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Social capital and health in the least developed countries: A critical review of the literature and implications for a future research agenda

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Research on the linkage between social capital and health has grown in recent years; however, there is a dearth of evidence from resource-poor countries. This review examines the association between social capital and physical health (including health behaviours) in the least developed countries (LDCs). Citations were searched using three databases from 1990 to 2011 using the keyword 'social capital' combined with the name of each of the 48 LDCs. Of the 14 studies reviewed, 12 took place in Africa and 2 in South Asia. All used cross-sectional study designs, including five qualitative and nine quantitative studies. The literature reviewed suggests that social capital is an important factor for improving health in resource-poor settings; however, more research is needed in order to determine the best measures for social capital and elucidate the mechanisms through which social capital affects health in the developing world. Future research on social capital and health in the developing world should focus on applying appropriate theoretical conceptualisations of social capital to the developing country context, adapting and validating instruments for measuring social capital, and examining multilevel models of social capital and health in developing countries.

Keywords: least developed countries; social capital; physical health; health behaviours; review

Introduction

Social capital – a broad term including social relationships, networks and values that facilitate collective action for mutual benefit – is one of the most popular concepts from sociology to be applied to public health. Since the mid-1990s, research on the linkage between social capital and health has grown exponentially (Kawachi, Subramanian, & Kim, 2008). Critics of the recent emergence of social capital claim that it does not contribute any new sociological ideas and that public health researchers have a tendency to combine a variety of different social phenomena under the label of 'social capital' (Kawachi et al., 2008; Portes, 1998). On the other hand, social capital has been cited as an interdisciplinary concept that can unite researchers with disparate interests under a common theme (Wakefield & Poland, 2005). Although there are differing opinions about the usefulness of the social capital construct, there has been evidence of the consistent use of specific components of social capital across a variety of studies (Kawachi et al., 2008; van Deth, 2003). This review proposes that social capital is a useful and important area to explore in global public health because (1) it has been linked to lower levels of mortality

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and better self-rated health (Kim, Subramanian, & Kawachi, 2008); (2) it can provide a theoretical basis for assessing the impact of community-based health promotion programmes (Murayama, Fujiwara, & Kawachi, 2012; Thomas-Slayter & Fisher, 2011) and (3) it can be used by the poor as a primary means of protection against risk and vulnerability (Carroll, 2001). Before examining the literature on social capital and health, it is important to review the current theoretical conceptualisations of social capital in public health.

Theoretical conceptualisations of social capital

The concept of social capital was originally developed by two renowned sociologists, James Coleman and Pierre Bourdieu. Coleman emphasised the trustworthiness of the social environment, which gave rise to three mechanisms through which social capital is generated: reciprocity exchanges, privileged access to information and group enforcement of norms (Coleman, 1988). These mechanisms function as group attributes that allow the individual to achieve his or her interests within a network. Coleman also discussed the negative aspects of social capital that could limit innovation when an individual adheres to group norms.

Bourdieu (1986) developed the idea of social capital in the context of thinking about how social inequalities reproduce themselves in society. He made a clear distinction between two elements of social capital: (1) the social relationships within the network that the individual can draw upon to access resources and (2) the amount and type(s) of resources possessed by individuals in the network (Bourdieu, 1986). In contrast to other definitions of social capital, there is a deliberate emphasis on the content of the resources accessible to individuals within the network. This emphasis creates the potential for negative aspects of social capital as well, namely by excluding specific individuals from accessing resources within a network (Bourdieu, 1986; Carpiano, 2006).

Although Coleman and Bourdieu advanced the theory of social capital, political scientist Robert Putnam popularised it with his work in Italy and the USA. Putnam (1993) suggested that when individuals develop connections with one another, these relationships help develop positive behaviours and attitudes that benefit society. These positive collective attributes include interpersonal trust, civic engagement and norms of reciprocity. Although Putnam's concept of social capital shares similarities with the theories established by Coleman and Bourdieu, he has been criticised for not paying attention to the negative aspects of social capital (Portes, 1998). Nonetheless, Putnam's collective conceptualisation of social capital has dominated the way in which this sociological construct has been translated into public health research (Moore, Shiell, Hawe, & Haines, 2005).

In order to better understand the differences between the various conceptualisations of social capital, there has been an effort to categorise the theories mentioned above based on (1) whether it is considered an individual or a collective attribute (Kawachi et al., 2008; Portes, 2000); (2) whether it is empirically measured as structural or cognitive social capital (Harpham, Grant, & Thomas, 2002) and (3) whether it is composed of bonding, bridging or linking social ties (Szreter & Woolcock, 2004).

First, Coleman and Bourdieu focused on individuals or small groups as the units of analysis with the benefits of social capital accruing to individuals or families through their connections with others (Portes, 2000). According to this framework, social capital is seen as an individual attribute that is measured as a resource that individuals can access through their social networks (Kawachi et al., 2008). By contrast, Putnam extends the

concept of social capital to communities and even nations (Portes, 2000). According to this framework, social capital is seen as a collective attribute where the amount of social capital in a community has the potential to benefit the community as a whole (Carpiano, 2006). Most agree that individual and collective social capital should both be measured because they have been found to have different associations with health (Harpham, 2008); however, a recent review of the literature shows that associations at the individual level are stronger when compared to the same indicator at the collective level (Kim et al., 2008). Distinguishing between these two conceptualisations of social capital is also important because they require the selection of different study designs and analytical techniques.

Second, it is important to differentiate between structural and cognitive forms of social capital because they have been shown to affect health outcomes in different ways (De Silva & Harpham, 2007). Structural social capital focuses on what people 'do' (e.g. group membership and civic participation) and is often objectively verified by assessing individuals' actions and behaviours. Cognitive social capital focuses on what people 'feel' (e.g. social trust, reciprocity and effective norms) and is often subjectively verified by assessing individuals' attitudes and perceptions. To date, evidence suggests that there are stronger associations between health and trust (cognitive social capital) when compared to associational membership (structural social capital) (Kim et al., 2008). These two different forms of social capital should continue to be measured together because they both contribute to the understanding of social capital.

Third, building upon Putnam's theory of social capital, the distinction was made between different types of social ties: bonding, bridging and linking (Szreter & Woolcock, 2004). Bonding capital refers to strong ties to family and friends resulting in a densely knit social network where individuals are alike in terms of their social identity (e.g. race, class, age, place of residence). Bridging capital, by contrast, refers to weak ties to acquaintances where there is little social involvement between people who are typically not alike in terms of their social identity. Linking capital is a type of bridging capital where the relationship not only cuts across socio-demographic differences but the individuals also differ with respect to power and authority gradients in society (Szreter & Woolcock, 2004). The distinction between these types of social ties allows for the examination of negative outcomes within close-knit communities with high levels of bonding capital, which can restrict individual freedom and promote the intolerance of diversity (Portes, 1998).

Social capital and health in developing countries

There is limited evidence from developing countries regarding the conceptualisation of social capital and the relationship between different forms of social capital and health, with the majority of the studies taking place in the industrialised country context (Harpham et al., 2002; Kim et al., 2008). A systematic review of social capital and mental health found 21 studies, of which only two were set in developing countries (De Silva, McKenzie, Harpham, & Huttly, 2005). Although mental health studies offer insights for thinking about physical health, there has not been a review of social capital and physical health (including health behaviours) focused on the developing country context. Social capital is of particular importance to physical health in developing countries because of their lack of human and financial capital. Specifically, the 48 countries that are currently classified as the least developed countries (LDCs) by the United Nations have great potential to benefit from the various forms of social capital due to their low income, weak

human resources and high economic vulnerability (United Nations, 2011). This paper aims to: (1) provide a critical review of studies examining the association between social capital and physical health in the LDCs and (2) suggest future research directions for social capital and health in the developing world.

Methods

Search strategy and selection criteria

This review includes all studies in English that explored the concept of social capital in the LDCs. Citations were searched using three databases for the period between 1990 and 1 June 2011: PubMed, Web of Science and POPLINE. All searches included the keyword 'social capital' in the title or abstract combined with the name of each of the 48 LDCs. Consistent with Kim et al. (2008), other terms that are similar to social capital by definition – 'social cohesion', 'social support' and 'social networks' – were not included in this search because the author was interested in how the developing world conceptualised and applied the term 'social capital' in research related to health and health behaviours. The search was limited to the LDCs because they are a clearly defined set of countries that represent the poorest and weakest segment of the international community (United Nations, 2011).

According to the initial PubMed search, only 39 of the 1066 articles on social capital (3.7%) took place in one of the 48 LDCs. The citations search from Web of Science and POPLINE contributed an additional 53 articles, for a total of 92 articles. Each article identified was evaluated for inclusion in the review based on the following criteria: (1) the study was empirical in nature; (2) the outcome of interest was related to physical health or health behaviours (studies focused on mental health were excluded from this review) and (3) the study attempted to measure social capital. Based on this set of criteria, 14 studies were reviewed.

Results

General study characteristics

From each study, the author abstracted the study authors and year of publication; sample size and country/setting; analytic strategy (qualitative, multivariate regression or multi-level analysis); conceptual framework (implicit or explicit application of individual/collective, structural/cognitive or bonding/bridging/linking forms of social capital); measures of social capital and health/health behaviour and the construct validity for those measures (weak, intermediate or strong); factors included as covariates in statistical models; and individual- and area-level effect estimates for social capital. The latter two factors were not abstracted from the qualitative studies because statistical models with covariates and effect estimates were not used. Due to the lack of standardised measures of social capital, the assessment of construct validity was based on the congruence between the variable(s) used to measure social capital and the conceptual framework (or lack thereof) applied to the study. Of the 14 studies reviewed, 12 took place in Africa (11 in East and Central Africa, one in West Africa) and two took place in South Asia (both in Bangladesh). All used cross-sectional study designs, 11 of which collected primary data. Ten studies assessed individual-level social capital and two studies assessed social capital as a collective attribute (the other two studies were not clear about the level of attribution). Only seven studies made explicit reference to structural/cognitive or bonding/bridging/linking social capital. The analytic methods included five qualitative

and nine quantitative studies, one of which used a multilevel approach. Of the nine quantitative studies, all attempted to contextualise the measurement of social capital; however, only two mentioned the validation of the social capital survey instrument. Tables 1 and 2 display the key characteristics and findings stratified by the health outcome from the quantitative and qualitative studies, respectively.

Sexual health

Of the 14 studies reviewed, six of the studies addressed the topic of sexual health. Five of the six studies used regression analysis to determine the association between social capital and sexual health behaviours. Agardh, Emmelin, Muriisa, and Ostergren (2010) explored the relationship between social capital and sexual behaviour among university students in Mbarara, Uganda. The study focused on distinguishing between trust with people who have a close relationship with the respondent (bonding capital) and trust with people who have a different background than the respondent (bridging capital). They found that individuals with low levels of bonding capital were less likely to always use a condom with a new sexual partner and individuals with low levels of bridging capital were more likely to have a high number of lifetime sexual partners. Erulkar and Ferede (2009) examined the effect of social exclusion (lack of social capital) on sexual debut among out-of-school females in three poor, urban areas of Ethiopia. The authors defined social exclusion by the number of friends each respondent had, the level of social support from the community and social participation in community groups or clubs. They found that the odds of a female's first sexual encounter being coerced were two times greater for females who were socially excluded when compared to those who were not excluded. Paek, Lee, Salmon, and Witte (2008) applied a multilevel model to examine the effect of social capital on the use of family-planning (FP) methods in Uganda. Measures of cognitive social capital (e.g. trust, social cohesion, reciprocity, social norms) were used at both the individual and village level. The findings revealed that individual-level social capital was not a significant predictor of FP behaviour. At the contextual level, social capital had a negative, but non-significant, effect on FP behaviours after cross-level interactions were included in the model. Djamba (2003) studied the association between household-level social capital and individual sexual behaviours in the Democratic Republic of Congo. He derived his conceptual framework from Coleman's model of social capital (Coleman, 1988) and found that the number of children in a household (the indicator used to measure social capital) was positively correlated with the initiation of premarital sexual activity. In a prior study by Djamba (1997), which took place in Zambia, he found that the same measure of household-level social capital was not associated with premarital sexual activity.

In the only qualitative study on sexual health, Larsen (2010) examined the cultural practice of labia elongation – the extension of the labia during the first signs of puberty – as a mechanism through which social capital was created in Rwanda. She suggested that the harmful cultural practice of labia elongation increased social capital by enforcing social norms (cognitive social capital) and strengthening social ties within the community (bonding capital). This type of social capital had the potential to lead to negative consequences as well, such as socially isolating females who refuse to or are unable to take part in labia elongation.

Table 1. Quantitative empirical studies on social capital, health and health behaviours in the LDCs.

Author(s) and year	Country and sample size	Analytic strategy	Conceptual framework	Social capital measures and construct validity	Health/health behaviour measures	Covariates	Estimates for social capital
Sexual health							
Agardh et al. (2010)	Uganda, 980 college students	Multivariate logistic regression	Individual attribute; explicit application of bonding and bridging forms of social capital	Trust in others (4-item score), bridging trust (5-item score), social participation; Construct validity: Intermediate	Previously had sex, number of lifetime sexual partners, condom use with new partner	Area of origin, educational level of household head, the role of religion in the family, age, sex	*(1) Trust in others:* Previously had sex: OR = 1.0 High # of sexual partners: OR = 1.0 Did not always use condom: OR = 1.6* *(2) Bridging trust:* Previously had sex: OR = 1.1 High # of sexual partners: OR = 1.8* Did not always use condom: OR = 1.0
Erulkar and Ferede (2009)	Ethiopia, 1837 out-of-school females ages 10–19	Multivariate logistic regression	Individual attribute; implicit application of bonding and cognitive social capital	Social exclusion (3-item score: no friends, no community support, no group participation); Construct validity: Intermediate	Sexual initiation before age 15, non-consensual sexual debut	Education, orphanhood status, marital status, alcohol use, migrant status, being a domestic worker	*(1) Social exclusion:* Sexual initiation<15: OR = 1.10 Coerced sexual initiation: OR = 1.99*
Paek et al. (2008)	Uganda, 350 adults over age 18	Multilevel regression	Individual and collective attribute; implicit application of cognitive social capital	*Individual level:* Social capital (6-item score: cohesion, trust, informal social control, reciprocity, enforcement of norms, social participation) *Village level:* Aggregate of individual-level score; Construct validity: Strong	*Individual level:* Current use of a FP method	*Individual level:* Age, gender, education level, religion, number of living children, perceived barriers to FP, perceived benefits of FP, self-efficacy, gender norms, exposure to health-related radio programmes, interpersonal communication *Village level:* Gender norms, exposure to health-related radio programmes, interpersonal communication	*(1) Social capital (individual level):* FP behaviour: β = 0.05 *(2) Social capital (village level):* FP behaviour: $\beta = -0.42$

Table 1 (*Continued*)

Author(s) and year	Country and sample size	Analytic strategy	Conceptual framework	Social capital measures and construct validity	Health/health behaviour measures	Covariates	Estimates for social capital
Djamba (2003)	Democratic Republic of Congo, 2000 women ages 14–24	Multivariate analysis using discrete-time event-history procedure	Individual attribute; implicit application of cognitive social capital	Number of household members from age 0 to respondent's age; Construct validity: Weak	Premarital sexual activity	Age, education, religion, religiosity, self-esteem, kinship, ethnicity, financial capital, human capital, residence, exposure to media, contraceptive and AIDS knowledge	*(1) No. of household members:* Premarital sex: $\beta = 0.08$*
Djamba (1997)	Zambia, 1379 never-married teenagers 15–19 years of age	Multivariate logistic regression	Individual attribute; implicit application of cognitive social capital	The number of all children, 0–19 years of age; Construct validity: Weak	Premarital sexual activity	Age, education, religion, residence, media exposure, financial capital, human capital	*(1) 3–6 children:* Premarital sex: $\beta = -0.07$ *(2) 7+ children:* Premarital sex: $\beta = 0.18$
Maternal and child health							
De Silva and Harpham (2007)	Ethiopia, 1756 mothers of 1-year-old children	Multiple linear regression	Individual attribute; explicit application of cognitive and structural social capital	Structural social capital (membership of groups, civic involvement, social support); cognitive social capital (trust, social harmony, perceived fairness, sense of belonging); Construct validity: Strong	Child nutrition status (height-for-age *z*-score, weight-for-age *z*-score)	*Child factors:* Sex, age, breastfeeding practice *Maternal factors:* Education level, age, marital status, religion, ethnicity, # of occupational activities, socio-economic status (SES) status *Household factors:* Poverty group, household composition *Contextual factors:* Place of residence	*(1) Member of 2+ community groups:* Height-for-age: $\beta = -0.08$ Weight-for-age: $\beta = 0.12$ *(2) Talked and joined citizenship activities:* Height-for-age: $\beta = 0.21$ Weight-for-age: $\beta = 0.07$ *(3) Support from 2+ individuals:* Height-for-age: $\beta = 0.26$* Weight-for-age: $\beta = -0.05$ *(4) Cognitive social capital:* Height-for-age: $\beta = 0.27$* Weight-for-age: $\beta = 0.24$*
Fantahun et al. (2007)	Ethiopia, 209 under-5 deaths and 647 referents	Conditional logistic regression	Individual attribute; implicit application of cognitive social capital	Social capital (5-item score: ability to borrow money, membership of the *Kebele* leadership, membership of community organisations, trusting people, thinking that people can hurt); Construct validity: Intermediate	Child mortality	Household economic status, household decision-making, maternal age, maternal literacy, number of pregnancies, absence of windows in house, immunisation status	*(1) Social capital score:* Under-5 child mortality: OR = 1.9*

Table 1 (*Continued*)

Author(s) and year	Country and sample size	Analytic strategy	Conceptual framework	Social capital measures and construct validity	Health/health behaviour measures	Covariates	Estimates for social capital
Self-rated health							
Nilsson et al. (2006)	Bangladesh, 1031 elderly persons age ≥ 60	Multivariate logistic regression	Individual attribute; implicit application of structural social capital	Individual level (4-item score: daily contact with children, household decision-making, visits neighbours, spends time with friends), community level (2-item score: community organisation membership, voted in last election); Construct validity: Weak	Self-rated quality of life	Age, marital status, household economic status, education	*(1) Individual-level social capital:* Quality of life: OR = 1.7* *(2) Community-level social capital:* Quality of life: OR = 1.9*
Sirven (2006)	Madagascar, 587 households	Probit models controlling for endogeneity	Individual attribute; implicit application of cognitive and structural social capital and explicit application of bonding social capital	Associations, collective actions, network involvement, traditional ceremonies; Construct validity: Strong	Self-rated health	Income, health (total expenditures dedicated to health, water quality, latrine quality), gender, age, education, household size, place of residence	*(1) Associations:* Self-rated health: ME = 0.167 *(2) Collective action:* Self-rated health: ME = 0.420* *(3) Ceremony:* Self-rated health: ME = 0.426 *(4) Network:* Self-rated health: ME = 0.416*

*$p < 0.05$

Table 2. Qualitative empirical studies on social capital, health and health behaviours in the LDCs.

Author(s) and year	Country and sample size	Analytic strategy	Conceptual framework	Social capital measures and construct validity	Health/health behaviour measures	Description of social capital findings
Sexual health						
Larsen (2010)	Rwanda, 56 people (doctors, men, women)	Qualitative analysis of individual interviews and focus group discussions	Level of attribution unclear; explicit application of bonding and cognitive social capital	Dissemination of information, enforcement of social norms, social support, reciprocity exchanges; Construct validity: Strong	Labia elongation, general sexual health	'The networks, reciprocities and trust that arise from the highly communal act [of labia elongation] amounts to social capital' (p. 823).
HIV and other infectious diseases						
Frumence et al. (2011)	Tanzania, 3 cases (villages), consisting of 29 key informant interviews and 120 participants	Case study analysis of key informant interviews and focus group discussions	Level of attribution unclear; explicit application of structural and cognitive forms of social capital	Structural social capital (the needs of vulnerable groups being served, new opportunities for participation created, increased enrolment by women) and cognitive social capital (formalised membership rules, strict conduct fostered, religious norms and values); Construct validity: Strong	Sexual behaviour changes (number of sexual partners, frequency of casual sex, abstinence until marriage among youth, demand for condom use)	'… structural and cognitive social capital contributed to changes in behaviour, specifically the number of sexual partners, instances of casual sex, abstinence until marriage among youth, and demands for condom use' (p. 8).
Frumence et al. (2010)	Tanzania, 3 cases (villages), consisting of 29 key informants, 120 community members	Case study analysis of key informant interviews and focus group discussions	Collective attribute; explicit application of cognitive, structural and bonding, bridging and linking social capital	Structural social capital (including bonding, bridging and linking), cognitive social capital; Construct validity: Strong	HIV prevalence	'People's participation in social groups (structural social capital) and the rules, values, norms, trust, and solidarity (cognitive social capital) that were developed by these groups influenced HIV transmission through changing risk behaviour' (p. 19).

Table 2 (*Continued*)

Author(s) and year	Country and sample size	Analytic strategy	Conceptual framework	Social capital measures and construct validity	Health/health behaviour measures	Description of social capital findings
Ware et al. (2009)	Nigeria, Tanzania, Uganda; 158 AIDS patients, 45 treatment partners, 49 health care providers	Ethnographic methods using category construction from individual interviews	Individual attribute; implicit application of structural social capital	Resources from social networks; Construct validity: Weak	Adherence to ART	'A more complete explanation [for ART adherence] highlights the role of social capital in relationships as a resource for prioritising adherence and overcoming economic obstacles to care' (p. 46).
Edgeworth and Collins (2006)	Bangladesh, 208 adults	Qualitative analysis of structured questionnaires, semi-structured interviews and focus group discussions	Individual attribute; implicit application of cognitive and structural social capital	NGO membership, household relations, village networks; Construct validity: Intermediate	Self-care for diarrhoeal disease	'Findings from this study reinforce the idea that widespread diffusion of preventive and basic curative health messages through NGO and Government of Bangladesh health personnel, and regular interaction with CHWs has served to increase households' capacity to recognise, diagnose and undertake appropriate forms of treatment in response to diarrhoea' (p. 2693).

HIV and other infectious diseases

There were three studies related to HIV treatment and support and one study related to the treatment of diarrhoeal disease. All four studies used qualitative methods to explore the relationship between social capital and health. Using grounded theory to develop their theoretical model, Frumence, Eriksson, Nyström, Killewo, and Emmelin (2011) studied how structural and cognitive forms of social capital (e.g. group membership, trust and social norms) may have influenced the progression of the HIV epidemic in three villages of Tanzania. Although it was unclear whether the study defined social capital as an individual or collective attribute, they found that both aspects of social capital protected against HIV infection by expanding access to formal and informal networks and empowering vulnerable groups to practice safer sexual behaviours. In a prior study, Frumence et al. (2010) examined the relationship between social capital and HIV prevalence using the same measures of social capital in the same three villages in Tanzania. They discovered that both cognitive and structural social capital were more pronounced in villages with high and medium HIV prevalence rates when compared to the village with low HIV prevalence rates. Ware et al. (2009) examined the relationship between social capital and adherence to antiretroviral treatment (ART) in three public HIV-treatment settings in Nigeria, Tanzania and Uganda. They found that an individual's social relationships were a 'critical resource' for supporting adherence to ART and managing economic hardship through overcoming stigma related to HIV as well as accessing resources to improve adherence. Edgeworth and Collins (2006) explored the role of social capital in assisting individuals and households during times of self-care treatment of diarrhoeal disease in rural Bangladesh. This study suggested that self-care treatment of diarrhoeal disease was successful when an individual had access to social and human capital assets, including health information, social support and resources, such as oral rehydration solution.

Maternal and child health

The two studies that addressed the topic of maternal and child health focused on child nutrition status and child mortality. De Silva and Harpham (2007) examined the association between maternal social capital (structural and cognitive) and child nutritional status in four developing countries: Peru, Ethiopia, Vietnam and India (only data from Ethiopia was considered in this review). The study showed that women in Ethiopia had high levels of group membership, high participation in citizenship activities and high levels of cognitive social capital. However, only cognitive social capital was significantly associated with both higher height-for-age and weight-for-age *z*-scores. Fantahun, Berhane, Wall, Byass, and Högberg (2007) studied the relationship between mothers' and caretakers' social capital (e.g. group membership and trust) and child mortality in Ethiopia. The authors claimed that low individual social capital scores were related to high child mortality; however, the selection of referent cases during data collection and the inclusion of all significant bivariate associations in the final regression model made it difficult to interpret the findings related to social capital and child mortality.

Self-rated health

Two studies addressed the topic of self-rated health. Nilsson, Rana, and Kabir (2006) investigated the association between social capital and self-rated quality of life among older adults in rural Bangladesh. Although the authors distinguished between

individual-level social capital and community-level social capital, both forms of social capital were measured at the individual level. The study showed that low levels of individual social capital (e.g. social relationships) and low levels of community social capital (e.g. civic participation) were significantly associated with poor quality of life when compared to high levels of each form of social capital. Sirven (2006) examined social capital (e.g. group participation and collective action) as a mediating factor in the pathway between the effect of income on self-rated health in rural Madagascar. This study utilised sophisticated analytic methods to analyse the individual effect of social capital on health and its mediating effect in the income-health causal pathway. Both endogenous (predicted by wealth of household) and exogenous forms of social capital were found to have a significant effect on improved self-rated health.

Discussion

Although research on the relationship between social capital and health has grown in recent years, there is a dearth of evidence from the developing world. The literature reviewed above suggests that social capital is a construct that can be applied across cultural contexts and has the potential to improve health in resource-poor settings. However, it is difficult to make decisive conclusions about the relationship between social capital and health due to the different types of indicators used to assess social capital, the variability in the quality of the social capital measures and the analytic methods used in each study. The first two studies related to sexual health revealed significant associations between the lack of social capital (as measured by relationships with their peers) and risky sexual behaviours (Agardh et al., 2010; Erulkar & Ferede, 2009), which suggests that social exclusion is associated with risky sexual behaviours. However, due to the use of cross-sectional study designs in these two studies, it is possible that the directions of the associations were reversed, such that the practice of risky sexual behaviours led to social isolation.

The latter three studies on sexual health used drastically different measures to assess social capital and showed mixed results. Paek et al. (2008) did not find a significant association between measures of cognitive social capital as defined by Putnam (1993), whereas Djamba found a marginal association between Coleman's (1988) definition of social capital in one study (Djamba, 2003), but no significant relationship in the other study (Djamba, 1997). All of the studies related to HIV and other infectious diseases were qualitative in nature (Edgeworth & Collins, 2006; Frumence et al., 2010/2011; Ware et al., 2009). Although these studies each assessed social capital in a unique way, they all revealed that participation in social groups had a positive effect on the social norms related to sexual behaviour and compliance with treatment. The direction of the association in the HIV prevalence studies suggested that an increase in HIV led to an increase in social capital, where social organisations were created in high HIV prevalence communities in order to cope with the effects of the epidemic (Frumence et al., 2010).

The strongest and most consistent associations between various measures of social capital and health come from studies that examined health outcomes rather than health behaviours. Measures of cognitive social capital were associated with increases in child nutrition status (De Silva & Harpham, 2007) and decreases in child mortality (Fantahun et al., 2007). Improvements in self-rated health (Nilsson et al., 2006; Sirven, 2006) were each significantly associated with higher levels of cognitive and structural social capital, including social relationships with friends and neighbours, membership in community organisations, involvement in social networks and collective actions. Again, it is difficult

to infer the direction of the association in the studies that examined child mortality (Fantahun et al., 2007) and quality of life (Nilsson et al., 2006). For example, the death of a child may result in depression and social isolation, whereas poor quality of life may inhibit the ability of individuals to develop social relationships. Although these studies differentiate between the health effects of different forms of social capital, more research is needed in order to determine the best measures for social capital and elucidate the causal mechanisms through which social capital affects health in these settings.

Study limitations

There were three major limitations to the studies that used quantitative methods. First, all of the studies used retrospective, cross-sectional data, which limited their ability to make causal inferences about the association between social capital and health. Second, the indicators used to measure social capital were different for each researcher and only two of the studies validated the measure of social capital using psychometric methods (De Silva & Harpham, 2007; Fantahun et al., 2007). This further complicates the ability to make comparisons about social capital across studies and supports the claim that there is a lack of consensus about the measurement of social capital (Harpham, 2008). Third, social capital is often conceptualised as a collective attribute that should be measured at the aggregate level (Harpham, 2008); however, only two studies explicitly measured social capital at the contextual level (Frumence et al., 2010; Paek et al., 2008).

There were two primary limitations to the studies that used qualitative data and purposive sampling. First, the results of these studies were not generalisable to any other setting due to the non-random selection of study participants. Second, the retrospective nature of each study limited the potential to make causal inferences about the relationship between social capital and health. In and of itself, qualitative research should not be dismissed as an appropriate methodology when studying social capital and health. Qualitative methods provide in-depth insights into potential mechanisms of action and improve internal validity (for a particular context) at the expense of limited external validity to other contexts.

Future research implications

In order to help overcome the limitations of the existing research and set a future global agenda for research on social capital and health in the developing world, three research priorities are proposed.

(1) Examine the theoretical conceptualisation and operationalisation of social capital in the developing country context

The most appropriate theoretical conceptualisation of social capital in the developing world draws upon concepts introduced in the development literature, namely bonding, bridging and linking social capital (Szreter & Woolcock, 2004). First, in many developing countries, strong intra-community ties (bonding capital) can lead to conformity to traditional norms and restrict individual freedom (Portes, 1998). This is especially true among certain ethnic and religious groups where behavioural norms can discourage the use of health care (Islam, Merlo, Kawachi, Lindström, & Gerdtham, 2006). On the other hand, bonding relationships can promote the use of health services by generating resources from close family and friends. It is important to understand the behavioural

norms and resources embedded within these bonding relationships in order to accurately assess the association between social capital and health.

Second, diverse, inter-community networks (bridging capital) can give individuals in developing countries better access to resources and information, as well as more opportunities to voice their claims and negotiate support (Carroll, 2001; Harpham et al., 2002). This is especially true for marginalised individuals who can benefit from opportunities to associate with individuals from different socio-economic and cultural backgrounds. Therefore, individuals with greater access to bridging relationships are more likely to have the necessary knowledge and resources to practice healthy behaviours.

Third, a form of bridging social capital that connects people across explicit power gradients in society is called linking capital (Szreter & Woolcock, 2004). Relationships between communities (or community members) and representatives of formal institutions such as health care providers, teachers and government officers can help leverage resources, ideas and information, especially in poor communities (Woolcock, 2001). This form of social capital has the greatest potential to not only improve health in the developing world but also to reduce disparities in health and health care. Future research in the developing world should consider using the bonding, bridging and linking social capital framework to conceptualise social capital as well as create reliable operational measures of these three forms of social capital that can be compared across time and context.

(2) Adapt and validate social capital assessment tools for the developing country context

Most generic survey instruments used to measure social capital are not validated in different cultural settings. Given that the same question about social capital may be interpreted differently in different cultural settings, there is a need to validate social capital survey instruments in each new cultural setting. De Silva et al. (2006) adapted the Social Capital Assessment Tool for four developing countries using psychometric methods, such as factors analysis and cognitive interviewing. However, this is the only known example of an instrument that has been adapted and validated for use in developing countries. They implore researchers to continue to validate the social capital survey instruments in different cultural settings in the future.

There is also a need to continue to search for 'valid, directly observable, collective, ecologic indicators' of social capital (Harpham, 2008). These types of indicators, also known as integral variables, differ from derived variables (another type of group-level variable) in that they are not aggregate measures of the characteristics of individuals in the group (Diez-Roux, 2002). Examples of integral variables include the existence of certain laws, population density or characteristics of the infrastructure. Very few studies have attempted to measure integral variables that accurately represent social capital. It is important to continue to develop instruments that measure aspects of social capital that are relevant to the developing country context (at the individual and community level) as well as validate the instruments that are already in use.

(3) Design sampling strategies to account for the multilevel effect of social capital on health

In order to account for the contextual impact of social capital on individual health behaviours and health outcomes, the study of social capital in public health typically uses a multilevel framework (Carpiano, 2006; Kawachi et al., 2008). This model-based

approach provides two advantages over a traditional design-based approach: (1) it allows the researcher to demonstrate whether social capital has an independent contextual effect on individual health outcomes, over and above the characteristics of individuals belonging to the social group and (2) it allows researchers to test for cross-level interactions between community-level social capital and individual characteristics, such as SES and ethnicity. Multilevel analysis of social capital is directly applicable to developing countries; however, very few data-sets exist in the developing world with this level of information. There is a need to design multilevel sampling strategies to analyse collective attributes, like social capital.

Conclusion

Population health in the developing world has the potential to benefit from efforts to improve social capital. This includes access to appropriate resources and the capability to benefit from those resources through social relationships within and between communities and organisations (Szreter & Woolcock, 2004). In order to encourage policy-makers and development assistance organisations to invest in innovative ways to strengthen social capital, it is imperative to build an evidence base for the effect of social capital on health in developing countries, especially for complex health issues such as HIV and AIDS (Thomas-Slayter & Fisher, 2011). Future research on social capital and health in the developing world should focus on applying theoretical conceptualisations of social capital that can be compared across contexts in the developing world, adapting and validating instruments for measuring social capital, and designing sampling strategies to collect multilevel data on social capital in developing countries.

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