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Social Science & Medicine 65 (2007) 1915–1927

SOCIAL SCIENCE & MEDICINE

www.elsevier.com/locate/socscimed

Health intervention in social context: Understanding social networks and neighbourhood

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Available online 5 July 2007

Abstract

Recruiting lay people from the neighbourhoods of target communities as Community Health Educators (CHEs) is an increasingly popular strategy for health interventions in the UK. CHEs are assumed to have a distinct advantage in reaching 'difficult to reach' groups by virtue of their network membership. However, results obtained from a recent intervention study [Chiu (2002). *Straight talking: Communicating breast screening information in primary care*. Leeds: Nuffield Institute for Health, University of Leeds] raised concerns about the much-asserted efficacy of networks and suggested that neighbourhood was a contextual factor that would potentially affect the results of health interventions. In addition, it suggested that the concept of social networks and other related concepts i.e. 'social embeddedness', 'social capital', and 'neighbourhoods' that underpin CHE interventions needed to be better understood. In order to examine these concepts in relation to CHE interventions, we conducted a pilot study involving 53 CHEs (26 White, 27 Black and Minority Ethnic) in seven health organisations across the UK. The CHEs took part in focus group interviews to explore their perceptions of social networks and neighbourhood. Quantitative information on their personal networks was also mapped using three proformas. This paper explores CHEs' networks with a specific focus on the concept of 'social embeddedness' and the effect of neighbourhood. Implications of these findings on the effectiveness of intervention are discussed.

Keywords: Social networks; Neighbourhood; Embeddedness; Health intervention; Community health educators; UK

Introduction

The significance of context for health intervention has long been recognised. This has been manifested in an increasing number of community-based interventions in public health and health promotion (Shea, 1992). While these interventions were contextualised in community settings, these settings themselves were taken for granted. It appears that 'community' could refer to specific districts, to ethnic groups, to organisations (e.g. hospitals, health centres and general practices) or to a mixture of all three.

In the UK, the relevance of the question, what constitutes 'community-based' intervention, has been reinforced by current neighbourhood regeneration polices aimed at addressing inequalities (ODPM, 2001). This funding stream has given rise to a number of health-oriented area based initiatives (ABI). The Community Health Educator (CHE) Model (Chiu, 2003) which recruits lay people from

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doi:10.1016/j.socscimed.2007.05.035

neighbourhoods to participate in interventions—ranging from capacity building, through promotion of life-style changes to accessing information and services—has flourished by drawing upon such resources. CHE interventions have tended to operate within designated electoral wards, or tied to specific groups of general practices in these wards. CHEs are assumed to have a distinct advantage in reaching 'difficult to reach' groups by virtue of their network membership.

If exploiting CHEs' social networks is a strategy to outreach to minority ethnic and low-income groups (e.g. Chiu, 2002; Lewin et al., 2006), and to address the broader agenda of community capacity building (Bishop, Earp, Eng, & Lynch, 2002), the understanding of social networks and neighbourhood is crucial for understanding the extent to which such interventions can be effective and what outcomes can reasonably be expected from them.

Social networks and CHEs

Although research has demonstrated that social networks can be a determinant of uptake of cancer screening services among some minority ethnic groups (Levy-Storms & Wallance, 2003; Suarez, 1994), and CHE intervention practice to-date has placed an implicit value upon CHEs' natural helping networks (e.g. Bishop et al., 2002; Gotay et al., 2000) in reaching targeted communities, no empirical evidence has been published on how these networks work. This taken-for-granted value of CHEs' natural networks has, however, been challenged by results from a recent intervention study aimed at improving breast screening uptake among four different communities (Pakistani, Bengali, Chinese and White) in the North of England through outreach to non-attenders of designated practices (Chiu, 2002). The study reveals that CHEs, although recruited from their own neighbourhoods, were not always successful in reaching non-attenders of their respective communities. CHEs who were most successful—Pakistani and Bengali—not only came from the targeted neighbourhoods but also appeared to be well connected and trusted within their communities. Both the White (English) and Chinese CHEs reported difficulties in reaching non-attenders from their communities. The reception of the White CHE on the doorstep was often negative and hostile. The Chinese CHEs operation was constrained by the scattered settlement of her community across the metropolitan area, yielding a small number of contacts throughout the project. In response to these results, a pilot study was conducted in Spring 2003 to examine the concept of social networks as it applies to CHE interventions. The study aimed to explore:

- What might be the structure and properties of these networks?
- What do these networks mean to CHEs personally—Are they aware of them and do they utilise them?
- If interventions are neighbourhood bounded, how do CHEs perceive their connections within their neighbourhoods?

Set against a brief summary of the global results of the study, this paper explores CHEs' networks with a specific focus on the concept of 'social embeddedness' and the effect of neighbourhood that impacts on CHEs' operation. Implications of these findings on the effectiveness of intervention are discussed.

Social embeddedness, social capital, and neighbourhood

The conception that CHEs' personal networks overlap with their targeted populations and are nested in geographically bounded neighbourhood networks reflects an assumed linkage between dense network forms and strong neighbourhood. Woolcock (1998) refers to the presence of dense intra-community ties or the degree to which individuals are integrated into their networks as 'embeddedness'; and associates resources with embeddedness and the membership of networks.

The assumption that strong ties in dense networks are a better resource was challenged by Granovetter (1973) who asserted, based on the results of his job-hunting study, that different ties have different values. Strong-ties, usually occurring between kin and family or individuals with whom contact is frequent are important for fostering co-operation, support and co-ordination. Weak-ties such as those with professional contacts and acquaintances are, however, better for collecting information (Chwe, 2000).

Another concept that is closely related to embeddedness is the concept of homophily—which refers to the likelihood that contacts will be more frequent between people with similar attributes. There is much evidence to suggest that the principle of homophily structures for various network ties

e.g. marriage, friendship, work, and support. Among social attributes such as age, sex, and education, race/ethnicity is the most salient dimension of network structure. Networks based on race/ethnicity create the strongest divides in a person's environment and have many implications for information transfer, attitude formation, and social interaction and experiences (McPherson, Smith-Lovin, & Cook, 2001). Given that ethnic divides exist in our urban neighbourhoods, ethnic-matching strategies between CHEs and targeted communities are common in CHE interventions.

Running in parallel with the above different perspectives of social embeddedness is the concept of social capital developed by Putnam (1995), Coleman (1988), and Kawachi, Kennedy, and Wilkinson (1999). Social capital is seen as the value of people's network ties; and trust, reciprocity, information and co-operation are specific benefits that flow from social networks. The different types of social capital, specifically bonding and bridging capital, are closely linked to different types of networks discussed above. Bonding capital is associated with trust, social cohesion, and support arising from social ties between homophilious individuals (Poortinga, 2006). Bridging capital refers to overlapping networks or multiplex-ties in which people like co-workers, parents, and neighbours are linked in more than one context. These linkages are conducive to the generation of strong social capital (Coleman, 1988). The concept of bridging capital resonates with Granovetter's (1973) assertion of the 'strength of weak-ties'. In the discourse upon social capital, cohesion, solidarity, and civic engagement are often positively valued. This collective aspect of social capital provides the platform from which health interventions can pursue a broader agenda of civic engagement (Hawe & Shiell, 2000) through the involvement of lay people in health interventions.

It is precisely the focus upon social cohesion and engagement that has led to the implicit characterisation of communities in classical 'lost' and 'saved' terms. For example, ethnic minority communities are often seen as homogeneous, close-knit and spatially bounded (Cameron & Field, 2000; Thomas, 2003; Van Kempen & Ozuekren, 1998) while the traditional solidary of the white working class is seen to have withered away (Forrest & Kearns, 2001).

The above reflects the Community Question debate in urban sociology (Wellman, 1979). Proponents of the 'lost' concept tended to focus on the negative consequences of weakening social ties in urban neighbourhoods. This view was, however, countered by the 'saved' argument which pointed to the evidence that communal solidarity persisted (e.g. Gans, 1962; Young & Willmott, 1957). Since the 1950s, a more complex conceptualisation of community has been developed. Community is neither 'lost' nor 'saved' but 'liberated' by modern technological development and individualisation processes (e.g. Fischer, 1982; Mann, 1954; Webber, 1970). The 'liberated' argument has shifted the emphasis from physical space to social space in the study of community and called attention to the complex and multi-dimensional relationships between solidarities, territorial ties and the value ascribed to cohesion.

Responding to the Community Question, Wellman (1979) studied intimate and non-intimate ties in East York, Toronto. He suggested that social ties are structural in origin. Close ties were mainly kin, and neighbourhood ties were generally routine non-intimate ties. These ties were embedded in clusters and cliques that greatly facilitate group support and social control. Wellman concluded that communities were neither lost, saved nor liberated but organised and structured as personal networks that 'do many things that communities are supposed to do' (Wellman, Carrington, & Hall, 1988, p. 176).

The rise of the significance of social networks, social capital, and the policy of 'new localism' referred to earlier produce a conundrum facing health intervention—if social networks are representative of communities, does neighbourhood matter? And to whom? Forrest (2000) suggested that it does. But the extent of its significance depends on actors' social and geographical positions. Contextual elements in the neighbourhood can affect the interactions, trust and civic norms that constitute social capital. Empirical evidence has suggested that lack of stability in neighbourhoods and other social-economic, physical, psychological, and cultural features, constrain inhabitants' interactions with each other and their ability to engage in civic activities and to participate in recreational facilities (Cheong, 2003; Kearns & Parkinson, 2001).

The above literature has provided the theoretical resources for our exploration of the relationships between social networks and neighbourhood and health intervention. Wellman's idea of personal

networks has informed the design of our proformas for collecting structural information about CHEs' networks e.g. number of ties with family and friends, clients and work, closeness (intimate) and distance (geographical) of these ties, and whether different networks overlap. If strong and weak ties are both important in different ways, and if individuals' interactions are affected by neighbourhood context, an understanding of CHEs' perception of their neighbourhoods and their level of attachment to them, as well as the perceived patterning of neighbouring behaviours would be important for effective functioning in their roles.

Methods

We surmised that the topography of CHEs' networks and some of the structural properties e.g. embeddedness (overlapping networks) and proximal closeness (neighbourhood bounded), would interact with the demands of the CHE role. The mapping of personal and client networks would, therefore, allow us to examine these structural properties.

The use of a mixed model design (Creswell, 2003; Tashakkori & Teddlie, 1998) offers at least three distinct methodological advantages. First, it enabled us to constitute the CHE's personal (family and friends) and work (clients and colleagues) networks on a descriptive level that associates their personal relations with their work practices (overlaps between these networks). Second, it enabled us to cross-reference the results of quantitative descriptive data and qualitative interpretations, offsetting some of the weaknesses of either approach alone. Third, the integration of interpretations from both the qualitative and quantitative data in analysis enabled us to relate the perception of neighbourhoods to CHEs' intervention practices.

Focus groups and organisations

A total of 53 CHEs were recruited from seven existing intervention programmes across England—Doncaster, the London borough of Ealing and Hammersmith, Sheffield, Leeds, Slough, Essex, and Bradford. These programmes were managed by Primary Care Trusts or Local Authorities; in one case by a voluntary organisation. All programmes were at different stages of development, and at the time the study began only 32 CHEs were active; the others were in training and thus unable to provide data on client contacts.

Each of the seven focus group discussions was recorded and transcribed for analysis. The focus group discussions and the mapping of networks using proformas took place in the same sessions with a short break between these two activities.

Network proformas

Immediately after each focus group discussion, CHEs were asked to map their personal social networks within three domains: family and friends, clients and work. Networks have both a synchronic and diachronic dimension: the synchronic relates to social networks in which people are currently engaged; the diachronic relates to the changing relationships that people establish throughout the courses of their lives. We were interested in individuals' current social networks and therefore invited CHEs to map only contacts with family, friends, clients, and at work within the past few months. Although we did not set out to compare differences between ethnic groups, we found that half of the total CHEs (= 26) were ethnically white (all were English), while the other half (= 27) were from minority ethnic groups, e.g. Pakistani, Chinese, Bengali and African Caribbean.

Data analysis

Qualitative data were analysed using both a manual method and the computer software package Nudist (non-numerical unstructured data indexing searching and theorising).

Quantitative data generated from network mapping were input into SPSS 12.0.1 (Statistical Package for Social Sciences). The data were collected in the form of discrete values. Positive skews were expected and the distribution of the variables was not expected to be normal so non-parametric tests were used throughout. In particular, comparisons were made between White and Black and Minority Ethnic (BME) groups of CHEs using Mann–Whitney U tests (Lehmann, 1975).

There was no priority assigned to either of the data sets but the insight gained from the analysis of qualitative data set off a chain of enquiries that ran 'back and forth' between the two, serving to deepen the interpretation.

Summary of results from the two data sources

The following five main themes emerged from the analysis:

(1) CHEs described their perceptions of social networks as 'commonsensical' yet 'unconscious', 'cognitive' and 'intangible', social networks were seen only to relate to social contacts at work or in community settings. Networks of family and friends appeared to have been taken for granted. Some used 'networking' as a noun to suggest the deliberate creation and use of social contacts for getting information and jobs, arguing that family networks were 'a different issue. They are only [your] ancestors by blood; *networking* is meaningful relationships.' There were different opinions on whether the three types of networks, family, friends and work, could be clearly separated or whether they overlapped, suggesting that many were unaware of either the expectations of them or their own connectivity with 'difficult to reach' members.

(2) The use of social networks in work practices—those CHEs who were new to health promotion work and had little experience in working with the communities tended to present their views of social networks in an abstract manner, while the veteran CHEs often expressed their views through concrete day-to-day experience using examples of their social interactions to illustrate their connectivity. Those whose relationships were more embedded in the local community tended to be quicker to recognise that their personal and client networks overlapped.

(3) Most CHEs saw themselves as carriers of health information, the dissemination of which relied on their social contacts.

(4) Social networks and emotional support—although CHEs recognised that social networks could provide support, this was mainly with reference to emotional support from colleagues in the work setting. However, some were conscious of themselves as a source of emotional support for members of the community.

(5) Embeddedness and neighbourhood—individual CHEs' perceptions of and feelings towards their own neighbourhoods became more marked when neighbourhood networks were discussed. While some were actively engaged with members of community in their neighbourhoods, others exercised personal choice not to become involved in a neighbourhood that was perceived to be hostile. This theme is further explored below.

Many CHEs witnessed changing social, material and cultural conditions that had affected social relationships and networks. The sub-themes of social mobility, inter-racial marriage, migration, and inter-ethnic and inter-generational tensions, emerged from the discussions.

Though mapping data showed a wide variation in individuals' numbers of social contacts, the patterns of CHEs' personal networks in terms of physical distances from different network domains i.e. friends, close/distant relatives, appeared to be very similar. The majority of CHEs had family and friends living close by and most had close ties (median number of such contacts $= 12$; range $= 25$) with either friends or family. However, when CHEs were split into two groups (White and BME), significant differences emerged. Firstly, there was a difference between White and BME CHEs in terms of the geographical distances of close and distant relatives, with BME-CHEs having more close relatives living outside the country but fewer distant relatives living outside the district compared with White CHEs. ($U = 240$, $p = 0.023$). A second result is that BME CHEs tended to have fewer friends and fewer close ties with these friends compared with White CHEs ($U = 178.5$, $p = 0.02$). Their contacts are dominated by family.

Third, we found a significant difference between the two groups of CHEs in how they interact with their team members in the work setting. There was a tendency for White CHEs to report that they both gave advice to and received advice from colleagues ($U = 173.00$, $p < 0.001$), while BME CHEs were more likely to characterise their interactions with colleagues as only receiving advice from them ($U = 257.5$, $p = 0.081$) and perceived a strong socialising element in their work setting ($U = 247.00$, $p = 0.031$).

CHEs' embeddedness was measured based on a simple numerical ratio (see next section for definition). There appeared to be no significant difference between the two groups in their embeddedness ratio ($U = 115.5$, $p < 0.390$, $n = 32$). However, and although this was statistically non-significant, we found that BME CHEs had more clients arising from friends and families (OR = 4.25 95% CI (2.48, 7.30)), suggesting they used their personal networks in the context of their work.

The significant differences found between the two groups on the geographical distance of their close and distant relatives and the size of friendship networks led to an insight that the concept of

embeddedness (the overlaps between CHEs personal networks and their clients) might be more complex and warrant further investigation. Using both data sources, some of these complexities are explored below.

Social embeddedness

In the focus group, when CHEs were asked how they made contact with their clients, many quickly recognised that their personal and client networks overlapped. One White CHE gave an example concerning her own son who was a client of the health organisation in which she worked, and who had contacts with her other clients. Others said that they currently worked with friends who were also friends of their relations.

On closer examination of the mapping data, it was found that among the 32 CHEs who had client contacts, 10 had no family and friends as their clients (not embedded at all), one CHE reported that all 14 of her clients were friends or members of her family (high embeddedness), and seven CHEs worked predominately with 'strangers' but had recently had at least one member of family or a friend as a client (low embeddedness).

In order to explore this further, we hypothesised that the proportion of family and friends as clients within the total client contacts might be a useful measure of how embedded CHEs were: the higher the ratio of family and friends in the client group, the higher the degree of embeddedness of CHEs in their communities and that BME CHE might be more embedded in their respective communities (Fig. 1 illustrates this).

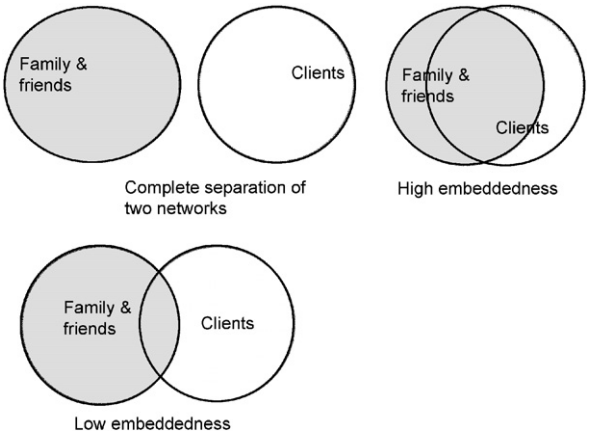

Fig. 1. The conceptual basis for embeddedness scores.

It was found that only 3 out of the 32 CHEs had an embeddedness ratio of 1. There was a wide variation among individuals in the proportion of families and friends involved as clients and no significant difference in the embeddedness ratios between the two groups (Mann–Whitney U score = 115.5, $p = 0.390$, $n = 32$). See Fig. 2.

When referral patterns were examined, BME CHEs were more likely to have clients referred by friends and family, whilst White CHEs tended to have their clients referred through the agencies (OR = 4.25 95% CI (2.48, 7.30)) (Table 1). This suggests that BME CHEs' indirect network ties might be at work. In light of this, our assumptions about 'strangers' in CHEs' client networks and how embeddedness could be measured may need to be modified. Our present way of measuring embeddedness appears to be inadequate to account for the efficacy of non-direct or weak links.

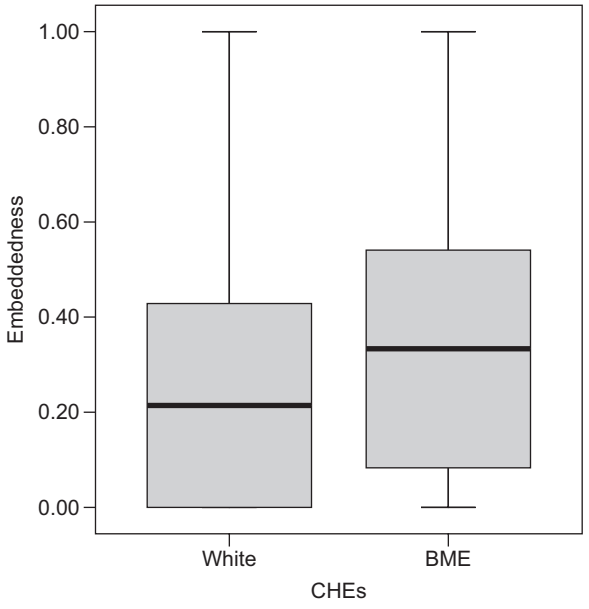

Fig. 2. The degree of embeddedness of White CHEs and BME CHEs.

Table 1
Referral patterns of clients and CHEs

	Friends and family	Agencies
BME CHEs ($n = 19$)	94	36
White CHEs ($n = 13$)	43	70

OR = 4.25 95% CI (2.48, 7.30).

Further complexity of the concept of embeddedness emerged from an exploration of the ties of two outliers. We compared DM:S who was a young White male with a large number of contacts = 52 but average number of clients = 12, with KB:E who was an Asian woman, in her mid forties with 30 contacts and 27 clients. DM:S's embeddedness score was 0.83 while KB:E's score was 0.48. The reason for DM:S's high score was that 10 of his clients were also his friends (two were neither related nor friends). However, all of them were referred to him through a third party, the doctor's surgery where he was based. His position is an example of a 'structural equivalent'. Although he achieved a high embedded ratio, his connectivity is not deemed to be efficacious since many of his contacts were redundant (Burt, 1992).

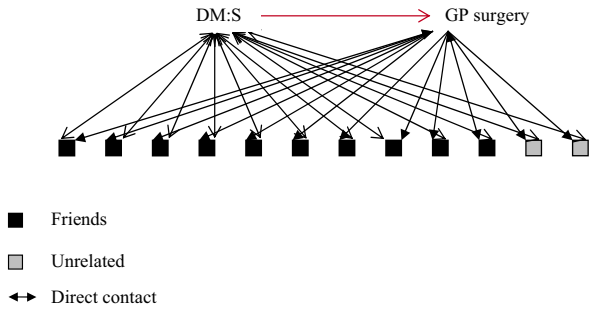

Fig. 3. Embeddedness diagram for DM:S.

Further aspects of this are revealed by the case of KB:E. She had an embeddedness ratio of 0.48, reporting that 13 of her 27 clients were friends and family, of whom seven were members of her family. But the remaining 14 were referred by friends of clients. This indirect connectedness indicates the working of a much more powerful concept of network connection i.e. 'structural holes', a concept which describes a non-redundant relationship between two contacts (Burt, 1992). Without KB:E, the health promotion agency would not have been able to access this client group as none was connected directly to the agency. The following maps of KB:E's and DM:S's networks (Figs. 3 and 4) illustrate this topography.

Figs. 3 and 4 demonstrate that the embeddedness ratio can only be a crude way of determining the potential connectivity of the CHEs. The extent to which they are embedded and how they realise the potential of personal networks in engaging health promotion activities requires further investigation not only of the strength (strong or weak) but also of the structure (e.g. degree of redundancy of contact) of ties.

It is possible that some of the variations found might have arisen from different role expectations

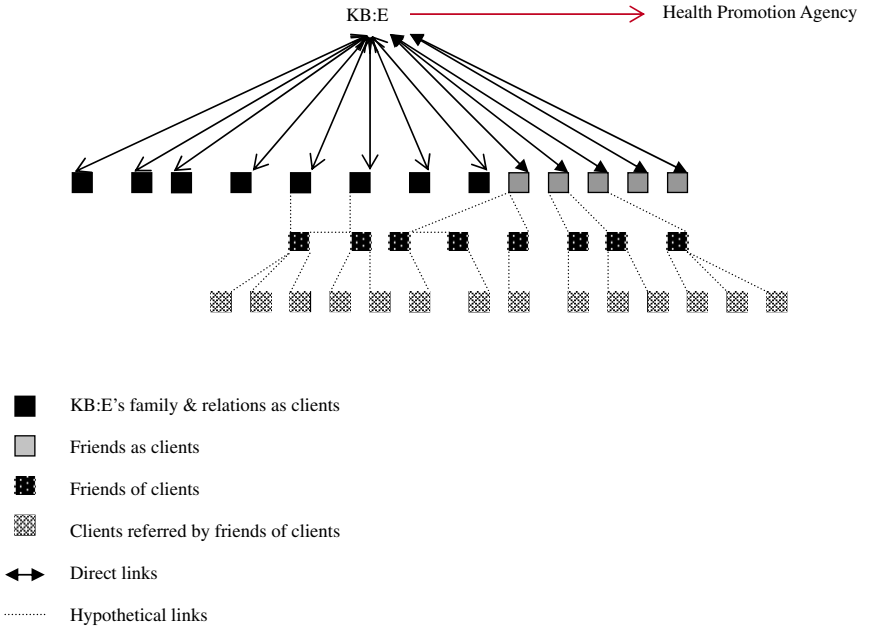

Fig. 4. Embeddedness diagram for KB:E.

and work remits of the CHEs in different organisations. For example, depending on the intervention design, some CHEs might be expected to work predominantly in one-to-one situations (outreach and/or advice work as in the case of DM:S); this would restrict the numbers of clients with whom they could interact and the sources of referrals. Others worked mainly with groups or a mixture of these intervention activities: one would expect the total number of their client contacts to be considerably larger. This alone would affect the embeddedness ratio. Therefore, a meaningful interpretation of degree of embeddedness has to account for the variety of activities of the CHEs within the context of the health intervention, as well as for higher order, indirect topography of networks.

Embeddedness in ethnically mixed neighbourhoods

Differences in network topography between CHEs and the way in which such differences may be affected by neighbourhood context was further explored through qualitative data. In the following excerpts, K:EH is a BME CHE from the Ealing and Hammersmith project that had long recruited CHEs from neighbourhoods whose social and cultural characteristics matched the target community. N:S is a White CHE from a recently established programme in Sheffield, in which the criteria for how workers would engage with local BME groups were unclear. It appears that the N:S had difficulty in engaging with women from the target Yemeni community nearby. The following comments typify the two ends of the spectrum of connectivity.

> BME CHE (K:EH): "…early [in the] morning, we send the children to school and go to work. In the evening we are free so we go to the Temple and tell them, and most of the time we talk to one lady and she is retiring and she told other people [about me]. One lady she was telling me about wanted to come to the Temple … that is how we communicate with each other. They [the Pakistani community] go to the Mosque. If they don't go, *Pavinder* goes to the house and then she explains [in her] friend's house. We explain what we are doing [as CHEs] and especially with ladies, even when we are waiting we say 'where do you live?'. We start talking like that—so that is how we get more friends. And then we tell them about breast screening…"
>
> White CHE (N:S): "The experience I have though, especially with the women-only groups, with the Yemeni ladies, is that sometimes they can't be available for a certain session, and yet I know they have other responsibilities like they may have to go to bridge classes or they may have other classes or their husbands may not let them come and its kind of, yes, why not? I know we know, why not? It's like reducing that peer pressure to actually do something rather than kind of question is your husband [letting you come] or is it your family responsibilities. I think there are other barriers to think about as well."
> Facilitator: "Do you think they are sometimes trying to get out of this by putting too much [emphasis on the] pull from their families?
> White CHE (N:S): "Well from my experience, yes. Just as a typical example my exercise classes when they are going to the gym, once they are there they actually love it but the main question [was getting them there].

The ease with which K:EH could reach members of her community in which she was socially and culturally embedded appears to be an example of the homophily principle at work (Mcpherson et al., 2001). Conversely, racial/ethnic dissimilarity is likely to explain the difficulty N:S encountered with the Yemeni women.

Neighbourhood effects

While examination of CHE's networks tends to support our assumptions about the efficacy of social networks, our analysis also suggests that inter- and intra-network interactions can be constrained by contextual factors such as reputation, social trust and civic norms in the neighbourhood. Not all of the CHEs in our study worked in their own neighbourhoods. Those that did, did not always find it easy. Those that did not, appeared to have actively chosen not to do so. For example, when the subject of neighbourhood networks was discussed, one CHE expressed a strong opinion on individual privacy and was adamant in her decision to keep herself to herself.

> TA:E: "Where I've lived [for] 14 years and I don't know anyone, but I don't want to know anyone. Once I close my door that's it. I don't want to know their businesses. I don't want them knowing mine. You know what I mean. I am a private person, I prefer [to be] discreet."

Choices such as this might have been influenced by the social environment of the neighbourhood. But other, normally untold, reasons for people in social and economically deprived neighbourhoods not wishing to be involved were alluded to by two other CHEs in this group.

> CK:E: "..[Shoebury] it is [at the] end of the line but there is quite a lot of council housing stock out there isn't there? People get sent there maybe [they] don't necessarily want to be there. A lot of single parents, yeah. Not working. Yet you [addressing other CHEs] say there is very little contact between them."
>
> LO:E: "Well because everybody's maybe got a little bit of business here, there and they don't want anybody else knowing because you can't survive on benefit as we all know. So everybody has a bit of work here and there and then they are worried about being shopped [reported to the police] aren't they, I mean that's the reality."

Participants believed that in a place of high mobility with a high proportion of homeless people and refugees, anonymity might confer protection. Contradictory though it might seem, 'keeping oneself to oneself' might be a good survival strategy in an unfavourable and potentially hostile environment. This could be one reason why people in the most deprived areas are 'difficult to reach'. Involvement in social and civic activities such as health projects might not only bring them no benefits, but it might also expose them to a variety of risks.

The above perception stands in sharp contrast with those who were involved in the intervention at Ealing and Hammersmith—an ethnically diverse inner London borough. The following remark, made by one of the participants, demonstrated that her day-to-day activities and social contacts were deeply rooted in her neighbourhood:

> KB:E&H: "I took my friend to hospital. She said, 'Drive me down there'. Where we were going I kept seeing people [from the] association. She said, '[There's] something spooky about you. Everywhere we go everyone knows you'. I said, 'What is wrong with that, I am comfortable with this you know'. But she said 'I am not'. I said 'Well you have to [be], because there is no threat about people. People are nice, they are concerned about things, they ask you about things.' … As soon as I walk out of my house, … people stop by because they trust you, although you might not have enough information to make them believe that this is what is going on, but [they'll say], 'Tell us how are things, what's next,?' It is like shops, your local shops. You meet people. And yesterday I was there about 10 minutes and I talked to about 6 people, and that is a nice feeling."

This insight into the possible impact of the social environment of different neighbourhoods upon how individual CHEs engage with their respective communities is complemented by the quantitative analysis of embeddedness ratios between the two districts, Ealing and Hammersmith and Essex. Using a one-sided test, we found that CHEs in Ealing and Hammersmith had higher embeddedness ratios than CHEs in Essex (Mann–Whitney $U = 4.5$ one-sided t test $p = 0.04$; Mean Rank E&H = 7.36 $E = 3.63$). However, due to the small sample size in this study, this link can only be described as tentative.

Changing social conditions and neighbourhood

Two different views about how social mobility affects relationships and individual autonomy emerged. They echo the 'lost' or 'liberated' arguments of the classic community question discussed above (Wellman, 1988). While the young White CHEs (mostly graduates) felt positive that their mobility had enabled them to broaden their horizons and outlooks on life, the older BME CHEs perceived mobility as weakening family and social relationships.

> UD:B: "More of a community when they all came over they were supporting each other economically or financially or emotionally."
>
> SK:B: "But it is changing. They are not just getting married; they want to get out."
>
> UD:B: "I mean working in the community for the last 25 years I have seen changes. When I started in early 70s, people used to live with extended families, no matter you had 8 children you stayed in the same house. Now I have seen 3rd generation in 25 years. I have seen the father, they used to bring the daughter and now the daughter is bringing… So the second generation stayed with the extended family living in the same [house] and now the third generation they are not even buying a house in the same street, they are leaving and preferably going to Keighley or Shipley outside. So I have seen changes and not

the same ideas—not support family closeness—they don't want that… They are saying 'I need space'."

Migration is another phenomenon that raises anxiety among some participants. One CHE perceived that her work would become increasingly difficult as a result of the language and cultural diversity of incoming migrant groups.

CP:B: "There is the Seven Day Adventists and then the Baptist, United, and now within Bradford we have got African people that come in, asylum seekers and refugees so there are issues around… Well I started to… build relationships but there are issues around African people from Africa and [the] Caribbean. People think they are the same but there are differences as well and especially around language. Because a lot of African people speak French [and] there are a vast number of languages that are in the African community. Within the African and Caribbean community, I think there is only one language [other than English] which is Dominican but the majority of Jamaicans speak English."

It appears that in Ealing and Hammersmith, because of the historical experience of migration and changing ethnic composition of the population, CHEs felt that they had been living in a cosmopolitan neighbourhood for a long time, and that people had learnt to live with each other. However, outside London, particularly in Essex, where the increase of asylum seekers was acutely felt by residents, CHEs detected a rise of racism. Living in an atmosphere of antagonism and social hostility, they perceived a fragmented neighbourhood and questioned whether social networks existed at all.

Social interaction in neighbourhood

Some participants felt that the conditions of modern day life were not congenial for building social links locally. For example, one participant remarked, "Because we are all rushing out to work—I think, we all live such busy lives; my neighbours are in and out to work. You say hello, as you sort of pass perhaps, and that's as far as it goes." However, others did see that people in the neighbourhood were linked by virtue of living in the same locality, and these links were often activated in time of personal or collective crisis such as illnesses, crime and natural disasters like floods. The remark below exemplifies the social support that can be expected from neighbours in times of crisis against a background of routine convivial exchange (Wellman & Wortley, 1990).

J:E: "Most of my neighbours are older and [on] sort of nodding [acquaintance] and we have a little chit-chat every once in a while. I never realised just how good they were until I had to be off work for quite a long time and they really rallied round and they were brilliant [in] getting my shopping. People in their 70's were going out getting my shopping."

The above exploration of CHEs' social networks and how they operate within them through the concept of embeddedness illustrates an 'inside–out' approach to looking at community-based intervention. It emerges that a high embeddedness ratio might not guarantee effective connectivity if the number of redundant contacts in the network is high. It appears that the structures of ties i.e. structural holes and structural equivalence might be determinants of efficacy, highlighting the complex ways in which social networks can be conceived i.e. both in tie strength and structure, and the shifting boundaries within which the notion of embeddedness is defined. Wider social change was perceived as having impacts on neighbourhood, with significant effects on how CHEs operate. In some settings, there is evidence to suggest that the morphology (e.g. ethnicity, language, culture, and socio-economic status) of CHEs personal networks is structured in the neighbourhood context. The effectiveness of CHEs' intervention might be influenced by the interplay between the topography of their networks and features of the neighbourhood.

Discussion and conclusion

This paper has presented findings from a study of CHEs' social networks, focussing on an exploration of the concept of embeddedness and the role of neighbourhoods in structuring relations and social practices in the context of health interventions. Although the results from this study are necessarily preliminary, they nevertheless provide insights into the much-asserted efficacy of the social networks of CHEs, and have implications for the effectiveness of community-based interventions. Theoretical and methodological lessons can also be drawn from this pilot study.

In order to improve the design, implementation and evaluation of such interventions, the development of social network research and the developing knowledge base should be drawn upon critically to provide a clear conceptualisation for intervention design. It is evident both from research literature and practice on the ground that this is not the case at present.

To understand social embeddedness of CHEs' personal networks is to understand aspects of social structure, cohesion, and solidarity of different communities.

The prevailing assumption that CHEs' personal networks are ethnically and neighbourhood-bounded has influenced intervention design, reflecting the persistent views of communities as either 'lost' (weakening ties among white working class) or 'saved' (flourishing ties among minority communities) in contemporary Britain. Comparison of the topography of CHEs' social networks between White and BME groups and exploration of their embeddedness suggests that the picture is more complex, reflecting the diversity of urban neighbourhoods and mobility histories and settlement patterns of ethnic groups. While newer migrant groups are likely to stay closer together for one or two generations following migration, diffusion eventually occurs due to socio-economic pressure, opportunity, and cultural change. Depending on which ethnic groups are targeted, interventions that put strict boundaries round wards or practices might unwittingly constrain some CHEs' ability to mobilise their network resources, leading to disparate outcomes.

Examination of individual CHEs' degree of embeddedness and network ties, raises questions about the interpretation of these ties for practical interventions.

Understanding of the forms of social capital embedded in ties is needed before intervention can exploit CHEs' personal networks appropriately. For example, the purposes of the interventions involved in this study ranged from improving access to information and/or services to broader commitment to community health development. Successful implementation of such a wide spectrum of activities requires that CHEs recognise the degree and nature of their social embeddedness and the interplay between social ties of different strengths in which the different forms of social capital are embedded (Cattell, 2001; Wellman & Wortley, 1990). CHEs need to be able to maximise the benefits of the influence afforded them by strong ties, such as trust and reciprocity (bonding capital) within their respective communities while cultivating the weak ties formed with institutions and organisations through their participation in health promotion activities. Acting as a link between health organisation and communities and forming intra-community ties (bridging capital) might be beneficial both to individuals and communities.

Despite evidence suggesting that social ties are less important in the neighbourhoods (Guest, 2000; Wellman et al., 1988), the case of BME CHE:K:E presented above shows the potential effectiveness of the property of 'structural holes' found in her personal networks. Recruitment of CHEs might be improved by attending to such properties rather than simply seeking a high degree of embeddedness that may yield little effective connectivity as demonstrated by the case of the DM:S. However, it has to be recognised that although loose networks might help to reach more clients, health promotion skills are necessary to bring about behavioural or developmental change in the community.

Social attributes e.g. ethnicity, language, cultural characteristics and socio-economic status are some of the descriptors of the morphology of social networks (Schaffer & Wagner, 1996), and are unlikely to be isomorphic with the topography of personal networks. However, in a multi-ethnic neighbourhood, racial/ethnic homophily appears to be a salient dimension that structures networks and that CHEs' ethnicity may be a significant factor affecting connectivity. The failure of the White CHE in our study to recruit Yemeni women to her exercise classes suggests that multi-ethnic teams of CHEs, matching the demographic profiles of the localities, might be a more effective strategy for improving uptake of services.

The finding that psychological and socio-economic features of neighbourhood significantly influenced how CHEs operate reminds us that social relations are structured by material conditions. The deliberate choice of some CHEs not to work in their own neighbourhoods for fear of hostility demonstrates the adverse effect of neighbourhood reputation on CHEs' practice. In such circumstances, the objective of a broader agenda of engagement and participation might be unattainable if it is unsupported by economic and social regeneration aimed at improving people's material conditions and the extent of partnership working across agencies. A participatory research approach would be necessary for the

design of evaluations of such a broad-based interventions, of which health interventions would be only a part. Indicators for improvement should not be confined only to behavioural or life-style changes but should include the extent of participatory praxis (Chiu, 2007) achieved over time.

The fact that neighbourhood varies in scale i.e. 'home area', locality, urban district or region, and has different dimensions for its inhabitants i.e. connectedness, familiarity and predictability, and social identity (Kearns & Parkinson, 2001) add to the complexity of how personal networks are structured. In mapping networks, we made crude judgements in terms of physical distance of network ties. This omission of detail is a major limitation of this exploration of the effects of neighbourhoods

Theoretical concepts associated with social networks and social capital are often broad and difficult to operationalise. Our attempt to measure social embeddedness by virtue of the overlaps between two network domains has proven to be crude. It did, however, provide us with a starting point from which to explore some of our assumptions. Everybody is embedded within networks, and these networks are nested within wider social structures (Wellman et al., 1988). Methodologically, the operationalisation of embeddedness will need to be developed, and much more work will need to be done to understand network research before interventions can fully benefit from it.

Acknowledgement

The pilot study was funded by the NHS Portfolio Research Programme at the University of Leeds. The authors would like to thank all the participants and organisations involved in the study.

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