, p.259). Others used terminology that quantified size such as "greater than six, but < 100 persons per square mile" (Buehler & Lee, 1992, p. 300); "less than 1,500 population" (H. J. Lee & Winters, 2004, p. 51); "a rural area of Taiwan that has a population density of 75 persons per square kilometer compared to a density of more than 3000 persons for the country as a whole" (L. L. Lee et al., 2007, p. 161); "greater than 100 kilometers from Perth [Australia]" (McConigley et al., 2000, p. 82), "the state is sparsely populated with an average of 6.2 people per square mile" (Sullivan et al., 2003, p. 567), and "small rural town of about 28,000 people"(Wittig, 2001, p. 204). One article, (Racher et al., 2004) laid out the multiple ways "rural" can be defined.

Topics

Fifty-four different topics emerged. The most common category was disease management, addressed in 22 articles. This was further subdivided into more specific categories such as cancer, cardiovascular/stroke, mental illness, antibiotic use and pain. Nursing or professional education, along with mentoring was the focus of 13 articles. Cultural issues were cited 10 times while women's health was the topic of nine articles.

Topics that were conspicuously absent included telehealth, technology, and communication infrastructure, or lack thereof. An exception to this finding was the discussion of a chronic illness model derived from a computer-based intervention for managing the health of chronically ill women in rural areas (Weinert et al., 2008). Also limited was research based on the core rural concepts of distance and isolation, with the exception of one article which described families' perceptions of their experiences and challenges that were due to living a great distance from a cancer treatment center (Scott-Findlay & Chalmers, 2001).

Source

Country of origin. The majority of the articles, 56, emanated from the United States. Other countries where studies originated were: Australia,18; Canada, 14; South Africa, 6; Dominican Republic, 2; Malawi, 2; New Zealand, 2; United Kingdom, 2; and Honduras, Korea, Peru, Sweden, and Taiwan, 1 each.

Publication. Articles were published in 66 journals. The *Online Journal of Rural Nursing and Health Care* published 10 of the articles reviewed. The *Journal of Advanced Nursing* published six; *Journal of Transcultural Nursing*, five; *Curationis, Oncology Nursing Forum* and *Public Health Nursing* four each; and *Australian Journal of Advanced Nursing* and *Nurse Education Today* three each. Seven journals published two articles and fifty one published one article each.

Discussion

Limitations

Some significant contributions to the rural nursing body of literature were potentially missed due to the methodology used in this review. The exclusion of dissertations from this review, while practical, limits the scope of the findings. The use of the selected search engines limited textbooks as a source of information, for example the Bushy series on rural nursing (Bushy, 1991a, 1991b) or the book on Nursing in the Rural Community (Bushy, 2000). Evidence-based practice guidelines, white papers, and position statements were not located through the search parameters. The deliberate choice of EBSCOHOST as a search engine may have led to the exclusion of some publications by authors from disciplines other than nursing. Some journals publishing articles pertinent to rural healthcare, such as the *Journal of Rural Health*, were not found through this search. The use of English language as a search delimiter potentially minimized international contributions.

The subjective identification of "rural in setting only" as an exclusion criterion may have further contributed to what is perceived as a gap in the body of literature. Topics labeled as rural in the title or abstract without further elucidation of how they apply to healthcare in the rural setting were excluded. Additional review was conducted where doubt regarding classification existed; however, inter-rater reliability was not calculated.

Conclusion

Rural nursing has experienced rapid growth over the last 23 years. Since the first seminal article by Long and Weinert (1989), there has been a proliferation of literature specific to rural nursing. However, the majority of the research found in this review was descriptive-correlational in nature. The discipline needs to produce higher levels of evidence to advance the state of the science and to formulate a basis from which to develop clinical practice guidelines and competencies specific to the specialty of rural nursing. The theoretical principles that guide rural nursing have been identified, and while evolving, they have not been sufficiently tested. The use of numerous and widely varied theories in the literature indicates that rural research is fragmented and lacks a solid theoretical foundation.

Defining the concept of rural has been imprecise over time and continues to be problematic in this review. It is useful to categorize definitions of rural for the purpose of discussion. Rather than standardizing definitions into a few all-purpose designations, nurse researchers should specify which aspects of rural are relevant to the phenomenon being studied, and then apply the

most appropriate definition. Authors have a responsibility to operationally define rural in future work. The use of the term rural in the title or abstract can be misleading. If the study is rural in setting only, it may add little to the body of literature. Those studies in which the concept is reflected throughout the study are more likely to contribute to the state of the science of rural nursing.

Studies pertinent to rural healthcare issues like disease management or professional practice need to include rural concepts as independent variables in order to accurately identify how these concepts affect outcomes. While increased communication infrastructure holds the promise of improved access for rural dwellers, a dearth of literature on the topic was found in this review. Therefore, the relationship between communication infrastructure and access to care should be further developed and tested. Few articles spoke to the specialized skills and knowledge required to care for rural populations. More work is needed in the area of rural nursing as a specialty.

Almost half of the seven billion people on earth live in rural areas (Brownlee, 2011). The sources of literature were not evenly distributed from a global perspective. Sixty-five percent of the articles reviewed were from North America. This may be due in part to the discussed limitations; however greater geographical diversity would provide a more comprehensive representation of rural nursing.

When accessing rural literature, no one search engine will adequately produce all-inclusive results. Well-defined literature search strategies are critical for enhancing the rigor of any type of review because incomplete and biased searches result in an inadequate database and the potential for inaccurate results (Cooper, 1998). Ideally, all of the relevant literature on the state of the science of rural nursing would be included in the review; yet obtaining dissertations was challenging and costly. Computerized databases proved efficient and effective; however, limitations associated with inconsistent search terminology and indexing problems yielded some studies that took place in rural settings only. Thus, other recommended approaches to searching the literature should include journal specific review and use of multiple search engines.

Inherent in conducting rural research is the need to operationally define rural. The variety of definitions, the absence of any definition, or the inappropriate application of a rural definition are methodological challenges for rural studies. While the state of the science of rural nursing research continues to have many weaknesses, we are making strides in expanding the body of knowledge, conducting more sophisticated and methodologically sound studies, and developing ongoing programs of nursing research.

Many challenges face the nursing research community in its efforts to expand the empirical knowledge base to inform rural nursing practice. Few journals specialize in rural health as a primary focus. More journals need to include manuscripts that adequately address issues of rural healthcare. Nurse researchers also have a responsibility to increase the scientific merit and level of evidence or their work. Funding agencies have a responsibility to acknowledge the challenges inherent in conducting rural research and support studies that will improve rural healthcare. An increased focus on rural nursing research and greater interdisciplinary collaboration can improve the state of the science of rural nursing and healthcare.

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