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ORIGINAL ARTICLE

See what we say: using concept mapping to visualize Latino immigrant's strategies for health interventions

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Abstract
Objectives Researchers need specific tools to engage community members in health intervention development to ensure that efforts are contextually appropriate for immigrant populations. The purpose of the study was to generate and prioritize strategies to address obesity, stress and coping, and healthcare navigation that are contextually appropriate and applicable to the Latino immigrant community in Cincinnati, Ohio, and then use the results to develop specific interventions to improve Latino health in our area.
Methods A community-academic research team used concept mapping methodology with over 200 Latino immigrants and Latino-serving providers. A community intervention planning session was held to share the final concept maps and vote on strategies.
Results The concept maps and results from the intervention planning session emphasized a community lay health worker model to connect the Latino immigrant community with resources to address obesity, stress and coping, and healthcare navigation.
Conclusions Concept maps allowed for the visualization of health intervention strategies prioritized by the larger Latino immigrant community. Concept maps revealed the appropriate content for health interventions as well as the process community members preferred for intervention delivery.

Keywords Latino/Hispanic · Concept mapping · Cincinnati · Community-based participatory research · Community health intervention

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Introduction

As the population of Latino immigrants in the US rises, a better understanding of their unique healthcare needs is a critical public health concern, especially in pre-emerging gateways which are communities in the US experiencing rapid immigration growth yet do not have infrastructure to sufficiently support immigrants' healthcare needs (Waters and Jiménez 2005). In Cincinnati, OH, most areas in the metropolitan region have experienced growth rates between 100 and 200 % and several pockets have increased by over 200 % from 2000 to 2010 (Jacquez et al. 2015).

The dramatic growth in the Latino population in our area (Pew Research Center 2013) necessitated an assessment of the current health needs and priorities of Latino immigrants. In response, we conducted a recent community-based participatory research project with *Latinos Unidos por la Salud* (LU-Salud), a Latino immigrant community research team, to explore health and healthcare experiences of Latino immigrants in Cincinnati, Ohio (Jacquez et al. 2016). Together, community and academic partners conducted a survey of over 500 local Latino immigrants purposefully

sampled from various Latino-concentrated neighborhoods in Cincinnati [see Jacquez et al. (2016) for details and results of the survey]. In this survey, Cincinnati Latino immigrants (18+ years, majority immigrated from Mexico and Guatemala, average of 10 years in the US) identified their top three health needs as obesity, stress and coping, and healthcare navigation, which aligned with US national health concerns for Latinos (Boudreau et al. 2013; Martinez et al. 2011; Torres et al. 2012). Obesity affects US Latinos at a higher rate than non-Hispanic whites, with 77 % of Latino adults and 39 % of Latino children having high body mass index (Ogden et al. 2014). In terms of stress and coping, Latino immigrants may experience acculturation stress due to discrimination, immigration status, lack of employment opportunities, low socioeconomic status, trauma and family conflict (Rusch et al. 2015; Torres 2010). Latinos who lack English proficiency skills demonstrate low usage of healthcare services (Hoerster et al. 2010), and in general, Latinos are less likely than all other ethnic minority groups in the US to have health insurance or to use preventive healthcare (Leclere and López 2012; Rusch et al. 2015). Latino immigrants specifically face challenges with the health care system regarding language challenges, interpretation issues, concerns with health insurance, and discrimination (Torres et al. 2012).

The purpose of this study was to identify and then prioritize specific strategies to address obesity, stress and coping, and healthcare for Latino immigrants in Cincinnati. The intent was to inform the design of intervention strategies based on the lived experience of the local community of Latino immigrants and Latino-serving providers. Needed was an approach that allowed academic researchers and community members to work collaboratively in the design of the study, the data collection, and the interpretation of results. Concept mapping (CM) is a mixed-method, participatory research approach that is uniquely suited to working with a community and being inclusive of the many and diverse perspectives on a particular issue (Burke et al. 2005; Kane and Trochim 2007; Trochim 1989; Walker et al. 2014). CM has been applied in various community health contexts including cancer screening (Ahmad et al. 2012), strategies to increase physical activity (Kelly et al. 2007), health disparities (Risisky et al. 2008), obesity and bullying interventions for youth (Vaughn et al. 2013), and strategies to address HIV/AIDS (Abdul-Quader and Collins 2011; Szaflarski et al. 2015).

Theoretical/conceptual framework

As a nontraditional migration destination for Latino immigrants, several factors contribute to Latinos virtually being a "hidden population" in Cincinnati, such as an underdeveloped infrastructure for Latino-focused health and social services (Jacquez et al. 2015; Waters and Jiménez 2005; Zúñiga and Hernández-León 2005), anti-immigrant sentiment (de Casanova 2010; Timberlake and Williams 2012), and state-wide policies restricting employment and driving privileges for undocumented immigrants (Jacquez et al. 2015; Riffe et al. 2008; Valdez et al. 2013). To effectively develop strategies that are contextually and culturally appropriate to the new Latino immigrant population, it was necessary to engage Cincinnati Latino immigrants and Latino-serving providers in the identification of intervention strategies to address obesity, stress and coping, and healthcare navigation.

Thus, the current study was based on a framework of social ecological theory and typology of community engagement. A social ecological framework emphasizes the interplay between personal and environmental factors, which include the physical, social, cultural, economic, and historical contexts that impact people, their relationships, and human phenomena (McLaren and Hawe 2005). As such, a social ecological explanatory model supports the integration of multiple perspectives through community engagement to understand the contextual and cultural nuances of Cincinnati Latino immigrants. Community engagement and participation in research varies in terms of the community's level of involvement, communication, and decision-making about project design and process. Community engagement ranges from some involvement and one-way communication (outreach), to greater involvement and connections with two-way communication (consultation), to participatory communication and partnership connections (involvement), to community involvement, partnership/trust building (collaboration), to strong bi-directional relationship, joint decision-making, and trust among partners (shared leadership) (Clinical and Translational Science Awards Consortium (CTSA) and Community Engagement Key Function Committee Task Force on the Principles of Community Engagement 2011; Winer and Ray 2000).

CM methodology is well-suited to actively and directly engage community members at each phase of the research process "so that they become research collaborators, contributing more than responses to questions" (Burke et al. 2005, p. 1394). CM follows community engagement principles on the collaboration and shared leadership end of the continuum in the current study by incorporating diverse community stakeholders (individual Latino immigrant community members, members of a Latino immigrant community research team, and Latino-serving health and social service providers) in the research design, recruitment/data collection, data analysis/interpretation, and translation of the results into practice. Specifically, the objectives of the study were to (1) generate strategies to address obesity, stress and coping, and healthcare

navigation that are contextually appropriate and applicable to the Cincinnati Latino immigrant community; (2) identify the most salient strategies within the areas of obesity, stress and coping, and healthcare navigation; and (3) use the results to develop specific interventions to improve Latino health in our area.

Methods

Participants and setting

Study participants (total $N = 240$) included Latino immigrant community members and Latino-serving providers from Hamilton County. Although the Census Bureau estimates the Hispanic/Latino population in the Greater Cincinnati area to be ~30,000, the Cincinnati Hispanic Chamber of Commerce estimates the actual population (which includes undocumented Latinos) to be closer to 70,000 people (Zandvakili et al. 2010). In Hamilton County, including the city of Cincinnati, there was 126 % growth of Latinos between 2000 and 2011 (Pew Research Center 2013). Per the 2005 Greater Hispanic/Latino Health Survey, the Cincinnati Latino immigrant population was relatively new (75 % came to live in Greater Cincinnati from 2000 to 2005), and were of Mexican (40 %), Guatemalan (16 %), Peruvian (13 %), and Columbian (6 %) national origin (The Health Foundation of Greater Cincinnati 2006). The remaining 25 % came from 14 other countries. In our recent survey (Jacquez et al. 2016) conducted with over 500 local Latino immigrants, respondents reported Mexico (51 %), Guatemala (28 %), Honduras (8 %) and Nicaragua (5 %) as their countries of origin; the remaining 8 % reported other birth countries in Latin America.

Study design

The current study was conducted as a collaborative effort between academic researchers and a community research team comprised seven Latina immigrants, LU-Salud. Created to investigate and improve research quality regarding health-related needs, beliefs, and behaviors of recent Latino immigrants living in Cincinnati, Ohio, USA, LU-Salud has been working in a health research partnership for almost 3 years since early summer 2013. In the beginning of the partnership, the seven LU-Salud community members received extensive community-based research training. The seven community members are all Latina mothers ranging in age from 29 to 49. Two of the seven women speak some English and the remaining speak Spanish. The women have lived in the US from 3 years up to 17 years. Birth countries include Guatemala, Nicaragua and Mexico. Two of the seven women are partially employed outside their homes but all continue to be well-connected and active members of the Latino community, including participation in their children's schools, and Latino-focused churches and agencies.

Because data was anonymous and intended to address health concerns for Cincinnati Latino immigrants, the institutional review board issued a non-human subjects' determination which meant that the study team rather than the institutional review board was responsible for ethical oversight. All study procedures followed ethical standards and participants consented to respond to the survey. We used CM to generate and then prioritize specific community-driven strategies to address obesity, stress and coping, and healthcare navigation relevant for Cincinnati Latinos. CM follows a six-step process of (1) preparation, (2) idea generation, (3) structuring, (4) representation, (5) interpretation and (6) utilization (Kane and Trochim 2007; Fig. 1). Beginning with the preparation step in CM, Latino

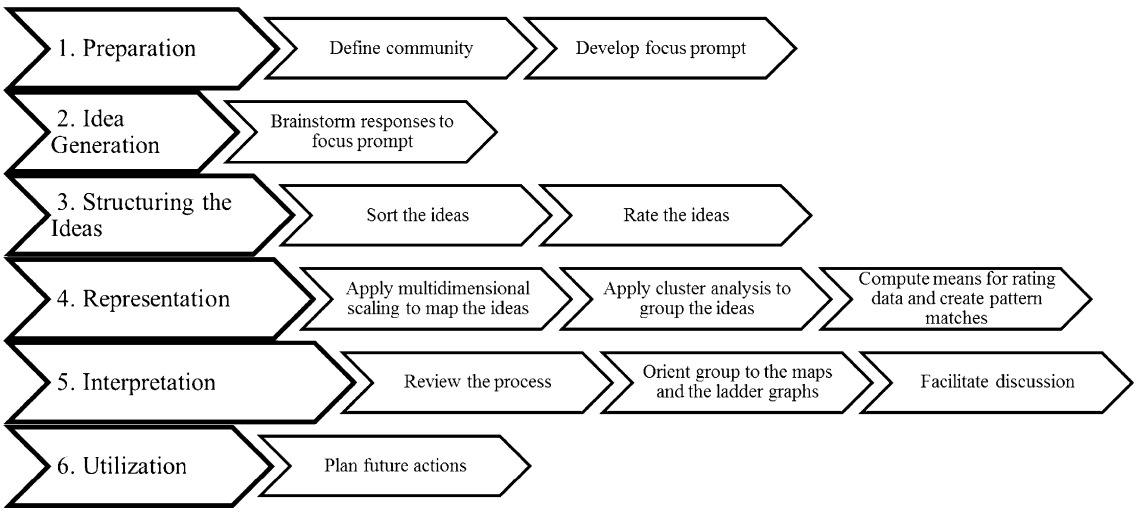


Fig. 1 The steps in concept mapping. USA 2015

community members from LU-Salud (described above) were partners who collaborated and shared leadership with researchers to define relevant stakeholders and decide on focus prompts to fulfill the study's objectives. In the subsequent CM steps 2-6, Latino community members from LU-Salud and Latino-serving service providers collected, organized, analyzed, interpreted, prioritized, and utilized data for action planning. The visual representations of CM data (described below) were particularly useful for the purpose of exploring, interpreting, and utilizing the data in collaboration with community members. Previous methodological work has demonstrated both the validity and utility of CM (Jackson and Trochim 2002; Rosas and Kane 2012).

Measures/procedure

Step 1: preparation

We partnered with LU-Salud to develop the three focus prompts in Spanish and English and to conduct the CM study. A focus prompt is an incomplete sentence that participants are asked to complete; it is intended to focus a group of participants on the issue at hand and prompt them for their best thinking about that issue. The focus prompts for obesity, stress and coping, and healthcare were: "To promote healthy weight and fight obesity in Cincinnati Latino children and adults, I believe we need to…. To help Cincinnati Latinos manage stress, I believe we need to …. To improve healthcare for Cincinnati Latinos, I believe we need to …."

Step 2: idea generation (data collection)

Using purposeful and snowball sampling (where one participant recommends other potential participants), LU-Salud community members approached Latino individuals in Latino-focused community settings (i.e., supermarkets, school functions, church meetings, neighborhoods) and asked them to generate 3–5 ideas in response to each of the three focus prompts in either Spanish or English (96 % responded in Spanish; $N = 216$). Of these 216 respondents, 20 % were ages 18–26, 50 % were 27–40, and 28 % were ages 41–55, 63 % were female, 59 % were from Mexico, and 21 % were from Guatemala, 63 % have children under 18, and the average years of living in the US and Cincinnati was 11 and 10 years, respectively.

Also using purposeful and snowball sampling, LU-Salud academic members recruited Latino-serving service providers to respond to the focus prompts during various meetings held by Latino-serving organizations ($N = 24$). Latino-serving providers included health, social service, legal, and educational professionals who work in a variety of hospital, clinic, agency, school, and community settings. Compared to the Latino individual respondents, these 24 service provider respondents were younger (37 % were ages 18–26, 29 % were 27–40, and 17 % were 41–55). Seventy-nine percent were female, 71 % were from the US with the remaining 28 % from various Latin American countries, and only 29 % had children under 18, and the average years of living in the US and Cincinnati was 28 and 14 years, respectively.

To manage the response burden, the research team eliminated redundant ideas and chose an upper limit of 100 statements per focus prompt that most clearly represented the overall responses. However, all the original responses were retained for further analysis to determine the salience of ideas within the community. The remaining responses were further edited for grammar and clarity of expression without altering the original meaning of the responses.

Step 3: structuring the ideas

The seven LU-Salud members (described above) and nine Latino-serving providers from the initial Idea Generation step ($N = 16$) completed an unstructured sorting of each set of statements into groups of similar ideas that they created and named. Due to the response burden and extended time required for sorting three sets of statements, this smaller number of 16 sorters were recruited because of their established engagement with the Cincinnati Latino immigrant community and because they represented a wide range of stakeholders in terms of their diverse positions in the community and broad-based knowledge about the Latino community. The sorters received three decks of cards containing each set of ~ 100 statements in their preferred language—Spanish or English. Each card contained one idea generated in response to each of the three focus prompts. The sorters were asked to take a deck and then individually sort all of the cards into groups based on their notion of similar categories of ideas, record their results and then repeat the process for the next deck of cards.

Step 4: representation (data analysis)

The sorting data from the respondents for each of the decks (i.e., obesity, stress and coping, and healthcare navigation) was aggregated and analyzed using multidimensional scaling (MDS) (De Leeuw and Mair 2011). MDS creates a map of the ideas with each idea positioned with x, y coordinates in a two-dimensional map. Ideas in close proximity will tend to have similar meaning and hierarchical cluster analysis utilizing Ward's algorithm (Everitt 1980) was applied to the x, y coordinates to compute clusters of points that identified themes or concepts among the ideas (Kane and Trochim 2007). Once the individual clusters were determined for

each of the areas of focus (i.e., obesity, stress and coping, and healthcare navigation), the redundant ideas that were eliminated from the sorting task were assigned to a cluster on their respective map (obesity, stress and coping, healthcare). Within each of the three maps, the percentage of all responses falling within each cluster (determined through qualitative coding of responses into the cluster containing the same or similar responses) were calculated and these percentages served as a proxy for each cluster's salience to the Cincinnati Latino immigrant community.

Step 5: interpretation

Academic members of LU-Salud reviewed the cluster solutions for obesity, stress and coping and healthcare, including the ideas in each cluster and the names that were associated with each cluster during the sorting process. Because there is not an objective best number of clusters, the academic members selected the most appropriate cluster solutions for the three areas with an eye toward balancing sufficient detail with as little overlap as possible. See Kane and Trochim (2007) for a more detailed discussion of how to decide on the most appropriate cluster solution which involves using discretion to both address the purpose of the project and translate the cluster solution into a "real-world" context. Next, the academic members labeled the individual clusters based on the overall theme among the ideas in each cluster using the categories suggested by participants during the sorting step as a guide.

Step 6: utilization

Because the ultimate goal of the project was to develop health interventions that reflect the "voice" of Latino immigrants in our area, 14 stakeholders met for an intervention planning session to turn concept mapping results into action. The 14 stakeholders included the seven LU-Salud members (described above) and seven interested Latino-serving providers from the initial Idea Generation step. During the intervention planning session, academic members of LU-Salud shared the cluster solutions for obesity, stress and coping, and healthcare navigation with the stakeholders to ensure that the cluster solutions made sense. Participants moved in small groups through each of the three areas, generating specific strategies to address the cluster content areas. After all the participants had the opportunity to generate specific strategies, the larger group reconvened and voted on most important and feasible strategies within each area (obesity, stress and coping, healthcare) for our Latino community. Next, the group identified the approaches to health interventions that would be most applicable and relevant for the Latino community in Cincinnati.

Results

Idea generation

Data collection resulted in a large set of diverse community responses that were relevant to addressing obesity (820 responses), stress and coping (760 responses) and healthcare (752 responses). After editing the statements to eliminate redundant ideas, we chose ~100 of the most representative statements for each set of responses (100 for obesity, 97 for stress and coping, and 96 for healthcare). Sturrock and Rocha (2000) report the stress values from random data for sorting from one to 100 objects. Given that the number of objects sorted for each maps in this study was 100 (obesity), 97 (stress and coping), and 96 (healthcare) then stress values below 0.396, 0.395 and 0.395, respectively, would suggest a less than 1 % chance that the objects are arranged randomly (Sturrock and Rocha 2000). Given that our stress values were less than 0.20 for each map (obesity = 0.198; stress and coping = 0.163; healthcare = 0.188) then we expect there is a less than 1 % chance that these data are random.

Concept maps

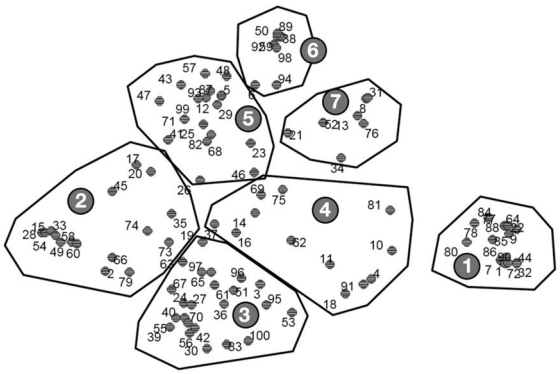
The MDS results show how each set of ideas for obesity (Fig. 2), stress and coping (Fig. 3) and healthcare (Fig. 4) are arranged in relation to each other. Figures 2, 3 and 4 also contain example responses representative of each cluster.

Obesity

The obesity concept map in Fig. 2 is comprised seven clusters that include personal responsibility, healthy eating and exercise, community information, and culturally appropriate health services. Cluster 4, Promote healthy eating in families, represents the largest percentage (40 %) of the original responses.

Stress and coping

Like obesity, the stress and coping concept map in Fig. 3 also contain seven clusters that range from individual contributors to stress to stress management strategies within Latino families and communities. Based on the original responses to the stress and coping focus prompt, the most popular cluster of responses was Cluster 3, Action-based strategies for stress, which represented over a



Cluster 1: Personal behaviors (40/820--5% of original responses)
44) Stop eating junk food
64) Eat in appropriate portions

Cluster 2: Expand culturally and linguistically appropriate health services (72/820--9% of original responses)
45) Hispanics should be treated with dignity
66) Have Spanish-speaking promoters to help guide people toward healthy choices

Cluster 3: Community education and information (161/820--20% of original responses)
24) Educate the community about nutrition and exercise
51) Promote knowledge about how to eat well and to learn what foods are healthy, especially in schools

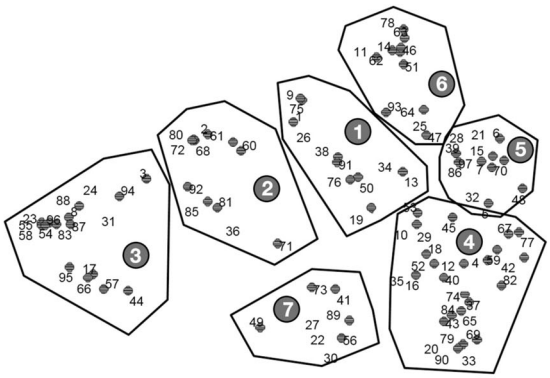
Cluster 4: Promote healthy eating in families (328/820--40% of original responses)
14) Work with stores frequented by Latinos to have healthy options
75) Make it a family affair with kids and parents involved

Cluster 5: Promote exercise places in the community (44/820--5% of original responses)
11) Encourage sports and physical activities for everyone, in ways that are feasible to add to a busy schedule
41) We live in places that are not appropriate to walk because there are many dangerous places and for this reason we prefer to go in our cars and we don't walk.

Cluster 6: Get exercise (131/820--16% of original responses)
36) Run, play, do exercise
94) Do exercise in free places

Cluster 7: Making it easier to eat healthy and exercise (44/820--5% of original responses)
12) Provide healthy grocery stores with fresh fruit and veggies reasonably priced in Latino neighborhoods
34) A campaign in the local stores so that they put more healthy foods instead of displaying sodas, potato chips, etc.

Fig. 2 Obesity concept map. Frequency and percentage of original obesity responses coded by cluster are included in parentheses. USA 2015



Cluster 1: Communicate and provide support around stress (66/760--9% of original responses)
26) Defeat the shame of thinking that we can only get ahead by ourselves
50) Name the problem. Address stress openly and make it an acceptable topic to talk about

Cluster 2: Psychological strategies to manage stress (109/760--14% of original responses)
36) Develop activities where you take time for yourself and not having to take care of everyone else
61) Trust God with our problems

Cluster 3: Action Based strategies for stress (248/760--33% of original responses)
3) Go out and look for positive friendships
8) Sleep well

Cluster 4: Counseling and professional support (97/760--13% of original responses)
37) Offer mental health services at community clinic geared toward Latino families and issues
84) Community workers that can help Latinos in roles/responsibilities of daily living

Cluster 5: Family and community education (89/760--12% of original responses)
15) Do campaigns where they talk about stress and how to combat it
32) School education for kids, after school programs

Cluster 6: Contributors to stress (98/760--13% of original responses)
46) Payment of bills and taxes, high rents
51) Give us documents

Cluster 7: Community spaces for physical activity/recreation (53/760--7% of original responses)
22) Provide safe outdoor spaces for people to gather in low income neighborhoods
30) Ensure Latino communities have access to parks, community recreational facilities

Fig. 3 Stress and coping concept map with example responses in each cluster. Frequency and percentage of original stress and coping responses coded by cluster are included in *parentheses*. USA 2015

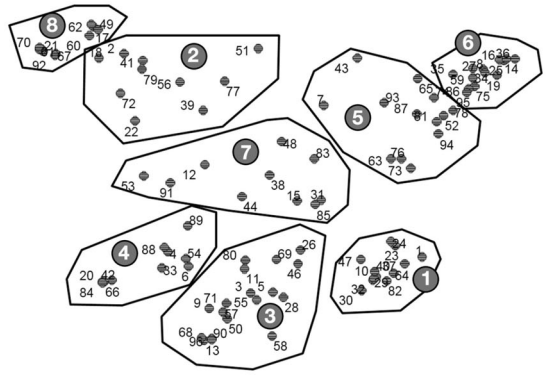
third of responses and included activities like exercise, listening to music, and meditation.

Healthcare navigation

The healthcare navigation concept map in Fig. 4 contain eight clusters that generally suggest the need for increased access to linguistically and culturally appropriate healthcare options that are respectful, non-discriminatory and relationship-focused. Clusters 4, Cheaper healthcare with less waiting; 5, Advocacy for language and support services for Latinos; and 6, More bilingual providers and interpreters, each represent about a fifth of the original responses (19, 17, and 18 %, respectively).

Intervention planning

The final concept maps and cluster solutions for obesity, stress and coping, and healthcare were shared with members of LU-Salud and a group of Latino-serving providers ($N = 14$) during an intervention planning session. Session attendees voted on most important and feasible strategies within each area (obesity, stress and coping, healthcare) for our Latino community. For obesity, the top voted interventions were free nutrition and exercise classes offered at convenient times and community locations. The most popular strategies to address stress and coping included classes/groups for emotional support, phone advice, mental health services in schools, and health promoters who address stress. For healthcare navigation, attendees prioritized health promoters, healthcare navigators, and more clinics with bilingual staff and providers. Across the three areas of obesity, stress and coping, and healthcare, attendees identified two common strategies: (1) health promoters and intermediaries to the larger healthcare system of some sort (navigators, *promoters*, health workers, advocates); and (2) greater access to health-related services at convenient community locations.



Cluster 1: Education and information (110/752--15% of original responses)
22) Give us information about where to find doctors
30) Offer services that help patients to understand and navigate the medical system

Cluster 2: Non-discriminatory treatment and equal rights (30/752--4% of original responses)
17) Make sure that patients feel welcomed - not threatened - when receiving healthcare, regardless of citizenship status
56) They should not consider your migratory situation, just your health needs and need for medical attention in the moment that you look for it

Cluster 3: More and new access points to healthcare services (106/752--14% of original responses)
57) Clinics on the weekends
69) Increase access to dental care for Latino patients. This includes location, cost, insurance requirements and translation/Spanish-speaking providers

Cluster 4: Cheaper healthcare with less waiting (145/752--19% of original responses)
3) Don't make someone wait so long in the waiting room
42) Medicines that are high quality and less expensive

Cluster 5: Advocacy for language and support services for Latinos (128/752--17% of original responses)
74) Advocate for bilingual patient advocates, in addition to interpreters, in major health care settings
94) Advocate for access to interpreters and educational materials in Spanish

Cluster 6: More bilingual providers and interpreters (134/752--18% of original responses)
14) Have more bilingual providers
34) Bilingual and bicultural personnel or interpreters who really have a rigorous training

Cluster 7: Culturally and contextually appropriate healthcare (50/752--7% of original responses)
48) Do studies based specifically on Latinos and don't think that we have the same complaints and problems as North Americans
83) Work within a lay health worker model within Latino specific neighborhoods and with clinics

Cluster 8: Respectful and relationship-focused care (49/752--6% of original responses)
49) Be attended as everyone else without inequality
62) Be conscious that even though we are Hispanics we deserve to be treated well

Fig. 4 Healthcare navigation concept map with example responses in each *cluster*. Frequency and percentage of original healthcare navigation responses coded by cluster are included in *parentheses*. USA 2015

Discussion

CM methodology (Kane and Trochim 2007; Trochim 1989) was used in the current study to identify and prioritize contextually relevant strategies to address obesity. The concept maps created a visual representation of the specific intervention strategies generated by over 200 Latinos in our area on three topics: obesity, stress and coping, and healthcare navigation. Taken as a whole, the obesity concept map depicts Cincinnati Latinos as fully cognizant of the personal responsibility and motivation that is required when it comes to healthy eating and exercise as strategies to reduce obesity risks. Cincinnati Latino immigrants are interested in educational programs and information to promote healthy eating and exercise especially within their families and the community. The concept map for stress and coping suggests that Cincinnati Latino immigrants are aware of strategies for stress mitigation including physical activity, family and community support, and professional support services. Primary contributors to stress include challenges to find employment opportunities, cost of living expenses, and immigration status. The concept map for healthcare navigation indicates that Latino immigrants in Greater Cincinnati feel that options for healthcare should be higher quality, be more culturally sensitive, and provide better access points for the community. In particular, they sought increased amounts of services available in their native language and information regarding how they can better utilize high quality and relationship-focused healthcare for themselves and their families.

Across all three concept maps and at the intervention planning session, participants emphasized community-based and relational interventions. This overarching theme is not surprising given the emphasis on *familismo*, "family loyalty, closeness, and getting along with and contributing to the wellbeing of the nuclear family, extended family, and kinship networks" common within Latino culture (Ayón et al. 2010, p. 744–745). A promising evidence-based intervention strategy that is based on the value of family and community, *promotores de salud* (community lay health workers), is culturally relevant, integrated into communities and based on a trusted relationship with peers (Cupertino et al. 2015; Lewin et al. 2007; Tran et al. 2014). Implementing a promoters-based model within the Cincinnati Latino community could provide broad access to resources addressing obesity, stress and coping, and healthcare navigation in a format that would be compatible with the expressed needs of Cincinnati Latino immigrants.

The community-partnered approach utilized in this study was a major strength in that it allowed researchers and community members to pool their respective strengths and move toward collaborative intervention development. A limitation with such an intensive community-partnered approach is a singular focus on Latino immigrants in Greater Cincinnati. Because this study took place in a new migrant location for Latinos, the results are primarily relevant within this context and the conclusions from this study are not intended to generalize to a more established Latino immigrant community. However, CM is a concrete tool that can be transferred to other contexts to engage immigrant and vulnerable communities toward identification of priority health issues and intervention development.

Conclusions

The CM process, implemented with the community, generated specific strategies that are currently being used to

develop health interventions in our local nontraditional destination area for Latino immigrants. Community-engaged research approaches are increasingly recognized for their utility in reducing health disparities, primarily due to their emphasis on inclusion of those communities most directly affected by the disparity to identify problems and potential solutions (Israel et al. 2010; Wallerstein et al. 2011). In addition, community participation in health and intervention development is recognized as essential for improving health outcomes (Farnsworth et al. 2014; Gryboski et al. 2015; Sallis et al. 2008). However, it is not always clear how best to directly engage community members, particularly, immigrant Latinos who have not been involved in the healthcare system and might be distrustful of academic researchers. In the current study, CM methodology provided a unique, community-engaged strategy that allowed our team to collect intervention ideas in the language and context of the participating stakeholders and display the relationship of ideas visually through the concept maps (Vaughn et al. 2016; Vaughn and McLinden 2016). Thus, as a concrete visual tool that led to intervention development, CM was a "practical and concise way to identify and quantify factors affecting implementation, develop conceptual models of implementation, target areas to address as part of implementation readiness and active implementation, and foster communication among stakeholders" (Green et al. 2012, p. 1). The concept maps created in the current study and the subsequent intervention planning session reflect the engagement of the Cincinnati Latino immigrant community, and can therefore be placed in the context of their specific social ecology, experience and values.

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Compliance with ethical standards

Funding This study was funded by a seed grant given by UC LEAF (University of Cincinnati Leadership Empowerment Advancement for Women STEM Faculty), a National Science Foundation ADVANCE grant-funded organization.

Conflict of interest Authors A, B, C, D all declare that they have no conflict of interest.

Ethical approval and consent Because data was anonymous and intended to address health concerns for Cincinnati Latino immigrants, the institutional review board issued a non-human subjects' determination which meant that the study team rather than the institutional review board was responsible for ethical oversight. All study procedures followed ethical standards, and participants consented to respond to the survey.

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