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Evidence of social network influence on multiple HIV risk behaviors and normative beliefs among young Tanzanian men

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ABSTRACT

Research on network-level influences on HIV risk behaviors among young men in sub-Saharan Africa is severely lacking. One significant gap in the literature that may provide direction for future research with this population is understanding the degree to which various HIV risk behaviors and normative beliefs cluster within men's social networks. Such research may help us understand which HIV-related norms and behaviors have the greatest potential to be changed through social influence. Additionally, few network-based studies have described the structure of social networks of young men in sub-Saharan Africa. Understanding the structure of men's peer networks may motivate future research examining the ways in which network structures shape the spread of information, adoption of norms, and diffusion of behaviors. We contribute to filling these gaps by using social network analysis and multilevel modeling to describe a unique dataset of mostly young men (n = 1249 men and 242 women) nested within 59 urban social networks in Dar es Salaam, Tanzania. We examine the means, ranges, and clustering of men's HIV-related normative beliefs and behaviors. Networks in this urban setting varied substantially in both composition and structure and a large proportion of men engaged in risky behaviors including inconsistent condom use, sexual partner concurrency, and intimate partner violence perpetration. We found significant clustering of normative beliefs and risk behaviors within these men's social networks. Specifically, network membership explained between 5.78 and 7.17% of variance in men's normative beliefs and between 1.93 and 15.79% of variance in risk behaviors. Our results suggest that social networks are important socialization sites for young men and may influence the adoption of norms and behaviors. We conclude by calling for more research on men's social networks in Sub-Saharan Africa and map out several areas of future inquiry.

1. Introduction

Social networks shape health and health behaviors by providing opportunities for social influence, comparison, support, and engagement (Berkman et al., 2000). Social influence, the process through which an individual's beliefs or behaviors are affected by others, is thought to occur through social norms, modeling of behaviors and consequences, and through social rewards and sanctions (Latkin and Knowlton, 2015). Social norms provide important information on perceived or actual prevalence (descriptive norms) and appropriateness (injunctive norms) of behaviors among peers (Cialdini et al., 1990) and encourage the adoption of norms and behaviors that are common and/or socially acceptable. Individuals may also be driven to adopt beliefs or behaviors through the observation of others, or modeling, and by reflecting on the consequences of that behavior (Bandura, 1977). Additionally, network members may reward individuals or punish transgressions against the norm.

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Social networks have been shown to influence a number of HIV risk behaviors including condom use (Barrington et al., 2009), sexual partnership concurrency (Yamanis et al., 2015), early sexual debut (Ajilore, 2015), as well as drug use and needle sharing (De et al., 2007; Lakon et al., 2006). These studies have highlighted the important role that peer characteristics (Ajilore, 2015), perceived descriptive norms of network members (Barrington et al., 2009), network structure and composition (De et al., 2007), as well as the interaction between network closeness and descriptive norms (Yamanis et al., 2015) may play in shaping HIV risk behaviors.

Despite the advances in our understanding of network influence on HIV-related behaviors, research on peer network influences on HIV risk and protective behaviors among young men in sub-Saharan Africa is severely lacking. Existing network research in the region has described sexual networks (Helleringer and Kohler, 2007) and has focused on examining network influences on perceptions of risk of AIDS (Helleringer and Kohler, 2005; Kohler et al., 2007). Other recent network studies in the region have examined network influences on condom use, but have been conducted with sub-groups of higher-risk men like men who have sex with men (MSM) (de Voux et al., 2015; Nelson et al., 2015). One notable exception is a recent study examining network effects on sexual partner concurrency among young men in Tanzania (Yamanis et al., 2015). This study found that men in more tightly connected networks were more likely to behave according to their peer network's concurrency norms. These results suggest that network-level characteristics are an important source of influence on young men's sexual behavior in this context.

The lack of network research on HIV-related behaviors among sub-Saharan African men is critical because young men are essential targets for HIV prevention in the region. This is because men often have more power within their sexual relationships (Jewkes et al., 2010) and also because men's low rates of healthcare utilization have important implications for ongoing antiretroviral treatment as prevention efforts (Mills et al., 2012). The lack of research on network influences on men's HIV risk and protective behaviors in the region is also important because men's HIV-related behaviors and beliefs are shaped by influential factors at multiple levels and intervening effectively requires an understanding of these multilevel influences (Kaufman et al., 2014). A systematic review of behavioral HIV prevention interventions for young people in sub-Saharan Africa found that many interventions were ineffective in part because they predominantly focused on changing knowledge and attitudes as opposed to utilizing a broader ecological perspective to identify and target other determinants of risk (Michielsen et al., 2010). Many theoretical perspectives, including social learning theory (Bandura, 1977), theory of normative social behavior (Rimal and Real, 2005), and structural theory of social influence (Friedkin, 2006) suggest that peer groups are a major source of influence on individual behavior. We need to understand whether and how peer networks are related to both risk and protective HIV-related behaviors in this context in order to inform the development of innovative, sustainable, and empirically based multi-level interventions that are needed to effectively prevent HIV (Latkin and Knowlton, 2005).

Understanding the degree to which multiple HIV risk behaviors and normative beliefs cluster within naturally occurring social networks may provide direction for future research that is needed to inform multilevel intervention approaches. This would increase our understanding of the degree to which men's friendship groups tend to share the same behaviors and normative beliefs. The reason that friends might hold similar beliefs or engage in similar behaviors could be that individuals are influenced by the behaviors and/or beliefs of their peers and change to conform to their peer (i.e. social influence). Under these conditions, interventions could leverage these social influence processes to encourage and reinforce behavior change through network-based interventions targeting popular or central network members. Alternatively, friends may share similar beliefs and behaviors because individuals seek out peers that are similar to them (i.e. social selection or homophily) (McPherson et al., 2001). In these cases, normative interventions targeting opinion leaders may not be as effective because new ideas may have difficulty gaining traction within networks (Valente, 2010). However, homophily may speed diffusion of new behaviors once these behaviors sufficiently permeate the networks because these groups tends to be characterized by high levels of trust and communication (Valente, 1995). Thus, understanding the clustering of normative beliefs and behaviors may help us understand which norms and behaviors have the greatest potential to be socially influenced.

Finally, few network-based studies have previously described the structure of social networks of youth in sub-Saharan Africa. As a result, we know little about the average network structure or ranges we might expect to find with regard to the structural characteristics of naturally occurring networks of youth. The structure of social networks is important to future research because the patterns of relationships between individuals can be used to understand how direct and indirect ties affect health behaviors.

To fill these gaps, we use social network analysis and multilevel modeling methods to describe a unique social network dataset of mostly men (n = 1249 men and 242 women) nested within 59 randomly selected social networks locally referred to as “camps” in Dar es Salaam. These camp-based social networks have a stable membership and form to socialize and support one another (Yamanis et al., 2010). Sociocentric network studies, studies of complete social networks, are ideal for assessing the structural characteristics of networks (Marsden, 2002). Because closed social groups with clear boundaries are needed to collect sociocentric network data, camp-based social networks in Dar es Salaam are aptly suited for this method of analysis.

The purpose of this study is to improve our understanding of the structure and composition of young men's peer networks as well as the levels of HIV-related risk behaviors and normative beliefs of these young men. We specifically examine the means, ranges, and clustering of men's normative beliefs (including attitudes towards condom use, attitudes towards multiple concurrent partners, attitudes towards intimate partner violence, and gender equitable norms) and behaviors (including sexual activity, age at first sex, lifetime number of sexual partners, past-year number of sexual partners, consistent condom use, sexual partner concurrency, IPV perpetration, alcohol use, and HIV testing) within their naturally occurring social networks. In particular, the aims of the study are to: 1) describe the composition and structure of the social networks enrolled in an on-going cluster-randomized intervention trial, 2) examine the means and ranges of men's network-level normative beliefs and behaviors, 3) assess the degree to which camp network membership explains variance in men's normative beliefs and behaviors, and 4) discuss the implications of our findings for future research.

2. Methods

Data for this study come from an on-going cluster-randomized HIV prevention trial with youth who socialize in urban social networks locally referred to as “camps”. Previous research with camp networks found that camps are semiformal groups who socialize regularly in a fixed location (Yamanis et al., 2010). Individuals described the support they receive from their fellow camp members when dealing with challenges including finding work and