Rural Community Leaders' Perceptions of Environmental Health Risks

Improving Community Health

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Abstract

Qualitative description was used to explore how rural community leaders frame, interpret, and give meaning to environmental health issues affecting their constituents and communities. Six rural community leaders discussed growth, vulnerable families, and the action avoidance strategies they use or see used in lieu of adopting health-promoting behaviors. Findings suggest intervention strategies should be economical, use common sense, be sensitive to regional identity, and use local case studies and "inside leadership." Occupational health nurses addressing the disparate environmental health risks in rural communities are encouraged to use agenda-neutral, scientifically based risk communication efforts and foster collaborative relationships among nurses, planners, industry, and other community leaders.

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Community-based research in environmental health is one of six research focus areas established by the Agency for Toxic Substances and Disease Registry (2001) in its 2002–2010 agenda for public health environmental research. This mandate acknowledges that local individuals create the context for environmental health science and recognizes the importance of using multiple lines of inquiry to fully inform the discipline.

Despite the popular image of rural areas as pristine spaces, research suggests that rural communities, and low-income families in particular, have higher cumulative environmental health risks (e.g., herbicide exposure, well-water contamination from agricultural runoff, and older housing) and differ significantly from more population-dense communities in health status, life expectancy, and health behaviors (Evans & Marcynyszyn, 2004; Hartley, 2004; Mayne & Earp, 2003; National Center for Health Statistics, 2004). Rural environmental health literature generally focuses on agricultural health and safety topics (Farr, Cooper, Cai, Savitz, & Sandler, 2004; Kirrane, Hoppin, Umbach, Samanic, & Sandler, 2004; Mandel et al., 1996; Marlenga, 1995; Martinez, Gratton, Coggin, Rene, & Waller, 2004) or health care professionals' perceptions of and readiness to treat occupational exposures (Prince & Westneat, 2001; Robson & Schneider, 2001). Little research has been conducted to improve understanding of the correlates of environmental health for rural populations in general.

The economy of the rural West is changing, with farming and agriculture representing the old economy

What Does This Mean for Workplace Application?

Occupational health nurses must share their knowledge and risk communication competence in responding to the need for environmental health information in rural communities. They can help shape community priorities by providing environmental health risk information in their interactions with employees, industry leaders, planners, and families. Occupational health nurses may tailor their interventions (e.g., screening families who have wells for their comfort in maintaining and protecting the quality of their drinking water) based on regional identity (e.g., has this community had an environmental health crisis or debate recently?) and community characteristics (e.g., population changes or land-use policies). Similarly, occupational health nurses must continue to advocate for local and state policy changes designed to improve the health of the community through environmental mechanisms (e.g., indoor smoking ordinances or mobile source air pollution controls). Through the development of community partnerships and effective risk communication, environmental health awareness will be promoted from the individual to the community level.

and tourism and service industries representing the new economy. Along with this transition from immersion in a traditional culture, rural places have specific regional identities that should pique the interest of researchers and practitioners wishing to deliver culturally informed public health interventions. Differences related to regional identity are important determinants of behavior and health among citizens (Hartley, 2004). The interconnectedness of context (e.g., neighborhood, community, and region) and composition (i.e., the individuals who reside there) is increasingly acknowledged in studies of health behavior (Eberhardt & Pamuk, 2004; Eschbach, Ostir, Patel, Markides, & Goodwin, 2004; Smith & Tessaro, 2005).

Scientists, policy makers, and the public conceptualize environmental health differently (Garvin, 2001; Pong, Pitblado, & Irvine, 2002) and along with health care professionals have the opportunity to improve community health through strategic interactions with formal and informal community leaders (Milstead, 1999). Successful interactions require knowledge of local, social, and economic factors that influence community priorities, opinions, and policies (Butterfield, 2002).

The primary aim of this research was to explore how rural community leaders frame, interpret, and give meaning to environmental health issues affecting their constituents and communities. Insights gained through understanding rural community leaders' perceptions of environmental health issues were used to guide the development of intervention strategies and future research in this setting.

METHODS

Ethical Considerations

This research was approved by the Montana State University Human Subjects Committee. Participation in the interview was voluntary and participants were informed verbally and in writing that they could end the interview at any time. Consent forms and information about the study were exchanged at the time of the interview. To protect anonymity, specific places or issues that could identify a community or participant have been changed in the responses presented in this article.

Sample

Six leaders from two communities in a rural, Western county (Economic Research Service rural–urban continuum code 5; approximate population, 70,000; Economic Research Service, 2003) were interviewed during the summer of 2003. Rural was defined as a county having fewer than 100,000 individuals or a county with no city populations greater than 50,000 and not adjacent to a county with a metropolitan area.

Community leaders were defined as any of the following: an elected or appointed city or county official; an administrator from health care, education, or industry; or a civic activist, lobbyist, clergy member, or other individual who may vote for appropriations for public health programs, influence policy, set priorities, or advocate on behalf of a specific subgroup of the community (Zotti & Kozlowski, 1994). Purposeful sampling of typical leaders was accomplished by contacting city and county government officials, law enforcement officers, public safety officials, industry representatives, and health care administrators for an interview. In this way, the researchers gained insights from leaders central to operational functions of the county as well as leaders on the fringe of governmental services. This sampling design was used to familiarize program staff with the perspectives of leaders in the full intervention setting (Patton, 2002).

Five men and one woman were interviewed. Interviews lasted between 40 and 80 minutes, were taped and transcribed verbatim, and were conducted in the leaders' workplaces by the same researcher. Four interviews were conducted in the county seat, the location of both city and county government offices. Two interviews were conducted in a community at the other end—both physically and in terms of service provision—of the county.

Interview Guide

The interview was semi-structured with 12 open-ended questions based on Dixon and Dixon's (2002) integrative environmental health framework (Sidebar). This framework posits that environmental health information can be conceptualized into four domains:
- Physiologic (i.e., environmental agents and their respective toxicodynamics).
- Vulnerability (i.e., attributes that lead to increased susceptibility to environmental risks).
- Epistemologic (i.e., how environmental risk information comes to be known and understood).

Interview Guide

Opening:

This study is looking into health issues that affect rural children and families in this county. We are interviewing community leaders to help inform our work on environmental health.

Next:

The Institute of Medicine (Pope, Snyder, & Mood, 1995) defines environmental health as freedom from illness and injury related to exposure to toxic agents and other environmental conditions potentially detrimental to human health. So, some people think of environmental health as the health of the environment. And some people think of environmental health as how the water, air, and soil affect human health. Tell me what you think of when you think of environmental health?

Physiologic domain (What are the problems?)

- What environmental health issues do you perceive as affecting your community/constituents?
- What environmental health issues are families in your community concerned about?

Vulnerability domain (Who is affected by the problems?)

- What individual characteristics make some community members or families more vulnerable to environmental risks?
- What community characteristics do you feel are putting community members at risk of environmental exposure?

Epistemologic domain (How do people know about this problem?)

- What are some common sources of information available to citizens about environmental health?
- Where do community leaders learn about environmental health resources?
- What attitudes in the community impede protective behaviors?
- What do families believe they can do to protect themselves from risks?

Health protection domain (What is done or should be done about the problem?)

- What do families currently do to protect themselves from risks?
- What resources (money, education, or water filtration systems) do families need to protect their children from environmental risks?
- Effective risk reduction requires both families and communities to take action and make changes. What portion of the efforts to reduce environmental risks should be addressed at the community level?
- What efforts have originated or could originate from your community leadership position?

- Health protection (i.e., actions to reduce risks and confidence that those actions will be effective).

Although this framework was used to inform the interview questions, it was not tested or verified in this study. Dixon and Dixon's (2002) domains were used to generate questions that reflected a broad interpretation of environmental health, one giving equal consideration to risks and the perception and interpretation of risks.

Data Analysis

This qualitative, descriptive study used continuous data analysis, a basic element of the constructivist grounded theory as described by Charmaz (2000). Constructivist theory recognizes the mutual creation of the data through the interview process and uses an inductive or emergent approach to interpret the data.

Data collection and the first part of data analysis occurred simultaneously, allowing the researchers to refine the interview process and invite comment on emerging themes in subsequent interviews. For example, one of the

early participants struggled to answer the first question: What environmental health issues do you perceive as affecting your community/constituents? During subsequent interviews, this question was preceded by the Institute of Medicine's definition of environmental health to help participants distinguish between popular and public health notions of the term environmental health (Pope, Snyder, & Mood, 1995).

When the interviews had concluded, further data analysis followed these steps:
- Transcripts were reread to "hear" each one again as part of a whole data set and gain a broad understanding of the participants' meaning.
- Themes were generated using open coding techniques.
- Extensive notes (theoretical memos) were made about themes that emerged during the fieldwork.
- A second researcher independently coded a 10% random sample of each transcript for reliability and confirmability of findings.

- Data were set aside.
- Four months later, transcripts were recoded using open coding techniques.
- Results from both data analysis sessions were then evaluated for consistency of findings.

This second data analysis was a strategy to address reflexivity, which acknowledges the subjective nature of qualitative research methods (Taylor & Bogdan, 1998). Looking and then looking again provided the researchers with an opportunity to reevaluate conclusions from each analysis and arrive at a richer interpretation.

Limitations

Methodologic limitations to this study were the small sample size and the exclusive use of community leaders in titled, traditional roles. Although the aim was to familiarize the research team with this rural community setting, the findings would have been richer if a broader participant base had been included. A larger study could have included more female leaders, minority leaders, and untitled or informal community leaders to expand the perspective past that shared by this predominantly male, white, middle-class group.

RESULTS

Most of the participants initially had difficulty placing the topic of environmental health in the context of their lives and communities. Some participants were skeptical that environmental health was an earnest area of research in a scenic and desirable geographic region. Further, some participants responded to the opening question with their thoughts on occupational safety, nutrition, industrial hygiene, or bioterrorism preparedness. In these instances, concrete probe questions were used to follow up the broad opening question. For example, the question "What environmental health issues affect your community?" might draw a blank stare or a comment about bioterrorism, whereas a follow-up probe (e.g., "Do you hear a lot of concern about air quality?") would clarify the abstract concept of environmental health.

As the topic of discussion was clarified and rapport was established, participants provided personal and insightful comments on environmental health. Questions framed at the professional level were often answered from the personal level with leaders sharing their own concerns or experiences rather than relating the concerns of their constituents. This may indicate that environmental health issues have not emerged in these communities' spheres of concern.

Findings are presented according to key themes that emerged from these discussions. Sampling of the prominent issues, required for brevity, reflects the choices of the researchers.

Population Growth as Community "Agent of Exposure"

Participants noted that population growth leads to increased solid waste production, more private wells and septic systems, water scarcity, declining air quality, and potential hazards from new industrial practices or businesses. Growth was mentioned by leaders in communi-

ties that have already experienced a population boom and by leaders in communities that anticipate future growth. Leaders noted that growth may create economic displacement into the county for lower-income individuals and families who can no longer afford to live in town, putting them at greater risk for environmental health problems due to decreased services (e.g., municipal water and sewer), older housing, aging septic systems, and distance from health care:

As more affluent families are moving into this area, what does that do to families who are not of those same means? Where are they forced to live? What does their housing look like?

Being new to the area, I'm always struck by the water quality in the county with all the septic systems and all the wells. There's all this growth out in the county, all these septic systems, all this well stuff, and all the livestock. There are a lot of things out there in the county and I wonder at what point is there going to be some catastrophe with our water system because we've got a lot of people.

You can get a job at McDonald's or somewhere like that, but you can't afford a house in town if you do. That's why a lot of people commute to the county.

I think for a while, when the state was small, they did not plan for the growth as fast as it's coming. I think as far as the community is concerned, managing that growth, whether it's the vehicle traffic, the groundwater, sewer systems, septic systems, drain fields, or our city's current waste plant, is probably the biggest issue. My understanding is that it's at its capacity.

From a real broad perspective, you can take the old timers' view. They want growth to stop because they feel that growth could jeopardize where this community will be down the road. They do worry about things like water. Not just the quality of water, but that there will be enough water to go around.

One participant noted that many individuals prefer living outside city limits (i.e., in the county) because the rules and regulations are less stringent. The participant cited a current controversy in the county over becoming incorporated and having municipal water and sewer established. Another participant mentioned a battle from the previous year when county residents successfully rejected city building inspections in favor of less stringent state inspections:

I think there are two parts to that because there are people who want to live in the city or in that type of community where your water, your sewer, and a lot of these things are handled for you and there are other people who don't feel that way. They want to live in the county because there are fewer regulations. It doesn't mean they are going to skimp. They just don't like being regulated.

Some respondents described community longevity as a characteristic for increased environmental health risks. Residents may have to overcome a sense of complacency from years of not having problems:

I think some of it is pretty universal. It's the mindset that if it was good enough for Grandpa, it's good enough now. And a lot of people, I think, tend to cling to that

thought process versus understanding that with just a little modification, you can really provide a safer environment overall.

Another respondent mentioned this in terms of child welfare:

When we talk about the kids, again, one generation has always lived this way and it has never been a problem. When you're bringing up a new generation inside of that, your mindset is that it has always been fine. You're not watching out for the things that are out there because there hasn't been a problem here for 200 years.

Businesses may also move into the county, where real estate is more affordable and fewer regulations and oversights enhance profitability:

I do know of one situation out in the county involving water. There was a big problem at a company that was in an inadequate building. There were too many people in the building and they over filled the septic system. It was a major hazard. It happened in the winter. Crews couldn't get in to repair the system because the ground was frozen. The system wasn't designed to handle that many people and yet the company stayed in this location. People were walking from their cars through raw sewage to get into the building. This company was saving money because it had moved out of the city.

Five Barriers to Action and Coping Mechanisms

Community leaders described barriers individuals face in health protection:

Conflict of Interest. The conflict is between the source of risk also being an important source of income (e.g., tourism or industry). In this scenario, the potential offender is already "in their backyard," so it is natural to develop strategies to repel vague health concerns to reduce cognitive dissonance, an intellectual discomfort that may motivate behavior change. The comment below is about residents of a tourism-dependent community remaining quiet about motorcycles after snowmobiles were the subject of a potential air quality ban. The respondent believes they pose a greater health risk than snowmobiles:

I honestly think there are people who are afraid. Let me use an example. It's not about environmental health, but it can be. Some folks want to ban snowmobiles locally, a big group of them. There aren't many who live here, but there are a lot of them out there with money. We've had more motorcycles come through here in the last month than snowmobiles in a whole winter. How can you say that 70,000 people going in the winter is worse than a million going in the summer?

With Busy Lifestyles, Ignorance Is Bliss. Leaders mentioned the hectic pace of American family life as a reason individuals shield themselves from environmental health information. One participant mentioned how information has complicated food choices:

Sometimes, like with organic or inorganic, I'd rather not know. If I knew how bad it was, I probably wouldn't eat anything. I read a book about beef and it really scared me. Now I'll go to the trouble of buying organic beef. But I don't know anything about chicken.

I think we have a lot of ingenuity. We continue to try

to outstrip problems with technology without going back and reassessing.

Hedging Bets. Individuals choose one set of protective behaviors or one exposure risk and hope that the others are less threatening or less real. One participant described this approach and offered an example:

I think you just kind of carve out things you can control, manage, and understand and there are other things you just kind of let go of. I don't drink bottled water. I hope the water is good enough. But then I'll buy organic vegetables or something else. I'll just carve out a little area and learn about it. For everything else, I just have to trust that the odds are with me and that I'll be okay.

Complicated Issues. Environmental health incorporates chemistry, climatology, topography, toxicology, and physiology. Frequently, the information is also discussed in terms of law, history, business, social disparity, and economics. Within this context, some participants explained that environmental health information often is not perceived as agenda free or neutral in regard to political ideology. Contrast this with the relative simplicity of risk factors for some diseases and it is clear why some participants thought the issues were too complicated:

I'm educated. I have a college degree in finance and I've been doing accounting and finance for 17 years. Can I do my own tax return? No! I feel the same way about environmental health and other health issues.

I think it's pretty hard for an individual or for a family, if environmental health isn't their issue and if they don't understand chemistry or things like that, to take the time and then be responsible for that.

Economics. The day-to-day affordability of self-protection is reflected by this category, rather than the major financial impact of employment vulnerability due to whistle-blowing:

I think families do what they can. I think people save money so that is why they go to store X. They don't say, "Well, maybe these vegetables were grown in Chile. We don't have any idea what pesticides they put on them." They say, "You know, they're really cheap at store X." I think money definitely plays a big role. It's the same thing with paint, carpet, or building materials—anything that shows up in your home or your office. I think a lot of times it's the money. It's not until you get educated, have a big scare, or have substantial resources that you take the time to learn or care about the non-toxic stuff.

We do advocate the use of smoke detectors and carbon monoxide detectors. But, realistically, given the economic status of a lot of our full-time residents, it's very difficult for them to be able to spend money on those types of appliances.

Interventions to Reduce Environmental Health Risks

Participants emphasized how change can be accomplished in rural areas. One participant summarized by saying, "The message needs to get out in a lot of different ways." Others thought citizens would be open to intervention if the ideas were sound, explained in a way compatible with regional and political identity, and affordable. For example, one participant suggested

that top-down mandates might be met with resistance. Also, participants advised that interventions need to raise awareness rather than prescribe protective actions to be culturally compatible with the resourcefulness of rural individuals. Another respondent said, "What I think I see more frequently than the lack of education is people ignoring the warnings, not realizing the real risks involved."

Regional identity was frequently mentioned as an important community characteristic:

It seems that we have a great dependence on individuals being able to make it on their own, pulling themselves up by their bootstraps.

We've got a lot of the macho man mentality here.

We live out in the wild, wild West. I know that sounds kind of crazy. I really think that we're very independent people. We don't want other people telling us what to do. We will do what we want to do for the most part.

Participants emphasized the importance of insider leadership for successful interventions and described word-of-mouth communication as a strength of rural communities. It was recommended that intervention strategies start with a small group of individuals and gain momentum through word-of-mouth communication. A participant remarked that rural individuals prefer to take care of their own business:

You start off with a small group and you use baby steps. I think this is how you get things done. Especially here, and probably in a lot of small communities, a small group gets together and talks about it. That group keeps getting bigger and bigger and before you know it, you have awareness.

If there's an issue that's important in the county or this town, it will get out in the town a lot better if it comes through community leaders.

Another talked about the importance of role modeling:

I think the only thing you can do is try to rely on your good home schooling and mind your manners, especially when you're out and about. Also, practice what you preach.

Another intervention strategy was to work with children and the elderly using informal contact and word-of-mouth dissemination:

I'm not sure if any studies qualify this, but I believe you should involve children at a young age with safety awareness and also the elderly population. The people in the middle are generally the people who are too busy to slow down long enough to really listen to any information. They're usually working. If they're not, then they're involved in some other activities. I feel being able to concentrate on those two age groups makes a difference.

One of the things I do now, but not as regularly as I'd like, is go to the senior luncheon on Wednesdays. I think the people there are more comfortable with authority figures. They seem a little bit more comfortable discussing things and listening to things.

Systems-level interventions were also discussed. One participant thought the city should be encouraged to work with businesses to keep them inside city limits, where workers and the environment have more protection:

I think there's definitely a role to be played with the relationship between the business community and the county and the cities in the county . . . to keep major businesses in areas where there's the infrastructure like a water system or building codes. I think it just hasn't caught up with us yet.

DISCUSSION

In epidemiologic terms, leaders identified growth as the "agent," the area outside the city as the "environment," and lower-income families as the "host" for increased environmental health risks to community members of the rural West. Several phenomena (both contextual and compositional) may coincide with increased settlement in the county to create an elevated risk profile for county residents. First, increased residential use may result in agricultural and residential conflicts including agricultural runoff in groundwater and surface water. Robson and Schneider's (2001) national study of rural health care providers found that groundwater and surface water pollution were the top two concerns when providers were asked about environmental health problems facing their constituents. Second, increased numbers of automobiles and increased distances to school and work compromise air quality. Third, economic displacement of lower-income families to the county, where municipal water and sewer are not available, could potentially lead to drinking and waste-water issues, particularly if they lack knowledge of well and septic management. Economic-related migration from the city to the county might also result in families living in older housing built with less stringent regulations, posing additional risks to families (e.g., poor ventilation, lead-based paint, or outdated heating appliances). Fourth, as the city grows, some businesses may also leave for affordable rents, less stringent regulations, or both. In this scenario, the employees and downstream residents face increased risks. Finally, environmental health issues can be tied up in the debate between community groups fighting for or against incorporation. The adoption of municipal waste treatment systems rather than individual septic systems embodies the debate between the "new" and the "old" ways. Families may be unaware of this dynamic and believe water quality risks are diminished by migrating to the county.

These findings provide a rationale for environmental scientists and health care practitioners to collaborate with city and county planners to develop inter-agency recommendations based on current and future growth projections. Collaborations between health scientists and planning professionals on the built environment have accomplished or been recommended for public health improvements (e.g., decreasing traffic fatalities, improving individual social capital, facilitating fitness through biking and walking infrastructure, and improving access to social support services for the aging and low-income families) (Heumann, 2004; Leyden, 2003; Lucy, 2003; Wang et al., 2004). Effective risk communication must be an integral part of these efforts to draw the attention of all community members to the role of the home environment, automobile use, and private drinking water as

sources of environmental exposures in expanding rural areas. Employees who have lived in the community for a long time may be at greater risk for environmental health problems because their cultural mindset is based on a time when air, soil, and water were safe. They may raise their children as though environmental health conditions have not changed for years or decades. Furthermore, if these community leaders are correct, individuals who have a private well and septic system should be added to the list of vulnerable populations, which focuses primarily on the immunocompromised, elderly, and very young.

The findings also provide insights into the operational definitions from Dixon and Dixon's (2002) health protection domain. In an effort to understand family behaviors, the researchers asked, "What do families currently do to protect themselves from risks?" Responses frequently evolved into a critical analysis of why families do not participate in protective behaviors. Although practitioners knowledgeable about Becker's (1974) Health Belief Model will find many of these "coping strategies" familiar, it is noteworthy that community leaders may limit their personal knowledge of environmental health risks, disregard environmental health information as politically biased, or hope consumer controls and government safeguards will provide protection. These strategies, if confirmed in future research to be widely used, provide an opportunity for advocates, scientists, and occupational health nurses to re-evaluate how they address risk perception and behavior change.

Lifestyles of employees affect their work and health, whether they live in urban or rural areas. Concerns about child welfare, busy lifestyles, changes in population demographics, and economic concerns are not unique to rural communities and may exist in urban or suburban communities as well. However, responding to these issues from within the rural infrastructure will differ from an urban or suburban approach. Participants offered strategies for environmental health interventions in rural areas that included working with existing intra-agency alliances and leaders, capitalizing on informal word-of-mouth communication styles, and presenting the message in a manner sensitive to regional identity. These qualitative data provided important insights into rural citizens' vernacular and value systems, especially the value of self-reliance. Using case studies of local environmental health phenomena is an ideal way to capitalize on word-of-mouth communication and may help overcome the false sense of security rural inhabitants attribute to geographic isolation. Intervention strategies should also be designed with the knowledge that environmental health information may not be considered agenda neutral. In this case, creating cognitive dissonance for health promotion activities is more challenging, as citizens may feel they can deflect that information. Every effort should be made to deliver interventions in a manner that deemphasizes philosophical identity and highlights objective scientific translation and risk communication.

CONCLUSIONS

Currently, the nursing literature addressing rural health determinants focuses primarily on concept analy-

sis (e.g., hardiness or insider vs. outsider). In this literature, environment has been viewed as a primarily contextual variable influencing health (e.g., length of time to drive to the clinic), rather than a central multidimensional variable with an important compositional component. This study focused on understanding the rural environment as a unified concept, rather than looking at specific dimensions such as agriculture, accident rates, or access. These data reveal subtle elements of environment (e.g., individual vs. collective rights in land use) that are central to understanding rural environmental health disparities.

Leader participants in this study provided insights into why community members do not engage in protective behaviors and discussed strategies for implementing regionally sensitive interventions to improve community health. Future research should identify ways that community leaders can support risk factor modification and decrease adverse environmental exposure. Also, different risk communication techniques should be tested for efficacy among rural populations.

Finally, given the alarming degree of environmental health risk and the lack of commensurate awareness, action, or legislation, health care professionals must continue to collaborate with local community leaders to learn about environmental risk perception. With improved understanding of environmental risk perceptions among rural community leaders, public health advocates can take informed steps toward change.

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