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Article

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Résumé

Alors que le nombre de personnes âgées augmentera de façon exponentielle au cours des prochaines décennies, la solitude, l'isolement social et la dépression constitueront des problèmes de santé publique de plus en plus importants dans cette population. Bien que les options de traitement établies, incluant certaines thérapies et médicaments, peuvent être utiles pour combattre la dépression, elles s'avèrent aussi coûteuses et parfois, inefficaces. Il est donc nécessaire de prendre en considération d'autres méthodes de traitement et des interventions sociales. Les méthodes alternatives de traitement pour les problèmes de santé mentale prennent une importance particulière pour les personnes âgées, puisque celles-ci rencontrent des obstacles liés au vieillissement, tels que la mobilité réduite et des cercles sociaux plus restreints. Dans ces circonstances, les réseaux sociaux en ligne peuvent offrir une « thérapie sociale » potentielle pour atténuer la solitude, l'isolement social et la dépression. L'objectif de cette revue de la portée était de rassembler et de résumer les publications existantes concernant les associations entre le réseautage social en ligne et les résultats en matière de santé mentale (p. ex. dépression, satisfaction de vivre, solitude) chez les personnes âgées. Une première recherche portant sur 3 699 articles a permis de recenser 52 articles répondant aux critères d'inclusion. Cinq thèmes communs ont été identifiés : 1) l'amélioration de la communication avec la famille et les amis, 2) la promotion de l'indépendance et de l'auto-efficacité, 3) la création de communautés en ligne, 4) les associations positives avec le bien-être et la satisfaction de vivre, et 5) la diminution des symptômes de dépression. Les implications de ces résultats pour la santé mentale des personnes âgées, la connectivité sociale, les programmes, ainsi que les politiques sont discutés.

Abstract

As the number of older adults is expected to increase exponentially within the next few decades, loneliness, social isolation, and depression among seniors are growing public health concerns. Although formal treatment options, such as therapy and medication, can be helpful for depression, they can also be expensive and sometimes ineffective. It is therefore important to consider other potential treatment options and social interventions. Alternative methods for addressing mental health issues are especially important for older adults, as they may encounter barriers associated with aging such as limited mobility and decreased social networks. In these circumstances, online social networking may offer a potential “social cure” to alleviate loneliness, social isolation, and depression. The purpose of this scoping review was to gather and summarize the current literature on associations between online social networking and mental health outcomes (e.g., depression, life satisfaction, loneliness) among older adults. An initial search of 3,699 articles resulted in 52 articles that met criteria for inclusion. Five common themes were identified: (1) enhanced communication with family and friends, (2) greater independence and self-efficacy, (3) creation of online communities, (4) positive associations with well-being and life satisfaction, and (5) decreased depressive symptoms. Implications for older adults' mental health, social connectedness, programs and policies are discussed.

By the year 2050, the percentage of older adults represented within the global population is projected to nearly double, from 12–22 per cent (World Health Organization, 2017). Although aging is associated with a variety of physical health issues, the simultaneous negative impact of mental health symptoms, such as depression, are often overlooked (World Health Organization, 2017). This is despite research suggesting that 10–15 per cent of older adults experience depressive symptoms as well as an additional 2 per cent being diagnosed with major depressive disorder (Kok & Reynolds, 2017). Depression affects various aspects of one's well-being including overall quality of life, demonstrated by the finding that an 8.3 quality-adjusted life year gap exists between older adults with depression and those without (Jia & Lubetkin, 2017).

Older adults are at a heightened risk of experiencing both social isolation and loneliness, because of (among other things) the death of friends and family, mobility-related issues, and

cognitive decline (Coyle & Dugan, 2012). Often, loneliness and social isolation are studied as separate entities, as social isolation is often understood as an objective state relating to the number of social relationships or frequency of contact with others, whereas loneliness is understood as a subjective emotional state (Newall & Menec, 2017). However, Newall and Menec (2017) argue that although one could experience loneliness without social isolation, or vice versa, researching both objective circumstances and subjective feelings together may provide a more holistic understanding of mental health, especially with respect to the outcomes of intervention studies. For example, having fewer social relationships does not necessarily mean that one experiences loneliness, as long as one has the social relationships that they desire; therefore, increasing the number of social relationships that one has may not equate to decreased feelings of loneliness (Newall & Menec, 2017). Nonetheless, loneliness and social isolation are associated with one another (Shankar, McMunn, Demakakos, Hamer, & Steptoe, 2017), and are often related to greater feelings of psychological distress, symptoms of depression, and poor physical health (Alpert, 2017; Taylor, Taylor, Nguyen, & Chatters, 2016; van Beljouw et al., 2014). Factors associated with loneliness in older adults include social isolation, gender, ethnicity, socio-economic status, and poor mental health (Cohen-Mansfield, Hazan, Lerman, & Shalom, 2015). Taken together, potential remedies for social isolation and loneliness should consider both subjective and objective dimensions, while also taking other social determinants of health into consideration.

Current Options for the Treatment of Depression among Older Adults

As major depressive disorder exists on a spectrum of severity, treatment options also vary widely (Skultety & Zeiss, 2006). This is coupled with the issue that many treatment options are often required, because almost 70 per cent of older adults do not respond directly to antidepressant medication and are in need of supplementary treatment (Kok & Reynolds, 2017). Although drug therapy is commonly used, it may not be the most suitable option for older adults with depression because of the high potential for co-morbidity with other chronic conditions that require medication, which may result in unanticipated drug interactions (Kok & Reynolds, 2017). Cognitive behavioural therapy has been shown to be effective in treating depression, especially in a group setting (Wuthrich, Rapee, Kangas, & Perini, 2016). However, commonly reported barriers to pursuing therapy include the costs associated with therapy, doubts regarding the usefulness of treatment, and a perception of indifference amongst therapists (Wuthrich & Frei, 2015). Ultimately, other types of treatments must also be considered.

One cost-effective treatment option (with few side effects) that is gaining ground is the idea that one's social group memberships and relationships can be effective remedies for many psychological health ailments—in the literature, this phenomenon has come to be known as the “social cure” (Haslam et al., 2018; Jetten, Haslam, & Haslam, 2012). However, although actively maintaining social group relationships is believed to reduce loneliness and depression (Cruwys, Haslam, Dingle, Haslam, & Jetten, 2014; Newall et al., 2009), there is a wide range of potential barriers—environmental, psychological, and economic—that may prevent older adults from doing so (Nicholson, 2012). For example, environmental or economic barriers such as living alone, on a fixed income, or in a rural location might decrease one's social network activity substantially

(Nicholson, 2012). Other psychological and physical barriers may include widowhood, cognitive decline, and sensory loss (Nicholson, 2012). As such, it is important to explore potential treatment options that help older adults to maintain their social relationships, while ensuring that the various barriers they encounter, such as issues with mobility and health concerns, are taken into consideration (Nef, Ganea, Müri, & Mosimann, 2013).

Social Technology: A Newer Alternative

One way for older adults to potentially mitigate the negative effects of loneliness and social isolation, while addressing some of the barriers that they face, may include the use of social networking sites (e.g., Facebook, Twitter) or other technology-based communication systems (e.g., e-mail, Skype). Indeed, introducing the use of social networking as a way of alleviating loneliness and feelings of social isolation may reduce the likelihood of developing major depressive disorder or experiencing depressive symptoms (Fokkema & Knipscheer, 2007). Assistive technology as an intervention has been used in other domains with the goal of improving the lives of older adults through, for example, maintaining cognitive integrity (Myhre, Mehl, & Glisky, 2017), enhancing physical health (Mackert, Mabry-Flynn, Champlin, Donovan, & Pounders, 2016), and even receiving behavioural treatment for depression (Lazzari, Egan, & Rees, 2011). Likewise, the use of online social networking has helped both to create new relationships and to strengthen existing relationships (especially with younger generations such as grandchildren; Berg, Winterton, Petersen, & Warburton, 2017), has been associated with decreased social isolation (Hajek & König, 2019), and has been shown to mitigate the effects of loneliness among older adults significantly (Mickus & Luz, 2002; Quinn, 2013). Online social networking has also been described as a platform to connect with other older adults at any time of day, serving as an opportunity to connect with people around the world, and ultimately decrease feelings of loneliness (Ballantyne, Trenwith, Zubrinich, & Corlis, 2010).

Nonetheless, although some research suggests that online social networking has a positive impact on older adults, other research findings in this area are inconclusive, especially because of a relative lack of research conducted specifically on the mental health of older adults using online social networking sites (Nef et al., 2013; Neves, Franz, Judges, Beermann, & Baecker, 2017). Likewise, research on the relationship between the mental health of older adults and social technology usage may be inconclusive because of a lack of a consensus on how social connectedness outcomes are defined (e.g., loneliness, social isolation, and social participation) and a lack of investigation into the variety of technologies used for communication (Baker et al., 2018). In this regard, communicating with online communities may decrease time spent with family (Sum, Mathews, Pourghasem, & Hughes, 2008), lead to mixed outcomes based on types of social relationships formed (Hage, Wortmann, van Offenbeek, & Boonstra, 2016), and may decrease feelings of social isolation without any impact on depression (Saito, Kai, & Takizawa, 2012). Other research has shown that the use of online social networking sites may be linked to decreased depression when the symptoms are severe, but not when they are mild (Kim, Lee, Christensen, & Merighi, 2015). Inconsistent findings have also emerged related to factors that could influence the association between mental health and online social networking site usage, such as the ethnicity, socio-economic status, and gender of participants (Khalaila & Vitman-Schorr, 2018; Minagawa & Saito, 2014).

Moreover, some older adults may be reluctant to use online social networking sites because of privacy concerns, lack of understanding of how to use the online platforms, and the lack of user-friendly options designed specifically for an older population (Lehtinen, Näsänen, & Sarvas, 2009; Nef *et al.*, 2013). Indeed, there is some evidence that older adults may not be as motivated to engage in online social networking as their younger counterparts because of the aforementioned concerns (Nef *et al.*, 2013). This inconclusive body of research hinders our capacity to fully understand potential associations between online social networking and depressive symptoms among seniors. Therefore, the objective of this scoping review was to gather, summarize, and better understand the existing literature on the use of online social networking and associations with mental health among older adults, in order to potentially inform future interventions, programming, and policies.

Methods

The scoping review methodology was based on the evaluation framework outlined by Arksey and O'Malley (2005).

Step 1: Identifying the Research Question

As stated, our research question was: "Is online social networking associated with depressive symptoms, social isolation, and/or loneliness among older adults?"

Step 2: Identifying Relevant Studies

To identify relevant studies, three members of the research team searched the following databases: PubMed, PsycINFO, and Scopus. These three databases were chosen in consultation with a library specialist because of their comprehensive collections of multidisciplinary articles, including the topics relevant to this scoping review. The search for related articles was done using the advanced search tool from each database, with a predetermined search string: ("mental health" OR loneliness OR depression OR "social isolation") AND (elderly OR aging OR geriatric OR retired OR retirement OR seniors) AND (Internet OR e-mail OR social technol* OR "social media"). The timeline was limited to articles published between 2008 and 2018, in order to consider a comprehensive number of articles for review while also maintaining recency.

Step 3: Study Selection

An initial search found 3,699 relevant articles in the databases: 592 from PubMed, 663 from PsycINFO, and 2444 from Scopus (Figure 1). These initial articles were screened based on their abstracts and titles, selecting those that focused on the links among aging (e.g., seniors, retirement), mental health (e.g., social isolation, loneliness, depression), and social technology (e.g., e-mail, social technology, social media). The types of studies included were quantitative and qualitative research, meta-analyses, systematic reviews, literature reviews, randomized control trials, and quasi-experimental, longitudinal, and mixed-method research. Exclusion criteria included outcome measures that were not relevant to mental health, the absence of social technology, or research examining technology that did not fit with social networking factors (e.g., assistive living technologies, robotics). Articles that were not research articles, such as book reviews and editorials, were also

excluded. The exclusion criteria led to the overall removal of 3,543 articles, resulting in 156 articles remaining from the initial 3,699. Following this removal process, each of these 156 articles was explored in more depth, ensuring that its outcome variables directly measured depression, social isolation, and/or loneliness, and to remove any duplicates. After this in-depth evaluation, we removed 34 duplicates. As a result, 52 relevant articles remained for this scoping review. These remaining articles were once again reviewed and discussed among the researchers to ensure inter-rater reliability and consensus that every article met the inclusion criteria.

Step 4: Charting the Data

The final selection of studies was catalogued into an Excel file that listed the study authors, country, year of publication, DOI, title, duration of intervention and comparison group (if applicable), study population, minimum sample age, sample size, aims of the study, methodology, outcome measures, relevant findings, social factors examined, and mental health outcomes. A simplified version of this spreadsheet summarizing each study's authors, publication year, country, sample size, minimum sample age, social factor(s) examined, mental health outcome(s), and summary of findings relevant to the current scoping review is presented in Figure 1.

Step 5: Collating, Summarizing and Reporting the Results

Overall, the results of this scoping review led to the evaluation of 52 articles (Table 1). The majority of studies used a quantitative ($n = 28$), qualitative ($n = 8$), or mixed methods approach ($n = 8$). Of the quantitative and mixed methods articles, eight studies had some form of intervention with a control group; of those eight intervention studies, two had randomized sampling while the others were non-randomized. The remaining articles identified in this scoping review were systematic and/or literature reviews ($n = 8$). Research methods to evaluate the use of online social networking, levels of loneliness and depression, overall feelings of social connectedness, and well-being included self-report scales and interviews. The studies were mostly conducted in the United States ($n = 15$), with additional studies in Australia ($n = 6$), the United Kingdom ($n = 5$), New Zealand ($n = 4$), South Korea ($n = 3$), Spain ($n = 2$), Israel ($n = 2$), The Netherlands ($n = 2$), Finland ($n = 2$), Brazil ($n = 1$), the Czech Republic ($n = 1$), China ($n = 1$), Canada ($n = 1$), Hong Kong ($n = 1$), South Africa ($n = 1$), Taiwan ($n = 1$), Japan ($n = 1$), Sweden ($n = 1$), Norway ($n = 1$), and Northern Ireland ($n = 1$).

Results

Based on analysis of the results presented in each of the 52 articles by members of the research team, potential themes were conceptualized. Subsequently, the team members discussed their findings amongst each other in order to reach a consensus on the final themes to be included. As a result, five key themes were generated (with some articles being relevant to more than one theme), including: (1) enhanced communication with family and friends, (2) positive associations with well-being and life satisfaction, (3) decreased depressive symptoms (4) greater independence and self-efficacy, and (5) creation of online communities (non-family relationships).

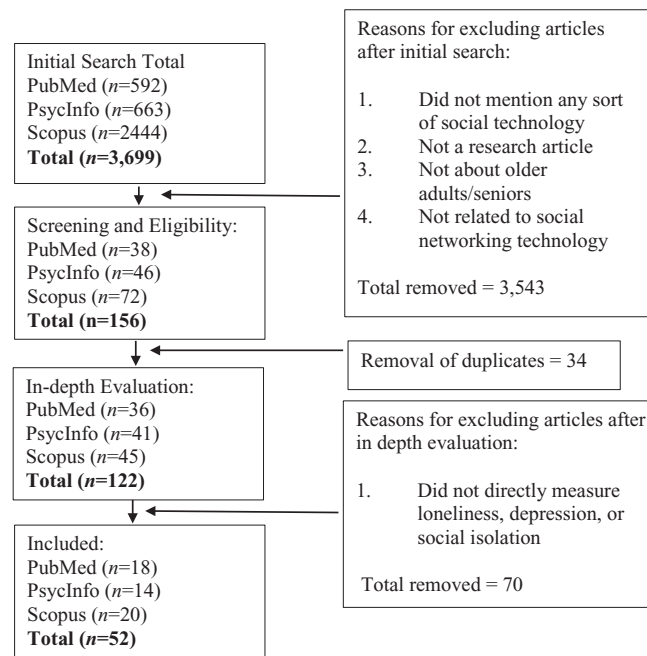


Figure 1. Flow chart of evaluation

Enhanced Communication with Family and Friends

A total of 31 articles highlighted the theme of enhanced communication between family and friends. For example, Hogeboom, McDermott, Perrin, Osman, and Bell-Ellison (2010) found that the use of online social networking by older adults was positively associated with a greater frequency of communication with family and friends. Likewise, online social networking was associated with older adults communicating more often and having a stronger bond with family than older adults who did not use social technology as often (Berg et al., 2017). These authors noted that an advantage of online social networking is the ability to communicate regardless of geographic location (Berg et al., 2017; Hogeboom et al., 2010). This was further supported by qualitative interviews, in which older adults often described the importance of online social networking because it made them feel less isolated and more connected to their families (Chen & Schulz, 2016; Chiu, Hu, Lin, Chang, & Chang, 2016).

Of the 31 articles included in this theme, 24 examined the effects that different social groups may have, such as family-related groups, friend-related groups, or both. Indeed, the results of these studies suggested that online social communication facilitated communication with both family and friends. For example, Berg et al. (2017) concluded that the ease of use and availability of social media technology made it possible for older adults to talk with family members and friends who lived far away. Another 5 of the 31 articles (i.e., Blusi, Asplund, & Jong, 2013; Cerna & Svobodova, 2017; Delello & McWhorter, 2017; Khalaila & Vitman-Schorr, 2018; Lehtinen et al., 2009) focused only on communication with family members. For example, Khalaila and Vitman-Schorr (2018) found that online social networking enhanced older adults' abilities to connect with family, which was associated with lower rates of loneliness. Finally, 2 out of the 31 articles focused specifically on friends (Chopik, 2016; Forsman & Nordmyr, 2017). Chopik (2016) found that online social media facilitated online friendships, which was associated with lower levels of loneliness. Likewise, in conducting a systematic review, Forsman and Nordmyr (2017) found

that a common theme across studies was that online social networking facilitated better interpersonal relationships.

Positive Well-Being and Life Satisfaction

Overall, 25 articles found an association between online social networking and increased well-being and life satisfaction. However, there appeared to be a lack of consensus on the strength of this association across studies. For example, some research (e.g., Forsman & Nordmyr, 2017; Ihm & Hsieh, 2015) has found a strong association between Internet use and well-being because online social networking can enhance interpersonal relationships and increase access and feelings of belonging to the community. Conversely, other studies have found a lesser association between well-being and online social networking (Chippis, Jarvis, & Ramlall, 2017; Erickson & Johnson, 2011; ten Bruggencate, Luijkx, & Sturm, 2018; Woodward et al., 2013). For example, in a systematic review of 22 research studies, the association between online social networking and well-being could only be determined to be weak, because of the lack of strong non-correlational research (Chippis et al., 2017). Such disparities in findings might be attributed to the socio-economic status of study participants, as some research has demonstrated that individuals with lower socio-economic status and/or lower levels of education may not readily have access to digital devices (Ihm & Hsieh, 2015). In this regard, Erickson and Johnson (2011) found that the association between online social networking and well-being became non-significant after controlling for demographic characteristics, such as income and age. However, Quintana, Cervantes, Sáez, & Isasi (2018) found a significant association between online social networking and well-being even when controlling for demographic characteristics.

Fewer Depressive Symptoms

The association between online social networking and fewer depressive symptoms was found in 18 of the 52 articles. However,

Table 1. Charted data of the 52 studies identified for this scoping review

Authors, Year, Country	Design	Sample Size (n)	Min. Age (Years)	Social Factor(s) Examined	Mental Health Outcome(s)	Relevant Findings
1. Aarts et al., 2015, Netherlands	Quantitative analysis	626	60	SNS usage	Mental health & loneliness	SNS usage is not associated with levels of loneliness and better mental health.
2. Berg et al., 2017, Australia	Qualitative interviews	60	65	SNS usage	Mental health status	The use of social technologies is associated with higher life satisfaction, decreased loneliness, and enhanced self-efficacy among older adults in rural communities.
3. Blaschke et al., 2009, UK	Literature review	N/A	N/A	ICT use	Mental health status	There is a potential association between ICT use and mental health; however, more research needs to be conducted.
4. Blusi, et al., 2013, Sweden	Intervention study & qualitative interviews	31	65	SNS usage	Levels of depression and social isolation	ICT-based service is associated with reduced loneliness and social isolation.
5. Cerna & Svobodova, 2017, Czech Republic	Survey	55	83	SNS competency	Social isolation and loneliness	Computer literacy skills strengthened communication with family and made participants feel more socially connected.
6. Challands et al., 2017, Australia	Survey	108	65	SNS usage	Depression & social connectedness	Online social connectedness moderated the relationship between driving cessation and depression.
7. Chen & Schulz, 2016, Hong Kong	Systematic review	25 (articles synthesized)	66	SNS usage	Loneliness, social isolation, social connectedness	Most studies found that SNS usage is associated with social connectedness; however, this was a short-term gain.
8. Chipps et al., 2017, South Africa	Systematic review	12 reviews (22 articles synthesized)	N/A	SNS usage	Social isolation and loneliness	There is inconclusive evidence that social isolation & loneliness are associated with SNS usage.
9. Chiu et al., 2016, Taiwan	Intervention study & qualitative interviews	20	53	SNS competency	Depression, well-being, and social isolation	Compared with baseline, older adults were less likely to report depressive symptoms and loneliness after training sessions on ICT.
10. Choi & Dinitto, 2013, USA	Quantitative analysis	6,680	N/A	SNS usage	Depression & anxiety	Depressive and anxiety symptoms, measures of psychological capital, were negatively associated with Internet use among older adults.
11. Choi et al., 2012, Korea	Meta-analysis	6 (studies included)	65	SNS usage	Loneliness and depression	SNS usage was used to cope with loneliness.
12. Chopik, 2016, USA	Quantitative analysis	591	50	SNS usage	Well-being, loneliness, & depression	Social network use is associated with fewer depressive symptoms – this relationship is mediated by loneliness.
13. Cotten et al., 2013, USA	Quantitative analysis	205	N/A	SNS usage	Loneliness	SNS usage was associated with lower levels of loneliness.
14. Cotten et al., 2012, USA	Quantitative analysis	7,839	50	SNS usage	Depression	SNS usage was generally seen to be positive, reducing levels of depression by 20–28%.
15. Cotten et al., 2014, USA	Quantitative analysis	3,075	50	SNS usage	Depression	SNS usage reduced probability of developing depression by 33%.

(Continued)

Table 1. Continued

Authors, Year, Country	Design	Sample Size (n)	Min. Age (Years)	Social Factor(s) Examined	Mental Health Outcome(s)	Relevant Findings
16. Cotterell et al., 2018, UK	Literature review	N/A	N/A	Historical, cultural, and political contexts for levels of isolation	Social isolation	Previous research has found that social technology decreases levels of isolation, but social context must also be reviewed to ensure effectiveness.
17. Delello & McWhorter, 2017, USA	Intervention study & survey	135	61	SNS competency	Social isolation	Social technologies have the potential to reduce social isolation by connecting older adults to new and existing relationships.
18. Díaz-Prieto & García-Sánchez, 2016, Spain	Survey	454	55	SNS usage	Social participation, autonomy, and loneliness	The use of social technologies is associated with a positive impact on self-esteem, mood, and overall mental health.
19. Dow et al., 2008, Australia	Intervention study, interviews, & focus groups	14	50	SNS usage	Depression and social isolation	Those who used social networking sites (e-mail) were less likely to experience depressive symptoms and social isolation.
20. Elliot et al., 2014, USA	Quantitative analysis	6,443	65	SNS usage	Depression, well-being, and social integration	ICT use may offer protective factors against depressive symptoms.
21. Erickson & Johnson, 2011, Canada	Survey	122	60	SNS usage	Well-being, social isolation, and self-efficacy	Individuals who used the Internet reported higher perceptions of self-efficacy and lower levels of social isolation than those who did not.
22. Forsman & Nordmyr, 2017, Finland	Systematic review	32 (articles included)	60	SNS usage	Social inclusion	Overall, there appears to be a positive association between Internet use and greater social inclusion.
23. Francis et al., 2017, USA	Randomized control trial	199	65	SNS usage	Social connectedness & well-being	ICT use is suggested to facilitate connection and communication with social ties, consequently enhancing well-being among older adults.
24. Gardiner et al., 2018, New Zealand	Systematic review	38 (studies included)	Not specified	SNS usage	Social isolation, loneliness	The lack of rigorous research calls for more research to be done.
25. Hagan et al., 2014, Northern Ireland	Meta-analysis	17 (studies included)	N/A	SNS usage	Loneliness	Of the studies reviewed, 4 of 17 articles suggested that SNS interventions reduced loneliness.
26. Heo et al., 2015, USA	Survey	5,203	65	SNS usage	Social support, loneliness, well-being	Internet usage and online social networking are related to higher levels of social support and well-being.
27. Hogeboom et al., 2010, USA	Quantitative analysis	2,284	50	SNS usage	Social integration	Internet usage is significantly associated with a high frequency of contacts with friends and family.
28. Ihm & Hsieh, 2015, USA	Survey	1,780	60	SNS usage	Well-being	SNS usage is significantly associated with well-being; however, socio-economic status plays a major role in this association.
29. Jun & Kim, 2017, South Korea	Quantitative analysis	6,306	50	SNS usage	Depression	Internet use was linked with lower levels of depression.

(Continued)

Table 1. Continued

Authors, Year, Country	Design	Sample Size (n)	Min. Age (Years)	Social Factor(s) Examined	Mental Health Outcome(s)	Relevant Findings
30. Khalaila & Vitman-Schorr, 2018, Israel	Interviews	502	50	SNS usage	QoL & loneliness	SNS usage is associated with QoL.
31. Khosravi et al., 2016, Australia	Systematic review	34 (studies included)	50	SNS usage	Depression & social isolation	SNS can be used to reduce social isolation and loneliness in older adults.
32. Lee et al. 2018, USA	Quantitative analysis	1411	65	SNS usage	Depressive symptoms & well-being	Frequency of SNS usage is associated with decreased risk for severe depressive symptoms and well-being amongst older cancer survivors.
33. Lehtinen et al., 2009, Finland	Intervention study & Interviews	8	58	Competency and attitudes of SNS	Social connectedness	Older adults reported a greater sense of independence and agency when using online social networking.
34. Leist, 2013, Netherlands	Literature review	N/A	N/A	SNS usage	Social connectedness	Online communities provided opportunities for social support when confronted with a difficult life situation.
35. Lifshitz et al., 2018, Australia	Quantitative study	306	50	SNS usage	Life satisfaction & depression	SNS usage was associated with greater life satisfaction.
36. Loi et al., 2016, Australia	Intervention study & qualitative interviews	5	N/A	SNS usage	Social isolation	SNS usage is not significantly associated with social isolation.
37. Machado et al., 2014, Brazil	Survey	12	60	SNS usage	QoL	The use of SNS can increase QoL by helping to maintain and create new relationships.
38. Minagawa & Saito, 2014, Japan	Quantitative analysis	5164	65	Cell phone use	Depressive symptoms	Cell phone usage was related to lower levels of depressive symptoms for women but not for men.
39. Morton et al., 2018, UK	Intervention study	76	60	SNS usage	Cognition & well-being	SNS usage is associated with improved cognition and increased social activity.
40. Nimrod, 2010, Israel	Content analysis	14 (online communities)	Not specified	SNS usage	Social connectedness	SNS usage is associated with enhanced social connectedness by providing social support.
41. Pfeil et al., 2009, UK	Qualitative interviews	31	60	SNS usage	Social connectedness	Through supportive online communities, SNS usage is associated with higher levels of social connectedness.
42. Quintana et al., 2018, Spain	Quantitative analysis	2,314	50	SNS usage	Well-being	ICT usage is positively associated with subjective well-being, but to varying degrees depending on measure.
43. Sims et al., 2017, USA	Survey	445	80	SNS usage	Life satisfaction, loneliness	Overall, SNS usage is associated with higher well-being (higher life satisfaction and reduced loneliness).
44. Szabo et al., 2019, New Zealand	Longitudinal observational study	1,165	60	SNS usage	Social connectedness & well-being	SNS usage is associated with higher well-being, decreased loneliness, and enhanced social connectedness.
45. ten Bruggencate et al., 2018, New Zealand	Qualitative semi-structured interviews	19	75	SNS usage	Social connectedness	SNS usage helps to facilitate higher levels of social connectedness with family and friends, along with a greater sense of autonomy.
46. Teo et al., 2019, USA	Quantitative analysis	1,424	N/A	SNS usage	Depressive symptoms	SNS use (specifically, Skype) is associated with decreased development of depressive symptoms.

(Continued)

Table 1. Continued

Authors, Year, Country	Design	Sample Size (n)	Min. Age (Years)	Social Factor(s) Examined	Mental Health Outcome(s)	Relevant Findings
47. Torp et al., 2007, Norway	Quantitative study & qualitative interviews	19	N/A	SNS usage	Well-being	Through qualitative interviews, participants reported feeling higher levels of support. Quantitative research, however, did not show a significant effect of level of stress or mental health problems.
48. Wilson, 2018, UK	Survey & content analysis	32	65	ICT usage	Loneliness & well-being	Online social technology is associated with higher levels of social integration.
49. Woodward et al., 2013, USA	Intervention study	19	60	ICT usage	Social connectedness, QoL	ICT group reported greater self-efficacy, perceived greater social support from friends, and reported significantly higher quality of life.
50. Xie, 2008, USA	Ethnographic study	33	50	CMC usage	Social connectedness	CMC provides opportunities to create online communities and to strengthen existing ones.
51. Zhang, 2016, New Zealand	Qualitative interviews	19	63	ICT usage	Well-being, social connectedness, self-efficacy	Social technology use helps older immigrants cope with challenges associated with moving to a new country, which increases social connectedness and self-efficacy.
52. Zhou, 2018, China	Survey	596	55	SNS usage	Loneliness, self-efficacy, social support	SNS use is associated with greater life satisfaction by increasing social integration.

Note. CMC= computer mediated communication; ICT = information communication technology; SNS = social networking site; QoL = quality of life.

as with the patterns associated with more positive well-being (noted previously), the strength of this relationship differed across studies, with some finding a significant association (Chiu et al., 2016; Chopik, 2016; Cotten, Ford, Ford, & Hale, 2012; Díaz-Prieto & García-Sánchez, 2016), while others did not (Erickson & Johnson, 2011; Minagawa & Saito, 2014). One longitudinal study found that Internet usage reduced the probability of depression by approximately 33 per cent (Cotten et al., 2012). Likewise, other correlational research has found a negative association between depressive symptoms and Internet usage (Choi & Dinitto, 2013). However, this association was also found to be influenced by demographic characteristics, such as ethnicity and socio-economic status: racial minority groups were less likely to use the Internet, and education level was a strong predictor of Internet use (Choi & Dinitto, 2013). In another study, the use of social technology was associated with lower levels of depressive symptoms, but this association only persisted among women when socio-economic status was taken into consideration (Minagawa & Saito, 2014).

Greater Independence and Self-Efficacy

A positive association between online social networking and a greater sense of independence and self-efficacy was found in 15 of the 52 articles (e.g., Chen & Schulz, 2016; Woodward et al., 2013; Zhang, 2016; Zhou, 2018). Some older adults may be reluctant to use online social networking; however, doing so may help to increase levels of confidence (Delello & McWhorter, 2017). For example, Woodward et al. (2013) found that teaching older adults how to use online social technology allowed them to engage with online communities and interact with both family and friends. This also helped older adults with issues relating to mobility, as demonstrated by higher self-reported ratings of quality of life and self-efficacy (Woodward et al., 2013; Zhang, 2016). Additionally, online social technology was described as a platform for older Chinese adults to share culture, news, and media in their native language, which fostered a greater sense of independence because this removed potential difficulties associated with having limited English skills (Zhang, 2016). Greater awareness of current events has also empowered older adults by allowing them to engage in thought-provoking discussions and to make more informed decisions (Chen & Schulz, 2016). Specifically, among older cancer survivors, online social networking was used as a tool for empowerment by allowing them to find social contacts and health information (Lee, Kim, & Sharratt, 2018).

Creation of Online Communities (Non-Family Relationships)

Finally, a total of 13 articles found that online social networking helped older adults to create new online communities with other older adults. This took place over platforms such as Facebook, as its simple interface provided an opportunity for the creation of entirely new online communities (Berg et al., 2017; Forsman & Nordmyr, 2017). For example, online support groups were formed, which offered an opportunity to give and receive support from those with similar life experiences, such as the death of a loved one (Berg et al., 2017). Other types of life experiences that older adults have discussed in their online communities are challenges experienced with aging, such as a loss of mobility or eyesight (Forsman & Nordmyr, 2017). These communities offered a place for older adults to joke about dealing with these age-related issues and receive information about how to get additional help or

resources to overcome them (Forsman & Nordmyr, 2017). In these online communities, individuals do not often meet the people with whom they are interacting face to face; however, participants often perceived their online social relationships to be as important as close in-person friends or family (Forsman & Nordmyr, 2017; Lehtinen *et al.*, 2009).

Discussion

Within the 52 articles included in this scoping review, five themes were identified that can be captured in two overarching categories; namely (1) mental health and (2) social connectedness. Mental health was discussed in terms of three main themes: depression, autonomy/self-efficacy, and subjective well-being. Social connectedness was further discussed in

two main themes: the creation of new online communities and enhancing existing relationships with family and friends. Taken together, online social networking appears to be associated with several factors tied to positive well-being, related to either mental health or social connections among older adults.

Implications for Older Adults' Mental Health

In line with previous research, the studies included in this scoping review generally found a positive association between online social networking and subjective well-being (Cotten, Ford, Ford, & Hale, 2014; Erickson & Johnson, 2011; Forsman & Nordmyr, 2017; Ihm & Hsieh, 2015; Khalaila & Vitman-Schorr, 2018; Leist, 2013; Lifshitz, Nimrod, & Bachner, 2018; Quintana *et al.*, 2018). However, well-being itself was often interpreted and measured quite differently across the studies. For example, whereas one study measured well-being as a combination of depressive symptoms, loneliness, and happiness (Chiu *et al.*, 2016), other research included the Satisfaction with Life Scale (Chopik, 2016; Heo, Chun, Lee, Lee, & Kim, 2015), a combination of the UCLA Loneliness Scale, the Life Satisfaction Index, the Self-Efficacy Scale, the Social Support Appraisal Scale, and the Beck Depression Inventory (Erickson & Johnson, 2011), or a combination of the Satisfaction with Life Scale, the Enjoyment of Life Scale, and components of the Quality of Life Scale (Quintana *et al.*, 2018). The lack of a standardized definition of well-being and discrepancies in operationalization may result in measurements of well-being that are neither reliable nor valid (Diener, Scollon, & Lucas, 2003). As a result, each research article's definition may be inferred through the types of scales used to measure well-being, as opposed to using one formal and consistent definition (Diener, 2009). For example, some studies conceptualized well-being as an umbrella term for mental health (Erickson & Johnson, 2011), while others analyzed quality of life (Khalaila & Vitman-Schorr, 2018), a combination of depressive symptoms and overall satisfaction with life (Lifshitz *et al.*, 2018), or a combination of satisfaction with life, happiness, and eudaimonia (Quintana *et al.*, 2018). Nonetheless, despite a lack of consensus regarding the definition of well-being, the research generally demonstrated a positive relationship between online social networking and each study's respective definition of subjective well-being.

Although we examined depression, loneliness, social isolation, and mental health more broadly, with regard to depression specifically, the research examined here generally found a link between greater online social networking and fewer depressive symptoms (Cotten *et al.*, 2014; Lee *et al.*, 2018; Lifshitz *et al.*, 2018; Minagawa & Saito, 2014). In particular, older adults with depression who lived

alone tended to benefit the most from using online social networking (Cotten *et al.*, 2014). Common measures of self-reported feelings of depression included loneliness, loss of appetite, feelings of sadness, lack of motivation, and restlessness (Chiu *et al.*, 2016; Chopik, 2016; Lee *et al.*, 2018; Teo, Markwardt, & Hinton, 2019). A large proportion of the research articles included in this scoping review (Challands, Lacherez, P., & Obst, 2017; Chiu *et al.*, 2016; Chopik, 2016; Cotten *et al.*, 2014; Teo *et al.*, 2019) used the Centre for Epidemiological Studies Depression Scale (CES-D), a widely used scale that has also been supported by previous research (Carleton *et al.*, 2013). Although the CES-D was originally designed to diagnose depression in (middle-aged) adult populations (Radloff, 1977), it has also been shown to be an effective measure of depressive symptoms for community-dwelling older adults (Cosco *et al.*, 2019; Lewinsohn, Seeley, Roberts, & Allen, 1997). Additionally, the association between decreased depressive symptoms and greater online social networking may be mediated by reduced loneliness (Chopik, 2016), as online social networking provides a platform for communication with others, bolstering relationships, participating in leisure activities, and increasing levels of confidence (Chen & Schulz, 2016). More specifically, applications that allow for video chats, such as Skype, which most closely resemble in-person interactions (compared with e-mail and instant messaging), appear to be associated to a greater extent with fewer depressive symptoms (Teo *et al.*, 2019). Therefore, this research suggests that the aforementioned benefits that online social networking may provide can serve as preventative measures against depression, loneliness, and even suicidal tendencies (Jun & Kim, 2017).

The research examined in this scoping review also generally suggested an association between online social networking and increased levels of self-efficacy and confidence (Blusi *et al.*, 2013; Chiu *et al.*, 2016; Erickson & Johnson, 2011; Leist, 2013; Xie, 2008). This association was found in correlational and qualitative studies (Díaz-Prieto & García-Sánchez, 2016; Erickson & Johnson, 2011; Szabo, Allen, Stephens, & Alpass, 2019; Zhang, 2016; Zhou, 2018) as well as two intervention studies (Chiu *et al.*, 2016; Morton *et al.*, 2018). Because of the small proportion of randomized control trials found in this scoping review, the direction of causality cannot be inferred. It is possible that more autonomous older adults are increasingly likely to use online social networking. However, it is equally likely that online networking allows for older adults to become more independent (Erickson & Johnson, 2011). Nonetheless, the two intervention studies (Chiu *et al.*, 2016; Morton *et al.*, 2018) did provide some support for the idea that online social networking may increase levels of autonomy. Regardless of the causal direction, however, increased levels of autonomy and self-efficacy in older adults are important to consider, especially given that a strong sense of self is often linked to greater overall mental health (Morton *et al.*, 2018). Indeed, regaining independence and self-efficacy may be especially important for older adults; in the studies examined here, some older adults reported avoiding potential opportunities for social engagement out of a fear of being rejected, as well as a loss of their "youthful identity" (Goll, Charlesworth, Scior, & Stott, 2015). Online social networking can sometimes compensate for the absence of activities requiring a certain level of independence and mobility that older adults sometimes no longer possess, or have increased difficulty with, such as driving (Challands *et al.*, 2017; Choi *et al.*, 2012). As a result, online social networking may help older adults increase their sense of autonomy through various mechanisms, such as learning new skills (Erickson & Johnson, 2011), conversing with other older adults with similar

experiences to make informed decisions (Blusi et al., 2013), increasing health literacy (Chiu et al., 2016), and even managing challenges associated with adjusting to a new country (Zhang, 2016). Fortunately, some features of online social networking applications can facilitate ease of use, especially for older adults, including voice control, the ability to provide and ask for logistical support through instant messaging, and language translation (Chiu et al., 2016; Xie, 2008). Through the ability to acquire new skills, older adults have reported feeling a greater sense of control over their lives, as well as increased confidence, and self-esteem (Zhang, 2016). As such, older adults felt as though they were able to re-establish a presence within their communities through having access to knowledge of current events, the ability to understand Internet references, and different options for leisure activities (e.g., chatting with distant friends, singing songs, and playing computer games; Blusi et al., 2013).

Implications for Older Adults' Social Connectedness

In addition to mental health, social connectedness was an overarching theme resulting from this scoping review, which could be further divided into two sub-topics: enhancing existing relationships and the creation of new online communities. Indeed, many of the studies examined here found that online social networking can serve as a tool to enhance existing relationships (Chen & Schulz, 2016; Chiu et al., 2016; Delello & McWhorter, 2017; Khosravi, Rezvani, & Wiewiora, 2016; Nimrod, 2010; Pfeil, Zaphiris, & Wilson, 2009; ten Bruggencate et al., 2018; Xie, 2008). Given that a common function of online social networking is to consistently keep in contact with family members from younger generations (e.g., nieces, nephews, and grandchildren) through applications such as e-mail and video-conferencing, such interactions often strengthen those relationships (Berg et al., 2017; Delello & McWhorter, 2017; Machado, Jantsch, de Lima, & Behar, 2014). This can be especially helpful for older adults who are geographically distant from their family members or for those who struggle with mobility (Chen & Schulz, 2016; Delello & McWhorter, 2017; Heo et al., 2015; Khosravi et al., 2016; ten Bruggencate et al., 2018). In this regard, especially given the likelihood of driving cessation among many older adults, online social networking has been shown to be a protective factor against social isolation and loneliness (Challands et al., 2017). As such, older adults may be motivated to use social networking technology (Chiu et al., 2016), with the added benefit of gaining social acceptance amongst their younger family members (Blusi et al., 2013). Older adults have also used online social networking to reconnect with childhood friends (Delello & McWhorter, 2017), which may, in some ways, compensate for the shrinking social network that is often associated with aging (Nimrod, 2010). Likewise, even among older adults living in retirement care, online social networking can be used to engage with other members of their retirement homes and their family (Delello & McWhorter, 2017), which also ties back to enhanced subjective well-being, as older adults who feel a stronger sense of group identification with their care communities are also more likely to report increased levels of happiness (Xie, 2008; Ysseldyk et al., 2021).

In addition to maintaining existing social contacts, another way in which older adults might compensate for potentially shrinking social networks is through the creation of new online communities. Oftentimes, older adults join or create online communities with other individuals with whom they have common interests, including hobbies, life circumstances, or physical proximity (Khosravi

et al., 2016; Nimrod, 2010; ten Bruggencate et al., 2018). For example, support groups are made available through online forums to allow for widow(er)s, caregivers, or those with chronic illness to communicate (Chen & Schulz, 2016; ten Bruggencate et al., 2018), where members can provide support for one another and share coping strategies that are potentially helpful with their respective circumstances (Xie, 2008). This can be especially beneficial, as older adults have reported that seeking help from individuals who can empathize with their current situations is paramount (Pfeil et al., 2009). For example, elderly women with chronic conditions have had the opportunity to create three-dimensional avatars of themselves in a peer-led forum that allows them to rely on each other for emotional and social support (Khosravi et al., 2016). Likewise, older adults can also use online social networking for leisure activities, such as singing karaoke and dancing through videoconferencing (Xie, 2008). Other examples include chat rooms where older adults can share advice on how to best use their technological devices (Xie, 2008), thus addressing a major mobility barrier (Woodward et al., 2013). The creation of online communities also has added benefits in rural communities (Berg et al., 2017; Blusi et al., 2013). As access to acquaintances, friends, community resources, and even health care services can be limited as a function of geographic location, older adults have reported using videoconferencing to interact with community groups and health care practitioners, often being quite satisfied with this alternative, as it saves travel time and is ultimately more cost efficient (Berg et al., 2017).

Implications for Programs and Policy

Taken together, increasing opportunities for older adults to engage in online social networking appears to be a potential method to alleviate loneliness, social isolation, and depression (Chiu et al., 2016; Chow & Yau, 2016; Morton et al., 2018; Neves et al., 2017). Generally speaking, intervention programs can ensure that technological devices are accessible to older adults (Blaschke, Freddolino, & Mullen, 2009), empower older adults (Hill, Betts, & Gardner, 2015), and provide in-depth training on social networking platforms (Poscia et al., 2018). However, a variety of social determinants of health, such as socio-economic status, ethnicity, and living in rural or remote areas, need to be taken into consideration to ensure that equity is achieved so that all older adults are equally able to reap the benefits of online social networking (Ihm & Hsieh, 2015; Khalaila & Vitman-Schorr, 2018).

Rural or remote areas may experience issues associated with Internet access, which may further disadvantage populations that already experience a dearth of health care services (Hodge, Carson, Carson, Newman, & Garrett, 2017). As previously mentioned, online social networking can be especially beneficial for older adults who are geographically distant from their family and friends, and the implementation of greater opportunities for online social networking can be beneficial, as seen through some intervention studies (Blusi et al., 2013; Dow et al., 2008). As such, interventions could also consider strategies for improving Internet access and providing opportunities for older adults to connect with one another, especially as older adults from rural areas are often quite motivated to learn how to use communication technology (Baker, Warburton, Hodgin, & Pascal, 2016).

The intersection between socio-economic status and ethnicity is also an important area of consideration for program and policy makers, particularly with regard to service access in under-served populations. This has been reflected in previous research, in which

older adults who did not use the Internet at all (or those who discontinued their Internet usage) were more likely to be from racial minorities and lower socio-economic groups (Choi & Dinitto, 2013; Yoon, Jang, Vaughan, & Garcia, 2018). Higher income is often associated with a greater level of access to technology and a greater ability to navigate the technology in question (Hargittai, Piper, & Morris, 2018). Furthermore, this association has been shown to be greater among older, compared with younger, adults (Ihm & Hsieh, 2015). This, in turn, can have a negative impact on health and well-being, as older adults with low socio-economic status may have decreased opportunities to benefit from the advantages that online social networking has to offer (Ihm & Hsieh, 2015), such as the ability to communicate with health care providers from a distance (Choi & Dinitto, 2013). Another important issue may be the lack of willingness by some minority group members to participate in online social networking, as experiencing discrimination may influence their motivation to connect with others online (Choi & Dinitto, 2013). Some potential ways that policy makers might lessen this “digital divide” include providing free technology and training sessions in public libraries and creating opportunities for people to donate technological devices to individuals from low-income households (Yoon *et al.*, 2018).

Limitations

Despite the contributions made by this scoping review toward understanding potential links between online social networking and older adults’ mental health, several limitations should be noted. First, most studies relied on self-reported measures of depressive symptoms, opening up the possibility of eliciting socially desirable responses (Erickson & Johnson, 2011) or experiencing difficulty reporting one’s mood in retrospect (Cotten *et al.*, 2014). Nonetheless, some research has demonstrated that self-report measures of health may be as reliable and accurate as clinical scales (Hudson, Anusic, Lucas, & Donnellan, 2020). Likewise, because of stigma and/or a lack of access to diagnostic and treatment services, some individuals may be prevented from receiving clinical diagnoses of depression; therefore, participant recruitment or analyses based on a formal diagnosis may not be as all-encompassing as hoped (Araya, Zitko, Markkula, Rai, & Jones, 2018; Clement *et al.*, 2014). Although a formal diagnosis was not part of the inclusion criteria for participants in the studies included in this scoping review, administering the same self-report scales to all participants to measure depressive symptoms, such as the CES-D (Challands *et al.*, 2017; Chiu *et al.*, 2016; Chopik, 2016; Cotten *et al.*, 2014; Teo *et al.*, 2019) may have helped to decrease potential discrepancies among the studies’ findings.

Second, articles from only three databases were examined: PubMed, PsycINFO, and Scopus. Although these databases were chosen *a priori* as adequate based on the topic of interest, there remains the possibility that our scoping review did not capture all relevant articles. Nonetheless, we consulted an experienced health and bioscience librarian to ensure the comprehensiveness of our search strings, and to ensure that the databases selected represented the most suitable options that would yield the highest number of relevant articles.

Finally, most of the studies included in this scoping review were correlational, and so suggestions of causal relationships should be interpreted cautiously. Future research may consider adopting more randomized controlled trial methodologies and/or longitudinal designs in order to better understand potential causal mechanisms, which would be especially relevant for program and policy implications.

Conclusions

As the older adult population is expected to increase dramatically in the coming years, mental health issues involving loneliness, social isolation, and depression are a growing concern. As “treatment” options for loneliness and social isolation—and the associated mental health impacts—are often difficult to implement, creative solutions that cater to older adults’ unique circumstances (e.g., mobility challenges, decreased social contacts), should be taken into consideration. This scoping review provided greater insight into the current research on the association between online social networking and mental health among older adults. The findings suggest that online social networking may indeed have a positive impact on mental health (including depressive symptoms), while increasing feelings of self-efficacy and independence. As such, interventions designed to provide education and opportunities, such as tutorials on online social networking and opportunities for older adults to use communication technologies, could be potential ways to increase social engagement and decrease loneliness. Nonetheless, various other social factors (e.g., related to other social determinants of health) must also be considered to ensure equitable opportunities for bridging the so-called digital divide that older adults often face, in order for more of them to benefit from this potential online “social cure” (Jetten *et al.*, 2012).

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