

Suicide-related Internet use: A review

Abstract

Objective: To review past research on how people use the Internet for suicide-related reasons and its influence on users. This review summarises the main findings and conclusions of existing work, the nature of studies that have been conducted, their strengths and limitations, and directions for future research.

Method: An online search was conducted through PsycINFO, PubMed, Ovid MEDLINE and CINAHL databases. Papers were included if they examined how the Internet was used for suicide-related reasons, the influence of suicide-related Internet use, and if they presented primary data. Although case studies of Internet-related suicide attempts do not present data, they were included as they demonstrate the unique ways in which the Internet can influence suicidal behaviour.

Results: Studies examining search trends and online communications between suicidal people can be useful in monitoring suicide risk in a population and furthering our understanding of the suicidal experience, respectively. While engaging in suicide-related Internet use was associated with higher levels of suicidal ideation, evidence of its influence on suicidal ideation over time was mixed. The present review also found a lack of studies directly recruiting suicidal Internet users. None (excepting case studies) examined the influence of suicide-related Internet use on suicidal behaviours or the influence of different types of suicide websites (i.e. pro suicide or suicide prevention websites). Online professional services can be useful to suicide prevention and intervention efforts, but require more work in order to demonstrate their efficacy.

Conclusions: Research has shown that individuals use the Internet to search for suicide-related information and to discuss suicide-related problems with one another. However, the causal link between suicide-related Internet use and suicidal thoughts and behaviours is still unclear. More research is needed, particularly involving direct contact with Internet users, in order to understand the impact of both informal and professionally moderated suicide-related Internet use.

Keywords

Suicide, Internet, online, suicide-related

Introduction

The Internet is easily accessible, widely available and often unregulated, allowing individuals to access information on a variety of topics and to communicate with strangers around the world. Its capabilities have attracted concerns over how it may negatively impact vulnerable individuals, such as suicidal people. Work on suicide and the media has predominantly focused on traditional forms of media, particularly surrounding the issue of suicide contagion (Pirkis et al., 2006). The Internet raises additional questions of not just how individuals are affected through passive exposure to suicide-related content, but also the ways in which it can be actively used for suicide-related reasons.

Daine et al. (2013) conducted a systematic review investigating the influence of the Internet on self-harm and suicide in young people. There was evidence of both positive influences, such as online media being used as a form of support, and negative influences, such as Internet addiction, cyberbullying, and the Internet being a source of information on suicide and self-harm.

The present review extends on the work of Daine et al. (2013) by focusing specifically on suicide-related Internet use. In order to provide as comprehensive an overview as possible, no age restriction was included. The aim was to summarise and assess the existing work on the nature of suicide-related Internet use and its influence of users, presenting previous findings as well as discussing the types of studies that have been conducted, their strengths and limitations, and directions for future research.

Method

A literature search was conducted on 19 August 2014 through PsycINFO, Ovid Medline, PubMed and CINAHL databases. Following the search strategy used by Daine et al. (2013), studies from 1991 (the year that the Internet became publicly available) to 2014 were included.

The search used the terms “suicid* AND (Internet OR online OR discussion forum OR online forum OR online support group OR Internet support group OR search engine* OR chat room OR chatroom OR virtual OR website OR web site)” and restricted papers to those published in English. A total of 1840 papers were returned across the four databases. Three hundred and sixty one duplicates were identified and removed. During initial screening of titles and abstracts (n=1479), papers that were not relevant to the area of suicide and the Internet, papers that examined those bereaved by suicide and papers that only focused on general Internet use, rather than suicide-related Internet use, were removed. In the second stage of screening (n=122), the full texts were assessed and studies were excluded if they did not examine the nature of suicide-related Internet use or its effects or if they did not present primary data. Although they did not present data, case studies of Internet-related suicides were included, given that they describe relatively unusual events and demonstrate the various ways in which the Internet can facilitate suicide. The PRISMA flow diagram showing the searching and screening process can be seen in Figure 1.

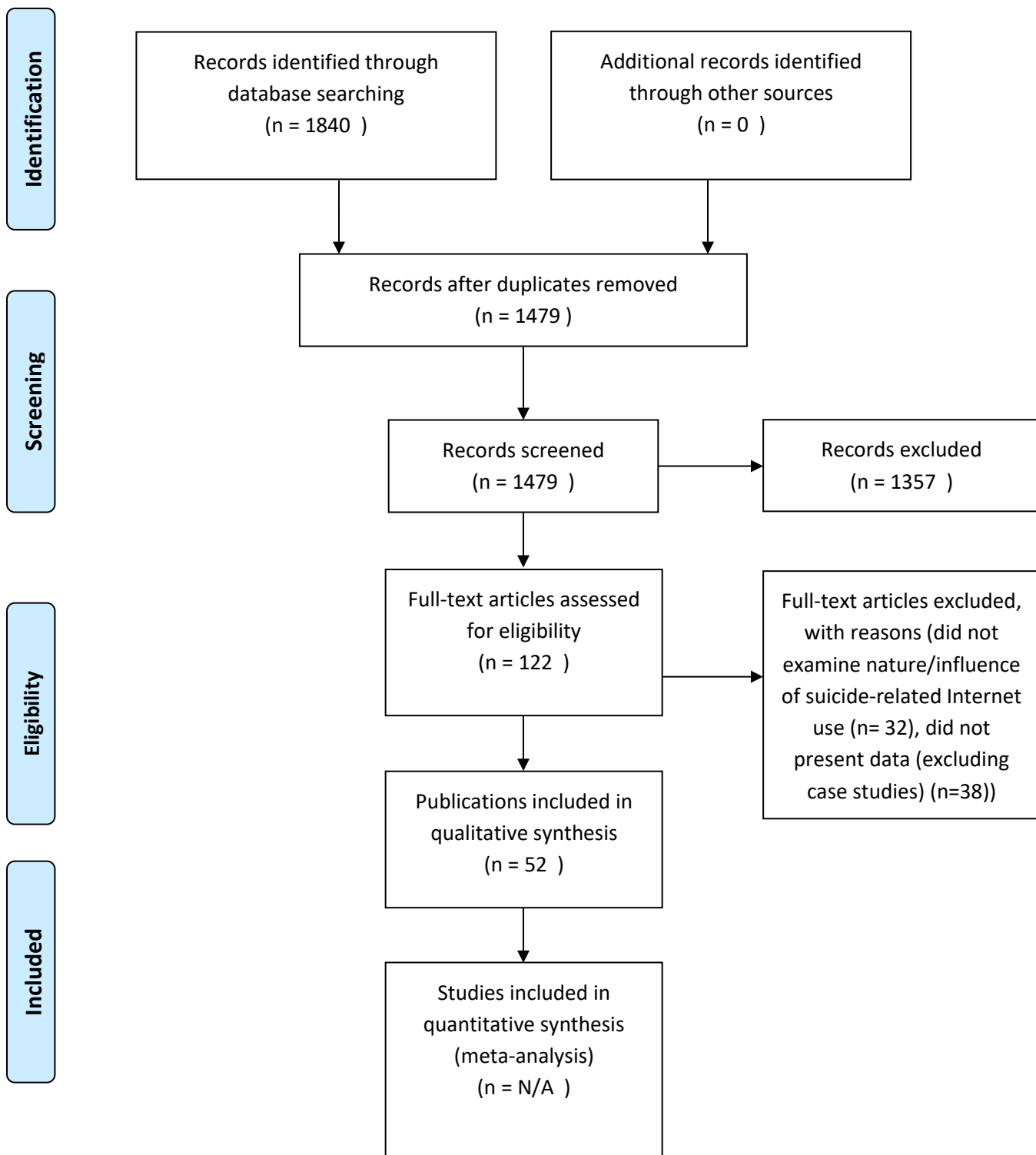


Figure 1. PRISMA diagram of searching and screening process

Results

The main findings and conclusions of the literature are presented below.

Use of the Internet to search for suicide-related content

Suicide-related Internet search trends can provide an indicator of suicide risk in a population.

Findings of significant associations between trends for suicide-related search terms and rates of suicide, as well as observed increases in certain search terms following suicide-related media reports suggest that search trends may be useful for monitoring suicide risk within a population.

Online searches conducted within the US for “commit suicide”, “suicide prevention” and “how to suicide” were significantly positively related to rates of suicide in the corresponding year (Gunn and Lester, 2013; Chen, 2012). In Japan, searches for “hydrogen sulfide”, “hydrogen sulfide suicide” and “suicide hydrogen sulfide” (a common method of suicide in Japan) were significantly positively associated with rates of suicide for people in their 20s and 30s, while searches for “BBS (bulletin board system) for suicide” and “suicide by jumping” were significantly associated with rates of suicide for people in their 30s, but not their 20s (Hagihara et al., 2012).

Other studies have shown that the relationship between suicide-related searches and rates of suicide can vary not only across age, but also culture and gender. In the US, searches for “suicide” were significantly negatively related to general population suicide rates, but significantly positively related to rates of suicide in youths. By contrast, searches for “depression” and “teen suicide” were not significant in either age group (McCarthy, 2010). Conversely, significantly positive links were found between suicide death rate and

searches for “depression” while searches for “suicide” and “suicide method” were not significant in both Japan (Sueki, 2011) and England and Wales (Bruckner et al., 2014).

Yang et al. (2011) assessed search terms representing various domains of suicide risk, including psychiatric, medical, and familial. The study, conducted in Taipei City, found that searches for “major depression” and “divorce” together accounted for 30.2% of the variance in population suicide rates. However, while “major depression” and “divorce” were only associated with adult and male suicides, searches for “anxiety” were only associated with female suicides.

Search trends can also provide a potential indicator of suicide contagion. In February 2008 in Japan and September 2010 in the UK, news outlets reported on several cases of hydrogen sulfide-related suicides. While search trends for the term “suicide” remained stable before and after the news reports, searches for “hydrogen sulfide” increased up to 50 times in April 2008 in Japan and over 9 times in the UK in the same week as the initial reports (Chang et al., 2011). Online searches for “how to commit suicide”, “ways to kill yourself”, “suicide pact” and “suicide hanging” have also been found to increase following high profile reports of suicide in Australia (Page et al., 2011). However, in such studies, a causal link between online searches and suicide deaths could not be established.

Users conducting suicide-related searches typically access scientific information and community resource websites. Suicide-related online searches can be conducted for a number of reasons, those of which are not evident from search trends alone. Wong et al. (2013) obtained information from an AOL data set and examined users’ browsing

behaviours after searching for suicide-related terms. Between March and May 2006, there were a total of 5526 suicide-related queries. Excluding entertainment-related searches (e.g. suicide girls), the most frequent searches were for the terms “suicide” (9.79%), followed by “how to commit suicide” (2.17%). Users searching for “suicide” were more likely to access scientific information and community resource websites, while those who searched for “how to commit suicide” were more likely to access websites on specific means. Though examination of browsing behaviour can provide some idea of the motivations behind conducting searches for particular suicide-related terms, it is still unclear whether these individuals were attempting to seek help for themselves, seek help for others, looking to commit suicide, or just had a general interest or curiosity.

Use of the Internet to express suicide-related feelings

Suicidal people use the Internet to post a variety of comments on their suicide-related feelings, providing significant insight into the lives and experiences of suicidal people. All studies that have examined how they use the Internet to express their suicide-related feelings have used data from comments posted publicly on the Internet, finding that suicidal people use both suicide-specific and non-suicide-specific websites to express themselves. On Myspace, 64 adolescents who posted suicidal statements referred to relationship issues (42.2%), with a minority referencing mental health problems and substance use (6.3%) (Cash et al., 2013). Comments posted in response to a two-part radio program broadcast by the ABC in Australia titled “Thinking about suicide” discussed triggers of suicidal feelings, experiences with having suicidal feelings, experiences with treatment, as well as the importance of accepting suicidal people (Dodemaide and Crisp, 2013). Horne and Wiggins (2009) found that through online self-expression, suicide

forums were used to construct the identities of users as authentically suicidal and to receive validation of this identity from other forum members.

Ikunaga et al. (2013) conducted a content analysis of posts on a Japanese suicide forum in order to explore the phenomenon of group suicide or online suicide pacts in Japan. They argued that the frequency of themes relating to interpersonal connection reflected Japanese cultural values emphasising group experience and belongingness, which could account for the popularity of online suicide pacts in Japan.

Online posts can also provide information about the suicidal process itself. Analyses of blog entries of a Chinese adolescent who had died by suicide revealed that more positive emotion words were used when posts were less frequent, while more negative emotion words were used when posts were more frequent (Li et al., 2014).

Other studies of the online writing characteristics of suicidal people show that there are significant differences when compared with distressed and non-distressed non-suicidal people. For example, posts of suicidal people are shorter in length, have more polarised expressions (e.g. “always”, “never”), have a higher use of negatives (e.g. “no”, “never”, “nothing”) (Fekete, 2002), include more global and stable causal attributions to negative life events, and show more unbearable psychological pain and negative constriction (i.e. rigid thinking) (Barak and Miron, 2005)

Suicide-related Internet use and suicidal behaviour

The Internet can facilitate suicide. A number of case studies demonstrate the ways in which the Internet might facilitate or encourage suicidal behaviour. Baume et al. (1997) and Baume et al. (1998) presented three cases of individuals who had attempted or died by

suicide after posting suicide notes to a suicide newsgroup. The notes themselves included statements of the intention to die and sought others' advice on effective methods.

Responses included both discouragement and discussions over the advantages or disadvantages of specific methods. They were, however, unable to show whether these online interactions actually influenced the suicide attempts.

Other cases in the literature describe individuals who have attempted or died by suicide after using the Internet to obtain information on suicide methods (Alao et al., 1999; Gosselink et al., 2012; Haut and Morrison, 1998; Prior, 2004; Cantrell and Minns, 2011; Corkery et al., 2010; Gallagher et al., 2003; Musshoff et al., 2010; Schneider et al., 2010), to obtain methods themselves (Becker et al., 2004), to form online suicide pacts (Mehlum, 2000; Birbal et al., 2009; Laberke et al., 2011) and to broadcast their suicide (Birbal et al., 2009). In their examination of group suicide in Japan, Naito (2007) discussed four cases of online suicide pacts. In one case, the strangers had met through a website for suicide prevention.

In interviews with 22 participants who had previously made near-fatal suicide attempts, 13 were found to have used the Internet as a source of information on suicide, with the Internet having shaped the attempts of eight participants. These individuals predominantly accessed professional information resources, general knowledge sites and news websites, rather than suicide-specific websites (Biddle et al., 2012).

Internet-related suicides are rare when compared with overall suicides. Although the Internet can indeed be used to facilitate suicide, Gunnell et al. (2012) found that Internet-related suicides were rare when compared with overall suicides. Using information

obtained from coroners' reports, of 593 completed suicides in England 2005, only nine were identified as having moderate or strong links to the Internet. These suicides involved searching online for particular methods, accessing websites containing information on methods and visiting euthanasia websites. None of the suicides were found to be the result of online pacts.

There is no evidence of increased suicidal behaviour in response to a suicide on an online forum. In light of concerns over the ease of locating and communicating with suicidal people online, Hsiung (2007) investigated the potential of a suicide contagion effect by analysing comments posted in reaction to the suicide of a prominent member on a mental health forum. He found no evidence of increases in self-harm or suicidal behaviour. Rather, individuals showed grief, anger, and sadness in response, and used the event to reflect on their own suicidality.

Suicide-related Internet use and suicidal ideation

Individuals who engage in suicide-related Internet use report higher levels of suicidal ideation. Those who use the Internet for suicide-related reasons have been found to be more likely to report higher levels of suicidal ideation than those who do not. Sueki (2013) surveyed participants recruited from a Japanese Internet survey company about suicidal ideation and their suicide-related Internet behaviours (consulting about mental health, sharing suicidal ideation, searching suicide methods and viewing suicide methods). Internet behaviours were rated on a scale of frequency from 1 "not at all" to 6 "every day", while suicidal ideation was measured using the Beck Scale for Suicidal Ideation.

Participants were surveyed at baseline and again three months later. Participants who

reported consulting about mental health, searching suicide methods, and viewing suicide methods at follow up were also more likely to report higher levels of suicidal ideation at follow up. Though the design of the study was longitudinal, statistical significance was only achieved between variables assessed at follow up. The model assessing the relationship between online suicide-related behaviours at baseline and suicidal ideation three months later was found not to have an adequate goodness of fit.

Cross-sectional surveys in Japan have also shown that accessing suicide websites or searching online for information about suicide or self-injury are associated with higher levels of suicidal ideation (Katsumata et al., 2008; Aiba et al., 2011), but do not establish a causal link. These studies have been conducted among community samples and include both suicidal and non-suicidal participants. Harris et al. (2009) instead restricted their sample to suicidal people and compared those that reported going online for suicide-related reasons and those who did not. Suicide-related users reported significantly higher depressive symptoms, higher risk for suicide, lower perceived social support, higher likelihood of not seeking help for suicide from anyone, and a lower likelihood of seeking help for suicide from friends.

There are mixed findings regarding the influence of suicide-related Internet use on suicidal ideation over time. Dunlop et al. (2011) examined young people's exposures to stories of suicide from various online sources and their levels of suicidal ideation 12 months later. Suicidal ideation was assessed by participants' ratings of how often they had felt suicidal within the past 12 months. Of all online sources, only forums were found to significantly predict increases in suicidal ideation at follow up. The researchers argued that online forums can negatively influence suicidal people because they allow free discussion of

suicide-related issues or mental health problems. However, it was not possible to conclude from their data how the forums were used, the types of forums used or the nature of suicide story exposure.

Cross-sectional studies have used participants' retrospective ratings of suicidal thoughts to investigate the influence of their Internet use. Two studies, using the same data set, found significant decreases among users of a German suicide forum in retrospective ratings of suicidal thoughts on a scale from 0 (absolutely no suicidal thoughts) to 6 (very strong suicidal thoughts) from before first using the forum to the time of the survey (Eichenberg, 2008; Kral, 2006). Significant decreases were also found in those with destructive motivations (e.g. searching for information on suicide methods) for using Japanese and German suicide forums (Sueki and Eichenberg, 2012). Generalisability of these findings is, however, limited, given that they sample from single suicide forums rather than a wide variety of websites. Additionally, as recruitment notices are posted on the forums themselves, those who use the forum more frequently or who have more positive experiences with the forum can be more likely to reply.

Harris et al. (2009) adopted a wider recruitment strategy, obtaining participants through email, blogs, newsgroups, search results, universities and Google advertisements. Participants were asked whether they felt more or less suicidal after going online for suicide-related reasons, with 69.7% of suicide-related Internet users reporting that they felt less suicidal.

Conversely, Sueki et al. (2014) found that disclosing suicidal feelings to anonymous others over the Internet and browsing online for information about suicide methods

significantly predicted increases in suicidal ideation 7 weeks later. Participants were recruited from a Japanese Internet survey company and administered various measures, including the Beck Scale for Suicidal Ideation, to assess outcome.

Informal online suicide communities can maintain suicidal feelings. While informal online suicide communities (i.e. not moderated by professionals) can be used in a positive manner, they can also maintain suicidal feelings rather than lead to recovery. Miller and Gergen (1998) examined posts on a suicide forum and found that the forum validated the experiences of members, as well as offered sympathy, acceptance, and encouragement to continue living. Through additional interviews with forum members, they concluded that while there were subtle, yet valuable, effects of the suicide forum, the forum nevertheless maintained, rather than transformed, users' suicidality.

Role of the Internet in suicide prevention

Informal online suicide communities can function as support groups. Email interviews with users of suicide and self-harm websites revealed that the most common themes in participants' discussions of their website use were the empathic understanding offered by other members, use of the websites to cope, and the sense of community offered to participants (Baker and Fortune, 2008).

Online suicide forums staffed by trained volunteers can have positive effects. Based on analyses of messages posted to an online suicide forum staffed by trained volunteers, Greidanus and Everall (2010) found that members used the forum to both seek and provide help. Gilat et al. (2012) assessed posts in an online support group and compared the number of response strategies used between trained volunteers and laypeople. The

trained volunteers used significantly more strategies in their responses, particularly emotional support, empowerment, interpretation, and cognitive change inducement. On the other hand, laypeople offered significantly more self-disclosure.

Additionally, more frequent activity in online forums staffed by trained volunteers and professionals may help in alleviating distress. Barak and Dolev-Cohen (2006) qualitatively measured levels of distress (via thematic coding) in messages posted over the course of three months. They compared the level of distress in messages between each of the three months and correlated the number of messages with level of distress. Although there was no significant difference in level of distress between each month, there was a significant negative relationship between the numbers of messages posted in the first month with level of distress in the third month. As posting frequency increased, levels of distress decreased.

Professional online-based interventions can reduce suicidal ideation. Two papers were identified that evaluated online-based interventions specifically targeted towards reducing suicidal thoughts. Both included a series of modules based on CBT principles to be completed by participants each week. The Reframe IT intervention was conducted among Australian secondary students aged 14-18 (Robinson et al., 2014). The intervention website also included an online adult character who verbally delivered therapy, video diaries of young people, a message board, factsheets, downloadable MP3s, and a list of helplines. Participants completed modules on school premises in the presence of a member of the research team.

The Suicidal Ideation Questionnaire was used as the primary outcome measure and administered to participants at pre-test and at post-test 8 weeks later. Participants reported a significant decrease in suicidal ideation with a moderate effect size. There were a small number of participants in this study ($n = 21$) and no control group.

The second study involved Dutch adults aged 18 and over recruited via the Internet (van Spijker et al., 2014). In order to ensure the safety of participants, the researchers monitored participants' levels of suicidal ideation and depression during the intervention and contacted those with particularly high scores. Thus, as participants were required to disclose their identity, the study was not anonymous, which could account for the 32.9% of eligible participants who declined to participate. Participants were randomised into an intervention group ($n = 116$) and a waitlist control group ($n = 120$). Both groups reported decreases in suicidal ideation at the end of the intervention period (6 weeks) compared with baseline scores. However, the intervention group reported significantly greater decreases in suicidal ideation than the control group, with this between group difference having a small effect size (van Spijker et al., 2014).

Discussion

Individuals use the Internet for suicide-related reasons in a number of ways, including searching for information about suicide and going online to discuss or express their suicidal feelings. Research investigating online suicide-related behaviours can offer valuable information while also being conducted using non-invasive methods and easily obtainable data (e.g. search trends and publicly available posts). Although search engine studies have not shown whether conducting suicide-related Internet searches leads to

suicide attempts, studying search trends and comparing them with other readily available suicide data can potentially provide an indicator of the risk for suicide in the population at a particular time. Insight into the suicidal process, the suicidal experience and suicide phenomena such as online pacts can also be obtained through assessing the online posts of suicidal people. Nevertheless, there are also several limitations of the research in this area. As they do not directly involve participants, they are unable to collect information (e.g. characteristics of users, motivations for use etc.) that would be useful in interpreting their findings. Additionally, studies that rely on data that are publicly available are unable to investigate those who engage in passive or non-interactive forms of suicide-related Internet use.

Evidence of the Internet's influence on suicidal behaviours is predominantly composed of case studies. They illustrate occasions where individuals have either attempted or died by suicide using the Internet to obtain information on suicide methods, obtain suicide methods themselves, or to form online pacts with strangers. While the findings are concerning, they neglect those who engage in suicide-related Internet use but do not subsequently attempt suicide. Indeed, Internet-related suicide is uncommon when compared with overall rates of suicide.

Using larger samples and surveys with Internet users, cross-sectional studies have investigated the link between suicide-related Internet use and suicidal ideation. Individuals who engage in suicide-related use tend to report decreases in suicidal thoughts at time surveyed compared to before first going online for suicide-related reasons. Thus, although those who use the Internet for suicide-related reasons may be more likely to report higher levels of suicidal ideation than those who do not, it is not necessarily the result of their

Internet use. The major limitation of these studies is the limited recruitment method. As they tend to solely recruit users from suicide forums, their findings do not generalise to those who engage in other forms of suicide-related Internet use. Furthermore, they prevent comparisons between different types of websites. For example, it is unknown whether pro-suicide websites can increase the risk for suicide and whether suicide prevention websites can decrease risk, or whether experiences may differ between those who use interactive compared to more passive forms of suicide-related Internet use. Additionally, there is also potential recall bias associated with using retrospective ratings to assess the effects of suicide-related Internet use. One longitudinal study using established measures conversely found that suicide-related internet use significantly predicted increases in suicidal ideation at follow up. The reasons for this inconsistency are unclear due to a number of differences in methodology.

Although it would be beneficial to conduct more longitudinal studies with large, widely recruited samples and use psychometrically validated tests to measure outcome, such studies are difficult to conduct in practice due to potential threats to the privacy and anonymity of users, as well as research-related ethical concerns. This is reflected in the lack of work directly surveying Internet users. Consequently, little is known about the characteristics of users, despite findings that those who engage in suicide-related Internet use are at significantly higher risk for suicide, report significantly higher depressive symptoms and perceive significantly lower social support.

Overall, the literature indicates that informal online suicide communities do not necessarily pose a risk to participants, and can offer valuable support by providing users with a place to share problems and feel accepted and understood. They are, however,

unable to replace professional services in terms of promoting recovery among suicidal people. There is evidence suggesting that online communities staffed by trained volunteers can have a useful role in suicide prevention and that online-based interventions can reduce suicidal ideation. However, more research is needed to examine and demonstrate the efficacy of such services.

Conclusion

The present review has provided a summary of the existing work investigating the nature of suicide-related Internet use and its influence on users by describing its main conclusions and findings. In some cases, conclusions were only supported by one study, demonstrating the lack of research in the area of suicide and the Internet. While studies using publicly available data are able to provide important information, direct contact with diverse samples of Internet users is also necessary in order to fully understand how various forms of suicide-related Internet use can impact individuals. More research needs to be conducted, addressing the limitations of previous studies, as well as evaluating the efficacy of existing online professional services.

The Internet can be a powerful resource for professionals. In order to truly integrate the Internet into suicide prevention and intervention, it is necessary to understand the role that the Internet plays in the lives of suicidal people, the type of people who are likely to engage in suicide-related Internet use and for what reasons, and how or if different online suicide resources can impact the risk for suicide.

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