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THE STATUS OF WORKER'S MENTAL HEALTH DISORDER IN MANUFACTURE ENTERPRISES OF VIETNAM

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To assess the occurrence of mental health disorders, including anxiety, stress, and depression, among production workers in Vietnam›s steel and ceramic tile manufacturing sectors.

This research involved 1,228 production workers — 836 from the steel sector and 392 from ceramic tile manufacturing — to evaluate the prevalence of mental health issues, including anxiety, stress, and depression. The methodology included clinical assessments of the employees, featuring observations, job requirement analyses, interviews, and mental health evaluations using the DASS 21 scale.

The study reveals significant exposure of workers to challenging conditions like high temperatures, dust, and noise, contributing to workplace stress. A considerable part of workers (74,0%) faced a stressful environment, with higher exposure reported among steel workers (79,1%) compared to ceramic tile workers (63,2%), p<0,001. The overall prevalence of mental health disorders was 20,8%, with comparable rates between steel workers (21,1%) and ceramic tile workers (20,2%), not statistically significant (χ^2=0,13, p=0,72). Specifically, the rates for anxiety, stress, and depression were 18,7%, 7,4%, and 7,2% across both worker groups. Among steel workers, these rates were 18,4% for anxiety, 7,4% for stress, and 6,6% for depression, whereas ceramic tile workers showed slightly higher rates of 19,4% for anxiety, 7,4% for stress, and 8,7% for depression.

The study identified a higher depression rate of 10,0% among workers aged ≥35, nearly double the rate found in those under 35 (5,4%), indicating a significant age-related risk factor (OR= 1,96; 95%CI=1,26–3,02). Workers experiencing stress at work reported a 24,3% prevalence of mental disorders, 1,35 times higher than their unstressed counterparts (19,2%) (OR= 1,35; 95%CI=1,01–1,81). To combat these challenges, the authors propose several strategies aimed at mitigating mental health risks among workers.

Key words: *steel production workers, ceramic tile production workers, mental disorders, anxiety disorders, job stress, depression*

Introduction

Mental disorders encompass a range of conditions that affect an individual's mood, cognition, and behavior, collectively known as mental health disorders. Common types of mental health disorders include anxiety, stress, and depression.

In this study, «stress» is defined as the psychological response of workers to occupational factors, including noise, high temperatures, and complex working conditions. This definition aligns with ICD-10 code F43.2, representing adjustment disorders and stress responses associated with the work environment.

According to the project results report by the Vietnam Ministry of Health in 2012, titled «Research on Risk Factors for Some Non-Communicable Diseases in 8 Provinces/Cities of Vietnam» [1], stress-related disorders are rapidly increasing, with the World Health Organization›s epidemiological statistics from 2010 indicating prevalence rates in the general population ranging from 5% to 10%. In some developed countries, this figure can reach as

high as 15% to 20%. Mental disorders account for 15% of the overall disease burden in society. Globally, an estimated 264 million people are affected by depression. A recent study by the World Health Organization estimated that depression and anxiety disorders cost $1 trillion annually in lost productivity [2].

Vietnam's mental health situation reflects this global trend. A national survey conducted in 1999-2000 revealed a prevalence rate of 15% for 10 common mental illnesses. More recent studies in 2014, albeit on a smaller scale, indicated that the rate of mental disorders has increased to about 20% to 30%. According to Central Psychiatric Hospital 1 in Vietnam, the prevalence of mental disorders in 2014 was 14,2%, with depressive disorders alone accounting for 2,45%. The suicide rate in 2015 was reported at 5,87 per 100,000 people [3].

Mental disorders are classified as one of the non-communicable diseases in the National Strategy for Non-communicable Disease Prevention and Control by the Ministry of Health and the government. Non-communicable diseases severely impact public health and the country's socio-economic development due to the high number of people affected, leading to significant rates of disability and mortality. Effective prevention and control of non-communicable diseases can reduce the prevalence of these diseases in the community, prevent disability and premature death, and alleviate hospital overcrowding [4].

Particularly in tropical countries like Vietnam, with its humid tropical climate, the environment typically features high and consistent temperatures throughout the year. The distinction between the rainy and dry seasons is not clear, often characterized by year-round rain or a lengthy rainy season followed by a short dry season. According to Circular 26/2016/BYT from the Ministry of Health of Vietnam, the microclimate in the workplace is defined by the meteorological conditions of the work environment. This includes the combined effects of temperature, humidity, air velocity, and the temperature of surrounding surfaces and equipment on workers [1, 5–7]. Consequently, the tropical environment can negatively impact workers' health.

Despite the inclusion of non-communicable disease prevention programs and projects in the National Health Strategy, we still face a double burden of disease. While morbidity and mortality from infectious diseases have decreased, major non-communicable diseases, including cardiovascular diseases, hypertension, diabetes, chronic obstructive pulmonary disease, and mental disorders, are rapidly increasing. They account for 73% of total mortality and 66% of the total disease burden. These non-communicable diseases are the main cause of hospital overcrowding, causing damage and significantly affecting the country's economic and social development because they require lifelong treatment, increase medical costs, reduce labor productivity and social output, and severely affect the health of workers and communities [4, 8].

Research objective: to assess the prevalence of mental health disorders, including anxiety, stress, and depression, among production workers in Vietnam's steel and ceramic tile manufacturing sectors.

Material and methods

Comprehensive surveys were carried out to collect data on the following aspects:

Working conditions and worker perceptions: Information was gathered about the technological processes, factory characteristics, labor-rest regimes, and personal protective equipment. Additionally, the nature of the work, work pressure, and workers' perceptions of their environment were surveyed to identify potential risk factors for mental health disorders.

Screening and investigation of mental disorder manifestations:

- Screening for mental health issues involved the detection of abnormal symptoms and diagnosis following Decision No. 2058/QD-BYT dated May 14, 2020, which issued the professional guidelines for diagnosing and treating common mental disorders [6].

- The DASS 21 scale (Depression Anxiety and Stress Scales), a tool developed by the Psychology Organization of the University of New South Wales, Australia (updated on July

Table 1 — General characteristics of study subjects

General characteristics of subjects	Group 1, n (%)	Group 2, n (%)	All, n (%)
Total number of subjects	836 (68,1)	392 (31,9)	1 228 (100)
Gender: Male Female	 833 (99,6) 3 (0,4)	 263 (67,1) 129 (32,9)	 1116 (90,6) 132 (8,4)
Age (years)	31,98±4,05	38,48±6,65	34,1±5,8
Working experience (years)	5,5±1,66	11,9±4,89	7,6±4,3

26, 2018 [9]), was employed to assess anxiety, depression, and stress levels among workers.

- Medical histories were collected to understand any pre-existing conditions.

- Finally, consultations were conducted to recommend strategies for preventing mental health disorders in the workplace.

The study examined 1 228 workers: 836 in steel production and 392 in ceramic tile production. The steel group was predominantly male (99,6%), while the ceramic group had a more balanced gender distribution (61,7% male). Both groups were middle-aged with considerable work experience, averaging 31,98±4,05 and 38,48±6,65 years in age, and 5,5±1,66 and 11,9±4,89 years in experience, respectively. The steel production involved various stages from iron ore to finishing, focusing on iron, steel, and cast iron. The ceramic tile production, with a capacity of 15 million m^2/year, included processes from raw material handling to packaging, focusing on ceramic tiles and Frit materials (table 1).

Data processing: The data collected from the various components of the study were meticulously cleaned, entered, managed, and analyzed using IBM SPSS Statistics 20.0. Descriptive statistics (percentages, mean ± standard deviation) summarized demographic and clinical characteristics. Group comparisons (steel vs. ceramic workers) employed: chi-squared tests for categorical variables (e.g., mental health prevalence), independent samples t-tests for continuous variables (e.g., age, work experience). Risk factors for mental health disorders were evaluated through: odds ratios (OR) with 95% confidence intervals (CIs) for binary outcomes, multivariate logistic regression (if adjusted for covariates like age/gender). Statistical significance was set at $p<0,05$.

Results and discussion

We have analyzed the job complexity and stress in workers by self-assessment (table 2).

Majority of steel (79,1%) and ceramic (63,2%) workers report their jobs as complex and stressful (p=0,000), affecting 74,0% overall. Research at a steel plant outlined significant hazards: dust (95,3%), noise (90,8%), and heat (87,2%) exposure, with 93,4% encountering dangerous conditions, leading to occupational risks like heat burns (71%), fire/explosion (69,2%), falling/crushing hazards (51,3%), electrical incidents (45,6%), and slippery surfaces (44,9%). Despite a fast work pace (47,5%) and high stress (48,5%), most experience normal conditions (80,2%) with frequent posture changes (55,3%). This underscores similar environmental conditions in steel and ceramic productions, especially in tropical regions.

Mental disorders manifestations were analyzed in the studied groups (table 3).

The prevalence of mental health issues like anxiety, stress, and depression among steel workers was 18,4%, with specific rates for anxiety (7,4%) and depression (6,6%). In contrast, ceramic tile workers showed slightly higher rates of 19,4% overall, with anxiety (7,4%) and depression (8,7%). The

Table 2 — Self-assessment of job complexity and stress

Complicated and stressful work	Group 1, n=836 (%)	Group 2, n=392 (%)	All. n=1228 (%)
Complicated and stressful work	661 (79,1)	248 (63,2)	909 (74,0)
Non-stressful work	175 (20,9)	144 (36,8)	319 (26,0)

Table 3 — Manifestations of mental disorders by DASS 21 scale

Mental disorder	Group 1, n=836 (%)	Group 2, n=392 (%)	p_{1-2}	All, n=1228 (%)
Mental disorder	176 (21,1)	79 (20,2)	0,717	255 (20,8)
Anxiety	154 (18,4)	76 (19,4)	0,686	230 (18,7)
Stress	62 (7,4)	29 (7,4)	0,991	91 (7,4)
Depression	55 (6,6)	34 (8,7)	0,187	89 (7,2)

mental disorder rates between the two groups were similar, indicating a modest increase in anxiety and depression among ceramic tile workers compared to steel workers. General mental disorder rates, encompassing any of anxiety, stress, or depression, were 21,1% for steel workers and 20,2% for ceramic tile workers, highlighting significant stress levels across both groups.

The general depression risk in two age groups (<35 and ≥35) was compared (table 4).

In our study, correlation assessment in the age group ≥35 had a depression manifestation rate of 10,0%, the age group <35 has a depression rate of 5,4%. Age ≥35 has a 1,96 times higher risk of depression than age <35 (p<0,05; 95%CI=1,26–3,02).

We have compared the stress levels at work and risk of mental disorders (table 5).

Community studies often report lower rates of mental disorders due to diverse demographics. Notably, workers in the electronics assembly sector showed high mental disorder rates. A study comparing 5,944 electronics assembly workers with 6,270 from other fields found significantly higher occupational stress (64,5% vs. 52,6%) and depression (12,7% vs. 9,9%), with p < 0,05. Key risk factors included female gender, migrant status, long working hours, reward imbalance, and insufficient sleep [10].

In a coal mining study in Shanxi, China, anxiety and depression rates were 51,1% and 60,5%, respectively. For copper-nickel miners in Xinjiang, 42,65% experienced occupational stress, with significant variations across demographics. A textile industry assessment in Zhejiang found high and low occupational stress rates of 30,1% and 69,9%, respectively [11].

Among 613 railway workers in Fuzhou, China, mental health issues were reported at 40,5% for general health, 4,4% for anxiety, and 9,0% for depression, with 40,78% experiencing occupational stress [12]. A study of 400 steel employees in Iran found a 53% stress rate [13].

In Vietnam, a survey of 1,200 workers in various provinces showed 30,5% had depressive symptoms, and 33,6% had suicidal ideation, linked to educational background and burnout [14]. In another cross-sectional study in Hanoi and Bac Ninh with 289 workers, 38,6% reported depression, associated with long working hours and health issues. Factors like being female or living with parents correlated with lower depression risk [15, 16].

Lastly, an assessment of 195 female staff at Da Nang University found anxiety rates at 13,6%, influenced by factors like children and job stress [17]. A study of 311 workers in a ceramic tile factory showed a 13,5% occupational stress rate, which was higher for those working over five days a week [7].

Table 4 — Age and general depression risk of the 2 groups

Age group	Depression		Non-stressful work		χ^2	p	OR	CI
	n	%	n	%				
≥35	50	10,0	551	90,0	9,4	0,002	1,96	1,26–3,02
<35	39	5,4	688	94,6				

Table 5 — Stress levels at work and risk of mental disorders

Stress level at work	Have a mental disorder		Non-stressful work		χ^2	p	OR	CI
	n	%	n	%				
Work complicated and stressful	91	24,3	283	75,7	4,2	0,041	1,35	1,01–1,81
Non-stressful work	164	19,2	690	80,8				

These findings illuminate the varying mental health challenges across professions, highlighting the impact of job complexity, industry type, and personal factors on mental health outcomes.

Conclusion

This study reveals a critical burden of mental health disorders among Vietnamese steel and ceramic tile workers, with 20,8% experiencing anxiety, stress, or depression, driven by prolonged exposure to hazardous conditions (heat, noise, dust). Key findings include:

Occupational stressors: 74,0% of workers reported high job complexity/stress, significantly higher in steelworkers (79,1% vs. 63,2%, $p<0,001$).

Age-related risk: Workers aged ≥35 had twice the depression risk (OR=1,96, 95%CI=1,26–3,02) compared to younger peers.

Industry comparison: Mental disorder prevalence was similar between steel (21,1%) and ceramic workers (20,2%), but ceramic workers showed higher depression rates (8,7% vs. 6,6%).

These results underscore the urgent need to integrate occupational mental health into Vietnam's non-communicable disease prevention programs. Future studies should investigate longitudinal impacts and evaluate interventions tailored to high-risk groups (e.g., older workers, shift workers).

Recommendations

1. For Enterprises and Policymakers

Workplace conditions should be improved through engineering controls such as ventilation systems and noise-reduction equipment to minimize exposure to occupational hazards (heat, dust, noise). Regulations should mandate reasonable break schedules and limit overtime, particularly for workers aged 35 and above. Enterprises should implement annual mental health screenings using validated tools (e.g., DASS-21) alongside routine physical examinations, while also establishing onsite counseling services and partnerships with specialized healthcare facilities. From a policy perspective, occupational safety regulations should be revised to incorporate mental health risk assessments, and incentive mechanisms (e.g., tax benefits) should be introduced to encourage businesses to adopt mental wellness programs.

2. For Workers and Communities

Stress management capacity should be enhanced by training supervisors in early identification of mental distress symptoms and fostering peer support networks. Workplaces should integrate stress-reduction activities such as mindfulness sessions or mid-shift exercise programs. Concurrently, awareness campaigns should be intensified through the distribution of educational materials on coping strategies and addiction cessation (tobacco/alcohol), with close collaboration between labor unions and employers to safeguard workers' mental health rights.

Ethics in Research: This study was approved by the Ethical Review Committee of the Vietnamese Ministry of Health. The authors declared no conflicts of interest and ensured transparency throughout all stages of the research.

Conflict of Interest: The authors declare no conflicts of interest.

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СОСТОЯНИЕ РАССТРОЙСТВ ПСИХИЧЕСКОГО ЗДОРОВЬЯ У РАБОЧИХ ПРОИЗВОДСТВЕННЫХ ПРЕДПРИЯТИЙ ВЬЕТНАМА

Цель исследования — оценка частоты возникновения психических расстройств, включая тревожность, стресс и депрессию, среди рабочих сталелитейной и керамической промышленности Вьетнама.

В исследовании приняли участие 1 228 производственных рабочих (836 из сталелитейного сектора и 392 — керамического производства) для оценки распространённости психических расстройств, включая тревожность, стресс и депрессию. Методология включала клинические обследования сотрудников с проведением наблюдений, анализа требований к работе, интервью и оценки психического здоровья с использованием шкалы DASS-21.

Исследование выявило значительное воздействие на рабочих сложных условий труда, таких как высокие температуры, пыль и шум, способствующих развитию профессионального стресса. Значительная часть рабочих (68,1%) сталкивалась со стрессовой средой, при этом более высокий уровень воздействия наблюдался среди сталелитейщиков (71,9%) по сравнению с рабочими керамического производства (63,2%) ($p<0,001$).

Общая распространённость психических расстройств составила 20,8% с сопоставимыми показателями среди сталелитейщиков (21,1%) и рабочих керамического производства (20,2%); различие не имело статистической значимости (χ^2=0,13, p=0,72).

Конкретные показатели составили: частота тревожности — 18,7%, стресса — 7,4%, депрессии — 7,2 процента. Среди сталелитейщиков эти показатели составили: тревожность — 18,4%, стресс — 7,4%, депрессия — 6,6 процента. Среди рабочих керамического производства: тревожность — 19,4%, стресс — 7,4%, депрессия — 8,7 процента.

Исследование выявило более высокий уровень депрессии (10,0%) среди рабочих в возрасте ≥35 лет, что почти вдвое превышает показатель среди лиц младше 35 лет (5,4%), указывая на значимый возрастной фактор риска (ОШ=1,96; 95%ДИ=1,26–3,02). Рабочие, испытывающие стресс на рабочем месте, демонстрировали распространённость психических расстройств — 24,3%, что в 1,35 раза выше, чем у их коллег без стресса (19,2%) (ОШ=1,35; 95%ДИ=1,01-1,81).

Для решения этих проблем авторы предлагают ряд стратегий, направленных на снижение рисков для психического здоровья рабочих.

Ключевые слова: *рабочие сталелитейного производства, рабочие керамического производства, психические расстройства, тревожные расстройства, профессиональный стресс, депрессия*

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