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Identification of factors integral to designing community-based CPR interventions for high-risk neighborhood residents

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Abstract

Background—High-risk neighborhoods can be identified as census tracts in which cardiac arrest incidence is high and bystander cardiopulmonary resuscitation (CPR) prevalence is low. However, little is known about how best to tailor community CPR training to high-risk neighborhood residents. The objective of this study was to identify factors integral to the design and implementation of community-based CPR intervention programs targeted to these areas.

Methods—Using qualitative methods, six focus groups with 42 participants were conducted in high-risk neighborhoods in Columbus, Ohio during January and February 2011 to elicit resident views on how best to design community-based CPR educational programs for these neighborhoods. Snowball and purposeful sampling by community liaisons was used to recruit

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DISCLOSURES

The other authors report no conflicts.

participants. Three reviewers analyzed the data in an iterative process to identify recurrent and unifying themes

Results—Focus group participants identified four principal considerations for the design of community-based CPR interventions: (1) Identifying lay people to serve as motivated leaders while targeting both senior citizens and school children to increase reach; (2) Finding appropriate community-based locations to hold CPR training; (3) Providing incentives to encourage more people to participate, and (4) Identifying and addressing barriers to participation.

Conclusion—Out-of-hospital cardiac arrest is a particular risk for minority and low-income communities. By working together with the community key factors integral to designing community-based CPR within these high-risk communities can be identified and implemented.

INTRODUCTION

People residing in neighborhoods comprised mainly of Latino, African American, or lower socioeconomic status residents are at higher risk of suffering out-of-hospital cardiac arrest (OHCA), are less likely to receive bystander cardiopulmonary resuscitation (CPR), and are less likely to survive compared to people residing in more affluent, white neighborhoods.¹⁻⁴

Geospatial epidemiological techniques have identified significant geographic variations in the incidence of OHCA and prevalence of bystander CPR by neighborhood⁵⁻⁹. One such study, conducted in Columbus, Ohio, identified five high-risk neighborhoods for OHCA (as defined by higher than expected incidence of OHCA with low prevalence of bystander CPR) compared to the rest of the city.⁵ These neighborhoods had 2-3 times higher incidence of OHCA and a fifth the prevalence of bystander CPR intervention compared to the average for that county. These high-risk neighborhoods tended to be comprised mainly of lower socioeconomic status and African-American residents.

Prior research has shown that there are significant barriers to learning and performing CPR in these high-risk neighborhoods.^{10,11} However, no prior studies have been conducted within this high-risk population to understand how to develop and implement successful community-based CPR educational programming. This study aimed to identify integral components for the design and implementation of a community-based CPR training program for high-risk neighborhood residents.

METHODS

Study Design and Sample

To identify high-risk neighborhoods (defined as having a high OHCA incidence and low prevalence of bystander CPR), spatial analytical approaches were applied. Further details are available elsewhere.⁵ Briefly, first, cardiac arrest data from the Columbus Fire Division cardiac arrest registry (April 2004 – September 2007), the CARES cardiac arrest information (October 2007 – April 2009), as well as current cardiac arrest surveillance registry information from nationwide pre-hospital systems, were analyzed and mapped to locate high-risk communities in Columbus, Ohio. Second, ArcGIS 9.3 (Environmental Systems Research Institute [ESRI] Inc., Redlands, CA) and Geoda software (<http://>

geodacenter.asu.edu/) were used to geocode available data. Third, spatial analysis methods were used to identify high-risk census tracts. From this evaluation, five neighborhoods were deemed high-risk, and three target areas were identified for focus group interviews: North; South; and Central Linden neighborhoods.

Study Participants

Forty-two residents from the three high-risk areas were recruited to participate in focus groups using purposeful and snowball sampling techniques. Further details of the study design can be found elsewhere.¹¹ Briefly, community liaisons from high-risk neighborhoods (SC, CB, MR) recruited focus group participants from local businesses through in-person recruitment, posted flyers and through radio advertisements. We recruited residents of the three target neighborhoods so that we could have a focus group that was comprised of residents from the same neighborhood (purposeful sample). Two focus groups were conducted in each of the 3 neighborhoods (total of 6 focus groups). We asked the respondents who agreed to attend the focus groups to recommend others who also lived in the target neighborhoods and to assist us in recruiting for future focus groups (snowball sample). We continued to recruit participants in the focus groups until our target sample size was reached. Ethics board approval for the study was obtained from The Ohio State University. Consent was obtained from participants prior to initiating focus group interviews, and each person received a ten dollar grocery store card incentive for their participation.

Data Acquisition and analysis

Six focus groups were conducted, with six to eight persons in each group. First, the recruited participants were asked to complete a brief socio-demographic questionnaire; and then the focus group interviews were conducted.¹² An interview guide was developed by the study team to obtain comments from participants related to: (1) perceived barriers to learning and performing bystander CPR; (2) familiarity with CPR; and (3) facilitators to learning and teaching CPR in high-risk neighborhoods. For consistency, one person (CB) served as the moderator in all six groups. One of the authors (CS) also participated in moderating two of the groups. All focus group responses were audiotaped and transcribed after personal identifiers were removed.

Qualitative analysis of each transcript was performed in a five step method which included: (1) generating a coding schedule; (2) coding the data; (3) delineation of the main categories; (4) grouping categories into major themes; and (5) developing explanations for the relations between themes.^{13,14} Preliminary codes were created from the transcripts. Three reviewers (CS, EM, and RK) read and independently coded each transcript. Next, the reviewers expanded and refined existing categories, and along with the full study team, developed the final coding structure and definitions. Disagreements were resolved with the full team by consensus. Codes were applied to certain lines from each transcript to enable reorganization into categories (e.g., material goods), which could then be attributed to a major theme (e.g., economic incentives). The three reviewers met to discuss and document interpretations and findings. Qualitative analysis software (NVivo 9.0, QSR International, Doncaster, Victoria, Australia) was used to facilitate reorganization of data into codes, categories, and themes.

RESULTS

The six focus groups were comprised of 42 participants (Table 1). These participants identified four principal factors that they considered integral to the design and implementation of a successful community-based CPR training program. These four areas included the following: (1) who should be trained; (2) where should training occur; (3) how can neighborhood members be incentivized to get training; and (4) barriers to participation in CPR training (Figure 1). The responses provided by the focus groups fell into one of four categories found to be integral to developing a community-based CPR training course. Moreover, participants felt consideration of these factors would assure that training programs were specifically designed and implemented to meet the needs of high-risk neighborhood residents.

TARGET POPULATIONS

There was large variation in the target populations mentioned by study participants. A common theme was to target whole families, with a special emphasis on drawing in the elders in the family who could make the training more personal (e.g. learn CPR to save Grandmother's life). In addition, participants suggested that community organizations that met regularly would be important groups to reach out to (e.g. Neighborhood Watch, church groups). One participant stated, *"Well, everywhere that two or three are gathered, that's an opportunity for the word to be spread. It doesn't have to be a room full of entertainment. It could just be a purpose."* Finally, the majority of participants felt that students in middle and high schools should be required to learn CPR as part of their core curriculum.

TRAINING LOCATIONS

The focus group participants mentioned many common locations including schools, churches, community events, and health fairs. They also mentioned food pantries as a great way to reach a group of people that are normally difficult to reach, *"[We] have a food pantry every Saturday and people can go there once a month to get food. And while they're waiting to get the groceries, they sign in. Then they have someone come up and speak, you know, like pray with them or whatnot. And you would definitely have everybody's attention and they have something like 75-100-125 people in there every Saturday. So if you contacted the food bank, then they would let you know where the food banks are at and you could go in and do your presentation. You would definitely have everybody's attention."*

There were also some other key locations mentioned, such as neighborhood watch meetings, grocery stores, libraries, homeless shelters and driver's license facilities. Ultimately, the focus group participants agreed that the most important part of choosing a location for a CPR program was, *"Anywhere close to where they can get to."*

PARTICIPATION INCENTIVES

The importance of incentives was also highlighted to motivate people from high-risk neighborhoods to come to training events. Fifty-four percent of the study participants reported annual household income of less than \$10,000 per year. This factored into their

feelings on why incentives were so important. One participant stated, *“I just know this from experience, it’s hard to motivate people without incentives, so like I said, depending on the population that you’re serving, and probably the population that need it the most, there would have to be some kind of incentive, be it food, whatever, to get people to even show up. I think in some of the upper echelon communities, I don’t think it would be that big of a deal to get people to show up. But then, again, [our culture] is just driven by “things”. If some of the better established communities just make these things available to the people in the community it may help get people there [to CPR training].”*

Another participant echoed this sentiment, *“What I find is a lot of times is you don’t get people to show up unless there is some motivator. There’s got to be an incentive or they just don’t come. The interest just remains low.”* The incentives listed by the participants included free classes, material incentives (e.g. grocery store cards, t-shirts), and academic or job skills credit. Because unemployment was a major concern for people living in these neighborhoods, participants perceived CPR certification as a job skill they could place on their resumes.

BARRIERS TO PARTICIPATION

Participants also highlighted key barriers to learning CPR. First, the current model for CPR training incorporates a one-size-fits-all approach for CPR training which our participants did not feel resonated with communities of different social, ethnic, and income make-up. Participants felt that more culturally tailored and sensitive approaches that directly targeted their community for CPR training would be more successful in their communities. One participant explained, *“I like that you have come to the neighborhood. Going to the neighborhoods directly improves accessibility.”* Another barrier to learning CPR was a lack of knowledge about the high rates of OHCA in these neighborhoods. One participant stated, *“With more education and more knowledge I think the numbers of participation would definitely up in this community.”* Another local neighborhood member stated, *“We perish for the lack of knowledge so if we get that information out there we can find all kinds of ways to get it to them if we have the information.”*

In addition, participants suggested that holding the CPR training programs during the spring or summer when the weather was nicer, before nightfall since many of the residents did not feel comfortable leaving their houses after dark, and during the middle of the month when there was a lull in activity in households.

DISCUSSION

This is the first study to identify factors integral to designing community-based CPR interventions for high-risk neighborhood residents. Other studies have questioned why residents of lower-income neighborhoods comprised of minority populations do not perform CPR,^{15,16} but this is the first study to investigate high-risk neighborhood residents’ views of critical factors that a community-based CPR intervention designed by the community for the community needs to address to be successful.

The four factors identified by the focus group participants suggest that identifying laypeople who are motivated leaders, finding appropriate locations within the neighborhood to recruit trainees, targeting engaged and motivated local citizens to become trainers, and reducing logistical obstacles may increase the reach of community-based CPR training initiatives. This has major implications for how CPR training initiatives are implemented in the community. The current paradigm is to blanket the city with a one-size-fits-all approach. However, our research shows that this strategy may not be successful in high-risk neighborhoods. Instead, based on our focus group participant recommendations, we would host our CPR training in the highest-risk neighborhoods, target certain populations such as families and community elders, and ensure that incentives are in place to motivate people to attend. Future research will need to be conducted to assess whether these community-based recommendations increase participation in CPR training programs.

There are some limitations to this study. The factors identified in this study were specific to a community in Columbus, Ohio that was comprised of primarily African-Americans, more than 50% of whom had an annual household income of less than \$10,000 and lived in the neighborhoods that had the highest crime rates in the city. It is possible that the recommendations from the focus group participants may not resonate with other communities or racial/ethnic populations. Further research will need to be conducted to see how these four factors are similar and different with other populations and communities. There may also be some selection bias in the sample, as the focus group participants were all recruited from the area by community liaisons that lived and worked in the neighborhoods. In addition, we chose sampling techniques to ensure that our focus groups comprised residents from the target neighborhoods. This may be perceived as a sampling bias. However, because we were most interested in reaching a target population living in the highest risk neighborhoods that are traditionally difficult to reach with standard CPR training, this was actually a strength of the study.

CONCLUSION

Out-of-hospital cardiac arrest is a particular risk for minority and low-income communities. Yet, CPR education in these communities is not widely available. This novel study elucidates key factors that are integral to designing and implementing community-based CPR training programs in high-risk neighborhoods. In order to increase participation in CPR training programs, it is essential that we listen to the communities that we are attempting to reach. Our research highlights the importance of working together with the community to target resources in the locations and populations in which it can have the greatest impact.

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Target Populations	Training Locations	Participation Incentives	Barriers to Participation
<ul style="list-style-type: none"> •Block captains •Church attendees •Families •Grandparents •Neighborhood watch meetings •New Mothers •Parents •Retirees/Elders in the Community •Students •Safe house volunteers •Youth Organizations (e.g. Boy/Girl Scouts, Boys' and Girls' Club) 	<ul style="list-style-type: none"> •Churches •Community events •Community/recreation centers •Doctors' offices •Driver's License Facilities •Food Pantries •Grocery stores •Health Fairs •Homeless Shelters •Libraries •Neighborhood Watch/Block Meeting •Schools •Senior Centers 	<ul style="list-style-type: none"> •Academic credit (e.g. GED or high school) •Child Care •CPR certificates •Food/grocery card •Free full certification classes •Fun community experience •Job skills •T-Shirts •Transportation cards 	<ul style="list-style-type: none"> •Accessibility •Cost •Distance •Fear of liability •Distrust of Police/EMS/Fire •Knowledge about why CPR is important •Language •Literacy •Time of Day •Unknown location •Weather

Figure 1.
Integral Factors for Designing and Implementing Community-Based CPR Program

Table 1Focus Group Participant Characteristics^a

	Number of Participants (%)
Age (years) (n=37)	
< 20	2 (5)
20 – 29	1 (3)
30 – 39	8 (22)
40 – 49	9 (24)
50 – 59	10 (27)
60 +	7 (19)
Gender (n=39)	
Male	6 (15)
Female	33 (85)
Neighborhood (n=41)	
North Central	4 (7)
North Linden	21 (10)
South Linden	3 (32)
Other	13 (51)
Race/Ethnicity (n=41)	
Black/African American	34 (83)
White	6 (15)
Other	1 (2)
Educational Attainment (highest level) (n=41)	
Some High School	7 (18)
Completed High School	11 (27)
Some College	11 (27)
Completed College	6 (14)
Master's Degree	6 (14)
Annual Household Income (\$/yr) (n=41)	
< 10,000	22 (54)
10,000 – 20,000	5 (12)
20,000 – 30,000	4 (10)
30,000 – 50,000	5 (12)
50,000 – 100,000	2 (5)
100,000 – 200,000	2 (5)
> 200,000	1 (2)

^a Of the 42 total participants, one did not complete the pre-focus group survey. (n=41)