Types and Sources of Stigma on Opioid Use Treatment and Recovery Communities on Reddit

Wayne Kepner[a], **Meredith C. Meacham**[b], **Alicia L. Nobles**[a]

[a]Division of Infectious Diseases and Global Public Health, Department of Medicine, University of California San Diego, California;

[b]Department of Psychiatry and Behavioral Sciences, University of California San Francisco, San Francisco, CA, USA

Abstract

Background: Digitally-mediated peer support may improve opioid use disorder (OUD) recovery. Our objective was to examine the types and sources of stigma that people seek support for in online OUD recovery communities (subreddits) on Reddit.

Methods: We extracted all posts containing stigma keywords from three subreddits as well as a random sample that do not contain stigma keywords. We conducted deductive content analysis to confirm that the post self-described an experience of stigma and identify the type (condition, intervention) and source (provider-based, public, self, structural) of stigma.

Results: Two-hundred and fifty-nine posts self-reported a stigmatizing experience. The majority of posts described an intervention stigma associated with medications for OUD. Posts discussing intervention stigma acknowledged the role of stigma in their treatment decision-making and quality of their treatment program. The most frequent sources of stigma were the public (including family members), provider-based (healthcare and pharmacy workers), structural (workplace, law enforcement, child protective services, and abstinence-based self-help groups), and self. No posts mentioned courtesy stigma. Posts sought assistance in navigating their experiences and participating in advocacy to counter stigmatized narratives.

Conclusions: Our study indicates that people in online communities seek support to disclose and manage experiences of stigma on Reddit in similar ways to people in offline communities with the noted exception of an absence of discussions of courtesy stigma. Since each subreddit is a microcosm of varying needs, we suggest areas of future work for collaborative resources developed between stakeholders of these subreddits and public health that work within the preexisting Reddit social norms.

Keywords

Stigma; peer-to-peer support; online communities; social media surveillance; infoveillance; intervention stigma

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✉**CONTACT** Alicia L. Nobles, alnobles@health.ucsd.edu, CRSF 9500 Gilman Drive, La Jolla, California 92093.

Introduction

The opioid crisis is a significant public health issue in the United States. Nearly 500,000 deaths from overdoses involving opioids occurred between 1999 and 2019 (CDC WONDER Online Database, 2020), and the crisis continues to evolve with 69,000 deaths from overdoses involving opioids occurring in 2020, representing a 37.6% increase from 2019 (Ahmad et al., 2022). Common strategies to address the opioid-related overdoses include medications for opioid use disorder (MOUDs) and harm reduction efforts like the distribution of the opioid overdose reversal drug naloxone (Centers for Disease Control & Prevention [CDC], 2012). Three types of MOUDs exist – methadone (opioid agonist medication; first-line treatment), buprenorphine (partial opioid agonist medication; first-line treatment), and extended-release naltrexone (opiate antagonist). Despite MOUDs being proven effective for treatment of OUD (Olsen & Sharfstein, 2014), in 2019, only 294,000 people of the 1.6 million people who had an opioid use disorder (OUD) in the past year received a MOUD (Substance Abuse and Mental Health Services Administration, 2020). There are a number of barriers contributing to underutilization of MOUDs including limited patient access to treatment, stringent regulation of prescribing and administration of MOUDs, and insufficient treatment capacity (Roman et al., 2011). The pervasive stigma surrounding OUDs and MOUDs is increasingly recognized as a hindrance to treatment and dismantling barriers to treatment (Adams & Volkow, 2020; Hadland et al., 2018; Roman et al., 2011; Tsai et al., 2019; Volkow et al., 2014; Wakeman & Rich, 2018; Woo et al., 2017).

Stigma is a socio-cultural process where groups with a socially discredited identity or health condition, or people within their proximity, are labeled, stereotyped, devalued, and even excluded, often in the context of preexisting power relations (Goffman, 1963; Livingston et al., 2012; Pescosolido & Martin, 2015; Weiss et al., 2006). Link and Phelan (2001) identify four interrelated components of stigma: distinguishing and labeling of differences, associating these differences with negative attributes, applying labels that connate a separation of "us" versus "them", and a loss of status and discrimination for the labeled persons. They further emphasize the dependence of stigma on power differences and note that stress associated with health condition-related stigma can be detrimental to health outcomes and life chances.

Pescosolido and Martin have drawn on systems science and social science research on stigma to propose a stigma complex that emphasizes the interface between the individual and society. In this framework, stigma is multifaceted, varying in the types of stigma, who or what entities enact (or are sources of) the stigma, and how one experiences the stigma (Pescosolido & Martin, 2015). Stigma can be associated with health conditions (e.g., OUD) or interventions (e.g., MOUD) (Madden, 2019). For example, an intervention stigma toward patients can occur when healthcare providers encourage patients to discontinue a MOUD (Olsen & Sharfstein, 2014), especially among specific groups like pregnant women, despite MOUD being the standard of care (Madden, 2019). Stigma can manifest from multiple sources (e.g., self, public, healthcare providers, structural, and courtesy) as well as be experienced in a multitude of ways including perceived, anticipated, or received (by the target of the stigma) or endorsed or enacted (by the source of the stigma). For example,

when a healthcare provider enacts a stigma toward a patient in OUD treatment, the source is considered provider-based stigma.

Research suggests that substance use disorders (SUDs) are more stigmatized than other health conditions (Corrigan, 2017; Rao et al., 2009; Ronzani et al., 2009; Room et al., 2001; Schomerus et al., 2011). The impacts of stigma serve as a barrier to harm reduction and treatment (Radcliffe & Stevens, 2008; Semple et al., 2005; Simmonds & Coomber, 2009; Tsai et al., 2019). Abstinence-based recovery programs (Knudsen et al., 2011) may stigmatize MOUDs (Allen & Harocopos, 2016) (e.g., references about substituting one opioid for another (Krawczyk et al., 2018; Volkow et al., 2014). Patients taking a MOUD report that stigma contributes to increased conflicts with interpersonal relationships, reluctance to initiate and continue treatment, distrust toward the healthcare system, and lowered self-esteem if internalized (Woo et al., 2017). Additionally, stigma contributes to health disparities in the treatment of OUD because of the increased stigmatization of OUDs among certain populations, especially those with other stigmatized identities. For example, Black and Hispanic people are less likely to receive a MOUD by a prescribing physician (Hansen et al., 2013; Lagisetty et al., 2019) and more likely to experience overcriminalization for having an OUD compared to the medicalization of an OUD for white people (Hansen & Netherland, 2016; Netherland & Hansen, 2017; Tsai et al., 2019). People who are currently incarcerated are often undertreated during this time or are not linked to treatment following incarceration (Aronowitz & Laurent, 2016; Nunn et al., 2009).

Nine out of 10 US adults use at least one social media platform (Bishop, 2019) with many seeking health information online (Finney Rutten et al., 2019), especially for stigmatized health conditions (Best et al., 2016; Dekeseredy et al., 2021; Nobles et al., 2020; Pretorius et al., 2019). Additionally, a recent study found that more than 70% of the outpatient clients for SUD treatment had regular access to the internet (Ashford et al., 2018). However, to date, most research focused on the stigma of substance use has been conducted in offline environments (Ashford et al., 2020). Less is known about how people seeking support in online communities describe the types and sources of stigma they experience.

Reddit, a social media platform that has more than 2 million online communities (called subreddits) that focus on a particular topic, is ripe for the study of online help seeking for stigmatized issues. Unlike other social media platforms (Twitter, Facebook, Instagram), Reddit is pseudo-anonymous and not socially networked. Reddit is the seventh most popular website in the United States (Alexa, 2021) and rivals Twitter with 430 million active monthly users (Perez, 2019). In turn, researchers have examined Reddit for surveillance of and insights into OUD including self-administered treatments for OUD recovery (Chancellor et al., 2019) and withdrawal (Meacham et al., 2022), topics of discussion for active opioid use (Pandrekar et al., 2018), prevalence of OUD symptoms (D'Agostino et al., 2017), social support during COVID-19 (Bunting et al., 2021), websites shared (Park & Conway, 2018), methods of opioid consumption (Balsamo et al., 2021), suicidality of people who use opioids (Yao et al., 2020), and public perception of people with OUD (Kaufman et al., 2021).

The aim of this study is to characterize the types and sources of stigma described in self-reports of stigmatizing experiences from three subreddits with a focus on OUD treatment and recovery to better understand requests for support in these online communities. Our study examines the three most subscribed to subreddits that focus on OUD treatment and recovery, r/Methadone, r/suboxone, and r/OpiatesRecovery. Building on this understanding, we discuss potential future work to develop organic, digitally-mediated interventions that work within the existing framework and social norms of Reddit to support people using these online communities.

Methods

To identify subreddits of interest, we compiled a list of keywords of prescription (brand name and generic) opioids from drugs.com (Fookes, 2018) and illicit opioids and slang derivatives of both prescription and illicit opioids from the US Drug Enforcement Administration (Drug Enforcement Administration, 2018). We filtered out and excluded keywords that are common in the English language and would lead to many false positives. For example, "dragon", "snowflake", "antifreeze", and "Mexican food" would likely lead to many more false positives than true positives. Using push-shift.io (Baumgartner et al., 2020), we searched the entire Reddit archive to identify subreddits that mention these keywords between January 1, 2019 and December 31, 2019. We visited the homepage of the 100 subreddits with the most frequent mentions of the keywords to evaluate if the subreddit was still live (as of July 3, 2020) and the focus on the subreddit (general substances, specific substances, opioid-specific, not related, banned). Additionally, if the subreddit's focus was on drugs, we examined the side bar for mentions of related subreddits identifying an additional six subreddits that included discussions of substances and were not in the top 100 by our keyword search; similarly we examined if the subreddits were live and identified the focus. Of the 106 subreddits we reviewed, thirteen subreddits focused exclusively on opioids and five of these focused on treatment and recovery. We focused on the three most popular subreddits by number of subscribers (ranging from 18,500 to 35,800 subscribers) focused on opioid use treatment and recovery. The two unselected treatment and recovery subreddits had under 3,000 subscribers. We also note that these three selected subreddits have previously been studied in other opioid related research on the Reddit platform where specific subreddits are named.

Next, we collected all posts containing the keyword "stigma" (inclusive of its variants "stigmatizing,", "stigmatize", "stigmatizes", "stigmatized") occurring from the inception through January 22, 2021 of the three subreddits r/Methadone (created on Oct 13, 2011), r/suboxone (created on Nov 23, 2011), and r/OpiatesRecovery (created on Feb 16, 2012) using the Pushshift application programming interface (API), which enables collection of posts (Baumgartner et al., 2020). We reviewed each post to ensure that the post described a stigma (e.g., not a solicitation for a survey) and, if so, retained the post for qualitative analysis.

Because posters may not explicitly describe their experience using a stigma-related keyword, or, for that matter, realize that they are describing a stigma-related experience, we collected a random sample of posts that did not include the keyword "stigma" or its

variants. We matched the sample size of this random sample to the sample size of the previously collected posts that described a stigma and stratified the sample size across the three subreddits.

Using the framework of types of stigma (i.e., condition, intervention) outlined by Madden (Madden, 2019) and the framework of sources of stigma (i.e., self, public, healthcare providers, structural, and courtesy) outlined by Pescosolido and Martin (Pescosolido & Martin, 2015), we (authors AN and WK) developed the codebook in Table 1. These stigma frameworks were selected for their comprehensiveness and frequent prior application to research with people who use substances or have health conditions like HIV or mental illness (Callen et al., 2022; Farrugia et al., 2021; Lincoln et al., 2017; Meyerson et al., 2021). We conducted deductive content analysis to label each post for the type of stigma (condition, intervention, or generic) and the source of the stigma (courtesy, provider-based, public, self, structural, or not disclosed). The labels were not mutually exclusive; that is each post could reflect one or more of the categories for the type and source of the described stigma. For example, a post can simultaneously describe an intervention stigma from a pharmacist and a bystander in the pharmacy aisle, which would be labeled as both provider-based and public stigma. We did not label the posts for how a stigma is experienced (perceived, endorsed, anticipated, received, or enacted) (Pescosolido & Martin, 2015) because it was often difficult to ascertain from a singular self-report on social media. We elaborate on this in the limitations.

First, two coders (authors AN and WK) independently labeled 25% of the posts and conducted two online meetings to iteratively refine the definitions of the codebook. Second, the finalized codebook was reapplied to the posts and the inter-coder reliability metric Cohen's kappa (k) was calculated. Third, the remaining 75% of the posts were split between the coders for labeling. All labeling was done in an Excel workbook.

This study was exempted from ethical review by the Human Research Protections Program at the University of California San Diego. Nonetheless, to avoid identification of the original posts (Ayers et al., 2018), we provide example quotes that are lightly modified from the original posts (e.g., changing time frames (e.g., changing "34 days" to "1 month") or using a thesaurus to find a similar word for the emotion described (e.g., changing "fearful" to "scared"). We inserted these quotes into the Google search engine to ensure that we could not recover the original post.

Results

Of the 269 posts that mentioned a stigma-related keyword, 236 posts described a stigma and were retained for further analysis. The majority of excluded posts were solicitations for treatment services, media articles or research studies. For example, "Live in Virginia? If anyone is struggling with addiction, knows anyone that is struggling, or just wants one, a Virginia non-profit offers to ship you a FREE Narcan/Naloxone opioid overdose reversal kit." Among the retained posts, 126 (53.4%), 67 (28.4%), and 43 (18.2%) posts were posted on r/OpiatesRecovery, r/Methadone, and r/suboxone, respectively. The types of stigma described included condition stigma (65 posts [38.0%]), generic stigma (12

posts [7.0%]), and intervention stigma (94 posts [55.0%]). The sources of stigma described included provider-based (22 posts [12.2%]), public (38 posts [21.1%]), self (10 posts [5.6%], and structural (22 posts [12.2%] of which four posts were attributed to mutual-help groups). Eighty-four (46.6%) posts did not explicitly disclose the source of stigma.

We matched the sample size of posts that contain stigma keywords with a random sample of posts that did not contain a stigma keyword resulting in 269 posts across the three subreddits with 139 posts (51.7%) from r/OpiatesRecovery, 77 posts (28.6%) from r/Methadone, and 53 posts (19.7%) from r/Suboxone. Of the 269 posts that did not mention a stigma-related keyword, 23 posts described a stigma and were retained for further analysis. The majority of excluded posts did not contain any description of stigma. Topics discussed in the excluded posts include: questions about medication specifics (e.g. dosages, side effects, state laws and policies), streams of consciousness about the recovery journey, advice for new members of the forum, and examples of success stories and stories of disappointments. Among the 23 retained posts, 13 (9.4%), 7 (9.0%), and 3 (5.6%) posts were posted on r/OpiatesRecovery, r/Methadone, and r/suboxone, respectively. The types of stigma described included condition stigma (19 posts [82.6%]) and intervention stigma (8 posts [43.5%]). We did not find any mentions of generic stigma in this sample. The sources of stigma described included self (11 posts [47.8%]), public (6 posts [26.1%]), provider-based (5 posts [21.7%]), and structural (4 posts [17.4%]). We did not find any mentions of courtesy as a source of stigma.

We achieved an inter-coder reliability of $\kappa = 0.90$ for condition stigma, $\kappa = 0.90$ for generic stigma, $\kappa = 0.90$ for intervention stigma, $\kappa = 1.00$ for a provider-based source, $\kappa = 0.85$ for a public source, $\kappa = 0.95$ for the source being self, $\kappa = 0.80$ for a structural source, and $\kappa = 0.80$ for sources not disclosed. Below we describe how each of these types and sources of stigma were described in the posts with Table 1 providing supporting quotes, Table 2 presenting the frequency of occurrence for each subreddit for the sample of posts that mentioned a stigma-related keyword, and Table 3 presenting the frequency of occurrence for each subreddit for the matched sample of posts that did not mention a stigma-related keyword.

Types of stigma

Condition stigma—Posts describing a condition stigma discussed feeling ashamed about their past or current OUD, and described strategies for navigating stigma about "*addiction*" that was enacted by the public, including family and friends, either in-person or on social media platforms. For example, one post describes feeling misjudged by those who haven't experienced "*being an addict*" first-hand (*quote 1*). Posts discussed concealing their OUD from their social network including not disclosing their OUD on networked social media (i.e., platforms outside of Reddit that emphasize social connections like Facebook or Twitter) or to their offline social network (*quotes 2–3*). Posts described feelings of unfairness that usage of some substances are more acceptable. For example, one post described how frequent alcohol use might be more socially acceptable than infrequent opioid use (*quote 4*). Finally, some posts described the feeling that stigma served as a preventative force that made the thought of engaging in opioid use less appealing or a motivating force that made them want to achieve recovery as a form of rebellion against the stigma (*quote 5*).

Intervention stigma—Posts describing an intervention stigma reported feeling that MOUDs are not accepted as a valid medical treatment and discussed strategies for hiding their medication status from friends and family. Several posts mentioned that members of 12-Step programs (e.g. NA) do not consider MOUDs abstinent from opioid use and consequently were unable to participate in certain milestone rituals like receiving a token of sobriety (i.e. 30 day token) or being eligible to work with a sponsor. For example, one post described that stigma from MOUDs are comparable to people who are actively using opioids (*quote 6*). Similarly, one post mentioned other Reddit members' disapproval of Narcan, an opioid antagonist medication used for rapid reversal of an opioid overdose (quote 7). Also, posts mentioned feelings of fear, inadequacy, or being considered "*lesser than*" in comparison to individuals who only practice abstinence. As a result, posts describe strategies for hiding their medication status from others, including other medical providers, as a way to prevent negative stereotypes and bias such as suspicions of drug-seeking behavior (*quote 8*).

Generic stigma—We define our label of generic stigma as posts that refer to stigma, but do not describe in enough detail to ascertain whether the stigma is based on a condition or intervention. Posts describing generic stigma refer to an ever-present feeling of judgment from their general social environment, interpersonal social circles, and media. Posts described feelings of unfairness and wanting to "*fight*" against stigma (*quote 9*).

Sources of stigma

Provider-based stigma—Posts reported that sources of provider-based stigma included healthcare providers, pharmacists, and pharmacy staff. Posts described concerns about disclosing their condition to their healthcare provider, strategies to successfully hide their status from healthcare providers, and anger about being treated unfairly or with disrespect. Posts described a fear of becoming vulnerable to discrimination or mistreatment by their medical providers and being viewed as untrustworthy, a "*criminal*," or "*drug-seeking*" if they were to disclose their current or former OUD to a provider (*quote 10*). Posts described that this fear served as a barrier to receiving adequate primary care and subsequently avoiding primary care altogether as a way to avoid stigma from providers (*quote 11*). One post described feeling "*defeated*" because their physician told them that their nervous system may never fully recover from past opioid use (quote 12).

Posts disclosed experiences of stigma by pharmacists and pharmacy staff describing these providers as "*rude*", "*aggressive*", "*suspicious*," and "*demeaning*" resulting in the poster feeling fear and shame. Posts also described a lack of knowledge about whether the behavior of the pharmacists and pharmacy staff was ethical and legal. For example, posts described uncertainty about the surveillance of patients receiving MOUDs, the legality of refusing to dispense a MOUD, and stigmatizing behaviors by pharmacists and pharmacy staff (*quote 13*).

Public stigma—Posts describing a public stigma reported serious conflicts with friends and family members stemming from their treatment or recovery status. Posts described feelings of hurt or betrayal from lack of compassion or understanding, along with disagreements about the effectiveness of MOUDs from both family and friends. Posts

described that stigma from OUD lingered long after starting or completing treatment, which resulted in an erosion of trust between family members. For example, one post described feeling sad and hurt by a comment about their opioid use by a loved one (*quote 14*). Other posts described being shamed by family members for their use of MOUDs and entertained suggestions on how to hide their treatment status from family (*quotes 15–16*). Posts described feelings of hurt, sadness, or betrayal as a result of their family members not trusting them because of a previous OUD (*quote 16*). Finally, posts described feeling unsure about whether to tell their social network about their OUD status, fear about what that disclosure would entail, and guilt about hiding their status from their network (*quote 17*).

Self-stigma—Posts describing a self-stigma reported internalized feelings of shame, disappointment, or self-loathing as a result of their OUD or treatment with MOUDs resulting in behaviors such as hiding their status from others, contemplating changing their treatment plan (e.g. switching from methadone to suboxone or not entering in-patient treatment), or feeling "*cowardly*" for not choosing an abstinence-based pathway (*quotes 18–20*).

Structural stigma—Posts described sources of structural stigma including from self-help groups (e.g., NA), the workplace, the criminal justice system, child protective services, and the SUD treatment system. Posts described anxiety surrounding the conflict of receiving MOUDs and 12-step groups' strict definition of sobriety, expressing concern about how their sobriety status might be viewed differently from other group members (*quotes 21–22*). One post described a feeling of shock and sadness when their sobriety status was ridiculed on social media. This post described receiving permission from their 12-step group sponsor to share their achievements on social media, but the post was met with online criticism about their status as a patient engaged in treatment with MOUDs (*quote 23*).

Posts described feeling unsure of how their MOUD status could affect their future employment and sought advice on how to navigate the workforce with a potentially stigmatizing status (*quotes 24 and 25*). For example, one post reported that they would not consider in-patient treatment for their OUD due to a fear that it would hinder their career (*quote 26*).

Posts described a fear of discrimination or unfair treatment by the legal system including their OUD status being used against them in court, being incarcerated instead of receiving treatment, and the potential of opioid withdrawal while incarcerated. For example, one post described a fear of losing a custody battle due to their status as a patient engaged in treatment with a MOUD (*quote 27*). Posts described the feeling that punitive policies against substance use have created a system that penalizes having an OUD instead of providing treatment (*quotes 28–29*).

Courtesy stigma—No posts that we reviewed mentioned a courtesy stigma. Individuals seeking support for stigmatization because of close social or professional proximity to an individual experiencing opioid use, treatment, or recovery were not captured in our sample.

Source of stigma not disclosed—These posts described a stigma, but did not disclose the source of the stigma (*quote 30*).

Discussion

In this study, we examined the types and sources of stigma self-reported on three treatment and recovery communities on Reddit. Our results indicate that posts discuss stigmatizing experiences from both the perspective of a person with OUD and engaged in treatment with MOUD. The stigmatizing experiences originated from multiple sources including the general public, family members, romantic partners, self-help groups, law enforcement, child protective services, healthcare providers, pharmacists, pharmacy staff, employers, and, if internalized, themselves. Although we anticipated capturing posts referring to courtesy stigma as offline studies have suggested, our results suggest that courtesy stigma may not be prevalent in these subreddits. Similar to members of offline communities, posts sought help navigating the stigma of being labeled as a person who currently or previously had an OUD and engaged in treatment with a MOUD. Requests for support to navigate stigmatizing experiences were prevalent for structural (workplace, health insurance) and provider-based (healthcare providers, pharmacy) sources of stigma. Posts also expressed interest in online and offline opportunities for advocacy to counter stigmatizing narratives.

Similarities and differences in self-reports of stigma across the three subreddits

Although all three subreddits were focused on treatment and recovery, the self-reports of stigma indicate there are similarities and differences among the online communities. All three subreddits contained posts self-reporting condition stigma. In general, posts from r/OpiatesRecovery focused more on contemplating the start of treatment and debated over the best pathway toward treatment - abstinence or MOUD - reflecting on how stigma, or fears about stigma, was impacting their decision.

By contrast, posts from r/Methadone and r/suboxone focused more on how stigma had impacted their treatment and recovery journey while receiving MOUD and how to improve their experience of intervention-related stigma. Posts from r/suboxone reported more conflict with the dispensing of their MOUD in comparison to the posts from r/Methadone. This is likely because dispensing of Suboxone and its generic formulation, buprenorphine/naloxone, can be done through a retail pharmacy unlike methadone which must be dispensed by an opioid treatment program (OTP). Posts from r/Methadone describe more concerns about workplace discrimination in comparison to posts from the r/suboxone. This is likely because unlike Suboxone, methadone must be dispensed daily by an OTP unless the patient is approved for limited takehomes. Additionally, posts from r/Methadone described more negative perceptions of the MOUD from the public potentially related to the increased regulation of methadone (in comparison to Suboxone) and the locations of OTPs, which are more likely in disadvantaged areas (Amiri et al., 2021; Hansen et al., 2013). Posts from both r/suboxone and r/Methadone describe needing help to navigate stigma from self-help groups and the public (specifically family and friends).

Similarities and differences in self-reports of stigma across posts with usage of stigma-related keywords

The types and sources of stigma discussed in 236 posts that explicitly mention stigma-related keywords are largely similar to the types of and sources of stigma discussed in the 23 posts that do not explicitly mention a stigma-related keyword but describe a stigmatizing experience. However, in general, intervention stigma was more prevalent in posts that explicitly mentioned a stigma-related keyword compared to posts that did not mention a stigma-related keyword and had a higher prevalence of discussions of condition stigma. Additionally, posts that did explicitly mention a stigma-related keyword often described their experience in richer detail. Our study did not examine the underlying intent or historical experience of the poster, but intent and experience could be explored in future work that utilizes participatory methods as described below.

Potential for peer support

Peer and community support is vital to the continuum of care for SUDs (Ashford et al., 2020). People participating in online communities have identified these communities as valuable resources for support and information from peers (Chung, 2014) and preliminary evidence suggests that these communities may support SUD recovery (Bergman et al., 2018; Bliuc et al., 2017). However, most research on peer support for SUD recovery is limited to in-person (Bassuk et al., 2016). Social media offers the potential of on-demand peer support, potentially overcoming obstacles of in-person support (e.g., transportation) (Ashford et al., 2020). Social media platforms, like Facebook, Instagram, or Twitter, mimic face-to-face interactions by allowing users to create profiles with visible images of themself and network to peers, which reduces the anonymity of online interactions (Ellison et al., 2007). In turn, people use stigma reduction strategies to manage communication about their stigmatized identities (Meisenbach, 2010) and discuss stigmatized health issues less on these platforms (Boudewyns et al., 2015). For example, postings by healthcare professionals (Haug et al., 2016) and the public (Chenworth et al., 2021) that stigmatize MOUDs are prevalent on Twitter. Unlike Twitter, which primarily hosts tweets discussing opioid use from people who do not use opioids, have OUD, or are engaged in treatment with MOUDs (Tofighi, Shahawy, et al., 2021 Jan-2021Mar), the subreddits in our study host posts primarily authored by people on the receiving end of stigma (potentially stemming from the pseudo-anonymity and community moderation of these subreddits).

Potential for public health to engage

Despite recent calls to meet people where they are at to improve access and adherence to substance use treatment (Alegría et al., 2021), most social media research to date (including our study) has only focused on characterizing conversations on social media (Dekeseredy et al., 2021; Russell et al., 2019; Tofighi, Aphinyanaphongs, et al., 2020; Tofighi, Shahawy, et al., 2021 Jan-2020Mar). Less emphasis has been placed on employing this knowledge to improve initiation and continuation of substance use treatment. Many healthcare professionals use the hashtag #MedTwitter (a popular hashtag for medical professionals engaged in information sharing on Twitter (O'Glasser et al., 2020), but these tweets may be outside of the audience of people who are personally experiencing the stigma (e.g.,

only 10% and 20% of tweets mentioning methadone and Suboxone, respectively, reflect first-hand experience with these MOUDs (Chenworth et al., 2021). Additionally, research on interventions to reduce stigma for OUD and MOUD (Livingston et al., 2012) have primarily focused on direct interventions to reduce public and provider-based stigma (e.g., persuasive communication, educational interventions, contact interventions (Arredondo et al., 2019) and self-stigma (e.g., cognitive behavioral therapy and acceptance and commitment therapy (Fung et al., 2011; Luoma et al., 2012) as well as indirect interventions to reduce structural stigma (e.g., professional guidance for language and reporting (Broyles et al., 2014; Saitz, 2016, 2015). The usage of social media platforms to deploy resources that are supportive of people experiencing OUD- and MOUD-related stigma is not well researched, in part because of the recent rise of social media in the past decade (Ashford, Bergman, et al., 2020). Based on the results of this study, below we suggest future work that fits within the preexisting social norms of the Reddit platform.

Potential for future work

Our results indicate that each of the subreddits is its own unique microcosm and resources should be tailored to each community. Similar to (D'Agostino et al., 2017), we find that most posts discussing stigma in the general subreddit, r/OpiatesRecovery, do not appear to be currently engaged in a treatment program in contrast to posts in the MOUD-specific subreddits (r/Methadone and r/suboxone) where posts focus on how to improve their experience within their existing treatment program.

Posts on r/OpiatesRecovery deliberate over whether to select MOUD or abstinence as a pathway to recovery based on concerns about stigma. This subreddit may benefit from wikis that provide informational support about the early stages of treatment and recovery. Wikis are a Reddit convention that are specific to each subreddit and serve as knowledge databases similar to Wikipedia. These wikis could be designed collaboratively by public health experts, moderators, and community members. Similarly, peers who are currently engaged in treatment with MOUD may conduct "Ask Me Anything" (AMAs), another Reddit convention where a poster can answer questions from peers about their lived experience.

In contrast, posts on r/Methadone and r/suboxone seek support to avoid and navigate stigma in the workplace and from healthcare providers. Resources, such as information on denial of Suboxone from a pharmacy or the revision of prescribing guidelines (Knopf, 2021) could be included in a wiki which may be helpful. AMAs with healthcare providers could focus on how to navigate communication with providers. Subject matter experts could collaboratively work with moderators to define credentials of who is allowed to have "flair" indicating they are a healthcare provider providing trustworthy information. Flair is another Reddit convention that allows one to denote information about the poster specific to each subreddit.

Posts in all subreddits indicated that the poster had experienced and was looking for support for internalized stigma. Future research could focus on the potential of using these platforms to deliver emotional support, like self-worth agenda interventions, which seek to reduce self-stigma by challenging myths and internalized prejudice (Corrigan, 2017). Additionally, some posts in all subreddits sought to engage in recovery-related advocacy which previous

research has shown may be helpful for individuals to enhance recovery (Ashford et al., 2019). In the future, it may be possible for this platform to serve as a conduit to connect people who wish to engage in advocacy.

Our suggestions for future work are focused on strategies that can be employed at the community-level rather than at the poster-level to avoid disruption of the community, especially perceptions of surveillance (Andalibi & Buss, 2020). However, we would be remiss to make suggestions of potential resources without engaging key stakeholders of this digitally-mediated community, specifically those who use this community for support. Participatory methods could be used to evaluate the acceptability of surveillance, potential resources the community may find useful and strengthen the relationship between public health and these online communities. As an example, our research found posts that attempt to address potentially stigmatizing content posted by other online community members (both internal and external to this particular online community); it may be possible that the community would be interested in resources that strengthen the community members' understanding of the types and sources of stigma. However, to our knowledge, no formal framework currently exists for how to engage in community-based participatory research in digitally-mediated communities ethically without harm (Anderson & McNair, 2018; McCosker et al., 2020; Souleymanov et al., 2016; Wallerstein & Duran, 2006) and this is an area that needs further attention. This is especially the case for proposed efforts to use automation to target interventions.

Limitations

First, our study is limited by the usage of keyword filtering. We acknowledge that other posts likely describe a stigma without explicit mention of the word "stigma", including posters who may not realize the experience they describe is stigmatizing. However, this study offers the first insight into the types of stigma that people posting to Reddit seek social support for in these online opioid treatment and recovery communities. Second, we did not examine experiential variants of stigma including whether the stigma was perceived, endorsed, anticipated, received, or enacted. Identifying these variants is difficult in observational data and could be further explored using participatory methods like interviews of posters. Finally, our study's goal is not generalizability to other online communities or offline communities, but rather implications for these three online communities. These subreddits combined have more than 59,000 subscribers (and an even larger readership), potentially representing the largest digitally-mediated opioid use treatment and recovery groups.

Conclusions

To our knowledge, this is the first study that captures and qualitatively analyzes the types and sources of stigma discussed in online communities focused on OUD treatment and recovery. Our study showed that discussion surrounding various types and sources of stigma is discussed in online communities and that strategies for navigating these situations are both requested and disseminated among its members. Future work should examine the

needs of other online treatment and recovery communities, especially those with differing characteristics of anonymity and social networking.

References

Adams VJM, & Volkow ND (2020). Ethical imperatives to overcome stigma against people with substance use disorders. AMA Journal of Ethics, 22(8), 702–708. 10.1001/amajethics.2020.702

Ahmad F, Rossen L, & Sutton P (2022, January 6). Products—Vital statistics rapid release— Provisional drug overdose data. Provisional Drug Overdose Death Counts. https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm

Alegría M, Frank RG, Hansen HB, Sharfstein JM, Shim RS, & Tierney M (2021). Transforming mental health and addiction services. Health Affairs (Project Hope), 40(2), 226–234. 10.1377/hlthaff.2020.01472 [PubMed: 33476189]

Alexa. (2021). Competitive analysis, marketing mix and traffic. Retrieved June 10, 2021, from https://www.alexa.com/siteinfo/reddit.com

Allen B, & Harocopos A (2016). Non-prescribed buprenorphine in New York City: Motivations for use, practices of diversion, and experiences of stigma. Journal of Substance Abuse Treatment, 70, 81–86. 10.1016/j.jsat.2016.08.002 [PubMed: 27692193]

Amiri S, McDonell MG, Denney JT, Buchwald D, & Amram O (2021). Disparities in access to opioid treatment programs and office-based buprenorphine treatment across the rural-urban and area deprivation continua: A US nationwide small area analysis. Value in Health: The Journal of the International Society for Pharmacoeconomics and Outcomes Research, 24(2), 188–195. 10.1016/j.jval.2020.08.2098 [PubMed: 33518025]

Andalibi N, & Buss J (2020). The human in emotion recognition on social media: Attitudes, outcomes, risks. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems, 1–16. 10.1145/3313831.3376680

Anderson E, & McNair L (2018). Ethical issues in research involving participants with opioid use disorder. Therapeutic Innovation & Regulatory Science, 52(3), 280–284. 10.1177/2168479018771682 [PubMed: 29714588]

AP Stylebook from 55th Edition. (n.d.). Retrieved June 10, 2021, from https://store.stylebooks.com/2020-ap-stylebook-print-edition.html

Aronowitz SV, & Laurent J (2016). Screaming behind a door: The experiences of individuals incarcerated without medication-assisted treatment. Journal of Correctional Health Care: The Official Journal of the National Commission on Correctional Health Care, 22(2), 98–108. 10.1177/1078345816634079 [PubMed: 26984133]

Arredondo J, Beletsky L, Baker P, Abramovitz D, Artamonova I, Clairgue E, Morales M, Mittal ML, Rocha-Jimenez T, Kerr T, Banuelos A, Strathdee SA, & Cepeda J (2019). Interactive versus video-based training of police to communicate syringe legality to people who inject drugs: The shield study, Mexico, 2015–2016. American Journal of Public Health, 109(6), 921–926. 10.2105/AJPH.2019.305030 [PubMed: 30998406]

Ashford RD, Bergman BG, Kelly JF, & Curtis B (2020). Systematic review: Digital recovery support services used to support substance use disorder recovery. Human Behavior and Emerging Technologies, 2(1), 18–32. 10.1002/hbe2.148

Ashford RD, Brown AM, Canode B, McDaniel J, & Curtis B (2019). A mixed-methods exploration of the role and impact of stigma and advocacy on substance use disorder recovery. Alcoholism Treatment Quarterly, 37(4), 462–480. 10.1080/07347324.2019.1585216

Ashford RD, Brown AM, Ryding R, & Curtis B (2020). Building recovery ready communities: The recovery ready ecosystem model and community framework. Addiction Research & Theory, 28(1), 1–11. 10.1080/16066359.2019.1571191

Ashford RD, Lynch K, & Curtis B (2018). Technology and social media use among patients enrolled in outpatient addiction treatment programs: cross-sectional survey study. Journal of Medical Internet Research, 20(3), e9172. 10.2196/jmir.9172

Ayers JW, Caputi TL, Nebeker C, & Dredze M (2018). Don't quote me: Reverse identification of research participants in social media studies. Npj Digital Medicine, 1(1), 1–2. 10.1038/s41746-018-0036-2 [PubMed: 31304287]

Balsamo D, Bajardi P, Salomone A, & Schifanella R (2021). Patterns of routes of administration and drug tampering for nonmedical opioid consumption: data mining and content analysis of reddit discussions. Journal of Medical Internet Research, 23(1), e21212. 10.2196/21212 [PubMed: 33393910]

Bassuk EL, Hanson J, Greene RN, Richard M, & Laudet A (2016). Peer-delivered recovery support services for addictions in the United States: A systematic review. Journal of Substance Abuse Treatment, 63, 1–9. 10.1016/j.jsat.2016.01.003 [PubMed: 26882891]

Baumgartner J, Zannettou S, Keegan B, Squire M, & Blackburn J (2020). The pushshift reddit dataset. In Proceedings of the International AAAI Conference on Web and Social Media, 14, 830–839.

Bergman BG, Claire Greene M, Hoeppner BB, & Kelly JF (2018). Expanding the reach of alcohol and other drug services: Prevalence and correlates of US adult engagement with online technology to address substance problems. Addictive Behaviors, 87, 74–81. 10.1016/j.addbeh.2018.06.018 [PubMed: 29960132]

Best P, Gil-Rodriguez E, Manktelow R, & Taylor BJ (2016). Seeking help from everyone and no-one: Conceptualizing the online help-seeking process among adolescent males. Qualitative Health Research, 26(8), 1067–1077. 10.1177/1049732316648128 [PubMed: 27179020]

Bishop M (2019). Healthcare social media for consumer informatics. In Edmunds M, Hass C, & Holve E (Eds.), Consumer informatics and digital health: Solutions for health and health care (pp. 61–86). Springer International Publishing. 10.1007/978-3-319-96906-0_4

Bliuc A-M, Best D, Iqbal M, & Upton K (2017). Building addiction recovery capital through online participation in a recovery community. Social Science & Medicine (1982), 193, 110–117. 10.1016/j.socscimed.2017.09.050 [PubMed: 29032310]

Boudewyns V, Himelboim I, Hansen DL, & Southwell BG (2015). Stigma's effect on social interaction and social media activity. Journal of Health Communication, 20(11), 1337–1345. 10.1080/10810730.2015.1018604 [PubMed: 26087307]

Broyles LM, Binswanger IA, Jenkins JA, Finnell DS, Faseru B, Cavaiola A, Pugatch M, & Gordon AJ (2014). Confronting inadvertent stigma and pejorative language in addiction scholarship: A recognition and response. Substance Abuse, 35(3), 217–221. 10.1080/08897077.2014.930372 [PubMed: 24911031]

Bunting AM, Frank D, Arshonsky J, Bragg MA, Friedman SR, & Krawczyk N (2021). Socially-supportive norms and mutual aid of people who use opioids: An analysis of Reddit during the initial COVID-19 pandemic. Drug and Alcohol Dependence, 222, 108672. 10.1016/j.drugalcdep.2021.108672 [PubMed: 33757708]

Callen G, Chory A, Sang F, Munyoro D, Aluoch J, Scanlon M, Enane L, McHenry M, Wools-Kaloustian K, Apondi E, & Vreeman R (2022). A Qualitative examination of perceived stigma and its sources among adolescents living with HIV in Western Kenya. Global Pediatric Health, 9, 2333794X211065335. 10.1177/2333794X211065335

CDC WONDER Online Database. (2020). Wide-ranging online data for epidemiologic research. https://wonder.cdc.gov/

Centers for Disease Control and Prevention [CDC]. (2012). Community-based opioid overdose prevention programs providing naloxone–United States, 2010. MMWR. Morbidity and Mortality Weekly Report, 61(6), 101–105. [PubMed: 22337174]

Chancellor S, Nitzburg G, Hu A, Zampieri F, & De Choudhury M (2019). Discovering alternative treatments for opioid use recovery using social media. In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems, 1–15. 10.1145/3290605.3300354

Chenworth M, Perrone J, Love JS, Graves R, Hogg-Bremer W, & Sarker A (2021). Methadone and suboxone® mentions on twitter: Thematic and sentiment analysis. Clinical Toxicology, 59(11), 982–991. 10.1080/15563650.2021.1893742 [PubMed: 33821724]

Chung JE (2014). Social networking in online support groups for health: How online social networking benefits patients. Journal of Health Communication, 19(6), 639–659. 10.1080/10810730.2012.757396 [PubMed: 23557148]

Corrigan PW (2017). Making the most of contact to erase stigma. Clinical Psychology: Science and Practice, 24(3), 324–326. 10.1111/cpsp.12205

D'Agostino AR, Optican AR, Sowles SJ, Krauss MJ, Escobar Lee K, & Cavazos-Rehg PA (2017). Social networking online to recover from opioid use disorder: A study of community interactions. Drug and Alcohol Dependence, 181, 5–10. 10.1016/j.drugalcdep.2017.09.010 [PubMed: 29024875]

Dekeseredy P, Sedney CL, Razzaq B, Haggerty T, & Brownstein HH (2021). Tweeting stigma: an exploration of twitter discourse regarding medications used for both opioid use disorder and chronic pain. Journal of Drug Issues, 51(2), 340–357. 10.1177/0022042620986508

Drug Enforcement Administration. (2018). Slang terms and code words: A reference for law enforcement personnel. DEA Intelligence Report DEAHOU-DIR-022 18 (2018): 2018–07.

Ellison NB, Steinfield C, & Lampe C (2007). The benefits of Facebook "Friends:" social capital and college students' use of online social network sites. Journal of Computer-Mediated Communication, 12(4), 1143–1168. 10.1111/j.1083-6101.2007.00367.x

Farrugia A, Pienaar K, Fraser S, Edwards M, & Madden A (2021). Basic care as exceptional care: Addiction stigma and consumer accounts of quality healthcare in Australia. Health Sociology Review: The Journal of the Health Section of the Australian Sociological Association, 30(2), 95–110. 10.1080/14461242.2020.1789485

Finney Rutten LJ, Blake KD, Greenberg-Worisek AJ, Allen SV, Moser RP, & Hesse BW (2019). Online health information seeking among US adults: Measuring progress toward a healthy people 2020 objective. Public Health Reports, 134(6), 617–625. 10.1177/0033354919874074 [PubMed: 31513756]

Fookes C (2018, February 28). Narcotic analgesics. Drugs.Com. https://www.drugs.com/drug-class/narcotic-analgesics.html

Fung KMT, Tsang HWH, & Cheung W (2011). Randomized controlled trial of the self-stigma reduction program among individuals with schizophrenia. Psychiatry Research, 189(2), 208–214. 10.1016/j.psychres.2011.02.013 [PubMed: 21377738]

Goffman E (1963). Stigma: Notes on the management of spoiled identity. Postgraduate Medical Journal, 45(527), 642–642. 10.1136/pgmj.45.527.642

Hadland SE, Park TW, & Bagley SM (2018). Stigma associated with medication treatment for young adults with opioid use disor der: A case series. Addiction Science & Clinical Practice, 13(1), 15. 10.1186/s13722-018-0116-2 [PubMed: 29730987]

Hansen HB, Siegel CE, Case BG, Bertollo DN, DiRocco D, & Galanter M (2013). Variation in use of buprenorphine and methadone treatment by racial, ethnic, and income characteristics of residential social areas in New York City. The Journal of Behavioral Health Services & Research, 40(3), 367–377. 10.1007/s11414-013-9341-3 [PubMed: 23702611]

Hansen H, & Netherland J (2016). Is the prescription opioid epidemic a white problem? American Journal of Public Health, 106(12), 2127–2129. 10.2105/AJPH.2016.303483 [PubMed: 27831792]

Haug NA, Bielenberg J, Linder SH, & Lembke A (2016). Assessment of provider attitudes toward #naloxone on Twitter. Substance Abuse, 37(1), 35–41. 10.1080/08897077.2015.1129390 [PubMed: 26860229]

Kaufman MR, Bazell AT, Collaco A, & Sedoc J (2021). This show hits really close to home on so many levels": An analysis of Reddit comments about HBO's Euphoria to understand viewers' experiences of and reactions to substance use and mental illness. Drug and Alcohol Dependence, 220, 108468. 10.1016/j.drugalcdep.2020.108468 [PubMed: 33540349]

Knopf A (2021). Move to eliminate x-waiver gathers steam, aimed at federal legislation. Alcoholism & Drug Abuse Weekly, 33(5), 1–4. 10.1002/adaw.32956

Knudsen HK, Abraham AJ, & Roman PM (2011). Adoption and implementation of medications in addiction treatment programs. Journal of Addiction Medicine, 5(1), 21–27. 10.1097/ADM.0b013e3181d41ddb [PubMed: 21359109]

Krawczyk N, Negron T, Nieto M, Agus D, & Fingerhood MI (2018). Overcoming medication stigma in peer recovery: A new paradigm. Substance Abuse, 39(4), 404–409. 10.1080/08897077.2018.1439798 [PubMed: 29432086]

Lagisetty PA, Ross R, Bohnert A, Clay M, & Maust DT (2019). Buprenorphine treatment divide by race/ethnicity and payment. JAMA Psychiatry, 76(9), 979–981. 10.1001/jamapsychiatry.2019.0876 [PubMed: 31066881]

Lincoln AK, Adams W, Eyllon M, Garverich S, Prener CG, Griffith J, Paasche-Orlow MK, & Hopper K (2017). The double stigma of limited literacy and mental illness: Examining barriers to recovery and participation among public mental health service users. Society and Mental Health, 7(3), 121–141. 10.1177/2156869317707001

Link Bruce G & Phelan Jo C (2001). Conceptualizing Stigma. Annual Review of Sociology, 27, 363–85.

Livingston JD, Milne T, Fang ML, & Amari E (2012). The effectiveness of interventions for reducing stigma related to substance use disorders: A systematic review. Addiction (Abingdon, England), 107(1), 39–50. 10.1111/j.1360-0443.2011.03601.x

Luoma JB, Kohlenberg BS, Hayes SC, & Fletcher L (2012). Slow and steady wins the race: A randomized clinical trial of acceptance and commitment therapy targeting shame in substance use disorders. Journal of Consulting and Clinical Psychology, 80(1), 43–53. 10.1037/a0026070 [PubMed: 22040285]

Madden EF (2019). Intervention stigma: How medication-assisted treatment marginalizes patients and providers. Social Science & Medicine (1982), 232, 324–331. 10.1016/j.socscimed.2019.05.027 [PubMed: 31125801]

McCosker A, Maddox A, Albury K, Dietzel C, & Barratt M (2020). Digital cultures of care, safety and wellbeing. AoIR Selected Papers of Internet Research. 10.5210/spir.v2020i0.11138

Meacham MC, Nobles AL, Tompkins DA, & Thrul J (2022). "I got a bunch of weed to help me through the withdrawals": Naturalistic cannabis use reported in online opioid and opioid recovery community discussion forums. Plos One, 17(2), e0263583. 10.1371/journal.pone.0263583 [PubMed: 35134074]

Meisenbach RJ (2010). Stigma management communication: A theory and agenda for applied research on how individuals manage moments of stigmatized identity. Journal of Applied Communication Research, 38(3), 268–292. 10.1080/00909882.2010.490841

Meyerson BE, Russell DM, Kichler M, Atkin T, Fox G, & Coles HB (2021). I don't even want to go to the doctor when I get sick now: Healthcare experiences and discrimination reported by people who use drugs, Arizona 2019. The International Journal on Drug Policy, 93, 103112. 10.1016/j.drugpo.2021.103112 [PubMed: 33461838]

Netherland J, & Hansen H (2017). White opioids: Pharmaceutical race and the war on drugs that wasn't. BioSocieties, 12(2), 217–238. 10.1057/biosoc.2015.46 [PubMed: 28690668]

Nobles AL, Leas EC, Dredze M, & Ayers JW (2020). Examining peer-to-peer and patient-provider interactions on a social media community facilitating ask the doctor services. In Proceedings of the International AAAI Conference on Web and Social Media, 14, 464–475.

Nunn A, Zaller N, Dickman S, Trimbur C, Nijhawan A, & Rich JD (2009). Methadone and buprenorphine prescribing and referral practices in US prison systems: Results from a Nationwide Survey. Drug and Alcohol Dependence, 105(1–2), 83–88. 10.1016/j.drugalcdep.2009.06.015 [PubMed: 19625142]

O'Glasser AY, Jaffe RC, & Brooks M (2020). To tweet or not to tweet, that is the question. Seminars in Nephrology, 40(3), 249–263. 10.1016/j.semnephrol.2020.04.003 [PubMed: 32560773]

Olsen Y, & Sharfstein JM (2014). Confronting the stigma of opioid use disorder—And its treatment. JAMA, 311(14), 1393–1394. 10.1001/jama.2014.2147 [PubMed: 24577059]

Pandrekar S, Chen X, Gopalkrishna G, Srivastava A, Saltz M, Saltz J, & Wang F (2018). Social media based analysis of opioid epidemic using reddit. In AMIA Annual Symposium Proceedings, 2018, 867–876. [PubMed: 30815129]

Park A, & Conway M (2018). Opioid surveillance using social media: How URLs are shared among Reddit members. Online Journal of Public Health Informatics, 10(1), e56. 10.5210/ojphi.v10i1.8419

Perez S (2019). Reddit's monthly active user base grew 30% to reach 430M in 2019. TechCrunch. Retrieved June 10, 21, from https://techcrunch.com/2019/12/04/reddits-monthly-active-user-base-grew-30-to-reach-430m-in-2019/?guccounter=1.

Pescosolido BA, & Martin JK (2015). The stigma complex. Annual Review of Sociology, 41(1), 87–116. 10.1146/annurev-soc-071312-145702

Pretorius C, Chambers D, Cowan B, & Coyle D (2019). Young people seeking help online for mental health: Cross-sectional survey study. JMIR Mental Health, 6(8), e13524. 10.2196/13524 [PubMed: 31452519]

Radcliffe P, & Stevens A (2008). Are drug treatment services only for 'thieving junkie scumbags'? Drug users and the management of stigmatised identities. Social Science & Medicine (1982), 67(7), 1065–1073. 10.1016/j.socscimed.2008.06.004 [PubMed: 18640760]

Rao H, Mahadevappa H, Pillay P, Sessay M, Abraham A, & Luty J (2009). A study of stigmatized attitudes towards people with mental health problems among health professionals. Journal of Psychiatric and Mental Health Nursing, 16(3), 279–284. 10.1111/j.1365-2850.2008.01369.x [PubMed: 19291157]

reddit.com Competitive Analysis, Marketing Mix and Traffic—Alexa. (n.d.). Retrieved June 10, 2021, from https://www.alexa.com/siteinfo/reddit.com

Reddit's monthly active user base grew 30% to reach 430M in 2019 | TechCrunch. (n.d.). Retrieved June 10, 2021, from https://tech-crunch.com/2019/12/04/reddits-monthly-active-user-base-grew-30-to-reach-430m-in-2019/

Roman PM, Abraham AJ, & Knudsen HK (2011). Using medication-assisted treatment for substance use disorders: Evidence of barriers and facilitators of implementation. Addictive Behaviors, 36(6), 584–589. 10.1016/j.addbeh.2011.01.032 [PubMed: 21377275]

Ronzani TM, Higgins-Biddle J, & Furtado EF (2009). Stigmatization of alcohol and other drug users by primary care providers in Southeast Brazil. Social Science & Medicine, 69(7), 1080–1084. 10.1016/j.socscimed.2009.07.026 [PubMed: 19692163]

Room R, Rehm J, Trotter RT II, Paglia A, & Üstün TB (2001). Cross-cultural views on stigma, valuation, parity, and societal values towards disability (pp. 247–297). Hogrefe & Huber Publishers. http://urn.kb.se/resolve?urn=urn:nbn:se:su:diva-56761

Russell D, Spence NJ, & Thames KM (2019). 'It's so scary how common this is now': Frames in media coverage of the opioid epidemic by Ohio newspapers and themes in Facebook user reactions. Information, Communication & Society, 22(5), 702–708. 10.1080/1369118X.2019.1566393

Saitz R (2015). Things that work, things that don't work, and things that matter—Including words. Journal of Addiction Medicine, 9(6), 429–430. 10.1097/ADM.0000000000000170 [PubMed: 26517322]

Saitz R (2016). International statement recommending against the use of terminology that can stigmatize people. Journal of Addiction Medicine, 10(1), 1–2. 10.1097/ADM.0000000000000178 [PubMed: 26588846]

Schomerus G, Lucht M, Holzinger A, Matschinger H, Carta MG, & Angermeyer MC (2011). The stigma of alcohol dependence compared with other mental disorders: A review of population studies. Alcohol and Alcoholism (Oxford, Oxfordshire), 46(2), 105–112. 10.1093/alcalc/agq089 [PubMed: 21169612]

Self-Study Guide—Program Evaluation—CDC. (2020, March 24). https://www.cdc.gov/eval/guide/index.htm

Semple SJ, Grant I, & Patterson TL (2005). Utilization of drug treatment programs by methamphetamine users: The role of social stigma. The American Journal on Addictions, 14(4), 367–380. 10.1080/10550490591006924 [PubMed: 16188717]

Simmonds L, & Coomber R (2009). Injecting drug users: A stigmatised and stigmatising population. The International Journal on Drug Policy, 20(2), 121–130. 10.1016/j.drugpo.2007.09.002 [PubMed: 17981451]

Souleymanov R, Kuzmanovi D, Marshall Z, Scheim AI, Mikiki M, Worthington C, & Millson MP (2016). The ethics of community-based research with people who use drugs: Results of a scoping review. BMC Medical Ethics, 17(1), 25. 10.1186/s12910-016-0108-2 [PubMed: 27129927]

Substance Abuse and Mental Health Services Administration. (2020). Key substance use and mental health indicators in the United States: Results from the 2019 National Survey on Drug Use and Health (HHS Publication No. PEP20-07-01-001, NSDUH Series H-55). Rockville, MD:

Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. Retrieved from https://www.samhsa.gov/data/

Tofighi B, Aphinyanaphongs Y, Marini C, Ghassemlou S, Nayebvali P, Metzger I, Raghunath A, & Thomas S (2020). Detecting illicit opioid content on Twitter. Drug and Alcohol Review, 39(3), 205–208. 10.1111/dar.13048 [PubMed: 32202005]

Tofighi B, Shahawy OE, Segoshi A, Moreno KP, Badiei B, Sarker A, & Krawczyk N (2021 Jan-Mar). Assessing perceptions about medications for opioid use disorder and Naloxone on Twitter. Journal of Addictive Diseases, 39(1), 37–45. 10.1080/10550887.2020.1811456 [PubMed: 32835641]

Tsai AC, Kiang MV, Barnett ML, Beletsky L, Keyes KM, McGinty EE, Smith LR, Strathdee SA, Wakeman SE, & Venkataramani AS (2019). Stigma as a fundamental hindrance to the United States opioid overdose crisis response. PLoS Medicine, 16(11), e1002969. 10.1371/journal.pmed.1002969 [PubMed: 31770387]

Volkow ND, Frieden TR, Hyde PS, & Cha SS (2014). Medication-assisted therapies—Tackling the opioid-overdose epidemic. The New England Journal of Medicine, 370(22), 2063–2066. 10.1056/NEJMp1402780 [PubMed: 24758595]

Wakeman SE, & Rich JD (2018). Barriers to medications for addiction treatment: How stigma kills. Substance Use & Misuse, 53(2), 330–333. 10.1080/10826084.2017.1363238 [PubMed: 28961017]

Wallerstein NB, & Duran B (2006). Using community-based participatory research to address health disparities. Health Promotion Practice, 7(3), 312–323. 10.1177/1524839906289376 [PubMed: 16760238]

Weiss MG, Ramakrishna J, & Somma D (2006). Health-related stigma: Rethinking concepts and interventions. Psychology, Health & Medicine, 11(3), 277–287. 10.1080/13548500600595053

Woo J, Bhalerao A, Bawor M, Bhatt M, Dennis B, Mouravska N, Zielinski L, & Samaan Z (2017). "Don't judge a book by its cover": A qualitative study of methadone patients' experiences of stigma. Substance Abuse: Research and Treatment, 11, 1178221816685087. 10.1177/1178221816685087

Yao H, Rashidian S, Dong X, Duanmu H, Rosenthal RN, & Wang F (2020). Detection of suicidality among opioid users on reddit: Machine learning–based approach. Journal of Medical Internet Research, 22(11), e15293. 10.2196/15293 [PubMed: 33245287]

Table 1.

Description of the types of stigma, sources of stigma, and supporting quotes self-described in posts.

Label[a]	Description	Reference	Quote[b]	Subreddit	Mentions stigma keyword
Type of stigma					
Condition stigma	Post mentions a stigma that is associated with the medical condition of an opioid use disorder (e.g., the post refers to addiction or opioid use; uses language like "junkie," "heroin user," "injection drug user," "addict" pejoratively)	1	"How many here get judged really bad, even being in recovery about being an addict in the past. No one and I mean no one understands opiate addiction unless they have been there themselves."	r/OpiatesRecovery	Yes
		2	"It's really painful that I can't post this on facebook, because I'd like to be able to be transparent about my past but I know it has such a strong stigma attached…"	r/Methadone	Yes
		3	"I relapsed yesterday after 10 months clean. I had a prescription for vicodin. I drove straight to the pharmacy and took them all. I was too ashamed to tell my friends and ask for help from them."	r/OpiatesRecovery	No
		4	"But is taking drugs once a month any different from getting drunk on alcohol all the time'?"	r/OpiatesRecovery	Yes
		5	"What motivates you? Aside from proving to myself I can recover from addiction, I am motivated by proving to every one who called me an addict and told me that I would fail at recovery wrong."	r/suboxone	No
Intervention stigma	Post explicitly mentions a stigma associated with a medication intervention for treatment of an opioid use disorder (e.g. the post refers to stigma surrounding buprenorphine, naloxone, methadone, naltrexone or other FDA approved medication for opioid use disorder).	6	"Is being on suboxone even that much better? There's nearly as much of a stigma with subs than being a straight junkie."	r/OpiatesRecovery	Yes
		7	"Why do people on Reddit say bad things about Narcan. it saved my life. I had been trying to quit for months before I overdosed. The Narcan injections were the only thing that turned around my recovery."	r/OpiatesRecovery	No
		8	"I am very weary of disclosing my status as a methadone patient even if it is to another healthcare provider."	r/Methadone	Yes
Generic stigma	Post does not explicitly mention or is unclear whether the stigma is associated with a medical condition or a medical intervention (e.g., a broad reference to stigma)	9	"The only way to fight the stigma that we're up against is by educating people."	r/Methadone	Yes
Sources of stigma					
Courtesy[c]	Post mentions a person (e.g., a family member) or group of persons (e.g., clinical providers at opioid treatment programs) that are negatively judged or mistreated because of their social proximity to the stigmatized population)	Not mentioned	Not mentioned	Not mentioned	
Provider-based	Post mentions a stereotype, prejudice, or discrimination by health professionals	10	"I had a bad experience with the last 2 psychiatrist appointments due to the stigma of being on methadone, they got the wrong impression and probably felt I was drug seeking because I'm so nervous all the time and also dealing with slight withdrawal from taper."	r/Methadone	Yes

Label[a]	Description	Reference	Quote[b]	Subreddit	Mentions stigma keyword
		11	"Do you avoid going to the doctor even when you need to because you cannot stand the stigma around addiction? I've had many times when I needed to see a doctor, but I avoided going because of the way I'm treated. I've heard comments about my addiction, that I'm a drug seeker, etc. Last time I went to the doctor I left crying because of it. Does anyone else avoid seeking medical attention because of this?"	r/OpiatesRecovery	Yes
		12	"According to my doc, some people have lost so much dopamine and will never recover and they eventually commit suicide. I honestly feel so defeated right now. I worked hard for my recovery and now I'm shattered."	r/suboxone	No
		13	"The pharmacy always messes with things or is just generally aggressive about filling the suboxone prescription. Does anyone else experience this?	r/suboxone	Yes
Public	Post mentions a stereotype, prejudice, or discrimination by the general population, including family and friends as the source	14	"Sad and scared that I'm here again. I showed my girlfriend how much of my pills were left and she said "Wow. You really do have a problem." I was hurt by that. I love her."	r/Methadone	No
		15	"But even now my Grandpa will tell me not to talk about Suboxone around my Grandma or other family members as if I should be ashamed or embarrassed."	r/suboxone	Yes
		16	"My dad called tonight and accused me of getting high again and it hurt me so bad. I've been sober the last two months. it just hurts. I guess the stigma of once an addict will always stick with us."	r/Methadone	Yes
		17	"I can't talk to my parents about these fears. Telling them their daughter has done heroin? I literally cry at the thought of such an exchange."	r/Methadone	Yes
Self	Post mentions an internalized acceptance of a stereotype or prejudice (e.g., acceptance for lower value of worth due to their condition)	18	"I feel like the tin man and tar is my oil. I'm not even sure what triggered me to use. Before I realized it, I had done it. I hate myself."	r/OpiatesRecovery	No
		19	"Also since moving to heroin I feel so embarrassed, especially due to the huge stigma attached to heroin (oxy isn't well known in London).	r/OpiatesRecovery	Yes
		20	"I don't know why, but I feel like I'm admitting defeat or like I'm taking the cowardly way out with suboxone."	r/suboxone	Yes
Structural	Post mentions intended or unintended prejudice or discrimination by an organization or institution including policies and laws (e.g., employment, cultural norms of abstinence-based support groups)	21	"I and others find it difficult to attend recovery meetings because we know that being on methadone isn't considered "clean""	r/Methadone	Yes
		22	"But now I see that every addict is different and what works for one person may not work for another. But not everyone sees it like that at all. There's one road, period. And if you don't take that road you're not doing it right in NA."	r/OpiatesRecovery	Yes
		23	"After 1 year of being on suboxone & working the 12 steps thru, I decided with my sponsor's approval to start sharing my story. I wanted to help other people just like me. Well, I was met	r/Suboxone	Yes

Label[a]	Description	Reference	Quote[b]	Subreddit	Mentions stigma keyword
			with people telling me my recovery is not real because I am on suboxone."		
		24	"I'm a functional addict, but I want to get off. I have a good job with insurance. How easy would it be to be prescribed subs? if I use my insurance, would my employer be made aware of it?"	r/Methadone	No
		25	"Getting off methadone? I'm thinking of doing it because I recently graduated into a healthcare industry and I'm really afraid of the stigma I'm going to be faced with."	r/Methadone	Yes
		26	"Going into a full fledged rehab center is not an option due to my career and the stigma for the rest of my work life."	r/OpiatesRecovery	Yes
		27	"Getting divorced I think my husband is going to try to keep me from having any custody of our twins simply because I'm on methadone."	r/Methadone	Yes
		28	"So why am I a criminal? Because the drug war made it like that. So instead of helping I get a criminal record."	r/OpiatesRecovery	Yes
		29	"We all know the difference between getting high and getting well. Jails keep killing addicts. I think it's cruel to let someone go through an opiate withdrawal."	r/Methadone	Yes
		30	"I'm almost 40 and I just don't care about the stigma. I don't care if I'm on subs forever. I want normalcy. some baseline sanity. Nothing else I've done works on a long enough time line. Wish me luck."	r/OpiatesRecovery	Yes
Not Disclosed	Post doesn't explicitly state the source of the stigma				

[a] the labels of the types and sources of stigma were not mutually exclusive; that is each post could reflect one or more of the categories for the type and source of the described stigma.

[b] example quotes are lightly modified original posts to avoid reverse identification.

[c] courtesy stigma was not mentioned in the posts. courtesy stigma refers to stigmatization because of close social or professional proximity to an individual experiencing opioid use, treatment, or recovery.

Table 2.

Frequency of occurrence of the types and sources of stigma by each subreddit for the n = 236 posts that contained a stigma-related keyword and described a stigmatizing experience.

	r/OpiatesRecovery n (%)	r/Methadone n (%)	r/suboxone n (%)	Total n (%)
Type of stigma				
Condition stigma	55 (84.6)	4 (6.1)	6 (9.2)	65 (18.7)
Intervention stigma	29 (30.8)	43 (45.7)	22 (23.4)	94 (27.1)
Generic stigma	6 (50.0)	4 (33.3)	2 (16.6)	12 (3.5)
Total mentions of types of stigma	90	51	30	171 (100)
Action-oriented stigma (Sources of stigma)				
Courtesy	0 (0)	0 (0)	0 (0)	0 (0)
Provider-based	7 (31.8)	7 (31.8)	8 (36.4)	22 (6.3)
Public	28 (73.7)	6 (15.8)	4 (10.5)	38 (11.0)
Self	9 (90.0)	0 (0)	1 (10.0)	10 (2.9)
Structural	15 (68.2)	5 (22.7)	2 (9.1)	22 (6.3)
Not Disclosed	38 (45.2)	33 (39.2)	13 (15.4)	84 (24.2)
Total mentions of sources of stigma	97	51	28	176 (100)

Table 3.

Frequency of occurrence of the types and sources of stigma by each subreddit for the random sample of n = 23 posts that described a stigmatizing experience, but did not contain a stigma-related keyword.

	r/OpiatesRecovery n (%)	r/Methadone n (%)	r/suboxone n (%)	Total n (%)
Type of stigma				
Condition stigma	13 (68.5)	4 (21.0)	2 (10.5)	19 (82.6)
Intervention stigma	2 (20.0)	6 (60.0)	2 (20.0)	10 (43.5)
Generic stigma	0 (0)	0 (0)	0 (0)	0 (0)
Total mentions of types of stigma	15	10	4	29
Action-oriented stigma (Sources of stigma)				
Courtesy	0 (0)	0 (0)	0 (0)	0 (0)
Provider-based	1 (20.0)	3 (60.0)	1 (20.0)	5 (21.7)
Public	3 (50.0)	1 (16.7)	2 (33.3)	6 (26.1)
Self	8 (72.8)	2 (18.2)	1 (9.0)	11 (47.8)
Structural	1 (25.0)	3 (75.0)	0 (0)	4 (17.4)
Not Disclosed	0 (0)	0 (0)	0 (0)	0 (0)
Total mentions of sources of stigma	13	9	4	26