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The COVID-19 outbreak and Google searches: Is it really the time to worry about global mental health?

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Dear Editor,

The outbreak of a novel coronavirus disease (COVID-19) might have a great impact on mental health (Brooks et al., 2020; Moccia et al., 2020; Troyer et al., 2020; Wang et al., 2020). It has been found that the pandemic has also affected the content explored by the internet users (Effenberger et al., 2020), as the Internet is an important source of information (Berger et al., 2005). Therefore, we aimed to investigate whether changes in the number of COVID-19 cases and deaths are associated with relative search volumes (RSV) of contents associated with mental health.

We searched the Google Trends™ (https://support.google.com/trends/) for the following keywords: "suicide", "depression", "anxiety" and "insomnia" among 24 countries. The Google Translate (https://translate.google.com) was used to translate keywords. The RSV indexes were retrieved for the period between February 18, 2020 and April 13, 2020. Due to potential seasonality of suicide trends, the RSV indexes for "suicide" were also retrieved for the period between February 18, 2019 and April 14, 2019. The Spearman rank correlation coefficients were analyzed. Moreover, a meta-analysis of correlation coefficients was performed. Results were considered significant if the p-value was less than 0.05.

There were significant negative correlations between the RSV for "suicide" and the number of COVID-19 cases and deaths in Argentina, Australia, Brazil, Canada, United Kingdom and United States (Supplementary Table 1). Pooled data analysis revealed similar results (Table 1, Supplementary Figs. 1 and 2). A significant negative correlation between the RSV for "depression" and the number of COVID-19 cases and deaths was found in Argentina, Australia, Belgium, Brazil, France, Japan, Netherlands, Poland, United Kingdom and United States (Supplementary Table 1, Supplementary Figs. 3 and 4). Pooled data analysis confirmed these findings (Table 1). In six countries (Argentina, Belgium, Brazil, France, Netherlands and Spain), a significant positive correlation between the RSV for "anxiety" and the number of COVID-19 cases and deaths was observed (Supplementary Table 1). However, this correlation was negative and significant in three countries (Australia, Canada and China). Pooled data analysis did not confirm a consistent pattern (Table 1, Supplementary Figs. 5 and 6). Finally, a significant positive correlation between the RSV for "insomnia" and the number of COVID-19 cases and deaths was detected in Argentina, Brazil, France, Israel, Italy and Spain (Supplementary Table 1). Pooled data analysis confirmed these findings for the number of COVID-19 deaths (Table 1, Supplementary Figs. 7 and 8). No significant correlations were found between the RSV indexes for "suicide" in 2020 and those in 2019 (Supplementary Table 3).

In this study, we found a significant positive correlation between the RSV for "anxiety" and the number of COVID-19 cases and deaths in six countries. However, in four countries (Australia, Canada, China, and the UK), an inverse relationship was shown. Interestingly, these are countries that differ in the incidence of a generalized anxiety disorder (lifetime prevalence of DSM-5 anxiety − 8% in Australia vs. 1% in China) (Ruscio et al., 2017). Similarly, we found a positive correlation between the RSV for "insomnia" and the number of COVID-19 cases and deaths in some countries. Less PTSD symptoms were observed among Wuhan residents during the COVID-19 outbreak who declared better sleep quality (Liu et al., 2020). Despite the increase in the number of COVID-19 cases, each of countries included in our analysis is at a different stage of the pandemic. In countries with stable epidemiological situation, we can expect different emotional responses. In addition, an important issue can be related to the sense of security provided by specific governments.

The RSV indexes for "suicide" and "depression" were negatively correlated with the number of COVID-19 cases and deaths. Moreover, the RSV indexes for "suicide" in 2020 and 2019 were not significantly correlated in neither of countries, and thus seasonal changes in suicide rates are unlikely to account for this observation. Lower suicide rates were also observed during 180 days following terrorist attacks in the USA on September 11, 2001 (Claassen et al., 2010). These findings suggest that in the proximity of life-threatening events, individuals might first consider protecting the most important aspects of their lives and change personal views on health and mortality. This may be associated with the phenomenon of resilience. Moreover, it is likely that a decrease in RSV indexes for "suicide" and "depression" is the consequence of increased social cohesion during the pandemic (Reger et al., 2020), based on the use of adaptive coping strategies. Moreover, intercultural differences should be taken into account in understanding these observations.

Although this analysis has certain limitations, our findings suggest

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Table 1
Pooled analysis of correlations between RSV for specific keywords and the number of COVID-19 cases and deaths.

Keyword	COVID-19 deaths			COVID-19 cases		
	r	95%CI	p	r	95%CI	p
"Suicide"	−0.12	−0.21 to −0.03	**0.011**	−0.14	−0.23 to −0.05	**0.002**
"Depression"	−0.24	−0.32 to −0.15	**< 0.001**	−0.25	−0.33 to −0.16	**< 0.001**
"Anxiety"	0.08	−0.05 to 0.20	0.220	0.05	−0.08 to 0.18	0.416
"Insomnia"	0.10	0.01 to 0.20	**0.026**	0.09	−0.01 to 0.19	0.067

Significant correlations ($p < 0.05$) were marked with bold characters.

that proximal effects of the COVID-19 pandemic manifest in less online information seeking for contents related to depression and suicide, and more online activity in seeking for contents associated with insomnia (low-to-moderate strength of correlations). Less consistent patterns of seeking for the information related to anxiety can be indicated.

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Conflict of interest

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.bbi.2020.04.083.

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