Journal of Mixed Methods Research
XX(X) 1–20

DOI: 10.1177/1558689813479175
http://jmmr.sagepub.com

Using Concept Mapping in Community-Based Participatory Research: A Mixed Methods Approach

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Abstract

Community-based participatory research (CBPR) has been identified as a useful approach to increasing community involvement in research. Developing rigorous methods in conducting CBPR is an important step in gaining more support for this approach. The current article argues that concept mapping, a structured mixed methods approach, is useful in the initial development of a rigorous CBPR program of research aiming to develop culturally tailored and community-based health interventions for vulnerable populations. A research project examining social dynamics and consequences of alcohol and substance use in Newark, New Jersey, is described to illustrate the use of concept mapping methodology in CBPR. A total of 75 individuals participated in the study.

Keywords

Community-based participatory research, substance abuse treatment, intervention development, health disparities, concept mapping, mixed methods

Few evidence-based interventions have accounted for community involvement when addressing substance use, particularly in distressed communities (Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 1998; Pinto et al., 2007; Prado et al., 2007). Researchers often encounter resistance in distressed communities because many individuals do not trust governmental programs and authority figures. Residents in these communities may fear that research and governmental programs will ultimately exploit their communities. These concerns may steam from the historical neglect and abuse these communities endured from researchers and governmental officials (e.g., Tuskegge syphilis study; Thomas & Quinn, 1991). This history has contributed to the continued exclusion of marginalized groups from research (Corbie-Smith, Thomas, & George, 2003). Another important benefit of including community perspectives in developing interventions consists of developing a comprehensive understanding of community problems. Research has demonstrated the difference between experiential and expert knowledge and how these two distinct ways of knowing can complement one another and improve health outcomes (Henderson, 2010).

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To address these issues, researchers from the medical and social science fields have encouraged the involvement of both community members and service providers as research partners (Dunlap, Golub, & Johnson, 2006; Pinto, 2009; Pinto & McKay, 2006; Schmidt, Greenfield, & Mulia, 2006; L. Windsor & Dunlap, 2010). Community-based participatory research (CBPR) is a collaborative approach that combines methods of scientific inquiry with community capacity-building strategies. Recently, several authors have published research reporting the successful application of CBPR in health research (Baker et al., 2012; Berkley-Patton et al., 2010; Henderson, 2010). For instance, Pinto, Yu, Spector, Gorroochurn, and McCarty (2010) found that involving service providers in research increases the likelihood that they will engage in evidence-based practices. CBPR fosters mutual trust among agencies, service providers, and community members in order to make research questions more relevant to community members and service providers, to enhance the quality of data collection, analysis, and interpretation, and to improve dissemination of research findings. CBPR can help researchers develop novel community-based interventions by facilitating the inclusion of community perspectives in all phases of research so as to increase participation rates, decrease loss of participants, strengthen external validity, and build individual and community capacity (Viswanathan et al., 2004).

Although research has shown mechanisms through which oppressive forces contribute to health disparities (Caetano, 2003; Gamble, 1997; Kwate, Valdimarsdottir, Guevarra, & Bovbjerg, 2003; LaVeist, 2005; Schnittker & McLeod, 2005), few methodologies have been developed specifically to unearth the community-level dynamics and consequences of key variables that characterize the struggles and strengths of communities of color facing substance abuse. Using existing methodologies (e.g., ethnography, focus groups, and interviews), previous research has characterized low-income African American neighborhoods as distressed environments where one is exposed to increased violence, crime, poverty, and fewer opportunities to overcome these obstacles (Boyd, Guthrie, Pohl, & Whitmarsh, 1994; Dunlap et al., 2006; Hall, 1997). However, these studies often describe social phenomena to inform policy development. They rarely provide concrete recommendations for interventions that were developed with participation from the community itself. Consequently, most existing interventions have not been systematically developed from the perspective of individuals residing in predominantly African American and distressed communities and thus have not been accessed by this population (Schmidt et al., 2006). Innovative methodologies that are useful in making scientific findings accessible to oppressed groups are urgently needed. CBPR is a paradigm and as such, it does not prescribe a specific methodology. Thus, it is important to identify and develop research methods that can be successfully used within the CBPR paradigm. Mertens (2007) proposes transformative mixed methodologies as a useful mechanism to address the challenges of conducting research in distressed communities while fostering social change.

The current article argues that mixed methods are useful in CBPR research because they combine the prolonged community contact and depth of qualitative research with the breath of quantitative work. This argument will be supported by a detailed account of the initial phase of a CBPR program aiming to reduce health disparities in a predominantly African American and distressed community. The first phase, described in this article, aimed to identify and operationalize the role of substance use in Newark, New Jersey, from the perspective of the community, while identifying community residents, consumers (in this case drug users), and service providers to serve in a new community collaborative board responsible for conducting the remaining phases of the CBPR program. The second phase consists of the development of a culturally tailored, manualized intervention. The third phase aims to pilot test the manualized intervention. The fourth and final phase consists of the implementation of the manualized and evidence-based intervention throughout the community.

This article will show how concept mapping was used within a CBPR paradigm in the first phase of the project conducted in partnership with a community-based organization (CBO). In this article, concept mapping is a comprehensive and integrated methodological approach described by Kane and Trochim (2007) that includes specific steps to develop a research question, collect and analyze data, and interpret findings with research participants' input. While concept mapping is a research method, we used it both as a tool to engage community members in the research process and as a research methodology. This approach provided a systematic mixed methods structure through which community residents, substance users, and service providers could be involved at every stage of the project. The article will also show how large amounts of complex qualitative and quantitative data were organized into community-friendly formats easily understood by researchers and community partners alike.

Applying Concept Mapping Within CBPR Paradigm

Concept mapping is a structured method for translating complex qualitative data into a pictorial form, which displays the interrelationships among ideas in a fashion easily understood by community partners (Shorkey, Windsor, & Spence, 2009b; Trochim, Cook, & Setze, 1994). There are similarities between concept mapping and other mixed methods strategies such as cultural domain analysis (Collins & Dressler, 2008). For instance, both use pile sorting and multidimensional scaling techniques. However, these are different approaches in that cultural domain analysis seeks to uncover the shared meaning assigned by participants to a particular phenomenon by examining the terms that they use. The analysis focuses at the intersection of language and cultural meaning. In concept mapping, the goal is to capture not only participants' shared views, but also the unique views of individual participants. Concept mapping also provides a specific structure that consists of five steps (demonstrated in the project below), including (a) community preparation, (b) community brainstorming (focus groups), (c) community sorting and rating, (d) multivariate statistical analysis; and (e) community interpretation/utilization of results (Kane & Trochim, 2007). In this project, concept mapping falls within the fully mixed sequential equal status methods design described by Leech and Onwuegbuzie's (2009) typology. Specifically, the project started by applying qualitative methods to develop items describing the role of drugs in Newark, New Jersey. Then these items were formatted and sorted into piles according to participants' conceptual understanding. Participants also rated items using a 5-point Likert-type scale according to their level of agreement. Conceptual piles and ratings were then analyzed quantitatively and qualitatively. The final map interpretation combines the quantitative results with participants' qualitative feedback. Thus, qualitative and quantitative methods were used sequentially across the stages of research and used concurrently in the analysis.

Concept mapping has been previously identified as a useful methodology for public health participatory research. For instance, it has been used to assess the impact of neighborhood context on a range of relevant health outcomes, including intimate partner violence and mental health (Burke et al., 2005). It has also been used to develop an assessment and implementation tool to increase cultural competence in substance abuse treatments (Shorkey, Windsor, & Spence, 2009a; Shorkey et al., 2009b). However, it has not been typically described as a useful methodology to engage distressed communities in CBPR health intervention development. By combining qualitative and quantitative research methods in an easy to understand ''recipe,'' concept mapping can strengthen the quality of public health participatory research by maintaining the depth and diversity of community's views, increasing community engagement in research, while also developing culturally tailored hypothesis and frameworks that can be subsequently tested with larger samples.

In this project, concept mapping was used in the first phase of the CBPR program to develop a framework describing, from a community perspective, both personal and community-level dimensions of social dynamics and consequences of alcohol and substance use in Newark's distressed communities. These procedures were also used to engage community members in the research process and develop a strong relationship between the researchers and community members.

The first step in building a CBPR program of research is identifying community partners and conducting a needs assessment in the community to develop research questions and identify community problems. Concept mapping is an affordable method to engage the community, identify individuals interested in joining the research team, and assess community needs in a community-friendly format. Like CBPR, concept mapping fosters rapport between researchers and community members through a system of data collection and analysis that incorporates community input into all stages of research.

Methods

Setting

The current project took place in Newark, the city with the highest prevalence rates for substance abuse in Essex County, State of New Jersey (Division of Public Health Services, 2008; New Jersey Department of Health and Human Services, 2007), with heroin accounting for more admissions to treatment centers than all other drugs combined (National Drug Intelligence Center, 2008). It was estimated that in 2002, over 69,000 individuals needed substance abuse treatment in New Jersey (New Jersey Department of Health and Human Services, 2007). Yet Essex County totaled 7,507 in 2005 (the highest for any New Jersey County): 5,295 services were for heroin and opioids (22% of the State total) and 587 were for cocaine (10% of the State total). Of these, 1,255 were injection drug users (New Jersey Department of Human Services, 2005).

The entire project took place over the course of 1 year including research question formulation, data collection, and dissemination of findings (Figure 1 depicts the project's steps). The project engaged substance users, community residents, substance abuse service providers, and researchers in order to identify key personal and community-level dimensions describing the dynamics and consequences of drugs and alcohol in Newark's distressed neighborhoods. Newark's distressed neighborhoods presented the lowest mean income and highest rates of crime (including violent and nonviolent), and HIV prevalence in comparison with Newark's more affluent neighborhoods (New Jersey Department of Human Services, 2005; New Jersey State Police, 2008). Distressed neighborhoods also had an active street drug market and the majority of residents were Black or African American.

Community Preparation

Preparation in concept mapping refers to identifying participants and developing a research question that is then used as the brainstorming prompt. In 2009, the principal investigator (PI) and first author joined a statewide planning group whose objectives included identifying gaps in HIV prevention and treatment services in New Jersey and making recommendation of specific actions to State Government. Through this group, the PI identified a substance abuse treatment service provider who was interested in collaborating in this research. Together, the research and service provider implemented the concept mapping methods in engaging the community in the research, developing a framework that described the role of drugs and alcohol in Newark, New

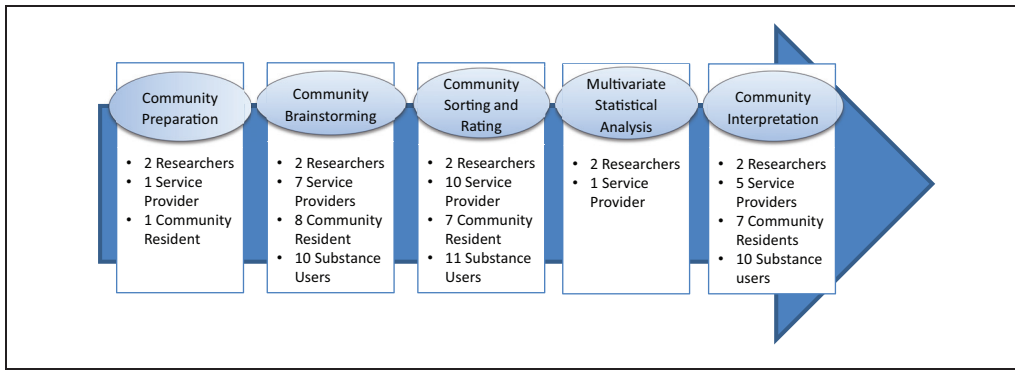

Figure 1. Research process and individuals involved in each stage.

Jersey; and identified other service providers, community residents, and substance users who were willing to join a community collaborative board to conduct the remaining phases of the CBPR program.

Once institutional review board approval was obtained, the research team (PI, one service provider, and one community member) identified three groups of research participants: (a) community residents (individuals who live and/or work in Newark's distressed communities; (b) service providers (providing substance abuse and HIV services in Newark's distressed communities); and (c) substance users (individuals who lived in Newark's distressed communities and were enrolled in outpatient substance abuse treatment services, including syringe exchange and support groups). These community subgroups were selected to provide different and complementary perspectives on drug use, community needs, and resources in the Newark area. A judgmental sampling procedure in which participants were selected based on the type of knowledge they can contribute (e.g., service provision, drug use, living in the community) was used to recruit providers and substance users from a CBO providing substance abuse services in Newark, New Jersey. This organization was selected because it is located in one of Newark's distressed neighborhoods and provides health services to approximately 5,000 individuals annually since 1988. Non–substance using community residents were recruited from another CBO that was identified through the service provider's community contacts. This second CBO is a grassroots agency that aims to empower the community through collective action and volunteer work.

Overall selection criteria included Newark residence, being older than 18 years, and self-reporting having knowledge of the social and cultural fabric of Newark's low-income and predominantly African American communities. Specific subgroup selection criteria included being a current substance user, being a current substance abuse service provider, or being a resident in the community who has been affected by drug use and/or drug trade. With help from a CBO counselor, a flyer was developed by the research team announcing the study and the date and time of each brainstorming session, sorting and rating, and interpretation meetings. The flyer encouraged individuals of all racial and ethnic groups to participate. Those interested in participating were asked to come to the data collection groups and participants were recruited on a first come, first serve basis. A cash incentive of US$20 was offered to promote participation.

Community Brainstorming

Brainstorming in concept mapping consists of a highly structured type of focus group in which data are collected in the form of words or statements in response to a specific prompt. Unlike a

typical focus group where participants are encouraged to answer questions and engage in dialogue, in brainstorming the data collected are restricted to statements generated by the group. Prior to the brainstorming session and with input from community members, the research team developed the key initial research question for this project: ''What is the role of drugs and alcohol in Newark's low-income and predominantly African American neighborhoods?'' During the brainstorming session, participants were asked to respond to this question with one word or a statement. The group facilitator would write the word or statement in the computer and the group followed along, watching the computer screen projected on the wall. The group would suggest ways to improve the wording until the group agreed the statement was clear. Note that participants do not have to agree with all statements, they must simply agree that the statement is clear and at least one person must feel the statement is relevant to the research question. Three separate brainstorming sessions were conducted to allow the different groups of participants (one group of community residents, one group of service providers, and one group of substance users) to express their unique perspectives about this matter. The sessions were facilitated by trained social workers. During the brainstorming session, participants were instructed to use their own words to describe the role of drugs and alcohol in Newark's low-income and predominantly African American neighborhoods.

The group facilitator used a projector and mobile computer to project the data collected and to obtain input from the group on how the data were being recorded. The facilitator conducted the brainstorming in a safe and nonjudgmental environment by emphasizing the importance of respecting one another's opinions. A total of 209 statements were thus generated. These were then collapsed into categories that had similar conceptual meaning and placed on a new grid of statements. The grid was distributed to five data coders (PI, two research assistants, and two service providers), who worked independently to delete and merge statements in order to eliminate redundancy and reduce the list as much as possible. Through consensus, the coders agreed to keep 100 items (approximately 50% of initial statements). The use of five coders enhanced reliability and community expression.

Community Data Sorting and Rating

Once the grid of 100 statements was finalized, the statements were entered into the concept systems software (Trochim & Kane, 2005). Each statement was then printed in 3 × 5 index cards (30 sets of 100 statements, one for each sorting/rating participant). In the sorting and rating stage, a new group of participants worked independently sorting the statements generated in the brainstorming session into conceptually similar categories. Then participants rated each statement according to agreement.

For the purposes of this project, three sorting and rating groups (each with substance users, community residents, and service providers) worked independently to code and organize the statements sets based on their opinions of which statements went together. Participants were told to group statements that, in their opinion, reflected similar concepts. Participants were then asked to assign a descriptive title to each pile of statements, based on each pile's content. Once the sorting was completed, participants rated each statement on a 5-point Likert-type scale (0 = *completely disagree with the statement* to 5 = *completely agree with the statement*). Concept mapping software allows for subgroup mean rating comparisons (e.g., compare perceptions between substance users, community residents, and service providers), though tests of statistical significance must be computed using a standard statistical software (e.g., SPSS; Kane & Trochim, 2007).

Multidimensional Scaling and Hierarchical Cluster Analysis

Sorting and rating data were entered into the concept mapping software and a preliminary analysis was conducted. Multidimensional scaling (Kruskal & Wish, 1978) is the key analysis employed in concept mapping. It aggregates the data collected in the sorting step into a similarity matrix to create a point map. This map is a pictorial representation of statements' co-occurrence in a pile (see figure later in text). Each point in the map represents a statement. The closer the statements are in the map, the more times they were put together in the same pile by participants and the closer they are conceptually. A sample of no more than 30 individuals is recommended for this analysis. Hierarchical cluster analysis (Romesburg, 1984) is used to identify the clusters in the map, thus providing the means to which boundaries are drawn to identify dimensions in the point map. In concept mapping, a stress indicator is calculated in order to assess the degree to which the map represents the grouping of the data. Research of other studies using concept mapping found stress values ranging from 0.155 to 0.352 with an average of 0.285 (Shorkey et al., 2009b; Trochim, 1993). High stress values suggest considerable variability in the way people grouped the statements. In general, stress values will be lower (i.e., the map will be a better fit) when there are more statements and more people rating the statements than otherwise (Johnsen, Biegel, & Shafran, 2000).

Community Interpretation and Utilization of Maps

In concept mapping, interpretation refers to the process by which preliminary results are presented to a new group of research participants so that they can interpret the map and suggest modifications to the analysis. In this project, the point map was presented to three separate participant groups: community residents; service providers; and substance users. These groups were convened to (a) interpret the map, (b) discuss potential changes to the preliminary analysis, (c) assign descriptive titles to the dimensions identified by hierarchical cluster analysis, and (d) decide how the concept map would be used by the community. A mobile computer including the concept mapping software and a projector were used to make any suggested changes to the analysis during the meeting. The first group to interpret the map included service providers, followed by substance users, and community residents. This group ordering was based on participants' availability to meet. The graduate research assistant took detailed notes about the discussion and all changes made to the preliminary analysis in each group. The changes were incorporated each time and presented to the subsequent group. The interpretation meetings' notes were then reviewed by the PI, one community member, and one service provider who met and through consensus, collapsed the dimensions into themes that described the essence of the interpretation meetings' discussion.

Development of the Newark Community Collaborative Board

At the conclusion of the concept mapping process, the research team was well known by individuals in the community and rapport had been developed. During the brainstorming, sorting and rating, and interpretation sessions, the researchers introduced CBPR principles and announced that at the end of the first phase, a community collaborative board would be created to apply CBPR and findings from this research in developing a community-based and culturally tailored intervention. Fliers were developed and distributed in the community via e-mail and paper copies. Those responding to the flier were encouraged to submit an application form to the research team. The application inquired about the applicants' background, expertise brought to the group, and their specific interest in joining the Newark Community Collaborative Board

(NCCB). Up to 15 individuals were selected to serve as NCCB members and other applicants could join meetings as guests. Member selection was made based on demographic and expertise characteristics to ensure as much diversity as possible.

Results

Sample Description

A total of 75 individuals, including substance users, service providers, and community residents participated in the study (Table 1). In the first phase (concept mapping), 27 participants were involved in the brainstorming sessions, including 7 providers, 10 substance users, and 10 community residents. The rating and sorting sessions included 9 community residents, 11 substance users, and 10 service providers. Finally, 18 individuals participated in the cluster map interpretation sessions, including 8 community residents, 7 substance users, and 3 service providers. The sample mean age was 44 years (9.24) and mean time living in a low-income and predominantly African American Newark neighborhood was 12 years (17.24). Approximately one third of the sample reported current substance use. Median annual income was $20,000.

At the end of the project, a total of 22 individuals applied to join the NCCB. Eleven were Black, three were Latinos, four were White, and four were mixed race. Fifteen were women. Age ranged from 29 to 61 years with a mean of 30 years. The sample included government officials, consumers, service providers, and researchers. A mixer event was conducted for applicants to meet one another, learn more about the project, and select the members through voting. At the event, applicants decided that everyone who applied and attended the mixer should be included as NCCB members.

Summary of Concept Mapping Findings

Like other reliability tests (Cortina, 1993), sorting and rating procedures generate an estimate of the degree to which the concept map represents a reliable grouping of the data, with high stress values indicating considerable variability in the way participants grouped the statements they generated in the brainstorming session. Our analysis yielded a stress value of 0.33, indicating that the final map was acceptable. The final concept mapping solution included eight dimensions that together characterized the way participants understood the dynamics and consequences of drugs and alcohol in the community, including (Windsor & Murugan, 2012; Windsor, 2010) (a) impact of alcohol as a legal drug in society; (b) street drugs/ prescription drugs: What's the difference?; (c) The impact of pot on individuals; (d) street power brokers; (e) police are part of the problem, not the solution; (f) drug dealers/drug market/drug trade; (g) impact of drugs on the community; and (h) motivators and aftermath of getting high. Figure 2 displays the final concept map solution and Table 2 provides the statements generated in the brainstorming session, rated according to participants' agreement and sorted into the dimensions. The numbers in the map correspond with the numbers of the statements listed in the table. Comparison analysis between the three groups' ratings did not yield statistically significant differences. Thus we grouped all ratings together.

Each dimension represents common themes that depict the dynamics and consequences of drugs and alcohol in Newark's distressed neighborhoods. These dimensions have been collapsed into three themes that best represent participants' perspectives: (a) impact of specific substance use on individuals and communities (Dimensions 1, 2, 3, and 8); (b) impact of drug trade and its players (Dimensions 4, 5, and 6); and (c) impact of substance use and drug trade on the community (Dimension 7). Below we provide a summary of each theme.

Table 1. Demographics (*N* = 75).

Demographic	Overall sample (%)	Community members subgroups (%)		
		Substance user (41%)	Community resident (29%)	Service provider (30%)
Completed at least high school or GED	90	76	97	100
Employment				
Full time	46	0	65	89
Part time	5	5	0	7
Unemployed	49	95	35	4
Female	58	53	64	59
Ethnicity				
African American	71	76	75	59
Black Caribbean	15	11	16	18
Hispanic	1	0	0	4
White	11	13	6	15
Other	2	0	3	4
Currently unmarried	79	87	73	74
Substances currently being used[a]				
Marijuana	7	5.3	0	19
Snorted heroin	17	42	0	4
Injected heroin	14	37	0	0
Crack cocaine	13	32	0	4
Cocaine	12	29	0	4
Smoked nicotine	14	24	3	15
Alcohol	20	26.3	21	11

a. Percentages do not add to 100% because the same person may have reported using several substances.

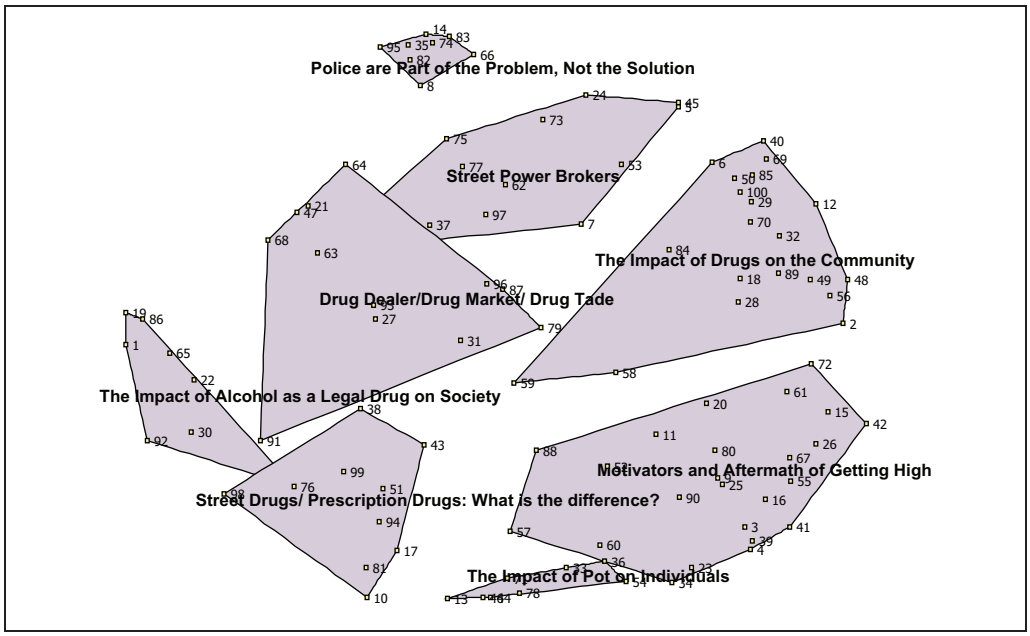

Figure 2. Final cluster map.

Note. Each cluster in the map represents one dimension of the dynamics and consequences of substance use and drug traffic in Newark's distressed communities. The closer a statement is to another statement in the map, the closer they are in conceptual meaning.

1. *Impact of specific substances on individuals and communities*: This theme reflected dimensions of the map about the interconnectedness of the impact of substance use on individuals and the community. For instance, participants discussed how the availability and cost of certain substances in the community affected individual substance use. Prescription drugs were typically preferred by users over illegal drugs because they are safer (e.g., pharmaceutics companies are regulated and use standard formulas while street dealers may use a variety of chemicals to dilute street drugs), and prescription drugs are less likely to produce severe withdrawal symptoms. Moreover, heroin and other illegal drugs were cheaper than prescription drugs in Newark. Participants contended that substance users often turn to illegal drugs or crime when they cannot afford to purchase prescription drugs.
2. *Impact of drug trade and its players*: This theme referred to the individuals and organizations involved in Newark's distressed neighborhoods' drug trade. The trade included drug dealers, neighborhood youth, the police, politicians, business owners, and some corrupt churches. Participants explained that all these groups benefit from the drug trade while impoverished youth are caught in the middle. For example, politicians develop restrictive policies that serve their political interests. The police, composed of both honest and corrupt officers, must implement these policies in the community, creating suspicion and fear. Drug policies carry heavy sentences for drug possession. Such policies encourage dealers to use neighborhood youth as lookouts and street drug sellers because higher level drug dealers are unwilling to risk heavy prison sentences. Businesses also benefited from the trade as many bodegas serve as storage for drugs and other businesses sell products popular in the ''flashy drug dealer lifestyle.'' Some churches in the

(*text continues on p. 16*)

Table 2. Statements According to Each Dimension and Overall Agreement Rates

Statement number	Statement	Agreement rating average
Dimension 1: Impact of alcohol as a legal drug in society		
30	Alcohol increases risk behaviors, such as unsafe sex and sharing needles	4.67
65	Alcohol is so prevalent it gets normalized and overlooked	4.43
92	The impact of alcohol is as destructive if not more destructive than drugs	4.37
76	Children whose parents use drugs are struggling in school and may drop out	4.30
1	Liquor stores are prevalent	4.03
22	People have a hard time recognizing the negative impact of alcohol	3.93
19	People have been fighting against opening liquor stores	3.80
86	It is easier to identify someone drinking alcohol, than using drugs especially in open parking lots where people hangout	3.67
Cluster stats:	Mean (*SD*)	4.15(0.32)
Dimension 2: Street drugs/ prescription drugs: What's the difference?		
17	Pills are just as popular as heroin	4.33
51	Kids are huffing (using inhalants)	3.90
43	Kids as young as 12 are using leak	3.80
38	Kids who were born addicted to drugs are having difficulties at school	3.80
98	Many people have difficulty obtaining prescription opiates because they are expensive	3.77
81	Heroin is cheaper than prescription opiates but it creates more physical dependency	3.77
99	Prescription opiates increase property crime because people need more money to buy it	3.63
94	Hard drugs (heroin, crack, cocaine) are cheaper than soft drugs (marijuana and alcohol)	3.47
10	Prescription opiates don't make people as sick as heroin	2.57
Cluster stats:	Mean (*SD*)	3.67 (0.45)
Dimension 3: The impact of pot on individuals		
33	People use pot to get high	4.57
54	Sometimes when people smoke pot, they want to use other drugs (it is a gateway drug)	4.43
13	People tend to believe pot is not harmful	4.33
44	Marijuana can be useful for medicinal purposes (e.g., relieving asthma, increasing appetite)	3.97
71	People have been dipping pot in embalming fluid (called leak)	3.80
46	Pot can be useful at first but over time it can create a tolerance and become an addiction	3.73
78	It is easier to be in control when using pot than when using drugs such as crack and heroin	3.50
36	Pot reduces violence because people chill out when they smoke it	3.13

(continued)

Table 2. (continued)

Statement number	Statement	Agreement rating average
Cluster stats:	Mean (*SD*)	3.93 (0.46)
Dimension 4: Street power brokers		
7	Drug dealers are hiring kids as runners to protect themselves from being arrested	4.73
97	Some people trade their welfare checks in corner stores for drugs and cash	4.63
53	The government has the power to clean up the drugs	4.50
63	Some people do not have documentation that is necessary to obtain services (i.e., identification)	4.43
73	The government is responsible for the presence of drugs in the community	4.37
77	Bodegas serve as a hangout for kids, drug dealers, and users	4.37
75	Drug trade went from very disorganized to somewhat organized through gang leadership	4.07
45	The community is being driven by political interests	4.03
37	Being a drug dealer comes with a very flashy lifestyle that entails earning respect, owning the block, and instilling fear in others	4.00
62	Businesses benefit from the wealth created by the drug trade because they sell products that appeal to dealers	3.97
24	The government is not interested in helping the community	3.57
5	There are some corrupt churches	3.40
Cluster stats:	Mean (*SD*)	4.17 (0.39)
Dimension 5: Police are part of the problem, not the solution		
35	Some police officers are involved in the drug trade	4.60
8	The police moves the drug trade from place to place, but they do not fully address it	4.43
83	Cops are practicing racial profiling	4.37
66	Some cops let people who they know break the law go as long as they do not break the law in front of the police	4.33
95	Most cops operate on emergency mode: remediate, not necessarily prevent	4.17
14	Cops are the biggest gang out there	3.90
74	The cops are arresting people if they are unable to provide information about crimes in the neighborhood	3.83
82	Residents can count on the cops for protection	2.50

(continued)

Table 2. (continued)

Statement number	Statement	Agreement rating average
Cluster stats:	Mean (*SD*)	4.02 (0.62)
Dimension 6: Drug dealers/drug market/drug trade		
87	The drug market provides children with false promises of wealth	4.37
68	Dealers buy some jewelry, they buy things, but there is no economic security	4.33
96	Adults who exploit children selling drugs can receive heavier prison sentences	4.33
64	Drug dealers finance local businesses to launder their money	4.30
93	Single mothers need to work many jobs and there is no one to care for the children	4.27
21	Some corner stores serve as storage for drugs	4.17
31	Sometimes kids have no way out of the drug game	4.17
47	The financial benefits of the drug trade encourages people to tolerate it	3.83
79	Drug use creates jobs for people who fight it (e.g., drug counselors)	3.80
91	Drug prices are determined by the strength of the drug (its ability to get people high)	3.77
27	Drug sellers are not making much money because they must pay high fees to higher level dealers, they lose their stash, and they get robbed	3.37
Cluster stats:	Mean (*SD*)	4.06 (0.31)
Dimension 7: Impact of drugs on the community		
69	People know that there are places in the community that are dangerous and should be avoided	4.70
18	Drug culture creates negative role models for the youth	4.53
32	Drugs increase gang activity	4.47
2	Because of drug use and sales, murders are increasing	4.47
29	Community members are exposed to drug-related shootings	4.47
100	The bad publicity surrounding drug use and sales overshadow the positive things that Newark has to offer, such as accessible public transportation and colleges	4.43
12	Community members fear walking by drug dealers on the street	4.40
89	People are annoyed by loud music, cursing, and gun shots that are aggravated by drugs	4.43
49	Drug use and violence forces legitimate businesses away	4.30
58	Children are growing up in an oppressive environment where they learn the extreme measures one takes to survive	4.27
56	Drug use tears up the entire community while in wealthy neighborhoods drug use and sale only tears up the family that is involved	4.27
40	Churches help provide support to community members	4.23

(continued)

Table 2. (continued)

Statement number	Statement	Agreement rating average
28	Children are at higher risk to fall victim to drugs because drugs are widely available and they are more acceptable than in wealthy communities	4.17
70	Drug dealers hide their drugs behind the siding of homes in the community	4.13
85	The introduction of drugs weakened unity in the community	4.13
59	The young generation is much more violent because they did not receive proper parenting from the drug-using parents	4.10
48	Drugs use and sales are overshadowing positive things such as accessible public transportation and colleges	3.93
6	There are few role models left to improve the community	3.87
84	Many people choose not to use social services	3.87
50	The community does not care for the children anymore because people are afraid of altercation with the parents	3.57
Cluster stats:	Mean (*SD*)	4.23 (0.26)
Dimension 8: Motivators and aftermath of getting high		
11	Some families get high together	4.57
67	Drug withdrawal makes people more irritable	4.57
90	Some drug users who recover can learn important lessons through their drug use	4.57
57	Drugs increase risk behaviors, such as unsafe sex and sharing needles	4.50
34	Drug withdrawal makes people more depressed	4.50
15	Many substance users have nothing to come back to after they finish drug rehab, so they often go back to drugs	4.47
42	It is easier to find drugs than accessible drug treatment	4.47
41	People choose to use drugs	4.40
80	People use drugs to "check out" of life's harsh realities, such as death of a parent, witnessing a parent on drugs, or the effects of HIV/AIDS	4.37
4	One reason people use drugs because they feel bad about themselves	4.30
26	Heroin withdrawal increases crime because users are willing to do anything to get it	4.27
23	Drug withdrawal makes people more aggressive	4.27

(continued)

Table 2. (continued)

Statement number	Statement	Agreement rating average
52	Young generations use pot, PCP (phencyclidine), ecstasy, and "leak/ wet" (pot dipped in the embalming fluid) while the older generation uses heroin, cocaine, and crack	4.23
72	Drugs can help people belong to a group	4.23
20	Some people will choose to not use drugs because they observed the effects of their parents using them	4.20
16	Some people will use drugs because they observed their parents using them	4.17
60	Drug withdrawal makes people more violent	4.10
3	Drugs act as a pacifier: People use drugs to deal with lack of jobs and education	4.00
9	There are some substance users that can function in society	3.93
39	Sometimes it is easier to find motivation to get high than to get into treatment	3.93
88	There are not many options for entertainment and people may find themselves getting high	3.90
61	Elderly men sometimes become addicted to drugs through the prostitutes they see	3.90
25	Drug abuse and dependence are increasing among the elderly	3.70
55	Intravenous drug use seems to be decreasing	2.47
Cluster stats:	Mean (*SD*)	4.17 (0.43)

community were corrupted and prayed on disenfranchised substance users and drug dealers to further their agenda of increased profit.

3. *Impact of substance use and drug trade on the community*: This theme reflected the relationship between substance use, drug trade, and crime. Participants talked about being exposed to drug-related violence, including witnessing shootings, being interrogated by the police about crimes they did not commit, being afraid to visit different parts of the neighborhood, and being scared that their children will be victims of violence and/or become addicted to drugs. Participants discussed the disadvantages that impoverished families must face when living in neighborhoods with high incidence of drugs and the effects of racism, discrimination, and lack of opportunities that result from residing in low-income communities. Participants also discussed a major change in neighborhood culture where the community no longer watches out for the welfare of the children. They explained that in the past, people felt comfortable disciplining their neighbors' children, but currently people are disconnected and afraid of experiencing violence.

Discussion

It has been argued that the field of substance abuse treatment will benefit from the development of behavioral interventions that go beyond treating the individual to fostering community involvement in the recovery process. The development of community-informed interventions can only be done by involving community members early in the research process. The current study applied CBPR principles to involve community residents, substance users, and service providers in order to examine the dynamics and consequences of alcohol and other drugs in Newark's distressed neighborhoods. This is the first step in developing community interventions that are grounded in community culture and experiential wisdom. Concept mapping was applied with community participation in each step of the research process. Findings from the perspective of community members revealed a set of dimensions that described the dynamics and consequences of drugs and alcohol in Newark's distressed neighborhoods at the individual, community, and policy. For instance, during the map interpretation, participants discussed the relationship between individual responsibility and social responsibility. On one hand, all participants agreed that substance users were responsible for their sobriety and that it was incumbent on them to seek treatment and make ''good choices.'' On the other hand, participants also recognized that the community in which they lived contributed to the ''bad choices'' they sometimes made. This continuum of individual and community impact was reflected in the map's dimensions, supporting the need for interventions that promote individual change while simultaneously combating drug traffic and strengthening community cohesion.

This article emphasizes the importance of community engagement in research to foster community cohesion, develop meaningful health interventions, policies, and services. Findings revealed the distrust that Newark community members have for the government and the police. This represents a significant barrier to community involvement in addressing substance use and the drug trade. While all participants agreed that drug and alcohol use have devastating consequences to the community, few people believed that the government was motivated to help address this issue in their community. African Americans often report feeling suspicious of governmental or formal institutions because of historical abuses they have endured (Corbie-Smith, Thomas, & George, 2003). Such distrust creates major obstacles for both the government and the community. Developing a working relationship between community members, the government, and the police force based on mutual trust will be a critical step in addressing drug use and traffic in Newark's distressed communities. Therefore, in addition to

implementing behavioral interventions in this community, work is necessary to build trust between the community and its government, including law enforcement.

There is a call for innovative, low-cost, and culturally tailored substance abuse treatment approaches that can address both individual and structural level needs (Dunlap et al., 2006; Dunlap & Johnson, 1992; Longshore, Grills, Annon, & Grady, 1998; Schmidt et al., 2006). Previous research highlighting the perspective of community members show that by integrating the worldviews of community members, culturally congruent health-related interventions can be developed (Dunlap et al., 2006; Pinto, McKay, & Excobar, 2008; L. Windsor & Dunlap, 2010). This study has thus used participatory methods in order to examine, from the perspective of the community, the impact of drugs on their lives and neighborhoods. It also used the work conducted through the research as a way to develop rapport and start bridging the gap between the researchers and community members. Our findings confirm that in Newark, substance abuse is not simply an individual problem. Therefore, it is critical to go beyond individual-level interventions and begin to address issues related to service provision in Newark, treatment barriers, and treatment improvement.

Limitations

Though concept mapping is a useful methodology to engage community members in research, it carries some limitations. Concept mapping lacks a good statistical mechanism to reduce the number of statements generated in focus groups, such as in factor analysis (Gorsuch, 1990). One could use a calculation of coefficient alphas to help exclude some of the statements; however, that can only be accomplished after the concept mapping is produced. The current study was not attempting to develop a reliable measure; but instead to use mixed methods to develop a framework describing community views about drugs and alcohol. Mertens (2007) argues that using qualitative methods is critical in gathering community perspectives while the quantitative approach provides the opportunity to demonstrate outcomes and increase the research credibility. In this study, qualitative methods were used to gather a comprehensive community understanding of drugs and alcohol in Newark and quantitative methods were used to increase the findings' reliability and help organize the data in a cohesive and easy to understand fashion.

While concept mapping employs qualitative research techniques, in-depth information is lost in the structured methods employed in the brainstorming sessions. Specifically, the prompt requires that participants provide words or statements as opposed to discussing the issues at hand in an open dialogue. This highly structured brainstorming format impedes the discovery of information that may arise from a less structured focus group or interviewing format. Thus, additional focus groups should be carried to enrich data on service provision in Newark, New Jersey.

Lessons Learned and Future Direction

Despite the challenges faced by Newark's community members, it is important to acknowledge the strength and resilience of these communities. In the face of limited funding and human resources, committed service providers have tirelessly worked to maximize service provision to meet the needs of their growing number of clients. Dedicated community members have rallied together to hold the government accountable in addressing the needs of all of their constituents, including those in traditionally overlooked areas. Drug users expressed enthusiasm at the possibility of changing their individual choices by engaging in community action. Understanding clients' needs, worldviews, strengths, and challenges can inform the development of an intervention that is meaningful to the participants and hence improve retention (Longshore et

al., 1998; Pinto et al., 2008). In that respect, CBPR is a promising approach in reducing health disparities because it incorporates community voices in the development of culturally congruous interventions.

The challenge in conducting CBPR lies in finding the balance between applying rigorous research designs and accommodating the needs and input of the community (Pinto et al., 2007). In reconciling research rigor and community input, it is important to take time to develop a strong and trusting relationship between researches and community members and develop a similar language through which both groups can convey their needs, ideas, questions, and concerns.

Concept mapping offers a useful structured method that was successfully applied in fostering community involvement in research. This method can be used to organize and display complex concepts, develop quantitative measures, identify community needs and resources, and provide a vehicle for community planning. Concept mapping also generates useful information at a relatively affordable cost. For instance, in developing quantitative measures, typical factor analysis requires a sample size of at least 5 individuals per questionnaire statement. In concept mapping, one can identify conceptual dimensions and calculate alpha scores with a total sample size of 30 individuals.

After the conclusion of this study, the NCCB successfully obtained funds to develop a community-based intervention that will target the individual and community factors identified in this research. The first step will consist of extensive NCCB training in substance abuse, community culture, research methods, and community action. Findings from this project will be used in the NCCB trainings to ensure the intervention will include components that address the dynamics and consequences of drugs and alcohol in Newark's distressed neighborhoods.

Author's Note

The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Mental Health or the National Institutes of Health.

Acknowledgments

The author would like to acknowledge Bob Baxter, Brenda Toyloy, and Vithya Murugan for their assistance conducting this research.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The project described was supported by the Center on Behavioral Health Services and Criminal Justice Research at Rutgers University (Award Number P30MH079920 from the National Institute of Mental Health).

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