

ORIGINAL RESEARCH

Public health nurses in rural/frontier one-nurse offices

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A B S T R A C T

Introduction: Public health nursing is the foundation of the United States' (US) public health system, particularly in rural and remote areas. Recent increasing interest in public health in the USA has highlighted that there is limited information available about public health nursing in the most isolated areas, particularly in the US. The purposes of this study were to: (1) describe the characteristics, competency levels, and practice patterns of public health nurses (PHNs) working in remote one-nurse offices; and (2) compare PHNs working in one-nurse offices with nurses working in multi-nurse offices in Idaho, in relation to their demographic characteristics, practice patterns and competency levels.

Methods: Using a cross-sectional descriptive design, a statewide sample of 124 PHNs in Idaho, including 15 working in one-nurse satellite offices, were assessed in relation to their demographic characteristics, experience, educational background, job satisfaction, practice characteristics, and competency levels in March to May 2007.

Results: The solo (nurses working in one-nurse offices) PHNs were based in 15 different counties, 10 frontier (population density of less than 7 persons/1.6 km²; 7 persons/mile²) and 5 rural. The counties ranged in population from 2781 to 28 114 (mean = 11 013), with population densities ranging from 0.9 to 29.4 persons/1.6 km² (mean = 8.6; 0.9 to 29.4 persons/mile²). The distance from their offices to the district main office ranged from 25.8 to 241.4 km (mean = 104 km; 16 to 150 miles, mean = 64.6 miles). All the solo PHNs were Caucasian females, with a mean age of 46.9 years and a mean of 22.5 years' nursing experience. Educationally, 7 (47%) held a bachelor degree in nursing, 6 (40%) had associates degrees, 1 (7%) had a diploma in nursing, and 1 (7%) was a licensed practical nurse (LPN). These solo PHNs provided a wide array of services with support from other nurses in the district, including epidemiology, family planning/sexually transmitted disease clinics, immunization clinics, communicable disease surveillance, and school nursing. They expressed strong job satisfaction, citing the benefits of autonomy, variety, and close



community ties, but also voiced some frustrations related to isolation. Their self-rated levels of competency were highest in the areas of communication, cultural competency, community dimensions of care, and leadership/systems thinking skills; and lowest in the areas of financial management, analytical assessment, policy development/program planning, and basic public health sciences skills. When the solo PHNs were compared with PHNs based in multi-nurse offices, there were no statistically significant differences between the solo and non-solo PHNs in demographics or competency levels, except in the competency area of community dimensions of practice skills. The mean self-rating for solo PHNs in relation to community dimensions of practice skills was significantly higher (3.9) than non-solo PHNs (3.2) ($t = 3.547, p = .002$).

Conclusions: These findings suggest that US PHNs practicing in isolated one-nurse offices in rural and remote communities are comparable to PHNs working in less isolated settings; however, solo nurses may have stronger community dimensions of practice skills. Their practice is more generalized than other PHNs and they express high levels of job satisfaction. The study was limited in that it was conducted in only one state and data were collected only by self-report. Further research is indicated to describe this unique subset of PHNs, particularly in terms of factors promoting recruitment and retention. Additional study into the conceptual aspect of isolation is also indicated in relation to public health practice in rural and remote areas.

Key words: isolation, public health nursing, remote, USA.

Introduction

Public health nurses (PHNs) represent the foundation of the US public health system, particularly in predominantly rural and remote areas¹. Nurses comprise 25% of the professional public health workforce in the USA^{2,3}. Public health nurses focus on assessing community health, assuring access to care, developing policies that promote population health, advocating for public health policies, communicating with vulnerable populations, and fostering community resiliency⁴. Since the 1990s, public health systems nationally have moved away from providing direct care to individuals, to a renewed focus on population health. Recently, increasing attention has been paid to strengthening the national public health infrastructure and workforce in response to emergency preparedness concerns and impending workforce shortages⁵. Concomitantly, issues regarding PHNs' scope of practice and competencies have been raised⁶⁻⁸.

Rural public health challenges

Rural public health has also received increasing attention in the past decade. According to a National Association of

County and City Health Officials' 1999 survey, 65% of all local health departments in the USA serve populations of less than 25 000 people⁹. High priority services provided by these rural public health agencies include environmental health, child health, and communicable disease control, particularly immunizations for adults and children¹⁰. In comparison with urban health departments, rural health departments tend to provide more personal health services, such as family planning and maternal/child care, laboratory services, community assessments, and community outreach/education, in spite of operating with lower funding levels, less access to grant funding, and geographic and transportation challenges¹⁰. In relation to the core public health functions, Suen and Magruder's research indicated that rural public health agencies had the lowest mean score on core function capacity, due to inadequate funding levels, planning capacity, and public health infrastructure¹¹. Challenges rural public health agencies face include 'attracting a skilled workforce, maintaining strong leadership to advocate for and lead a prevention agenda, and ensuring population health activities' p.186¹². In 2004, *Bridging the Health Divide: The Rural Public Health Research Agenda* identified the need for research in the areas of rural public health infrastructure, workforce development and



competency enhancement, rural health disparities, access to care/safety net support, rural public health preparedness, and environmental health issues¹³.

Internationally, rural and remote public health has been addressed historically and currently in greater depth outside the USA. From a Canadian perspective, Bavington notes that rural and remote public health professionals often function as overworked generalists with long-distance supervision, mentoring, and consultation¹⁴. He also notes, however, that professional isolation can result in greater innovation and independence. The other international leader in rural and remote public health is Australia, with a rich history of 'bush nursing', which began in 1910 in Australia's most remote areas and continues today¹⁵. John Wakerman, the Director of the Australia's Centre for Remote Health, also speaks to the innovative nature of rural and remote public health and advocates for moving 'away from the deficit model of rural and remote health' (p.54)¹⁶.

Rural public health nursing

Several studies have demonstrated that US PHNs provide the majority of public health services, particularly in rural and remote areas. A major concern, however, is that in the USA most rural PHNs' highest level of nursing education is an associate degree, which typically does not include any curricular content in public health. In addition, the public health nursing workforce is aging and retiring at rapid rates, which creates serious workforce concerns, especially in rural and remote areas where recruitment and retention of well prepared nurses has been challenging historically^{2,5}. In general, recruitment and retention of rural public health professionals, particularly nurses, can be problematic due to location, educational opportunities, and financial constraints¹⁷. Juhl et al's research supports this concern related to public health funding, particularly as evidenced by chronically low salaries among rural PHNs¹⁸. Similarly, Canadian studies with rural PHNs have documented broader scopes of practice, challenges related to inadequate staffing and resources, lower salaries, but moderate levels of job satisfaction among rural compared with urban PHNs^{19,20}. In a

study of the public health system in Idaho and Wyoming conducted in the period 1998–1999, Richardson et al. found that Idaho had 39 public health professionals per 100 000 people, over half of whom were nurses²¹. Consistent with national data, most of these nurses did not have formal preparation in public health. In a study of public health systems in Alaska, Montana, and Wyoming, Rosenblatt and Rosenblatt found that rural PHNs were more likely to work part-time but stayed in their positions longer than their urban counterparts²².

Rural public health nursing challenges

The literature related to public health nursing in the USA's most remote areas (often referred to as 'frontier') is particularly limited. The Frontier Education Center reported that nurses serving frontier areas in general tend to have lower levels of education and earn lower salaries than nurses in non-frontier areas²³. They noted:

...because most frontier and rural communities are distant from hospitals, residents may rely on non-hospital based care settings for a greater proportion of their care than their urban counterparts ... thus, nurses serving in home health, public health, primary care, school health or faith-based settings are important resources in communities that may otherwise have no locally-based provider. (p.10-11)²³

Public health nurses working in the most isolated areas must provide a variety of services which requires a 'broad knowledge base, versatility, and the ability to improvise' (p.501)²⁴. In contrast with less remote settings, service delivery may be primarily home-based due to scarcity of health facilities and travel constraints^{10,24}. Bushy and others note that the more remote the community, the greater the challenge in dealing with health care delivery and workforce issues, including recruitment and retention^{25,26}.

International studies focusing on remote nursing practice in Australia and Canada provide important related insights. Australian studies indicate that issues of high turnover, need



for locum relief due to stress and fatigue, communication barriers and inadequate preparation and administrative support were consistent problems voiced by nurses serving remote Australian communities, often in one-nurse outposts²⁷⁻²⁹. The landmark Canadian study *The Nature of Nursing Practice in Rural and Remote Canada* examined RN practice in rural and remote areas throughout Canada, in all clinical settings, including 412 nurses employed in community/public health agencies^{30,31}. Results from interviews indicated the importance of local and long-distance collegial networks, accessible resources, and 'distance-proof, responsive management structure and processes' to address the nurses' feelings of being marginalized and 'being out of sight and out of mind' (p.46)³². Andrews et al's³³ analysis of the Canadian study data specifically focusing on nurses working alone in rural and remote settings (11.5% of the total sample) represents the most directly applicable comparable study to the present Idaho study. Their analysis included 81 nurses (19.9%) working in community health/public health agencies, which constituted the most common work setting for nurses working in one-nurse settings, followed by outpost nursing stations. They reported that work satisfaction, which was highest among diploma prepared nurses, was positively related to the ability to have face-to-face contact with colleagues, availability of equipment, and decision latitude. Barriers to continuing education and job-related psychological demands were negatively related to work satisfaction. Results specifically from 'outpost nurses' in Canada's remote northern communities, who provide care primarily to Aboriginal populations, indicated the importance of strong preparation, problem solving, critical thinking and adaptability to change skills, self-direction/self-motivation, access to continuing education, and strong administrative support to address the chronic high turnover rates³⁴. These findings support earlier research with Canadian outpost station nurses which documented challenges related to limited resources and travel requirements³⁵. In both Canada and Australia, these isolated 'outpost' nurses 'do it all', providing primary care and crisis/emergency care along with public health services,

which differs from US PHNs serving rural/remote communities who have a narrower scope of practice.

Conceptually, isolation has been identified as a distinguishing characteristic of rural and especially remote nursing in the US and internationally^{23,28,30,35-38}. In addressing public health nursing practice in the most remote settings, professional and personal isolation may be particularly relevant challenges. Bushy stated (p.40)³⁶:

Professional isolation is closely related to geographic isolation and can be perceived a positive, negative, or a combination of both. Many rural nurses enjoy the professional independence and creativity not usually found in larger practice settings. Others find that the responsibilities in a rural community health agency can be overwhelming. Often there is no immediately accessible professional network that can provide support and consultation on a matter of concern. Likewise, the lack of immediately available opportunities for establishing relationships with other professionals, or not having the 'central office' nearby, can reinforce feelings of isolation. Professional isolation requires an outstanding ability for a nurse to evaluate and prioritize needs and the types of services that can be provided to the local population. The lack of physical access to other providers, education, and technology can potentially cause considerable role strain.

Telecommunication capability, including phone and internet service, is critical in addressing the isolation challenges of remote nursing practice, however many rural and remote areas lack adequate communication networks, especially cell phone and internet coverage.

Public health nurse competency

In response to the increased attention on public health infrastructure and quality in the USA, in 2004 the Office of Workforce Policy and Planning, Centers for Disease Control and Prevention (CDC) along with the Council on Linkages



(COL) between Academia and Public Health Practice, developed a list of core competencies for all public health professions, including the following eight competency domains³⁹:

- analytic assessment skills
- policy development/program planning skills
- communication skills
- cultural competency skills
- community dimensions of practice skills
- basic public health sciences skills
- leadership and systems thinking skills
- financial planning and management skills.

The Quad Council of Public Health Nursing Organizations expanded on these competency domains in relation specifically to public health nursing practice⁴⁰. The Quad Council competencies are also congruent with the American Nurses Association's (ANA) *Public Health Nursing Scope and Standards of Practice*⁸.

Purpose

Thus, the research-based knowledge related to the unique practice area of public health nursing in remote settings is extremely limited. The purposes of this study, therefore, were to: (i) describe the characteristics, competency levels, and practice patterns of PHNs working in remote one-nurse offices; and (ii) compare PHNs working in one-nurse offices with nurses working in multi-nurse offices in Idaho USA, in relation to their demographic characteristics, practice patterns and competency levels.

Methods

This study, conducted March to May 2007 as part of a comprehensive study of public health nursing in Idaho, used a cross-sectional descriptive comparative design.

Setting

Idaho is a predominantly rural state in the Pacific Northwest region of the United States. With a population of 1.5 million, Idaho consists of 44 counties, two-thirds of which are classified as rural or frontier. The Idaho Office of Rural Health defines rural counties as those with no communities having more than 20 000 people, and frontier counties as those with population densities of less than 7 persons per 1.6 km² (7 persons/mile²), which is consistent with national definitions. The US designation of 'frontier' is similar to the term 'remote' which is used more commonly internationally.

Public health services in Idaho are delivered through a unique, nationally recognized structure of 7 autonomous districts that include 4 to 8 counties each. Each district has a significant rural/frontier proportion of their population. The land areas of the districts range from 12 358 to 27 363 km² (7679 to 17003 miles²). The population density of the districts based on 2005 population estimates ranges from 7.5 to 43.7 persons per 1.6 km² (7.5 to 43.7 persons per mile²), with a mean of 19.2 persons per 1.6 km² (19.2 persons per mile²) and standard deviation of 12.4⁴¹. All districts have a central headquarters in the largest community in the district, with small outreach offices to serve outlying communities. The required credential to practice as a PHN in Idaho is licensure as a registered nurse (RN). Registered nurses in Idaho can hold either an associate (2 year) or baccalaureate (4 year) degree in nursing. In some districts, licensed practical nurses (LPNs) who are prepared at the technical level and do not hold a degree in nursing are employed as PHNs, due to nursing shortages.

Sample

The total sample consisted of 124 PHNs currently practicing in Idaho's official public health agencies, including 15 serving in one-nurse offices. Inclusion criteria were intentionally broad: nurses currently employed in community settings with the job title 'public health nurse' or who identify themselves as PHNs. Nurses from the state office and each of the 7 public health districts in Idaho were



included. The 2006 National Sample Survey of Registered Nurses estimated that there were approximately 70 PHNs in Idaho⁴². Based on this population estimate, we were confident that the majority of PHNs in Idaho were included in the study.

Procedures

On-site structured interviews with staff nurses and administrators were conducted with all PHNs who met the inclusion criteria. Participation was voluntary, written consent was obtained, and confidentiality strictly protected. Almost all nurses who were approached agreed to be interviewed if available. The study procedures were approved by the university Institutional Review Board prior to data collection. Demographic data including age, ethnicity, sex, experience, and educational background were collected (Table 1). To assess competency levels, participants were asked to rate their level of competency in relation to each of the 8 Council on Linkages Between Academia and Public Health Practice domains on a 1 to 5 scale (1 = beginning competency/awareness and 5 = expert competency/proficiency). Overall competency scores were computed by averaging the domain ratings for each participant (Table 2). The data were statistically analyzed using descriptive statistics, two-tailed Pearson correlations, ANOVAs, and independent *t*-tests, using a significance level of $p < .05$.

Results

Characteristics of public health nurses working in one-nurse offices

The 15 PHNs who worked in one-nurse offices were based in 15 different counties (located in 6 of the 7 public health districts), 10 of which were frontier and 5 rural. The counties they served ranged in population (2005 estimates) from 2781 to 28 114 people (mean = 11 013), with land masses of 724.2 to 13 655.3 km² (mean = 3753; 450 to 8485 miles²,

mean = 2332), and population densities ranging from 0.9 to 29.4 persons per 1.6 km² (0.9 to 29.4 persons/mile², mean = 8.6). The solo nurses' offices were located in communities ranging in size from 909 to 11 143 people (mean = 3471) (based on 2000 census figures). The distance from their offices to the district headquarters ranged from 25.8 to 241.4 km (mean = 104; 16 to 150 miles, mean = 64.6 miles).

Demographically, the solo PHNs were all Caucasian females and their ages ranged from 31 to 64 years (mean = 46.9). They reported a mean of 7.7 years in their current position (range = 1–20 years), a mean of 8.6 years experience in public health (range = 1–20), and a mean of 22.5 years experience in nursing in general (range = 7–40 years). Educationally, 7 (47%) held a baccalaureate degree in nursing (BSN), 6 (40%) had associate degrees, 1 (7%) had a diploma in nursing, and 1 (7%) was an LPN. Two-thirds of the sample received their nursing education from in-state nursing programs. These demographic characteristics are fairly representative of the Idaho nurse population, except for the higher rate of baccalaureate prepared nurses among the solo PHN sample⁴³.

Their self-rated levels of competency were strongest in the areas of communication (mean = 3.9), cultural competency (mean = 3.9), community dimensions of care skills (mean = 3.9), and leadership/systems thinking skills (mean = 3.6) and lowest in the areas of financial management (mean = 2.6), analytical assessment (mean = 2.6), policy development/program planning (mean = 2.8) and basic public health sciences skills (mean = 3.5). Their combined average level of competency ranged from 2.0 to 4.1 with a mean of 3.3.

The solo PHNs reported providing a wide array of services with support from other nurses in the district, including epidemiology, family planning/STD clinics, immunization clinics, communicable disease surveillance, and school nursing. They expressed strong job satisfaction citing the benefits of autonomy, variety and close community ties. One frustration voiced by several solo PHNs related to problems



in communication with the main district office and at times feeling 'out of the loop'. Communication with other nurses in the district was conducted mainly by email and phone. Most districts conducted monthly staff meetings at the main office which all nurses attend for training, coordination and networking.

Comparison of solo public health nurses with public health nurses in multi-nurse offices

When compared with the PHNs working in multi-nurse offices, the solo PHNs were found to be quite similar, with no statistically significant differences, except in one competency area (Tables 1, 2). The solo PHNs were slightly younger than the non-solo PHNs. Experientially, the solo PHNs had more total nursing experience but fewer years experience in public health and a slightly higher mean number of years in their current position. In the non-solo sample, 56.4% held a BSN or higher, compared with 50% of the solo PHNs (who were RNs). There were no significant differences between the solo and non-solo PHNs in relation to demographic characteristics or competency ratings, with the exception of the competency area of 'community dimensions of practice skills'. In this area, the mean rating for solo PHNs was 3.9, compared with 3.2 for non-solo PHNs ($t = 3.547, p = .002$). In the multi-nurse offices, the nurses often reported specialized practices, focusing on a particular program, such as immunizations. In contrast, in the outlying one-nursing offices, the practice was described as more generalized with nurses working across programs in collaboration with other nurses in the district.

Discussion

This study represents the first description of PHNs serving in single-nurse offices in the USA. The solo PHNs in this study were predominantly middle-aged women with extensive experience in nursing and public health, and less than half of the sample held a bachelor or higher degree. These

demographic characteristics are fairly consistent with previous studies in the USA, Australia and Canada. The solo nurses in the Canadian sample were slightly older than the Idaho sample and lived in somewhat smaller communities, with 75% living in communities of 2500 or fewer, and included 29.5% with a bachelor or higher degree (which was slightly higher than the total sample)³³. The Idaho sample provided a wide range of public health services with support from other nurses in the district, and expressed strong job satisfaction, citing the benefits of autonomy, variety, and close community ties, however challenges related to isolation and communication with colleagues were noted. These challenges are also consistent with those previously reported by Canadian and Australian nurses in remote practice. Their self-rated levels of competency were highest in the areas of communication, cultural competency, community dimensions of care, and leadership/systems thinking skills, and lowest in the areas of financial management, analytical assessment, policy development/program planning, and basic public health sciences skills. The solo nurses were very similar to their colleagues in multi-nurse offices demographically and in self-rated competency levels, except in the area of community dimension of practice skills, in which the solo PHNs were significantly higher than the non-solo PHNs. These findings suggest that US PHNs practicing in isolated one-nurse offices in rural and remote communities are comparable to PHNs working in less isolated settings; however, solo nurses self-report stronger community dimensions of practice skills. Their practice is more generalized than other PHNs and they express high levels of job satisfaction but some frustration with issues related to isolation and communication. This high level of job satisfaction along with the relatively low turnover rate contrasts with some previous reports from Australia and Canada among nurses in remote practice; however, this may be due to the degree of isolation and the strong connection to the community, along with differing demands and scopes of practice.



Table 1: Comparison of demographic characteristics of public health nurses in solo versus multi-nurse offices

Characteristic	Solo PHNs (n = 15)		Multi-nurse (n = 109)	
	Mean	SD	Mean	SD
Experience (years)				
In nursing	22.5	11.9	21.7	12.1
In public health	8.6	6.3	12.1	9.5
In current position	7.7	6.2	6.3	6.0
Age (years)	46.8	10.4	49.6	9.2

PHNs, public health nurses.

Table 2: Comparison of public health nurses in solo versus multi-nurse offices competency levels

Competency area (skills)	Mean rating	
	Solo PHNs (n = 15)	Multi-nurse (n = 109)
Communication	3.9	3.9
Cultural competency	3.9	3.6
Community dimensions of practice	3.9	3.2*
Leadership/systems thinking	3.8	3.5
Basic public health sciences	3.5	3.2
Policy development/ program planning	2.8	3.2
Analytic assessment	2.6	2.7
Financial planning/ management	2.6	2.7
Total competency score	2.8	3.2

PHNs, public health nurses.

* $p < .05$ (two-tailed).

The finding that the solo nurses were for the most part quite similar in demographic characteristics, education, experience and competency levels to PHNs working in multi-nurse offices, contradicts some possible biased perceptions that nurses serving the most isolated rural and frontier communities are less prepared than their more urban colleagues. Conversely, the results indicate that the solo nurses are highly autonomous with demanding, generalized practices. Based on these challenges, it could be argued that solo practice requires the highest level of PHN preparation and competency, which was not demonstrated in this study.

A critical finding was the fact that the solo PHNs self-rating of competency in relation to community dimensions of practice was significantly higher than the PHNs in multi-nurse offices. This finding is consistent with previous correlational analysis of competency levels and rurality, as

measured by district population density, suggesting that PHNs serving rural and frontier communities feel as competent as nurses serving more urban areas and more competent specifically in the area of community dimensions of practice⁴⁴. The fact that the solo nurses expressed significantly higher levels of competency in the domain of community dimensions of practice supports rural nursing theory and scholarship that has documented the strong community base of rural/frontier nursing in all areas of practice⁴⁵. The generalized nature of solo public health nursing practice, in contrast to the more specialized focus of urban practice, may also contribute to the higher levels of self-reported competency among solo nurses in relation to community dimensions of practice skills.

The results also support the conceptual perspective of the influence of isolation on remote public health nursing



practice. Maintaining strong communication networks and collegial support for solo PHNs are key strategies in promoting professional satisfaction and program effectiveness.

Limitations

The limitations of this study included the volunteer sample from only one state in the USA. Information regarding practice characteristics, attitudes and concerns among the solo nurses was somewhat limited, due to the brief nature of the structured interviews. Also, the rather simplistic nature in which competency was measured, along with the lack of reliability and validity data to support this measurement approach, represent limitations. This approach was necessitated based on the time demands of the larger study; however, in future research, more detailed assessment using all the Quad Council competency indicators could be used in order to measure competency in greater depth⁴⁰. The fact that levels of competency were measured only by self-report represents an additional limitation. Validation of self-reported competency levels using supervisor and/or peer ratings would serve to strengthen future studies.

Conclusions and implications

Further research is indicated to compare these findings with other states, nationally, and internationally. In addition, further research is needed to more fully describe this unique subset of PHNs, particularly in terms of factors promoting recruitment and retention. Implications for practice and policy point to the need for ensuring the infrastructure to support PHNs in solo practice through strong support networks and adequate communication systems. Also, given the age and tenure of the solo nurses in this study, efforts to address future education and recruitment of PHNs to remote practice are indicated to ensure an adequate supply of nurses for the future in these vital roles and unique practice settings.

These findings indicate that solo PHNs in Idaho provide essential services to remote communities, much like their

colleagues in similar settings internationally. Lessons learned from this study include the need to continue to address resource and communication issues, including technology, to support PHNs in solo practice. The strong collaborative model in which Idaho's solo PHNs are supported by their nursing colleagues through the public health district structure may serve as a model for other states and nations to promote recruitment, retention and quality care. The fact that the PHNs in one-nurse offices were quite comparable to their colleagues in multi-nurse offices speaks to the commonality that an effective district structure with strong collegial and administrative support can produce.

This cross-sectional descriptive study of PHNs in one-nurse versus multi-nurse offices in a predominantly rural state demonstrated the unique aspects of remote public health nursing practice as well as the commonalities with more urban settings. The strong job satisfaction and community orientation of solo PHNs, despite the geographic and professional isolation, affirms the positive nature of this unique practice setting.

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