






Association of job loss, income loss, and financial burden with adverse mental health outcomes during coronavirus disease 2019 pandemic in Thailand: A nationwide cross-sectional study

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Abstract

Background: Economic crises during the coronavirus disease (COVID-19) pandemic severely impacted mental health outcomes. However, there is limited evidence on this issue in Thailand. We aimed to evaluate the association of economic burden during the first phase of the pandemic and the risk of adverse mental health outcomes in the Thai population.

Methods: We recruited 2,303 participants aged 18 years or above with employment/full-time jobs before the national lockdown in April–May 2020. The measures of economic burden were job loss, income loss, and financial problems related to the outbreak. The outcomes included depressive symptoms, anxiety, and perceived stress. The association between economic burden and adverse mental health outcomes was evaluated using multivariable logistic regression models.

Results: Individuals who lost their jobs during the COVID-19 pandemic had a higher risk of perceived stress compared to those who maintained their job (adjusted odds ratio [OR], 2.40; 95% confidence interval [CI], 1.28–4.51; $p = .006$). A higher risk of anxiety was observed in individuals with a monthly income loss of 50% (adjusted OR, 1.42; 95% CI, 1.03–1.99; $p = .035$; individuals without income loss, reference group) or over. Self-reported financial problems were significantly associated with adverse mental health outcomes (nonexperienced financial problems, reference group): Adjusted ORs of 1.84 (95% CI, 1.34–2.51; $p < .001$) for depressive symptoms, 2.00 (95% CI, 1.48–2.71; $p < .001$) for anxiety, and 2.12 (95% CI, 1.51–2.95; $p < .001$) for perceived stress.

Conclusions: Economic burden, especially self-reported financial problems, was associated with adverse mental health outcomes. However, long-term studies are

needed to address the mental health consequences of COVID-19 and economic downturns.

KEYWORDS

COVID-19, economic burden, financial problems, income loss, job loss, mental health

1 | INTRODUCTION

The coronavirus disease-2019 (COVID-19) was declared a pandemic and a global emergency by the World Health Organisation on January 30, 2020. Since then, it has rapidly spread in 216 countries (Burki, 2020; Mahase, 2020). As of October 18, 2020, over 37 million COVID-19 cases and 1 million deaths were reported globally (World Health Organization, 2020). The numbers are still rising as countries anticipate a second or third wave of infections. The pandemic has affected people from all walks of life; unprecedented measures, including lockdowns, movement restrictions, physical distancing rules, and schools and workplace closures, have been taken to contain the spread of the disease. The continued implementation of restrictions in the past few months may have helped delay the peaking of the epidemic. However, it has posed the largest economic shock the world has experienced in decades. The World Bank has forecasted the deepest economic recession for all countries (5.2% contraction in gross domestic product [GDP]) since World War II (World Bank, 2020).

Economic crises had greatly influenced the mental and psychological wellbeing of the population, especially those who are directly affected (World Health Organization: Regional Office for Europe, 2011). Generally, mental health problems are related to the determinants of population health, including inequality, poverty, deprivation, and other social and economic metrics. Although it is difficult to determine the causal relationship between these factors, existing evidence illustrates that poor mental health is linked with substantial financial strain, indebtedness, and unemployment (Drydakis, 2015; Fiori et al., 2016; Jenkins et al., 2008; Parmar et al., 2016; Silva et al., 2018; Urbanos-Garrido & Lopez-Valcarcel, 2015). Furthermore, the prevalence of mental health problems, such as common mental disorders, substance-related disorders, and suicidal behavior, tends to be higher during the period of economic recession than during normal times (Frasquilho et al., 2016). Amid the COVID-19 pandemic, certain groups of people may be particularly vulnerable to COVID-19 related economic burden, for instance, those unemployed, in debt, or facing financial problems, which have detrimental effects on their mental wellbeing. As such, the current economic crisis brought about by the COVID-19 pandemic may make people with or without preexisting mental illness more prone to poor mental health.

In Thailand, which effectively contained the COVID-19 outbreak, 3–5 million people (8%–13% of the current workforce) are unemployed, the highest figure ever seen on record. The country's labor force started to weaken because of the economy even before the outbreak. The implementation of national health and government

policies forced large-scale businesses to shut down, resulting in job losses; indeed, the number of employees with irregular salaries, low-paid workers, and those without a written contract are continually increasing. According to the latest projection of the International Monetary Fund in October 2020, Thailand's economy is projected to decline by 7.1% in 2020, its worst GDP report ever (International Monetary Fund, 2020). Before the pandemic, the Thai economic growth slowed in 2019, with Thailand's household debt being the highest in Asia. According to financial institutions, the ratio of household debt to GDP soared to 80% in the first quarter of 2020; however, it could increase to 90% of the GDP amid the economic downturn and COVID-19 pandemic (Onthaworn, 2020).

Taken together, we postulated that the general Thai population, especially those facing economic burden, is at risk of developing mental health and psychosocial problems during the COVID-19 pandemic. To our knowledge, the association between the general population's mental health issues and economic decline in Thailand due to the economic recession during the COVID-19 pandemic has not been evaluated. Therefore, this nationwide cross-sectional study aimed to evaluate the association of economic burden during the first phase of the COVID-19 pandemic, including job loss, income loss, and financial problems, with the risk of adverse mental health outcomes in the general Thai population.

2 | METHODS

2.1 | Study design and participants

This study is a part of wave I (April 21–May 4, 2020) of The Health Outcomes and Mental Health Care Evaluation Survey: Under the Pandemic Situation of COVID-19 (HOME-COVID-19). Details of the protocol are published elsewhere (Mongkhon et al., 2021; Nochaiwong et al., 2020). In brief, we conducted an open, online, voluntary, nationwide survey through convenient selection of the target population in Thailand. Participants who (i) were Thai citizens, permanent residents, or nonresidents with work permits aged 18 years or above at the date of the survey; (ii) had full-time employment before the national lockdown owing to the COVID-19 outbreak; (iii) can read and communicate in the Thai language; and (iv) can access the Internet were eligible for inclusion in this study. Those who did not complete the online survey, or spent less than 2 min or more than 60 min on the survey were excluded. We developed an online questionnaire via the SurveyMonkey® platform, which could limit one-time participation per unique Internet Protocol address. Relevant links

or QR codes were distributed to the eligible population using a convenience and snowball sampling strategy via social media networks, including public websites, Facebook, LINE, Twitter, and Instagram.

This study was performed in accordance with the Declaration of Helsinki. Ethics approval was granted by the Committee of Research Ethics of the Faculty of Public Health (ET010/2020) and Faculty of Pharmacy (23/2563), Chiang Mai University. A written consent form was obtained from all participants before completing the questionnaire. The study was reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology Statement (von Elm et al., 2007) and the Improving the Quality of Web Surveys: The Checklist for Reporting Results of Internet E-Surveys (Eysenbach, 2004).

2.2 | Assessments

The main independent variables were job loss, income loss, and financial problems related to the COVID-19 outbreak. We used dichotomous (yes/no) questions to assess job loss and self-reported financial problems. Income loss was categorized as no, less than 50% of monthly income, or 50% or more of monthly income. The Thai versions of the Patient Health Questionnaire—9-items (PHQ-9), Generalised Anxiety Disorder Scale—7-items (GAD-7), and Perceived Stress Scale—10-items (PSS-10) were used to evaluate the mental health outcomes.

The PHQ-9 was used for measuring depressive symptoms and comprises nine items rated on a 4-point Likert scale. The total score ranges from 0 to 27, with higher scores reflecting greater depression severity within the past 2 weeks. The cut-off score for the depressive symptom group was 9 or above. The PHQ-9 Thai version showed good psychometric properties, with a Cronbach's α of .79 (Lotrakul et al., 2008).

The GAD-7 was used for measuring worry and anxiety symptoms within the past 2 weeks and comprises seven items rated on a 4-point Likert scale. The total score ranges from 0 to 21, with higher scores indicating more severe anxiety. A cut-off point of 5 or above was used to identify the general population with anxiety symptoms. The psychometric properties of this tool were excellent, with a Cronbach's α of .92 (Spitzer et al., 2006).

The PSS-10 was used to measure the perception of stress, and the items are rated on a 5-point Likert scale; the questions are related to the participants' feelings and thoughts during the previous month. Scores range from 0 to 40; higher scores indicate a higher degree of stress. A cut-off point of 14 or above was considered to indicate perceived stress. The PSS-10 has good psychometric properties, with a Cronbach's α of .85 (Wongpakaran & Wongpakaran, 2010).

2.3 | Covariates

Baseline sociodemographic characteristics included age, sex, educational level, marital status, religion, occupation/profession status,

region of residence, living status, reimbursement schemes, history of mental illness, history of chronic noncommunicable diseases (NCDs), debt, media exposure, confirmed cases in the community, and quarantine/isolation information. The Brief Resilient Coping Scale, a four-item questionnaire with each item rated on a 5-point Likert scale, was also used to assess current resilience capability (Sinclair & Wallston, 2004).

2.4 | Sample size calculation

According to a priori protocol, 3.3%–75.5% of the general population were selected, based on the results of previous studies reporting the prevalence of mental health problems (e.g., depression, anxiety, and stress) during the COVID-19 outbreak (Nochaiwong et al., 2020). The sample was calculated using the compensation for a design effect of 2.0 and a response rate of 60%. To obtain statistical power of 80% and a type I error probability of 0.05, this study required 1,310 participants for the final analysis.

2.5 | Statistical analyses

Descriptive statistics were used and expressed as frequency and percentage, mean \pm standard deviation (SD), or median with a range (min–max) as appropriate. To test the differences in baseline characteristics between economic burden groups, an independent *t* test or Wilcoxon rank-sum test was used for continuous data and Fisher's exact test for categorical data. The prevalence of adverse mental health outcomes in each economic burden group was assessed. For all models, we adjusted the weights for the national population and the rate of Internet use obtained from the National Statistic Office of the Thai Ministry of Information and Communication Technology.

The associations of job loss, income loss, and financial problems with the risk of adverse mental health outcomes were evaluated using multivariable logistic regression models to control for potential confounding factors (Kleinbaum & Klein, 2010). We reported the crude odds ratios (ORs) and the corresponding 95% confidence intervals (CIs). Multicollinearity was examined using a variance inflation factor (VIF) value of 4 or above as a cut-off point for further investigation, and a VIF value of 10 or above indicated a serious multicollinearity, which required correction (O'Brien, 2007). All three models were analyzed after adjusting for different confounders: (i) Model 1 adjusted for age and sex; (ii) model 2 for model 1 plus marital status, education level, religion, region, living status, reimbursement scheme, history of mental illness, history of NCDs, and debt; and (iii) model 3 for model 2 plus information exposure during the COVID-19 outbreak, confirmed cases in the community, quarantine status, and resilient coping. Subsequently, missing data or incomplete responses were excluded from the analyses. All analyses were performed using Stata 14.0 (StataCorp, LP). The two-tailed tests conducted had a type I error rate of .05.

3 | RESULTS

3.1 | Participants' characteristics

Among the 4,322 participants screened in the first wave of the HOME-COVID-19 survey, 318 who were unable to complete the questionnaire survey and 1,701 who were unemployed or with non-full-time jobs before the national lockdown were excluded (Figure 1). Therefore, 2,303 participants (mean age, 34.5 ± 10.2 years) were eligible for this study, of which, 60.0% were females, 67.5% were single, and 8.1% had a history of mental illness (Table 1). Of the 2,303 participants, 262 (11.4%) lost their jobs, whereas 374 (16.2%) and 755 (32.8%) reported monthly income losses of less than 50% and 50% or above, respectively. Additionally, 1,196 (51.9%) participants had self-reported financial problems (Table 1).

3.2 | Job loss and mental health status

Our results revealed that participants who reported losing their job had 51.9%, 56.9%, and 84.7% prevalence rates of depressive symptoms, anxiety symptoms, and perceived stress, respectively (Tables 2–4). Using a cut-off PHQ-9 value of 9 or above, job loss was a significant risk factor for depression compared to participants who

maintained their job; however, the significance was diluted in model 3 (fully adjusted model), (adjusted OR, 1.51; 95% CI, 0.97–2.34; $p = .070$) (Table 2). Job loss was a significant risk factor for anxiety symptoms, with models 1 and 2 revealing adjusted ORs of 1.76 and 1.58, respectively (Table 3). However, when more covariates were incorporated in model 3, we only found a statistically nonsignificant trend of higher anxiety symptoms (adjusted OR, 1.39; 95% CI, 0.89–2.18; $p = .146$). According to the risk of perceived stress, job loss was a statistically significant risk factor for perceived stress in all models, with adjusted ORs of 2.19 (95% CI, 1.28–3.76; $p = .004$), 2.18 (95% CI, 1.24–3.83; $p = .007$), and 2.40 (95% CI, 1.28–4.51; $p = .006$) for models 1, 2, and 3, respectively (Table 4).

3.3 | Income loss and mental health status

We grouped the participants into those with or without income loss with 50% of lost income as the cut-off point. Participants with a monthly income loss of less than 50% and 50% or above had the following prevalence rates: 36.6% and 43.2%, for depressive symptoms; 38.2% and 49.4%, for anxiety symptoms; and 69.2% and 78.4%, for perceived stress, respectively (Tables 2–4). Income loss showed a slight association with depressive symptoms when no income loss was used as a reference group. Among the three models in Table 2,

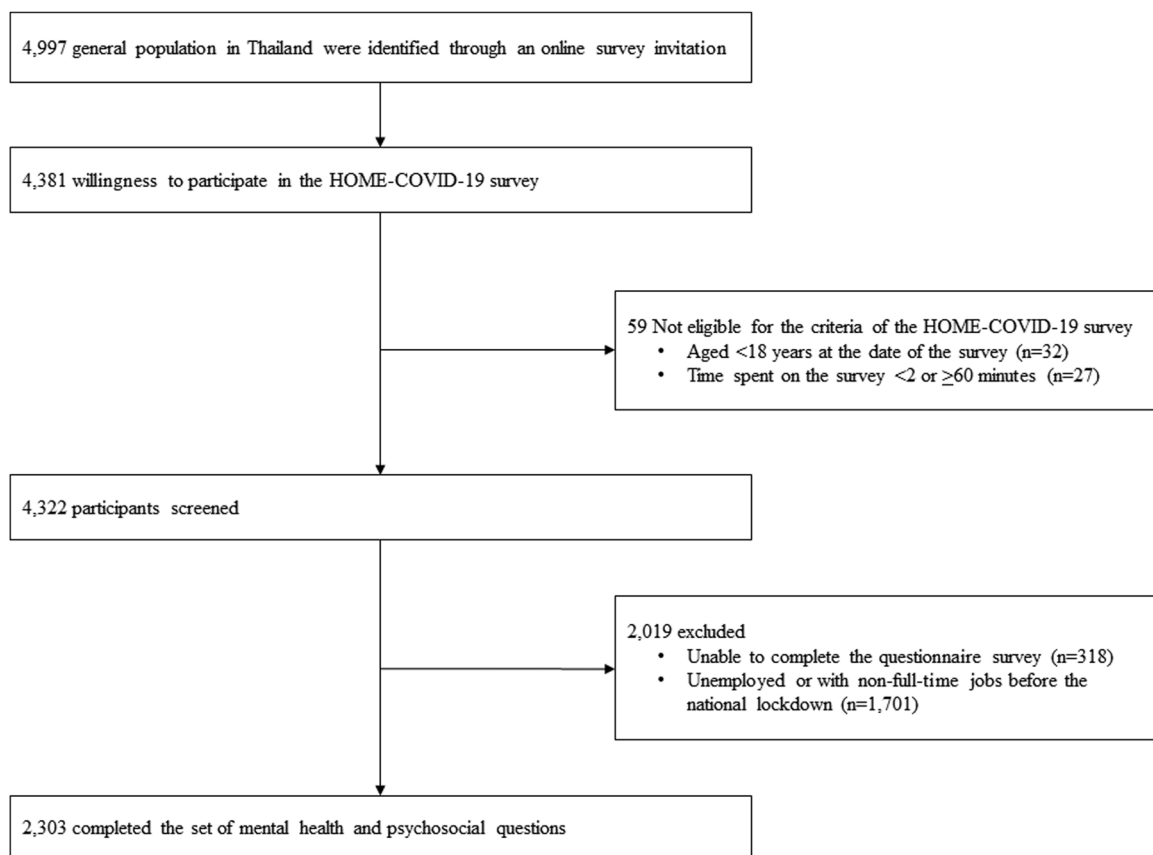


FIGURE 1 Flow diagram for study participants. HOME-COVID-19, The Health Outcomes and Mental Health Care Evaluation Survey Research Group-Coronavirus disease 2019

TABLE 1 Participants characteristics according to the economic burden during the COVID-19 pandemic in Thailand (n = 2,303)

Characteristics	Job loss			Income loss			Self-reported financial problems				
	Overall (n = 2,303)	No (n = 2,041)	Yes (n = 262)	p Value	No (n = 1,174)	Monthly income loss of <50% (n = 374)	Monthly income loss of ≥50% (n = 755)	p Value	No (n = 1,107)	Yes (n = 1,196)	p Value
Age, year (mean ± SD)	34.5 ± 10.2	35.0 ± 10.3	30.5 ± 8.9	<.001	34.9 ± 10.2	35.5 ± 11.0	33.2 ± 9.6	.009	35.6 ± 10.8	33.4 ± 9.5	<.001
≤30	1,009 (43.8)	845 (41.4)	164 (62.6)	<.001	484 (41.2)	158 (42.3)	367 (48.6)	.003	444 (40.1)	565 (47.2)	<.001
31-50	1,072 (46.6)	986 (48.3)	86 (32.8)	<.001	572 (48.7)	168 (44.9)	332 (44.0)		525 (47.4)	547 (45.7)	
≥51	222 (9.6)	210 (10.3)	12 (4.6)		118 (10.1)	48 (12.8)	56 (7.4)		138 (12.5)	84 (7.0)	
Sexual identity											
Male	851 (37.0)	774 (37.9)	77 (23.4)	.020	443 (37.7)	143 (38.2)	265 (35.1)	.371	430 (38.8)	421 (35.2)	.127
Female	1,384 (60.0)	1,206 (59.1)	178 (67.9)		703 (59.9)	218 (58.3)	463 (61.3)		649 (58.6)	735 (61.5)	
Other	68 (3.0)	61 (3.0)	7 (2.7)		28 (2.4)	13 (3.5)	27 (3.6)		28 (2.5)	40 (3.3)	
Marital status											
Single	1,554 (67.5)	1,349 (66.1)	205 (78.2)	<.001	778 (66.3)	257 (68.7)	519 (68.7)	.097	746 (67.4)	808 (67.6)	.331
Married/domestic partnership	654 (28.4)	608 (29.8)	46 (17.6)		357 (30.4)	98 (26.2)	199 (26.4)		322 (29.1)	332 (27.8)	
Divorced/widowed/separated	95 (4.1)	84 (4.1)	11 (4.2)		39 (3.3)	19 (5.1)	37 (4.9)		39 (3.5)	56 (4.7)	
Education level											
Illiterate/primary school/junior high school	110 (4.8)	84 (4.1)	26 (9.9)	<.001	33 (2.8)	10 (2.7)	67 (8.9)	<.001	18 (1.6)	92 (7.7)	<.001
Senior high school/diploma/high vocational	354 (15.4)	298 (14.6)	56 (21.4)		113 (9.6)	55 (14.7)	186 (24.6)		88 (8.0)	266 (22.2)	
Bachelor's degree/higher education	1,839 (79.8)	1,659 (81.3)	180 (68.7)		1,028 (87.6)	309 (82.6)	502 (66.5)		1,001 (90.4)	838 (70.1)	
Religion											
No	174 (7.6)	147 (7.2)	27 (10.3)	.082	78 (6.6)	25 (6.7)	71 (9.4)	.070	81 (7.3)	93 (7.8)	.694
Region											
Capital and vicinity	877 (38.1)	802 (39.3)	187 (71.4)	.001	510 (43.4)	163 (43.6)	204 (27.0)	<.001	528 (47.7)	349 (29.2)	<.001
Provincial	1,426 (61.9)	1,239 (60.7)	75 (28.6)		664 (56.6)	211 (56.4)	551 (73.0)		579 (52.3)	847 (70.8)	
Living status											
Alone	402 (17.5)	361 (17.7)	41 (15.6)	.727	221 (18.8)	71 (19.0)	110 (14.6)	.069	226 (20.4)	176 (14.7)	.001
With family	1,730 (75.1)	1,529 (74.9)	201 (76.7)		876 (74.6)	273 (73.0)	581 (76.9)		806 (72.8)	924 (77.3)	
With others	171 (7.4)	151 (7.4)	20 (7.6)		77 (6.6)	30 (8.0)	64 (8.5)		75 (6.8)	96 (8.0)	
Reimbursement scheme											
Government/state enterprises	388 (16.9)	388 (19.0)	0 (0.0)	<.001	325 (27.7)	36 (9.6)	27 (3.6)	<.001	302 (27.3)	86 (7.2)	<.001
Universal coverage scheme	468 (20.3)	363 (17.8)	105 (40.1)		129 (11.0)	69 (18.5)	270 (35.8)		106 (9.6)	362 (30.3)	

TABLE 1 (Continued)

Characteristics	Job loss		Income loss		Monthly income loss		Self-reported financial problems		
	No (n = 2,041)	Yes (n = 262)	p Value	No (n = 1,174)	Monthly income loss of <50% (n = 374)	Monthly income loss of ≥ 50% (n = 755)	No (n = 1,107)	Yes (n = 1,196)	p Value
Overall (n = 2,303)	952 (46.6)	92 (35.1)		544 (46.3)	193 (51.6)	307 (40.7)	502 (45.3)	542 (45.3)	
Social security scheme	403 (17.5)	65 (24.8)		176 (15.0)	76 (20.3)	151 (20.0)	197 (17.8)	206 (17.2)	
Self-payment/others	187 (8.1)	38 (14.5)	<.001	78 (6.6)	29 (7.8)	80 (10.6)	70 (6.3)	117 (9.8)	.003
History of mental illness	451 (19.6)	53 (20.2)	.804	224 (19.1)	66 (17.6)	161 (21.3)	212 (19.2)	239 (20.0)	.636
History of chronic NCD ^a									
Yes	1,591 (69.1)	161 (61.4)	.006	790 (67.3)	272 (72.7)	529 (70.1)	684 (61.8)	907 (75.8)	<.001
No	774 (33.6)	69 (26.3)	<.001	437 (37.2)	108 (28.9)	229 (30.3)	378 (34.2)	396 (33.1)	<.001
Information exposure during the COVID-19 outbreak									
<1 h/day	945 (41.0)	99 (37.8)		505 (43.0)	165 (44.1)	275 (36.4)	506 (45.7)	439 (36.7)	
1–2 h/day	584 (25.4)	94 (35.9)		232 (19.8)	101 (27.0)	251 (33.3)	223 (20.1)	361 (30.2)	
≥3 h/day	1,521 (66.0)	168 (64.1)	.354	749 (63.8)	264 (70.6)	508 (67.3)	751 (67.8)	770 (64.4)	.033
Confirmed cases in the community									
No	346 (15.0)	36 (13.7)		200 (17.0)	42 (11.2)	104 (13.8)	171 (15.5)	175 (14.6)	
Yes	436 (18.9)	58 (22.1)		225 (19.2)	68 (18.2)	143 (18.9)	185 (16.7)	251 (21.0)	
Not known	1,336 (58.0)	113 (43.1)	<.001	738 (62.9)	228 (61.0)	370 (49.0)	727 (65.7)	609 (50.9)	<.001
Quarantine status									
Never	724 (31.4)	99 (37.8)		343 (29.2)	105 (28.1)	276 (36.6)	280 (25.3)	444 (37.1)	
Past	243 (10.6)	50 (10.1)		93 (7.9)	41 (11.0)	109 (14.4)	100 (9.0)	143 (12.0)	
Current	988 (42.9)	128 (48.8)	.089	485 (41.3)	163 (43.6)	340 (45.0)	412 (37.2)	576 (48.2)	<.001
Resilient coping ^b									
Low resilient copers	890 (38.7)	95 (36.3)		475 (40.5)	125 (33.4)	290 (38.4)	467 (42.2)	423 (35.4)	
Medium resilient copers	425 (18.4)	39 (14.9)		214 (18.2)	86 (23.0)	125 (16.6)	228 (20.6)	197 (16.5)	
High resilient copers									

Abbreviations: COVID-19, coronavirus disease-2019; NCD, noncommunicable disease.

^aTo include diabetes mellitus, hypertension, dyslipidemia, stroke and heart disease, chronic kidney disease, chronic lung disease, and cancer.

^bDefined according to the brief resilient coping scale: 4–13 points, low resilient copers; 14–16 points, moderate resilient copers; and 17–20, high resilient copers.

TABLE 2 Economic burden during the COVID-19 outbreak and the risk of depressive symptoms

Economic burden	No. of cases/no. of total (%)	PHQ-9 score, mean \pm SD (median, min-max)	Depression (PHQ-9 value of ≥ 9 points)						
			Model 1 ^a	Model 2 ^b	Model 3 ^c				
			OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value	
Job loss									
No	705/2,041 (34.5)	6.9 \pm 5.8 (6, 0 - 27)	Reference (1.00)		Reference (1.00)		Reference (1.00)		
Yes	136/262 (51.9)	9.8 \pm 6.2 (9, 0-27)	1.68 (1.13-2.49)	.010	1.51 (1.00-2.28)	.048	1.51 (0.97-2.34)	.070	
Income loss									
No	378/1,174 (32.2)	6.4 \pm 5.5 (5, 0-27)	Reference (1.00)		Reference (1.00)		Reference (1.00)		
Monthly income loss of <50%	137/374 (36.6)	7.3 \pm 5.8 (6, 0-27)	1.26 (0.87-1.82)	.230	1.31 (0.87-1.96)	.199	1.43 (0.94-2.16)	.090	
Monthly income loss of \geq 50%	326/755 (43.2)	8.4 \pm 6.3 (7, 0-27)	1.38 (1.05-1.80)	.020	1.23 (0.91-1.68)	.182	1.36 (0.98-1.88)	.063	
Self-reported financial problems									
No	321/1,107 (29.0)	6.1 \pm 5.3 (5, 0-27)	Reference (1.00)		Reference (1.00)		Reference (1.00)		
Yes	520/1,196 (43.5)	8.3 \pm 6.2 (7, 0-27)	1.80 (1.40-2.30)	<.001	1.78 (1.33-2.38)	<.001	1.84 (1.34-2.51)	<.001	

Note: The ORs corresponding to 95% CIs are presented weighted according to the national population and the rate of internet use in Thailand.

Abbreviations: CI, confidence interval; COVID-19, coronavirus disease-2019; OR, odds ratio; PHQ-9, Patient Health Questionnaire-9-items.

^aModel 1 adjusted for age and sexual identity.

^bModel 2 adjusted for model plus marital status, education level, religion, region, living status, reimbursement scheme, history of mental illness, history of chronic non-communicable diseases, and debt.

^cModel 3 adjusted for model 2 plus information exposure during the COVID-19 outbreak, confirmed cases in the community, quarantine status, and resilient coping.

TABLE 3 Economic burden during the COVID-19 outbreak and the risk of anxiety symptoms

Economic burden	No. of cases/no. of total (%)	GAD-7 score, mean ± SD (median, min-max)	Anxiety (GAD-7 value of ≥5 points)								
			Model 1 ^a			Model 2 ^b			Model 3 ^c		
			OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value			
Job loss											
No	795/2,041 (39.0)	4.2 ± 4.5 (3, 0-21)	Reference (1.00)		Reference (1.00)		Reference (1.00)				
Yes	149/262 (56.9)	6.1 ± 5.0 (5, 0-21)	1.76 (1.18-2.60)	.005	1.58 (1.05-2.38)	.028	1.39 (0.89-2.18)	.146			
Income loss											
No	428/1,174 (36.4)	3.8 ± 4.1 (3, 0-21)	Reference (1.00)		Reference (1.00)		Reference (1.00)				
Monthly income loss of <50%	143/374 (38.2)	4.5 ± 4.6 (3, 0-21)	0.94 (0.65-1.34)	.719	0.94 (0.64-1.38)	.739	0.99 (0.67-1.47)	.960			
Monthly income loss of ≥50%	373/755 (49.4)	5.3 ± 5.1 (4, 0-21)	1.50 (1.15-1.95)	.003	1.34 (0.99-1.81)	.057	1.42 (1.03-1.99)	.035			
Self-reported financial problems											
No	341/1,107 (30.8)	3.5 ± 4.1 (2, 0-21)	Reference (1.00)		Reference (1.00)		Reference (1.00)				
Yes	603/1,196 (50.4)	5.3 ± 4.8 (5, 0-21)	2.14 (1.68-2.72)	<.001	2.09 (1.58-2.77)	<.001	2.00 (1.48-2.71)	<.001			

Note: The ORs corresponding to 95% CIs are presented weighted according to the national population and the rate of internet use in Thailand.

Abbreviations: CIs, confidence intervals; COVID-19, coronavirus disease-2019; GAD-7, Generalized Anxiety Disorder-7-items; OR, odds ratio.

^aModel 1 adjusted for age and sexual identity.

^bModel 2 adjusted for model plus marital status, education level, religion, region, living status, reimbursement scheme, history of mental illness, history of chronic noncommunicable diseases, and debt.

^cModel 3 adjusted for model 2 plus information exposure during the COVID-19 outbreak, confirmed cases in the community, quarantine status, and resilient coping.

TABLE 4 Economic burden during the COVID-19 outbreak and the risk of perceived stress

Economic burden	No. of cases/no. of total (%)	PSS-10 score, mean \pm SD (median, min-max)	Stress (PSS-10 value of ≥ 14 points)					
			Model 1 ^a		Model 2 ^b		Model 3 ^c	
			OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value
Job loss								
No	1,422/2,041 (69.7)	16.5 \pm 6.6 (17, 0-40)	Reference (1.00)		Reference (1.00)		Reference (1.00)	
Yes	222/262 (84.7)	19.6 \pm 6.4 (19, 4-37)	2.19 (1.28-3.76)	.004	2.18 (1.24-3.83)	.007	2.40 (1.28-4.51)	.006
Income loss								
No	793/1,174 (67.5)	15.8 \pm 6.4 (16, 0-38)	Reference (1.00)		Reference (1.00)		Reference (1.00)	
Monthly income loss of <50%	259/374 (69.2)	16.8 \pm 6.9 (17, 0-40)	1.23 (0.84-1.80)	.282	1.26 (0.85-1.86)	.254	1.37 (0.89-2.09)	.148
Monthly income loss of $\geq 50%$	592/755 (78.4)	18.4 \pm 6.5 (19, 3-38)	1.30 (0.95-1.78)	.099	1.17 (0.83-1.66)	.372	1.44 (0.98-2.13)	.066
Self-reported financial problems								
No	685/1,107 (61.9)	15.1 \pm 6.5 (16, 0 - 40)	Reference (1.00)		Reference (1.00)		Reference (1.00)	
Yes	959/1,196 (80.2)	18.4 \pm 6.3 (18, 0 - 38)	2.20 (1.66-2.89)	<.001	1.97 (1.46-2.66)	<.001	2.12 (1.51-2.95)	<.001

Note: The ORs corresponding to 95% CIs are presented weighted according to the national population and the rate of internet use in Thailand.

Abbreviations: CIs, confidence intervals; COVID-19, coronavirus disease-2019; OR, odds ratio; PSS-10, Perceived Stress Scale-10-items.

^aModel 1 adjusted for age and sexual identity.

^bModel 2 adjusted for model plus marital status, education level, religion, region, living status, reimbursement scheme, history of mental illness, history of chronic noncommunicable diseases, and debt.

^cModel 3 adjusted for model 2 plus information exposure during the COVID-19 outbreak, confirmed cases in the community, quarantine status, and resilient coping.

only the group reporting a monthly income loss of 50% or lesser had a significant association with depression (adjusted OR, 1.38; 95% CI, 1.05–1.80; $p = .020$ (model 1). This significant association was lost in models 2 and 3. Compared with no income loss, participants with a monthly income loss of 50% or more had a significant association with anxiety symptoms: adjusted ORs of 1.50 (95% CI; 1.15–1.95, $p = .003$) in model 1 and 1.42 (95% CI; 1.03–1.99, $p = .035$) in model 3. After dividing the participants into two groups according to PSS-10 scores, income loss was not a statistically significant risk factor for perceived stress in any of the models (Table 4).

3.4 | Financial problems and mental health status

Results revealed that 43.5%, 50.4%, and 80.2% of the participants with self-reported financial problems developed depressive symptoms, anxiety symptoms, and perceived stress, respectively (Tables 2–4). Further analyses of the relationship between self-reported financial problems and depressive symptoms, anxiety symptoms, and perceived stress showed statistically significant differences in all aspects after adjusting for various confounders (all models). The adjusted ORs for depressive symptoms were 1.80 (95% CI, 1.40–2.30; $p < .001$), 1.78 (95% CI, 1.33–2.38; $p < .001$), and 1.84 (95% CI, 1.34–2.51; $p < .001$) in models 1, 2, and 3, respectively (Table 2). The adjusted ORs for anxiety symptoms were 2.14 (95% CI, 1.68–2.72; $p < .001$), 2.09 (95% CI, 1.58–2.77; $p < .001$), and 2.00 (95% CI, 1.48–2.71; $p < .001$) in models 1, 2, and 3, respectively (Table 3). Finally, the risk of perceived stress had a positive association with self-reported financial problems, with adjusted ORs of 2.20 (95% CI, 1.66–2.89; $p < .001$), 1.97 (95% CI, 1.46–2.66; $p < .001$), and 2.12 (95% CI, 1.51–2.95; $p < .001$) in models 1, 2, and 3, respectively (Table 4).

4 | DISCUSSION

To our knowledge, this study was the first to conduct a nationwide online survey to address the early effects of the economic burden caused by the COVID-19 pandemic and the risk for adverse mental health outcomes among the general population in Thailand. Our findings showed that among the general population who were employed before the national lockdown, 11.4% ended up losing their jobs, whereas 16.2% and 32.8% reported monthly income losses of less than 50% and 50% or above, respectively. Moreover, 51.9% of the participants' self-reported financial problems related to the COVID-19 outbreak.

Before the COVID-19 pandemic, a population-based longitudinal study in the United States found that drops in household incomes were substantially associated with an increased risk for incident mood, anxiety, or substance use disorders (adjusted OR, 1.30; 95% CI, 1.06–1.60) (Sareen et al., 2011). Longitudinal studies have also revealed that housing payment problems and indebtedness have significant detrimental effects on mental wellbeing (Taylor et al., 2007)

and increase the risk of depression (incidence density ratio [IDR], 2.4; 95% CI, 1.6–3.6) and anxiety (IDR, 1.9; 95% CI, 1.4–2.6) (McLaughlin et al., 2012). A cross-sectional study based on the national working population sample in the United Kingdom showed that job insecurity (OR, 1.86; 95% CI, 1.47–2.35) and being in debt (OR, 2.17; 95% CI, 1.58–2.98) are significantly associated with depression (Meltzer et al., 2010). Furthermore, during the recession in Greece, people under stressful economic situations had a 1.33-fold increased risk of developing a major depressive episode (Madianos et al., 2011).

During the COVID-19 pandemic, several cross-sectional studies have reported the effects of economic burden and mental health and psychosocial issues. A study of active members of the labor force of six European nations showed that individuals with an instant loss of income have a higher probability of reporting feelings of depression than those who maintained their income (33.2% vs. 21.5%; $p < .001$) (Witteveen & Velthorst, 2020). Furthermore, Wilson et al. (2020) found that job insecurity due to the COVID-19 outbreak and financial concern among employed individuals in the United States are associated with greater depressive and anxiety symptoms. With regard to young adults in the United States who recently experienced employment loss, the estimated risk ratios for depression and anxiety were 1.22 (95% CI, 1.12–1.32; $p < .001$) and 1.25 (95% CI, 1.13–1.37; $p < .001$), respectively (Ganson et al., 2021).

In a particular population, a survey among 735 Italian dentists during the lockdown indicated that perceived job insecurity was positively associated with depressive symptoms (β coefficient, .58; 95% CI, 0.35–0.70; $p < .001$) (Gasparro et al., 2020). Thayer & Gildner, 2020 also found that individuals who experienced financial stress in relation to the COVID-19 pandemic had a twofold increased risk of having clinically depressive symptoms (OR, 2.23; 95% CI, 1.80–2.77; $p < .001$).

Collectively, our findings expanded the literature on economic burden and mental health during the COVID-19 pandemic. Individuals who lost their job had 2.40-fold odds of higher perceived stress, whereas those who had a monthly income loss of 50% or above had a 1.42-fold higher risk of developing anxiety symptoms. Self-reported financial problems were substantially associated with adverse mental health outcomes: 1.84-, 2.00-, and 2.12-fold higher levels of depressive symptoms, anxiety symptoms, and perceived stress, respectively. Our findings unsurprisingly showed the different impact of the three measures of economic burden on mental health, losing jobs or income loss had a lesser effect on mental health outcomes. This factor had the highest impact among participants with self-reported financial problems related to the COVID-19 outbreak. With regard to the economic burden, self-reported financial problems are the subjective indicator that reflects the perception of financial strain, a powerful factor of onset and duration of mental health episodes, more than the objective indicators (i.e., loss of job and income) (Weich & Lewis, 1998).

We postulated that individuals with economic burden may experience widespread social inequality and financial exclusion in terms of socioeconomic status, education, employment, public health coverage (reimbursement scheme or health insurance), housing, and

access to recognized financial services (i.e., resorting to loan sharking, or illegal loans). Thus, inequalities and poverty levels may mediate the temporal link between economic stress and unemployment and adverse mental health outcomes contingent on the economic burden during the COVID-19 outbreak.

Our findings show the early effects of the COVID-19 pandemic and provide important insights into the economic burden indices—job loss, income loss, and financial problems. The study was conducted considering the public mental health response in Thailand, which is characterized by a high economic vulnerability in terms of the estimated percent change in real GDP growth below the world average (world GDP: -5.2; Thailand GDP: -7.1) (International Monetary Fund, 2020; World Bank, 2020), a high household debt-to-GDP ratio (Onthaworn, 2020), and high inbound tourism expenditure (% of GDP) (Kovacevic & Jahic, 2020).

Nonetheless, our study had several limitations. First, the evidence indicates the association between the consequences of the economic burden brought by the COVID-19 pandemic and the risk of adverse mental health outcomes at the national level. As this study used cross-sectional online survey data, we could not establish a causal relationship between economic burden and consequences of adverse mental health outcomes. Second, to prevent breaking physical distancing protocols, our findings were based on an open online survey, which can be prone to information bias and limit participants to only those who can access the Internet. Consequently, the effect estimates of our findings should be interpreted with caution. Additionally, as non-Thai, part-time employees were excluded from this study, the results may only generalize to the native Thai people's experiences who are/were fully employed and had access to the Internet. Lastly, this study focused on the period of the national lockdown and collected data on short-term public responses to the COVID-19 outbreak during the 1st phase of the pandemic in Thailand. As such, the findings only reflected the short-term effects. Hence, further studies are warranted to examine the long-term effect through a panel of Wave II, III, and IV data collection.

Despite the abovementioned limitations, our findings suggest the magnitude of the impacts of the economic burden on public mental health outcomes amid the COVID-19 pandemic and global economic recession. In promoting public mental wellbeing, we underscore that early identification and effective assessment in individuals who are facing unemployment, debts and economic strain, and financial problems, particularly those who have a pre-existing mental illness, may help optimize the planning of financial counseling, debt relief programs, family support programs, and interventions to enhance access to effective health coverage, financial organization, and utility companies.

As the study only focused on investigating the effects of the economic crisis on depressive symptoms, anxiety symptoms, and perceived stress, we were unable to examine its impact on substance use disorders as well as suicidal ideation and suicide attempts. Studies conducted before the COVID-19 pandemic have revealed negative trends in these aspects during economic recessions (Frasquilho et al., 2016; Meltzer et al., 2011; Sareen et al., 2011).

Hence, future public health surveys should pay attention to these issues. As the global economy can be expected to continue contracting, longitudinal studies are needed to explore the effects of economic stress and downturn and the subsequent risk of adverse mental health outcomes during and after an epidemic or a pandemic. In addition, such longitudinal surveys could also be supported by governments and public health officials to increase awareness and ensure the timely implementation of both financial and nonfinancial strategies.

5 | CONCLUSION

Economic burden, especially self-reported financial problems, was associated with all adverse mental outcomes, namely, depression symptoms, anxiety symptoms, and perceived stress in the first phase of the pandemic. Countries' policies for addressing the recession should focus on supporting people facing economic stress and unemployment. Compensation and reimbursement should be provided to individuals who are badly in need of these types of support and in a timely manner. Further studies are needed to determine effective strategies to manage the impacts of the COVID-19 pandemic and economic turndown on mental health issues during and after such crises.

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests. All the researchers involved performed this study in the context of their research.

AUTHOR CONTRIBUTIONS

Study concept/design study and study supervision, statistical analysis, drafting of the manuscript: Chidchanok Ruengorn and Surapon Nochaiwong. *Administrative, technical, or material support:* Chidchanok Ruengorn and Ratanaporn Awiphan. *Critical revision of the manuscript for important intellectual content:* Ratanaporn Awiphan, Nahathai Wongpakaran, and Tinakon Wongpakaran. All authors contributed acquisition, interpretation of data, and take responsibility for the integrity of the data and the accuracy of the data analysis.

DATA AVAILABILITY STATEMENT

Data will be shared upon reasonable request and with permission according to the Health Outcomes and Mental Health Care Evaluation Survey Research Group (HOME-Survey) data release policy.

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