

Pandemic Effects on the Perception of Eating Disorder X Posts Among Adolescents and Transitional Age Youth

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Eating disorders (EDs) are serious mental health conditions that can have devastating physical and psychological effects. They are significantly underdiagnosed and undertreated, and many individuals suffer in silence due to stigma, shame, and lack of access to appropriate care. Adolescents and transitional age youth (TAY) suffer from high prevalence of EDs, highlighting the need for effective prevention and intervention strategies, and improved access to evidence-based treatment options. Estimates suggest that at least 9% of the global population suffers from EDs, with the average age of onset being 18 years.¹ Adolescents aged 13 to 18 are particularly vulnerable, with approximately 2.7% affected. TAY likely have an even higher number of ED cases.² EDs have the highest fatality rates of any mental illness, with an estimated 4% of patients with anorexic nervosa dying from complications.³

The growing use of social media among these age groups highlights its potential as a research tool to observe trends in the prevalence and severity of EDs in response to world events. Additionally, various studies link social media use to higher levels of body dissatisfaction, disordered eating, and negative self-image, making it a powerful influence on the development and maintenance of EDs.⁴ The use of social media platforms such as X (formerly known as Twitter), Instagram, TikTok, and Snapchat exposes young people to curated images and messages that promote unrealistic beauty standards and stigmatize larger body sizes. These messages can trigger or exacerbate eating disorder symptoms in vulnerable individuals, fueling a cycle of negative thoughts and behaviors that can be difficult to break.

The COVID-19 pandemic further complicated the relationship between social media and EDs. Individuals turning to social media platforms as a source of connec-

tion and entertainment during lockdowns and quarantines contributed to an increased risk of exposure to disordered eating content. Social media can provide a sense of community and support for individuals struggling with EDs but can also reinforce maladaptive thoughts and behaviors by creating echo chambers of disordered eating and by encouraging maladaptive comparisons to others' appearances and lifestyles.

The increased use of social media has made adolescents and TAY more vulnerable to developing EDs, particularly during the COVID-19 pandemic, when people reported worsening mental health due to isolation and excessive social media usage.⁵ Our goal was to understand how the COVID-19 pandemic affected engagement with EDs by analyzing X (formerly known as Twitter) trends. We hypothesized that we would see an increase in messages with content related to EDs after the onset of the pandemic.

Method

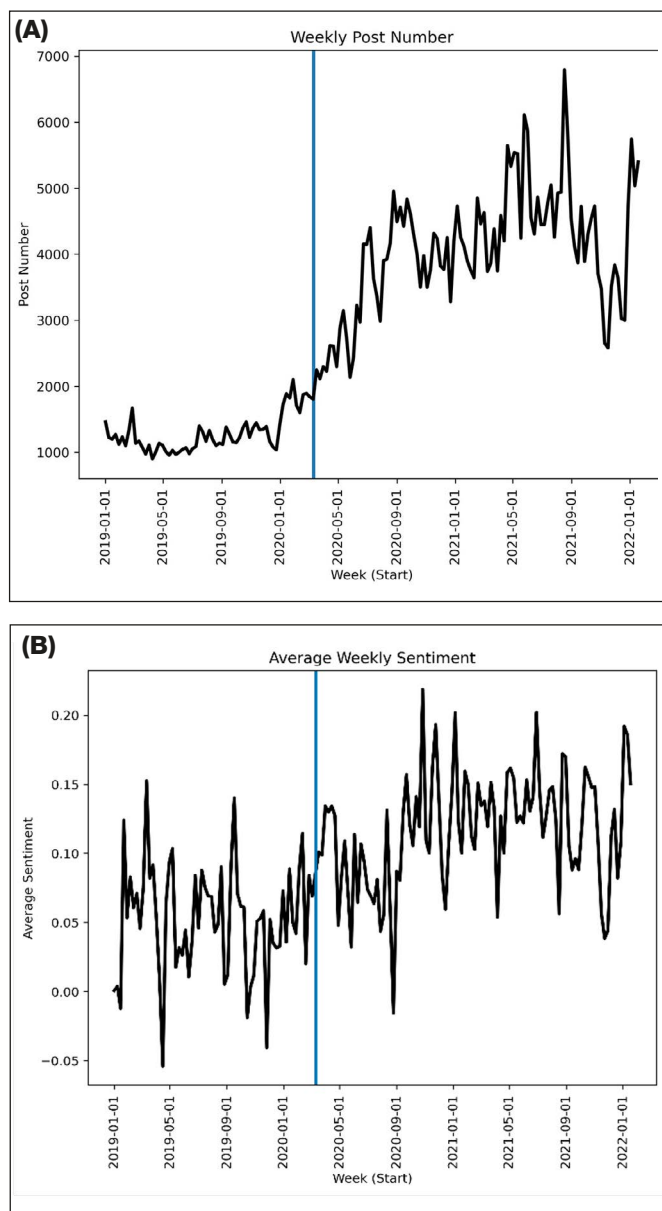
We utilized public data from X (formerly known as Twitter) API, yielding 476,375 posts (formerly known as Tweets) relating to EDs collected from January 1, 2019, to late January 2022. Posts were selected for and restricted to topics related to EDs using the following hashtags: “#anorexia,” “#anaprobs,” “#bulimia,” “#bingeeating-disorder,” “#compulsiveeating,” “#ednos,” “#edprobs,” “#proana,” “#promia,” “#thinspo,” “#thinspiration,” “#bodyslip,” “#edtwit,” “#bodycheck,” and other similar hashtags that have been used in previous research on the topic. Many of the keywords are related to the *DSM-IV* criteria for clinical diagnosis of ED.⁶ We limited promotional content by excluding posts with keywords such as “promo code,” “% off,” “use the code,” and “check us out.”

We performed sentiment analysis on all posts using the Valence Aware Dictionary and sentiment Reasoner (VADER) tool, with scores averaged per week.⁷ The VADER tool computes a normalized, weighted composite score for each post, with -1 representing most extreme negative sentiment and +1 representing most extreme positive sentiment. We compared means using two sample t-test on the averages of the number of ED-related posts per week and the average sentiment per week between the “pre-COVID” (Jan 2019 – Feb 2020) and “post-COVID” (March 2020-January 2022) time periods. We split pre-COVID and post-COVID time periods on March 11, 2020, when the World Health Organization declared COVID-19 a pandemic.

To supplement the sentiment analysis, we performed a qualitative analysis of a random sample of 500 ED-related posts, 250 each from before and after pandemic onset. Coders manually categorized posts into several categories, including “pro-EDs,” “against EDs,” “in recovery,” “research,” “discussion”, and “ads.” Inter-coder reliability was assessed with a portion of the sample dataset. Coders also took note of any overarching themes found in the “pro-EDs” posts, which were defined as posts that promoted unhealthy eating or exercise behavior. We used Z-score tests for two population proportions to determine significant differences in the proportion of the different categories of posts between pre- and post-COVID time periods.

We used custom Python code to quantify and collect posts relating to EDs, to conduct the sentiment analysis, to perform all statistical tests, and to generate Figure 1.

Figure 1. Weekly Post Number and Average Sentiment



Note: (A) Total number of posts per week from January 2019 to January 2022. The blue line represents the start of the pandemic declared by the World Health Organization. (B) Average sentiment of all posts from each week from January 2019 to January 2022. The blue line represents the start of the pandemic declared by the World Health Organization.

Results

Of the 476,375 posts collected, the top ten key hashtags among all ED-related posts were “#ed,” “#anorexia,” “#bulimia,” “#proana,” “#proanawt,” “#thinspo,” “#thinsp0,” “#edtwit,” “#ana,” and “#meanspo.” The average number of posts under each hashtag was 53,378, with “#edtwit” having the greatest number of posts at 248,016.

When looking at the average number of posts per week, we observed a significant increase in the number of weekly posts relating to EDs, from 1,292 (SD= 282) posts per week pre-COVID to 4,072 (SD= 953) per week post-COVID ($t(48) = -26.954$, $p < 0.001$) (Figure 1A). Average weekly sentiment regarding EDs increased from 0.053 (SD= 0.039) to 0.116 (SD = 0.042) after March 2020 ($t(48) = -9.55$, $p < 0.001$) (Figure 1B).

Accordingly, we found an increase in the percentage of favorable, “pro-ED” posts, from 49% pre-COVID to 73% post-COVID ($z = -5.6795$, $p < 0.00001$) in our manually coded sample of 500 posts. Some of the themes that we noticed included a greater sense of “community” in post-COVID pro-ED posts, with more requests for “mutuals” (X [formerly known as Twitter] users who reciprocally follow each other), polls, advice, and sharing of experiences with different diets and foods. Reflecting the greater percentage of “pro-ED” posts in the online X (formerly known as Twitter) community, the proportion of all other ED related posts dropped pre-COVID to post-COVID. The number of posts explicitly discouraging ED behaviors dropped from 4% pre-COVID to 3% post-COVID ($z = 1.2338$, $p = 0.2187$). The number of posts where users shared about their experiences in ED recovery dropped from 11% pre-COVID to 3% post-COVID ($z = 3.4602$, $p < 0.001$). The proportion of all other posts (in other categories such as research, discussion, and ads) dropped from 32% pre-COVID to 21% post-COVID ($z = 2.6378$, $p < 0.01$).

Discussion

In summary, our study found that the number of ED-related posts increased after the COVID-19 pandemic onset and its associated government-mandated lockdowns. These findings reflect the rise in mental health

concerns among people during the pandemic. Specifically, we noted an increase in the proportion of posts expressing positive sentiment towards EDs, which coincided with clinicians’ reports of a surge in hospitalizations related to EDs during the pandemic. The increase in positive sentiment towards EDs may reflect a coping mechanism among individuals who were struggling with the pandemic’s effects on their mental health.

Our study underscores the need to preempt mental health exacerbations, especially among adolescents and TAY, during global events that cause undue stress and isolation. Future pandemics and environmental changes due to global warming are prime examples of such events. Caregivers, parents, teachers, and physicians should work together to develop strategies to mitigate the negative effects of such events on the mental health of young individuals.

Furthermore, we found that the content of the posts seemed to promote community, raising questions about the role of social media as an echo chamber for individuals with EDs. While social media can provide a sense of community to people with EDs who may feel isolated and alone, it may also exacerbate their conditions if it promotes unhealthy behaviors. The glorification of certain EDs on social media may result in individuals with these disorders feeling validated and may lead to increased engagement with these behaviors.

Our study, along with others, highlights the need for further investigation into the benefits and harms of social media in the context of mental health. For example, we should consider whether patients should have access to the internet during inpatient unit stays, or whether their access should be limited to mitigate the potential negative effects of social media on their mental health. Additionally, we should explore whether parents should limit their children’s social media exposure, and if so, how to implement such limitations effectively. These are important questions that require further investigation to ensure that individuals with EDs receive the support they need to maintain their mental health in a world where social media plays an increasingly significant role.

References

1. Arcelus J, Mitchell AJ, Wales J, Nielsen S. Mortality rates in patients with anorexia nervosa and other eds: a meta-analysis of 36 studies. *Archives of General Psychiatry*. 2011;68(7):724-731. <https://doi.org/10.1001/archgenpsychiatry.2011.74>
2. EDs. National Institute of Mental Health (NIMH). Accessed April 6, 2023. <https://www.nimh.nih.gov/health/statistics/eating-disorders>
3. Crow SJ, Peterson CB, Swanson SA, et al. Increased mortality in bulimia nervosa and other EDs. *AJP*. 2009;166(12):1342-1346. <https://doi.org/10.1176/appi.ajp.2009.09020247>
4. Jlotsa B, Naccache B, Duval M, Rocher B, Grall-Bronnec M. Social media use and body image disorders: association between frequency of comparing one's own physical appearance to that of people being followed on social media and body dissatisfaction and drive for thinness. *Int J Environ Res Public Health*. 2021;18(6):2880. <https://doi.org/10.3390/ijerph18062880>
5. Imran N, Zeshan M, Pervaiz Z. Mental health considerations for children & adolescents in COVID-19 Pandemic. *Pak J Med Sci*. 2020;36(COVID19-S4):S67-S72. <https://doi.org/10.12669/pjms.36.COVID19-S4.2759>
6. Cavazos-Rehg PA, Krauss MJ, Costello SJ, et al. "I just want to be skinny.": A content analysis of tweets expressing eating disorder symptoms. *PLOS ONE*. 2019;14(1):e0207506. <https://doi.org/10.1371/journal.pone.0207506>
7. Hutto CJ, Gilbert EE. VADER: A parsimonious rule-based model for sentiment analysis of social media text. Eighth International Conference on Weblogs and Social Media (ICWSM-14). Ann Arbor, MI, June 2014.

Take Home Summary

We found that on X (formerly known as Twitter), both the number of posts relating to EDs and the proportion of those posts promoting negative ED behaviors significantly increased during the COVID-19 pandemic, possibly due to isolation and increased use of social media among adolescents and transitional-age youth.

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