Research paper

Frequency of social contact in-person vs. on Facebook: An examination of associations with psychiatric symptoms in military veterans

Alan R. Teo[a,b,c,*], Benjamin K. Chan[c], Somnath Saha[a,d], Christina Nicolaidis[c,d,e]

[a] VA Portland Health Care System, HSR&D Center to Improve Veteran Involvement in Care (CIVIC), 3710 SW US Veterans Hospital Rd (R&D 66), Portland, OR 97239-2964, USA
[b] Oregon Health & Science University, Department of Psychiatry, 3181 SW Sam Jackson Park Rd (Multnomah Pavilion, Room 2316), Portland, OR 97239-3098, USA
[c] Oregon Health & Science University and Portland State University, School of Public Health, Biostatistics and Design Program, 3181 SW Sam Jackson Park Rd (CB669), Portland, OR 97239-3098, USA
[d] Oregon Health & Science University, Division of General Internal Medicine & Geriatrics, 3181 SW Sam Jackson Park Rd L475, Portland, OR 97239-3098, USA
[e] Portland State University, School of Social Work, 1600 SW 4th Ave, Portland, OR 97201-5522, USA

A B S T R A C T

Introduction: Social isolation is closely associated with negative mental health outcomes. Social media platforms may expand opportunities for social contact, but whether online interactions are as effective as face-to-face, or in-person, interactions at protecting against the negative effects of social isolation is unclear.
Methods: Participants consisted of U.S. military veterans who served since September 2001 and used Facebook (n = 587). Our independent variables were frequency of social contact occurring in-person and on Facebook. Dependent variables were probable psychiatric disorders and suicidality, measured using several validated screening tools. The independent effect of each form of social contact was assessed using multivariate logistic regression, which included adjustment for several potential confounders.
Results: We found that veterans who frequently interacted on Facebook engaged in more in-person social contact than infrequent Facebook users (p < .001). More frequent in-person social interaction was associated with significantly decreased risk of symptoms of major depression and PTSD, compared with contact every few weeks or less. In contrast, increased frequency of social interaction on Facebook had no associations with mental health outcomes.
Limitations: All associations are cross-sectional (direction of association is unclear) and based on self-report measures.
Conclusions: Although veterans who frequently use Facebook are also typically social in their offline life, it is their offline (in-person) social interaction, rather than their social contact on Facebook, that is associated with reduced psychiatric symptoms.

1. Introduction

Decades of literature has established the benefits of social relationships for multiple aspects of psychological well-being and mental health (Cornwell and Waite, 2009; Kawachi and Berkman, 2001; Berkman et al., 2000; Caccioppo et al., 2010; Cohen, 2004; Newsom et al., 2003).

Social relationships have both structural (e.g., number of ties, type of relationship) and functional dimensions. The function of our social ties that has perhaps been most linked to health outcomes is social support.

Social support, either perceived availability or actual receipt of it,

has been linked with better health outcomes across countless observational studies (Cohen, 2004; House et al., 1988). One of the leading theories of social support argues that it may act as a buffer, or insurance policy, against stressors that otherwise might induce depression, anxiety or other emotional problems (Cohen and Wills, 1985). In addition, neuroscience research suggests that social support arises, at least in part, from the literal physical presence of support. For instance, hand-holding by our close supports seems to provide a sense of security that our brains use to reduce negative emotion and physiological reactivity (Coan et al., 2006).

In today's world, communication with friends and family online—and particularly through social media—is part of daily life. The

average time a user spends on Facebook is 50 minutes a day, almost as much time as people spend eating and drinking (Stewart, 2016). Given this modern reality, researchers and the general public alike are keenly interested in how online social contact—also referred to as computer-mediated communication—impacts our well-being and mental health. Nonetheless, much of the research on social support, has either pre-dated contemporary modes of social interaction, not directly compared offline and online modes of social interaction, or implicitly assumed social contact to be face-to-face.

In a sample of community-residing older adults in the United States, we previously showed that as in-person social contact became more frequent, the risk of developing depression two years later declined in a dose-dependent fashion (Teo et al., 2015). In contrast, increasing amounts of contact via phone, writing, or email did not have such a protective effect against depressive symptoms. Still, it is unclear whether these findings differ when considering interactions on social media. Results of studies on social media use have been mixed, some suggesting increased risk for mental health problems (Kross et al., 2013; Shakya and Christakis, 2017; Verduyn et al., 2015) and others concluding a positive impact (Ellison et al., 2007; Nabi et al., 2013; Burke and Kraut, 2016). Additionally, other mental health outcomes besides depression warrant investigation. Among military veterans in the United States, for instance, rates of PTSD, substance use disorders, and suicide are also high (Ilgen et al., 2012; Reger et al., 2015; Seal et al., 2018,2011).

Finally, it is important to know whether relationships on social media might substitute for those in a person's offline life, a notion called *network substitution*. People have limited time for socialization. Knowing how much time and energy to invest in social media, or how much screen time is reasonable, is of great interest to the public (Molina, 2017), as well as researchers developing social media-based interventions (Coiera, 2013).

In this paper, we aimed to address two research questions. First, to what extent do veterans who socialize on Facebook also have in-person social contact? Second, is more social contact on Facebook (or conversely, in-person) associated with lower risk of screening positive for psychiatric disorders or suicidality in military veterans? We hypothesized that: (1) veterans using Facebook would not engage in less in-person social contact; and (2) both social contact on Facebook and in-person would be associated with lower risk of psychiatric symptoms.

2. Methods

2.1. Participants and recruitment

The target population for our study was U.S. military veterans who served since September 2001, a group often referred to as Iraq and Afghanistan era veterans. We chose this population as one with high rates of social isolation, depression, PTSD, and suicidality, and largely consisting of individuals who are online and facile with social media. Among the 1,329 who completed the online screener, 711 met eligibility criteria (age 18 or older, had been on active duty after September 2001 but not at the time of the survey). Of these, 605 completed the online survey, and we excluded from analysis individuals who completed surveys in less than five minutes (n = 10), had a duplicate or multiple survey responses (n = 6), or incorrectly answered a military-related 'insider knowledge' question designed to reduce chance of online survey misrepresentation (n = 2) (Pedersen et al., 2015; Kramer et al., 2014), resulting in a final analytic sample of 587 participants.

2.2. Procedure

Online survey participants were recruited using Facebook ads containing a call to action to participate in a health research study, which we describe in a separate publication (Teo et al., 2018). In brief, study

ads broadly targeted Facebook users in the United States of any age or gender who had interests relevant to military veterans (e.g., an interest in the "United States Armed Forces"). Survey items confirmed respondents' status as a veteran. Ads were hosted by Facebook pages affiliated with Oregon Health & Science University (OHSU) and linked to an online survey. After completing an eligibility screener, participants proceeded to the full online survey, which was active between January and March 2017.

2.3. Measures

2.3.1. Independent variables: social contact

We assessed frequency of social contact occurring: (1) in-person and (2) on Facebook, by adapting previously validated survey items used by the Health and Retirement Study and Pew Research (Health and Retirement Study 2010; Pew Research Center 2016). We asked participants, "On average, how often do you do each of the following with any of your friends or family: Meet up-in person? Actively interact on Facebook, such as sharing, posting, commenting, or tagging?" We used a 5-point response scale ranging from "several times a day" to "every few weeks or less often."

2.3.2. Dependent variables: probable psychiatric disorders and suicidality

To screen for mental health problems, we employed a number of validated self-report tools. For PTSD, we used the Primary Care PTSD Screen for DSM-5 (PC-PTSD), a five-item scale assessing past-month symptoms of a lifetime traumatic event. A score of three or higher on the PC-PTSD indicates a positive screen (Prins et al., 2016). For alcohol use disorder, we used the Alcohol Use Disorders Identification Test Alcohol Consumption Questions (AUDIT-C), a three-item scale on frequency and intensity of drinking. An AUDIT-C score of four or higher for men, or three or higher for women, indicates a positive screen for problematic drinking (Bush et al., 1998). For major depression, we used the Patient Health Questionnaire-2 (PHQ-2), for which a score of two or higher indicates a positive screen (Kroenke et al., 2013). For suicidality, we used the Depressive Symptom Inventory Suicidality Subscale (DSI-SS), a four-item scale on suicidal ideation within the past two weeks (Joiner et al., 2002). A score of two or higher on the DSI-SS indicates a positive screen in a population-based sample (von Glischinski et al., 2016).

2.3.3. Covariates

Covariates and other variables used to describe the sample were taken from self-report survey items and included sociodemographic characteristics, assessment of frequency of social contact, social media platforms used, reasons for using social media platforms, interest in online health-related interventions, and psychiatric history.

2.4. Statistical analysis

To compare the proportion of participants at varying levels of social interaction on Facebook and in-person, we used a chi-squared test for trend. We used logistic regression to model the association between frequency of social contact and positive screening for psychiatric problems. Four models were estimated, one for each psychiatric problem. Both social contact measures were included in the same model in order to determine the independent effect of each. We examined multicollinearity of the independent variables, concluding that the correlation between in-person and Facebook social contact did not substantively bias associations between social contact and any of the outcomes. Social contact measures were modeled as a set of four indicator variables where the least frequent category ("every few weeks or less often") was the referent. Potential confounders included in the models were the number of social media platforms used in addition to Facebook, lifetime history of suicidal ideation, and lifetime history of suicide attempts. Subjects were excluded from model estimation when