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Predictors of increased affective symptoms and suicidal ideation during the COVID-19 pandemic: results from a large-scale study of 14 271 Thai adults

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ABSTRACT

Background Increasing data suggest emergent affective symptoms during the COVID-19 pandemic.

Objectives To study the impact of the COVID-19 pandemic on affective symptoms and suicidal ideation in Thai adults.

Methods The Collaborative Outcomes Study on Health and Functioning during Infection Times uses non-probability sampling (chain referring and voluntary response sampling) and stratified probability sampling to identify risk factors of mental health problems and potential treatment targets to improve mental health outcomes during pandemics.

Findings Analysing 14 271 adult survey participants across all four waves of the COVID-19 pandemic in Thailand, covering all 77 provinces from 1 June 2020 to 30 April 2022, affective symptoms and suicidality increased during COVID-19 pandemic. Affective symptoms were strongly predicted by pandemic (feelings of isolation, fear of COVID-19, loss of social support, financial loss, lack of protective devices) and non-pandemic (female sex, non-binary individuals, adverse childhood experiences (ACEs), negative life events, student status, multiple mental health and medical conditions, physical pain) risk factors. ACEs, prior mental health conditions and physical pain were the top three risk factors associated with both increased affective symptoms and suicidal ideation during the COVID-19 pandemic. Partial least squares analysis showed that ACEs were the most important risk factor as they impacted most pandemic and non-pandemic risk factors.

Clinical implications Rational policymaking during a pandemic should aim to identify the groups at highest risk (those with ACEs, psychiatric and medical disease, women, non-binary individuals) and implement both immediate and long-term strategies to mitigate the impact of ACEs, while effectively addressing associated psychiatric and medical conditions.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The COVID-19 pandemic has witnessed a surge in the prevalence of mental health symptoms.

WHAT THIS STUDY ADDS

⇒ During the COVID-19 pandemic, an increase in affective symptoms primarily affects high-risk populations, such as those who experienced adverse childhood experiences.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Supporting the populations at risk of developing affective symptoms is an essential treatment strategy.

INTRODUCTION

The emergence of COVID-19 has become a global pandemic in March 2020.[1] The negative impact of the pandemic on individuals is multifaceted, affecting aspects such as daily life, physical health, mental health, economics and society.[2] Undoubtedly, the pandemic has heightened significant economic and social challenges on a global scale. The disruptions caused by the pandemic have magnified difficulties in various facets of life, resulting in a cascade of adverse consequences.[3]

During the initial phase of widespread epidemics, it is often observed that a larger-than-expected number of individuals experience mental health issues. There is evidence suggesting that pandemics have a significant impact on mental disorders.[2 4] Pandemics have the potential to trigger new psychiatric symptoms in individuals who have no history of such disorders, exacerbate existing mental health conditions and even lead to mental health challenges among the caregivers of those affected by SARS-CoV-2 infection.[5] Importantly, this impact on mental health can be felt by individuals regardless of whether they have been directly exposed to the virus, with many people feeling sadness or anxiety related to the fear of falling ill or dying.[6] From the initial shock of the outbreak to the ongoing challenges of containment, individuals, families and communities have been thrusted into an era of uncertainty and induced/worsened mental symptoms. This period has been marked by disruption of daily routines, concerns over personal and public health, economic turmoil and social isolation.[2 7] As the pandemic unfolded, the mental and emotional toll of these stressors became increasingly evident.

Stress during the COVID-19 pandemic has emerged as a critical issue, affecting people of all ages, backgrounds and walks of life.[8] Understanding the multifaceted nature of this stress and its far-reaching consequences is beneficial for individual well-being and for informing public health responses, mental health support systems and strategies for improving resilience in the face of future challenges. Such detailed analysis also contributes to a better understanding of the psychological impact of such events on a global scale.[5–7]

Adverse childhood experiences, which encompass a spectrum of early-life traumas ranging from abuse and neglect to household dysfunction, have long been recognised as significant determinants of physical and mental health outcomes in adulthood.[9–11] Similarly, negative life events, such as financial difficulties, loss of employment or personal tragedies, have the potential to disrupt the delicate equilibrium of one's well-being. What has come to the forefront during this pandemic is the revelation that these prior life experiences serve as profound determinants of how individuals navigate and respond to the multifaceted challenges posed by COVID-19.[12] The relationship between adverse childhood experiences and mental health during the COVID-19 pandemic is an area of active research, suggesting that adverse childhood experiences may impact mental health during the pandemic in some individuals.[13 14]

The Collaborative Outcomes Study on Health and Functioning During Infection Times (COH-FIT) study explores the effects of a myriad of psychosocial stressors, which individuals have faced during the COVID-19 pandemic, on mental health and aims to delineate the most relevant predictors of mental symptoms that have emerged during the COVID-19 pandemic. We further seek to understand how these pre-existing factors influence the psychological toll of social distancing measures, and the disparities in coping and resilience. As we unravel this intricate web of connections, we can gain insight into the nuanced ways in which personal histories shape our responses to global crises, reinforcing the importance of a holistic understanding of health and well-being in the extent beyond the confines of the present moment. Through this large-scale exploration, we aim to shed light on the profound psychological consequences of the pandemic crisis. Since adverse childhood experiences may contribute to affective symptoms[15] and thus may contribute to the mental health impact of the pandemic, we have used adverse childhood experiences as an explanatory variable in our analysis.

METHODS

COH-FIT Thailand was conducted under the same protocol as COH-FIT.[3 16] Following a Consensus-Based Checklist for Reporting of Survey Studies (eChecklist), we report methods and results. Online supplemental file 1, tables 1–3, display the various questions used to evaluate the affective symptoms and all other features that were included in the analyses. We examined all four waves (W1, W2, W3 and W4) of the COVID-19 pandemic in Thailand, encompassing all 77 provinces between 2020 and 2022. The study period was divided into four time periods which encompass the four pandemic waves between 1 June 2020 and 30 April 2022: wave 1 (W1)—survey during 1 June–31 December 2020, characterised by a lockdown (n=6721); W2—from 1 January to 31 July 2021, characterised by the knowledge that the COVID-19 strain may be more dangerous (n=1273); W3— from 1 August to 31 August 2021, characterised by vaccinations of the Thai population (n=5592) and W4—from 1 January to 30 April 2022, characterised by economic revival in Thailand (n=1294). In the first, second and third wave, voluntary response and chain referring sampling was used to recruit participants through regional campaign programmes in hospitals all over Thailand, by using social media platforms, such as Facebook, Twitter, Instagram and Line and by allowing chain referrals (total number=12 978). In the fourth wave, we recruited participants with the help of BVA Doxa (www.bva-doxa.com), a market research company that recruited a total number of 1294 Thai participants using a representative sampling technique. BVA Doxa realised a stratified probability sampling based on computer-assisted web interviewing on Thai adults. Stratification was performed used predefined strata including gender, age, geographic area (the five major regions of Thailand), job status and education. The quota samples were defined according to official sources and as such we investigated a representative sample. Since, there may be differences in the features among the waves due to pandemic-related factors, governmental-associated policies or sampling techniques, we statistically controlled for possible effects of the waves by entering the waves as additional covariates in the analyses.

Statistics

We compared continuous variables between study groups using an analysis of variance, whereas category variables were compared using a contingency table analysis. We conducted univariate general linear model analysis and multivariable regression analyses, while adjusting for baseline affective symptom scores, age, gender and the four pandemic waves, to determine the relevant predictors of the intrapandemic affective symptom score. Key model metrics, including F, df and p values, as well as the total variance (R^2), as model effect size and standardised beta-coefficients, were determined. Using the White and modified Breusch-Pagan tests,[17] homoskedasticity was confirmed. In the final model, residuals, residual plots and data quality were always evaluated. To estimate the changes in affective, mental health, resilience, physical health, physical pain, social support, household interpersonal relationships, family interaction satisfaction and fear of COVID-19 scores from the prepandemic to the intrapandemic time, regression analyses are conducted with the intrapandemic scores as the dependent variables and the prepandemic scores as the explanatory variables. Such analyses also reduce the interindividual variation in self-ratings because they are adjusted for the baseline self-rating scores. A repeated measures generalised estimating equation (GEE) with fixed effects of time (prepandemic vs intrapandemic scores of affective symptom subdomains (anxiety, depression, obsessive-compulsive disorder (OCD) symptoms, post-traumatic stress disorder (PTSD) symptoms and mood fluctuations) was employed, while covarying for the effects of age, sex and pandemic waves. All analyses used a p value of 0.05 as the significance threshold and were conducted in a two-tailed fashion. Online supplemental file 2 describes how we performed principal component analysis and partial least squares (PLS) analysis.[15 18–21]

RESULTS

The pandemic increases mood-related rating scores

To examine the differences in the severity of affective symptoms between the prepandemic and intrapandemic conditions, we conducted GEE analyses, repeated measurements (prepandemic vs intrapandemic conditions). Table 1 demonstrates that the pandemic was associated with increased anxiety (feeling nervous, on edge), depression (lack of interest or pleasure in doing things), PTSD (being watchful or alert) and OCD (thoughts that are frequent, unwanted and intrusive), as well

Table 1 Differences in baseline versus pandemic affective scores as well as the G-AS PC

Variable	Baseline	Pandemic	Wald	df	P value
Anxiety	33.17 (0.28)	45.25 (0.30)	1797.73	1	<0.001
Depression	26.46 (0.27)	33.24 (0.031)	695.50	1	<0.001
PTSD	27.69 (0.28)	43.67 (0.33)	2663.17	1	<0.001
OCD	20.88 (0.26)	28.35 (0.30)	1150.17	1	<0.001
Mood swings	24.24 (0.26)	34.40 (0.31)	1780.31	1	<0.001
G-AS PC score	−0.205 (0.009)	0.206 (0.010)	3368.41	1	<0.001

All results of general equation estimation, repeated measures.
G-AS, general affective symptom; OCD, obsessive-compulsive disorder; PC, principal component; PTSD, post-traumatic stress disorder.

as mood swings (mood suddenly changing from depressed to euphoric to irritable).

Sociodemographic and clinical data

Since we were interested in examining the effects of adverse childhood experiences on the intrapandemic G-AS scores, we present the main data measurements for participants with and without adverse childhood experiences. The main demographic and clinical data evaluated in the current study are displayed in table 2. The presence of at least one adverse childhood experience was associated with increased body mass index, increased financial loss due to the pandemic, increased negative life events, more medical disorders, increased mental health problems, increased physical pain symptoms, increased feelings of isolation, higher prepandemic and intrapandemic G-AS scores and increased intrapandemic suicidal attempts and suicidal ideation. Participants who experienced one or more adverse childhood experiences had reduced socioeconomic status, resilience, physical health, social support, household interpersonal relationships and satisfaction with family interaction.

All results in table 1 showed significant interaction patterns between the adverse childhood experiences groups and time (baseline and pandemic scores). For example, there was a significant interaction between adverse childhood experiences X time for depressed mood (χ^2=51.98, df=1, p<0.001). Thus, the increase in depression scores was significantly greater among those with adverse childhood experiences (+9.38±0.46) than among those without (+5.30±0.31). Online supplemental file 3, figure 1 displays the baseline and pandemic depression scores for subjects with and without adverse childhood experiences.

Predictors of the intrapandemic G-AS scores

There was a strong correlation between prepandemic and intrapandemic G-AS scores, and online supplemental file 3, figure 2 depicts the partial regression of the intrapandemic G-AS on prepandemic G-AS scores (after adjusting for age, gender and the four waves), indicating that baseline values account for around 55.5% of the variance in intrapandemic G-AS scores. This finding shows that when calculating associations between the intrapandemic G-AS scores and other possible predictors, the prepandemic G-AS values must be considered in the analyses (see 'Statistics' section).

We were able to extract PCs from the items 'the most severe symptoms are due to observing the spread and knowing the risks of the COVID-19 outbreak' and 'how much can the most severe symptoms be attributed to self-isolation/physical distancing' (labelled PC-COVISO, indicating attribution to the COVID-19

Table 2 Sociodemographic and clinical data of the participants included in the study divided into two groups based on the presence of ACEs

Variable	No ACEs (n=9595)	≥1 ACE (n=4676)	F	df	P value
Number of ACEs	0.0	2.3 (1.7)	–	–	–
Age (years)	34.71 (12.69)	35.74 (11.68)	21.44	1/14269	<0.001
Male/Female/Non-binary/Transgender	2710/6576/105/69	1200/3316/87/47	26.79	3	<0.001
Body mass index (kg/m^2)	22.80 (4.43)	23.42 (4.78)	55.14	1/12960	<0.001
Socio-economic status (%)	55.28 (20.16)	53.03 (19.99)	34.73	1/12519	<0.001
Student (no/yes)	7217/1992	3842/734	60.23	1	<0.001
Financial loss due to pandemic (%)	45.39 (29.64)	49.88 (31.36)	62.29	1/12725	<0.001
Number of negative life events	0.19 (0.56)	1.17 (1.39)	3584.78	1/14269	<0.001
Number of mental illnesses	0.03 (0.24)	0.18 (0.58)	427.85	1/14269	<0.001
Any mental disorder (no/yes)	9327/268	4114/562	488.50	1	<0.001
Pandemic mental health score (%)*	78.60 (0.59)	75.37 (0.60)	97.03	1/12405	<0.001
Pandemic resilience (%)*	67.80 (0.75)	64.28 (0.77)	70.45	1/12490	<0.001
Pandemic physical health score (%)*	78.30 (0.49)	77.25 (0.50)	15.04	1/12463	<0.001
Pandemic physical pain score (%)*	25.07 (0.61)	26.33 (0.62)	13.62	1/12279	<0.001
Pandemic social support (%)*	2.337 (0.057)	2.224 (0.057)	9.94	1/9923	<0.002
Pandemic household interpersonal (%)*	73.19 (0.78)	71.75 (0.80)	12.05	1/11038	<0.001
Pandemic family interaction satisfaction (%)*	75.15 (0.65	73.45 (0.67)	21.54	1/12850	<0.001
Protective devices availability (%)	86.52 (18.75)	86.81 (18.79)	0.72	1/13207	0.396
Feels isolated (%)*	40.98 (31.63)	45.98 (33.40)	70.09	1/13125	<0.001
Fear of COVID-19 (%)*	66.93 (0.34)	61.87 (0.45)	79.77	1/9958	<0.001
Pandemic G-AS (PC scores)	0.024 (0.0038)	0.458 (0.038)	464.31	1/9854	<0.001
Baseline G-AS (PC scores)	−0.193 (0.925)	0.319 (1.037)	656.43	1/10014	<0.001
Pandemic suicide attempts*	0.099 (0.017)	0.133 (0.017)	11.86	1/10165	<0.001
Pandemic suicidal ideation (%)	4.86 (14.73)	9.86 (21.98)	188.00	1/10176	<0.001

*These values are adjusted for their baseline (prepandemic levels) using regression analysis.
ACEs, adverse childhood experiences; G-AS, general affective symptom; PC, principal component.

Table 3 Results of regression analysis with the pandemic G-AS principal component score as dependent variable and sociodemographic and non-pandemic-associated data as explanatory variables

Explanatory variables	F	df	P value	R^2	Direction
Baseline G-AS	14339.73	1/9888	<0.001	0.592	Positive
Age	269.65	1/9887	<0.001	0.027	Inverse
Gender	19.05	3/9858	<0.001	0.006	See figure 1
COVID-19 pandemic waves	305.56	3/9886	<0.001	0.085	See online supplemental file 2
Socio-economic status	38.14	1/9303	<0.001	0.004	Inverse
Income loss during pandemic	300.65	1/9364	<0.001	0.031	Positive
Being student	55.08	1/9721	<0.001	0.006	Positive
Current body mass index	0.84	1/9315	0.359	0.000	–
Number of ACEs	269.69	1/9855	<0.001	0.027	Positive
Number of NLEs	429.42	1/9854	<0.001	0.042	Positive
Composite ACEs+NLEs	486.50	1/9854	<0.001	0.047	Positive
Any mental disorder	152.09	1/9855	<0.001	0.015	Positive
Number of mental disorders	172.18	1/9855	<0.001	0.017	Positive
Pandemic mental health score*	2056.95	1/9779	<0.001	0.174	Positive
Pandemic physical health score*	615.69	1/9789	<0.001	0.059	Inverse
Pandemic physical pain score*	482.56	1/9749	<0.001	0.047	Positive
Pandemic resilience*	418.45	1/9463	<0.001	0.046	Inverse

All regressions (except the first) are adjusted for baseline G-AS scores, which were entered as additional explanatory variables.
*These values are adjusted for their baseline (prepandemic levels) using regression analysis.
ACEs, adverse childhood experiences; G-AS, generalised affective symptom; NLEs, negative life events.

outbreak and social isolation). These 10 items are shown in online supplemental file 1, table 1, while online supplemental file 1, table 5 shows the construction of PC-COVISO. The latter reflects the participants' attribution of the mood symptoms to the pandemic and isolation. These findings indicate that individuals do not distinguish between the effects of the pandemic and isolation or social distancing on their mental symptoms. Online supplemental file 3, figure 3 depicts the partial regression of the pandemic G-AS score on PC-COVISO, which indicates that 12.4% of the variance in the changes in G-AS from the prepandemic to the intrapandemic time could be explained by the participant's perceptions that this is due to knowing the risks of the COVID-19 outbreak, self-isolation and physical distancing (shown is a partial regression plot adjusted for sex, age, waves and baseline G-AS scores).

To examine the effects of other solitary predictors on the changes in G-AS from the prepandemic to the intrapandemic time, we conducted univariate generalised linear model (GLM) analyses with the intrapandemic G-AS scores as the dependent variable, prepandemic G-AS as the explanatory variable and age, sex and the four waves as the explanatory variables. Table 3 demonstrates that age (inversely), gender and the different waves had a substantial effect on pandemic G-AS. Significant and inverse associations exist between age and G-AS. We also examined nonlinear effects of age, but none could be detected. Online supplemental file 3, figure 4 demonstrates that the pandemic G-AS values for waves 3 and 4 were considerably lower than those for waves 1 and 2 ($p<0.001$). Online supplemental file 3, figure 5 demonstrates that males had substantially lower pandemic G-AS scores than females, non-binary and transgender individuals. There were no significant differences between the latter three study groups regarding G-AS scores.

The effects of the other explanatory variables shown in tables 3 and 4 were analysed using univariate GLM with the pandemic G-AS score as the dependent variable and baseline G-AS and each of the listed data as explanatory variables. The latter were inputted separately, one by one. These analyses revealed that the pandemic G-AS score was positively associated with income loss, being a student, the total number of adverse childhood experiences, the total number of negative life events, mental disorders, changes in mental health and physical pain from baseline to the COVID-19 pandemic. In order to estimate the total impact of adverse childhood experiences and negative life events, we computed the z composite score of both psychological stressors (composite adverse childhood experiences+negative life events). This index was strongly associated with the G-AS score. On the other hand, there were inverse relationships between variations in pandemic G-AS and socioeconomic status, physical health and resilience. The results of univariate GLM analyses with COVID-19-associated data as explanatory variables are presented in table 4. Changes in G-AS sores were significantly associated with concerns about COVID-19 infection, COVID-19 infection symptoms, feelings of isolation and lowered social support, household interpersonal satisfaction and family interaction satisfaction. Conversely, the presence of protective devices was associated with decreased pandemic G-AS scores.

Online supplemental file 2 shows the results of multivariate regression analysis and PLS analysis. Figure 1 shows the final PLS model.

DISCUSSION

Our data revealed consistent patterns of psychological impact of the COVID-19 pandemic on the mental health status of Thai adults during the four pandemic phases. Nonetheless, the first and second waves exhibited more significant adverse effects on affect than the last two episodes. As such, we found that the impact of the pandemic on mental health declined over time. This effect can be attributed to various factors such as adaptation to the pandemic, vaccination, treatment, economic recovery and reduced isolation.[22] This trend can also be explained by the fact that at the onset of pandemics, uncertainty and a lack of

Table 4 Results of regression analysis with the pandemic G-AS score as dependent variable and COVID-19 pandemic-associated data as explanatory variables

Explanatory variables	F	df	P value	R^2	Direction
Fear of COVID-19	161.78	1/9218	<0.001	0.017	Positive
COVID-19 contact	1.61	1/9819	0.205	0.000	–
Symptoms of COVID-19	9.43	1/9826	0.002	0.001	Positive
Tested positive for SARS-CoV-2 virus	0.40	1/2772	0.528	0.000	–
Family tested positive for SARS-CoV-2 virus	1.99	1/9778	0.159	0.000	–
Family is hospitalised due to COVID-19	2.01	1/9815	0.156	0.000	–
Family member died due to COVID-19	1.54	1/9815	0.215	0.000	–
Changes in G-AS are due to isolation/social distancing	577.32	1/4985	<0.001	0.104	Positive
Changes in G-AS are due to fear of COVID-19	698.59	1/4983	<0.001	0.123	Positive
Feeling isolated	892.87	1/9647	<0.001	0.085	Positive
Availability of protective devices	41.10	1/9621	<0.001	0.004	Inverse
Pandemic social support*	185.90	1/9088	<0.001	0.020	Inverse
Pandemic household satisfaction interaction*	446.71	1/8244	<0.001	0.051	Inverse
Pandemic family interaction satisfaction*	512.64	1/8209	<0.001	0.059	Inverse

All regressions are adjusted for baseline G-AS scores, which were entered as explanatory variables together with age, sex, the four waves and the listed variables.
*These values are adjusted for their baseline (prepandemic levels) using regression analysis before being entered in the regression.
G-AS, generalised affective symptom.

preparedness often accompany the sudden surge in infected cases, leading to overloaded healthcare systems and shortages of medical supplies. In addition, responses regarding mental health were more prevalent among women, non-binary and transgender individuals than among men. Findings from many countries have revealed that gender roles and responsibilities, along with cultural and job disparities, have disproportionately impacted women and transgender individuals during the COVID-19 pandemic.[23]

Our analysis confirmed a significant impact of pandemic and non-pandemic as risk factors on pandemic affective symptoms

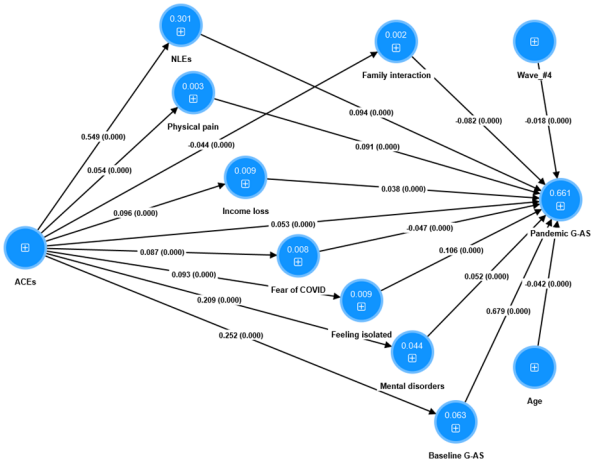

Figure 1 Results of partial least squares analysis. The pandemic and prepandemic general factor of affective symptoms (pandemic and baseline G-AS) are entered as factors extracted from anxiety, depression, obsessive-compulsive, post-traumatic stress and mood swing complaints. The other variables were entered as single indicators. The changes in the pandemic G-AS scores were strongly predicted (66.1%) by 11 variables, and 8 of these variables were also associated with adverse childhood experiences (ACEs). The results show that baseline G-AS, and all single indicators, except age and the fourth wave (W4), partly mediate the effects of ACEs on the pandemic G-AS scores. Figures in blue circles indicate explained variances. Shown are path coefficients with exact p values. NLEs, negative life events.

in Thailand. Decreases in satisfaction with family interactions are probably another consequence of social isolation, whereas increasing dissatisfaction with household interactions during the pandemic may also be the consequence of increasing tensions in the household due to the time spent together during social isolation.[24] As part of the biopsychosocial model of affective disorders,[25 26] the effects of decreased social support on depression and anxiety symptoms are now well-established. In any case, these effects and consequences of social isolation are substantially greater than the effects of COVID-19 fear. As such, fear of COVID-19 is more strongly associated with affective symptom severity than being positive or suffering from the symptoms.

It is well established that prior mental health issues and the recurrence of affective episodes are the most accurate predictors of future affective symptoms.[27] In our study, the second most important risk factor was bodily health problems, including the presence of physical pain. It is well-established that physical pain is significantly associated with affective symptoms,.[28 29] The most significant non-pandemic risk factors for suicidal ideation were the number of mental disorders, the previous mental health status and adverse childhood experiences. Prior research has demonstrated that the baseline mental health status, including the recurrence of affective episodes (a measure of illness severity), and adverse childhood experiences are significant predictors of later affective episodes and the severity of these episodes.[30]

We conceptualised the pandemic environment as a complex, interconnected system, approximating a network of nodes, using PLS analysis. This model (see figure 1) best delineated the pandemic and non-pandemic risk factors that intersect to predict increases in affective symptom severity. The top four predictors were a combination of pandemic and non-pandemic risk factors, including, in descending order of importance, feelings of isolation, negative life events, changes in physical pain and dissatisfaction with family interactions. Thus, adverse childhood experiences predict non-pandemic risk factors, such as prepandemic mental health, income loss and physical health. We have previously demonstrated and discussed that adverse childhood experiences in unipolar depression and bipolar disorder predict the onset of affective symptoms, the severity of depression and anxiety, social support and socioeconomic status, including

income.[30] Moreover, we have demonstrated and discussed previously that adverse childhood experiences also predict the number of negative life events.[27 31] This relationship may be explained by the fact that many individuals with adverse childhood experiences end up in environments with many problems, thereby causing frequent negative life events.[31] It is crucial to note that adverse childhood experiences are also associated with increases in pandemic-associated risk factors, such as feelings of isolation, and decreased satisfaction with family interactions. Therefore, adverse childhood experiences may intersect with the effects of the pandemic environment to exacerbate affective symptoms caused by the pandemic. Moreover, in affective disorders, adverse childhood experiences are associated with increased anxiety severity, as measured by the Hamilton Anxiety Rating scale.[32] As a result, adverse childhood experiences have highly significant total indirect effects on the pandemic affective severity scores that cannot be distinguished using univariate or multivariate regression analysis. PLS analysis showed that adverse childhood experiences had the strongest influence of all predictors on the increases in affective symptoms during the pandemic.

Overall, the results of our Thai COH-FIT study provided a comprehensive evaluation of COVID-19 effects on affective symptoms in the Thai population. Our study identified high-risk categories of individuals who are likely to respond to a pandemic with an increase in affective symptoms, particularly when isolation and self-isolation are government strategies for dealing with the pandemic. Adverse childhood experiences sufferers and those who suffer from mental health disorders (particularly major depression, generalised anxiety disorder, PTSD, panic disorder and anorexia nervosa) or medical conditions (particularly migraine, allergies, asthma, peptic ulcer, chronic skin disease and chronic abdominal pain), women, transgender and non-binary persons, as well as students are at the highest risk.

Limitations

Our study has some limitations and strengths. At the individual level, it first employs a cross-sectional design pertaining to the ratings during the pandemic, paired with a retrospective recall for the situation just before the pandemic started in the given region. This means that COH-FIT captures a single snapshot of data at a single point in time, which limits its ability to establish precise causal relationships or precisely trace changes over time that are observed and described at the population level, as individuals participated in the COH-FIT study throughout the pandemic. In that sense, COH-FIT Thailand operates more as a population-based study than an individual-level analysis-focused study. Nevertheless, we took measures to reduce the possibility of bias due to retrospective evaluations by entering the prepandemic scores of the G-AS (and various risk factors) in the regression analyses. This method allowed us to compute the actual changes in self-rated G-AS scores (and other scores including social support, physical pain, etc) from the prepandemic to the intrapandemic condition. Although during wave 4 we used a stratified probability or representative sampling technique, non-probability sampling was used during the first three waves. The latter techniques including both voluntary response sampling and chain referral sampling may, in theory, result in higher sampling bias as compared with probability sampling. Nevertheless, we made continued efforts to develop a diverse sample, for example, by using sample seed diversity (multiple and variable seeds) and including various sampling waves with multiple seeds. Moreover, the PLS models derived in the overall study sample and in the probability, samples were found to be reproducible and cross-validated and demonstrated a high degree of similarity. Importantly, these findings suggest that the models derived here possess a high degree of generalisability for the Thai population. Future research should use a probability stratified sampling method during pandemic periods to delineate the parameter estimates of the non-pandemic and pandemic risk factors on the increase in G-AS scores and suicidal ideation in other countries and cultures.

CONCLUSIONS

Affective symptoms that emerged during the challenging time of the COVID-19 pandemic were significantly predicted by various factors, including adverse childhood experiences, being female or non-binary, negative life events, feeling of isolation, being a student, physical pain symptoms, the presence of multiple mental and medical conditions, the number of mental disorders, fear of COVID-19 infection, age, attenuated social support and family involvement satisfaction. Likewise, the worsening of suicidal ideation during the pandemic was predicted by pandemic risk factors, pandemic-associated protective factors and non-pandemic factors. The COH-FIT Thailand study has delineated vulnerable groups emphasising the crucial principles of equity and inclusivity that should guide policymaking during times of crisis. Furthermore, since fear of COVID-19 is a significant risk factor, this study highlights the media's obligation to deliver impartial and accountable information, while refraining from exaggerating potential threats that may exacerbate anxiety among susceptible populations.

Our findings have far-reaching implications for the development of evidence-based health policies and strategies to cope with the detrimental effects of the current COVID-19 pandemic and future pandemics. Optimising the treatment plans for individuals belonging to these risk groups and optimising the availability of psychiatric and medical services and added support systems during social isolation periods are for this purpose the most essential strategies.

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