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Original Research

Prevalence and Associated Factors of Depression, Anxiety, and Stress Among Hanoi Residents, Vietnam

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ABSTRACT

Background: The increasing prevalence of stress, anxiety, and depression poses a greater risk, potentially amplifying complications and intensifying challenges across various aspects of public health. This study aims to evaluate the existing levels of stress, anxiety, and depression in individuals while analyzing key associated factors. **Methods:** 3840 residents of Hanoi city were selected for interview. An online questionnaire concerning psychological parameters, including the Impact of Depression, Anxiety, and Stress Scale-21 (DASS-21), was conducted. Statistical analyses were done using STATA version 15.0, with p-values under 0.05 considered significant. **Results:** The prevalence of depression, anxiety, and stress were 12.5%, 18.6%, and 10.6%, respectively. The rates of one symptom were 14.4%, two symptoms were 6.9%, and all three symptoms were 4.4%, respectively. There was a negative correlation with levels of depression, anxiety, and stress (adjOR (95%CI) =-0.2 (-0.22 - -0.17) – 0.12 (-0.15-0.09) – 0.09 (-0.13 - -0.06); p<0.01). Compared to men, women frequently experience higher levels of stress and anxiety. Married people experience lower levels of stress, anxiety, and depression compared to single people, and people who live in rural areas experience lower levels of depression than people who live in urban areas (adjOR (95%CI) = -0.04 (-0.07--0.01); p<0.01). **Conclusions:** The study provides evidence that people experience mental health problems such as depression, anxiety, and stress in Vietnam. There is a need for timely response measures to improve people's health and cope with different epidemic scenarios in the future.

Keywords: Depression; anxiety; physiological stress; Vietnam

1. INTRODUCTION

Mental disorders are delineated by clinically significant impairments in cognitive processes, emotional regulation, or behavioral functioning.(1) Within this spectrum, stress-related conditions, anxiety disorders, and depressive syndromes are collectively classified as common mental disorders. Epidemiological data suggest that approximately 970 million individuals globally are affected by such conditions, constituting nearly 19% of the total world population.(2) Longitudinal trends reveal a marked increase in the prevalence of major depressive episodes among adolescents aged 12 to 17 years, rising from 8.7% to 13.2%, and among young adults aged 18 to 25 years, from 8.1% to 13.2%, between 2005 and 2017.(3) Furthermore, there is a discernible epidemiological shift wherein non-communicable

diseases (NCDs)—including mental health disorders—are superseding infectious diseases as principal contributors to disability and premature mortality, particularly within developing regions.[4,5]

The World Health Organization (WHO) officially designated COVID-19 as a global pandemic on March 11, 2020. As of February 27, 2024, a total of 703,735,806 confirmed cases and 6,986,380 fatalities have been reported worldwide.[6] Characterized by its exceptional transmissibility and its unprecedented disruption across modern society, the pandemic has exerted profound effects across all societal sectors, with particularly notable ramifications for psychological well-being.[7-9] In Asia, numerous middle-income countries (MICs) contend with persistent economic vulnerabilities and constrained healthcare infrastructures, which have contributed to a substantial burden of psychological morbidity among their populations.[10]

In an effort to mitigate viral transmission, governments globally enacted a range of public health interventions, including mandates for self-isolation and nationwide lockdowns. Although these measures proved effective in curbing infection rates and reducing mortality, they concurrently imposed significant adverse consequences on the mental health and social stability of populations, transcending socio-demographic boundaries. Vietnam—a developing nation with an estimated population approaching 100 million—has similarly experienced a marked escalation in mental health concerns. A national study conducted in 2020 reported that the prevalence of depression, anxiety, and stress stood at 4.9%, 7.0%, and 3.4%, respectively, with increases attributed to the pandemic's impact.[11] Multiple sociodemographic determinants—including living arrangements, household income, marital status, and educational attainment—have been identified as correlates of heightened vulnerability to mental health disorders among young populations.[12] The escalating mental health burden not only affects individual well-being but also strains healthcare and social support systems, which remain underdeveloped and ill-equipped to respond adequately.[13] Formal psychiatric services, such as dedicated hospitals and welfare centers, remain insufficiently established across the country.[14] Compounding these challenges are critical shortages in the mental health workforce, both in terms of capacity and specialized expertise.[14] The COVID-19 pandemic has further intensified these systemic deficiencies, posing significant obstacles to the provision of comprehensive mental health care across the broader community.

As the capital and principal center for governance and economic activity, Hanoi is undergoing rapid socio-economic transformation, driven by a range of complex factors that exert substantial influence on the psychological health of its residents. In 2020, Hanoi faced its first wave of the COVID-19 pandemic, marking the inaugural implementation of widespread "social distancing" measures in both the city and the country at large, in accordance with public health directives aimed at containing viral transmission. Although these interventions were essential and effective in mitigating the spread of COVID-19, the imposition of prolonged social isolation was associated with detrimental effects on population mental health.[15] At the individual level, mandatory home confinement has been linked to an array of adverse emotional responses, including heightened levels of depression, anxiety, and stress. Additional psychosocial stressors identified during the pandemic include the pervasive fear of infection, critical shortages of personal protective equipment, and the perceived infringement of personal freedoms under unfamiliar public health mandates.[15,16] Despite the considerable mental health challenges emerging during the pandemic, no epidemiological investigations have yet been conducted to characterize the prevalence of key psychological disorders—namely depression, anxiety, and stress—among Hanoi's population. Given the pressing need for empirical data to inform targeted mental health interventions and strengthen healthcare responses, this study was undertaken with two principal objectives: (1) to estimate the prevalence of symptoms of depression, anxiety, and stress in the urban population of Hanoi during 2020, and (2) to examine selected sociodemographic factors associated with these psychological outcomes.

2. METHODS

2.1. Study Design and Setting

A cross-sectional study was conducted in Hanoi, Vietnam, between July and October 2020. Data collection employed a quantitative approach utilizing self-administered online questionnaires. Ethical approval for the study was obtained from Hanoi Medical University (reference number 866).

Participants were initially recruited through personal networks and social media platforms.

Individuals with whom the research team had prior personal or professional relationships were invited to complete the survey and were subsequently encouraged to disseminate the survey link to their acquaintances and relatives. This recruitment strategy followed a snowball sampling technique, whereby initial respondents facilitated the enrolment of additional participants. The sampling process continued until the required sample size was achieved. All respondents provided informed consent for the use of their data in the study.

2.2. Participants and Sample Size

The quantitative survey to select research subjects from 15 years old and up in Hanoi, Vietnam in 2020.The following formula was used to calculate the sample size:

$$n = Z^2_{(1-\frac{\alpha}{2})} \frac{p(1-p)}{(p\varepsilon)^2}$$

Which, p is the percentage of participants who suffer from Depression (p=0.29), Anxiety(p=0.32), Stress (p=0.35) in the study of Mirzaei et al.; ε = 0.05 (due to limited resources of research).[17] The maximum calculated sample size was 3236 subjects.

Actually, the study surveyed 3840 subjects using snowball sampling.

2.3. Variables

The self-answering survey questionnaire is designed on Google form. The survey link was sent to subjects from 15 years old and up in Hanoi, Vietnam, using the DASS 21 scale.[18] General information including age, gender, religion, ethnicity, location, marital status, education, occupation, and economic status. On the other hand, DASS 21: consists of 21 questions about 3 issues related to mental health: depression (7 questions), anxiety (7 questions) and stress (7 questions).

2.4. Statistical Methods

Descriptive statistics and inferential statistics were performed using STATA 15.0 software. Quantitative variables are described by mean and standard deviation, qualitative variables are described by frequency and percentage. The association between some factors and anxiety, depression and stress was correlated and measured by univariate and multivariate linear regression analysis, with the dependent variable being the subjects' anxiety, depression and stress scores (0 – 42).

Mental health symptomatology was assessed using the DASS-21 scale, which has been previously validated in the Vietnamese context.[18] The DASS-21 comprises 21 items measuring three domains of psychological distress: depression (7 items), anxiety (7 items), and stress (7 items). Each item is scored on a 4-point Likert scale ranging from 0 to 3. The total score for each domain was calculated by summing the scores of the respective 7 items, multiplying the result by two, and interpreting the severity according to established cut-off values. The resulting scores for each domain range from 0 to 42, with higher scores indicating greater symptom severity (Table 1).

Table 1. The DASS-21 scores

Level	Depression	Anxiety	Stress
Normal	0 – 9	0 - 7	0 - 14
Mild	10 – 13	8 - 9	15 - 18
Medium	14 – 20	10 - 14	19 - 25
Severe	21 – 27	15 - 19	26 - 33
Very serious	≥28	≥20	≥34

3. RESULTS

Among the 3840 citizens who took part in the research, more than half of the respondents were female (54.8%). Many of the study participants (53.2%) were under 25 years old.; 18.1% were between the ages of 26 and 34; and just roughly 5% were beyond 60. Regarding marital status, more than half (57.9%) are single, 40.2% are married and less than 2% are divorced, separated, widowed, and so on. The majority of research participants lived in urban areas (67.7%) and had a college education (68.4%). And only 30.1% of the participants gave up their studies after reaching the foundational levels. Furthermore, respondents mainly belonged to the average financial group (91.5%) (Table 2).

Table 2. Participants' characteristics (n=3840)

Characteristics	Number (n)	Percentage (%)
Gender		
Female	2106	54.8
Male	1734	45.2
Age groups		
≤25	2044	53.2
26-34	694	18.1
35-45	459	12.0
46-60	460	12.0
>60	183	4.7

(*continued on next page*)

Table 2. (*continued*)

Characteristics	Number (n)	Percentage (%)
Marital status		
Single	2223	57.9
Married	1543	40.2
Others	74	1.9
Location		
Urban	2598	67.7
Rural	1242	32.3
Academic level		
High school and under	1155	30.1
College	2627	68.4
Graduate	58	1.5
Job		
Fixed salary (officer, pensioner)	2803	73.0
Unfixed salary (freelancers, farmers)	946	24.6
Other (unemployed, housewives)	91	2.4
Work status		
Officials	469	12.2
Full-time, unlimited	1167	30.4
Full-time, term-limited	573	14.9
Part-time	748	19.5
Others	883	23.0
Finance		
Wealthy	130	3.4
Medium	3515	91.5
Hard	195	5.1

The results showed that the majority of subjects had normal mental health status. The proportion of respondents showing signs of moderate to very severe depression, anxiety, and stress were 6.28%, 12.5% and 5.9%, respectively (Table 3).

According to Table 4, there was 25.7% of participants reported having at least one sign of stress, anxiety, or depression. The rates of one expression were 14.4%, two expressions were 6.9%, and all three expressions were 4.4%, respectively.

Table 5 demonstrated that age was negatively associated with levels of depression, anxiety, and stress (adjOR [95% CI] = -0.20 [-0.22 to -0.17], -0.12 [-0.15 to -0.09], and -0.09 [-0.13 to -0.06], respectively; $p < 0.01$). Women exhibited higher levels of stress and anxiety compared to men. Married individuals reported lower levels of depression, anxiety, and stress relative to single individuals. Participants residing in rural areas experienced lower levels of depression than their urban counterparts (adjOR [95% CI] = -0.04 [-0.07 to -0.01]; $p < 0.01$). Individuals with unstable incomes, such as farmers and freelance workers, had lower levels of psychological distress compared to those with stable salaries, including public sector employees. Regarding employment status among government workers, full-time indefinite employees reported higher levels of depression, anxiety, and stress compared to civil servants, whereas part-time employees demonstrated lower levels (adjOR [95% CI] = -0.10 [-0.14 to -0.08], -0.17 [-0.21 to -0.14], and -0.08 [-0.10 to -0.04], respectively; $p < 0.05$).

Table 3. Prevalence of depression, anxiety, and stress in study subjects (n=3840)

Severity	Depression		Anxiety		Stress	
	Number (n)	Percentage (%)	Number (n)	Percentage (%)	Number (n)	Percentage (%)
Normal	3359	87.5	3126	81.4	3433	89.4
Mild	244	6.4	221	5.8	180	4.7
Moderate	184	4.8	366	9.5	144	3.8
Severe	28	0.7	73	1.9	59	1.5
Extremely severe	25	0.6	54	1.4	24	0.6

Table 4. Prevalence of one or more symptoms of stress, anxiety and depression at the same time in respondents (n=3840)

Symptoms	Number (n)	Percentage (%)
Normal	2852	74.3
1 Symptom	553	14.4
2 Symptoms	265	6.9
3 Symptoms	170	4.4

Table 5. Associated factors with depression, anxiety and stress related to COVID-19 among Vietnamese

Factors	Depression		Anxiety		Stress	
	Adj. OR	**95%CI**	**Adj. OR**	**95%CI**	**Adj. OR**	**95%CI**
Age	-0.20**	-0.22; -0.17	-0.12**	-0.15; -0.09	-0.09**	-0.13; -0.06
Gender						
Female	Ref.		Ref.		Ref.	
Male	0.24	0.01; 0.06	0.06**	0.03; 0.09	0.07**	0.04; 0.10
Marital status						
Single	Ref.		Ref.		Ref.	
Married	-0.19**	-0.21; 0.16	-0.13**	-0.16; -0.11	-0.11**	-0.14; -0.08
Others	0.00	-0.04; 0.05	0.01	-0.03; 0.06	0.02	-0.01; 0.06
Location						
Urban	Ref.		Ref.		Ref.	
Rural	-0.04*	-0.07; -0.01	-0.04*	-0.07; -0.01	-0.04*	-0.07; -0.01
Academic level						
High school and under	Ref.		Ref.		Ref.	
College	0.03	-0.01; 0.06	0.00	-0.04; 0.03	0.00	-0.03; 0.03
Post-graduate	-0.01	-0.04; 0.01	-0.02	-0.04; 0.01	0.01	-0.01; 0.03
Job						
Fixed salary (officer, pensioner)	Ref.		Ref.		Ref.	
Unfixed salary (freelancers, farmers)	-0,10**	-0.14; -0.08	-0.07**	-0.01; -0.04	-0.08**	-0.10; -0.04
Other (unemployed, housewives)	-0.02	-0.05; 0.01	0.00	-0.03; 0.04	-0.01	-0.04; 0.02
Work status						
Officials	Ref.		Ref.		Ref.	
Full-time, unlimited	-0.08**	-0.1; -0.04	-0.03**	-0.06; 0.00	-0.05**	-0.08; -0.02
Full-time, term-limited	-0.01	-0.03; 0.03	-0.01	-0.04; -0.03	-0.02	-0.05; 0.02
Part-time	0.07**	0.04; 0.10	0.06**	0.03; 0.10	0.05**	0.02; 0.09
Others	0.05**	0.02; 0.08	0.02	-0.02; 0.05	0.04**	0.00; 0.07
Finance						
Wealthy	Ref.		Ref.		Ref.	
Medium	-0.10**	-0.20; -0.07	-0.10**	-0.15; -0.07	-0.06**	-0.10; -0.03
Hard	0.13**	0.08; 0.17	0.11**	0.06; 0.15	0.09**	0.05; 0.13

* p<0.05; ** p<0.01; Ref. = Reference group

4. DISCUSSION

Overall, the study evaluated the existing levels of stress, anxiety, and depression in individuals while analyzing key associated factors of Hanoi people in the context of COVID-19. In Vietnam, mental health issues are widespread and increasing. While there have been some advancements, the overall mental health service environment and healthcare response capacity remain inadequate.[13] Formal mental health services, such as psychiatric hospitals and social welfare centers, are not adequately established.[14] Additionally, the country also faces shortages in both the quantity and quality of specialized mental health workforce.[14] The pandemic crisis exacerbates these challenges, impacting the entire community's mental health support. The country was also one of the nations that enforced strict lockdown measures in response to the Covid-19 pandemic. The partial nationwide lockdowns demonstrated effective in containing the spread of Covid-19 within the community. However, these measures also generated adverse socio-economic impacts on the population. High rates of household income loss and declines in quality of life across various domains were observed among Vietnamese citizens as a result of the pandemic's consequences.[19]

We found that the overall depression rate among the study participants is comparable to the findings of Le

Thi Huong's research conducted in our country during the lockdown.[20] Additionally, a study examining the mental health status of individuals in seven middle-income countries in Asia indicated that Vietnam had the lowest scores for depression, anxiety, and stress among the countries surveyed.[10] Furthermore, our research reported significantly lower rates of depression compared to Iran and Mexico, which had rates of 47.9% and 41.3%, respectively.[21,22] Our research reported much lower rates compared to China and Iran at 43.1% and 47.9%, respectively.[21,23] The epidemic situation and responses varied by country, and differences in certain characteristics of the research subjects could explain the variations in our study results. For instance, the research in China focused on clinically stable patients with COVID-19. Alternatively, it is worth mentioning that countries where governments promptly enforced strict policies observed lower rates of clinically significant depressive symptoms.[24] Therefore, it is crucial for governments to implement policy interventions to engage community participation in mental health.

The World Health Organization (WHO) predicted that the global prevalence of anxiety in the community was 3.6% prior to the pandemic.[25] In our study, we found that 18.6% of participants exhibited symptoms of anxiety, ranging from mild to extremely severe. This rate is even higher than the highest reported prevalence worldwide, which is 7.7% in the United States.[25] Additionally, the level of anxiety symptoms observed in our research surpassed those reported among citizens during the quarantine period and among young individuals during the second wave of COVID-19.[20,26] In our research, moderate anxiety was the most common. It is important to pay attention to the greater percentage of people who report having moderate to severe anxiety. Interventions might be required, depending on the severity of the anxiety, since ongoing anxiety can result in suicidal thoughts. Our research indicated that the rate of stress among our inhabitants during the quarantine period was 6.5%.[20] This figure, however, was significantly lower than reports from other countries during the pandemic. A systematic review found that the worldwide rate of stress during the COVID-19 epidemic was 29.6%,[27] while a study conducted in Iran in early 2021 reported a stress rate of 36.6%.[21] The level of stress from moderate, to severe to extremely severe is notably elevated in our research. Stress, however, is a mental illness that frequently co-occurs with other illnesses, worsening their effects and severity. Furthermore, stress can act as a trigger for a variety of mental health conditions, highlighting the significance of early identification, prompt intervention, and treatment in the context of both prevention and treatment initiatives. From the research, it is evident that subjects displaying signs of mental disorders often exhibit a combination of depression, anxiety, and stress. Our result was lower than a study conducted in Iran, where the comorbidity rate of the three disorders was 9.1%.[21] Additionally, it was also lower than the findings in Alijanvand et al.'s research.[28] Notably, the incidence of depression paired with stress (16.5%) was higher than the prevalence of depression paired with anxiety (12.0%) and anxiety paired with stress (10.23%) in the total sample. At the same time, the results of this study also demonstrated a higher prevalence of comorbidities than pure anxiety, stress or depression.[28] However, combined with previous research evidence, confirms that mental disorders can co-occur and mutually influence each other. Comorbidities between depression, anxiety and stress cause patients to experience multiple relapses of these mental illnesses.[29] Patients with comorbidity between these disorders experience more severe psychological symptoms, more impaired physical and mental health, and lower quality of life than those with one disorder. Furthermore, patients with mixed psychological disorders are also more likely to have suicidal thoughts.[30,31] Therefore, patients with co-morbid mental disorders may require additional special attention.

Logistic regression analysis indicates that older age groups tend to have fewer mental disorders, a finding that aligns with many studies conducted worldwide.[32-34] This result can be attributed to the fact that older individuals often learn from their experiences and are better equipped to handle various situations effectively. Compared to single individuals, married people generally experience lower levels of depression, anxiety, and stress. Living alone is considered a risk factor for mental health issues, especially during times of high stress and worry, as it reduces opportunities for sharing and support. This aligns with research conducted in Turkey.[35] Income and occupation significantly influence the prevalence of mental disorders. Those who are self-employed, such as farmers and technology cab drivers, typically report lower rates of mental health problems compared to individuals with fixed salaries, such as civil servants and pensioners. Furthermore, individuals in part-time or non-permanent jobs tend to have higher incidences of depression, anxiety, and stress

compared to their civil servant counterparts. Many part-time and irregular workers are students, who are particularly susceptible to mental health challenges. Numerous studies have highlighted the prevalence of mental health issues among the student population.[36,37] The study has several limitations. First, its cross-sectional design prevents the establishment of causal relationships. Second, using social media for convenience sampling creates accessibility barriers for certain demographic groups, which reduces the representativeness of the research sample. Third, the accuracy of the data may be compromised by differences in how respondents interpret the questions, as well as the subjective nature of their opinions. Additionally, the sensitive nature of the research topic caused some participants to be hesitant, hindering the transparency of the information they provided. Finally, while our study employed the DASS-21 (Depression, Anxiety, and Stress Scale), it did not address other important aspects, such as COVID burnout. Research indicates that burnout is a significant public health issue, particularly during the COVID-19 pandemic.

5. CONCLUSION

This study provided empirical evidence on the prevalence of depression, anxiety, and stress within the population. It expanded the existing literature by investigating the psychological impacts of the COVID-19 pandemic. Early detection of anxiety, stress, and depressive symptoms served as important prognostic indicators for potential long-term mental health consequences. The absence of timely intervention risked profound and enduring effects on psychological well-being, social structures, and economic stability. The findings were expected to support the development of targeted strategies and policy responses by governmental and organizational stakeholders to address the growing burden of mental health disorders, particularly during public health emergencies.

Ethical Approval

The ethics committee gave its approval to the research at the Hanoi Medical University by Decision No. 866/QĐ-ĐHYHN, date April 29, 2020.

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Competing Interests

All the authors declare that there are no conflicts of interest.

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Underlying Data

Derived data supporting the findings of this study are available from the corresponding author on request.

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