

Results of the COVID-19 Mental health international for the General population (COMET-G) study.

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Abstract

Introduction

There are few published empirical data on the impacts of COVID-19 on mental health, and until now, no large international study.

Material and Methods

During the COVID-19 pandemic, an online questionnaire registered demographic, health data, previous psychiatric history, current anxiety, depression, and suicidality, belief in conspiracy theories and domains. Data from 55,589 participants from 40 countries were used (64.85% females aged 35.80 ± 13.61 ; 34.05% males aged 34.90 ± 13.29 and 1.10% other aged 31.64 ± 13.15). Distress and clinical depression were identified with the use of a previously developed cut-off and algorithm, respectively.

Statistical Analysis

Descriptive statistics were calculated. Chi-square tests, multiple forward stepwise linear regression analyses and Factorial Analysis of Variance (ANOVA) tested relations among variables.

Results

Major depression was detected in 17.80% and distress in 16.71% participants. A significant percentage reported a deterioration in mental state, family dynamics and everyday lifestyle. Persons with a history of mental disorders had higher rates of current depression (31.82% vs. 13.07%). Belief in conspiracy theories was widespread, with at least half of participants accepting at least to a moderate degree of some non-bizarre conspiracy. The highest RR to develop depression was associated with a history of Bipolar disorder and self-harm/attempts (RR=5.88). Suicidality was not increased in persons without a history of any mental disorder while the RR for the manifestation of at least moderate suicidal thoughts was 13.5 for psychotic history and 7.37 for non-psychotic history. Based on these results a model was developed.

Conclusions

The final model revealed multiple vulnerabilities and an interplay leading from simple anxiety to clinical depression and suicidality through distress. This could be of practical utility since many of these factors are modifiable. Future research and interventions should focus specifically on them.

Key words: COVID-19; depression; suicidality; mental health, conspiracy theories, mental disorders, psychiatry, anxiety

Introduction

Since the COVID-19 outbreak a year and a half ago, the pandemic triggered feelings of fear, worry, and stress, reflecting responses to an extreme threat for the community and the individual. In addition, changes to social behavior, as well as working conditions, daily habits, and routine have imposed secondary stress, especially the expectation of an upcoming economic crisis and possible unemployment. Conspiracy theories and maladaptive behaviors were also prevalent, compromising the public defense against the outbreak.

There are several empirical data papers, but their methodology varies, and it is very difficult to make comparisons among countries and also it is difficult to arrive at universally valid conclusions. Additionally, the literature is full of opinion papers, viewpoints, perspectives, guidelines, and narrations of activities to cope with the pandemic. These borrow from previous experience with different pandemics and utilize common sense, but, as a result, they often obscure rather than clarify the landscape. The role of the mass and the social media has been discussed but remains poorly understood in empirical terms.

An early meta-analysis reported high rates of anxiety (25%) and depression (28%) in the general population (Ren et al., 2020) while a second one reported that 29.6% of people experienced stress, 31.9% anxiety and 33.7% depression (Salari et al., 2020). Not only do we need more reliable and valid data, but also, we need to identify risk and protective factors to be able to recommend measures that will eventually improve public health by preventing the adverse impact on mental health and simultaneously improve health-related behaviors.

The aim of the current study was to investigate the rates of anxiety, clinical depression and suicidality and their changes in the adult population aged 18-69 internationally, during the COVID-19 pandemic. Secondary aims were to investigate their relations with several personal, interpersonal/social and lifestyle variables. The aim also included the investigation of the spreading of conspiracy theory beliefs concerning the COVID-19 outbreak and their relationship with mental health.

Material and Methods

Method

The protocol used is available in the web appendix; each question was given an ID code; the results these ID codes were used throughout for increased accuracy.

According to a previously developed method, (Fountoulakis et al., 2001; Fountoulakis et al., 2021; Fountoulakis et al., 2012) the cut-off score 23/24 for the CES-D and a derived algorithm were used to identify cases of major depression, as those identified by both methods. Those identified by only one of them, were considered cases of distress (false positive cases in terms of depression).

The data were collected online and anonymously from April 2020 through March 2021, covering periods of full implementation of lockdowns as well as of relaxations of measures in countries around the world. Announcements and advertisement were done in the social media and through news sites, but no other organized effort had been undertaken. The first page included a declaration of consent which everybody accepted by continuing with the participation.

Approval was initially given by the Ethics Committee of the Faculty of Medicine, Aristotle University of Thessaloniki, Greece and locally concerning each participating country.

Material

The study sample included data from 40 countries (figure 1) concerning 55,589 responses (64.85% females; 34.05% males; 1.10% other) to the online questionnaire. The contribution of each country and the gender and age composition are shown in table 1. Details concerning various sociodemographic variables (marital status, education, work etc. are shown in the web appendix, in web tables 1-9).

The study population was self-selected (except from the data from Latvia, however here the non-stratified raw dataset was included). It was not possible to apply post-stratification on the sample as it was done in a previous study (Fountoulakis et al., 2021), because this would mean that we would utilize a similar methodology across much different countries and the population data needed were not available for all.

Statistical Analysis

- Chi-square tests were used for the comparison of frequencies when categorical variables were present and for the post hoc analysis of the results a Bonferroni-corrected method of pair-wise comparisons was utilized (MacDonald and Gardner, 2016).
- Factorial Analysis of Variance (ANOVA) was used to test for the main effect as well as the interaction among categorical variables. The Scheffe test was used as the post-hoc test.
- Multiple forward stepwise linear regression analysis (MFSLRA) was performed to investigate which variables could contribute to the development of others.

Results

Demographics

The study sample included data from 40 countries (table 1). In total responses were gathered from 55,589 participants, aged 35.45 ± 13.51 years old; 36047 females (64.84%; aged 35.80 ± 13.61) and 18927 males (34.05%; aged 34.90 ± 13.29), while 615 declared 'other' (1.11%; aged 31.64 ± 13.15). One third of the study sample was living in the country's capital and an additional almost one fifth in a city of more than one million inhabitants. Half were married or living with someone while 10.41% were living alone. Half had no children at all and approximately 75% had bachelor's degree or higher. In terms of employment, 23.54% were civil servants, 37.06% were working in the private sector, 18.35% were college or university students while the rest were retired or were not working for a variety of reasons; of these 33.86% did not work during lockdowns. The detailed composition of the study sample in terms of country by gender by age are shown in web table 1, while the composition in terms or residency, marital status, household size, children, education, and occupation are shown in the web tables 2-7 of the appendix.

History of health

Moderate or bad somatic health was reported by 17.79% participants and presence of a chronic medical somatic condition was reported by 20.43%. Detailed results are shown in web tables 8 and 9. Being either relatives or caretakers of vulnerable persons was reported by 44.41% (web table 10).

In terms of mental health history and self-harm, 7.85% had a prior history of an anxiety disorder, 12.57% of depression, 1.16% of Bipolar disorder, 0.97% of psychosis and 2.70% of other mental disorder. Any mental disorder history was present in 25.25%. At least once, 21.44% had hurt themselves in the past and 10.59% had attempted at least once in the past. The detailed rates by sex and country are shown in web table 11.

Family

In terms of family status, 43.95% were married, 48.53% had at least one child and only 10.41% were living alone. The responses suggested an increased need for communication with family members in 38.08%, an increased need for emotional support in 26.22%, fewer conflicts in 34.81% and increased conflicts within families for 37.71%, an improvement of the quality of relationships in 23.95%, while in most cases (61.62%) there was a maintenance of basic daily routine (web table 12). During lockdowns 33.86% did not work and 66.14% continued to work, while 48.43% expected their economic situation to worsen because of the COVID-19 outbreak (web table 13).

Present mental health

Concerning mental health, 9.92% reported an increase in anxiety, and 11.53% reported an increase in depressive feelings. Suicidal thoughts were increased in 17.16%. Overall, current major depression was present in 20.49% of females, 12.36% of males and 27.64% of those registered as 'other', with an unweighted average 17.80% for the whole study sample. Additionally, distress was present in 17.41%, 15.17%, 23.09% and 16.71% respectively. In aggregate, one third of the

study sample manifested significant distress or clinical depression. Persons with history of mental disorders had higher rates of current depression (31.82% vs. 13.07%, chi-square test = 2520.61; df=1; p<0.0001) (web tables 14, 15, 18 and 19).

The mean scale scores were 43.58±13.08 for the STAI-S, 20.56±9.21 for the CES-D, and 93.27±152.81 for the Intention subscale of the RASS. The complete results by sex and country are shown in web table 17.

From the total sample, 4.80% reported that they often thought much or very much about committing suicide if they had the chance. Males and females had similar rates (4.96% vs. 4.48%) but those self-identified as ‘other’ had much higher rates (19.18%). In subjects with a history of psychotic disorder or self-harm/attempt the rate was 15.39% while in those with history of non-psychotic disorder it was 8.41%. In persons free of any mental disorder or self-harm/attempt history the rate was as low as 1.14%. This means that the RR for the manifestation of at least moderate suicidal thoughts was equal to 13.5 for psychotic history and 7.37 for non-psychotic history. In those identified as ‘other’ sex, the RR was equal to 4.28.

Lifestyle changes

There were lifestyle changes concerning physical activity, exercise, appetite and eating, sex and sleep and the respective rates are shown in web table 20. Since some people reported improvements and other people a deterioration on the topic, the excess (the difference between these rates) is reported here. In summary, in 45.05% the overall physical activity has been reduced, approximately an excess of 14% reported an increased appetite and was eating more than before, an excess of 10% more were eating in an unhealthy way and 13.21% put more than 2 kilos of body weight. Internet and social media use were increased in 62.38% and 54.35% respectively but new habits emerged only in 22.11%. A decrease in smoking and alcohol use was reported (an excess of 20% more were smoking and drinking less) while an excess of 30% reported reduction in the use of illegal substances. The frequency of intercourse and satisfaction were inadequate for approximately an excess of 20%. In approximately 19.18% religious or spiritual inquires increased at least ‘much’.

Beliefs in conspiracy theories

On average at least half of cases accepted at least a moderate degree some non-bizarre conspiracy including the deliberate release of the virus as a bioweapon to deliberately create a global crisis. In detail the responses by sex and country are shown in web table 21.

Modeling of mental health changes during the pandemic

The history of any previous mental health condition acted as a risk factor for the development of current major depression with all chi-square tests being significant at p<0.001 (see web appendix part 3.2.1 in Statistical analysis). Interestingly a history of self-harm or suicidality emerged as a risk factor even for persons without reporting mental health history, of which 23.44% developing depression in the presence only of this risk factor. The combination of both self-harm and suicidal attempts history with specific mental health history revealed that subjects without any such history at all had the lowest rate of current depression (10.73%), while the presence of previous self-harm/attempts increased the risk in subjects with past anxiety (36.94%), depression (50.19%),

bipolar disorder (63.11%), psychoses (48.58%) and other mental disorder (41.23%). The highest relative risk (RR) was calculated for the combined presence of history of Bipolar disorder and self-harm/attempt (RR=5.88). All RR values are shown in table 2

The presence of a chronic somatic condition acted as a significant but weak risk factor for the development of depression (Chi-square=87.533.72, df=2, $p<0.001$; Bonferroni corrected Post-hoc tests suggested the two groups differed in the presence of depression ($p<0.001$) but not distress ($p>0.05$). In terms of rates, 20.78% of those with a chronic somatic condition manifested depression vs. 17.03% of those without (RR=1.22).

The results of the MFSLRA suggested that a significant number of variables acted either as risk or as protective factors (Table 3, figure 2). These factors explained 16.4% of change in anxiety, 13.5% of change in depressive affect, 4.7% of change in suicidal thoughts and 23.9% of the development of dysphoria or depression. The individual contribution of each predictor separately was very small (many b coefficients were very close to zero).

If we consider a more or less linear continuum from fear to anxiety to depressive emotions to clinical depression and eventually to suicidality, the model which can be derived suggests there is a core of variables (marked with 'C' at the far-right column of figure 1) which exert a stable either adverse or protective effect throughout the course of the development of mental state.

Factorial ANOVA was significant for sex (Wilks=0.989, $F=39.85$, $df=16$, error $df=111,000$, $p<0.0001$) and type of work (Wilks=0.990, $F=7.22$, $df=80$, error $df=352,000$, $p<0.0001$) as well as for their interaction (Wilks=0.990, $F=3.40$, $df=160$, error $df=415,000$, $p<0.0001$) concerning the scores of STAI-S, CES-D and RASS. The Scheffe post-hoc tests (at $p<0.05$) revealed that most groups defined by sex and occupation differed from each other in a complex and difficult to explain matrix.

Conspiracy theories manifest a complex behavior with some of them exerting a protective effect at certain phases (figure 2). The mean scores of responses to questions pertaining to different conspiracy beliefs by history of any mental disorder and current clinical depression are shown in table 4. Factorial ANOVA suggested that sex, history of any mental disorder and current clinical depression as well as some but not all their interaction (after correction for multiple testing) were significant factors concerning the belief in conspiracy theories (table 5). The results of post-hoc tests are shown in webtable 25. They suggest that females were significantly more likely to believe conspiracy theories than males. This is also true for those with current clinical depression. Interestingly, those with history of non-psychotic disorder (anxiety, depression, other) were less likely to believe in conspiracy theories in comparison to those without, while the opposite was true concerning psychotic history (bipolar disorder, psychosis) as well as history of self-harm and suicidal attempts. These findings were consistent across disorders and theories.

The investigation of the interaction of current depression with history of non-psychotic mental disorder suggested that current depression acted as a risk factor and history acted as a protective. On the contrary there was no interaction between current depression and history of psychosis or self-harm/attempt.

Discussion

This large international study was a convenience sample of 55,589 participants from 40 countries. Major depression was detected in 20.49% of females, 12.36% of males and 27.64% of those registered as ‘other’ (average 17.80%). Distress was present in 17.41%, 15.17%, 23.09% and 16.71% respectively. A significant percentage reported a deterioration in mental state, family dynamics and everyday lifestyle. Persons with history of mental disorders had higher rates of current depression (31.82% vs. 13.07%). Believing in conspiracy theories was widespread with at least half of cases accepting at least to a moderate degree of some non-bizarre conspiracy. History of any mental health disorder or self-harm or suicidality was a risk factor for the development of current major depression. Person without any such history had the lowest rate of current depression (10.73%), while the highest rate was for the coexistence of history of Bipolar disorder and self-harm/attempts (63.11%; RR=5.88). The rate of major depression was 20.78% of those with a chronic somatic condition vs. 17.03% of those without (RR=1.22). The RR for the manifestation of at least moderate suicidal thoughts was equal to 13.5 for psychotic history and 7.37 for non-psychotic history. In those identified as ‘other’ sex, the RR was equal to 4.28. For those without any mental health history, the rate of suicidal thoughts was exactly what would be expected from the general population (Fountoulakis et al., 2012).

The model developed suggested that a significant number of variables acted either as risk or as protective factors, explaining 23.9% of the development of dysphoria or depression, but their individual contribution was very small. Conspiracy theories manifest a complex behavior with some of them exerting a protective effect at certain phases. Females were significantly more likely to believe in conspiracy theories and also this was true for those with current clinical depression. Those with history of non-psychotic disorder (anxiety, depression, other) were less likely to believe in conspiracy theories, while the opposite was true of psychotic history (bipolar disorder, psychosis) as well as history of self-harm and suicidal attempts. These findings were consistent across disorders and theories. Current clinical depression acted as a risk factor and past history acted as a protective for the development of such beliefs. On the contrary there was no interaction between current depression and history of psychosis or self-harm/attempt.

The overall levels of major depression were lower than the rates reported in the literature, probably because of the stringent criteria of the algorithm in the current study. Other studies reported that more than two-thirds of the population experienced at least severe distress (Busch et al., 2021; Dominguez-Salas et al., 2020; Gualano et al., 2020; Knolle et al., 2021; Ozdin and Bayrak Ozdin, 2020a; Petzold et al., 2020; Verma and Mishra, 2020), a rate which is double in comparison to our findings. On the other hand other studies showed similar results (Cenat et al., 2021; Daly et al., 2021; Lei et al., 2020; Li et al., 2020; Prati, 2021; Wang et al., 2020a), and also concerning the role of self-determined sex (Duarte and Pereira, 2021; Fu et al., 2020; Garcia-Fernandez et al., 2021; Gualano et al., 2020; Shi et al., 2020; Solomou and Constantinidou, 2020). High levels of suicidality have been reported previously (Caballero-Dominguez et al., 2020). Furthermore, our findings are in perfect accord with a recently published meta-analysis (Cenat et al., 2021). The large heterogeneity among countries probably reflects different phases of the pandemic in each country during the data collection. Rates of depression and mental health deterioration in general are probably higher in those that actually suffered from COVID-19 (Deng et al., 2021).

The multivariable analysis of the data allowed the current paper to propose a staged model concerning the impact of the pandemic on mental health (figure 2). This model assumes that stress and anxiety develop first, which progresses to risk for depression and finally suicidality. These

constitute distinct stages, and progress from earlier to later stages is not mandatory and occurs only in a minority of the population. However, it is unlikely that a later stage appears without the previous emergence of an earlier stage.

According to the model proposed, with the onset of the pandemic, its psychological impact and the development of severe anxiety and distress were determined by several sociodemographic and interpersonal variables including age, fears specific to the pandemic, the quality of relationships within family, keeping a basic daily routine, change in economic situation, history of any mental disorder and being afraid that him/herself or a family member will get COVID-19 and die. Similar findings concerning the effects of these factors has been reported in the literature (Elbogen et al., 2021; Elhai et al., 2021; Gambin et al., 2021; Garre-Olmo et al., 2021; Huang and Zhao, 2020a, b; Li et al., 2020; Ozdin and Bayrak Ozdin, 2020a; Rossi et al., 2021; Solomou and Constantinidou, 2020; Wang et al., 2020a), but until now their detailed contribution had not been identified and no comprehensive model had been developed.

As the stressful condition persists and anxiety develops into distress and dysphoric depressive-like states, greater age emerges as a protective factor. Interestingly at the next stage, when major depression emerges, greater age may become a risk factor, while religious/spirituality exerts a mostly protective effect. This is in accord with an interpretation of burning out based on reason and experience psychological coping resources, and as a result despair due to prolonged stress appears. When this happens, coping mechanisms not based on reason may take over.

At pandemic onset we might not had imagined the important role and the impact of conspiracy theories, largely social media driven, which are currently widely accepted as being important since the literature strongly supports their relationship with anxiety and depression (Chen et al., 2020; De Coninck et al., 2021). What is interesting is that the results of the current study suggest that the COVID-19 related conspiracy theories could be classified as being either ‘threatening’ or ‘reassuring’ and these two groups exert different effects at different phases and periods. At the early phase ‘threatening’ conspiracy theories cause anxiety and distress while the ‘reassuring’ which include an element of denial or religiousness exert a protective effect and act as a coping-like mechanism. However, all of them act as risk factors for the development of major depression, which implies that the coping function of some of them might backfire if initially unsuccessful. Interestingly, all of them seem to be protective factors against the development of suicidality (except for religious content), probably by gaining the role of a coping mechanism which, however, might reflect different underlying processes.

Current major depression and history of mental disorders are both critical factors related to believing in conspiracy theories. Our results could mean that the critical factor which increases belief is the presence of current clinical depression, while the history acts at a second level. As correlation does not imply causation, conspiracy theories could be either the cause of depression, a copying mechanism against depression or a marker of maladaptive psychological patterns of cognitive appraisal. After taking into consideration the complete model, and especially the relationship to past mental health history, the authors propose that the beliefs in conspiracy theories are a copying mechanism against stress. The finding of the relationship between current depression and believing in conspiracies is in accord with the literature (De Coninck et al., 2021; Freyler et al., 2019; Tomljenovic et al., 2020), but the finding of the differential effect of non-psychotic vs. psychotic history is difficult to explain, mainly concerning the protective effect of non-psychotic history. One explanation could be found in the theory concerning ‘Depressive Realism’ (Alloy et al., 1981; Alloy and Abramson, 1979; Alloy and Abramson, 1988; Beck et al., 1987; Lobitz and

Post, 1979; Nelson and Craighead, 1977) which suggests that depressive persons are more able than others to realistically interpret the world, however this leads to pessimism.

The restriction of time outside the house because of the lockdown is clearly a risk factor, and it interacts with history of mental disorder for the deterioration of mental state. This is in accord with the literature (Di Blasi et al., 2021; Rossi et al., 2021). At the most extreme end, when the emergence of suicidal thinking is possible, the family environment and family responsibilities and care act either as risk or protective factors, depending on their quality, while religiosity/spirituality and all beliefs in conspiracy theories act as protective factors, except for one which includes religious content. These results are in accord with the reports in the literature (Arslan and Yildirim, 2021; Huang and Zhao, 2020a, b; Jovancevic and Milicevic, 2020; Li et al., 2020; Ozdin and Bayrak Ozdin, 2020b; Wang et al., 2020a).

The high rates of belief in conspiracy theories is in accord with findings from other countries (Ahmed et al., 2020; Leibovitz et al., 2021; Salali and Uysal, 2020; Uscinski et al., 2020) and are a worrying manifestation. Conspiracy beliefs – especially those regarding science, medicine, and health-related topics – are widespread (Oliver and Wood, 2014), are widely distributed in the social media (Ahmed et al., 2020; Banerjee and Meena, 2021) challenging the capacity of the average person to distill and assess the content (Desta and Mulugeta, 2020; Duplaga, 2020). These exert a well-documented adverse effect on health behaviors, especially vaccination (Allington et al., 2020; Allington et al., 2021; Bertin et al., 2020; Biddlestone et al., 2020; Bogart et al., 2010; Freeman et al., 2020; Gu et al., 2021; Jolley and Douglas, 2014; Lazarevic et al., 2021; Marinthe et al., 2020; Romer and Jamieson, 2020; Salali and Uysal, 2020; Sallam et al., 2020; Soveri et al., 2021; Teovanovic et al., 2020). There seems to be some relationship of believing in bizarre conspiracy theories and psychotic tendencies or history of psychotic disorders (Jolley and Paterson, 2020).

A difficult to answer question is how many of the cases detected by questionnaires and sophisticated algorithms correspond to real major clinical depression. The underlying neurobiology is opaque and maybe much diagnosed depression might simply be an extreme form of normal adjustment reaction (He et al., 2021). The impressive increase in new cases of depression found in our sample is in accord with the literature (Robillard et al., 2021). It is expected that these adverse effects on mental health will rapidly attenuate with the lifting of lockdown restrictions and the end of the pandemic (Daly and Robinson, 2021) but enduring effects will impact some vulnerable populations. So far studies investigating the long-term outcome and the long-term impact of the pandemic on mental health display equivocal findings (Bendau et al., 2021; Wang et al., 2020b). Especially sociability and the sense of belonging could be important factors determining mental health and health-related behaviors (Biddlestone et al., 2020), and these factors seem to correspond to specific vulnerabilities seen especially in western cultures.

Conclusion

The current paper reports high rates of depression, distress, and suicidal thoughts among the general population during the pandemic, with a high prevalence of beliefs in conspiracy theories. For the development of depression, general health status, previous history of depression, self-harm and suicidal attempts, family responsibility, economic change, and age acted as risk factors while keeping daily routine, religiosity/spirituality and belief in conspiracy theories were acting mostly as protective factors.

Strengths and limitations

The strengths of the current paper include the large number of participants from 40 countries who filled the questionnaire and the large bulk of information obtained, as well as the detailed way of post-stratification of the study sample.

The major limitation was that the data were obtained anonymously online through self-selection of the responders.

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Author contributions

All authors contributed equally to the paper.

KNF and DS conceived and designed the study. The other authors participated formulating the final protocol, designing, and supervising the data collection and creating the final dataset. KNF and DS did the data analysis and wrote the first draft of the paper. All authors participated in interpreting the data and developing further stages and the final version of the paper.

Figure 1: Map of the 40 participating countries

Figure 2: The developed multiple vulnerabilities model representing the mechanism through which the COVID-19 outbreak in combination a great number of factors could lead to depression through stress, and eventually to suicidality. A number of variables act as risk factors (red) or as protective factors (green), while some of them change direction of action depending on the phase (green/red). Three core clusters emerge (delineated with the dotted lines)

| Country | Males | | | | Females | | | | Other | | | | N | % |
|-----------------|-------|-------|-------|-------|---------|-------|-------|-------|-------|------|-------|-------|------|------|
| | N | % | Age | | N | % | Age | | N | % | Age | | | |
| | | | Mean | SD | | | Mean | SD | | | Mean | SD | | |
| Argentina | 439 | 20.14 | 44.53 | 14.39 | 1725 | 79.13 | 40.60 | 14.49 | 16 | 0.73 | 37.44 | 17.29 | 2180 | 3.92 |
| Australia | 21 | 30.43 | 33.67 | 8.05 | 48 | 69.57 | 32.63 | 7.89 | | 0.00 | | | 69 | 0.12 |
| Azerbaijan | 70 | 19.89 | 36.20 | 10.33 | 280 | 79.55 | 37.71 | 11.46 | 2 | 0.57 | 26.00 | 0.00 | 352 | 0.63 |
| Bangladesh | 1681 | 55.42 | 24.09 | 5.24 | 1333 | 43.95 | 23.98 | 5.48 | 19 | 0.63 | 27.42 | 8.88 | 3033 | 5.46 |
| Belarus | 200 | 18.30 | 38.62 | 12.46 | 893 | 81.70 | 39.15 | 11.11 | | 0.00 | | | 1093 | 1.97 |
| Brazil | 86 | 40.19 | 31.36 | 13.06 | 127 | 59.35 | 28.80 | 9.97 | 1 | 0.47 | 31.00 | | 214 | 0.38 |
| Bulgaria | 202 | 26.47 | | | 558 | 73.13 | | | 3 | 0.39 | | | 763 | 1.37 |
| Canada | 142 | 27.73 | 42.24 | 15.49 | 367 | 71.68 | 42.57 | 14.00 | 3 | 0.59 | 46.33 | 17.79 | 512 | 0.92 |
| Chile | 86 | 26.71 | 40.76 | 15.43 | 234 | 72.67 | 39.57 | 15.08 | 2 | 0.62 | 42.50 | 16.26 | 322 | 0.58 |
| Croatia | 1041 | 35.91 | 41.73 | 11.70 | 1835 | 63.30 | 42.32 | 11.84 | 23 | 0.79 | 44.26 | 13.75 | 2899 | 5.22 |
| Egypt | 24 | 14.55 | 37.38 | 14.18 | 141 | 85.45 | 39.66 | 11.82 | | 0.00 | | | 165 | 0.30 |
| France | 64 | 24.33 | 38.98 | 14.70 | 197 | 74.90 | 37.89 | 15.53 | 2 | 0.76 | 27.50 | 10.61 | 263 | 0.47 |
| Georgia | 48 | 11.59 | 30.77 | 6.82 | 364 | 87.92 | 32.06 | 9.04 | 2 | 0.48 | 33.50 | 6.36 | 414 | 0.74 |
| Germany | 15 | 25.00 | 48.93 | 18.58 | 45 | 75.00 | 34.87 | 13.98 | | 0.00 | | | 60 | 0.11 |
| Greece | 624 | 18.26 | 36.55 | 10.58 | 2772 | 81.10 | 34.00 | 9.87 | 22 | 0.64 | 29.59 | 6.68 | 3418 | 6.15 |
| Honduras | 74 | 33.48 | 28.19 | 7.17 | 147 | 66.52 | 32.05 | 11.09 | | 0.00 | | | 221 | 0.40 |
| Hungary | 146 | 19.13 | 44.60 | 11.95 | 617 | 80.87 | 41.36 | 11.95 | | 0.00 | | | 763 | 1.37 |
| India | 3044 | 61.01 | 33.51 | 8.94 | 1917 | 38.42 | 31.59 | 11.97 | 28 | 0.56 | 28.36 | 7.86 | 4989 | 8.97 |
| Indonesia | 909 | 27.68 | 33.64 | 12.06 | 2358 | 71.80 | 30.49 | 11.42 | 17 | 0.52 | 28.00 | 11.62 | 3284 | 5.91 |
| Israel | 28 | 19.44 | 48.79 | 18.24 | 116 | 80.56 | 38.97 | 13.56 | | 0.00 | | | 144 | 0.26 |
| Italy | 257 | 26.22 | 43.10 | 16.17 | 717 | 73.16 | 41.22 | 14.17 | 6 | 0.61 | 42.17 | 21.14 | 980 | 1.76 |
| Japan | 182 | 70.00 | 45.31 | 11.61 | 78 | 30.00 | 41.71 | 11.10 | | 0.00 | | | 260 | 0.47 |
| Kyrgyz Republic | 614 | 27.76 | 36.38 | 14.16 | 1561 | 70.57 | 38.87 | 14.58 | 37 | 1.67 | 33.57 | 12.60 | 2212 | 3.98 |
| Latvia | 1036 | 39.72 | 48.18 | 12.38 | 1570 | 60.20 | 45.26 | 14.64 | 2 | 0.08 | 48.00 | 18.38 | 2608 | 4.69 |
| Lithuania | 271 | 21.54 | 39.34 | 13.62 | 983 | 78.14 | 40.16 | 12.75 | 4 | 0.32 | 40.75 | 12.89 | 1258 | 2.26 |
| Malaysia | 311 | 32.29 | 41.95 | 12.08 | 578 | 60.02 | 39.24 | 11.71 | 74 | 7.68 | 39.03 | 12.66 | 963 | 1.73 |
| Mexico | 447 | 25.03 | 36.84 | 16.13 | 1332 | 74.58 | 38.18 | 14.74 | 7 | 0.39 | 22.86 | 4.78 | 1786 | 3.21 |
| Nigeria | 752 | 65.22 | 30.30 | 7.46 | 397 | 34.43 | 25.83 | 7.55 | 4 | 0.35 | 31.75 | 7.97 | 1153 | 2.07 |
| Pakistan | 575 | 28.24 | 25.46 | 6.35 | 1445 | 70.97 | 23.45 | 4.42 | 16 | 0.79 | 24.75 | 10.93 | 2036 | 3.66 |

| | | | | | | | | | | | | | | |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|-------------|--------------|--------------|--------------|---------------|
| Peru | 56 | 36.13 | 43.80 | 15.80 | 99 | 63.87 | 38.72 | 14.03 | | 0.00 | | | 155 | 0.28 |
| Poland | 286 | 18.58 | 33.46 | 11.54 | 1239 | 80.51 | 33.65 | 11.24 | 14 | 0.91 | 31.21 | 14.67 | 1539 | 2.77 |
| Portugal | 16 | 18.82 | 43.31 | 18.22 | 68 | 80.00 | 42.34 | 13.77 | 1 | 1.18 | 38.00 | | 85 | 0.15 |
| Romania | 293 | 20.22 | 47.54 | 14.45 | 1144 | 78.95 | 46.77 | 14.21 | 12 | 0.83 | 51.58 | 15.45 | 1449 | 2.61 |
| Russia | 3825 | 38.50 | 30.34 | 12.03 | 5847 | 58.85 | 31.74 | 12.25 | 264 | 2.66 | 27.64 | 10.87 | 9936 | 17.87 |
| Serbia | 152 | 25.08 | 39.16 | 11.94 | 453 | 74.75 | 41.84 | 11.77 | 1 | 0.17 | 58.00 | | 606 | 1.09 |
| Spain | 330 | 31.82 | 51.49 | 14.85 | 703 | 67.79 | 48.52 | 13.53 | 4 | 0.39 | 50.00 | 13.11 | 1037 | 1.87 |
| Turkey | 95 | 27.38 | 25.03 | 6.26 | 249 | 71.76 | 25.05 | 7.36 | 3 | 0.86 | 21.33 | 0.58 | 347 | 0.62 |
| Ukraine | 306 | 21.07 | 38.42 | 15.38 | 1132 | 77.96 | 39.09 | 13.13 | 14 | 0.96 | 35.93 | 17.88 | 1452 | 2.61 |
| UK | 55 | 34.38 | 43.53 | 11.12 | 105 | 65.63 | 44.56 | 11.95 | | 0.00 | | | 160 | 0.29 |
| USA | 124 | 30.32 | 37.50 | 15.47 | 273 | 66.75 | 37.78 | 14.51 | 12 | 2.93 | 28.00 | 9.78 | 409 | 0.74 |
| TOTAL | 18927 | 34.05 | 34.90 | 13.29 | 36047 | 64.85 | 35.80 | 13.61 | 615 | 1.11 | 31.64 | 13.15 | 55589 | 100.00 |

Table 1: List of participating countries by sex, with number of subjects and mean age

| History | Risk to develop depression | | | |
|-----------------------------------|-----------------------------------|-----------|--|-----------|
| | When alone | | When history of self-harm/attempt is also present | |
| | % | RR | % | RR |
| No previous history at all | 10.73 | 1.00 | | 1.0 |
| Any mental disorder | 31.81 | 2.96 | | |
| Anxiety | 25.93 | 2.42 | 36.94 | 3.44 |
| Depression | 35.31 | 3.29 | 50.19 | 4.68 |
| Bipolar disorder | 47.98 | 4.47 | 63.11 | 5.88 |
| Psychosis | 37.59 | 3.50 | 48.58 | 4.53 |
| Other | 23.61 | 2.20 | 41.23 | 3.44 |
| Only history of self-harm/attempt | 23.44 | 2.18 | | |

Table 2: Relative Risk (RR) to develop depression vs. participants with no mental health history and no history of self-harm or suicidal acts:

| | Change in anxiety (F21) R ² = 0.164; F(30,45821)=301.42 p<<0.0001; SE of est: 0.819 | | | | Change in depressive affect (G21) R ² = 0.135; F(25,45826)=286.45 p<<0.0001; SE of est: 0.840 | | | | Development of dysphoria or depression R ² = 0.239; F(31,45816)=464.99 p<<0.0001; SE of est: 0.673 | | | | Change in suicidal thoughts (O11) R ² = 0.047; F(31,45820)=72.429 p<<0.0001; SE of est: 0.784 | | | |
|---|--|------|--------|---------|--|------|--------|---------|---|------|--------|---------|--|------|--------|---------|
| | b | SE | T | p | b | SE | t | p | b | SE | t | p | b | SE | t | p |
| Intercept | -0.75 | 0.03 | -24.60 | <0.0001 | -0.81 | 0.03 | -26.37 | <0.0001 | 0.81 | 0.02 | 32.30 | <0.0001 | 0.46 | 0.03 | 15.93 | <0.0001 |
| Demographics | | | | | | | | | | | | | | | | |
| Sex (A1)- 'other' was not included | 0.04 | 0.01 | 4.57 | <0.0001 | -0.02 | 0.01 | -2.03 | 0.0426 | -0.09 | 0.01 | -13.25 | <0.0001 | 0.03 | 0.01 | 3.79 | 0.0002 |
| Age (A2) | | | | | 0.00 | 0.00 | 6.91 | <0.0001 | 0.00 | 0.00 | -13.14 | <0.0001 | 0.00 | 0.00 | -7.87 | <0.0001 |
| Number of persons in household (A5) | 0.01 | 0.00 | 3.98 | 0.0001 | 0.01 | 0.00 | 4.61 | <0.0001 | -0.01 | 0.00 | -4.66 | <0.0001 | -0.01 | 0.00 | -4.07 | <0.0001 |
| Education level (A7) | -0.04 | 0.00 | -8.37 | <0.0001 | -0.02 | 0.00 | -4.02 | 0.0001 | -0.01 | 0.00 | -2.34 | 0.0193 | 0.02 | 0.00 | 3.68 | 0.0002 |
| Work and finance | | | | | | | | | | | | | | | | |
| Continue to work during lockdown (A11) | 0.02 | 0.01 | 2.01 | 0.0447 | | | | | -0.02 | 0.01 | -2.95 | 0.0032 | | | | |
| Change in economic situation (E7) | 0.10 | 0.00 | 28.56 | <0.0001 | 0.10 | 0.00 | 26.90 | <0.0001 | -0.03 | 0.00 | -9.93 | <0.0001 | -0.02 | 0.00 | -7.14 | <0.0001 |
| Health | | | | | | | | | | | | | | | | |
| Condition of general health (B1) | 0.13 | 0.00 | 33.51 | <0.0001 | 0.11 | 0.00 | 28.83 | <0.0001 | -0.11 | 0.00 | -34.88 | <0.0001 | -0.04 | 0.00 | -11.26 | <0.0001 |
| Presence of a chronic medical condition (B2) | | | | | | | | | 0.02 | 0.01 | 2.60 | 0.0093 | | | | |
| Family/social | | | | | | | | | | | | | | | | |
| Being a carer of a person belonging to a vulnerable group (B4) | -0.02 | 0.01 | -2.29 | 0.0220 | | | | | -0.01 | 0.01 | -2.16 | 0.0312 | 0.04 | 0.01 | 4.74 | <0.0001 |
| Conflicts within family (E3) | -0.04 | 0.00 | -10.35 | <0.0001 | -0.06 | 0.00 | -13.24 | <0.0001 | 0.07 | 0.00 | 20.83 | <0.0001 | 0.05 | 0.00 | 13.71 | <0.0001 |
| Change in quality of relationships within family (E4) | 0.15 | 0.01 | 29.11 | <0.0001 | 0.17 | 0.01 | 31.80 | <0.0001 | -0.04 | 0.00 | -8.62 | <0.0001 | -0.08 | 0.01 | -15.42 | <0.0001 |
| Keeping a basic routine during lockdown (E5) | 0.11 | 0.00 | 25.54 | <0.0001 | 0.11 | 0.00 | 24.14 | <0.0001 | -0.11 | 0.00 | -29.75 | <0.0001 | -0.04 | 0.00 | -10.45 | <0.0001 |
| Changes in religiousness/spirituality (P1) | 0.01 | 0.00 | 2.76 | 0.0057 | 0.03 | 0.00 | 8.02 | <0.0001 | 0.05 | 0.00 | 13.01 | <0.0001 | -0.03 | 0.00 | -6.95 | <0.0001 |
| Mental health history | | | | | | | | | | | | | | | | |
| History of anxiety (B5) | -0.29 | 0.06 | -4.69 | <0.0001 | -0.51 | 0.06 | -8.14 | <0.0001 | 1.79 | 0.05 | 35.24 | <0.0001 | 0.61 | 0.06 | 10.25 | <0.0001 |
| History of depression (B5) | -0.26 | 0.06 | -4.35 | <0.0001 | -0.49 | 0.06 | -7.99 | <0.0001 | 1.91 | 0.05 | 38.97 | <0.0001 | 0.58 | 0.06 | 10.20 | <0.0001 |
| History of Psychosis (B5) | -0.25 | 0.07 | -3.54 | 0.0004 | -0.36 | 0.07 | -4.96 | <0.0001 | 1.85 | 0.06 | 31.32 | <0.0001 | 0.51 | 0.07 | 7.48 | <0.0001 |
| History of Bipolar disorder (B5) | -0.27 | 0.07 | -3.94 | 0.0001 | -0.47 | 0.07 | -6.82 | <0.0001 | 1.94 | 0.06 | 34.85 | <0.0001 | 0.62 | 0.06 | 9.52 | <0.0001 |
| History of other mental disorder (B5) | -0.29 | 0.06 | -4.56 | <0.0001 | -0.48 | 0.07 | -7.31 | <0.0001 | 1.75 | 0.05 | 33.34 | <0.0001 | 0.61 | 0.06 | 10.01 | <0.0001 |
| History only self-harm/attempt (combination of B5, O12 and O13) | -0.02 | 0.01 | -3.02 | 0.0025 | -0.04 | 0.01 | -6.36 | <0.0001 | 0.17 | 0.01 | 31.49 | <0.0001 | 0.06 | 0.01 | 9.25 | <0.0001 |
| The effect of the pandemic | | | | | | | | | | | | | | | | |
| Fears of getting COVID-19 (C1) | -0.09 | 0.00 | -20.77 | <0.0001 | -0.06 | 0.00 | -12.45 | <0.0001 | 0.06 | 0.00 | 16.01 | <0.0001 | 0.02 | 0.00 | 4.41 | <0.0001 |

| | | | | | | | | | | | | | | | | |
|--|-------|------|--------|---------|-------|------|--------|---------|-------|------|-------|---------|-------|------|--------|---------|
| Fears that a member of the family will get COVID-19 and die (C3) | -0.06 | 0.00 | -16.35 | <0.0001 | -0.04 | 0.00 | -10.06 | <0.0001 | 0.05 | 0.00 | 17.27 | <0.0001 | -0.01 | 0.00 | -4.08 | <0.0001 |
| Time spent outside of house during lockdown (D1) | 0.02 | 0.00 | 7.55 | <0.0001 | 0.02 | 0.00 | 4.76 | <0.0001 | | | | | | | | |
| Currently locked up in the house (D2) | -0.02 | 0.00 | -5.65 | <0.0001 | -0.04 | 0.00 | -8.44 | <0.0001 | 0.03 | 0.00 | 7.64 | <0.0001 | 0.02 | 0.00 | 4.11 | <0.0001 |
| Satisfaction by availability of information (D4) | 0.05 | 0.00 | 12.27 | <0.0001 | 0.04 | 0.00 | 9.86 | <0.0001 | -0.02 | 0.00 | -7.12 | <0.0001 | -0.05 | 0.00 | -13.78 | <0.0001 |
| Beliefs in conspiracy theories | | | | | | | | | | | | | | | | |
| The vaccine was ready before the virus broke out and they conceal it (J1) | 0.02 | 0.00 | 5.55 | <0.0001 | 0.02 | 0.00 | 5.49 | <0.0001 | 0.02 | 0.00 | 5.47 | <0.0001 | -0.01 | 0.00 | -3.46 | 0.0005 |
| COVID-19 was created in a laboratory as a biochemical weapon (J2) | -0.01 | 0.00 | -2.17 | 0.0300 | | | | | | | | | -0.02 | 0.00 | -3.69 | 0.0002 |
| COVID-19 is the result of 5G technology antenna (J3) | -0.01 | 0.00 | -2.87 | 0.0041 | -0.03 | 0.00 | -5.16 | <0.0001 | 0.03 | 0.00 | 7.75 | <0.0001 | 0.01 | 0.00 | 2.74 | 0.0062 |
| COVID-19 appeared accidentally from human contact with animals (J4) | -0.02 | 0.00 | -7.21 | <0.0001 | | | | | 0.02 | 0.00 | 7.82 | <0.0001 | -0.01 | 0.00 | -3.71 | 0.0002 |
| COVID-19 has much lower mortality rate but there is terror-inducing propaganda (J5) | 0.01 | 0.00 | 3.02 | 0.0026 | | | | | 0.01 | 0.00 | 3.47 | 0.0005 | -0.02 | 0.00 | -6.22 | <0.0001 |
| COVID-19 is a creation of the world's powerful leaders to create a global economic crisis (J6) | -0.01 | 0.00 | -2.24 | 0.0251 | | | | | | | | | -0.01 | 0.00 | -2.35 | 0.0186 |
| COVID-19 is a sign of divine power to destroy our planet (J7) | 0.02 | 0.00 | 5.20 | <0.0001 | | | | | 0.02 | 0.00 | 5.48 | <0.0001 | 0.02 | 0.00 | 4.71 | <0.0001 |

Table 3: Results of four separate Multiple Forward Stepwise Linear Regression Analysis (MFSLRA) with change in anxiety (F21), change in depressive affect (G21), change in suicidal thoughts (O11) and the development of distress or depression as dependent variables. The predictors are shown in the left column.

| | | Reassuring conspiracy theories | | | | | | Threatening conspiracy theories | | | | | | No believing in conspiracy theories | |
|-----------------------------|--------------------------------|--------------------------------|------|------|------|------|------|---------------------------------|------|------|------|------|------|-------------------------------------|------|
| Current Clinical depression | History Of any mental disorder | J1 | | J5 | | J7 | | J2 | | J3 | | J6 | | J4 | |
| | | mean | SD | mean | SD | mean | SD | mean | SD | mean | SD | mean | SD | mean | SD |
| No | Yes | 0.82 | 1.13 | 1.37 | 1.30 | 0.49 | 0.96 | 1.16 | 1.24 | 0.46 | 0.91 | 1.12 | 1.26 | 1.88 | 1.24 |
| No | No | 0.97 | 1.15 | 1.48 | 1.28 | 0.62 | 1.03 | 1.35 | 1.25 | 0.59 | 0.98 | 1.30 | 1.27 | 1.69 | 1.21 |
| Yes | Yes | 1.09 | 1.28 | 1.52 | 1.33 | 0.68 | 1.12 | 1.40 | 1.34 | 0.65 | 1.09 | 1.33 | 1.33 | 1.90 | 1.25 |
| Yes | No | 1.23 | 1.24 | 1.59 | 1.28 | 0.96 | 1.23 | 1.57 | 1.29 | 0.89 | 1.17 | 1.53 | 1.31 | 1.78 | 1.22 |
| All Grps | | 0.98 | 1.17 | 1.48 | 1.29 | 0.64 | 1.05 | 1.34 | 1.26 | 0.60 | 1.01 | 1.29 | 1.28 | 1.75 | 1.22 |

Table 4: Means of responses (from -2 to +2) to all conspiracy theories by current clinical depression and history of any mental disorder

| Effect | Wilks' | F | effect df | Error df | p-value |
|--|---------------|----------|----------------------|---------------------|----------------|
| Sex | 0.988 | 91.7 | 7 | 54956 | <0.0001 |
| History of any mental disorder | 0.994 | 44.2 | 7 | 54956 | <0.0001 |
| Major depression (currently) | 0.985 | 122.3 | 7 | 54956 | <0.0001 |
| Sex by History of any mental disorder | 1 | 2.2 | 7 | 54956 | 0.030 |
| Sex by Clinical depression (currently) | 0.998 | 16.4 | 7 | 54956 | <0.0001 |
| Clinical depression (currently) by History of any mental disorder | 0.999 | 8.7 | 7 | 54956 | <0.0001 |
| Sex by Clinical depression (currently) by History of any mental disorder | 1 | 2.6 | 7 | 54956 | 0.010 |

Table 5: Factorial ANOVA results, with sex, history of any mental disorder and current clinical depression as factors. All factors are significant as well as some their interaction (after correction for multiple testing) concerning the belief in conspiracy theories.

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