SUPPLEMENTARY MATERIAL

**Gender differences and post-pandemic mental health impacts:
a mediation study on Vietnamese adolescents**

Thanh Long Nguyen,[1] Victor Storm,[2] Lam Toi Phung,[3] Cong Thien Le,[1] Thi Thu Ha Le,[1] Thi Hoa Nguyen,[1] Son Tung Vu,[4] Thien Thang Tran,[5] Minh Hanh Vu,[6] Van Tuan Nguyen[1]

[1]Hanoi Medical University, Vietnam; [2]University of Sydney, Camperdown, Australia; [3]University of Medicine and Pharmacy, Vietnam National University, Hanoi, Vietnam; [4]Bach Mai Hospital, Hanoi, Vietnam; [5]Can Tho University of Medicine and Pharmacy, Vietnam; [6]Quang Ninh Mental Health Protection Hospital, Vietnam

Correspondence: Van Tuan Nguyen, Hanoi Medical University, Ha Noi, Vietnam.
Tel.: +84913551842.
E-mail:nguyenvantuan@hmu.edu.vn

Supplementary Table 1. Descriptive characteristics of study participants (n=552).

Characteristics	n (%)
General characteristics	
Gender	
Male	265 (48.01)
Female	287 (51.99)
Living arrangement	
With both parents	464 (84.06)
With father only	24 (4.35)
With mother only	55 (9.96)
With grandparents or others	9 (1.63)
Parental relationship	
Harmonious	456 (82.61)
Conflict	25 (4.53)
Separated, divorced, or deceased	71 (12.86)
Family history of mental disorders	
No	540 (97.83)
Yes	12 (2.17)
Psychosocial characteristics	
Family conflict	
No	482 (87.32)
Yes	70 (12.68)
History of psychological trauma	
No	525 (95.11)
Yes	27 (4.89)
Experienced stigma	
No	537 (97.28)
Yes	15 (2.72)
Alcohol use	
No	522 (94.57)
Yes	30 (5.43)
Smoking	
No	539 (97.64)
Yes	13 (2.36)
Frequency of internet use	
Infrequent	152 (27.54)
Frequent	400 (72.46)
Place of residence	
Rural	255 (46.20)
Urban	297 (53.80)
Income level	
High	12 (2.17)
Average	391 (70.83)
Low	149 (26.99)
Satisfaction with income	
Dissatisfied	300 (54.35)
Satisfied	252 (45.65)
COVID-19 related characteristics	
History of illness other than COVID-19	
None	305 (91.87)
Yes	27 (8.13)
Income change due to COVID-19 pandemic	
No change	215 (39.02)
Decreased by less than one-third	287 (52.09)
Decreased by more than one-third	49 (8.89)
Number of COVID-19 infections	
Never infected	197 (35.69)
Infected once	333 (60.33)

Infected twice	22 (3.98)
Number of COVID-19 vaccine doses	
None	10 (1.81)
One dose	16 (2.90)
Two doses	130 (23.55)
Three doses	392 (71.01)
Four doses	4 (0.72)
Severity of symptoms during first COVID-19 infection	
Mild	197 (35.69)
Moderate	117 (21.20)
Severe	3 (0.54)
Unknown	235 (42.57)
Vaccination status at time of first COVID-19 infection	
One dose	89 (16.12)
Two doses	120 (21.74)
Three doses	47 (8.51)
Unvaccinated	61 (11.05)
Unknown	235 (42.57)
Self-assessment of mental state post- *vs*. pre-COVID-19 infection	
No change	260 (47.10)
Changed	74 (13.41)
Unknown	218 (39.49)

Supplementary Table 2. Prevalence of anxiety and depression (n=552).

Categories	n (%)
Depression (RADS)	
Not present	476 (86.2)
Present	76 (13.8)
Anxiety (SCARED)	
Not present	407 (73.7)
Present	145 (26.3)
SCARED Subgroups	
Panic disorder or specific somatic symptoms	102 (18.5)
Generalized anxiety disorder	90 (16.3)
Separation anxiety disorder	182 (33.0)
Social phobia	117 (21.2)
School avoidance disorder	77 (14.0)

SCARED, Screen for Child Anxiety Related Emotional Disorders; RADS, Reynolds Adolescent Depression Scale.

Supplementary Table 3. Factors associated with depression (Reynolds Adolescent Depression Scale) and anxiety (Screen for Child Anxiety Related Emotional Disorders).

Factors	RADS		SCARED	
	cOR (95%CI)	aOR (95%CI)	cOR (95%CI)	aOR (95%CI)
General Factors				
Age	1.03 (0.9-1.2)	1.1 (0.8-1.5)	1.0 (0.9-1.1)	1.0 (0.8-1.3)
Gender				
Male	1	1	1	1
Female	**3.0 (1.7-5.1)***	**5.7 (1.9-17.1)**	**3.7 (2.4-5.7)***	**4.3 (2.0-9.0)***
Living with				
Both parents	1	1	1	1
Father	2.2 (0.9-5.9)	0.6 (0.03-11.0)	1.0 (0.4-2.5)	0.3 (0.02-4.2)
Mother	1.3 (0.6-2.8)	0.2 (0.02-3.3)	1.4 (0.8-2.6)	0.5 (0.1-4.2)
Grandparents or others	0.8 (0.1-6.8)	1.7 (0.1-53.3)	0.8 (0.2-4.0)	3.4 (0.3-41.4)
Parental relationship				
Harmonious	1	1	1	1
Conflict	**3.6 (1.5-8.7)**	1.4 (0.2-8.5)	2.0 (0.9-4.6)	0.5 (0.1-2.5)
Separated, divorced, or deceased	**2.0 (1.1-3.9)***	3.2(0.2-42.4)	1.4 (0.8-2.4)	1.4 (0.2-12.1)
Family history of mental disorders				
No	1	1	1	1
Yes	3.3 (1.0-11.1)	1.0 (0.2-5.0)	2.9 (0.9-9.1)	1.2 (0.1-13.5)
Family conflict				
No	1	1	1	1
Yes	**5.1 (2.9-9.0)***	**6.8 (1.9-24.5)**	**3.2 (1.9-5.3)***	**3.8 (1.2-11.9)***
History of psychological trauma				
No	1	1	1	1
Yes	**4.1 (1.8-9.3)***	1.3 (0.2-7.4)	**3.8 (1.7-8.3)***	**5.5 (0.9-32.9)**
Experienced stigma				
No	1	1	1	1
Yes	**10.5 (3.6-30.5)***	**22.0 (1.1-450.4)***	**2.5 (0.9-7.1)**	0.7 (0.1-7.5)
Alcohol use				
No	1	1	1	1
Yes	1.3 (0.5-3.4)	1.4 (0.2-8.5)	0.8 (0.4-2.0)	0.4 (0.1-1.7)
Smoking				
No	1	1	1	1
Yes	2.9 (0.9-9.6)	6.0 (0.2-165.2)	1.8 (0.6-5.5)	2.8 (0.3-29.9)
Frequency of internet use				

Infrequent	1	1	1	1
Frequent	**2.5 (1.3-4.9)****	1.8 (0.5-7.3)	**2.2 (1.3-3.5)*****	2.0 (0.8-4.9)
Place of residence				
Rural	1	1	1	1
Urban	**1.9 (1.1-3.2)***	2.3 (0.9-5.8)	**1.7 (1.2-2.5)****	2.1 (1.0-4.2)
Income level				
High	1	1	1	1
Average	0.7 (0.1-3.3)	0.6 (0.04-8.3)	**0.3 (0.1-0.9)***	0.2 (0.03-1.4)
Low	1.1 (0.2-5.1)	1.2 (0.1-18.7)	0.5 (0.2-1.7)	0.5 (0.1-3.7)
Satisfaction with income				
Dissatisfied	1	1	1	1
Satisfied	0.7 (0.5-1.2)	0.6 (0.2-1.7)	0.7 (0.5-1.0)	0.5 (0.2-1.1)
None	1	1	1	1
Yes	2.1 (0.8-5.2)	0.4 (0.1-2.5)	1.7 (0.8-3.9)	0.7 (0.2-2.5)
Change in income due to COVID-19				
No change	1	1	1	1
Decreased by less than one-third	1.2 (0.7-2.1)	2.4 (0.9-6.6)	1.0 (0.7-1.5)	0.8 (0.4-1.5)
Decreased by more than one-third	1.4 (0.6-3.4)	3.4 (0.6-18.6)	1.3 (0.6-2.53)	1.6 (0.5-5.2)
Number of COVID-19 infections				
Never infected	1	-	1	-
Infected once	1.2 (0.7-2.1)	0.3 (0.1-1.5)	1.4 (0.9-2.1)	0.5 (0.1-1.9)
Infected twice	**3.5 (1.3-9.6)***	-	2.0 (0.8-5.2)	-
Number of COVID-19 vaccine doses				
Less than 2 doses	1	1	1	1
2 doses	1.2 (0.3-4.5)	1.6 (0.2-15.6)	0.6 (0.2-1.4)	0,4 (0.1-2.4)
3-4 doses	1.2 (0.4-4.3)	0.7 (0.1-7.6)	0.5 (0.2-1.2)	**0.1 (0.01-0.6)***
Mild	1	1	1	1
Moderate	**2.2 (1.2-4.0)***	1.2 (0.5-3.0)	1.4 (0.9-2.4)	0.9 (0.5-1.9)
Unvaccinated	1	1	1	1
One dose	1.0 (0.4-2.3)	0.5 (0.1-1.7)	0.8 (0.4-1.7)	0.7 (0.2-1.9)
Two doses	0.8 (0.3-1.7)	0.5 (0.1-1.8)	0.8 (0.4-1.5)	0.8 (0.3-2.3)
Three doses	0.9 (0.3-2.5)	0.3 (0.1-1.6)	0.9 (0.4-2.0)	0.8 (0.2-2.9)
No change	1		1	1
Changed	**4.9 (2.6-9.1)*****	**4.3 (1.6-11.6)****	**4,1 (2.4-7.0)*****	**3,8 (1.7-8.4)****

cOR, crude odds ratio; aOR, adjusted odds ratio; 95%CI, 95% confidence interval; *p<0.05; **p<0.01; ***p<0.001.

Supplementary Table 4. Analysis of factors associated with the Screen for Child Anxiety Related Emotional Disorders subgroups.

Factors	cOR (95%CI)	aOR (95%CI)
Panic Disorder or Specific Somatic Symptoms		
Self-assessment of mental state post- vs. pre-COVID-19 infection		
No change	1	1
Changed	**3.1 (1.7-5.5)***	**2.9 (1.3-6.4)***
Generalized Anxiety Disorder		
Gender		
Male	1	1
Female	**3.2 (1.9-5.3)***	0.8 (0.6-1.1)
Family conflict		
No	1	1
Yes	**2.8 (1.6-4.9)***	2.2 (0.6-7.8)
Psychological trauma		
No	1	1
Yes	**3.3 (1.4-7.4)**	4.6 (0.7-31.5)
Experienced stigma		
No	1	1
Yes	**4.8 (1.7-13.6)**	4,6 (0.7-31.5)
Frequent internet use		
Infrequent	1	1
Frequent	**2.3 (1.3-4.2)**	1.5 (0.5-4.7)
Place of residence		
Rural	1	1
Urban	**1.6 (1.0-2.5)***	**2.6 (1.1-6.2)***
Self-assessment of mental state post- vs. pre-COVID-19 infection		
No change	1	1
Changed	**4.9 (2.7-9.0)***	**3.7 (1.6-8.7)**
Separation Anxiety Disorder		
Gender		
Male	1	1
Female	**2.3 (1.6-3.3)***	**3.6 (1.9-6.8)***
Self-assessment of mental state post- *vs.* pre-COVID-19 infection		
No change	1	1
Changed	2.5 (1.5-4.2)***	**2.2 (1.1-4.4)***
Social Phobia		
Gender		
Male	1	1
Female	**3.2 (2.1-5.1)***	**3.9 (1.9-8.0)***
Frequent internet use		
Infrequent	1	1
Frequent	**2.3 (1.3-3.9)**	1.9 (0.8-4.8)
Number of COVID-19 infections		
Never infected	1	-
Infected once	**1.7 (1.1-2.6)***	0.6 (0.2-2.3)
Infected twice	1.1 (0.4-3.6)	-
Self-assessment of mental state post- *vs.* pre-COVID-19 infection		
No change	1	1
Changed	**2.0 (1.1-3.5)***	1.4 (0.7-3.0)
School Avoidance Disorder		
Age	**1.2 (1.0-1.3)**	**1.5 (1.1-2.1)**
Gender		
Male	1	1
Female	**2.8 (1.7-4.8)***	1.8 (0.7-4.6)
Parental relationship		
Harmonious	1	1
Conflict	2.0 (0.8-5.3)	2.0 (0.3-13.0)
Separated, divorced, or deceased	1.1 (0.5-2.2)	**0.1 (0.0-1.0)***

Family conflict		
No	1	1
Yes	**2.3 (1.2-4.2)****	0.9 (0.2-3.8)
Psychological trauma		
No	1	1
Yes	**2.8 (1.2-6.6)***	**7.5 (1.1-52.3)***
Experienced stigma		
No	1	1
Yes	**3.2 (1.1-9.7)***	7.8 (0.5-130.3)
Frequency of internet use		
Infrequent	1	1
Frequent	**2.3 (1.2-4.3)***	1.1 (0.3-3.7)
Place of residence		
Rural	1	1
Urban	**1.7 (1.0-2.8)***	1.5 (0.3-3.7)
Self-assessment of mental state post- *vs*. pre-COVID-19 infection		
No change	1	1
Changed	**5.3 (2.8-10.1)*****	**5.4 (2.1-14.2)*****

cOR, crude odds ratio; aOR, adjusted odds ratio; 95%CI, 95% confidence interval; *p< 0.05; **p<0.01; ***p<0.001.

Supplementary Table 5. Summary of mediation analysis results.

Effect description	Coefficient	Std.Error	Z-value	P-value
Direct effect of gender on RADS	1.1762	0.3648	3.22	0.001
Indirect effect through self-assessed mental health	1.8224	0.6053	3.01	0.003
Total effect	2.9987	0.6549	4.58	<0.001

Std., standard. The specifics of the mediation analysis results are encapsulated in Table 5, which systematically outlines the coefficients, standard errors, Z-values, and P-values associated with each pathway of influence.