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IMPACT OF THE COVID-19 PANDEMIC ON MENTAL HEALTH IN BRAZIL, AN ANALYSIS BY GOOGLE TRENDS

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Abstract: Introduction: The literature suggests that the pandemic is capable of accentuating levels of anxiety and stress in healthy individuals and potentiating the symptoms of those with pre-existing mental disorders. **Goal:** To assess the impact of the Covid-19 pandemic on the search profile for terms related to mental health on the Google Trends digital platform. **Method:** Descriptive, exploratory research, which analyzed Google searches on terms related to mental health during the Covid-19 pandemic period. Twelve terms were searched using the Google Trends (GT) interface to access internet search data. The Kolmogorov-Smirnov test and the t-student test were used to compare the indicators before and after the pandemic. **Result:** The terms "anxiety" and "stress" showed a considerable increase trend in the analyzed period. Among the terms related to interactive practices, all showed a growth trend, with "passiflora" being the term with the highest increase. **Conclusion:** There was an increase in searches on the GT digital platform for terms related to mental health, with integrative practices showing a more significant increase in relation to psychic symptoms. This finding may indirectly reflect the increase in mental illness in the population, as well as the online search for self-care solutions.
Keywords: Mental health; Covid-19; Google Trends.

INTRODUCTION

COVID-19 AND MENTAL HEALTH

The outbreak of the disease caused by the new coronavirus (COVID-19) originated a global crisis with dramatic consequences for health, economy and society (HOLMES et al., 2020). In this scenario, dubious or even false information about the transmission, geographic reach, number of infected and the lethality rate of the new coronavirus brought insecurity and fear to the population (ORNELL et al., 2020).

In addition to a concrete fear of death, the COVID-19 pandemic can increase insecurity due to economic and social repercussions (ORNELL et al., 2020). Thus, the fear of the unknown accentuates the levels of anxiety and stress in healthy individuals and potentiates the symptomatology of those with pre-existing mental disorders (SHIGEMURA et al., 2020).

During an epidemic, the number of people with affected mental health tends to exceed the number of people infected with the disease in question (REARDON, 2015). Furthermore, excessive media information about the pandemic causes anxiety in people, especially young people, due to the widespread access to social media (CHENG; JUN; LIANG; 2014).

Psychological symptoms, emotional disturbances, stress, depressive mood, irritability, insomnia and post-traumatic stress symptoms have been reported to occur in people in quarantine (BARROS et al., 2020). In addition, cases of suicide potentially linked to the psychological implications of COVID-19 have also been reported in some countries on the Asian continent (GOYAL et al., 2020; JUNG; JUN, 2020).

It has been shown that women, the unemployed and those who consume more than one hour of information a day about COVID-19 had a higher incidence of mood disorders (MOREIRA, 2020). On the other hand, the practice of regular physical exercise, the existence of a garden in the house and advanced age proved to be protective factors in terms of mental health (MOREIRA, 2020).

It is pertinent, therefore, to measure the increase in the incidence of mental disorders in the general population at this unique moment in history, in order to develop preventive and therapeutic measures in mental health.

INTEGRATIVE AND COMPLEMENTARY PRACTICES

Faced with psychological distress and lack of access to mental health services, it is common for the population to seek self-care alternatives to alleviate their suffering, often resorting to integrative and complementary practices.

Integrative and Complementary Practices (PACS) are consistent with what the WHO calls traditional medicine and complementary/ alternative medicine (CARVALHO; NÓBREGA, 2018). In accordance with these recommendations, in 2006 the National Policy on Integrative and Complementary Practices was approved in Brazil, with the intention of implementing and adapting such actions/ services (BRASIL, 2015).

One of the approaches, within the PACS, that has gained space worldwide is aromatherapy. It is considered as a therapeutic practice that discusses and uses the psychological, physiological and pharmacological action of essential oils applied through olfaction, inhalation or dermal application; with the intention of prevention, cure and reduction of symptoms (HOROWITZ, 2011).

Phytotherapy is a therapy characterized by the use of medicinal plants in their different pharmaceutical forms (BRASIL, 2015). The use of herbal medicines is foreseen by the PNPIC, but the practice in the SUS is still a challenge, because despite being widely used, they are mostly based on lay, traditional or cultural indications, without the guidance of a health professional (RAFFONE, et al., 2019).

Meditation is characterized as a group of mental practices that influence cognition, emotion, mental and somatic events by directing attention and awareness (RAFFONE, et al., 2019). In this sense, mental training based on meditation leads to improvements in awareness, cognition and emotional regulation, thus providing the achievement of less negative mental states (RAFFONE, et al., 2019).

Physical activity can be understood as any bodily movement that results in energy expenditure, having components and determinants of a biopsychosocial, cultural and behavioral nature (WHO, 2021). This practice is positively related to physical, emotional and psychological well-being, reduces emotional responses to stress, state of anxiety and also reduces mild and moderate levels of depression (ORNELL, 2021).

In this context of a pandemic, PACS could be beneficial. Among the strategies for managing anxiety and stress in these conditions, the following stand out: taking breaks when watching, reading or listening to the news, including social media; take care of the body, do physical activities; breathe, stretch and meditate; try to eat healthy and balanced meals; to sleep; avoid alcohol and drugs; do some other pleasurable activity (AMUNDSON et al., 2020).

GOOGLE TRENDS AS A DATA SOURCE

The internet has become an abundant and accessible source of health information. The huge volume of data produced by daily searches associated with certain regions recorded by Google Trends can provide interesting information about what, where and when searches for a given population are linked - a term already established in the literature as seekingbehavior (search behavior), (ABEDI et al., 2015).

The profile of queries to internet search engines allows the assessment of interests, concerns and intentions of a population on a given topic (PASSOS et al., 2020). This is a growing tool in the monitoring of diseases and health conditions and related behaviors (AYERS et al., 2014).

Therefore, monitoring the profile of online searches can provide insight into human behavior, as this field is growing significantly and could in the future be a useful and inexpensive tool to assess behavioral changes and provide data for research that could not otherwise be accessed. otherwise (MAVRAGANI ET AL., 2018). Search trends can "predict the present" in a simple and low-cost way, thus contributing to provide support for the analysis of sociocultural phenomena ((PASSOS et al., 2020).

In this sense, the objective was to evaluate the impact of the Covid-19 pandemic on the search profile for terms related to mental health on the Google Trends digital platform, reflecting psychic illness in Brazil.

METHODOLOGY

The present study consisted of a descriptive, exploratory research, with a quantitative approach, which described the searches carried out on Google on terms related to mental health in the period of the Covid-19 pandemic. Twelve terms were searched using the Google Trends (GT) interface to access internet search data.

The terms were chosen for their semantic association with the description of diseases and their symptoms, usually found in the first searches and are "anxiety", "panic attack", "depression", "stress", "insomnia", "sadness". The terms chosen that relate to integrative practices are "meditation", "essential oil", "passiflora", "valerian", "yoga", "physical activity".

The GT presents estimates that allow for the dimensioning of search trends on topics of interest in geographic boundaries; thematic categories in addition to temporal delimitations. GT algorithms normalize data from a total number of searches in a given region/period on a scale that oscillates between 0 and 100 presented as Relative Search Volumes/s (VRB) (PASSOS et al., 2020).

These numbers represent search interest relative to the highest point on the graph for a given region over a given time period. A value of 100 is the peak popularity of a term. Likewise, a score of 0 means that the term had less than 1% of the popularity that peaked (GOOGLE, 2021). The VRBs are, by definition, always smaller than 100 (Y axes of the graphs) depicting searches in relative values, comparable to higher access volumes over a period. The representation in proportions corrects the absolute number of searches considering an oscillating number of Internet accesses in a given region (PASSOS et al., 2020).

The terms were searched from January 1, 2019 to June 30, 2021 with filters by region (Brazil) and subject topic (Health). Collection took place in July and August 2021. Data were exported as CSV files (Comma-separatedvalues) to electronic spreadsheets.

Data were analyzed using the SPSS statistical package (Statistical Package for Social Science) version 26.0. The normality of the collected data was verified using the Kolmogorov-Smirnov test. The presentation of indicators of integrative practices and psychic symptoms were performed using a measure of central tendency (mean) and measures of dispersion (standard deviation and 95% confidence interval and interquartile range). The comparison of indicators before and after the declaration of a pandemic was performed using Student's t test. The trend in the evolution of the search for terms was verified through Pearson's correlation analysis. In all analyses, the significance level adopted was 5% ($p < 0.05$).

Based on the information on the wide difference between the percentages of searches, a box diagram or "boxplot" was elaborated. This graph shows the maximum

and minimum limits (extreme values), the quartiles and median, allowing visually to perceive the amplitude of the interquartile difference.

Because it is public domain data, the study was exempt from submission to the Research Ethics Committee in accordance with resolution 510/2016 of the National Health Council.

RESULTS

It was possible to observe with the data obtained that most of the terms that were researched about mental health (psychic symptoms) obtained a significant value of change in the analyzed period, that is, with $p<0.001$, namely: anxiety, depression, stress and sadness.

Of these words, "depression" and "sadness" showed a downward trend in Google Trends searches, while "anxiety" and "stress" showed a considerable increase trend. In addition, "panic attack" and "insomnia", although with an increase in research, did not obtain significance to be considered (TABLE 1). The period of the pandemic refers to the date of March 11, 2020, when it was declared by the WHO.

In relation to integrative practices, all searched terms showed a significant increase in searches considering before and after the Covid-19 pandemic. The biggest increasing trends were seen in "essential oil" and "Valerian".

In **Table 2**, it is possible to observe the Pearson correlation, which measured the statistical relationship between the two continuous variables, before and after the pandemic event. Values closest to 1 are those that show the greatest indication of an upward

	Pandemic (World Health Organization)		*p**
	Before	Later	
Integrative practices			
Physical activity	45,65 ± 13,95	57,34 ± 13,98	<0,001
Meditation	70,71 ± 6,57	76,76 ± 10,04	<0,001
Essential oil	41,44 ± 8,02	74,15 ± 12,76	<0,001
Passiflora	22,56 ± 3,91	39,22 ± 19,56	<0,001
Valeriana	53,31 ± 9,39	70,15 ± 10,87	<0,001
Yoga	60,13 ± 5,41	62,40 ± 13,67	<0,001
Psychic symptoms			
Anxiety	59,05 ± 7,04	79,12 ± 7,69	<0,001
Panic attack	48,18 ± 18,87	50,18 ± 16,00	0,512
Depression	53,19 ± 13,52	40,04 ± 3,37	<0,001
Stress	69,92 ± 9,34	80,99 ± 8,13	<0,001
Insomnia	62,45 ± 9,93	65,84 ± 13,12	0,102
Sadness	81,40 ± 6,50	69,87 ± 5,75	<0,001

**Teste of Student (Mean ± Standard Deviation)*

Table 1. Result of comparing indicators of integrative practices and psychological symptoms before and after the declaration of a pandemic by the WHO.

	Pandemic			
	Before		Later	
	r	*P*	*r*	p
Integrative practices				
Physical activity	-0,28	0,03	-0,23	0,06
Meditation	-0,09	0,51	-0,65	<0,001
Essential oil	0,59	<0,001	0,24	0,05
Passiflora	0,03	0,80	0,60	<0,001
Valeriana	0,20	0,11	-0,17	0,16
Yoga	-0,16	0,22	-0,79	<0,001
Psychic symptoms				
Anxiety	0,73	<0,001	0,49	<0,001
Panic attack	0,30	0,02	-0,19	0,13
Depression	0,14	0,29	0,23	0,06
Stress	0,17	0,18	0,33	0,01
Insomnia	0,04	0,73	-0,50	<0,001
Sadness	-0,32	0,01	-0,34	<0,001

Table 2. Result of Pearson's correlation analysis of each indicator of integrative practices and psychic symptoms before and after the declaration of a pandemic by the WHO.

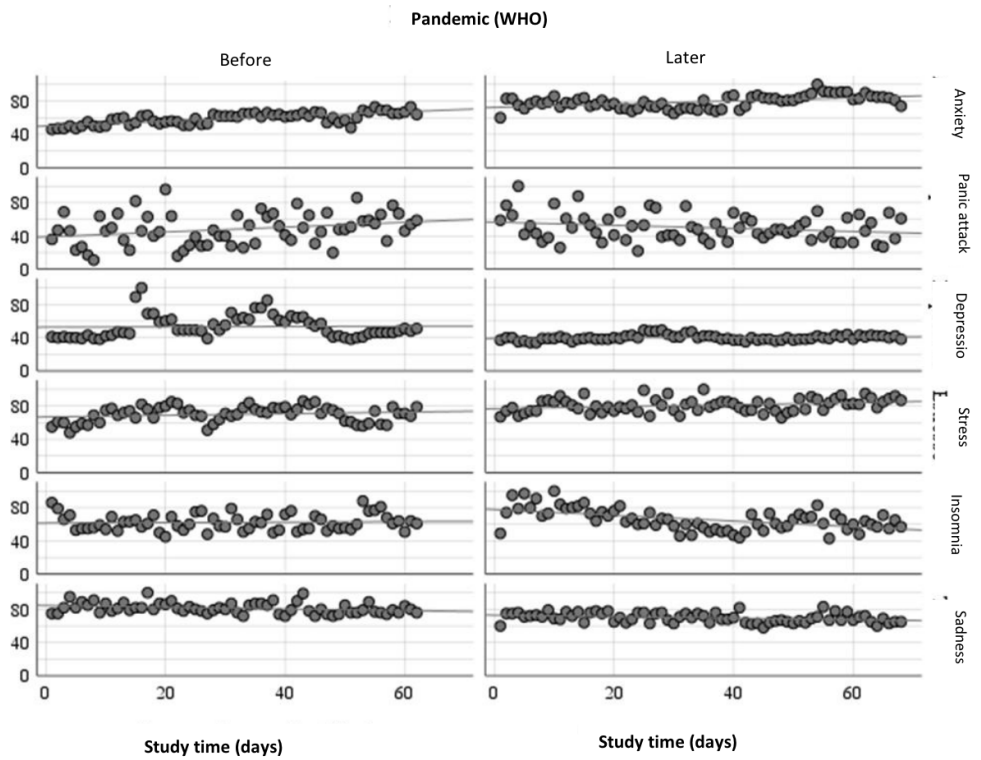

Figure 1a. Scatter plot demonstrating the trend of psychological symptoms indicators over the study period, before and after the W.H.O. (World Health Organization) declaration of a pandemic.

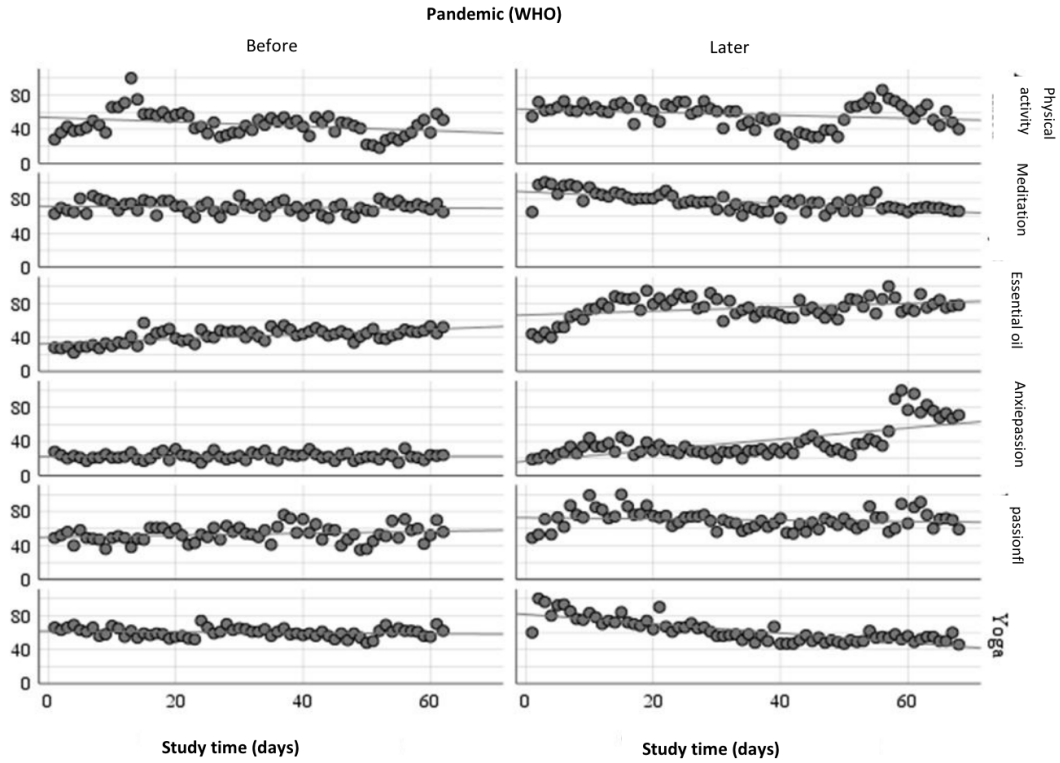

Figure 1b. Scatter chart demonstrating the trend of indicators of integrative practices over the study period, before and after the World Health Organization declaration of a pandemic.

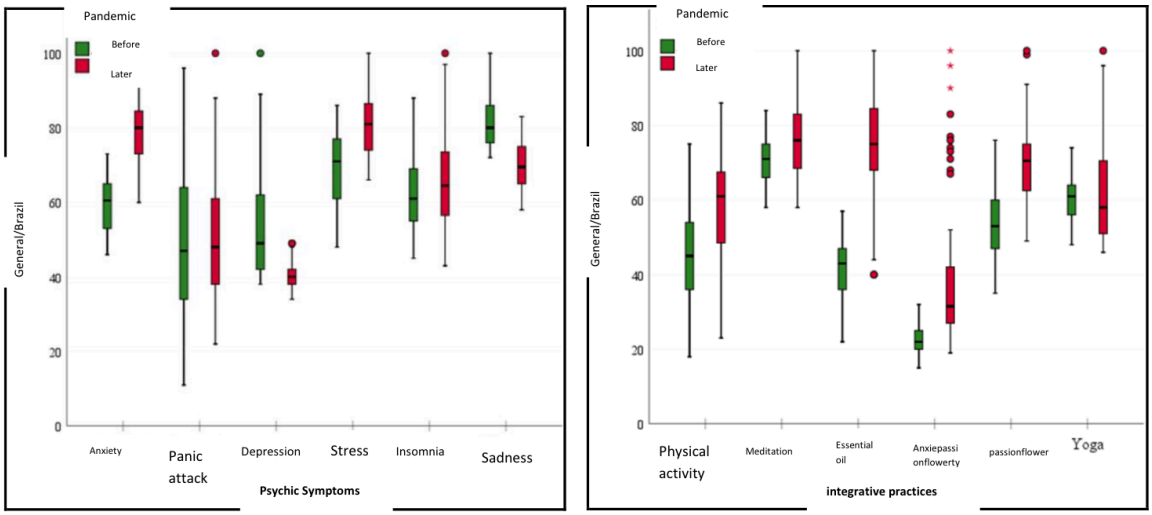

Figure 2. Boxplot chart demonstrating the central tendency, symmetry and dispersion of indicators of psychic symptoms and integrative practices before and after the declaration of a pandemic by the WHO.

trend in searches for each term. Negative values show a downward trend. Also, the closer the value is to 0, the lower the correlation.

Looking at Figure 2, it can be seen that the search for "passiflora" showed a large increase after the pandemic. The presence of outliers is also noted, which are considered atypical data, that is, before the pandemic event, the trend was towards precision and symmetry and later there were peaks in searches for this word.

In addition, these graphs allow the observation of the symmetry and variation of the data in the analyzed period. Therefore, the larger the box, the greater the asymmetry, that is, the greater the variation of the data in the time interval, as observed in "panic attack".

It is also possible to analyze the pattern of dispersion by the extremes. When the box is reduced in size, as in the word "sadness", it means that the search values are concentrated around the median.

DISCUSSION

Throughout history, there are numerous reports of overwhelming pandemics, however, this is the first time that a pandemic has spread so quickly around the world, not only geographically, but also through communication on social networks. (ESQUIVEL et al., 2021) Constant exposure to news about a situation such as the pandemic can harm mental health. Some authors, such as Neria (2011) and Thompson (2019) have already indicated that indirect exposure to mass trauma through the media can increase initial rates of post-traumatic stress disorder (PTSD) symptoms (REARDON, 2015; RAFFONE, 2015; RAFFONE, 2015). et al., 2019).

Gao et al (2020) conducted a study with the Chinese population during the current pandemic and found an association between frequent exposure to social media and news about COVID-19 with a higher risk for symptoms of anxiety and depression. In this sense, the director-general of the WHO stated that the world is facing an "infodemic" associated with the pandemic, demonstrating prolonged and excessive exposure to information about such a problem (SHIGEMURA, et al. 2020).

In general, it is a well-known fact that the pandemic can influence the mental health of individuals. In a Brazilian study during this period, with a sample of 45,161 individuals, the frequent feeling of sadness/depression reached 40% of Brazilian adults, and the frequent feeling of anxiety and nervousness was reported by more than 50% of the participants (BARROS et al, 2020).

A survey with 7,236 Chinese found a prevalence of 35.1% of anxiety, 20.1% of depressive symptoms and 18.2% of people with poor sleep quality (AHMED et al. 2020) These data are consistent with those found in the present study, which showed that symptoms related to anxiety and stress were more expressive in digital searches than those related to depression and sadness or insomnia.

According to the Barros 2020 survey, among the individuals interviewed who did not have sleep problems, more than 40% started to have it and almost 50% of those who already had it had the problem worsened (BARROS et al., 2020). Esquivel and his collaborators in 2021 also found insomnia to be one of the most prevalent physical symptoms in their sample during the pandemic period. However, in the present study, insomnia did not present significant variation in the data in the *Google Trends,* showing only a slight increase.

The literature also showed the highest prevalence of symptoms of depression and anxiety and sleep problems among younger people during a pandemic, in a context of social isolation. These data are possibly

due to the various stressors caused by the COVID-19 pandemic, including loneliness resulting from social isolation, fear of contracting the disease, economic tension and uncertainty about the future (BARROS et al., 2020).

In addition, changes in the lifestyle of a large part of the population associated with the development of mood disorders during the COVID-19 pandemic led to a search for alternative and complementary methods in order to alleviate or treat persistent symptoms. Therefore, there was a certain preference for herbal medicine, since it can be easily found in drugstores and pharmacies and often sold without the need for a medical prescription (WERNECK; CARVALHO, 2020; SIMONETTI et al., 2021).

In this sense, the research by Pessolato and his collaborators, in 2021, observed an increase in the consumption of herbal medicines composed of Passiflora and Valeriana after the pandemic event, a fact that is also consistent with data from the *Google Trends,* which showed a considerable increase in online searches for such substances, especially valerian.

Another integrative practice that was highlighted by the considerable increase in digital searches in the pandemic was aromatherapy for the search for "essential oils". This is a therapeutic practice that uses the properties of essential oils to restore balance and harmony in the body, aiming to promote physical and mental health (CHERAGHBEIGI et al., 2019).

Inserted in the Unified Health System (SUS) through Ordinance No. 702, of March 21, 2018, aromatherapy makes up the list of 29 therapeutic modalities institutionalized with the National Policy on Integrative and Complementary Practices - PNPIC (BRASIL, 2018). The psychic effect of aromatherapy is due to the direct connection of olfactory receptors to the Central Nervous System (CHERAGHBEIGI et al., 2019; NASCIMENTO et al, 2020), producing changes in brain chemistry.

CONCLUSIONS

It was possible to notice an increase in the trend of searches on the digital platform for terms related to mental health, with integrative practices showing a more significant increase in relation to psychic symptoms. This highlights the search for alternative treatments for symptoms that emerged or intensified during the period evaluated.

It must be considered that Brazilian states are going through different moments of the pandemic, which could impact the final results, which considered the country as a whole. The phenomena that involve internet search interest cycles are quite complex, but the GT can undoubtedly offer a vast field of investigations.

Further studies are needed to further elucidate this complex issue, since understanding the real impact of the COVID-19 pandemic on the mental health of the population will require time and research. Furthermore, the results found highlight the important role of service providers related to mental health.

Finally, immediate efforts must be made, such as training general practitioners to meet mental health demands, investigating patients' self-medication and approaching integrative practices in the therapeutic plan. Thus, the country will be able to reduce the impact of the pandemic on the mental health of the population.

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