




#Depression: Findings from a Literature Review of 10 Years of Social Media and Depression Research

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Abstract. The purpose of our literature review was to understand the state of research related to social media and depression within the past 10 years. We were particularly interested in understanding what has been studied in relation to immigrant college students, as they are especially at risk for depression. Searching three databases, ACM Digital Library, PubMed, and IDEALS, we found 881 research articles. Based on our criteria, 78 research papers were included in our analysis. Although social media use is common among college students and depression is an issue for many immigrants and college students, we found few studies that focused specifically on college students, and we identified no studies on immigrant college students or college-aged immigrants. The research articles focused primarily on Twitter and general social media usage (rather than specific social media platforms) and commonly employed qualitative methods. We identify four gaps in the existing literature, why they matter, and how future research (our own included) can begin to address them.

Keywords: Social media · Depression · Mental health · Literature review
College student · Immigrant · Underrepresented populations

1 Introduction

Depression is the leading cause of disability across the world [1]. More than 300 million people suffer from depression worldwide [1]. According to the National Institute of Mental Health [2], approximately 16.1 million people in 2015, ages 18 and above, experienced at least one of the major depressive symptoms within the past year. Especially for college students in the United States, depression is a prevalent issue [3]. Within the college population, immigrant college students may be more susceptible to

depression [4]. In particular, they face more challenges as an immigrant that affect their academic success in college [4].

While the exact cause of depression is unknown [5], it can impact one's life dramatically. For example, depression is related to poor work performance, missing work, and increased suicide risk [5]. Additionally, it is the second leading cause of death for 15 to 29 year olds [2]. College students who experience depressive symptoms are often reluctant to seek treatment [6, 7]. This is especially problematic among immigrants [8]. Part of this can be attributed to the stigma of mental illnesses [6, 7]. Research has shown that perceived public stigma and personal stigma are barriers to individuals seeking treatment and help [6]. The stigma surrounding mental illnesses may partly explain why people are turning to technology to acquire and share information about health conditions, like depression. As of 2008, 72% of young adults looked up health information online, and 21% of adults used the internet to learn more about depression, anxiety, stress, or mental health issues [9]. As our society slowly evolves around technology, more people are using social media in relation to mental health conditions, such as depression [10, 11]. This is no surprise given the popularity and availability of social media in the United States. According to the Pew Research Center [12], approximately 79% of Americans have a Facebook account, 24% have Twitter, 32% have Instagram, 31% have Pinterest, and 29% have LinkedIn as of 2016. People are now using these types of general-purpose technologies to learn about different health-related topics and share health-related information that may be uncomfortable to discuss in person.

Therefore, understanding how social media is used in relation to depression is becoming increasingly important, especially among groups that depression significantly impacts, such as college and immigrant college students. What do we know about social media use and depression among immigrant college students? In order to begin to answer this question, we first sought to understand what has already been studied about the use of social media for depression with a particular focus on populations related to college or college-aged people and immigrants. Given the increase in social media use and the prevalence of depression, we believe this is the ideal time to look at the state of research about social media and depression. Therefore, in this paper, we report findings from our literature review, which aims to better understand how social media has been studied in relation to depression over the last 10 years in Human-Computer Interaction (HCI) and Health Informatics. This paper represents the first phase of our research and provides the basis for the second phase, which is described in the Future Research section. This literature review provides insights about research that has already been done in relation to social media and depression, emphasizing a lack of research on immigrant college students. Thus, our goal for this paper is to highlight these gaps and identify future research directions.

2 Methods

2.1 Research Questions

Our primary objective was to better understand what has been studied in relation to social media and depression in HCI and Health Informatics. While we were particularly

interested in immigrant college populations, our goal was broader: we wanted to identify the types of methods, populations, and platforms studied. For this paper, we focus mostly on the quantitative analysis of the literature. Therefore, we identified three broad research questions:

RQ1: *What methods are used in studies of social media and depression?*

RQ2: *What populations are specifically identified in studies of social media and depression?*

RQ2a: *Are college students explicitly discussed in these studies?*

RQ2b: *Are immigrants explicitly discussed in these studies?*

RQ2c: *Are immigrant college students explicitly discussed in these studies?*

RQ3: *What social media platforms are studied in research on social media and depression?*

2.2 Search Strategy

We sought to identify studies that were related to social media and depression in order to better understand what has been studied about social media use and depression among immigrant college students. We performed literature searches through three databases: (1) ACM Digital Library, (2) PubMed, and (3) IDEALS (iConference). These were chosen because they included many journals and conferences related to HCI and Health Informatics. The third author was assigned to search the ACM Digital Library, the first and fourth author were assigned to search PubMed, and the second and fifth author were assigned to search IDEALS.

In order to collect relevant studies, we conducted 18 keyword searches in each database with combinations of the following keywords: social media, depression, mental health, college student, university student, immigrant, first generation immigrant, and second generation immigrant. Broad and general searches (e.g., social media and depression) were used to obtain as many articles as possible in relation to social media and depression to help answer RQ1, RQ2, and RQ3. Additionally, specific searches (e.g., college and social media and depression) were used to identify articles specific to our population of interest and to explore RQ2 in more detail (particularly RQ2a, RQ2b, and RQ2c). Although our focus was depression, we searched for broader terms (e.g., mental health) in order to acquire more articles that may relate to depression. We applied filters to the searches: we restricted the keyword searches to abstracts only, focused on articles in the English language, included only scholarly and peer-reviewed articles, and limited the publication timeframe to 2007 to 2017. The timeframe was chosen to be within the last 10 years because social media usage in the United States hit a high point in 2007 and has been increasing [13].

2.3 Study Selection

Figure 1 shows an overview of the process to identify the relevant articles for analysis. The database searches resulted in 881 articles. Then, the articles were screened in relation to social media and depression. During this screening phase, only the abstracts were reviewed. If articles passed the screening, their citations were saved in Mendeley,

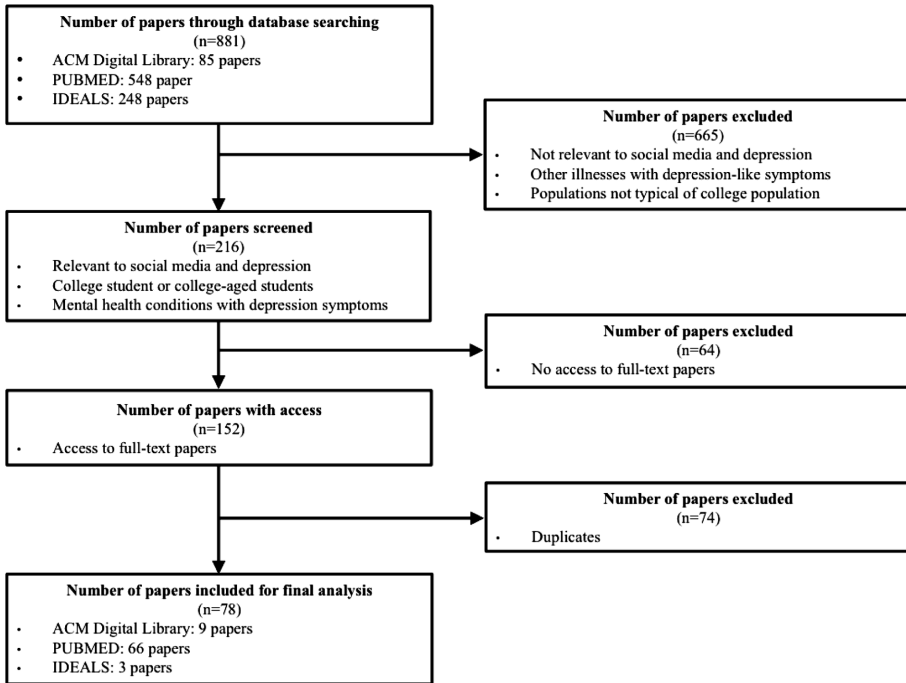


Fig. 1. Flowchart showing our process of identifying papers for our final analysis.

a reference manager. Articles were included if they discussed social media generally or named specific platforms. They were also included if they focused on a population that may have overlapped with college-aged students. This is because we found many studies were not explicit in identifying the population studied. In the United States, the enrollment rates for colleges comprised mostly of the 18 to 24 year old population (approximately 11.8 million students in 2015) [14]. Therefore, articles that used the term “adolescents” were included if they specifically focused on individuals who were 18 years old or older, and articles that used the term “adults” were included if their age ranges overlapped a typical college population. Additionally, articles about the general population were included because 90% of social media users are among the ages of 18 to 29 [15]. We included articles about mental health conditions generally if they mentioned depression-like symptoms.

Through the screening, a total of 665 articles were excluded. Studies were excluded if there was no relevant information about social media, depression, or if they focused on a population that typically would not overlap with college students. The excluded articles consisted of only mentioning one or two of our keywords (e.g., depression only but no mention of social media), focusing on a specific type of depression (e.g., postnatal depression), mentioning depression-like symptoms as a result of another illness or disease, and focusing on an older population (e.g., 65 year olds) or a younger population (e.g., 12 year olds), which would not be typical of a college population.

Next, the 216 articles that passed the screening were examined to see if the full-text was available. Two of the databases, ACM Digital library and PubMed, had restrictions with some of the articles. Only IDEALS provided access to all of the full-text articles. If we could access the full-text, we downloaded the PDF of each article into Mendeley. A total of 64 articles were excluded because we could not access the full-text.

Finally, the remaining 152 articles were examined for duplicates. As a result, 74 articles were excluded. A final total of 78 articles¹ were included in our analysis. The first author reviewed the final articles, and then an excel spreadsheet was compiled with the title, authors, year of publication, abstracts, methods, populations, technologies, and social media platforms of the final articles. We used this spreadsheet to track and organize the articles for our analysis.

3 Findings

As illustrated in Table 1, the articles were analyzed according to the types of methods (RQ1) and populations (RQ2) used in research studies. Qualitative (n = 30) followed by quantitative (n = 17) were the most popular types of methods used to study the relationship between social media and depression. There were only a few research studies that used both qualitative and quantitative methods (mixed methods) (n = 8). In addition, most of the research studies focused primarily on the general population (n = 40). Of those studies that explicitly named their target population, adults and adolescents were commonly discussed. While many studies specifically examined adults (n = 18) and adolescents (n = 15), the college student population (n = 5) was not thoroughly represented in these articles, and no identified studies focused on immigrants or immigrant college students.

Table 1. Method and Population types

Method type	# of Studies	Population type	# of Studies
Qualitative	30	Adults ^a	18
Quantitative	17	Adolescents ^b	15
Mixed (qualitative & quantitative)	8	College students	5
Literature review	9	General population	40
Other	14	Immigrants	0
Total	78		78

^aAmong the 18 articles, adults' ages ranged from 18 to 64 years old.

^bAmong the 15 articles, adolescents' ages ranged from 11 to 21 years old.

As Table 2 highlights, the articles were also analyzed according to the types of social media platforms (RQ3). For specific social media platforms, Twitter (n = 27),

¹ Due to Springer's page limitations, the final articles could not be included in this paper. A list of the articles can be obtained by contacting the first author.

followed by Facebook (n = 18) and then Reddit (n = 10) were the most frequently cited. However, it was commonly found that articles did not discuss specific platforms but rather discussed social media more generally in the research studies (n = 23). Articles that focused on adolescents and mentioned specific social media platform examined Twitter (n = 4), Facebook (n = 3), a health forum known as Horyzons (n = 1), and an online counseling service known as Kooth (n = 1). On another note, the articles that focused on adult populations mainly discussed unspecified social media platforms (n = 14), Facebook (n = 3), and Twitter (n = 2). The articles specifically identifying college students that also named a specific social media platform focused on Facebook (n = 2), Reddit (n = 1), and Yik Yak (n = 1). Only one article about college students did not specify any social media platforms (n = 1).

Table 2. Social media types

Social media type	# of Studies
Facebook	18
Google+	3
Instagram	5
Reddit	10
Twitter	27
YouTube, Forums	8
LinkedIn, Pinterest, Wikipedia	2
Myspace, Tumblr	4
Flickr, Livejournal, Orkut, Photobucket, Snapchat, Vine, WordPress, YikYak, Camoni, Douban, Horyzons, Kooth, Miki, PatientsLikeMe	1
No specific social media named	23

Articles about multiple social media platforms were counted individually for our analysis.

Social media has been studied in terms of social identity, social support, technology use, online community, and cyber victimization. The majority of the literature in the context of social media and depression has discussed mental health more generally (e.g., well-being, anxiety, self-harm). Social media was discussed in terms of general social media and mobile usage, specific social media sites (e.g., Twitter, Reddit, YouTube, etc.), and management and intervention for mental health (e.g., suicide prevention, reducing depressive symptoms, and increasing online peer-to-peer groups).

4 Discussion

From our literature review of 10 years of research, we found that studies of social media (most commonly about Twitter) focused on the general population (rather than explicitly naming a population), and the majority of research methods to collect and analyze data were qualitative. In this section, we discuss the gaps in the literature, why these gaps matter, and how our future research aims to address them.

4.1 Gaps in Literature

One of our primary contributions of this work is highlighting future areas of research based on our literature search. We identified four main gaps in terms of methods, populations, and social media platforms: (1) More researchers need to take a mixed method approach to understand depression and social media; (2) College students in general are not studied as the focal population group; (3) Immigrant college students specifically are understudied and; (4) There is a lack of diversity of social media platforms which are studied.

Based on our analysis, a majority of the studies involved the use of only qualitative or quantitative methods. Out of the 78 research articles, only 8 articles involved the use of mixed methods. However, mixed methods need to be utilized in more research studies as they benefit from the strengths of both qualitative and quantitative methods, which also means they compensate for the shortcomings of each of these methods alone [14]. Mixed methods strengthens the data collection and analysis [14] because it allows for more comprehensive information to be gathered on the research topic, and additional questions can be addressed.

As most of the literature focused on general social media users, there remains a gap in the literature examining the relationship between social media and depression among specific subgroups of social media users. Although we specifically looked for articles about college students, we only found 5 relevant articles. They are an important yet understudied population. In fact, it is reported that approximately 3 in 10 students have reported feeling so depressed that they found it difficult to function [15]. However, almost 75% of college students reported that they do not reach out for clinical services [16]. The articles that have researched college students and social media have focused on how social media sites, specifically Facebook and Reddit, are used in relation to mental health wellbeing. Because depression has become a very common health problem among college students in the United States [3], it is crucial we learn more about how they are using social media to manage depression and how social media may impact depression.

Although we also attempted to identify articles specifically about immigrant college students, they remain understudied. Immigrant college students are also an important population to research as they represent a large percentage of the college student population [17]. In fact, 24% of undergraduate college students were identified as first and second generation immigrant students in 2011 and 2012 [17]. They are also at an increased risk for depression [18]. First generation immigrants often carry the burdens of being an immigrant and a first-generation college student, which creates additional challenges in transitioning to college, achieving personal dreams, and abiding to familial expectations [18]. Additionally, these challenges have been associated with immigrant college students feeling more stressed and depressed compared to their non-immigrant college peers [4]. By understanding immigrant college students' challenges and mental health struggles, mental health can be better assessed and intervened.

Finally, we found the majority of studies focused on Twitter, followed by general social media, and Facebook. While Facebook and Twitter are common among 18 to 29 year olds, other social media platforms, such as Instagram, Pinterest, and messaging applications (e.g., Snapchat) are also popular among this group [12]. Additionally,

college students have taken an interest in social media platforms that focus on pictures or videos (e.g., Instagram) [19]. However, we identified only 5 studies on Instagram, only 2 on Pinterest, and only 1 on Snapchat. Therefore, more research is needed on these types and other types of social media platforms. Additionally, more studies need to explicitly name the social media platforms on which they focus. This is important because social media platforms differ in their design, users, interaction, effects, etc. Without knowing the types of social media studied, it is difficult to translate and build upon these research findings.

4.2 Limitations

With our literature search, we aimed to be as exhaustive as we could in identifying articles related to HCI and Health Informatics. It is possible, though, that we may have missed some studies due to our keyword choices as well as the databases we searched. It is important to note that keywords were chosen in regard of our population of interest. Although our goals were broad, our intention was to identify literature around college students with a particular focus and interest in immigrant populations. Due to many articles not explicitly naming their population, we included general social media users, adults, and adolescents if they overlapped with college-aged individuals. Thus, we acknowledge that the populations discussed in these articles may not all be college students. Our paper highlights not only the lack of studies explicitly focusing on this group, but also the issues with generalizing findings when populations are not made explicit.

Furthermore, we only searched through three databases with a focus on HCI and Health Informatics as our goal was to draw attention to the gaps in these two fields, which have expertise and interest in social media and increasingly in mental health. Additionally, certain articles retrieved from ACM Digital Library and PubMed were not full-text and thus excluded from our literature review. Relevant studies involving social media and depression could have been omitted as a result. Finally, we acknowledge that there may have been selection bias during the screening process. While we met weekly as a team to discuss any questions about our search process, it is possible we may have missed studies due to each individual's interpretation of the articles.

4.3 Future Research

As mentioned beforehand, this literature review is phase one of a proposed research project. In order to begin to address the above mentioned gaps in phase two of our project, we are planning to conduct a study on how first and second generation immigrant college students with depression use social media. We will use a quantitative questionnaire on depression symptoms, social media usage, demographics, and culture and conduct qualitative semi-structured interviews with immigrant college students with depression. The goal is to better understand the use and impact of social media on immigrant college students with depression. We are also interested in how they navigate their social stratosphere through social media to manage their depression symptoms. We will group specific social media platforms together as part of our analysis in

order to understand the benefits and drawbacks of particular platforms. Our research findings aim to create more inclusive social media platforms and services. We hope to gain insight on how immigrant college students use specific social media platforms as an alternative to clinical mental health services, which could lead to improvements in therapy and design recommendations for social media and other types of technology.

5 Conclusion

Because social media is so popular today, this is a perfect time to understand social media in relation to depression. In particular, we were interested on who is the focus of these studies. Our literature search reveals a lack of research on immigrant college students despite the prevalence of depression among this group. Searching through three databases related to HCI and Health Informatics, we found 78 articles related to social media use and depression. The majority of articles used qualitative methods, focused on a general population of social media users, and focused on Twitter or discussed social media generally. We found few articles specifically about college students and no articles about immigrant college students. This is problematic considering the prevalence of depression among college students and immigrants [3, 4] as well as the popularity of social media among college-aged people [19]. Therefore, we identify four gaps in terms of methods, population, and social media, which need further attention. We hope that through this paper, we can spark interest in addressing these gaps and emphasize the importance of studying social media use in relation to depression not only among college students, but also immigrant college students and other populations.

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