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Social networks and future direction for obesity research: A scoping review

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ABSTRACT

Despite significant efforts to decrease obesity rates, the prevalence of obesity continues to increase in the United States. Obesity risk behaviors including physical inactivity, unhealthy eating, and sleep deprivation are intertwined during daily life and are difficult to improve in the current social environment. Studies show that social networks—the thick webs of social relations and interactions—influence various health outcomes, such as HIV risk behaviors, alcohol consumption, smoking, depression, and cardiovascular mortality; however, there is limited information on the influences of social networks on obesity and obesity risk behaviors. Given the complexities of the biobehavioral pathology of obesity and the lack of clear evidence of effectiveness and sustainability of existing interventions that are usually focused on an individual approach, targeting change in an individual's health behaviors or attitude may not take sociocontextual factors into account; there is a pressing need for a new perspective on this problem. In this review, we evaluate the literature on social networks as a potential approach for obesity prevention and treatment (i.e., how social networks affect various health outcomes), present two major social network data analyses (i.e., egocentric and sociometric analysis), and discuss implications and the future direction for obesity research using social networks.

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Introduction

Overweight or obesity—one of the most preventable causes of morbidity and mortality in the United States (Stobbe, 2010)—contributes nearly 17% to total U.S. medical costs (Cawley & Meyerhoefer, 2012). By 2030, the prevalence of overweight in the U.S. population will increase to 86%, and 51% of these individuals will be considered obese (Wang, Beydoun, Liang, Caballero, & Kumanyika, 2008). By 2050 one in three U.S. adults could have type 2 diabetes (Stobbe, 2010). Similarly, a significant number of people could develop an obesity-related condition such as nonalcoholic fatty liver disease, stroke, and other cardiovascular diseases (CVDs; Strazzullo et al., 2010; Tsuneto et al., 2010). As a result, obesity-related morbidity and mortality are expected to increase in the future (Adams et al., 2006; Stobbe, 2010). Despite significant efforts to reduce obesity, modifiable risk factors such as the rates of physical inactivity, high-fat and high-calorie food consumption, and sleep deprivation in the United States continue to increase.

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Interventions to reduce and prevent obesity have not been successful. Obesity interventions provided in clinical rather than community-based settings often show very low participation rates. Even in community-based physical activity interventions, the dropout rate is up to 50% (Dishman, 1998; Young & Stewart, 2006). In addition, most weight loss interventions that include physical activity or dietary components show short-term effects, but the majority of participants regain weight within 5 years of the intervention (Perri & Corsica, 2002). Given the complexities of the biobehavioral pathology of obesity, accumulating data show that simultaneously changing multiple health behaviors is crucial to preventing and effectively tackling obesity (Cawley & Meyerhoefer, 2012; Marshall & Rue, 2012; Stobbe, 2010; Troxel et al., 2010), but there is a lack of clarity regarding which combination of strategies is the most effective and sustainable. These obesity risk behaviors—physical inactivity, unhealthy eating, and poor sleep behavior (e.g., voluntary or involuntary sleep deprivation)—are intertwined with each other during daily life and are difficult to improve without considering the contextual factors of the social environment (Jackson, 2003; Swinburn & Egger, 2002).

There are many challenges to adopting healthy behaviors, especially in the current social environment (e.g., increased portion sizes, proliferation of fast food restaurants, and reduced opportunities for physical activity; Table 1; Institute of Medicine, 2006). Recent findings suggest that social networks, the webs of social relations and interactions (Smith & Christakis, 2008), may also contribute to obesity risk behaviors. Social networks have a powerful influence on many health behaviors with negative influences on HIV risk behaviors, alcohol consumption, and smoking through social influences and person-to-person contact (Berkman, Glass, Brissette, & Seeman, 2000; Bohnert, Bradshaw, & Latkin, 2009; Booth et al., 2011; Latkin et al., 2009; Seo & Huang, 2012). In contrast, social networks positively influence depression and CVD through social support (Berkman & Glass, 2000; Berkman et al., 2003; Luppino et al., 2010). Obesity is a risk factor for depression or CVD (Luppino et al., 2010), which also may be influenced positively or negatively by social networks (Berkman & Kawachi, 2000; Berkman et al., 2003); however, knowledge of the relationship between obesity risk behaviors and social networks is very limited.

Table 1 – Challenges to Adopting Healthy Behaviors in the Current Social Environment

- Increased portion sizes, "supersizing" of commercially available foods
- Access to energy-dense foods in schools and work (e.g., high-energy dense snacks and sugary drinks sold in vending machines)
- Proliferation of fast-food restaurants
- Difficulties to obtain nutritious food in low-income communities because of a lack of supermarkets and limited access to healthy, fresh food
- Advertising of less healthy foods
- Two or more televisions in most households
- Use of labor-saving devices that reduce physical activity (e.g., electronic cleaning devices)
- Lack of safe and appealing places to play or be active in many communities
- Lack of protected bike lanes and pedestrian-friendly streets
- Lack of sleep because of busy lifestyles or nighttime use of electronic entertainment (e.g., TV, computers, video games, cell phones, and movies)

The purpose of this review was to evaluate the literature on social networks in order to determine their relevance as a potential approach for modifying behavioral risk factors for overweight and obesity. We first discuss concepts often used in social network research and how social networks affect health outcomes and introduce two major methods of social network analysis (i.e., egocentric and sociometric analysis). Second, we summarize research that supports the positive and negative influences of social networks on health outcomes. Third, we describe research related to social determinants of obesity and propose a conceptual model of social networks and their influence on obesity. Finally, we discuss future directions for obesity research using social networks.

Methods

We conducted a scoping review of the scientific literature in which we mapped or summarized a wide range of literature to convey the breadth and depth of the field and identify gaps in existing literature and innovative approaches (Ehrich, Freeman, Richards, Robinson, & Shepperd, 2002). Researchers use this method to clarify a complex concept and refine subsequent research inquiries (Davis, Drey, & Gould, 2009; Levac, Colquhoun, & O'Brien, 2010). Scoping reviews are particularly relevant to emerging areas of research or areas in which a paucity of randomized controlled trials makes it difficult for researchers to undertake systematic reviews (Levac et al., 2010). Unlike systematic reviews, scoping reviews identify all relevant literature regardless of the study design, and the reviewers do not typically assess the quality of included studies (Arksey & O'Malley, 2005; Armstrong, Hall, Doyle, & Waters, 2011; Levac et al., 2010).

Our study is guided by Arksey and O'Malley's methodological framework including identifying the research questions, identifying relevant studies, selecting studies, charting the data, collating, summarizing, and reporting the results (Arksey & O'Malley, 2005).

Identifying the Research Questions

We identified the following research questions. What is known about social networks in health research? *Social*