An Egocentric Network Analysis of Survivors of Intimate Partner Violence

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Intimate partner violence (IPV), defined as behavior within an intimate relationship that causes any physical, sexual or psychological harm (WHO, 2021), is a global health issue impacting millions of women. Based on data from the WHO Global Database on Prevalence of Violence Against Women, it is estimated 27% of ever-partnered women between the ages of 15-49 have experienced IPV in their lifetime (Sardinha et al., 2022). Rates between high- and low-income countries vary (Sardinha et al., 2022). Prevalence estimates of high-income countries, such as the United States, are lower on average than the prevalence estimates of lower-income countries.

In the United States, about one in three women and one in four men have experienced severe physical violence by an intimate partner, according to estimates from the National Intimate Partner and Sexual Violence Survey (Leemis et al., 2022). More than 2 in 5 women and men in the United States report experiencing any form of physical violence by an intimate partner (Leemis et al., 2022). Estimates of any lifetime psychological aggression were even higher; nearly half of both women and men experienced some type of psychological aggression in their lifetime (Leemis et al., 2022). IPV is pervasive at the national and global levels and the consequences of this public health issue are many.

It is well-established that current and past IPV have a significant impact on the mental and physical well-being of survivors. Negative health outcomes of IPV include poor daily functioning, physical injury, chronic pain, gastrointestinal disorder, sexually transmitted infections (STIs), depressive symptoms, PTSD, and suicidal ideation (WHO, 2021; Coker et al.,

2002; Campbell, 2002). IPV contributes to social behavioral problems as well as cognitive impairment and decreased academic performance (Brewer et al., 2018; WHO, 2021). Social isolation caused by IPV has consequences for the social well-being of survivors, further impacting the general health and mental well-being of survivors.

Social support is a well-known protective factor for IPV survivors (Levendosky et al., 2004, Goodman & Smyth, 2011; Latta & Goodman, 2011; Sylaska & Edwards, 2014; Ogbe et al., 2020). Social support may strictly be defined (Scott & Carrington, 2014) as the "aid—the supply of tangible or intangible resources—individuals gain from their network members." In the context of IPV survivorship, social support is considered the availability of instrumental and emotional assistance through family, neighbors or friends of IPV survivors (Goodman & Smyth, 2011). IPV survivors are more likely to seek out informal support from the people in their social networks than formal resources of support such as healthcare and law enforcement (Brieding et al., 2007).

Overall, social support is related to positive health outcomes for IPV survivors (Ogbe et al., 2020). Positive reactions from social supporters are associated with higher self-esteem, a feeling of empowerment in controlling their own lives, and fewer psychological health symptoms such as depressive and anxiety symptoms (Sylaska & Edwards, 2014). Additionally, social support interventions have been shown to improve mental health and social support outcomes (Ogbe et al., 2020). A social network approach has been recommended as a more effective way to improve the long-term safety of IPV survivors, as compared to traditional individualistic interventions (Goodman et al., 2016; Goodman & Smyth, 2011; Nolet et al., 2021). While an increasing number of studies have adopted a network perspective by focusing on

informal social support in intimate partner violence, little is known about the actual structure, composition, size and dynamics of these social networks.

Social network analysis (SNA) can address that gap in knowledge and provide additional context to current understanding of social support for IPV survivors. SNA is the study of social structures through the use of networks and application of graph theory (Knoke & Yang, 2019). It describes the relationships between a set of individuals or groups and is often used to understand the behaviors of actors within the network. SNA has been applied in a number of fields including healthcare research. SNA can be used to understand well-being and health behaviors.

It is important to differentiate the concepts of *social support* and *social networks* as conceptual confusion has presented methodological issues for SNA. Social networks are the structures made of nodes or actors and links connecting them, some with stronger links than others (Crossley et al., 2015; Knoke & Yang, 2019). Social support is a function of social relationships resulting in the production of resources whereas social networks are dynamic structures comprised of linkages between social actors that may or may not provide social support (Heaney & Israel, 2008). Social support (the function) is engaged by actors in a social network (the structure). In recognizing this conceptual difference, the author was able to identify the gap in the literature and determine the need for a study of the social networks of survivors.

SNA includes measures of the social network structure as well as its composition. Network *size* is often calculated as the number of actors in the network. Researchers will often want to know the *density* of the network, or how many connections there are between actors divided by the number of total possible connections. The *strength of ties* is often of interest when trying to understand stronger and weaker connections in the network. Lastly, there are multiple

measures of *centrality*, or the importance of an actor in a network, which are described in more detail in the first manuscript.

A paucity of research has applied SNA to understand the support networks of IPV survivors. As of this writing, few studies have examined the social networks of survivors using SNA techniques (Katerndahl et al., 2013; Willie et al., 2019; Nolet et al., 2020). Furthermore, no study to date has explored the relationship between the characteristics of IPV survivors' support networks and their mental health outcomes.

The specific aims of this dissertation are two-fold. The first specific aim is to describe the social network characteristics of women who have experienced intimate partner violence and compare their social networks with women who have never experienced IPV. Network characteristics include composition (types of relationships), network size (number of network members), density (number of ties compared to all possible ties), and structure (centrality, tie strength). The second aim is to examine whether social network characteristics such as network size, density, and strength of ties have an association with health outcomes including depressive symptoms, PTSD symptoms, and general health.

The first manuscript of this dissertation serves as a systematic review of the literature regarding social network analysis of intimate partner violence. The systematic review was conducted following PRISMA guidelines and utilized the Covidence systematic review system to identify and review reports of social network analyses related to IPV and social network mapping studies of IPV survivors' networks. In reviewing the state of the literature, the author was able to confirm the need for a social network analysis of IPV survivors' networks and health outcomes. This study is described in two parts, based on the specific aims of the dissertation.

The second manuscript addresses the first specific aim of the dissertation study. The analysis in this manuscript compares the social network characteristics of IPV survivors with a control group of women who have not experienced violence. A standard multiple regression was conducted to control for confounding variables such as age and income. Network characteristics included in the analysis were network size, network density, degree centrality, average tie strength, and percentage of relationship types. A qualitative descriptive analysis was used to supplement the social network data in the study.

Finally, the third manuscript addresses the second aim of the dissertation study. This manuscript reports the hierarchical regression models used to predict general health and mental health outcomes scores by demographic, IPV, and social network variables. The health outcomes were measured by Short Form-12 survey scores, Center for Epidemiologic Studies Depression Scale scores, and PTSD Checklist- Civilian Version scores of participants. Predictors, including age, income, education, and network characteristics were entered into logistic regression models to identify significant predictors to be entered into final adjusted models each for depressive symptomology and PTSD symptomology.

The manuscripts are presented in the order in which they are described above and in the style of how they will be presented for academic journal submission. Academic journals considered for submission are either in the violence research, nursing research, or public health research domains. Open-access, peer-reviewed journals will be prioritized to promote equal access to the research and to reach a wider readership overall.

The author, to her knowledge, conducted the first social network analysis of IPV survivors' support networks and health outcomes. Additionally, the analysis described in the second manuscript is only the second social network analysis of IPV survivors' support networks to be

conducted in the United States. The first dissertation manuscript is unique as well, as it is the only systematic review of social network analysis of intimate partner violence.

The long-term goal of this program of research is to understand mental health outcomes and their relationship to changes in the characteristics of IPV survivors' social networks over time in order to determine appropriate community-based and social network-driven interventions. The research described in the following three manuscripts may serve as the basis for future studies of the social networks of IPV survivors.

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