Impact of the COVID-19 Pandemic on Mental Health: Real-Time Surveillance Using Google Trends

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In the wake of COVID-19, the capacity to track emerging trends in mental health symptoms and needs will guide public health responses at multiple ecological levels. Using Google Trends to track population-level mental health-related Google searches in the United States, this investigation identified pandemic-associated spikes in searches related to anxiety symptoms and remote treatments for anxiety, such as deep breathing and body scan meditation. As other discernable population-level changes in mental health have yet to emerge, continued surveillance is warranted.

Keywords: pandemic, anxiety, mindfulness, Internet-based therapy, search engine

COVID-19 is poised to impact population mental health dramatically (Holmes et al., 2020; Pfefferbaum & North, 2020). The pandemic will affect the population in a series of waves: the immediate morbidity and mortality from COVID-19, disruptions to urgent care for non-COVID-19 conditions, disruptions to chronic disease care, and the rapidly escalating incidence of mental health conditions related to generalized anxiety, trauma, and other sequelae. The capacity to detect emerging changes in mental health symptoms and treatment needs could guide public policy decisions, the strategic decision making of mental health organizations, the availability of assessment and treatment services, and research funding priorities at state, regional, and national levels. The present investigation was designed to illustrate how Google Trends can be used to track emerging COVID-19-related changes in population mental health.

Google Trends (http://trends.google.com) is a powerful publically accessible website that allows individuals to examine longitudinal population-level variation in the relative frequency with which people use specific Google search terms. Data are updated in real time and can be examined worldwide or by nation, state, metro region, or city. Although by no means a "window into the soul," people's search terms reflect relatively uncensored desires for information and thus lack many of the biases of traditional self-report surveys. Google Trends analyses have been used to predict important societal outcomes, such as disease transmission, voting behavior, and key economic indicators (Choi & Varian, 2012; Nuti et al., 2014; Stephens-Davidowitz & Pabon, 2017), and it can also be used to forecast population mental health symptoms and needs.

Using Google Trends, we sought to take a snapshot of changes in population mental health in the United States in the first 40 days following the World Health Organization pandemic declaration on 3/11/20. Specifically, we downloaded weekly search term frequency data for the 52 weeks from 4/21/19 to 4/19/20 and used the Mann–Whitney U test to compare frequencies pre-to-post pandemic declaration. Findings spanned four themes, with illustrative examples shown in Figure 1. Foremost, following the pandemic declaration, we found a steep but temporary increase in Google searches related to worry (see Figure 1A; *worry:* $p < .0001$, *worry health:* $p = .017$, *panic:* $p < .0001$, and *hysteria:* $p < .0001$, with a similar pattern for related terms not shown). Next, we suspect this everyday worry began to morph into increases in clinically relevant anxiety symptoms. As shown in Figure 1B, anxiety symptom-related searches spiked slightly later and were more enduring (all $ps < .001$). Note that while worry and anxiety symptom searches have regressed most recently, it is unknown whether symptoms are actually abating or search behavior is merely exhausting.

A third finding was that despite considerable effort, we were surprised that we could not find evidence to date of meaningful changes in searches related to other mental health symptoms (a few
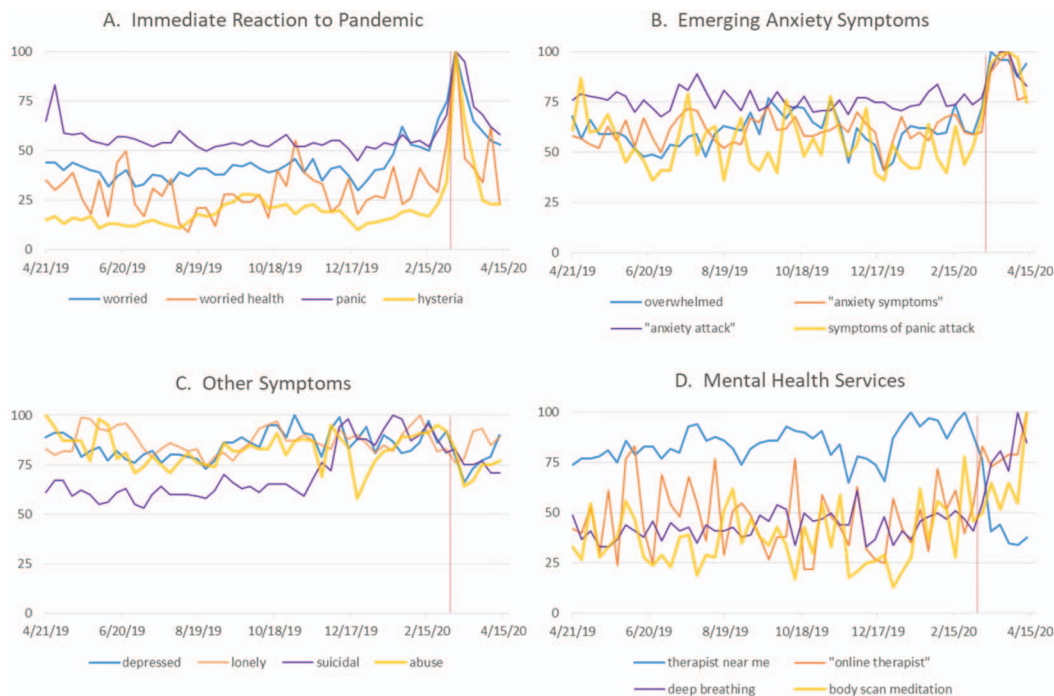
Figure 1. Google Trends analysis of mental health related search themes (4/21/19 – 4/19/20). The World Health Organization declared a pandemic on 3/11/20. Searches suggest an immediate uptick in worry and panic, followed by the onset of anxiety symptoms. We could not detect changes in other mental health symptoms. People have shifted from seeking in-person to remote therapy and are especially interested in deep breathing and body scan meditation techniques. See the online article for the color version of this figure.

examples in Figure 1C). News media interviews with experts in mental health have warned of escalating depression, loneliness, suicidal ideation, domestic abuse, insomnia, substance misuse, and traumatic stress; we discerned no such changes to date. It may be that the onset of such changes will occur later, suggesting the need for continued surveillance on Google Trends. Alternatively, the population may be more resilient than anticipated in rationalizing some elements of the pandemic (e.g., "it's normal to feel lonely when self-isolating"). Moreover, population-level increases in stress in some life domains may be partially offset by reductions in stress from fewer close-proximity interactions with difficult bosses and coworkers.

A final theme was that Google search behavior suggests people are experiencing different mental health service needs. Expectedly, people are switching from searching for in-person therapists (e.g., *therapist near me: p* < .00001) to remote therapy modalities (e.g., *"online therapist": p* < .0001; Figure 1D). More profound, individuals are also searching more for certain therapeutic techniques, especially those commonly used in the treatment of anxiety (e.g., *deep breathing: p* < .00001; *body scan meditation: p* < .001). Public health initiatives and mental health organization marketing campaigns could benefit from promoting these services in high demand.

In sum, these analyses of Google Trends data suggest that Americans are already experiencing meaningful increases in anxiety symptoms and have a desire for the remote delivery of common anxiety treatment techniques. Continued monitoring of Google Trends may reveal changes in other mental health symptoms over the longer term

that we could not yet detect. These findings and continued surveillance can guide public mental health initiatives across multiple ecological levels that can mitigate the psychological toll of COVID-19.

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