

Original Article

Impact of the COVID-19 pandemic on the Thai population: Delineating the effects of the pandemic and policy measures

Nongyao Kasatpibal PhD^{1,2} , Nongkran Viseskul PhD^{1,2} , Akarapong Untong PhD³ ,
Kwaunpanomporn Thummathai PhD¹, Kampong Kamnon PhD⁴ , Srisakul Sangkampang MNS⁵, Rusila Tokilay MPH⁶,
Srisuda Assawapalanggool PhD⁷  and Anucha Apisarntharak PhD⁸

¹Division of Nursing Science, Faculty of Nursing, Chiang Mai University, Chiang Mai, Thailand, ²Epidemiology Research Center of Infectious Disease (ERCID), Chiang Mai University, Chiang Mai, Thailand, ³School of Tourism Development, Maejo University, Chiang Mai, Thailand, ⁴Rajavithi Hospital, Bangkok, Thailand, ⁵Lumthamenchai Hospital, Nakhon Ratchasima, Thailand, ⁶Yala Provincial Public Health Office, Yala, Thailand, ⁷Infection Control Section, Mae Sot Hospital, Thailand and ⁸Division of Infectious Diseases, Thammasat University Hospital, Pratumthani, Thailand

Abstract

Objectives: This study aimed to determine the impacts of the COVID-19 pandemic and policy measures and delineate the impact of each on a cohort of Thai citizens.

Methods: A cross-sectional study was conducted among 2,500 Thai people from October 2020 to January 2021. A questionnaire collecting demographic information and other data was sent to eligible subjects.

Results: Overall, 51.6% and 49.5% of participants felt the impacts of COVID-19 and policy measures at the highest level, respectively. The study demonstrated that the weighted effect of the impact of the COVID-19 outbreak was statistically ($p < .001$) greater than that of policy measures on family (0.664 vs 0.618), education (0.562 vs 0.557), and the economy (0.643 vs 0.572). The weighted effect of the impact of policy measures was statistically ($p < .001$) greater than that of the COVID-19 pandemic on people's daily activities (0.675 vs 0.651), cultural/traditional or community way of life (0.769 vs 0.736), access to healthcare services and infection prevention supplies (0.410 vs 0.390), and mental health (0.625 vs 0.584).

Conclusions: About half of the participants had a high level of impact from both the COVID-19 pandemic and policy measures. The results of this study suggest that policy measures need to be judged with caution, and the government should provide more comprehensive support to reduce the impact on people's lives.

(Received 5 September 2023; accepted 22 November 2023)

Introduction

The COVID-19 pandemic and policy measures such as lockdown, social distancing, and working or studying at home have had prolonged effects on people's daily activities,^{1,2} families,¹ culture/traditions or ways of life,³ education,⁴ access to healthcare services and infection prevention supplies,⁵ the economy,¹ and mental health.^{1,3} A study on the social and cultural impacts of COVID-19 found that the pandemic caused a reduction in daily activities, certain religious activities, and traditional and cultural activities. It also kept friends and family members at a distance, resulting in a lack of social contact.² In addition, patients, people under quarantine, caregivers, family, friends, and communities were exposed to social stigma due to lack of knowledge about the disease, resulting in paranoia and anxiety in society, social isolation, and a decrease in the solidarity and unity of people in society.^{6,7} A pilot

study in Thailand demonstrated that the effects of the COVID-19 pandemic and government policies included a decrease in national travel (63.5%), eating out (63.0%), participation in religious, traditional and cultural activities (61.5%), patronage of beauty salons (61.0%), and shopping at the mall (58.0%).⁸

A study in Zambia found that the spread of COVID-19 affected the education of students at the high school level. The teachers and students lacked support for online learning. This resulted in a reduction in learning interactions between students and teachers. It also affected the students' entrance examination scores to higher education.⁹ These findings were very similar to the findings of a pilot study in Thailand. Some students reported a delay in graduation (61.0%), did not have devices and accessories needed for online learning (43.0%), had no support for solving problems during online learning (43.0%), had difficulty accessing or had no internet access for online learning (38.5%), and lacked the skills for online learning (38.0%).⁸

The COVID-19 pandemic disrupted the global economy. It resulted in the economic slowdown of countries around the world, including Europe, the Americas, and Asia¹⁰ resulting in a

Corresponding author: Nongyao Kasatpibal; Email: nongyaok2003@gmail.com

Cite this article: Kasatpibal N, Viseskul N, Untong A, *et al.* Impact of the COVID-19 pandemic on the Thai population: Delineating the effects of the pandemic and policy measures. *Antimicrob Steward Healthc Epidemiol* 2023. doi: 10.1017/ash.2023.523

© The Author(s), 2023. Published by Cambridge University Press on behalf of The Society for Healthcare Epidemiology of America. This is an Open Access article, distributed under the terms of the Creative Commons Attribution licence (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted re-use, distribution and reproduction, provided the original article is properly cited.

decrease of gross domestic product and economic growth.¹¹ It also slowed down the manufacturing of essential goods, disrupted supply chains, led to losses in national and international business, and resulted in poor cash flow for global markets.² In addition, a report from the US revealed that COVID-19 caused a financial crisis among those with low incomes, with 43.0% of US adults losing their jobs or having their wages cut. As a result, 53.0% of US adults did not have enough funds to cover expenses in the first month after a job loss and only 23.0% expected that they had enough funds to get through a three-month period.¹² Economic experts predicted that the impact could cause 420–580 million people worldwide to enter into poverty.¹¹ A study of people in urban slums in Thailand found that 18.9% and 18.0% of working-aged participants were laid off or had reduced working time and income, respectively. Street food vendors could not earn income (18.2%), while those who were self-employed had reduced or no income (18.4%). A majority (60.2%) of the population had vastly decreased income and nearly a third of the population (31.2%) lost about half their income. Less than 10.0% felt little or no economic impact due to earning a fixed salary.¹³

Previous studies have demonstrated that the major impact of the COVID-19 pandemic has been psychological leading to increased fear, anxiety, stress, and depression leading to suicide.^{14–19} A study in China found that the frequency of social media exposure increased the risk of anxiety (OR = 1.72, 95% CI = 1.31–2.26) and both depression and anxiety (OR = 1.91, 95% CI = 1.52–2.41).²⁰ A pilot study in Thailand found that the participants felt stress after being laid off (63.5%), stress from the fear of being unemployed (62.5%), anxiety about finding a new job (62.0%), anxiety about future layoffs (61.0%), and depression from social isolation (39.0%).⁸

COVID-19 and subsequent government policies have affected various aspects of people's lives. However, few studies have compared the contribution of each. This study aimed to ascertain the impacts of the COVID-19 pandemic and resulting policy measures.

Methods

Study design and participants

Between October 2020 and January 2021, a cross-sectional study was conducted among 2,500 people living in 5 provinces in Thailand using a stratified sampling method. Participants who lived in Bangkok, Chonburi, Chiang Mai, Nakhon Ratchasima, and Yala provinces were selected because they experienced a notable surge in COVID-19 cases in each region during the study timeframe. All participants were at least 18 years of age, able to communicate in the Thai language, and were willing to cooperate with this study. Persons who were critically ill during the study period or who could not provide information for this study were excluded.

Ethical considerations

The Research Ethics Committee at the Faculty of Nursing, Chiang Mai University (reference no. 105-2020) approved this study. Before signing an informed consent form, participants were made aware of the study's objectives, procedures, and benefits. Data collection began only after participants had given their consent. Each participant's identity was kept confidential.

Instrument

The researchers developed a questionnaire as the research instrument, which underwent a thorough review to establish a clear theoretical framework for each impact domain. Two research

consultants provided feedback, leading to reorganization of impact classification into 7 aspects. Following this, six experts assessed construct validity, ensuring face validity through a Zoom meeting where wording in some questions was revised. Pilot testing with 15 samples gathered feedback on question clarity, relevance, and appropriateness, leading to further refinement based on input from experts and the pilot testing.

The content validity index of the impact of the COVID-19 questionnaire was 1.00 and the reliabilities of the impact of the COVID-19 questionnaire and the depression anxiety stress questionnaire (DASS-21) translated into the Thai language DASS-21²¹ were 0.84 and 0.83, respectively.

The questionnaire consists of three parts. Part 1: demographic information that included the province, age, gender, occupation, education level, religion, income, and level of compensation from the government. Part 2: the impact of the COVID-19 pandemic (the consequences of the spread of SARS-CoV-2) and policy measures (the consequences of the actions taken by governments, ministry of public health, and other organizations to mitigate the spread of COVID-19) questionnaire with a total of 48 items on a 4-point rating scale with responses of none (1 point), low (2 points), moderate (3 points), and high (4 points). The impact of the COVID-19 pandemic and policy measures was classified into 7 aspects including people's daily activities, family, cultural/traditional or community ways of life, education, infection prevention and access to healthcare, economy, and mental health. The total impact score was further divided into 3 levels: low, moderate, and high. Part 3: the depression anxiety stress questionnaire asks the individual to indicate the presence of a symptom over the previous week. This questionnaire had a total of 21 items on a 4-point rating scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much or most of the time) and was designed to measure the severity of a range of symptoms common to depression, anxiety, and stress. Responses were classified into 5 levels including normal, mild, moderate, severe, and extremely severe.

Data collection

Village health volunteers distributed the questionnaire to 500 participants living in each of 5 provinces for a total of 2,500 participants. The response rate was 100%.

Data analysis

Data were analyzed using R version 3.5.1. Frequency and percentage, mean and standard deviation, and median and range were calculated for demographic data, the impact of the COVID-19 pandemic, and policy measures data as appropriate. Factor loadings in confirmatory factor analysis were performed and *T*-statistics were used to test the overall weighted mean difference between the impact of the COVID-19 outbreak and policy measures and the differences in each province. The level of significance was set at $p < .05$.

Results

Demographics

Most participants were female (71.6%), laborers (34.6%), and had a mean age of 43.4 ± 14.4 years. Most participants identified as Buddhist (78.0%). A majority of participants held a primary- or secondary-level education (35.2% and 34.0%, respectively). Most of them had mid-level incomes (83.7%). Most participants received compensation from the government (59.0%) (Table 1).

Table 1. Participant demographics (n = 2,500)

Characteristics	n	%
Sex		
Female	1,791	71.6
Male	709	28.4
Occupation		
Laborer	866	34.6
Farmer	444	17.8
Merchant	278	11.1
Company employee	220	8.8
Government officer	199	8.0
Student	121	4.8
Retired civil servant	83	3.3
Government employee	36	1.4
State enterprise employee	15	0.6
Unemployed	238	9.6
Age (years)		
≤30	649	26.0
31–40	421	16.8
41–50	527	21.0
51–60	579	23.2
>60	324	13.0
Mean = 43.4, SD = 14.4, Median = 44.5, Range = 18–70		
Religion		
Buddhist	1,951	78.0
Muslim	521	20.8
Christian	28	1.2
Highest education level		
Primary school	877	35.2
Secondary school	850	34.0
Diploma degree	231	9.2
Bachelor's degree	501	20.0
Master's degree or higher	41	1.6
Income		
High	23	0.9
Middle	2,092	83.7
Low	330	13.2
None	55	2.2
Compensation from the government		
Received	1,496	59.0
Not received	962	38.5
Unknown	62	2.5

Level of impact on COVID-19 from the pandemic and policy measures

Overall, participants reported a high level of impact from the COVID-19 pandemic and the resulting policy measures (51.6% and 49.5%, respectively). The top five categories that were impacted by the COVID-19 pandemic and the policy measures

implemented were access to healthcare services and infection prevention supplies (76.6% vs 73.5%), economy (73.7% vs 70.6%), mental health (70.8% vs 67.3%), education (69.4% vs 68.1%), and people's daily activities (62.6% vs 60.0%) (Table 2).

Impact on COVID-19 from the pandemic and policy measures

The top five categories impacted by the COVID-19 pandemic and policy measures were the economy including a decrease in income (65.9% vs 59.6%), insufficient income (65.4% vs 59.0%), temporary furlough from work (62.6% vs 56.1%), loss of income 61.5% vs 55.3%), and layoffs from work (60.4% vs 59.8%). These were followed by the impact on their daily activities including decreased international travel (59.4% vs 54.4%), decreased domestic travel (54.9% vs 50.8%), and decreased shopping at the mall (51.2% vs 47.2%) (Table 3).

Level of anxiety, stress, and depression from the COVID-19 pandemic

Some participants reported extremely severe anxiety (11.0%), extremely severe stress (4.2%), and extremely severe depression (6.3%) from the COVID-19 outbreak (Table 4).

Comparing effects of the COVID-19 pandemic to policy measures

The weighted effect of the impact of COVID-19 was statistically ($p < .001$) greater than that of governmental policy measures on family (0.664 vs 0.618), education (0.562 vs 0.557), and economy (0.643 vs 0.572). The weighted effect of the impact from governmental policy measures was statistically ($p < .001$) greater than that of COVID-19 on daily activities (0.675 vs 0.651), cultural/traditional or community ways of life (0.769 vs 0.736), access to healthcare services and infection prevention supplies (0.410 vs 0.390), and mental health (0.625 vs 0.584) (Table 5).

Discussion

This study achieved a 100% response rate. This may be because this study attributes its success to a clear and concise questionnaire, pre-testing for construct and face validity, and effective communication by researchers emphasizing the survey's benefits, confidentiality, and anonymity. Accessibility was ensured by 7 researchers and 125 health volunteers visiting participants' homes, allowing for immediate completion or within 2 weeks at the participants' convenience. Incentives of 100 baht (approximately three dollars) for participants were offered.

This study found that about half of the participants felt the effects of COVID-19 and subsequent governmental policy measures affected them at the highest level. The weighted effects of the impact of the COVID-19 pandemic and policy measures were different.

More than 60.0% of participants felt the economic impact of the COVID-19 pandemic and the policy measures were the most profound, including a decrease in income, being furloughed from work, or being unemployed. The findings are consistent with global reports^{10,11} and studies from the US¹² and Thailand.^{11,13,22}

The impact from the COVID-19 pandemic and policy measures had significant effects on people's daily activities including international travel, domestic travel, shopping at the mall, grocery shopping, visits to beauty salons, dining out, attending parties, outdoor exercise, visiting banks, entertainment, meeting close friends, and meeting romantic partners. These findings are

Table 2. Level of impact of COVID-19 from the pandemic and policy measures among participants (*n* = 2,500)

Score	Level	Impact on COVID-19			
		From pandemic		From policy measures	
		<i>n</i>	%	<i>n</i>	%
Overall impact					
≤95	Low	169	6.8	186	7.4
96–143	Moderate	1,040	41.6	1,076	43.0
144–192	High	1,291	51.6	1,238	49.5
Impact from pandemic: Mean = 141.8, SD = 28.1, Median = 145.0, Range = 48–192					
Impact from policy measures: Mean = 139.9, SD = 28.2, Median = 143.0, Range = 48–192					
Access to healthcare services and infection prevention supplies					
≤5	Low	153	6.1	171	6.8
6–8	Moderate	432	17.3	492	19.7
9–12	High	1,915	76.6	1,837	73.5
Impact from pandemic: Mean = 9.7, SD = 2.3, Median = 10.0, Range = 3–12					
Impact from policy measures: Mean = 9.5, SD = 2.4, Median = 10.0, Range = 3–12					
Economy					
≤15	Low	228	9.1	246	9.8
16–23	Moderate	430	17.2	488	19.5
24–32	High	1,842	73.7	1,766	70.6
Impact from pandemic: Mean = 25.6, SD = 6.1, Median = 27.0, Range = 8–32					
Impact from policy measures: Mean = 25.1, SD = 6.2, Median = 26.0, Range = 8–32					
Mental health					
≤9	Low	364	14.5	356	14.2
10–14	Moderate	367	14.7	462	18.5
15–20	High	1,769	70.8	1,682	67.3
Impact from pandemic: Mean = 15.6, SD = 4.8, Median = 17.0, Range = 5–20					
Impact from policy measures: Mean = 15.3, SD = 4.8, Median = 17.0, Range = 5–20					
Education					
≤11	Low	164	6.6	182	7.3
12–17	Moderate	601	24.0	616	24.6
18–24	High	1,735	69.4	1,702	68.1
Impact from pandemic: Mean = 19.4, SD = 4.6, Median = 20.0, Range = 6–24					
Impact from policy measures: Mean = 18.8, SD = 4.6, Median = 20.0, Range = 6–24					
Daily activities					
≤23	Low	198	7.9	221	8.8
24–35	Moderate	738	29.5	779	31.2
36–48	High	1,564	62.6	1,500	60.0
Impact from pandemic: Mean = 36.9, SD = 8.6, Median = 38.0, Range = 12–48					
Impact from policy measures: Mean = 36.4, SD = 8.7, Median = 38.0, Range = 12–48					
Cultural/traditional or community ways of life					
≤9	Low	219	8.8	223	8.9
10–14	Moderate	745	29.8	791	31.6
15–20	High	1,536	61.4	1,486	59.5
Impact from pandemic: Mean = 15.0, SD = 4.1, Median = 15.0, Range = 5–20					
Impact from policy measures: Mean = 14.8, SD = 4.1, Median = 15.0, Range = 5–20					

(Continued)

Table 2. (Continued)

Score	Level	Impact on COVID-19			
		From pandemic		From policy measures	
		<i>n</i>	%	<i>n</i>	%
Family					
≤17	Low	1,033	41.3	1,018	40.7
18–26	Moderate	893	35.7	897	35.9
27–36	High	574	23.0	585	23.4
Impact from pandemic: Mean = 19.7, SD = 7.7, Median = 19.0, Range = 9–36					
Impact from policy measures: Mean = 19.8, SD = 7.7, Median = 19.0, Range = 9–36					

Table 3. Response to impact of COVID-19 from outbreak and policy measures items among participants (*n* = 2,500)

Impact of COVID-19 items	Level of impact of COVID-19 from outbreak				Level of impact of COVID-19 on policy measures			
	None <i>n</i> (%)	Low <i>n</i> (%)	Moderate <i>n</i> (%)	High <i>n</i> (%)	None <i>n</i> (%)	Low <i>n</i> (%)	Moderate <i>n</i> (%)	High <i>n</i> (%)
Economy								
1. Decrease in income	151 (6.0)	210 (8.4)	492 (19.7)	1,647 (65.9)	173 (6.9)	248 (9.9)	588 (23.5)	1,491 (59.6)
2. Lack of income	156 (6.2)	217 (8.7)	493 (19.7)	1,634 (65.4)	180 (7.2)	232 (9.3)	613 (27.8)	1,475 (59.0)
3. Temporarily furloughed from work	215 (8.6)	206 (8.2)	515 (20.6)	1,564 (62.6)	230 (9.2)	226 (9.0)	642 (25.7)	1,402 (56.1)
4. No income	228 (9.1)	215 (8.6)	519 (20.8)	1,538 (61.5)	275 (11.0)	273 (10.9)	558 (22.3)	1,394 (55.8)
5. Laid off from work	276 (11.0)	247 (9.9)	468 (18.7)	1,509 (60.4)	244 (9.8)	247 (9.9)	627 (25.1)	1,382 (55.3)
6. Increased cost of studying/working from home	163 (6.5)	221 (8.8)	646 (25.8)	1,470 (58.8)	179 (7.2)	264 (10.6)	696 (27.8)	1,361 (54.4)
7. Increase income from food delivery	512 (20.5)	441 (17.6)	676 (27.0)	871 (34.8)	515 (20.6)	449 (18.0)	749 (30.0)	787 (31.5)
8. Increase income from online sales	626 (25.0)	433 (17.3)	649 (26.0)	792 (31.7)	605 (24.2)	466 (18.6)	702 (28.1)	727 (29.1)
Daily activities								
1. International travel	391 (15.6)	242 (9.7)	381 (15.2)	1,486 (59.4)	390 (15.6)	271 (10.8)	479 (19.2)	1,360 (54.4)
2. Domestic travel	229 (9.2)	299 (12.0)	599 (24.0)	1,373 (54.9)	236 (9.4)	356 (14.2)	639 (25.6)	1,269 (50.8)
3. Shopping at the mall	137 (5.5)	337 (13.5)	745 (29.8)	1,281 (51.2)	175 (7.0)	318 (12.7)	826 (33.0)	1,181 (47.2)
4. Grocery shopping	106 (4.2)	322 (12.9)	887 (35.5)	1,185 (47.4)	129 (5.2)	349 (14.0)	920 (36.8)	1,102 (44.1)
5. Beauty salon	241 (9.6)	385 (15.4)	706 (28.2)	1,168 (46.7)	254 (10.2)	383 (15.3)	793 (31.7)	1,070 (42.8)

(Continued)

Table 3. (Continued)

	Impact of COVID-19 items	Level of impact of COVID-19 from outbreak				Level of impact of COVID-19 on policy measures			
		None <i>n</i> (%)	Low <i>n</i> (%)	Moderate <i>n</i> (%)	High <i>n</i> (%)	None <i>n</i> (%)	Low <i>n</i> (%)	Moderate <i>n</i> (%)	High <i>n</i> (%)
6.	Dining out	158 (6.3)	364 (15.5)	835 (33.4)	1,143 (45.7)	171 (6.8)	374 (15.0)	899 (36.0)	1,056 (42.2)
7.	Attending parties	265 (10.6)	439 (17.6)	699 (28.0)	1,097 (43.9)	268 (10.7)	455 (18.2)	791 (31.6)	986 (39.4)
8.	Outdoor exercise	185 (7.4)	388 (15.5)	910 (36.4)	1,017 (40.7)	205 (8.2)	476 (19.0)	859 (34.4)	960 (38.4)
9.	Banking services	205 (8.2)	458 (18.3)	825 (33.0)	1,012 (40.5)	199 (8.0)	391 (17.3)	964 (38.6)	946 (37.8)
10.	Entertainment	384 (15.4)	473 (18.9)	674 (27.0)	969 (38.8)	362 (14.5)	464 (18.6)	778 (31.1)	896 (35.8)
11.	Meeting with close friends	266 (10.6)	545 (21.8)	871 (34.8)	818 (32.7)	276 (11.0)	581 (23.2)	885 (35.4)	758 (30.3)
12.	Meeting with romantic partners	505 (20.2)	496 (19.8)	758 (30.3)	741 (29.6)	468 (18.7)	554 (22.2)	754 (30.2)	724 (29.0)
Mental health									
1.	Anxiety about layoffs	309 (12.4)	256 (10.2)	544 (21.8)	1,391 (55.6)	304 (12.2)	305 (12.2)	625 (25.0)	1,266 (50.6)
2.	Stress from unemployment	306 (12.2)	290 (11.6)	524 (21.0)	1,380 (55.2)	325 (13.0)	331 (13.2)	623 (24.9)	1,221 (48.8)
3.	Anxiety about finding a job	282 (11.3)	273 (10.9)	622 (24.9)	1,323 (52.9)	317 (12.7)	322 (12.9)	653 (26.1)	1,208 (48.3)
4.	Stress from being temporarily furloughed from work	323 (12.9)	275 (11.0)	609 (24.4)	1,293 (51.7)	295 (11.8)	327 (13.1)	707 (28.3)	1,171 (46.8)
5.	Depression from being alone	479 (19.2)	354 (14.2)	646 (25.8)	1,021 (40.8)	464 (18.6)	419 (16.8)	654 (26.2)	963 (38.5)
Education									
1.	Students delayed graduation	155 (6.2)	322 (12.9)	676 (27.0)	1,347 (53.9)	165 (6.6)	285 (11.4)	791 (31.6)	1,259 (50.4)
2.	Students cannot go to tutoring	151 (6.0)	324 (13.0)	734 (29.4)	1,291 (51.6)	159 (6.4)	328 (13.1)	827 (33.1)	1,186 (47.4)
3.	Students do not have access to devices and accessories for online learning	219 (8.8)	349 (14.0)	783 (31.3)	1,149 (46.0)	237 (9.5)	380 (15.2)	785 (31.4)	1,098 (43.9)
4.	Students do not have support for online learning	206 (8.2)	390 (15.6)	766 (30.6)	1,138 (45.5)	211 (8.4)	398 (15.9)	814 (32.6)	1,077 (43.1)
5.	Students do not have access to Internet for online learning	243 (9.7)	386 (15.4)	750 (30.0)	1,121 (44.8)	217 (8.7)	367 (14.7)	852 (34.1)	1,064 (42.6)
6.	Students do not have skills for online learning	198 (7.9)	403 (16.1)	819 (32.8)	1,080 (43.2)	206 (8.2)	400 (16.0)	859 (34.4)	1,035 (41.4)
Access to healthcare services and infection prevention supplies									
1.	Lack of mask	165 (6.6)	298 (11.9)	787 (31.5)	1,250 (50.0)	179 (7.2)	345 (13.8)	803 (32.1)	1,173 (46.9)
2.	Difficulty in accessing healthcare	141 (5.6)	314 (12.6)	815 (32.6)	1,230 (49.2)	158 (6.3)	331 (13.2)	880 (35.2)	1,131 (45.2)

(Continued)

Table 3. (Continued)

	Impact of COVID-19 items	Level of impact of COVID-19 from outbreak				Level of impact of COVID-19 on policy measures			
		None n (%)	Low n (%)	Moderate n (%)	High n (%)	None n (%)	Low n (%)	Moderate n (%)	High n (%)
3.	Lack of alcohol hand gel	174 (7.0)	333 (13.3)	820 (32.8)	1,173 (46.9)	191 (7.6)	356 (14.2)	840 (33.6)	1,113 (44.5)
Cultural/traditional or community ways of life									
1.	Decrease in support for each other in community activities	189 (7.6)	469 (18.8)	788 (31.5)	1,054 (42.2)	186 (7.4)	495 (19.8)	859 (34.4)	960 (38.4)
2.	Decrease in religious activities	235 (9.4)	500 (20.0)	760 (30.4)	1,005 (40.2)	227 (9.1)	548 (21.9)	785 (31.4)	940 (37.6)
3.	Increase screening and surveillance PIQ from other areas	249 (10.0)	496 (19.8)	785 (31.4)	970 (38.8)	264 (10.6)	525 (21.0)	802 (32.1)	909 (36.4)
4.	Decrease preserved traditions and culture	189 (7.6)	543 (21.7)	812 (32.5)	956 (38.2)	186 (7.4)	568 (22.7)	849 (34.0)	897 (35.9)
5.	Increase screening and surveillance of PIQ living in community	237 (9.5)	502 (20.1)	910 (36.4)	851 (34.0)	243 (9.7)	521 (20.8)	919 (36.8)	817 (32.7)
Family									
1.	Lack of caregiver for bedridden	771 (30.8)	500 (20.0)	635 (25.4)	594 (23.8)	768 (30.7)	529 (21.2)	670 (26.8)	533 (21.3)
2.	Lack of caregivers for older adults	731 (29.2)	521 (20.8)	682 (27.3)	566 (22.6)	723 (28.9)	575 (23.0)	672 (26.9)	530 (21.2)
3.	Lack of caregivers for children	760 (30.4)	578 (23.1)	641 (25.6)	521 (20.8)	727 (29.1)	596 (23.8)	677 (27.1)	500 (20.0)
4.	Decrease in community relationships	569 (22.8)	716 (28.6)	709 (28.4)	506 (20.2)	584 (23.4)	711 (28.4)	726 (29.0)	479 (19.2)
5.	Decrease in sexual activity and pregnancy among teenagers	936 (37.4)	653 (26.1)	522 (20.9)	389 (15.6)	932 (37.3)	649 (26.0)	560 (22.4)	359 (14.4)
6.	Decrease in family relationships	924 (37.0)	642 (25.7)	593 (23.7)	341 (13.6)	890 (35.6)	620 (24.8)	662 (26.5)	328 (13.1)
7.	Increase fear of having sexual activity with husband, wife, or romantic partner	1,046 (41.8)	610 (24.4)	508 (20.3)	336 (13.4)	1,015 (40.6)	630 (25.2)	538 (21.5)	317 (12.7)
8.	Increase arguing with romantic partner	1,189 (47.6)	593 (23.7)	441 (17.6)	277 (11.1)	1,129 (45.2)	613 (24.5)	492 (19.7)	266 (10.6)
9.	Increase broken family or divorce	1,312 (52.5)	541 (21.6)	388 (15.5)	259 (10.4)	1,233 (49.3)	574 (23.0)	449 (18.0)	244 (9.8)

congruent with systematic reviews^{1,2} and studies from Turkey²³ and the US.²⁴

Some participants in this study also had psychological problems including anxiety about layoffs, stress from unemployment, anxiety about finding a job, stress from being temporarily furloughed from work, and depression from being alone. This is similar to findings from studies conducted in the US,²⁴ Spain,²⁵ Italy,²⁶ and Thailand.^{8,16,27-29}

This study also found that some participants had problems related to their education including delays in their graduation, not being able to attend tutoring, not having access to devices and accessories for online learning, lack of support for online learning, lack of Internet access for online learning, and lack of skills for online learning. This is congruent to findings from studies in Spain,⁴ Saudi Arabia,³⁰ and Thailand.⁸

Table 4. Level of anxiety, stress, and depression from the COVID-19 pandemic among participants (*n* = 2,500)

Level	Psychological impact					
	Anxiety		Stress		Depression	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Normal	1,688	67.5	1,898	75.9	1,791	71.6
Mild	261	10.4	172	6.9	227	9.1
Moderate	180	7.2	194	7.8	216	8.6
Severe	95	3.8	132	5.3	108	4.3
Extremely severe	276	11.0	104	4.2	158	6.3

Table 5. Comparison of the weighted effect of impact of the COVID-19 pandemic and policy measures among participants

Impact category	Weighted effect of impact from COVID-19 pandemic and policy measures*					
	Overall (<i>n</i> = 2,500)	Bangkok (<i>n</i> = 500)	Chonburi (<i>n</i> = 500)	Chiang Mai (<i>n</i> = 500)	Nakhon Ratchasima (<i>n</i> = 500)	Yala (<i>n</i> = 500)
Daily activities	0.651 (0.675)	0.602 (0.594)	0.561 (0.604)	0.758 (0.748)	0.736 (0.692)	0.749 (0.748)
Family	0.664 (0.618)	0.619 (0.612)	0.708 (0.656)	0.687 (0.619)	0.649 (0.638)	0.551 (0.568)
Cultural/traditional or community ways of life	0.736 (0.769)	0.634 (0.729)	0.703 (0.822)	0.697 (0.693)	0.702 (0.749)	0.699 (0.788)
Education	0.562 (0.557)	0.757 (0.638)	0.657 (0.678)	0.554 (0.563)	0.495 (0.552)	0.569 (0.549)
Access to healthcare services and infection prevention supplies	0.390 (0.410)	0.534 (0.465)	0.447 (0.413)	0.352 (0.491)	0.317 (0.286)	0.462 (0.432)
Economy	0.643 (0.572)	0.696 (0.640)	0.727 (0.631)	0.556 (0.521)	0.667 (0.654)	0.592 (0.554)
Mental health	0.584 (0.625)	0.658 (0.611)	0.674 (0.692)	0.540 (0.572)	0.509 (0.627)	0.508 (0.518)

*Weighted effect of impact from policy measures was presented in parenthesis.

Participants in this study also reported problems with access to healthcare services, which was similar to studies from Chile,³¹ Nigeria,³² and Thailand.⁸

In addition, this study found that participants had difficulty accessing infection prevention supplies due to a shortage of masks^{33,34} and alcohol-based hand sanitizers.³⁴

Some participants in this study had issues with cultural/traditional or community ways of life including decreased support for each other in community activities, decreased religious activities, increased screening and surveillance of people in quarantine (PIQ) from other areas, inability to practice traditions and culture, and increased screening and surveillance of PIQ living in the community. This is on par with studies from the WHO,⁷ France,^{3,6} Ghana,³⁵ and Thailand.⁸

Participants in this study also experienced familial problems including lack of caregivers for bedridden family members, older adults, and children; a decrease in community relationships; a decrease in sexual activity and pregnancy among teenagers; a decrease in family relationships; fear of engaging in sexual activities with a spouse or romantic partner; arguments with a romantic partner; and having a broken family or divorce. These findings are

congruent with one systematic review³⁰ and another study done in Thailand.⁸

As determined by this study, the overall weighted effects of the impact of COVID-19 and policy measures were statistically different. The strength of this effect varies among different categories. In the case of being affected by the COVID-19 pandemic, people in urban areas, such as Bangkok and Chonburi, were affected by changes in education more than other categories, which further affected the economy. This is due to the fact that parents have to take time off work to take care of their children attending school online at home. On the other hand, people in rural areas such as Chiang Mai, Nakhon Ratchasima, and Yala found that their cultural/traditional or community ways of life and daily activities were impacted more than other categories. The policy measures affected the economy and mental health as reported by people in urban areas, including Bangkok and Chonburi. People in rural areas, including Chiang Mai, Nakhon Ratchasima, and Yala, reported that daily activities remained an important aspect of their lives. People in Nakhon Ratchasima and Yala reported that cultural/traditional or community ways of life were of higher importance than other categories, which was

different from Chiang Mai where access to healthcare services and infection prevention supplies were most important.

The impact on cultural/traditional or community ways of life and daily activities led to reduced interactions within the community and changed the social norms of people who lived in rural areas and usually had close relationships. The economic and psychological impacts result in a reduced quality of life and, in some cases, may lead to suicide.

This study's findings can be used to develop policies or other methods to reduce the impact of future pandemics on the population. They can also be used as a guide when looking at the severity of aspects of the impact of COVID-19 and policy measures, especially in urban and rural areas where impacts are different depending on peoples' lifestyles, cultural/traditional or community ways of life, and social norms. Policymakers should develop strategies to provide appropriate support based on how the categories are affected in specific areas (rural vs. urban). If the dominant impact is caused by the COVID-19 pandemic, the government should focus on reducing the spread of COVID-19 and decreasing the incidence of new cases. If the dominant impact is caused by policy measures, especially the country lockdown by which people were hit hardest, the government should focus on changing policies as appropriate based on the prevalence of COVID-19 and ensuring the balance of the 7 categories, especially the economy, daily activities, and cultural/traditional or community ways of life. Information from this study can be used to devise policies in accordance with the dynamics of the COVID-19 pandemic. The government should change policies and adopt measures appropriately to the pandemic situation and balance these measures with other goals such as the economy, education, and way of life. The government should adopt disease control measures based on risk areas instead of implementing a comprehensive lockdown of the entire country.

Based on our literature review and to the best of our knowledge, this is the first study that has looked at the impact of the COVID-19 pandemic and compared the impact of the pandemic and government policy measures. The impacts of the COVID-19 pandemic and policy measures are interconnected, as the latter are responses to the challenges posed by the pandemic, yet they also have distinct characteristics and implications. Recognizing the dynamic of the pandemic and policy effectiveness is crucial, as it makes identifying and comparing their actual effects challenging. Researchers addressed this complexity by explaining impact definitions to participants before questionnaire completion, allowing time for questions and answers.

The results of this study are strengthened by it being a multi-site study with a large sample size and geographic and demographic variability in Thailand. It is important to recognize that individuals within these regions may not be representative of all Thai citizens. The limitation, however, is that it used a self-reported questionnaire which may lead to information bias. This was mitigated by the high content validity of the questionnaire as well as informing all participants about the importance of accuracy when responding to the questions.

Conclusion

About half of the participants in this study felt that the impacts of COVID-19 and the resulting governmental policy measures affected their lives. However, the weighted effect of the impact of the COVID-19 pandemic and the policy measures affected areas and categories differently. More than 60% of participants felt that

the economic impact of COVID-19 and the policy measures were the most profound, leading to a decrease in income, lack of income, being temporarily furloughed from work, or being unemployed. Based on this study, we recommend that the government should change policies and adopt measures appropriately to the pandemic situation to ensure that there is a balance with other goals. The government should provide widespread support to reduce the impacts of the pandemic and people's suffering.

Acknowledgments. The authors would like to thank Professor Emeritus Dr. Mingsarn Kaosa-ard for her recommendations and assistance.

Authors contribution. The project was conceptualized and designed by the authors. NK: Data collection, data analysis, and writing original draft. NV: Data collection, data analysis, and assisting in writing original draft. AU: Data analysis and supervision. KT, KK, SS, RT, SA: Data collection. AA: Supervision. All authors approved the final manuscript.

Financial support. This work was funded by the National Research Council of Thailand under KHONTHAI 4.0 Spearhead Program. This research work was partially supported by Chiang Mai University.

Competing interests. No conflict of interest to declare.

References

1. El Keshky MES, Basyouni SS, Al Sabban AM. Getting through COVID-19: the pandemic's impact on the psychology of sustainability, quality of life, and the global economy – a systematic review [published correction appears in *Front Psychol*. 2021 May 26;12:700815]. *Front Psychol* 2020;11:585897.
2. Haleem A, Javaid M, Vaishya R. Effects of COVID-19 pandemic in daily life. *Curr Med Res Pract* 2020;10:78–79.
3. Raude J. Determinants of preventive behaviors in response to the COVID-19 pandemic in France: comparing the sociocultural, psychosocial and social cognitive explanations. <https://doi.org/10.31234/osf.io/4yvk2>. Accessed June 14, 2020.
4. Sintema EJ. Effect of COVID-19 on the performance of grade 12 students: implications for STEM education. *EURASIA J Math Sci Tech Ed* 2020;16:em1851.
5. Moynihan R, Sanders S, Michaleff ZA, et al. Impact of COVID-19 pandemic on utilisation of healthcare services: a systematic review. *BMJ Open* 2021;11:e045343.
6. Raude J. Determinants of preventive behaviors in response to the COVID-19 pandemic in France: comparing the sociocultural, psychosocial and social cognitive explanations. <https://doi.org/10.31234/osf.io/4yvk2>. Accessed June 14, 2020.
7. World Health Organization [WHO]. Social stigma associated with COVID-19. 2020. https://www.who.int/docs/default-source/searo/thailand/covid19-stigma-guide-th-final.pdf?sfvrsn=1eebbcac_0. Accessed June 17, 2020.
8. Kasatpibal N. *Knowledge, Attitude, and Preventative Practices Taken by the Thai Population Regarding People with COVID-19 and People in Quarantine*. Chiang Mai: Faculty of Nursing, Chiang Mai University; 2020.
9. Sintema EJ. Effect of COVID-19 on the performance of grade 12 students: implications for STEM education. *EURASIA J Math Sci Tech Ed* 2020;16:em1851.
10. United Nations Conference on Trade and Development. Global trade impact of coronavirus (COVID-19) epidemic. 2020. <https://unctad.org/en/PublicationsLibrary/ditcinf2020d1.pdf>. Accessed June 14, 2020.
11. Sumner A, Hoy C, Ortiz-Juarez E. Estimates of the impact of COVID-19 on global poverty. WIDER Working Paper 2020/43. 2020; Helsinki: UNU-WIDER. <https://doi.org/10.35188/UNU-WIDER/2020/800-9>.
12. Parker K, Horowitz JM, Brown A. *About Half of Lower-income Americans Report Household Job or Wage Loss Due to COVID-19*. Social & Demographic Trends Project, Pew Research Center; 2020. https://www.pewresearch.org/social-trends/wp-content/uploads/sites/3/2020/04/PSDT_04.21.20_covidfinance_FULL.REPORT.pdf

13. Satayanurug A, Visetpricha B, Pintobtang P, *et al*. The urban slum people in a changing society. <https://www.isranews.org/article/isranews/download/18017/87576/18.html>. Accessed June 12, 2020.
14. Ho CS, Chee CY, Ho RC. Mental health strategies to combat the psychological impact of COVID-19 beyond paranoia and panic. *Ann Acad Med Singapore* 2020;49:1–3.
15. Hossain MM, Sultana A, Purohit N. Mental health outcomes of quarantine and isolation for infection prevention: a systematic umbrella review of the global evidence. *Epidemiol Health* 2020;42:e2020038.
16. Apisarntharak A, Siripraparat C, Apisarntharak P, *et al*. Patients' anxiety, fear, and panic related to coronavirus disease 2019 (COVID-19) and confidence in hospital infection control policy in outpatient departments: a survey from four Thai hospitals. *Infect Control Hosp Epidemiol* 2021;42:1288–1290.
17. Zhang Y, Ma ZF. Impact of the COVID-19 pandemic on mental health and quality of life among local residents in Liaoning Province, China: a cross-sectional study. *Int J Environ Res Public Health* 2020;17:2381.
18. Choi EP, Hui BP, Wan EY. Depression and anxiety in Hong Kong during COVID-19. *Int J Environ Res Public Health* 2020;17:3740.
19. Torales J, O'Higgins M, Castaldelli-Maia JM, Ventriglio A. The outbreak of COVID-19 coronavirus and its impact on global mental health. *Int J Soc Psychiatry* 2020;66:317–320.
20. Gao J, Zheng P, Jia Y, *et al*. Mental health problems and social media exposure during COVID-19 outbreak. *Plos One* 2020;15:e0231924.
21. Oei TP, Sawang S, Goh YW, Mukhtar F. Using the depression anxiety stress scale 21 (DASS-21) across cultures. *Int J Psychol* 2013;48:1018–1029.
22. International Labour Organization. COVID-19: impact on migrant workers and country response in Thailand. 2020. https://www.ilo.org/wcmsp5/groups/public/—asia/—ro-bangkok/—sro-bangkok/documents/briefingnote/wcms_741920.pdf. Accessed May 15, 2021.
23. Ali H, Yilmaz G, Fareed Z, Shahzad F, Ahmad M. Impact of novel coronavirus (COVID-19) on daily routines and air environment: evidence from Turkey. *Air Qual Atmos Health* 2021;14(3):381–387. <https://doi.org/10.1007/s11869-020-00943-2>
24. Giuntella O, Hyde K, Saccardo S, Sadoff S. Lifestyle and mental health disruptions during COVID-19. *Proc Natl Acad Sci USA* 2021;118:e2016632118.
25. Rodríguez-Rey R, Garrido-Hernansaiz H, and Collado S. Psychological impact and associated factors during the initial stage of the coronavirus (COVID-19) pandemic among the general population in Spain. *Front Psychol* 2020;11:1540.
26. Saladino V, Algeri D, Auriemma V. The psychological and social impact of COVID-19: new perspectives of well-being. *Front Psychol* 2020;11:577684.
27. Thatrimontrichai A, Weber DJ, Apisarntharak A. Mental health among healthcare personnel during COVID-19 in Asia: a systematic review. *J Formos Med Assoc* 2021;120:1296–1304.
28. Narupaves N, Kulworasreth P, Manaantakul N, Warren DK, Weber DJ, Apisarntharak A. Coronavirus disease 2019 (COVID-19) preparedness in a Thai international school: emotional health and infection control practices [published correction appears in *Infect Control Hosp Epidemiol*. 2022;43(9):1311]. *Infect Control Hosp Epidemiol* 2022;43:1307–1309.
29. Apisarntharak A, Apisarntharak P, Siripraparat C, Saengaram P, Leeprechanon N, Weber DJ. Impact of anxiety and fear for COVID-19 toward infection control practices among Thai healthcare workers. *Infect Control Hosp Epidemiol* 2020;41:1093–1094.
30. Alghamdi AA. Impact of the COVID-19 pandemic on the social and educational aspects of Saudi university students' lives. *Plos One* 2021;16:e0250026.
31. Núñez A, Sreenganga SD, Ramaprasad A. Access to healthcare during COVID-19. *Int J Environ Res Public Health* 2021;18:2980.
32. Okereke M, Ukor NA, Adebisi YA, *et al*. Impact of COVID-19 on access to healthcare in low- and middle-income countries: current evidence and future recommendations. *Int J Health Plann Manage* 2021;36:13–17.
33. Ji D, Fan L, Li X, Ramakrishna S. Addressing the worldwide shortages of face masks. *BMC Mater* 2020;2:9.
34. Kampf G, Scheithauer S, Lemmen S, Saliou P, Suchomel M. COVID-19-associated shortage of alcohol-based hand rubs, face masks, medical gloves, and gowns: proposal for a risk-adapted approach to ensure patient and healthcare worker safety. *J Hosp Infect* 2020;105:424–427.
35. Osei-Tutu A, Affram AA, Mensah-Sarbah C, Dzokoto VA, Adams G. The impact of COVID-19 and religious restrictions on the well-being of Ghanaian Christians: the perspectives of religious leaders. *J Relig Health* 2021;60:2232–2249.