THEORY AND METHODS

Uncovering neighbourhood influences on intimate partner violence using concept mapping

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While neighbourhood influences on the risk of intimate partner violence have been reported, this body of research has suffered from a lack of strong theoretical and conceptual guidance, and few studies have examined the potential pathways from neighbourhoods to intimate partner violence. This paper used concept mapping methods with 37 women who were residents of Baltimore City to obtain cluster maps representing the important neighbourhood domains that affect the prevalence, perpetration, severity, and cessation of intimate partner violence. Domains important for intimate partner severity and perpetration differed from those important for cessation of intimate partner violence. Finally, diagrams of the domains, drawn by the concept mapping participants, illustrated the pathways by which neighbourhood characteristics potentially influence intimate partner violence severity, perpetration, and cessation. These results can be used to generate testable hypotheses regarding neighbourhood influences on intimate partner violence in future quantitative research and to inform the design of public health intimate partner violence programmes.

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Research in the area of neighbourhoods and health has grown exponentially over the past decade[1-4] including a small focus on neighbourhoods and intimate partner violence (IPV).[5-10] In the first published study to use multilevel methods to examine neighbourhood risk factors for IPV, O'Campo and colleagues reported that indicators of neighbourhood socioeconomic position were significantly associated with the risk of IPV with lower neighbourhood socioeconomic position being associated with higher risks of violence during the childbearing year.[7] Subsequent studies of neighbourhoods and IPV have repeated these findings of low neighbourhood socioeconomic position being associated with higher risk of partner violence[5 9] and have extended them to report that high levels of neighbourhood collective efficacy serves as a protective factor against partner violence[6] and high levels of neighbourhood mobility increases the risk of IPV.[9] Taken together, the breath of neighbourhood characteristics examined in relation to IPV is rather narrow and cannot begin to contribute to a comprehensive understanding of how neighbourhoods affect the risk of partner violence, a feature that is shared with the larger literature on neighbourhoods and health.[1] Moreover, few studies have examined outcomes other than perpetration of violence creating a gap in knowledge regarding how neighbourhoods might facilitate cessation of IPV.

Research on neighbourhoods and health, including those concerned with IPV has suffered from a lack of strong theoretical and conceptual guidance[1 3 4] and failure to consult those with "lived experiences" in high risk neighbourhoods. The primary goal of the research presented here was to examine, using methods of concept mapping, the range of neighbourhood factors associated with women's experiences of IPV. We were particularly interested in (1) identifying specific neighbourhood level items and clusters of items that women perceive to be related to IPV, (2) exploring the relative importance of the items and clusters to different IPV outcomes (prevalence, perpetration, severity, and cessation), and (3) understanding the pathways from the neighbourhood items and clusters of items to experiences of IPV.

METHODS

The methodology of concept mapping was used in this study.[11-13] Concept mapping, an innovative qualitative method, provides a conceptual framework for how a group views a particular topic.[12 13] Trochim (1989), describes concept mapping as "a structured process, focused on a topic or construct of interest, entailing input from one or more participants, that produces an interpretable pictorial view (concept map) of their ideas and concepts and how these are interrelated".[13] Concept mapping uses statistical tools to provide rigour and credibility to data generated through qualitative techniques and provides visual products that are comparatively easy to interpret.[11 14] Concept mapping follows a series of structured data collection steps (brainstorming, sorting, rating) that, unlike other qualitative methods group methods such focus groups, are in the control of the participants. Concept mapping incorporates elements of both qualitative and quantitative methodologies to produce a visual display of how a group views a topic. Unlike focus group discussions, concept mapping provides a structured approach for allowing study subjects to both identify issues and participate in the interpretation of their group perceptions.[14 15]

Participants

Participants were drawn from two sources: an ongoing research study that concerned the joint occurrence of HIV infection and IPV[16 17] and a second study that sought to examine the

Table 1 Rating statements used in the ''sorting and rating groups'' for the four IPV outcomes

IPV outcome	Rating statement	Value indicator
Prevalence	Please rate on a scale of 1 to 5 how each item is related to women's experiences of intimate partner violence (IPV). 1 = No relation; 2 = some relation; 3 = moderate relation; 4 = strong relation; 5 = extremely strong relation	Strength of perceived relation between item and IPV
Severity	Please rate on a scale of 1 to 5 how each item might make women's experiences of intimate partner violence (IPV) worse or more severe. 1 = Not make worse; 2 = somewhat likely to make worse; 3 = moderately likely to make worse; 4 = strongly likely to make worse; 5 = extremely likely to make worse	Degree to which item worsens severity of IPV
Perpetration	Please rate on a scale of 1 to 5 how each item is related to a man's perpetration of intimate partner violence (IPV). 1 = No relation; 2 = some relation; 3 = moderate relation; 4 = strong relation; 5 = extremely strong relation	Relation of item to a man's perpetration of IPV
Cessation	Please rate on a scale of 1 to 5 how each item supports women's ability to end intimate partner violence (IPV). 1 = Not supportive; 2 = somewhat supportive; 3 = moderately supportive; 4 = strongly supportive; 5 = extremely supportive	Degree to which item supports cessation of IPV

multiple ways in which IPV can be described and defined. While having experienced IPV was not a criterion for participation, a large proportion of our sample had experienced some type of IPV in her adult lifetime. Most participants from the concept mapping activities were African American, had completed high school or the equivalent, and were over the age of 30 years. All participants (n = 37) were residents of Baltimore City. Further details about the sampling can be found elsewhere.[15]

Data collection activities
The data collection process entailed three primary activities; brainstorming groups; sorting and rating groups; and groups to discuss pathways from neighbourhood factors to experiences of IPV. All data collection activities and materials were approved by the Johns Hopkins Institutional Review Board. While detailed descriptions of the method and the specific data collection procedures for this study are presented elsewhere,[15] we describe each step briefly here as well.

Brainstorming
Two brainstorming discussion groups of about 1.5 hours were held with a total of 14 participants who were asked to generate a list of items that describe ''characteristics of neighbourhoods that could relate in any way, good or bad, to women's experience of IPV.'' To avoid any potential confusion, we provided the participants with definitions of ''neighbourhood'' and ''IPV''. In the groups we told the women, ''We are defining neighbourhood as: a physically bounded area characterised by some degree of homogeneity and/or social cohesion.'' And for IPV we noted, ''Intimate partner violence may include acts that are physically and emotionally harmful or that carry the potential to cause physical harm. IPV may include sexual coercion [forced sex] or assaults, physical intimidation, threats to kill or to harm, restraint of normal activities or freedom, and denial of access to resources. While there are many words or phrases used to describe this—abuse, violence, wife abuse, wife beating—we will use the phrase intimate partner violence or IPV.''

The neighbourhood items lists from the two groups were combined and any duplicates eliminated. We also added five items not mentioned by the women but noted in the literature as being related to IPV: ''income/wealth'', ''people with professional jobs'', ''families with young children'', ''intimate partner violence shelters'' and ''lots of people moving in and out of neighbourhood''. This list served as the set of items to be used in the subsequent sorting and rating groups.

Sorting and rating
Two sorting and rating groups of about 3.5 hours each were held with a total of 37 participants. Several tasks were accomplished in the sorting and rating groups. The participants were asked to sort each of the 51 items generated in the brainstorming groups into piles that made sense to them. Each participant was asked to name or label each pile she generated. Participants were then given four rating sheets, each with a different question posed (see table 1). Each rating sheet listed the 51 items and asked the participants to rate the relative importance of each item to the outcome of interest on a scale of 1 to 5.

Once sorting and rating activities were completed and data entered into the Concept Systems software program, multidimensional scaling and hierarchical cluster analyses were performed to obtain information about the distance of each item to all other items and to create ''clusters'' of items representing conceptual domains. Because the Concept Systems software can perform these analyses quickly, we were able to share these results with the participants to provide them with the opportunity to contribute to the identification of the final cluster solution (that is, fewer or more clusters as well as whether the location of the items were consistent with their own perceptions).

Pathway identification groups
The final group discussions were held with 20 participants for about two hours each to gather additional information regarding the perceived relation between the neighbourhood factors and experiences of IPV. Small groups of three to four participants worked collectively to illustrate in a diagram how items within clusters were related to each other and to IPV that reflected their understanding of how the items in the clusters were related to each other and to IPV.

RESULTS
Neighbourhood characteristics
Table 2 displays the 51 neighbourhood characteristics that our participants perceived to be related to intimate partner violence. Items described a variety of characteristics ranging from descriptions of physical attributes (for example, lots of rubbish, abandoned houses), economic characteristics (for example, poverty, unemployment, income/wealth), attributes of residents (for example, people who do not care, public drunkenness, people who take a stand), resources (for example, community centres, emergency assistance programmes), and beliefs or attitudes of residents (for example, macho attitudes about control) to name a few groupings of items.

Table 2 Fifty one items within their seven clusters and the average ratings for each of the four IPV outcomes

Cluster	Item name (item number*)	Prevalence rating	Severity rating	Perpetration rating	Cessation rating
Cluster 1: deterioration contributors					
	Poverty (40)*	high	high	high	low
	Evictions (38)	moderate	moderate	moderate	low
	Isolated locations (41)	moderate	moderate	moderate	low
	Lots of people moving in and out (51)*	low	low	low	low
	Abandoned houses (27)	low	low	low	low
	Lots of rubbish (6)	low	low	low	low
Cluster 2: negative social attributes					
	People who are hanging out (1)	low	moderate	moderate	low
	Violence (42)	high	high	high	low
	Access to drugs (5)	high	high	high	low
	Unemployment (16)	high	high	high	low
	People who do not care (7)	moderate	high	moderate	low
	Children exposed to drugs on the street (9)	moderate	moderate	moderate	low
	Police that do not care (32)	moderate	high	moderate	low
	Public drunkenness (2)	moderate	high	high	low
	Racial/ethnic segregation (21)	low	low	low	low
Cluster 3: violence attitudes and behaviours					
	Macho attitudes about control (12)	high	high	high	low
	Ignorance about intimate partner violence (3)	high	high	high	low
	People who should know better (4)	high	high	high	low
	Child abuse (36)	high	moderate	moderate	low
	Lay offs (39)	moderate	high	high	low
	Mental illness (11)	moderate	high	high	low
	Absence of adults (10)	moderate	moderate	moderate	low
	Youth homicide/child homicide (37)	moderate	moderate	moderate	low
	Gossip (45)	moderate	moderate	moderate	low
	Single mothers (8)	moderate	low	moderate	low
Cluster 4: stabilisation factors					
	People who intervene themselves (31)	moderate	low	moderate	moderate
	Families with young children (49)*	moderate	low	low	moderate
	Income/wealth (47)*	moderate	low	low	moderate
	Cultural norms (46)	low	low	low	moderate
	People with professional jobs (48)*	low	low	low	moderate
Cluster 5: neighbourhood monitoring					
	People who call 911, the police, authority (30)	moderate	low	low	high
	Job availability (15)	moderate	low	low	moderate
	People who take a stand (29)	moderate	low	low	high
	Alertness/vigilance of people (44)	moderate	low	low	moderate
	Curfew (13)	low	low	low	moderate
	Homeownership (28)	low	low	low	moderate
Cluster 6: communication networks					
	Police presence (23)	moderate	low	low	high
	Churches (24)	moderate	low	low	high
	People who are aware of resources (33)	moderate	low	low	high
	Communication between neighbours (20)	low	low	low	moderate
	Community networks (22)	low	low	low	high
	Neighbourhood meetings (43)	low	low	low	moderate
	Playgrounds (17)	low	low	low	moderate
Cluster 7: community enrichment resources	IPV shelters (50)*	high	low	low	high
	Women's groups (34)	moderate	low	low	high
	Hotlines (25)	moderate	low	low	high
	Outreach centres (35)	moderate	low	low	high
	Emergency assistance programmes (26)	moderate	low	low	high
	Access to public health facilities (14)	low	low	low	high
	Community centres (19)	low	low	low	moderate
	Recreation centres for children (18)	low	low	low	moderate

*These five items were added by the researchers to the original list generated by the participants. These items reflected neighbourhood characteristics that appear in the literature but not explicity mentioned by the participants.

Cluster content

Analysis of the pile sort data facilitated a better understanding of how closely related these 51 items were to each other. Multidimensional scaling and hierarchical cluster analyses of the sorting data yielded point maps and clusters (see table 2 where the content of the clusters can be seen and fig 1 where the clusters are depicted pictorally). Detailed discussions with the participants in the sorting and rating groups facilitated the final seven cluster solution to for the data (fig 1). Participants also helped to name each of the clusters.

Table 2 lists the items in groups of clusters which are briefly described here. Cluster 1: deterioration contributors contains items generally associated with economic disadvantage. Items within cluster 2: negative social attributes focus on social characteristics that are manifested and institutionalised as part of the neighbourhood structure. Present in the cluster are both demographic and crime related factors.
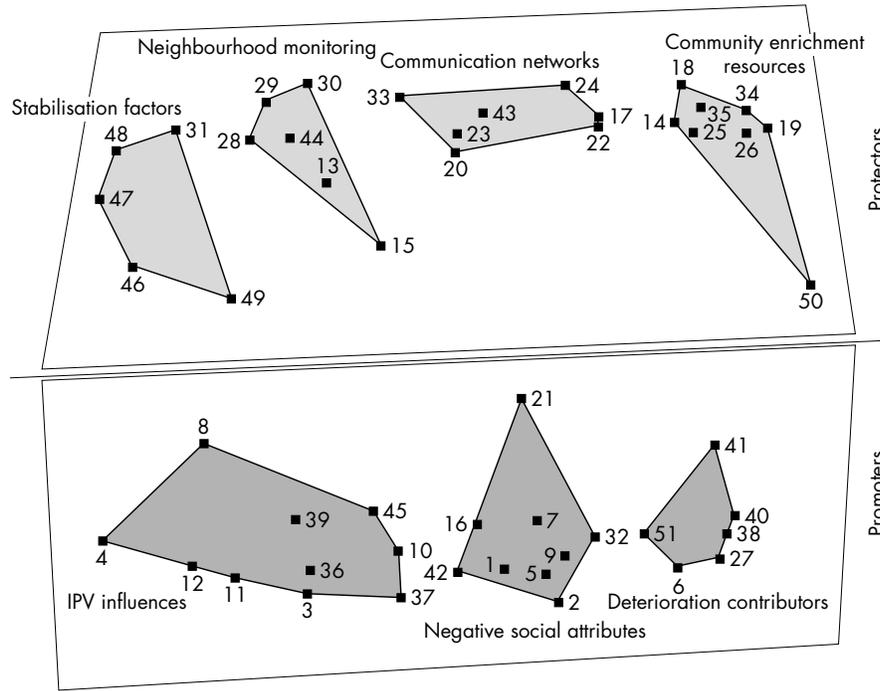
Figure 1 Cluster maps and comparison of map regions—protectors and promotors. These seven clusters are comprised of the 51 items generated in the discussion groups. The numbers within the clusters correspond to the item numbers and do not have any other meaning. The cluster labels were based upon the participants suggested names. The top half of the map identifies items and clusters that are "protective" of perpetration of partner violence while those clusters within the bottom half of the map were seen by the participants as being "promoters" of violence perpetration. Items and clusters in close proximity to each other are conceptually closer than items or clusters which are further apart.

Cluster 3: violence attitudes and behaviour contains items relate to attitudes, ignorance, and capacity to control violence behaviours. Cluster 4: stabilisation contributors consists of five items, three of which were introduced by the researchers to the brainstorming list (see items marked with†). Six items within cluster 5: neighbourhood monitoring relate to having an engaged and active neighbourhood environment. Cluster 6: communication networks items represent the structural characteristics of a neighbourhood that would contribute to increased formal and informal communication between residents. The final cluster, cluster 7: community enrichment resources consists of items that are related to access to services.

Figure 1 shows the clusters pictorially. Items, as noted by item numbers that are noted next to the items listed in table 1, are also seen within the clusters. Similarity between items is illustrated on the map as a physical distance between two points. In general, statements closer together were determined to be more closely related than items further

apart. The clusters fell into two broad categories of "promoters" of and "protectors" from IPV (see fig 1).

Additional discussion of these categories can be found below.

Relative importance

Rating information captured how relevant the participants perceived the items to be for each IPV outcome (prevalence, severity, perpetration, and cessation). The right half of table 2 displays the item ratings across all participants for each of the four IPV ratings—prevalence, severity, perpetration, and cessation. Using the distribution of the ratings, the rating levels were divided into categories of "high" (items rated 3.8 or higher), "moderate", (items rated between 3.7 and 2.9) and "low" (items rated 2.8 or lower). In general, the severity and perpetration ratings are virtually identical. That is, the items were rated as being similarly important for these two outcomes. The prevalence ratings were also similar to those for severity and perpetration. However, for cessation, the ratings were almost reversed compared with severity or perpetration. That is, those items that received a high rating for severity and perpetration received a low rating for cessation.

The ratings also followed what would be expected from the perspective of the clusters falling into the promoter or protector categories. Clusters that were IPV promoters were more highly rated on the perpetration and severity outcomes while clusters that were protectors were more highly rated on the cessation outcome.

Pathways diagrams

The five clusters that rated highly for prevalence (clusters 2, 3, 5, and 7) and the four clusters that were highly rated with cessation (clusters 4, 5, 6, and 7) were discussed in the pathway identification groups. Women in these groups were able to articulate and diagram how several of the items within cluster domains are related to each other and to the IPV outcomes. We share here two of the diagrams from the groups (see figs 2 and 3).

One cluster that was discussed in relation to IPV cessation was cluster 6, "communication networks" (fig 3). If we start
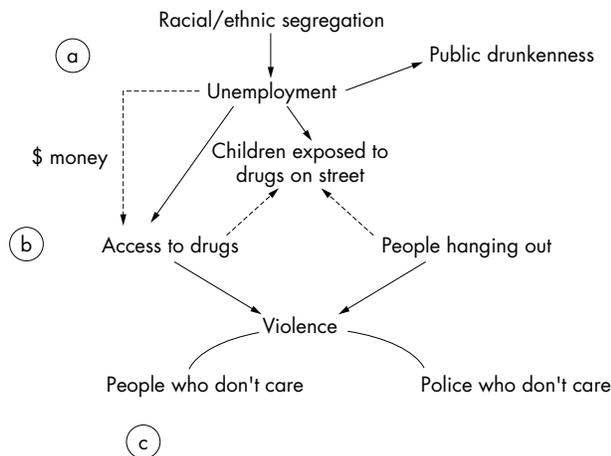

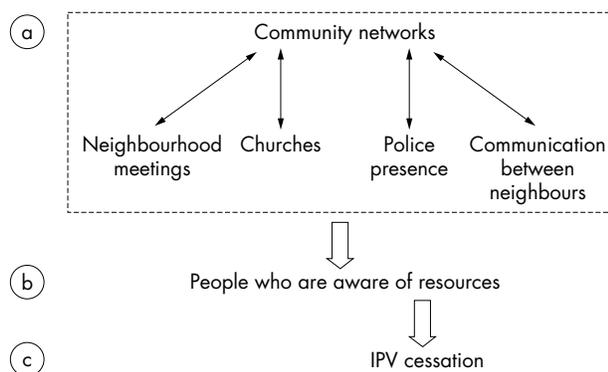Figure 2 Diagram drawn by participants for cluster 6: communication networks.

Figure 3 Diagram drawn by mapping participants for cluster 2: negative social attributes.

at the first set of discussions, (labelled ''a'' in the graph), the participants noted that the items of communication networks, neighbourhood meetings, churches, police presence, and communication between neighbours were all related to each other. Specifically, communication networks were closely linked to the other items as illustrated in the diagram. This cluster of items led to residents who would be ''aware of resources'' for IPV (see area ''b'' of the diagram). Finally, this would eventually contribute to an increased likelihood of IPV cessation for neighbourhood residents. None of the groups that discussed cluster 6 focused on the item of playgrounds.

Figure 3 illustrates the relations within cluster 2, ''negative social attributes''. Unemployment was one of the central organising factors for that cluster (see area ''a'' of the figure). Contributing to unemployment was racial segregation. Unemployment in turn contributes to public drunkenness and access to drugs and to children being exposed to drugs on the street (area ''b'' on the figure). These contribute to violence (IPV) and the violence is also reinforced by people and police who do not care and people hanging out (area ''c'' on the figure).

DISCUSSION

Concept mapping is a qualitative approach with several strengths[15] including the high levels of participation on the part of the subjects in terms of generating the original items or concepts; an emphasis on input from all participants by allowing each subject to sort and rate the items with minimal group discussion or promotion of group consensus; interpretation of the findings by the participants; and in our case, an in depth exploration of the relation of the items within the clusters to each other and to the IPV outcomes of interest. This lay perspective is an important contribution to an improved understanding of how neighbourhoods affect residents' wellbeing and could contribute to the generation of testable hypotheses about how neighbourhoods affect experiences of IPV.

What the paper adds

This paper fills a gap in the literature on multilevel models of residential neighbourhoods and women's health. Specifically, the paper contributes new knowledge about the neighbourhood characteristics that may be important for the perpetration or cessation of intimate partner violence in urban settings. Moreover, the pathways by which neighbourhood factors affect the risk or cessation of intimate partner violence are presented.

Policy implications

- Researcher-community collaborative approaches, using methodologies such as concept mapping, are necessary for the development of meaningful multilevel interventions and programmes.
- Results from this research show that important neighbourhood characteristics, many of which have intervention or policy relevance, are currently absent from existing multilevel neighbourhood and intimate partner violence research.
- Neighbourhood interventions designed to tackle male perpetration of intimate partner violence should target different factors than those designed to address women's ability to end intimate partner violence.

While concept mapping is innovative, there are limitations to this study that we note here. Our sample was almost exclusively African American and primarily low income and previous research has shown that African Americans reside in vastly different types of neighbourhoods than other ethnic minorities and European Americans.[18–22] Our findings may, therefore, be mostly relevant for lower income African Americans residing in urban environments. We conducted these concept mapping groups with women only as we thought that women may differ from men in their perspectives on and experiences with IPV. However, it would be important to gain the perspectives of men on the topic of neighbourhoods and IPV to confirm whether the perceptions of how neighbourhoods influence IPV differ by sex and if so, to get the input of men on this subject.

Our findings have implications for future research on neighbourhoods and IPV. Qualitative studies are seen as important components of the neighbourhood effects literature.[23] While much qualitative research on neighbourhoods provides rich descriptions of historical and social neighbourhood processes, it requires enormous amounts of time to implement and complete. By contrast, concept mapping methods tap into the perspectives of those with ''lived experience'' in neighbourhoods and provides useful information about mechanisms of neighbourhood effects upon health requiring comparatively little time to implement and complete. Secondly, future multilevel studies of neighbourhoods and IPV must expand the characteristics that are examined in relation to IPV including those factors that are important for IPV perpetration and cessation. This is especially important because our data suggest that those items currently under study were not seen as among the most important neighbourhood characteristics for IPV.

The collection of data on neighbourhood characteristics such as intervention by neighbours in situations of IPV, alertness and vigilance of neighbours about IPV, and communication between neighbours about issues of IPV in future research will require creative thinking about how to measure those aspects of neighbourhoods.

Furthermore, it is clear that neighbourhood characteristics differentially affect the outcomes of IPV cessation and IPV prevalence, severity, and perpetration. Our study is the first to examine how neighbourhood characteristics are related to IPV cessation. Consequently, there were several neighbourhood characteristics identified in this study that have not been reported previously as being important for IPV. The availability of resources such as IPV shelters, hotlines, and less obviously, access to public health facilities, women's groups, and recreation centres for children were part of the cluster on ''community enrichment resources''. The

availability of these resources was the most important set of items for IPV cessation. If we are to further our understanding of how neighbourhood characteristics influence the whole range of IPV experiences, future research must focus on both cessation and perpetration of IPV and do so separately.

Not only do our findings provide a potential starting point for informing the generation of specific hypotheses about how neighbourhoods affect IPV but the information can be used for informing the design of interventions. The diagrams generated by the participants illustrate possible interactions between the neighbourhood characteristics. Knowing the pathways and mechanisms by which neighbourhood characteristics exert their influence on people, and whether the effects are direct or are part of a complex set of processes, is critical information for the design of interventions and programmes to tackle IPV. Our findings suggest that those programmes concerned with cessation may differ in their consideration of neighbourhood factors from those programmes tackling IPV prevalence and severity. In summary, our findings yielded information about new characteristics that might be important to consider in future research and programmes concerning IPV.

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