



# FREQUENCY AND ASSOCIATED FACTORS OF MENTAL HEALTH PROBLEMS IN COVID-19 VACCINATED WORKERS AT A PERUVIAN PUBLIC HOSPITAL

FRECUENCIA Y FACTORES ASOCIADOS A PROBLEMAS DE SALUD MENTAL EN TRABAJADORES VACUNADOS CONTRA EL COVID-19 DE UN HOSPITAL PÚBLICO PERUANO

José Raúl Collantes-Schmidt <sup>1,a</sup>, Belén Virrueta-De La Sota <sup>1,a</sup>, Marlon Yovera-Aldana <sup>2,b</sup>, Marco Antonio Bautista-Macedo <sup>1,c</sup>

## ABSTRACT

**Introduction:** The pandemic increased stress and underdiagnosed mental health issues in the workplace. **Objective:** To determine the frequency of mental health problems and their associated factors among vaccinated workers at the Dos de Mayo National Hospital (HNDM). **Methods:** A cross-sectional analytical study was conducted using secondary data from a mental health survey carried out by the HNDM Mental Health Service in October 2021. The Self-Reporting Questionnaire (SRQ) was administered to all HNDM workers who had received the full vaccination scheme. Statistical analysis included chi-square tests and logistic regression to identify associated factors. Results: Of 2109 workers, 2.7% presented mental health problems, with a higher prevalence in women (3.4%) compared to men (1.5%), and more frequent in the age groups 18-29 years (4.8%) and 50-59 years (4%). Divorced/separated individuals (7%) had a higher prevalence compared to single (2.8%) or married (2%) individuals. Multivariate analysis indicated a positive association with women (ORa: 2.30; 95% CI: 1.22-4.84) and divorced/separated individuals (ORa: 3.00; 95% CI: 1.12-7.25) compared to married/cohabiting individuals. There was a negative association in the 30-39 years (ORa: 0.43, 95% CI: 0.19-0.96) and 40-49 years (ORa: 0.30, 95% CI: 0.11-0.81) age groups compared to 18-29 years. No significant associations were found for other variables. **Conclusion:** One in forty HNDM workers presented mental health problems, with higher risks observed among women, younger and older age groups, and divorced/separated individuals. Improved screening and support for early intervention are recommended.

**Keywords:** Mental Health; COVID-19; Vaccination; Health Personnel. (Source: MESH-NLM)

## RESUMEN

**Introducción:** La pandemia aumentó el estrés y los problemas de salud mental subdiagnosticados en el trabajo. **Objetivo:** Determinar la frecuencia de problemas de salud mental y sus factores asociados en trabajadores vacunados del Hospital Nacional Dos de Mayo (HNDM). **Métodos:** Se realizó un estudio transversal-analítico utilizando datos secundarios de una encuesta de salud mental llevada a cabo por el Servicio de Salud Mental del HNDM en octubre de 2021. Se administró el Self-Reporting Questionnaire (SRQ) a todos los trabajadores del HNDM que habían recibido el esquema completo de vacunación. El análisis estadístico incluyó pruebas de chi-cuadrado y regresión logística para identificar factores asociados. **Resultados:** De 2109, el 2,7% de los trabajadores presentaron problemas de salud mental. 3,4% en mujeres y 1,5% en hombres y fue más frecuente en los grupos de edad de 18-29 años (4,8%) y 50-59 años (4%); así como en las personas divorciadas/separadas (7%) que las solteras (2,8%) o casadas (2%). El análisis multivariado indicó asociación positiva con mujeres (ORa: 2,30; IC 95%: 1,22-4,84) y personas divorciadas/separadas (ORa: 3,00; IC 95%: 1,12-7,25) frente a casados/convivientes. Hubo una asociación negativa en los grupos de 30-39 años (ORa: 0,43, IC 95%: 0,19-0,96) y 40-49 años (ORa: 0,30, IC 95%: 0,11-0,81) frente a 18-29 años. No se encontraron asociaciones significativas para otras variables. **Conclusión:** Uno de cada cuarenta trabajadores del HNDM presentó problemas de salud mental, con mayores riesgos observados entre mujeres, grupos etarios más jóvenes y mayores, y personas divorciadas/separadas. Se recomienda mejorar tamizaje y apoyo para intervención temprana.

**Palabras clave:** Salud mental; COVID-19; Vacunación; Personal sanitario. (Fuente: DeCS- BIREME)

<sup>1</sup> Universidad Científica del Sur, Lima, Peru.

<sup>2</sup> Grupo de Investigación Neurociencias, Efectividad Clínica y Salud Pública. Universidad Científica del Sur, Lima, Peru.

<sup>a</sup> Graduate of the Master's Degree in Occupational and Environmental Medicine.

<sup>b</sup> Master in Clinical Epidemiology.

<sup>c</sup> Master in Risk Prevention and Occupational Health.

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## INTRODUCTION

Mental health problems are underdiagnosed conditions in the workplace. There are prejudices and feelings of self-criticism among workers, making early diagnosis and subsequent management difficult <sup>(1,2)</sup>. When the COVID-19 pandemic began in 2020, it added a new work-related stress situation, leading to an increase in mental health problems <sup>(3)</sup>. This prompted the Ministry of Health to implement regulations to diagnose and improve working conditions, provide psychological support, and establish mechanisms to promote mental health and prevent mental disorders <sup>(4)</sup>.

Locally, high prevalences of depression (45.9%), anxiety (40.2%), and stress (49.0%) have been reported among healthcare workers during the early stages of the COVID-19 pandemic <sup>(5)</sup>, similar to those found in other parts of Latin America <sup>(6)</sup>. In the United Kingdom, a large percentage (58%) of staff reported difficulty coping with these problems and communicating them to their superiors, leading to the use of alcohol, cigarettes, and other substances, exacerbated by social restrictions <sup>(7)</sup>. In a humanitarian aid group in Africa, a prevalence of depression and anxiety of 39% was shown <sup>(8)</sup>.

Similarly, there was an increase in the incidence of depressive symptoms in the general population <sup>(9)</sup>, indirectly reflecting a progression in all work areas, not just in critical care areas <sup>(10)</sup>. Global systematic reviews have compared the frequency of mental health problems during the COVID-19 pandemic between healthcare workers and those in other areas, showing similar levels of distress but differing in causes <sup>(11)</sup>. In a Dublin hospital in 2020, health personnel showed 20.3% and 21% moderate intensity depression and anxiety, respectively. However, a considerable portion of the total respondents (22%) were administrative staff, and this group had the highest scores. Therefore, it is essential to also consider this labor group <sup>(12)</sup>.

Additionally, the factors associated with mental health problems among healthcare personnel are multiple and complex <sup>(13)</sup>. They are related to conditions such as long working hours and chronic stress <sup>(14)</sup>. However, information on the disease burden that includes all personnel and not just clinical staff is limited <sup>(15)</sup>.

Considering a context where more than 50% of healthcare personnel had received the second dose of the COVID-19 vaccine and the effectiveness in reducing mortality and severe disease was evident <sup>(16)</sup>, this study aimed to determine the frequency of mental health problems and their associated factors among vaccinated workers against COVID-19 at the Hospital Nacional Dos de Mayo (HNDM) in 2021.

## METHODS

### Design and Study Area

The research had a cross-sectional-analytical design based on secondary analysis of a database created by the HNDM mental health service in relation to the Health Surveillance and Care Plan for workers in the context of the COVID-19 pandemic, carried out in October 2021. The HNDM is a Peruvian public hospital managed by the Ministry of Health of Peru. It is located in central Lima and, according to its complexity level, is classified as a III-1 hospital. At the beginning of the COVID-19 pandemic, it was designated by the government as one of five referral hospitals for the care of coronavirus-affected patients <sup>(17)</sup>.

### Population and Sample

Our study included all records with complete responses from the Self-Reporting Questionnaire (SRQ). The original survey included all healthcare or administrative workers of the hospital who had received the complete vaccination scheme at the time of evaluation and agreed to answer the questionnaire; therefore, no sampling was done. The original survey was sequentially applied to the entire population present during the third COVID-19 vaccination dose. No initial sample size was calculated for frequency and associated factors. However, the sample size power was calculated for both, detailed in the analysis plan section.

For statistical power calculation, the STATA 18 program was used. To estimate power for prevalence calculation, we used the command `power oneproportion`. We estimated obtaining a difference in proportion between 0.025 to 0.80, considering a prevalence of mental health problems of 0.83 <sup>(18)</sup>.





We obtained similar powers of 99.9% for both limits. Regarding associated factors, the power twoproportions or artbin formula was used, depending on whether they had two or more than two categories, respectively. We found a power for the sex variable of 80.7% and for the education level of 7%. For age group, marital status, position, and work area, a similar power of 56% was obtained.

### Variables and Instruments

A person was considered a positive case of mental health problems if they had at least five positive responses out of a total of thirteen on the SRQ. The WHO SRQ questionnaire, designed between 1978 and 1993, has a sensitivity of 62.9% to 90% and a specificity of 44% to 95.2%. The Technical Guide for Mental Health Care for Health Personnel in the Context of COVID-19 by the Ministry of Health of Peru (MINSA), developed in 2020, recommends it as an adapted and validated instrument for use in health facilities in Metropolitan Lima, with Ministerial Resolution No. 186-2020-MINSA.

Regarding other variables, age was categorized as 18 to 29; 30 to 39; 40 to 49; 50 to 59; and 60 or older years; sex (male or female); education level (complete or incomplete secondary, technical, and higher); marital status (single, married, divorced or separated, cohabiting, and widowed); occupational group (doctors, nurses, other health professionals, nursing technicians, other health technicians/assistants, and administrative/general services) and work area (emergencies and critical areas, hospitalization, outpatient consultation, diagnostic support, and administrative offices).

The "other health professionals" category included obstetricians, nutritionists, psychologists, physical therapists, etc., excluding the already indicated nursing group. The "other health technicians and assistants" group included laboratory technicians, radiology technicians, among others. The administrative/general services group included workers not directly related to healthcare work: lawyers, journalists, engineers, system programmers, auditors, maintenance, or other related personnel. Regarding work areas, emergency and critical areas included all emergency areas (adult, pediatric, and gynecology-obstetrics), regardless of whether they were differentiated as COVID-19 areas,

as well as intensive care units (adult ICU, pediatric ICU, and intermediate care unit). It also included the pharmacy and emergency cash desk area. In the case of hospitalization areas, the hospitalization rooms, chemotherapy environments, delivery rooms, and obstetric center adjacent to patient admission areas were considered. For outpatient consultation, all outpatient consultation rooms used for ambulatory care were considered. In some services, due to the lack of an exclusive office environment, the consultation room was used as an office outside user care hours. In all other cases, administrative offices included the offices of healthcare services as well as other purely administrative function offices such as insurance, economy, personnel, logistics, planning, etc. Finally, diagnostic support areas included pharmacy, laboratory, clinical pathology, blood bank, anatomical pathology, and imaging environments.

### Procedures

Authorization was requested to conduct the research and access the data from the HNMD Mental Health Service, which contained the results of the mental health screening surveys conducted as part of the Health Surveillance and Care Plan, approved with Directorial Resolution 073-2020, based on MINSA Directives specified in the Technical Guide for Mental Health Care for Health Personnel in the Context of COVID-19, approved with Ministerial Resolution 180-2020-MINSA.

The initial survey was conducted by the HNMD Mental Health Service. It was carried out in the hospital's outpatient area from October 18 to 30, 2021, during the third COVID-19 immunization for healthcare personnel. Psychology staff handed a sheet with the abbreviated SRQ questionnaire to the worker, providing the respective explanation for marking their responses and allowing 20 minutes for its completion. The data were then recorded in a spreadsheet.

### Statistical Analysis

We used Stata Version 15.1 (Stata Corp, College Station, TX, USA). The absolute and relative frequencies of the workers' demographic and labor characteristics were reported.

Prevalence was calculated by dividing the number of positive results with more than five responses in relation to the total screened, and it was also calculated according to baseline characteristic categories. We assessed whether there was an association between the presence of mental health problems and baseline characteristics using the Chi-Square test. If the assumption that expected frequencies were less than 5 in more than 20% of the cells was not met, Fisher's exact test was used. Crude and adjusted odds ratios (OR) with their 95% confidence intervals were estimated using binary logistic regression analysis. Adjustment was made with variables that had a p-value less than 0.2. Collinearity and independence of factors were evaluated. For all hypothesis tests, an alpha value of 5% was used.

#### Ethical Aspects

The research was approved by the Institutional Ethics Committee in Research of the Universidad Científica del

Sur with Certificate No. 355-CIEI-CIENTÍFICA-2022, and the HNDM Biomedical Research Ethics Committee gave a favorable opinion on February 23, 2023, with evaluation No. 018-2023-CEIB-HNDM.

## RESULTS

### General characteristics

The total number of records in the database at the start was 2,378. Of these, 269 were incomplete and did not meet the study's eligibility criteria. Therefore, the included records were 2,109. In the included population, females predominated at 62.2%, and the group under 40 years old represented 43.4%. Regarding marital status, 50.9% were single. Additionally, 94% had higher education, and nursing staff represented 44% of the surveyed population.

According to the work area, personnel in service areas and outpatient clinics predominated, comprising 37.4% (Table 1).

**Table 1.** Descriptive characteristics of the study sample.

Characteristics	n = 2109
<b>Sex</b>	
Female	1 311 (62.2%)
Male	798 (37.8%)
<b>Age group</b>	
18 to 29 years	269 (12.8%)
30 to 39 years	646 (30.6%)
40 to 49 years	494 (23.4%)
50 to 59 years	424 (20.1%)
60 years and older	276 (13.1%)
<b>Marital status</b>	
Married/Cohabiting	936 (44.4%)
Divorced/Separated	98 (4.7%)
Single	1075 (50.9%)
<b>Educational level</b>	
Up to Primary/Secondary	126 (5.9%)
Up to Higher Education	1983 (94.0%)



<b>Occupational group</b>	
Physicians	575 (27.2%)
Nurses	360 (17.1%)
Non-physician Health Professionals*	167 (8.1%)
Nursing Technicians	368 (17.4%)
<b>Other Technicians / Health Assistants</b>	171 (8.3%)
Administrative /General Services	468 (22.2%)
<b>Work area</b>	
Diagnostic Support Areas	235 (11.1%)
Administrative Office Areas	407 (19.3%)
Emergency and Critical Areas	474 (22.5%)
Hospitalization Areas	204 (9.7%)
Service Areas, Departments, and Outpatient Clinics	789 (37.4%)
<b>Case Status</b>	
Negative	2052 (97.3%)
Positive	57 (2.7%)

\* Psychologists (5), nutritionists (33), obstetricians (36), medical technologists (70), pharmacists (33), dentists (4).

### Prevalence of mental health problems

The prevalence of mental health problems was 2.7%. It was more frequent in women than in men (3.4% vs. 1.5%;  $p=0.008$ ). The highest prevalence was found among those aged 18 to 29 years and 50 to 59 years, showing a bimodal distribution ( $p=0.022$ ). Regarding marital status, divorced/separated individuals reached 7%, compared to single or married individuals who were at 2% ( $p=0.022$ ). For different educational levels, positions, or work areas, the prevalence of mental health problems was similar. Regarding occupational groups, the highest percentage was observed in nursing technicians, followed by physicians ( $p=0.045$ ) (Table 2).

### Multivariate Analysis

In the multivariate analysis, women had 1.3 times higher risk of having mental health problems (ORa: 2.30; CI 95%: 1.22 to 4.76;  $p=0.005$ ). The age group of 30 to 39 years had a 57% lower risk of mental health problems compared to the 18 to 29 years age group (ORa: 0.43; CI 95%: 0.19 to 0.96;  $p=0.036$ ). A similarly lower risk was observed in the 40 to 49 years age group, with a 70% reduction (ORa: 0.30; CI 95%: 0.11 to 0.81;  $p=0.010$ ).

Regarding marital status, divorced/separated individuals had twice the risk of mental health problems (ORa: 3.00; CI 95%: 1.12 to 7.25;  $p=0.019$ ). The rest of the variables did not show any association (Table 3).

**Table 2.** Factors associated with having a positive case of mental health problems.

Characteristic	Positive case n = 57	Negative case n = 2 052	P value
<b>Sex</b>			
Male	12 (1.5%)	786 (98.5%)	0.008 *
Female	45 (3.4%)	1.266 (96.6%)	
<b>Age group</b>			
18 to 29 years	13 (4.8%)	256 (95.2%)	0.022 †
30 to 39 years	14 (2.2%)	632 (97.8%)	
40 to 49 years	7 (1.4%)	487 (98.6%)	
50 to 59 years	17 (4.0%)	407 (95.9%)	
60 years and older	6 (2.2%)	270 (97.8%)	
<b>Marital status</b>			
Married/Cohabiting	20 (2.1%)	916 (97.7%)	0.022 *
Divorced/Separated	7 (7.1%)	91 (92.8%)	
Single	30 (2.8%)	1045 (97.2%)	
<b>Educational level</b>			
Up to Primary/Secondary	2 (1.6%)	124 (98.4%)	0.578 †
Up to Higher Education	55 (2.8%)	1928 (97.2%)	
<b>Occupational Group</b>			
Physicians	22 (3.8)	553 (96.2)	0.045 †
Nurses	7 (1.9)	353 (98.1)	
Other health professionals	2 (1.2)	169 (98.8)	
Nursing technicians	16 (4.4)	352 (95.6)	
Other technicians/health assistants	2 (1.2)	165 (98.8)	
Administrative/General services	8 (1.7)	460 (98.3)	
<b>Work Area</b>			
Diagnostic support areas	3 (1.3%)	232 (98.7%)	0.229 †
Administrative office areas	7 (1.7%)	400 (98.3%)	
Emergency and critical areas	14 (2.9%)	460 (97.0%)	
Hospitalization areas	5 (2.5%)	199 (97.6%)	
Service areas, departments, and outpatient clinics	28 (3.5%)	761 (96.5%)	

\*Chi-square test of independence. † Fisher's exact test.



**Table 3.** Simple and adjusted multivariable regression analysis of factors associated with having a positive case of mental health problems.

Characteristic	ORc	CI 95%	p value	ORa	CI 95%	p value
<b>Sex</b>						
Male	Ref.			Ref.		
Female	2.32	1.20 a 4.86	0.008	2.30	1.22 a 4.84	0.005
<b>Age group</b>						
18 to 29 years	Ref.			Ref.		
30 to 39 years	0.44	0.20 a 0.95	0.034	0.43	0.19 a 0.96	0.036
40 to 49 years	0.28	0.11 a 0.70	0.008	0.30	0.11 a 0.81	0.020
50 to 59 years	0.82	0.39 a 1.75	0.604	0.83	0.35 a 2.02	0.683
60 years and older	0.44	0.15 a 1.13	0.099	0.46	0.14 a 1.33	0.166
<b>Marital status</b>						
Married/Cohabiting	Ref.			Ref.		
Divorced/Separated	3.52	1.35 a 8.19	0.005	3.00	1.12 a 7.25	0.019
Single	1.31	0.75 a 2.36	0.349	0.98	0.51 a 1.88	0.939
<b>Educational level</b>						
Up to Primary/Secondary	Ref.					
Up to Higher Education	1.77	0.54 a 10.9	0.432			
<b>Occupational Group</b>						
Physicians	Ref.					
Nurses	0.4	0.22 a 1.17	0.113			
Other health professionals	0.29	0.07 a 1.28	0.103			
Nursing technicians	1.14	0.60 a 2.13	0.691			
Other technicians/health assistants	0.31	0.07 a 1.31	0.110			
Administrative/General services	0.44	0.20 a 1.00	0.050			
<b>Work area</b>						
Diagnostic support areas	Ref.					
Administrative office areas	1.35	0.37 a 6.33	0.663			
Emergency and critical areas	2.35	0.76 a 10.3	0.182			
Hospitalization areas	1.94	0.47 a 9.57	0.367			
Service areas, departments, and outpatient clinics	2.85	1.00 a 12.0	0.088			

ORc: Crude Odds Ratio. ORa: Adjusted Odds Ratio. CI95%: Confidence Interval to 95%

## DISCUSSION

Our study found a low frequency of mental health problems, with one in 40 workers experiencing some mental health issue. Among the evaluated factors, female sex, the youngest or oldest age groups, and divorced/separated individuals were associated with these problems. The frequency of mental health problems among healthcare personnel during the

COVID-19 vaccination status, professional group, and the type of instrument used, ranging from 47% to 83% in national studies. At the Hospital Regional de Tumbes<sup>(18)</sup>, during the 2020-2021 period, using the SRQ, a high percentage of workers with some mental health problem (82.9%) was found. context varied depending on geographical area, This study only considered ICU health personnel in the COVID area with a sample of



only 35 subjects. On the other hand, a study from the Hospital Regional Docente Las Mercedes in Chiclayo during 2021<sup>(19)</sup>, with 212 workers, found that 47% of the population had anxious and depressive symptoms, with a higher frequency in men (76%) and associated with alcohol consumption. This study was conducted among non-COVID health personnel and used a different version of the SRQ (SRQ-18), so the frequencies might not be comparable.

We did not find studies describing healthcare and administrative personnel during the pandemic that used the abbreviated SRQ version suggested by MINSa, making it impossible to compare our results at the national level. However, we have verified that the abbreviated SRQ version has been successfully used for screening and treatment in the general population in Lima, where the questionnaire was applied virtually to 2,027 people, finding 77.9% positive cases and providing psychological intervention in 63% of cases, achieving a significant reduction in SRQ scores in at least 58% of participants<sup>(20)</sup>. This demonstrates the effectiveness of the tool as a screening and follow-up instrument. Additionally, there were no prior screenings at HNDM, so it was not possible to evaluate the change or impact of the COVID-19 pandemic.

Regarding the variables related to a higher prevalence of mental health problems, the female gender is the most represented in the health area and presents, as in other series, the highest frequency of stress and depression<sup>(6)</sup>. Regarding age, a meta-analysis conducted in Asia did not find a relationship with depressive disorders. However, an observational study reported that in the 31 to 40-year-old groups, fear of infecting their families prevailed, and in the 41 to 50-year-old groups, concern for their health prevailed. In our case, we can assume a similar motivation, where young adults (30 to 49 years old) expressed a lower frequency of mental health problems than younger (18 to 29 years old) or older adults. Finally, single/divorced marital status, compared to married individuals, presented an increased risk. Loneliness and isolation would influence mental health problems such as depression, as they lack concomitant family emotional support. Although not related, nursing technicians had the highest prevalence of mental health problems,

even higher than doctors. This coincides with reports of adverse outcomes in personnel during the pandemic, where this occupational group presented one of the highest frequencies<sup>(20)</sup>.

### Explanation of results

Healthcare personnel, regardless of the work area, have been affected by the COVID-19 pandemic in mental health without distinction<sup>(16)</sup>. However, we are struck by the low disease burden in our study at this particular moment of the pandemic. We can theorize that, at the time of the original survey, there was a complete vaccination scheme, and it was conducted while the third dose was being applied, which may have created an environment of optimism and transitory resilience<sup>(21)</sup>. At the same time, the effectiveness of the vaccine in reducing mortality and severe cases was demonstrated globally and locally<sup>(22)</sup>. The non-probabilistic convenience selection of workers may have also influenced it since only those who attended in person developed the survey, excluding those who worked virtually. Similarly, we must consider the way the questionnaire was administered, conducted while waiting for their vaccination and with limited supervision by surveyors.

### Research recommendations

Given that the prevalence result of mental health problems differs widely from those reported in national and international studies, we suggest establishing specific guidelines to apply the SRQ more accurately or choosing another instrument with better sensitivity. We recommend continuing screening and expanding information on associated factors to establish a profile of those who might be more susceptible to these problems and thus be able to act on the environment, recognize warning signs, and make an early diagnosis for timely intervention. It is essential to remember that mental health problems affect the quality of patient care and the workers' quality of life.

### Limitations and strengths

Among the limitations, we consider that the SRQ questionnaire only allows us to screen and establish the possibility of a mental health problem without specifying the diagnosis, so it must be confirmed with a specialized medical evaluation.







The evaluated factors do not intend to estimate causality, nor are all the associated factors that may intervene in the results available. There are factors related to mental health problems that have not been analyzed in this study; characteristics such as working hours, sleep hours, and economic status were not considered when applying the mental health screening instrument. There was no baseline screening of mental health problems in HNMD personnel before the COVID-19 pandemic to estimate changes in prevalence or factors. As it was conducted concurrently with the COVID-19 vaccination process, there is a possibility that participants did not pay attention to correctly filling out the questionnaire, did not have enough time to respond, or did not have an adequate environment to reflect on their answers.

Likewise, the surveyed population was limited to those working in person and did not include workers on sick leave or ill and those with virtual work; however, at the time of the survey, 90% were under this modality. Also, the convenience capture of workers, i.e., through non-probabilistic selection, could have led to potential selection bias.

We also consider as strengths that a validated and recommended questionnaire by the Ministry of Health was used to screen for mental health problems in health sector workers, as well as the sample size of 2,100 subjects, which allows for establishing the frequency of mental health problems with sufficient power.

## CONCLUSIONS

One in 40 workers who worked in person at HNMD in 2021 had mental health disorders. Associated factors were female sex, extreme age groups, and divorced/separated marital status. The post-vaccination context and some methodological limitations express this particular moment and limit its use for future recommendations. Regardless, the collaboration between mental health areas and Occupational Medicine should be strengthened to promote optimal working conditions for health personnel, elevated with or without a pandemic.

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**Correspondence:** Marlon Yovera-Aldana.

**Address:** Jirón San Martín 230 Dpto 502. Magdalena del Mar, Lima, Perú.

**Telephone:** +51 943990228.

**E-mail:** [myovera@cientifica.edu.pe](mailto:myovera@cientifica.edu.pe)

## REFERENCES

1. Villca Villegas JL, Moreno Choque RA, Gomez Verduguez CA, Vargas Aguilar AA. Influencia de la pandemia del COVID-19 en la salud mental de los trabajadores en salud. *Gaceta Médica Boliviana*. 2021;44(1):75-80. doi: [10.47993/gmb.v44i1.200](https://doi.org/10.47993/gmb.v44i1.200)
2. Salanti G, Peter N, Tonia T, Holloway A, White IR, Darwish L, et al. The impact of the COVID-19 pandemic and associated control measures on the mental health of the general population: A systematic review and dose-response meta-analysis. *Annals of Internal Medicine*. 2022;175(11):1560-71. doi: [10.7326/M22-1507](https://doi.org/10.7326/M22-1507).
3. Hill JE, Harris C, Danielle LC, Boland P, Doherty AJ, Benedetto V, et al. The prevalence of mental health conditions in healthcare workers during and after a pandemic: Systematic review and meta-analysis. *Journal of Advanced Nursing*. 2022;78(6):1551-73. doi: [10.1111/jan.15175](https://doi.org/10.1111/jan.15175).
4. Kotera Y, Gilbert P, Asano K, Ishimura I, Sheffield D. Self-criticism and self-reassurance as mediators between mental health attitudes and symptoms: Attitudes toward mental health problems in Japanese workers. *Asian Journal of Social Psychology*. 2019;22(2):183-92. doi: [10.1111/ajsp.12355](https://doi.org/10.1111/ajsp.12355).
5. Strohmeier H, Scholte WF, Ager A. Factors associated with common mental health problems of humanitarian workers in South Sudan. *PLoS One*. 2018;13(10):e0205333. doi: [10.1371/journal.pone.0205333](https://doi.org/10.1371/journal.pone.0205333).
6. Spoorthy MS, Pratapa SK, Mahant S. Mental health problems faced by healthcare workers due to the COVID-19 pandemic—A review. *Asian Journal of Psychiatry*. 2020;51:102119. doi: [10.1016/j.ajp.2020.102119](https://doi.org/10.1016/j.ajp.2020.102119).
7. Greene T, Harju-Seppänen J, Adeniji M, Steel C, Grey N, Brewin CR, et al. Predictors and rates of PTSD, depression and anxiety in UK frontline health and social care workers during COVID-19. *European Journal of Psychotraumatology*. 2021;12(1):1882781. doi: [10.1080/20008198.2021.1882781](https://doi.org/10.1080/20008198.2021.1882781).
8. Corbett G, Milne S, Reagu S, Mohan S, Hehir M, Lindow S, Connell MO. Anxiety and depression scores in maternity healthcare workers during the Covid-19 pandemic. *Authorea Preprints*. 2020. doi: [10.1002/ijgo.13279](https://doi.org/10.1002/ijgo.13279).
9. Sheraton M, Deo N, Dutt T, Surani S, Hall-Flavin D, Kashyap R. Psychological effects of the COVID 19 pandemic on healthcare workers globally: A systematic review. *Psychiatry Research*. 2020;292:113360. doi: [10.1016/j.psychres.2020.113360](https://doi.org/10.1016/j.psychres.2020.113360).
10. Vásquez GA, Salcedo ME. Depression, anxiety, and stress in dentists in times of covid-19 in northern Peru. *Journal of Oral Research*. 2021;10(2):1-7. doi: [10.17126/joralres.2021.022](https://doi.org/10.17126/joralres.2021.022).
11. Antiporta DA, Cutipé YL, Mendoza M, Celentano DD, Stuart EA, Bruni A. Depressive symptoms among Peruvian adult residents amidst a National Lockdown during the COVID-19 pandemic. *BMC Psychiatry*. 2021;21:1-12. doi: [10.1186/s12888-021-03107-3](https://doi.org/10.1186/s12888-021-03107-3).
12. Gómez-Martínez S, Ballester-Arnal R, Gil-Julia B, Abizanda-Campos R. Ansiedad, depresión y malestar emocional en los profesionales sanitarios de las Unidades de Cuidados Intensivos. *Annals of Psychology*. 2015;31(2):743-50. doi: [10.6018/analesps.31.2.158501](https://doi.org/10.6018/analesps.31.2.158501).
13. Martínez-Ponce D, Amat-Traconis M, Cala-Rosalba L, Chapan-Xolio E, Valenzuela-Velázquez L, Lecourtois-Amézquita M. Psychological repercussions on nursing staff due to the COVID-19 pandemic: A cross-sectional study. *Journal of Healthcare Quality Research*. 2023;38(1):3-10. doi: [10.1016/j.jhqr.2022.08.005](https://doi.org/10.1016/j.jhqr.2022.08.005).
14. Guo W-P, Min Q, Gu W-W, Yu L, Xiao X, Yi W-B, et al. Prevalence of mental health problems in frontline healthcare workers after the first outbreak of COVID-19 in China: a cross-sectional study. *Health and Quality of Life Outcomes*. 2021;19:1-10. doi: [10.1186/s12955-021-01743-7](https://doi.org/10.1186/s12955-021-01743-7).
15. Huarcaya-Victoria J, Villarreal-Rao B, Luna M, Rojas-Mendoza W, Alarcon-Ruiz CA, Villarreal-Zegarra D, et al. Factors associated with mental health outcomes in hospital workers during the COVID-19 pandemic: A mixed-methods study. *International Journal of Environmental Research and Public Health*. 2022;19(9):5346. doi: [10.3390/ijerph19095346](https://doi.org/10.3390/ijerph19095346).
16. Ministerio de Salud. Cinco hospitales del Minsa se encuentran preparados para albergar posibles pacientes con el virus COVID-19. 2020 [citado 20 de noviembre del 2023]. Disponible en: <https://www.gob.pe/institucion/minsa/noticias/84987-cinco-hospitales-del-minsa-se-encuentran-preparados-para-albergar-posibles-pacientes-con-el-virus-covid-19>
17. Marchán Valladares JM, Neyra Cornejo MY. Salud mental y estrés laboral en personal de salud de UCI del Área COVID-19 del Hospital Regional de Tumbes 2020 – 2021 [Internet] [Tesis de grado]. [Trujillo, Perú]: Universidad Privada Antenor Orrego; 2023 [citado 2 de febrero de 2024]. Disponible en: <https://repositorio.upao.edu.pe/handle/20.500.12759/11025>
18. Barboza Nuñez JV. Salud mental durante la pandemia SARS-COV-2 del personal de salud del área no COVID, de un Hospital del Ministerio de Salud, Lambayeque 2021 [Internet] [Tesis de grado]. [Lima, Perú]: Universidad de San Martín de Porres; 2023 [citado 5 de febrero de 2024]. Disponible en: <https://repositorio.usmp.edu.pe/handle/20.500.12727/12275>
19. Santa-Cruz J, Moran L, Tovar M, Peinado J, Cutipe Y, Ramos L, et al. Mobilizing digital technology to implement a population-based psychological support response during the COVID-19 pandemic in Lima, Peru. *Global Mental Health*. 2022;9:355-65. doi: [10.1017/gmh.2022.36](https://doi.org/10.1017/gmh.2022.36).
20. Ministerio de Salud. Minsa señala que efectividad de la tercera dosis de la vacuna contra la COVID-19 es más del 87% comparada con tener solo dos dosis de la vacuna. 2022 [citado 20 de noviembre del 2023]. Disponible en: <https://www.gob.pe/institucion/ins/noticias/630496-minsa-senala-que-efectividad-de-la-tercera-dosis-de-la-vacuna-contra-la-covid-19-es-mas-del-87-comparada-con-tener-solo-dos-dosis>
21. Perez-Arce F, Angrisani M, Bennett D, Darling J, Kapteyn A, Thomas K. COVID-19 vaccines and mental distress. *Lin CY, editor. PLoS ONE*. 8 de septiembre de 2021;16(9):e0256406. doi: [10.1371/journal.pone.0256406](https://doi.org/10.1371/journal.pone.0256406)
22. Santabárbara J, Bueno-Notivol J, Lipnicki DM, Olaya B, Pérez-Moreno M, Gracia-García P, et al. Prevalence of anxiety in health care professionals during the COVID-19 pandemic: A rapid systematic review (on published articles in Medline) with meta-analysis. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*. 2021;107:110244. doi: [10.1016/j.pnpb.2021.110244](https://doi.org/10.1016/j.pnpb.2021.110244)