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RESEARCH ARTICLE

Personal worries about COVID-19 transmission among Vietnamese adults during the COVID-19 pandemic

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Abstract

Background: Personal worries about COVID-19 transmission can have significant health effects on both physical and mental health. The project objectives were to determine the prevalence and factors influencing personal worries about COVID-19 transmission among adult Vietnamese men and women in 2021.

Methods: A cross-sectional survey was conducted in 2021 among adults living in Hanoi City and Ho Chi Minh City, Vietnam in which a total of 447 individuals completed the questionnaire survey. A 5-point Likert scale was used to measure whether survey respondents were worried about being infected with COVID-19, whether family/friends will catch COVID-19, and about spreading the virus to others. The rating scores were then used to categorize study participants as "worried" (score 1-3) and "not worried" (score 4-5).

Results: The study found that slightly more than two-thirds of the study sample were worried about being infected with COVID-19. Additionally, approximately four in every five respondents were worried that family/friends would catch COVID-19 or were concerned about spreading the virus to others. Individuals who did not engage in outdoor activities during the prior two weeks exhibited higher worry about being infected with COVID-19 compare to whom did. People living with someone at high risk for COVID-19 and worrying about losing their home had concerns that family/friends would catch COVID-19 more than whom did not. Men and individuals without a medical history of chronic disease and health insurance were less likely to express worries about spreading the COVID-19 virus to others compared to women and those with these chronic conditions and with insurance.

Conclusion: Our findings emphasize the interplay between individual risk perception and broader social determinants of health in shaping attitudes and behaviors related to COVID-19 prevention and control.

Keywords: Personal worries, COVID-19, transmission, Vietnamese, adults.

Introduction

On December 31, 2019, health officials in Wuhan City, China reported a coronavirus outbreak associated with a pneumonia of unknown etiology to the World Health Organization,¹ a virus which has since been identified as the novel coronavirus (COVID-19). Understanding the features of this highly infectious virus in different communities and countries will hopefully lead to improved measures for reducing disease transmission and improving health-related outcomes for persons infected by COVID-19.

The COVID-19 pandemic has raised concerns about the transmission of the virus and the potential health consequences for individuals who contract the disease. Worries about COVID-19 transmission can have significant health implications on one's physical and mental health. Individuals who are worried about COVID-19 transmission may experience symptoms of anxiety and depression,² and may engage in excessive handwashing or other disinfection practices.³ Personal worries can also lead to social isolation, which can exacerbate mental health issues, and increase the risk of developing chronic diseases such as cardiovascular disease and diabetes.⁴

One noteworthy limitation in the existing literature is the potential delay in seeking medical care due to fears of contracting COVID-19. ⁵ It has been observed that individuals who are worried about COVID-19 transmission may postpone seeking timely medical care, which can have detrimental effects on their health outcomes. This knowledge gap highlights the need for further investigation into the relationship between personal worries about COVID-19 and

healthcare-seeking behavior. We looked at factors associated with personal worries about COVID-19 transmission. Need to mention other studies looking at factors associated with worries, and what they found. The present study was conducted to describe the prevalence of, and factors associated with, personal worries about COVID-19 transmission among Vietnamese adults during the COVID-19 pandemic in 2021.

Methodology

Study setting

The present study was a cross-sectional survey among adults living in Hanoi City and Ho Chi Minh City, Vietnam in 2021. The study was conducted by the Institute of Population, Health and Development in Hanoi, Vietnam.

Study participants and Sampling methods

The study recruited adults 18 years and older living in Hanoi City from July to December 2021 and in Ho Chi Minh City from May to October 2021.

Any adult aged 18 years or older living in the two areas under study during the survey period could participate in the self-reported survey without any a priori determined sample size. We used a convenience sampling method through social networks and text messaging and the "snowball" method by contacting friends, acquaintances, and relatives by forwarding links to at least 20 phone numbers of people who lived in Hanoi City and Ho Chi Minh City during the epidemic lock-down period. All study participants provided written informed consent. A total of 447 adults completed study survey.

Survey instrument

The questionnaire used in this study was based on a questionnaire previously used in a survey of Vietnamese adults living in Worcester, Massachusetts, USA

(<https://www.umassmed.edu/prc/news/2020/06/greaterworcester-covid-19-survey/>) and has been culturally adapted for persons living in Vietnam. The approximate 30 minutes long questionnaire consisted of four sections: demographic characteristics, health status during the pandemic, social norms during the pandemic, and self-protection actions and awareness of COVID-19.

The first section collected information on participants' socio-demographic characteristics including their age, sex, address, and level of education. Information about participants' health status included whether they had symptoms of COVID-19, their medical history of various chronic diseases, and COVID-19 vaccination status. Questions about social norms during the pandemic included whether the individual went outside during the prior 2 weeks, employment status (before COVID-19), living with someone at high risk for coronavirus/COVID-19, moving out of their home due to COVID-19, and worries about losing their home.

Survey respondents were asked to describe their personal worries about COVID-19 transmission using a 5-level Likert scale (from very strong disagreement to very strong agreement) for the 3 following statements: extent of worry about being infected with COVID-19, worry that family/friends will catch COVID-19, and extent of concern that the respondent will spread COVID-19 to others.

The Cronbach's Alpha of Awareness scale (3 items) was 0.73.

Data collection activities

During the pandemic, the survey link, which included an informed consent form and study questionnaire, was developed and posted via social networks and sent via text messages to adults living in Hanoi and Ho Chi Minh City during the period under study. If someone was interested in participating in the survey, they could open the survey link, sign the consent form, and complete the study questionnaire. Their responses were stored in a secure database according to HIPPA regulations at the Institute of Population, Health and Development.

Study outcomes

The primary study outcomes were the rating scores (range 1-5) for three statements reflecting personal worries about COVID-19 transmission based on the survey participants responses: extent of worry about being infected with COVID-19 (scored 1 to 5), worry that family/friends will catch COVID-19 (scored 1 to 5), and extent of concern that the respondent will spread COVID-19 to others (scored 1 to 5). For purposes of analysis, we classified the rating scores into 2 categories as not worried (1 to 3 on the Likert scale), and worried (4 or 5) for each statement reflecting personal worries about COVID-19 transmission.

Data analysis

To examine differences in the characteristics of the study population according to their self-reported worries about COVID-19 transmission (worried vs. not worried), the t-test was used for continuous variables and Chi-square tests and Fisher's exact tests for categorical variables.

To examine factors potentially associated with the primary study outcomes, we carried out a series of unadjusted and adjusted logistic models. Factors associated with personal worries about COVID-19 transmission included survey respondents demographic characteristics, health status, and social norms. Factors that yielded on a cutpoint of $p < 0.2$ in univariate analysis were included in the multivariable models. A backward elimination process was conducted to select the final models, which included only factors with a p value < 0.05 . Area under the ROC curve was calculated for final models and goodness of fit test was conducted to test model fit data. All analyses were conducted using R studio (reference).

Ethical considerations

All study participants completed a written consent form and had the right to refuse or withdraw study participation at any time. The study was approved by the IRB at the Institute of Population, Health and Development (2021/PHAD/COVID-01).

Results

A total of 447 participants (43.6% were from Hanoi, and 56.4% were from Hochiminh city) completed the survey with mean age of 34.2 (SD = 13.3) years and 43.6% were men. There were 68.9% study participants reported personal worried about being infected with COVID-19. The percentage of people who worried about family/friends would catch COVID-19 in our results was 79.2%. And results showed that 79.6% people in our study were worried about spreading the COVID-19 to others.

Socio-demographic characteristics according to worried status

There were no differences in selected socio-demographic characteristics among those who were worried as compared with those who were not worried about being infected with COVID-19, about family/friends will catch COVID-19, and about spreading the COVID-19 to others (Table 1).

Table 1. Demographic characteristics according to Personal worries about COVID-19 transmission status

Characteristics n (%)	Worried about being infected with COVID-19		p-value	Worried that family/friends will catch COVID-19		p-value	Worried about spreading COVID-19 to others		p-value
	Worried	Not worried		Worried	Not worried		Worried	Not worried	
	(n=308)	(n=139)		(N=354)	(N=93)		(n=356)	(n=91)	
Female	180 (58.4)	67 (48.2)	0.23	194 (54.8)	35 (37.6)	0.23	206 (57.9)	46 (50.5)	0.26
Age (years)									
Mean (SD)	34.3 (12.9)	34.2 (14.2)	0.98	34.2 (13.3)	34.5 (13.4)	0.83	34.1 (12.9)	34.9 (14.7)	0.65
< 20	21 (6.8)	17 (12.2)		28 (7.9)	10 (10.8)		29 (8.1)	9 (9.9)	
20 - 29	117 (38.0)	46 (33.1)		134 (37.9)	29 (31.2)		133 (37.4)	30 (33.0)	
30 - 39	81 (26.3)	32 (23.0)	0.33	87 (24.6)	26 (28.0)	0.74	88 (24.7)	25 (27.5)	0.93
40 - 49	43 (14.0)	21 (15.1)		51 (14.4)	13 (14.0)		51 (14.3)	13 (14.3)	
>= 50	46 (14.9)	23 (16.5)		54 (15.3)	15 (16.1)		55 (15.4)	14 (15.4)	
Educational level University or higher	195 (63.3)	83 (59.7)	0.54	217 (61.3)	61 (65.6)	0.52	222 (62.4)	56 (61.5)	0.98
Living HCM City	167 (54.2)	85 (61.2)	0.21	197 (55.6)	55 (59.1)	0.63	208 (58.4)	44 (48.4)	0.11
Having health insurance	275 (89.3)	121 (87.1)	0.60	317 (89.5)	79 (84.9)	0.29	321 (90.2)	75 (82.4)	0.06
Received 2 dose COVID vaccine	281 (91.2)	121 (87.1)	0.23	318 (89.8)	84 (90.3)	0.99	320 (89.9)	82 (90.1)	0.99

Health status during the pandemic according to personal worried status

Individuals who worried about being infected with COVID-19 were more likely to report experiencing vision difficulties than those who did not. Survey respondents who worried about family/friends catching COVID-19 had a higher prevalence of

runny nose symptoms and a greater likelihood of having a history of diabetes (Table 2). Furthermore, individuals who worried about spreading the COVID-19 to others were more likely to report experiencing stomach-ache and loss of taste symptoms, as well as having at least one medical history condition.

Table 2. Health status during the pandemic according to Personal worries about COVID-19 transmission status

Health status n (%)	Worried about being infected with COVID-19		p-value	Worried that family/friends will catch COVID-19		p-value	Worried about spreading COVID-19 to others		p-value
	Worried	Not worried		Worried	Not worried		Worried	Not worried	
	(n=308)	(n=139)		(N=354)	(N=93)		(n=356)	(n=91)	
Health symptoms									
Fever	37 (12.0)	17 (12.2)	0.99	46 (13.0)	8 (8.6)	0.33	46 (12.9)	8 (8.8)	0.37
Feeling feverish	54 (17.5)	27 (19.4)	0.73	68 (19.2)	13 (14.0)	0.31	66 (18.5)	15 (16.5)	0.76
Chills	66 (21.4)	24 (17.3)	0.37	77 (21.8)	13 (14.0)	0.13	75 (21.1)	15 (16.5)	0.41
Muscle pain	80 (26.0)	35 (25.2)	0.95	95 (26.8)	20 (21.5)	0.36	91 (25.6)	24 (26.4)	0.98
Runny nose	89 (28.9)	30 (21.6)	0.13	107 (30.2)	12 (12.9)	0.001	99 (27.8)	20 (22.0)	0.32
Sore throat	72 (23.4)	30 (21.6)	0.77	84 (23.7)	18 (19.4)	0.45	82 (23.0)	20 (22.0)	0.94
Productive cough	46 (14.9)	17 (12.2)	0.54	53 (15.0)	10 (10.8)	0.38	46 (12.9)	17 (18.7)	0.22
Dry cough without phlegm	45 (14.6)	21 (15.1)	0.99	55 (15.5)	11 (11.8)	0.46	56 (15.7)	10 (11.0)	0.33
Sneeze	136 (44.2)	56 (40.3)	0.51	160 (45.2)	32 (34.4)	0.08	153 (43.0)	39 (42.9)	0.99
Tired	133 (43.2)	52 (37.4)	0.30	148 (41.8)	37 (39.8)	0.82	152 (42.7)	33 (36.3)	0.32
Shortness of breath	39 (12.7)	12 (8.6)	0.28	43 (12.1)	8 (8.6)	0.44	43 (12.1)	8 (8.8)	0.49
Nausea or vomiting	20 (6.5)	8 (5.8)	0.93	23 (6.5)	5 (5.4)	0.88	25 (7.0)	3 (3.3)	0.29
Headache	107 (34.7)	43 (30.9)	0.50	123 (34.7)	27 (29.0)	0.36	125 (35.1)	25 (27.5)	0.21
Stomach-ache	56 (18.2)	20 (14.4)	0.39	63 (17.8)	13 (14.0)	0.47	67 (18.8)	9 (9.9)	0.043
Diarrhea	51 (16.6)	28 (20.1)	0.43	62 (17.5)	17 (18.3)	0.98	63 (17.7)	16 (17.6)	0.99
Loss of sense of smell	27 (8.8)	14 (10.1)	0.79	35 (9.9)	6 (6.5)	0.41	33 (9.3)	8 (8.8)	0.99

Health status n (%)	Worried about being infected with COVID-19		p-value	Worried that family/friends will catch COVID-19		p-value	Worried about spreading COVID-19 to others		p-value
	Worried	Not worried		Worried	Not worried		Worried	Not worried	
	(n=308)	(n=139)		(N=354)	(N=93)		(n=356)	(n=91)	
Loss of taste	24 (7.8)	10 (7.2)	0.98	30 (8.5)	4 (4.3)	0.26	32 (9.0)	2 (2.2)	0.027
At least 1 health symptom	205 (66.6)	94 (67.6)	0.91	239 (67.5)	60 (64.5)	0.67	241 (67.7)	58 (63.7)	0.55
Medical history									
Chronic lung disease	17 (5.5)	3 (2.2)	0.18	18 (5.1)	2 (2.2)	0.35	17 (4.8)	3 (3.3)	0.75
Chronic kidney disease	5 (1.6)	0 (0)	0.31	5 (1.4)	0 (0)	0.55	5 (1.4)	0 (0)	0.56
Liver disease, or chronic digestive disease	17 (5.5)	9 (6.5)	0.86	21 (5.9)	5 (5.4)	0.99	21 (5.9)	5 (5.5)	0.99
Chronic neurological disease	1 (0.3)	0 (0)	0.99	1 (0.3)	0 (0)	0.99	1 (0.3)	0 (0)	0.99
Heart disease	20 (6.5)	6 (4.3)	0.49	23 (6.5)	3 (3.2)	0.34	24 (6.7)	2 (2.2)	0.16
Hypertension	34 (11.0)	14 (10.1)	0.89	39 (11.0)	9 (9.7)	0.86	41 (11.5)	7 (7.7)	0.39
Diabetes	12 (3.9)	3 (2.2)	0.51	15 (4.2)	0 (0)	0.049	11 (3.1)	4 (4.4)	0.77
Autoimmune disease	7 (2.3)	5 (3.6)	0.63	8 (2.3)	4 (4.3)	0.47	11 (3.1)	1 (1.1)	0.49
Weak or altered immune system	5 (1.6)	0 (0)	0.31	3 (0.8)	2 (2.2)	0.61	5 (1.4)	0 (0)	0.56
Difficulty breathing while sleeping	19 (6.2)	5 (3.6)	0.37	21 (5.9)	3 (3.2)	0.44	20 (5.6)	4 (4.4)	0.84
History of lung cancer	1 (0.3)	0 (0)	0.99	1 (0.3)	0 (0)	0.99	1 (0.3)	0 (0)	0.99
History of tuberculosis	7 (2.3)	2 (1.4)	0.83	7 (2.0)	2 (2.2)	0.99	9 (2.5)	0 (0)	0.27
Depends on beer/wine	7 (2.3)	0 (0)	0.17	7 (2.0)	0 (0)	0.37	7 (2.0)	0 (0)	0.38
Dependence on drugs	17 (5.5)	3 (2.2)	0.18	16 (4.5)	4 (4.3)	0.99	19 (5.3)	1 (1.1)	0.14
Other chronic diseases	18 (5.8)	8 (5.8)	0.99	22 (6.2)	4 (4.3)	0.65	23 (6.5)	3 (3.3)	0.37

Health status n (%)	Worried about being infected with COVID-19		p-value	Worried that family/friends will catch COVID-19		p-value	Worried about spreading COVID-19 to others		p-value
	Worried	Not worried		Worried	Not worried		Worried	Not worried	
	(n=308)	(n=139)		(N=354)	(N=93)		(n=356)	(n=91)	
At least 1 medical history	101 (32.8)	38 (27.3)	0.30	117 (33.1)	22 (23.7)	0.11	119 (33.4)	20 (22.0)	0.048
Health problems									
Difficulty in hearing	11 (3.6)	1 (0.7)	0.16	11 (3.1)	1 (1.1)	0.47	11 (3.1)	1 (1.1)	0.49
Difficulty in seeing	83 (26.9)	25 (18.0)	0.043	91 (25.7)	17 (18.3)	0.18	86 (24.2)	22 (24.2)	0.99
Difficulty concentrating, remembering, or making decisions	75 (24.4)	31 (22.3)	0.73	84 (23.7)	22 (23.7)	0.99	87 (24.4)	19 (20.9)	0.57
Difficulty walking or climbing stairs	30 (9.7)	13 (9.4)	0.99	35 (9.9)	8 (8.6)	0.86	35 (9.8)	8 (8.8)	0.92
Difficulty dressing or bathing	9 (2.9)	2 (1.4)	0.54	9 (2.5)	2 (2.2)	0.99	8 (2.2)	3 (3.3)	0.84
Difficulty doing daily tasks	16 (5.2)	6 (4.3)	0.87	19 (5.4)	3 (3.2)	0.56	18 (5.1)	4 (4.4)	0.99
At least 1 health problem	135 (43.8)	53 (38.1)	0.30	153 (43.2)	35 (37.6)	0.39	151 (42.4)	37 (40.7)	0.85

Social norms during the pandemic according to personal worried status

Individuals who worried about being infected with COVID-19 exhibited a significantly higher incidence of outdoor activity within the prior two weeks, in comparison with those who did not harbor such concerns (Table 3). Moreover, individuals who worried about family/friends will catch COVID-19 demonstrated a significantly higher likelihood of cohabiting with individuals at an elevated risk of COVID-19 infection, as well as displaying greater

apprehension towards potential housing insecurity, when contrasted with those who did not express such worries (Table 3).

Table 3. Social norms during the pandemic according to Personal worries about COVID-19 transmission

Social norms n (%)	Worried about being infected with COVID-19		p-value	Worried that family/friends will catch COVID-19		p-value	Worried about spreading COVID-19 to others		p-value
	Worried	Not worried		Worried	Not worried		Worried	Not worried	
	(n=308)	(n=139)		(N=354)	(N=93)		(n=356)	(n=91)	
Going outside (last 2 weeks)	255 (82.8)	126 (90.6)	0.043	300 (84.7)	81 (87.1)	0.69	301 (84.6)	80 (87.9)	0.52
Having paid work (Before COVID-19 pandemic)	225 (73.1)	95 (68.3)	0.36	255 (72.0)	65 (69.9)	0.78	255 (71.6)	65 (71.4)	0.99
Housing status									
Family house	78 (25.3)	36 (25.9)	0.69	91 (25.7)	23 (24.7)	0.96	87 (24.4)	27 (29.7)	0.31
Rented house	82 (26.6)	30 (21.6)		90 (25.4)	22 (23.7)		94 (26.4)	18 (19.8)	
Own house	76 (24.7)	36 (25.9)		87 (24.6)	25 (26.9)		85 (23.9)	27 (29.7)	
Other	72 (23.4)	37 (26.6)		86 (24.3)	23 (24.7)		90 (25.3)	19 (20.9)	
Having child 18 years old or younger	164 (53.2)	71 (51.1)	0.75	184 (52.0)	51 (54.8)	0.71	185 (52.0)	50 (54.9)	0.70
Living with someone at high risk for COVID-19	80 (26.0)	33 (23.7)	0.70	98 (27.7)	15 (16.1)	0.032	93 (26.1)	20 (22.0)	0.50
Moving out of home due to COVID-19	16 (5.2)	7 (5.0)	0.99	16 (4.5)	7 (7.5)	0.37	19 (5.3)	4 (4.4)	0.92
Worry about losing home	94 (30.5)	45 (32.4)	0.78	101 (28.5)	38 (40.9)	0.031	109 (30.6)	30 (33.0)	0.76

Factors associated with of personal worries about COVID-19

Individuals who did not engage in outdoor activity during the prior two weeks exhibited a higher likelihood of expressing worry about being infected with COVID-19, in comparison with those who participated in such activity (Table 4). On the other hand, cohabiting with individuals who were not at high risk for COVID-19 was associated with a reduced likelihood of expressing worry about family/friends will catch COVID-19. Individuals

who expressed worries about housing insecurity expressed greater concerns that family/friends will catch COVID-19, when contrasted with those who did not harbor such concerns. Men and those without a medical history of chronic disease were less likely to express worries about spreading the COVID-19 virus to others as compared to their counterparts, whereas having health insurance was associated with a greater likelihood of expressing such concerns.

Table 4. Factors associated with Personal worries about COVID-19 transmission

Factors	Worried about being infected with COVID-19*	Worried that family/friends will catch COVID-19**	Worried about spreading COVID-19 to others***
	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Sex			
Female	-	1.00	1.00
Male	-	1.41 (0.88 - 2.29)	0.59 (0.36 - 0.97)
Living place			
Hanoi City	1.00	-	1.00
Hochiminh City	0.71 (0.46 - 1.08)	-	1.53 (0.94 - 2.49)
Health insurance			
No	-	-	1.00
Yes	-	-	2.29 (1.15 - 4.42)
Medical history			
At least 1	1.00	-	1.00
None	0.68 (0.43 - 1.07)	-	0.56 (0.31 - 0.98)
Going outside (last 2 weeks)			
Yes	1.00	-	-
No	2.04 (1.10 - 4.04)	-	-
Housing status			
Family house	-	-	1.00
Rented house	-	-	1.98 (1.00 - 4.02)
Own house	-	-	0.94 (0.50 - 1.76)
Other	-	-	1.49 (0.76 - 2.97)

Factors	Worried about being infected with COVID-19*	Worried that family/friends will catch COVID-19**	Worried about spreading COVID-19 to others***
	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Living with someone at high risk for COVID-19			
Yes	-	1.00	-
No	-	0.48 (0.26 - 0.86)	-
Worry about losing home			
Yes	-	1.00	-
No	-	1.81 (1.12 - 2.92)	-
Area under the ROC curve	57.7%	50.5%	64.0%
Goodness of fit test	< 0.001	NA	< 0.001

*Final model included sex, age group, education level, living area, health insurance status, COVID vaccine status, number of health symptom, number of medical histories, number of health problem, history of going outside in last 2 weeks, having paid work before COVID-19 pandemic status, housing status, having child <= 18 years old, living with someone at high risk for COVID-19, moving out of home due to COVID-19 and worry about losing home.

Discussion

Our findings suggest that a significant proportion of the study population had worries about COVID-19 transmission, with nearly three out of every four participants being concerned about being infected with COVID-19, that family/friends will catch COVID-19, or about spreading the virus to others. Our results revealed that going outside during the prior two weeks was significantly associated with personal worries about being infected with COVID-19. Living with someone at high risk for COVID-19, and worrying about losing their home, were associated with concerns that family or friends would catch COVID-19. Lastly, the study also identified men and those without a medical history of chronic disease and did not have health insurance were less likely to express worries about spreading the COVID-19 virus to others. These findings underscore the complex interplay between individual risk perception and broader social determinants

of health in shaping attitudes and behaviors related to COVID-19 prevention and control.

Self-worries about COVID-19 transmission

Our findings suggest a high prevalence of worry among survey respondents regarding the potential for COVID-19 infection, transmission to family and friends, and spreading the disease to others. We found that more than two-thirds of study worried about being infected with COVID-19, while approximately 4 in every 5 respondents expressed worry that family/friends will catch COVID-19 and about spreading COVID-19 to others.

There are several reasons why people may be worried about COVID-19. First, the immediate psychological response to the pandemic can lead to anxiety and worry². The uncertainty and unpredictability of the pandemic, concerns about spreading the virus to others, as well as the potential for severe illness and death can contribute to personal worries.⁷

These findings are consistent with previous research on the psychological impact of the COVID-19 pandemic in China (2020), which found 35.1% of the public had generalized anxiety disorder, 20.1% had depressive symptoms, and 18.2% had poor sleep quality during the COVID-19 pandemic, and suggest a need for interventions that address individuals' fears and concerns about the disease to promote effective public health responses.⁸ Possible strategies could include targeted public health messaging, social support networks, and mental health services to help individuals manage the anxiety and stress related to the pandemic⁹.

Factors associated with personal -worries about COVID-19 transmission

Worries about being infected with COVID-19

Our results show there was a significant association between personal worries about getting infected with COVID-19 and having gone outside within the two weeks prior to the survey. This finding provides insights into the reasons why people may experience anxiety and fear related to outdoor activities during the pandemic.

Our study finding was consistent with a study of more than 8,500 Bangladeshi participants (2022) which found that people who spent more time outside were more likely to engage in preventive behaviors, such as wearing masks and washing hands, but were also more likely to experience anxiety and fear related to COVID-19¹⁰. This suggests that while going outside may increase the likelihood of exposure to the virus by increasing the chance of close-contact with infected people during the COVID-19 pandemic, it may also promote

healthy behaviors that reduce the risk of infection.

A study of more than 10,000 American men and women (2020) found that people who reported greater concerns about COVID-19 were more likely to engage in social distancing behaviors, including avoiding outdoor activities¹¹. This highlights the importance of addressing concerns and fears related to the pandemic in order to promote healthy behaviors.

While outdoor activities may increase the risk of exposure to the virus, they may also promote healthy behaviors and provide mental health benefits. It is important for individuals to weigh the risks and benefits of outdoor activities and to take preventive measures to reduce the risk of infection.

Worries that family or friends will catch COVID-19

The COVID-19 pandemic has significantly impacted mental health worldwide. Fears of contracting the virus and the anxiety related to social distancing measures have led to an increase in self-reported mental health issues. Our findings suggest that living with someone at high risk for COVID-19 and worrying about losing their home were associated with worrying that family or friends will catch COVID-19.

A systematic review and meta-analysis of 19 observational studies conducted in 2020, found that the fear of losing one's home due to the economic impact of the pandemic was associated with increased levels of anxiety and depression¹². Inasmuch, these and our findings suggest that financial concerns related to the pandemic can contribute to

mental health issues¹³. The systematic review suggested that the fear of contracting the virus and the associated social distancing measures have led to increased levels of anxiety, depression, and stress. Therefore, it is essential to provide support and resources to individuals who are experiencing these challenges during the pandemic.

Worries about spreading the COVID-19 virus to others

The COVID-19 pandemic has raised concerns about the risk of spreading the virus to others. We identified several factors associated with worrying about spreading COVID-19 to others, including individuals who were male or had no medical history of chronic disease were found to have lower likelihoods of expressing concerns about spreading the COVID-19 virus to others as compared to their counterparts. On the other hand, individuals with health insurance were found to have a higher likelihood of expressing such concerns. Similar to our study findings, a study aimed to investigate the level of psychological impact, anxiety, depression, and stress experienced by the general public in China during the COVID-19 pandemic, which conducted in 2019 and included 1210 respondents from 194 cities in China, found that women were more likely to worry about spreading COVID-19 to others than men², suggesting that gender differences in risk perception may contribute to differences in worrying about spreading the COVID-19 virus to others.

While we did not find age associated with worries about spreading the COVID-19 virus to others in our study, a study with more than 450 adult workers in the U.S participated in

2020 found that older adults were more likely to worry about spreading COVID-19 to others¹⁴. This review suggested that older adults may be more vulnerable to the virus and may, therefore, be more concerned about transmitting it to others. Furthermore, our result did not find living area associated with worries about spreading the COVID-19 virus to others; however, a study examining the relationship between where one lived and COVID-19 anxiety among Chinese college students that people living in urban areas reported higher levels of worry about spreading the virus than those living in rural areas¹⁵. These discrepancies may be due to different study populations and settings and study time periods, 2021.

Our results may be related to differences in risk perception and awareness of the potential consequences of spreading the virus. Therefore, it is essential to provide education and support to individuals who are experiencing these concerns during the present or future disease outbreaks.

Study strengths and limitations

The strength of our study was that we utilized an anonymous online survey of more than 400 Vietnamese adults to collect information during the pandemic among persons living in two large capital cities in Vietnam. However, the study has some limitations, including using convenient sample, and a lack of information about the specific reasons for differences in worry by sex and health insurance status, as well as the potential impact of other social determinants of health, such as income and education, on personal worries about COVID-19 transmission.

Conclusion

We found that a significant proportion of the study population reported being worried about being infected with COVID-19, family/friends contracting the virus, and spreading the virus to others. Our results identified several socio-demographic factors that were significantly associated with

personal worries about COVID-19 transmission. These findings emphasize the interplay between individual risk perception and broader social determinants of health in shaping attitudes and behaviors related to COVID-19 prevention and control .

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