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ORIGINAL ARTICLE

Adapting an Evidence-based Cardiovascular Disease Risk Reduction Intervention to Rural Communities

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Abstract

Purpose: Using the RE-AIM framework, the primary purpose of this qualitative study was to assess focus group data to generate information on the applicability of an evidence-based cardiovascular disease (CVD) risk intervention developed for an urban setting for rural areas in Nebraska. We also sought to determine potential adaptations that may be necessary to implement the study in a rural setting. The CVD risk reduction intervention is based on the Community Outreach and Cardiovascular Health (COACH) program, which included nurse practitioner/community health worker teams.

Methods: This qualitative study involved conducting 3 focus groups with patients with CVD risk factors to assess community readiness for participating in the intervention, the mode of the delivery of the intervention, the setting of the intervention, program content, and raising awareness of the intervention.

Findings: Findings from the focus groups indicate acceptability toward a CVD risk reduction program modeled after the COACH. Participants favored initial in-person face-to-face interactions with a nurse practitioner that could transition to phone-based meetings and Skype. In addition, participants underscored that confidentiality can be a concern in small communities and therefore community health workers need to be trusted individuals. Calls for additions to COACH materials were very specific and participants underscored the need for social support.

Conclusions: With minor adaptations, the COACH program can be pilot tested in rural settings to address key health concerns and behaviors that affect risk for cardiovascular health.

Key words cardiovascular disease, community health workers, health disparities, rural health.

National statistical trends indicate that heart disease-related mortality rates in nonmetropolitan communities are higher in comparison to metropolitan areas. For the past 10 years, rural areas have had a higher coronary heart disease mortality rate compared to urban areas.[1] Nonmetropolitan and metropolitan communities differ in factors that influence cardiovascular disease (CVD) risk, including higher rates of CVD risk factors such as hypertension, cigarette smoking, obesity, and a sedentary lifestyle.[2,3] Availability of resources for preventive services such as CVD reduction and access to health care also differ between nonmetropolitan and metropolitan communities. Residents of nonmetropolitan areas are more likely to report less access to health care and lower quality of health care.[4] In Nebraska, in 2016, 80 out of 93 counties were considered nonmetropolitan;[5]

furthermore, based on 2010 census data, 31 out of the 80 nonmetropolitan counties were considered frontier counties.[6]

Further, rural poverty rates have been higher than urban rates since the 1960s when the rates were first recorded.[7] Adults from nonmetropolitan rural Nebraska counties experience health disparities in comparison to all Nebraska residents, manifested as higher rates of heart attack, coronary heart disease, stroke, hypertension, hyperlipidemia, and diabetes compared to overall state statistics.[8] Using the RE-AIM framework,[9] the primary purpose of this qualitative study was to assess focus group data to generate information on the applicability of an evidence-based CVD risk intervention developed for an urban setting for a rural Nebraska setting. In addition, we sought to determine potential adaptations to the intervention that may be necessary to address the burden of CVD in rural communities.

Background/Rationale

Evidence supports the need and desire of rural residents to reduce CVD risk in their communities,[10] yet few interventions have been designed, or adapted, specifically for rural settings.[11] Considering different structures and resources needed for implementation in rural areas, there exist opportunities to adapt efficacious urban health promotion interventions, based on generalizable behavior change theories, for rural populations.[12-15] Potential program modifications include innovative program design strategies to develop prevention programs that build in adaptation to enhance program fit to a specific community while simultaneously maximizing fidelity of implementation and program effectiveness.[12] Data from 70 Federal Office of Rural Health Policy grantees found that programs may need to address the following barriers to implementation in rural settings: geographic isolation, literacy rates, persistent workforce shortages, population diversity, and poverty.[15]

In addition to addressing potential barriers in rural areas, adaptations of evidence-based approaches could be facilitated using planning and evaluation models such as the RE-AIM framework.[9] By translating research into practice and helping with program planning and adaptations for clinical and community settings, the RE-AIM framework facilitates understanding of the relative weaknesses and strengths of varying approaches to health promotion and chronic disease self-management. The RE-AIM framework can be used as a planning and adaptation guide to improve reach, efficacy (or effectiveness, depending on design type), adoption, implementation, and maintenance of an intervention. The framework encourages program implementers to consider each RE-AIM dimension as they plan, identify, and employ evidence-based principles, addressing external validity factors to improve broad adoption and sustained implementation of effective adaptations of evidence-based interventions.[16]

The specific aim of this qualitative study was to identify the acceptability of and/or adaptations required to implement an evidence-based nurse practitioner (NP)/community health worker (CHW)-led CVD risk reduction intervention that showed efficacy in an urban context to a rural setting, in order to maximize reach and efficacy.

The CVD risk reduction intervention is based on the Community Outreach and Cardiovascular Health (COACH) program, which successfully applied cognitive behavioral strategies using NP/CHW teams in an urban and medically underserved population to improve clinical outcomes for CVD disease risks.[17,18] COACH participants were recruited from Federally Qualified Health Center clinics in Baltimore, Maryland. COACH participants included 525 patients who met one or more of the following inclusion criteria: documented cardiovascular disease, type 2 diabetes, hypercholesterolemia, hypertension, or HbA1c that exceeded goals established by national guidelines. Participants were randomly assigned to NP/CHW ($n = 261$) or enhanced usual care ($n = 264$) groups.[17] Individuals in the intervention arm showed significant improvement in serum lipids, blood pressure, and glucose control compared with the usual care group.[17,18] The NP/CHW teams used cognitive behavioral strategies such as goal setting, self-monitoring, and self-efficacy building in delivering the intervention. The NP served as a case manager, assessing CVD risk and assisting with establishing and evaluating medication adherence, exercise, and diet. The CHW reinforced instructions by the NP. In addition, the CHW helped COACH participants address anticipated barriers to treatment adherence through problem-solving exercises.

The 12-month intervention included regularly scheduled clinic visits in addition to in-person and telephone follow-up. Individuals who had not yet achieved goals received a more intense intervention, which included a home visit from the CHW and more frequent telephone follow-up calls. The COACH program guide, a low-literacy wellness guide, was developed to promote therapeutic lifestyle changes. COACH program participants received the guide at the first encounter, took it home as a tool for making changes, and were asked to bring it to each visit. The guide included sections focusing on the patient's laboratory results and therapeutic goals for weight, lipids, blood pressure, and hemoglobin A1c (for diabetics). The guide also included sections on

customized tips for taking medicine, healthy eating, physical activity, and smoking cessation. Furthermore, each section included space for patients to list goals, potential barriers, strategies to deal with barriers, ways to reward oneself, and support people to help facilitate meeting goals.[17,18]

While in rural populations interventions to improve diet,[19] promote physical activity,[19,20] and decrease sedentary behavior[20,21] have shown some positive outcomes, there exists a need to identify more promising practices for rural CHW programs to guide program development, implementation, and ultimately sustainability.[22] The programmatic adaptation of the COACH program to a rural setting has the potential to change public health practice and provide information on strategies aimed at reducing CVD risk in rural populations who experience a disproportionate burden of CVD mortality.

Methods

Design

This qualitative study involved conducting 3 focus groups with patients with CVD risk factors. We assessed community readiness for participating in the intervention, the mode of the delivery of the intervention, the setting of the intervention, program content, and how to raise awareness of the intervention. We chose to use focus groups, as participants with shared experience or vested interest can provide in-depth perspectives on social norms, beliefs, values, and expectations.[23] Furthermore, focus groups can stimulate participants to share their views and discuss other individuals' ideas.[23] We intended to provide a sample of participants representative of Nebraskans residing in nonmetropolitan, nonfrontier counties. The aim of the focus groups was to gather typical perspectives but not all perspectives from potential program participants, as a means to ensure the generation of ideas to adapt the COACH curriculum. Based on previous examinations of qualitative studies using nonprobability samples, results have shown that samples as small as 20 informed individuals allow for the examination of a social or cultural construct; the present study involved the examination of something more specific—the implementation of an evidence-based curriculum.[24] We used content analysis to explore the explicit and implicit meaning of transcribed texts. The study received IRB approval.

Sample and Recruitment

The sample included 26 participants who were English speaking, 19 years or older, and had been seen within the last year at 1 of 3 participating health care facilities in 3 different nonmetropolitan counties in Nebraska. Inclusion criteria for the study required participants to have 2 or more of the following CVD risk factors: (1) blood pressure ≥140/90 mm Hg, (2) LDL-C 100 mg/dl or LDL-C 130 mg/dl if no diagnosed CVD or diabetes, (3) if diabetic, HgbA1c 7% or fasting glucose 125 mg, or (4) currently a smoker. Participants represented a convenience sample identified through electronic health records and CVD risk factors alone. Clinic employees recruited prospective participants in-person or via telephone until 12 people had agreed to participate in each of the 3 focus groups. Focus groups were held in a private room at the clinic. At the scheduled time of each focus group participants signed informed consent forms. We anticipated a 30% no-show rate resulting in a final average count of 8 individuals for each group, which aligns with the literature's recommendation of 8 to 10 participants to stimulate productive yet manageable discussion for the moderator.[24-26]

Instrument

Focus group questions were developed based on a review of the literature and input from a 4-member research team and an individual who met study inclusion criteria. Open-ended questions were developed, and for purposes of clarification follow-up questions were included in the instrument. A semi-structured interview guide examined rural residents' views on the following topics: community readiness for participating in the intervention, the mode of the delivery of the intervention, program content, and raising awareness of the intervention.

Facilitated by a trained moderator, the focus groups began with a discussion about what types of activities the participants engaged in to keep their hearts healthy and associated challenges with engaging such activities. The moderator then reviewed the tenets of the COACH program, focusing on programmatic components related to medication management, diet, exercise, and goal setting, and the roles of the NP/CHW team. In addition, the moderator facilitated a discussion regarding the mode and setting for communication between NP/CHW and prospective program participants, ie, in-person communication at the clinic, in the home, over the telephone (including voice and text), virtually, or by e-mail. Next, the moderator reviewed the COACH program guide. The moderator then asked participants to critique the following sections of the guide: medications, eating, physical activity, cigarette smoking, participant goals, participant results, reminders from the nurse practitioner, and definitions. The moderator also examined ways in which contextual factors, ie, logistical, environmental, and cultural obstacles, might affect implementation of a rural NP/CHW-led CVD risk reduction intervention in a rural setting.

Procedures

Prior to engaging in the focus groups, participants filled out a brief demographic survey. Focus groups were conducted in a private room and were audio recorded. The recordings were transcribed verbatim. Two members of the research team took notes during the focus groups, which provided context for interpreting the data. The mean duration of the 3 focus groups was 78 minutes (ranging from 59 to 105 minutes).

Data Analysis

Using NVivo qualitative data analysis software (version 10, 2012; QSR International Pty Ltd., Doncaster, Victoria, Australia), each focus group was analyzed for key themes that emerged regarding the adaptation of the COACH program to a rural setting.[27] These themes were used to develop representative codes, which had operational definitions, examples, and nonexamples.

Credibility of Data

Two coders independently coded the focus group data line-by-line and discussed disagreements until consensus was reached. Using the RE-AIM framework as an analytic lens, the focus group analysis focused on maximizing reach (the proportion of rural patients with CVD risk factors that would participate in a rural COACH intervention) and efficacy (outcomes of the intervention on rural residents with CVD risk factors), while considering potential participant perceptions of intervention features relative to future implementation.[9] As this was a preliminary study to determine participant perceptions of potential adaptations for local implementation, it did not include quantitative assessment of reach, effectiveness, adoption, implementation, and maintenance.

Findings

Demographics of Participants

In the 3 focus groups, a total of 11 women and 15 men participated. Their mean age was 66 years old. The mean age of focus group #1 was 72 years, while the mean age of focus groups #2 and #3 were 52 and 65 years, respectively. With the exception of 2 participants who identified as white and Hispanic, all other participants identified as white and non-Hispanic. Among the participants, 34.6% had 4 years or more of college education, and 24 (92%) of participants reported that their preferred method for learning about health education was one-on-one in-person verbal communication with a health professional (see Table 1).

Focus Group Themes

A codebook consisting of 21 codes was developed across the following 4 areas: acceptability of the COACH program (6 codes), communication with COACH NP/CHW team (4 codes), COACH program guide (4 codes), and raising awareness of COACH (7 codes) (see Table 2).

1. Acceptability of the COACH Program

The acceptability of the COACH program included themes that aligned with program reach, characteristics of an effective approach, and interest for community adoption. The majority of participants who voiced an opinion on the potential reach of the program expressed interest in joining the program and communicated an interest in adopting the program in their community. One participant highlighted the need for health education in the community stating,

> I mean, I wish there was someplace around here that would talk more about healthy eating and your diet and foods and how you could prepare them. There's just nothing like that around here that gets into much detail (Focus group 1, participant 4).

Another participant spoke of the importance of encouragement from a health worker to facilitate reach and efficacy, stating,

> It'd be great if you had that person as more of a cheerleader, somebody that's gonna just hold your hand and cheer you on. They're not gonna walk the bike for you, they're gonna maybe say, 'Hey, I'm proud of you' (Focus group 2, participant 13).

A third participant spoke of the norms that could present a challenge to the reach of the program in rural settings and stated,

> I think it would be acceptable. My only challenge, and I'm just talking for me, is that I need to get over my pride and say, OK, in a small community, we all know each other. And sometimes we all have problems and issues, and it's confiding with somebody you know that you really don't wanna say, 'OK. I got some large problems here,' and it's just your own pride that prevents me sometimes from going and saying, 'I need help with this,' or that type of thing. But once you can get over that, I think

Table 1 Demographic Characteristics of Participants

Characteristics	N	%
Sex		
Male	15	57.7%
Female	11	42.3%
Age		
35-49	3	11.5%
50-65	8	30.8%
65 and older	15	34.6%
Race		
White	26	100%
Ethnicity		
Hispanic	2	8%
Non-Hispanic	24	92%
Education: Highest grade of school year completed		
Never attended school or only attended kindergarten	0	–
Grades 1 through 6 (Elementary)	0	–
Grades 7 through 8 (Middle school)	0	–
Grade 9 through 12 or GED (High school)	12	46.2%
College 1 year to 3 years (Some college or technical school)	5	19.2%
College 4 years or more (College graduate)	9	34.6%
Income: Annual household income from all sources		
Less than $15,000 ($10,000 to less than $15,000)	1	4%
Less than $20,000($15,000 to less than $20,000)	3	12%
Less than $25,000 ($20,000 to less than $25,000)	0	–
Less than $35,000 ($25,000 to less than $35,000)	4	16%
Less than $50,000 ($35,000 to less than $50,000)	6	24%
Less than $75,000 ($50,000 to less than $75,000)	5	20%
$75,000 or more	6	25%
Missing	1	4%
Most preferred method to learn about health information		
One-on-one in-person verbal communication with health professional	23	88%
One-on-one verbal communication via telephone with health professional	0	–
One-on-one verbal communication via Skype with health professional	2	8%
Surfing the internet	0	–
Reading health brochures	0	–
Reading magazine articles	0	–
Listening to audio recordings	1	4%
Self-reported cardiovascular disease risk factors		
High blood pressure	21 (Missing 1)	84%
High cholesterol	22	85%
Diabetes	14 (Missing 1)	56%
Current tobacco smoker	4 (Missing 1)	26%

any community health worker would be fine (Focus group 3, participant 18).

Speaking to the energetic nature of her community, this participant also described the community's expectation for the adoption and implementation of the best program available,

> Well, I think as far as [town] and the surrounding communities are concerned, they're very aggressive communities, communities that are looking for the best that you can have and there's a lot of programs working towards that goal, so I think this would just be a great benefit to add to all of that. That'd be very helpful (Focus group 3, participant 18).

Among those who felt participation in the COACH program was not necessary (and provided specifics), the reason cited was that they had someone else to support them such as a spouse or a trusted nurse.

2. Patient Communication with a NP/CHW Team

With regard to communication with an NP/CHW team, participants gave a number of directions for implementation. For example, participants saw advantages with face-to-face communication within the domains of accountability, motivation, and rapport. In terms of benefits associated with a face-to-face implementation, one participant stated,

> Think face-to-face—and then when you had to come back for a recheck, so to speak, then you've gotta answer for it. So you would be more accountable (Focus group 1, participant 7).

Another participant pointed out motivation as another advantage that would make the program effective stemming from face-to-face interaction with a health care provider and stated,

> But I know I would be more motivated if the doctor says, 'You need to lose 10 pounds . . . you need to follow this medication regimen more precisely' (Focus group 2, participant 14).

A third participant indicated enhanced rapport as an aspect of an initial face-to-face approach that would make the program more effective, stating,

> I think initially face to face would be top priority 'cause you have to meet each other, set the ground rules, kind of explain it. And then maybe you can

> go into more e-mail, telephone calls, some of those things (Focus group 3, participant 19).

Participants also emphasized that a key implementation feature would be the need for a CHW to travel to engage in in-person face-to-face communication with prospective participants. One participant stated, "*That person would have to travel that distance to be successful in the community*" (Focus group 3, participant 22). However, participants balanced this implementation strategy with possible telephone-based follow-up. One participant stated,

> So I wouldn't be able to do it by e-mail, but, yeah, I would talk to the nurse practitioner over the phone or something like that would probably help (Focus group 1, participant 5).

Participants expressed both positives and negatives to Skype (Skype Technologies S.A.R.L., Palo Alto, California) video conferencing as an implementation strategy and acknowledged that e-mail was not an ideal form of communication. Participants also recognized the need for linguistically appropriate services:

> So just those logistical things and the languages I think people – we have communities moving in where language might be a barrier, but we also have rural people who still speak languages of Bohemian or Czech, or German (Focus group 2, participant 14).

3. The COACH program guide

We learned how focus group participants wanted us to adapt the materials with the goal to maximize program efficacy for participants in the region. Participant critiques of the COACH program guide indicated a need for more examples and explanations regarding exercise, diet, and medication use, in addition to further guidance for people with diabetes. Concerning the need to enhance materials to include additional exercise activities one participant stated, "*Yeah. They have none on like lifting weights or cardio, like swimming and stuff like that. They don't have any of that listed, either*" (Focus group 2, participant 15). With regard to the need for more specific information on diet the same participant said,

> One thing on the diet section, they list some of the healthier meats, also. They say just sample meats, but they don't say which is healthier for you, the beef, chicken (Focus group 2, participant 15).

Regarding diet there were comments about the need for specific information on portion control stemming from: a lack of knowledge and inability to discern what constitutes an appropriate serving size. One participant said, *"What you think looks like a small piece of meat is probably a lot larger*" (Focus group 3, participant 17). In addition one participant referred to the burden of portioning out appropriately sized portions as "*being able to separate it out every time*" (Focus group 2, participant 15). There were also further requests for more guidance on diet for diabetics. One participant said, "*So where do I start, with diabetes, or just plain old healthy eating?*" (Focus group 2, participant 12). Suggesting a further demand for more specific information in the COACH program guide on interactions between different medications, one participant stated,

> How do you know which one's [medication] gonna react against the other ones? I mean, sometimes I think, 'Well, I'm taking this one. It's causing a problem somewhere else' (Focus group 1, participant 6).

Finally, participants underscored the need for the expanded definition and the inclusion of additional images to enhance the COACH program guide. One participant stated,

> Yes, even expanded because there are things that they talked to me about that I go, 'Just exactly – ' I still try and figure out the difference between good cholesterol and bad cholesterol. I like to think I'm not a total moron, but I can't keep 'em straight (Focus group 1, participant 2).

Another participant indicated a need for additional images, "*Sometimes pictures state 9 words*" (Focus group 3, participant 19). One participant said,

> They could have like a picture of the healthy lung and the smoker's lung. They could have that . . . They could have that in there because that does scare some people (Focus group 2, participant 15).

Raising Awareness of COACH

We learned modes of communication through which rural residents anticipated an improved reach of the program. The 3 most commonly identified modes of communication to improve potential reach of the COACH if delivered in a rural setting were (1) word of mouth, (2) at health care visits, and (3) via newspaper ads, radio announcements, and social media. One participant stated, "*Word of mouth in a small community goes pretty far*" (Focus group 3, participant 26). One other participant stated, "*Rural people listen to the radio. They do. So as a point of making people aware. Sure, a radio spot's not a bad idea at all*"

Table 2 Focus Group Themes

Code	Definition	Example
Acceptability of and Interest in the COACH Program (6 codes)		
Program readiness	Participant describes aspects of the community that suggest a readiness for the COACH program.	*"Folks around here are starting to become more conscious of their health."*
Program not needed	Participant says that the COACH program is unnecessary or not needed in the community	*"This sounds like a helpful program, but for me, my wife helps me a lot – I would not need any more."*
Program interest possible	Participant says that the COACH program may be helpful in the community. The participant does not commit to an affirmative or negative on whether he/she thinks the program would be useful.	*"I might be open to it, depending on the person, the worker or nurse."*
Program potentially helpful	Participant describes some aspect of health that the COACH program could assist with.	*"I think it would be really helpful to have someone remind me of the pills I have to take, I have so many, and having that reminder would really help."* [Medication management]
Promising program approach	Participant describes an approach that would make it most likely that the NP or CHW is accepted in the community.	*"You would have to give people a choice of who they wanted to work with. You couldn't just force me to work with someone that is mean."*
Potential program barrier	Participant describes some feature of the community that might hinder the success of the COACH program in their community.	*"I think you would have to do a lot of marketing. You need make yourself known multiple times before people remember you and take any action."*
Communication with Nurse Practitioner/Community Health Worker Team (4 codes)		
In-person advantage	Participant describes a specific advantage(s) in meeting with his/her NP or CHW, in-person.	*"I think initially face to face would be top priority 'cause you have to meet each other, set the ground rules, kind of explain it."*
Technology advantage	Participant describes specific advantage(s) in using technology in meeting with his/her NP or CHW.	*"I'm pretty good with texts; I see "em" and reply."*
E-mail not preferred	Participant describes ignoring or not acting on e-mail communications.	*"I don't check my e-mail all that often . . . "*
Channels equivalent	Participant feels that the merit of face-to-face visits versus visits via distance technology is equivalent.	*"I'm easy – either way is fine with me."*
COACH Program Guide (4 codes)		
Portion challenges	Participant describes facing challenge in measuring or portioning his/her food.	*"Measuring food has always been tricky for me."*
Diabetes-specific challenges	Participant describes feeling confused about the dietary recommendations for diabetes.	*"So if you look, bread, grains, and very first one – breads, grains, and other starches. Seven or 8 servings a day. I flip over to the diabetes. Grains, starches. They don't line up."*
Images needed	Participant feels that images could improve part (or all) of the COACH curriculum.	*"They could have like, a picture of a healthy lung along with a smoker's lung . . . . Sometimes pictures state 9 words."*
Additional explanation needed	Participant expresses the need for a more detailed explanation of a concept.	*"Maybe something about heat stroke when you're exercising. They didn't have nothing on heat stroke. I mean, they had precautions."*
Raising Awareness of COACH (7 codes)		
Verbal recruitment	Participant mentions recruitment by members of the community telling their personal contacts (friends, family, co-workers, etc.) about the opportunity to participate in COACH.	*"I think my wife knows a lot of people – she could refer."*
Health recruitment	Participant mentions recruitment through hospitals or other health services.	*"I think a letter from the clinic."*
CBO recruitment	Participant mentions recruitment through a community-based agency (other than a hospital or health service agency).	*"Maybe getting people through a senior center, that would be a way."*
Social media recruitment	Participant mentions recruitment through social media.	*"I'm no good with social media, but I know some people are."*
Newspaper recruitment	Participant mentions recruitment through print newspapers.	*"I know that many people read the free newspaper – that could get the word out."*
No newspaper recruitment	Participant mentions recruitment would NOT be effective through newspapers.	*"No one reads newspapers – subscriptions are way down."*
Radio recruitment	Participant mentions recruitment through radio.	*"Doing an interview on the radio with the nurse, that would be a good way to get the word out and let people know who you are."*

(Focus group 1, participant 11). With regard to newspaper use and employment of a health service visit as a forum to promote a rural COACH program, one participant stated,

> Putting that in the paper saying you're doing a study about it. That'd get a lot of people. Or put a flier out here (at the clinic) for when people are coming in and out so they can see you're doing it (Focus group 2, participant 15).

An additional participant stated, "*And, of course, your clinics. Go to anywhere and there's a clinic, and have a big poster or something. I think that would be great advertising*" (Focus group 3, participant 25). In communities with no history of CHWs, participants emphasized the need to market the concept of CHWs to rural residents. One participant stated,

> The marketing aspect of it. You just can't present it once. It has to be ongoing, and then you have to provide opportunities for people maybe quarterly or a couple a times a year or so, so people know about it and understand it (Focus group 3, participant 25).

Discussion

Using the RE-AIM framework to maximize reach and efficacy, this study set out to generate information on the applicability to rural areas of an evidence-based CVD risk intervention developed for an urban setting. The study also sought to determine potential adaptations that may be necessary to address the burden of CVD in rural Nebraska/rural communities. As with any study the findings are specific to the sample and region where the data were collected. However, it is likely that these findings generalize more broadly to the rural Great Plains states and populations where similar health patterns, economic factors, and cultural values exist.

The literature underscores the need for making deliberate modifications to evidence-based original models to enhance program fit to rural communities.[12,15] Results from our study confirm this finding. Data from the focus groups of rural Nebraska patients with CVD risk factors indicate acceptability of an NP/CHW CVD risk reduction program modeled after the COACH intervention.

Based on our focus group data we propose the following adaptations to the COACH interventions for rural settings to maximize reach and efficacy: raising community awareness of the role of CHWs prior to implementing a program in rural communities unfamiliar with their role and emphasizing the confidentiality for prospective program participants. As documented in the literature, issues surrounding confidentiality and privacy represent concerns among rural patients and barriers to health care in rural communities.[28,29] Additional adaptations we propose to maximize reach include having initial face-to-face meetings between the NP/CHW team and program participants with the option for transitioning to future phone-based meetings, having additional examples and explanations regarding strategies to lessen CVD risk in the COACH program guide, addressing geographic distance in rural communities, and having linguistically appropriate services available. These findings are consistent with a previous study that describes the following contextual factors that can affect the implementation of evidence-based interventions in rural settings: logistical, environmental, and cultural obstacles such as geographic isolation, workforce availability, health literacy, population diversity, and rural cultural factors.[15] Furthermore, in line with the existing COACH program, participants expressed a need for a rural COACH intervention to include social support/encouragement in addition to the specific health education components.

Limitations

There are some limitations with this study. We used a convenience sample of white, English-speaking patients with health care access residing in nonmetropolitan, nonfrontier counties. In the setting of high uninsurance rates in rural communities and changing demographics manifested as an increased Hispanic non-English-speaking immigrant population, our sample is not representative of all rural Nebraskans. In addition, the first focus group had a higher mean age and a higher proportion of retirees, which may have influenced results regarding COACH program acceptability and potential program adaptations to rural settings. Therefore, generalizability of this study to other rural populations may be limited. While the strength of focus groups allows for interaction among participants, the major limitation is that some participants may be more willing or able to express their ideas than others.

Conclusions

Although CVD mortality rates have decreased for all regions and states in the United States, geographical disparities in mortality, in relative terms, have widened over time, disproportionately affecting rural Americans.[30] Called for in the Patient Protection and Affordable Care Act,[31] the National Prevention Strategy recommends support for research to identify effective strategies to

eliminate health disparities, a strategic focus on communities of greatest risk, and an increased capacity of the prevention workforce to address disparities.[32] Furthermore, an examination on how federal grantees implement evidence-based health practices in rural settings concluded that opportunities for building a more robust rural health evidence base include investments in rural-specific research and theory building and translation of existing evidence using a rural lens.[15] While results from this study provide descriptive narratives and generalizability to other rural communities is not ensured, the adaptation process undertaken in the context of the RE-AIM framework, to maximize reach and efficacy for a COACH intervention implemented in a rural setting, can be generalized. Future research based on this study will include pilot testing the COACH program adapted to a rural setting with the proposed modifications, including the use of virtual technology by NP/CHW teams to address geographic distance.

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