Mental Health Search Trends of Turkey During the COVID-19 Pandemic

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***Abstract*—This paper explains our analysis of the mental health of people residing in Turkey during the COVID-19 pandemic, working on Google search terms to detect the trends in mental health problems throughout the pandemic.**

***Index Terms*—covid-19, pandemic, mental health, search terms**

I. Introduction

The impact of the COVID-19 pandemic on the world has been severe. While the problems caused directly by the infection such as mortality are focused on intensely, other important effects of the pandemic and its impact on society are less focused on. This research aims to shed light upon mental health, an easily forgotten consequence of the pandemic and related safety measures by analyzing the search terms data in Turkey. Mental health and suicide is a neglected consequence of the pandemic in Turkey, although other countries are revealing their statistics. By using Google Trends statistics as our data set, we have analyzed the rising problem of mental health during the pandemic and found a rapidly worsening decline in mental health through the search terms related with mental health and suicide. In this paper, we refer to relevant work done on this matter that point towards the same direction as our findings, and we call for urgent awareness of the mental health issues during the pandemic and associated lockdowns.

II. Related Work

As mentioned, the aim of our research is to analyze the long-term effects of the pandemic and the measurements taken against it, and how these affect the mental health of people. The significance of our research is supported by the literature. For example, Cullen et al. (2020) suggest that mental health is very important and poor mental health is a peril during a pandemic, while comparing the mental health situation with the swine flu. Serafini et al. (2020) also conducted a similar analysis, showing the extent of the psychological impact of the COVID-19 pandemic. Therefore, it is important to conduct more research to raise awareness to the mental health effects of COVID-19 and lockdowns, which we feel is easily overlooked. The call for awareness is urgent. As shown by Sher (2020), the mental health effects of the pandemic can be very dangerous and lead to elevated suicide rates, which should be prevented at all cost.

For our domain we have chosen Turkey as the subject to test our thesis that COVID-19 and measures against it are harmful to the mental health of people. For other countries, there are a number of relevant researches that focus on the mental health effects of the pandemic on the populace. Grechyna (2020) draws attention to the mental health situation in Spain, targeting lockdowns in schools and the dire mental consequences of lockdowns on students. Lee (2020) reached the same conclusion for a worldwide perspective, with students' mental health analysis throughout the world. Therefore it is very important to take mental health measures, targeted towards young people as well. Xu & Banks (2020) shows a general analysis of the mental health situation in the UK during the first 2 months of the pandemic, displaying a substantially worsened situation of 8.1% worse on average, which is far more severe for young adults and women who already reported low mental health.

Based on the mentioned work, we feel that it is important to research as much as possible into different countries and time periods. As we have been closely involved with Turkey's situation during whole pandemic and we believe that compared to many other European countries, the situation in Turkey is at least as severe. Therefore, we predict that similar trends will be easily visible in our analysis.

III. Methodology

The analysis was done using search engine query statistics on the Google search engine, which is supplied by Google Trends (https://trends.google.com/trends/). According to unofficial sources, it is estimated that 85% of people use Google as their main search engine in Turkey. We analyzed four keywords in the native language, anxiety(anksiyete), depression(depresyon), suicide(intihar), psychologist(psikolog). Google Trends provides us search popularity of a search term based on a region and time interval, as a normalized value between 0 to 100. Data provided by Google does not give us exact count of a given keyword but rather the popularity of the search against other searches within the country which indicates changes in trends. For each of the keywords, graph and regression analysis was performed between the dates 01/03/2020, until 20/06/2021. Our main metric is linear regression, which shows the general trend of the mental health problem. We have also performed 4-weekly analysis on the

data, to analyze in detail the trends between the months with respect to the pandemic measures and severity of the cases during that period, to further analyze the impact of lockdowns as well.

The usage of Google Trends stems from the fact that actual suicide and mental health statistics are not made publicly available by the Turkish government, which we feel needs to be as transparent as possible, for every country. However, as clearly demonstrated by Barros et al. (2019), it is confirmed that Google Trends metrics have a direct correlation with the actual situation within a country, who have performed this analysis for the suicide rates in Ireland, validating the accuracy of our results.

IV. Results

The following graphs show the results of our analysis.

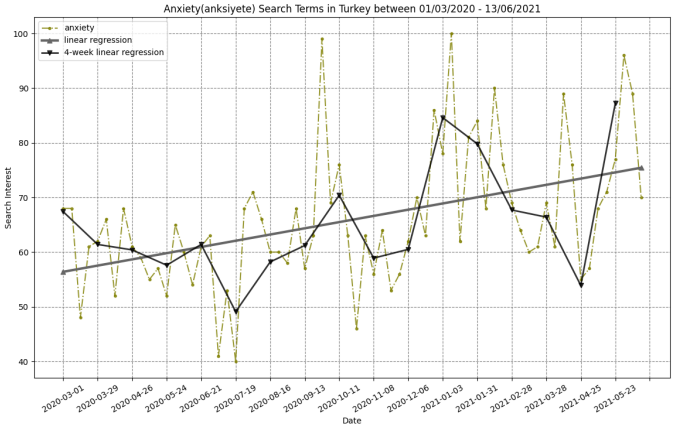

Fig. 1. Anxiety search interest in Turkey

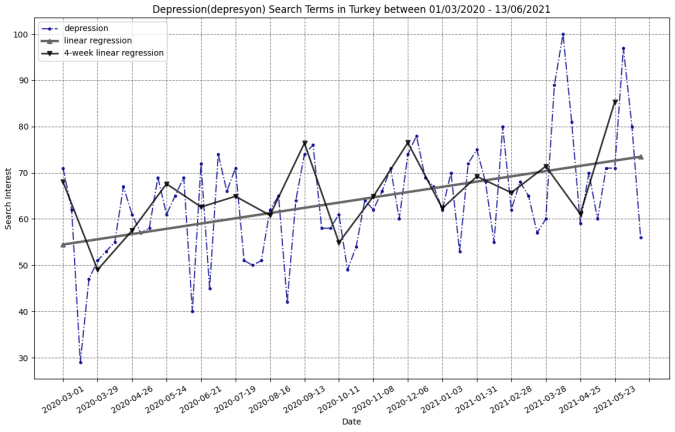

Fig. 2. Depression search interest in Turkey

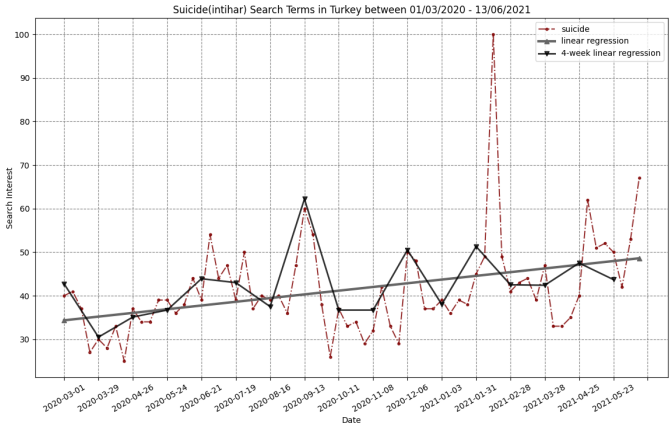

Fig. 3. Suicide search interest in Turkey

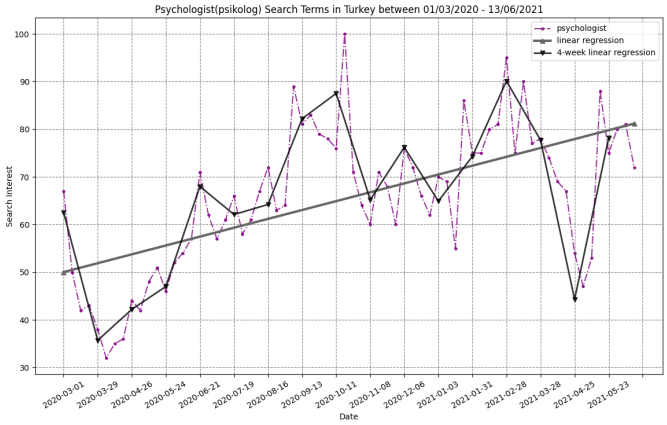

Fig. 4. Psychologist search interest in Turkey

Search Keyword	Weekly Interest Change
Anxiety	0.280
Depression	0.279
Suicide	0.209
Psychologist	0.458

TABLE I
WEEKLY CHANGE FOR THE SEARCH INTEREST

V. Discussion

Our results indicate a positive trend in all four categories, suggesting a progressively worsening mental health situation in Turkey. The 4-weekly trends have significant variation in their values, but do show correlation with the recent pandemic situation at that time.

The beginning of the pandemic saw a major relief in people, which is attributed to people not having to go to work and being unable to comprehend the severity of the situation. As the cases worldwide and nationwide raised, so did the mental health search queries.

One such major point is through September to October when the graphs spike. This was when Turkey's Health Ministry officially admitted to only list sick people as COVID-19 cases, and decided to show the entirety of the cases and sick people separately, resulting in several magnitudes higher of COVID-19 cases than previously assumed. The resulting mental health search trends could be explained by a sudden loss of hope and fear in people's minds about the progression of the pandemic.

Another point of spike in the graphs is towards the end of November, when the schools were officially declared to be online until the end of the year.

Beginning of March saw a relief when relaxation of the precautions was declared. However, the number of cases spiked in March until the end of April, which is also reflected as a major spike in our graphs.

It can therefore be seen that the 4-weekly changes are also in-line with our hypothesis, which is the pandemic situation and measures taken has a direct negative effect on people's mental health.

Regarding the analysis of our project, our dataset is based on Google Trends so there might be objections regarding the usability of our dataset as web searching might not clearly show that there is a severe problem within people's mental health. To verify that there is a severe problem that should not be overlooked, we require an extended dataset that has been built with cooperation with government agencies where possible data might be weekly anti depressant sales, number of suicides, psychologist appointments. Although our related work (Barros et al., 2019) shows that Google Trends search terms has a high correlation with real world metrics, any objections regarding our data set can be tested with information we can get from government agencies. We can use same techniques on such a dataset to verify our hypothesis. In addition to that, as a technique we can compare our results to other first world countries to see whether having better conditions during the pandemic has affected people differently than Turkey.

VI. Conclusion

Through our analysis, we found that there is a significant correlation in all four metrics, anxiety, depression, suicide and psychologist search queries. The general trends and short-term changes display a direct correlation with the situation of the pandemic, and the announcement of lockdowns. The change in cases are also a factor, which suggest people's hope and fear adjustments resulting in a variance of mental health. Furthermore, the general regression shows that despite occasional relief and the public availability of vaccines, the pandemic situation continues to worsen people's mental health. More analysis, care and government-funded programmes should be used to take care of the mental health until the end of the pandemic.

References

[1] Cullen, W., Gulati, G., & Kelly, B. D. (2020). Mental health in the COVID-19 pandemic. QJM: Monthly Journal of the Association of Physicians, 113(5), 311–312.

[2] Sher, L. (2020). The impact of the COVID-19 pandemic on suicide rates. QJM: Monthly Journal of the Association of Physicians, 113(10), 707–712.

[3] Lee, J. (2020). Mental health effects of school closures during COVID-19. The Lancet. Child & Adolescent Health, 4(6), 421.

[4] Grechyna, D. (2020). Health threats associated with children lockdown in Spain during COVID-19. SSRN Electronic Journal. doi:10.2139/ssrn.3567670

[5] Xu, X., & Banks, J. (2020). The mental health effects of the first two months of lockdown and social distancing during the Covid-19 pandemic in the UK. The IFS.

[6] Serafini, G., Parmigiani, B., Amerio, A., Aguglia, A., Sher, L., & Amore, M. (2020). The psychological impact of COVID-19 on the mental health in the general population. QJM: Monthly Journal of the Association of Physicians, 113(8), 531–537.

[7] Yunge Hao, COVID-19 and Mental Health Search Terms, https://www.kaggle.com/luckybro/mental-health-search-term.

[8] Barros, J. M., Melia, R., Francis, K., Bogue, J., O'Sullivan, M., Young, K., … Duggan, J. (2019). The validity of Google Trends search volumes for behavioral forecasting of national suicide rates in Ireland. International Journal of Environmental Research and Public Health, 16(17), 3201

[9] Pedregosa, F., Varoquaux, G., Gramfort, A., Michel, V., Thirion, B., Grisel, O., Blondel, M., Prettenhofer, P., Weiss, R., Dubourg, V., Vanderplas, J., Passos, D., Brucher, M., Perrot, M., Duchesnay, E. (2011). Scikit-learn: Machine Learning in Python. Journal of Machine Learning Research, 12, 2825–2830.

[10] Hunter, J. (2007). Matplotlib: A 2D graphics environment. Computing in Science and Engineering, 9(3), 90–95.