

Original Article:

Functional status related to post-COVID 19 Syndrome in the nursing staff of a Second Level Hospital in Quito-Ecuador

Estado funcional relacionado con el Síndrome post-COVID 19 en el personal de enfermería en un Hospital de Segundo Nivel de Quito-Ecuador

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Abstract

Introduction: Nurses are on the front line fighting against the COVID-19 and are at high risk of infection by direct patient care. Multiple factors determine the severity of this disease and along with persistent symptoms due to subsequent infection, affect the functional status of the infected nurses. **General Objective:** To determine the functional status related to the post-COVID-19 in direct patient care nurses at Hospital General Docente de Calderón during 2022. **Method:** The research has a quantitative approach with a descriptive, observational and cross-sectional design which determined the functional status related to the post-COVID 19 syndrome in 142 respondents. For this purpose it was used the Spanish version of Post COVID 19 Functional Status Scale, previously validated. **Results:** The average age of the participants was 36.8 years, 110 women and 32 men. Regarding functional limitations, 54.9 % had no limitations, 16.9 % had minimal limitations, 5.6 % had mild limitations, 12.7 % had moderate limitations and 9.9 % had severe limitations. By exploring possible associations between variables, a significant relationship ($p < 0.005$) was found between functional status with age and the number of infections. **Conclusions:** Although the largest percentage does not present functional limitations, it is worth noting that the 45.1 % of nurses and auxiliary nurses, with minimal or severe functional limitations, continue to work in areas of medium or greater complexity. It constitutes an important input for the improvement of occupational health.

Keywords: Functional Status. Nursing Staff. Post-Acute COVID-19 Syndrome.

Resumen

Introducción: El personal de enfermería se encuentra en primera línea en la lucha contra la COVID-19 y presenta un alto riesgo de infección. Múltiples factores determinan la severidad de la enfermedad y junto a los persistentes síntomas subsecuentes, comprometen el estado funcional del personal contagiado. **Objetivo General:** Determinar el estado funcional relacionado al síndrome post-COVID-19 en el personal de enfermería en un Hospital General de Quito, Ecuador 2022 **Diseño y Método:** Se realizó un estudio de enfoque cuantitativo con un diseño descriptivo, observacional y de corte transversal, el cual determinó el estado funcional relacionado al síndrome post-COVID-19 en 142 encuestados mediante la Escala Funcional Post-COVID 19 versión en español, previamente validada. **Resultados:** El promedio de edad de los participantes fue de 36,8 años, la muestra estaba conformada por 110 mujeres y 32 hombres. En cuanto a las limitaciones funcionales se encontró que el 54,9 % no presenta limitaciones, el 16,9 % limitación mínima, el 5,6 % limitación leve, el 12,7 % limitación moderada y el 9,9 % limitación severa. Se encontró relación significativa ($p < 0.005$) entre el estado funcional con la edad y el número de contagios. **Conclusiones:** Si bien, el mayor porcentaje del personal de enfermería no presenta limitación funcional, llama la atención el 45,1 % con limitaciones funcionales entre mínimas y severas que laboran en áreas de mayor complejidad, lo que se debe considerar para el mejoramiento de la salud laboral.

Palabras claves: Estado Funcional. Personal de Enfermería. Síndrome post-agudo de COVID-19.

Introduction

Coronavirus disease (COVID-19) is caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) (1). The first case reported in Ecuador occurred on February 29, 2020, in a 71-year-old woman whose death was recorded on March 13, 2020 (2). The American continent is characterized by its heterogeneity in sociocultural, political, and economic aspects, which translates into limitations in healthcare structures, resource management, and a scarcity of healthcare personnel (3). Consequently, the pandemic exposed disparities in the quality, cost, and accessibility of healthcare (4).

At the onset of the COVID-19 pandemic, there was a simultaneous lack of knowledge about the virus, protocols, and personal protective equipment, coupled with long and exhausting work hours. This created significant physical and emotional stress for healthcare personnel, particularly nurses, leading to a chronic and unsustainable increase in workload (5).

The pandemic had a severe impact on the nursing team, who were on the front lines providing direct care to patients from the onset of the pandemic (6). They faced increased workloads and a reduction in available staff, which resulted in them having to work under greater pressure than usual and often in defiance of safe work procedures and practices (7).

As a result, the importance of occupational health was recognized as a significant aspect of this new reality which makes it necessary to know and analyze the evolution of the disease, the risk of exposure for professionals and workers in health centers where they play a crucial role in the care of affected patients (8).

For this reason, this study aims to determine the functional status related to post-COVID-19 syndrome in the direct care nursing staff who work at Hospital General Docente de Calderón during 2022. Additionally, it pretends to characterize the direct care nursing staff post-COVID-19; to analyze their physical, mental and social functional status and to explore possible associations between the variables studied.

Subjects and methods: A quantitative, observational, descriptive and cross-sectional study was carried out. For this purpose, institutional approval was obtained from the Hospital Docente de Calderón, all participants signed the informed consent form, and data anonymity was guaranteed. The data collection instrument was the Post-COVID 19 Functional Scale, Spanish version (Chile).

The population consisted of direct care nursing staff, both professional and auxiliary who worked at the Hospital during 2022. It comprised 455 professionals (316 nurses and 139 auxiliary nurses). The sample was selected by non-probabilistic, intentional or convenience sampling, which made it possible to contemplate the target population. For this purpose, the report

of COVID-19 infections from the Occupational Health Area was considered and were confirmed by PCR or antigen test; therefore, an initial sample of 202 participants was estimated.

The inclusion criteria were: nursing personnel working at the Hospital General Docente Calderón, agreed to participate voluntarily in this study, perform direct patient care, and have a confirmed COVID-19 infection by any diagnostic method with more than 6 months since recovery. The exclusion criteria included nursing personnel who were not infected with COVID-19 or whose diagnosis was presumptive.

The following variables were taken into account: Post-COVID-19 Syndrome, Functional status, Age, Sex, Comorbidities, Exposure Time/Workday, COVID-19 Morbidity, Nursing staff, Immunization, Personal protective equipment.

Techniques and instruments: Participants were asked to provide information on socio-demographic characteristics and medical history (age, sex, pre-existing comorbidities, exposure time/workday, COVID-19 morbidity, nursing role classification, number of immunizations and access to personal protective equipment, service where they works, number of contagions, most serious contagion).

The Post-COVID-19 Functional Status (PCFS) Scale for adult survivors of COVID-19 was used as an objective tool when evaluating patients with post-COVID-19 syndromes (9). This ordinal scale assesses the totality of functional limitations Post COVID-19 (9). The Leiden group, Netherlands, proposed this scale with the purpose of evaluating patients after hospital discharge, at 4 and 8 weeks to maintain a follow-up in their recovery, and at 6 months to evaluate the functional sequelae. Therefore,

the PCFS scale maintains its usefulness both at the time of hospital discharge and for monitoring functional status after discharge (10). The description of each grade of the scale is detailed in Annex 1, Chile version (11).

Semantic validation of the PCFS was performed by means of a written survey for each of the judges. Six health professionals participated: 3 nursing graduates and 3 nursing assistants who met the following inclusion criteria: knowledge of the subject, experience in the application of the scale, more than 5 years of professional practice and experience at

providing direct care to patients with COVID-19. The experts evaluated the content of the scale with its 6 dimensions in the categories of: clarity, coherence and relevance for which a Likert-type response format with 5 response alternatives was used. The average score for each item, according to the experts, was greater than 4, it corresponds to a clear and precise question for measuring the phenomenon under study. It was decided not to use the first question, "Did the patient die after the diagnosis of COVID-19?," because it generated confusion in the response. In addition, words such as "you" were modified to "for you"; "local shopping" to "store" in the dimensions of basic activities of daily living and instrumental activities of daily living.

The reliability and validity of the instrument were assessed through a pilot test administered to a total of 25 health professionals, including nurses and nursing assistants, who worked in a clinic in Quito. The statistical analysis was performed using SPSS statistical software for Windows (Version 26.0, IBM Inc., Armonk, NY, USA). The construct validity of the PCFS scale was evaluated using Cronbach's α coefficient, yielding a result of 0.935 which permits considering the scale as highly reliable and suitable for its application. Each item was individually evaluated, with a Cronbach's alpha greater than 0.9 and coefficients ranging from 0.918 to 0.948. It proved that each of the questions are highly reliable and at the same time allowed modifications to be made to the approach of the aforementioned questions.

Data processing and analysis: Once the results of the physical surveys were obtained, the data were exported to an Excel database, cleaned and transferred to the statistical program IBM SPSS version 26 for comprehensive analysis of each variable's behavior. To ensure data confidentiality, codes were assigned to each survey conducted for every participant, effectively safeguarding their identity and personal information.

For data analysis, descriptive statistics were employed to address the research objectives. The qualitative variables (sex, personnel, service, availability of PPE, immunization, comorbidity, contagion, contact time, COVID morbidity) were analyzed through frequencies and percentages, while the age variable was analyzed through mean and standard deviation. Age was represented by ranges and comorbidity and immunization were represented by absolute frequencies.

For the tabulation and descriptive analysis of data, Microsoft Office Excel 2016 was used alongside SPSS version 26 statistical software.

Ethical principles: The present study was submitted for review to obtain ethical approval by the Ethics Committee for Research on Human Beings of the Universidad Central del Ecuador, with approval code: 011-G-FCM-2023. Additionally, approval was obtained from the public institution where the study was conducted (Annex 2). Throughout the research process, the present study consistently adhered to the principles of bioethics endorsed by the CEISH, as well as national and international legislation and regulations in force, such as the Declaration of Helsinki.

The benefits derived from this research directly impacted the participants by providing valuable insights into post-COVID-19 functional status, and thus contributed with evidence that contributes to the occupational health of this important group.

Informed Consent: Before administering the instrument to the nursing professionals, their consent to participate in the study was obtained. The purpose of the research and their contribution to it were clearly explained. Additionally, they were assured that refusal to participate would not result in any detrimental effects for either the participants or the researchers.

categorizing them as a young working population. Approximately 74.6% of the participants were nursing professionals engaged in direct patient care duties.

Regarding the work characteristics, most of the nursing personnel carried out their current activities in the Hospitalization service (43.0%, n=61), followed by the Critical Areas service (40.8%, n=58). It is noteworthy that 93% of the participants had access to personal protective equipment (PPE) during the pandemic. Regarding work shifts, there was a greater exposure time to the virus during 12-hour shifts (47.2%, n=67), followed by 24-hour shifts (43.7%, n=62). These extended work hours are considered significant risk factors for COVID-19 infection among the nursing staff.

Regarding the characteristics associated with the infection, approximately 58.8% of the participants were infected with COVID-19 at least once. Among these, 81% (n=115) indicated that this was their most severe infection. The severity of the infection reached a moderate level of morbidity in 48.6% (n=69) of these cases.

About 66.9 % had no previous comorbidities. The highest percentage of morbidity corresponds to respiratory disease with 14.1 % (n=20). Regarding COVID-19 immunizations, 64.8 % (n=92) of the nursing staff had the second booster as shown in Table No. 1.

Results

Of the planned sample of 202 participants, 60 individuals did not meet the inclusion criteria. Additionally, some participants refused to participate in the study and did not sign the informed consent form. Consequently, the results presented here reflect the data from the 142 participants who did meet the inclusion criteria and agreed to participate. These results will be described in accordance with the objectives of the present study.

Sociodemographic Characteristics:

The surveyed population exhibited a feminization trend, with 110 women and 32 men participating. The mean age of the participants was 36.88 years, with a standard deviation of 8.59 years. The age range of the participants was 25 to 64 years,

Table 1: Characteristics associated with COVID-19 infection in nursing staff (n=142).

	Variable	Frequency (n)	Percentage (%)
No. of infections	1	75	52.8
	2	48	33.8
	3	13	9.2
	4	6	4.2
	0	2	1.4
No. of most severe infections	1st contagion	115	81
	2nd contagion	24	16.9
	3rd contagion	1	0.7
Morbidity	Mild	42	29.6
	Moderate	69	48.6
	Severe	30	21.1
	Critical	1	0.7
	Respiratory	20	14.1
Previous comorbidities	Cardiovascular	2	1.4
	Hematological	5	3.5
	Immunological		
	Digestive	3	2.1
	Endocrine-metabolic	5	3.5
	Other	12	8.5
	None	95	66.9
No. of immunizations	First dose	0	0
	Second dose	18	12.7
	First booster	32	22.5
	Second booster	92	64.8

Source: Study Survey - Section I: Sociodemographic Data

Post-COVID-19 functional status scale:

Most of the participants (54.9%) maintain a range without functional limitations (Grade 0), 16.9% have a minimal functional limitation (Grade 1), 12.7% have a moderate functional limitation (Grade 3), while 5.6% maintain a slight functional limitation (Grade 2). It should be noted that 9.9% have a severe functional limitation (Grade 4), considering this population as vulnerable, as can be seen in Table 2.

Tabla 2: Escala de Estado Funcional Post- COVID-19

Variable	Frequency (n)	Percentage (%)
No functional limitations (Grade 0)	78	54.9
No significant functional limitations (Grade 1)	24	16.9
Mild functional limitations (Grade 2)	8	5.6
Moderate functional limitations (Grade 3)	18	12.7
Severe functional limitations (Grade 4)	14	9.9
Total	142	100

Source: Study Survey - Section II: Functional status scale

Relationship of Variables:

Before exploring the relationship of variables, the Kolmogorov-Smirnov normality test was applied to determine the distribution of the data, given that the sample size was greater than 50. The results obtained were $p=0.001$, indicating that the data did not follow a normal distribution; therefore, non-parametric statistics were used.

A result is statistically significant when it is not likely to have been due to chance, as indicated by the p-value. However, considering only the p-value in the study is limiting and can result in a loss of significant data. Therefore, other factors were also taken into account. One such factor is sex, which is important due to the feminization of the profession. It was observed that, across different grades, males were the least affected. Additionally, within grade 4, no differences were seen between the activities of the nursing personnel.

The Hospitalization service maintains a high mean in relation to functional limitations, considering this group as vulnerable compared to other services. Despite not finding a significant relationship between access to personal protective equipment

and the degree of limitation, it is important to highlight it due to its relationship with the exposure time to the virus, particularly during 12-hour shifts among the personnel. Regarding comorbidities, it is noteworthy that about 11 professionals had a respiratory disease prior to infection. Finally, immunizations for the year 2022 were available up to the fourth dose, but only 56 professionals had received the second booster to prevent the severity of the disease, as shown in Table 3.

Table 3: Relationship between the sociodemographic characteristics and the Functional Status Scale.

Variable	Grade 0		Grade 1		Grade 2		Grade 3		Grade 4	
	%	n	%	n	%	n	%	n	%	n
Age										
25-34	35	25	14	10	3	2	9	6	3	2
35-44	33	23	5	4	3	2	6	4	5	4
45-54	7	5	5	4	1	1	1	1	4	3
Over 55	3	2	0	0	1	1	2	1	2	1
Sex										
Female	59	41	17	12	7	5	15	11	12	8
Male	19	13	7	5	1	1	3	2	2	1
Nursing Staff	63	44	18	13	6	4	12	8	7	5
Auxiliary nursing staff	15	10	6	4	2	1	6	4	7	5
Service										
Critical areas	37	26	10	7	3	2	4	3	4	3
Surgical areas	6	4	4	3	0	0	1	1	0	0
Outpatient hospitalization	32	22	5	4	4	3	11	8	9	6
Previous comorbidities										
Respiratory	11	8	1	1	2	1	4	3	2	1
Cardiovascular	1	1	1	1	0	0	0	0	0	0
Immunological-hematological	3	2	0	0	0	0	1	1	1	1
Digestive	2	1	1	1	0	0	0	0	0	0
Endocrine-metabolic	1	1	3	2	0	0	0	0	1	1
other	4	3	0	0	1	1	3	2	4	3
None	56	39	18	13	5	4	10	7	6	4
Immunizations										
First dose	0	0	0	0	0	0	0	0	0	0
Second dose	11	8	1	1	1	1	4	3	1	1
First booster	18	13	6	4	1	1	2	1	5	4
Second booster	49	35	17	12	6	4	12	8	8	6

Source: Study Survey - Section II: Functional status scale

To explore possible relationships between sociodemographic characteristics and the Post-COVID-19 functional status scale, bivariate analysis was used, which showed a significant positive relationship ($p= 0.037$) between age and functional status, indicating that the greater the age, the greater the degree of functional status impairment. Likewise, a significant positive relationship ($p=0.001$) was found between the number of infections and functional status, which shows that the greater the number of infections, the greater the functional limitation, as can be seen in Table 4.

To explore possible relationships between sociodemographic characteristics and the Post-COVID-19 functional status scale, bivariate analysis was used, which showed a significant positive relationship ($p=0.037$) between age and functional status, indicating that greater age is associated with a higher degree of functional status impairment. Likewise, a significant positive relationship ($p=0.001$) was found between the number of infections and functional status, demonstrating that a higher number of infections correlates with greater functional limitation, as can be seen in Table 4.

Table 4: Functional Status Scale Post-COVID-19

Variables	p-value
Age- Functional status	0,037
Number of infections	0,001

Source: Study Survey - Section II: Functional status scale

A significant bilateral relationship between the different dimensions of the Post-COVID-19 functional status scale could also be evidenced, where a higher or lower score acquired in the physical ($p=0.216$) and emotional ($p=0.290$) dimensions determines an equal alteration in the social dimension, as can be seen in Table 5.

Table 5: Relationship of the Dimensions of the Functional Status Scale Post-COVID-19

	Physical and Social Dimension	Dimension	Emotional dimension
Physical Dimension			
Correlation coefficient	1	0.216*	0.14
	0	*	7
Exact bilateral significance		0.010	0.08
			2
Social Dimension			
Correlation coefficient	0.2	1%	0.290**
	16*		
	*		
	0.0		0.000
Exact bilateral significance	10		
Emotional dimension			
Correlation coefficient	0.1	0.290*	1
	47		
Exact bilateral significance	0.08	0.000	
	2		

**Correlation is significant at level 0.01 (bilateral)
Source: Study Survey - Section II: Functional status scale

Discussion

The primary objective of this study was to determine the functional status associated with post-COVID-19 syndrome among direct care nursing staff at a General Hospital in Quito, Ecuador, in the year 2022. The study evaluated a cohort of 142 health professionals, comprising nursing assistants and graduates who met the specified inclusion criteria.

It was found that following COVID-19 infection, 54.9% of participants reported no functional limitations (Grade 0), while 45.1% experienced some degree of functional limitation. Specifically, 16.9% had minimal functional limitation (Grade 1), 12.7% had moderate functional limitation (Grade 3), and 5.6% had mild functional limitation (Grade 2). Notably, 9.9% of participants reported severe functional limitation (Grade 4), indicating vulnerability within this population.

The results obtained are compared with those of the study "Prevalence of Functional Limitation in COVID-19 Recovered Patients Using the Post COVID-19 Functional Status Scale," conducted in Nepal by Pant et al. In their study, it was observed

that more than 56.6% of patients, including health personnel, reported no limitations (12). Similarly, in the study "Evaluation of the Post-COVID-19 Functional Status (PCFS) Scale in a cohort of patients recovering from hypoxemic SARS-CoV-2 pneumonia" conducted in France by Benkalfate N et al., 88% did not experience functional limitations (13). These studies underscore the scale's adequate semantic and cultural validation in their respective languages, suggesting that the results obtained were reliable. Thus, these findings indicate that the outcomes of our study are consistent with existing research.

The association between sociodemographic characteristics and the Post-COVID-19 functional status scale was assessed through bivariate analysis, revealing distinct patterns among the study population. Age and the number of infections emerged as significant factors influencing functional status.

The study found an average age of 36.8 years, indicating a predominantly young working population. This aligns with national statistics from the National Survey of Employment, Unemployment, and Underemployment (ENEMDU), which reports that 70.25% of workers in this sector are under 50 years old (14). The analysis revealed a significant positive relationship between age and functional status, suggesting that as age increases, there is a greater degree of functional impairment. This trend may be influenced by the inclusion of younger participants, given that the hospital staff averages 8 years of service and is considered relatively young. Additionally, younger individuals may generally experience better outcomes compared to older adults following COVID-19 infection (12).

In analyzing the relationship between the number of infections and functional status, a significant positive correlation was identified, indicating that higher infection rates correlate with greater functional limitations. Studies indicate that nearly 90% of COVID-19 cases manifest clinical symptoms characteristic of the infection, and persistent symptoms may lead to further deterioration in functional status. This can include declines in pulmonary function, mental health issues, and varying degrees of impact on quality of life, affecting long-term physical, mental, social, and cognitive well-being (12).

A statistically significant result indicates that the observed effect is unlikely to be due to chance (p-value). However, relying solely on this value in the study can be limiting and may lead to a loss of important data. It's also important to consider the potential impact of sex, given the feminization of the profession. Evidence suggests that women may be disproportionately affected by post-acute COVID-19 syndrome, with sequelae more frequently observed among female patients (15).

In Ecuador, women constitute 65.8% of health personnel (14). Therefore, it's important to note that a profession is considered feminized when the percentage of women exceeds 55% of the workforce compared to men (16). In this study, 77.46% (110 individuals) of the surveyed population were women, while 22.54% (32 individuals) were men. This underscores the persistence of a patriarchal social model dating back to the 19th century, which normalized the notion that nursing should exclusively be a female domain due to their nurturing role, akin to mothers caring for their children. This perception entrenched women in roles seen as extensions of their domestic duties (17)."

According to the most recent data from the Statistical Registry of Health Resources and Activities of the Ecuadorian Institute of Statistics and Census, there are a total of 25,900 nurses and 17,560 auxiliary nurses nationwide (18). Approximately 74.6% of these professionals are directly involved in patient care. The Hospitalization service stands out with a significant proportion of nursing staff experiencing various levels of functional limitations, highlighting this group's vulnerability compared to other services. In our current investigation, a majority of nursing personnel (43.0%, n=61) are assigned to the Hospitalization service. This area was notably impacted due to the continuous influx of COVID-19 patients requiring extended hospital stays, necessitating increased staffing levels (19).

Although no significant relationship was found between access to personal protective equipment and the degree of functional limitation, it is crucial to highlight this finding due to its association with the duration of virus exposure. The study revealed a predominance of extended work shifts, particularly 12-hour shifts (47.2%, n=67) and 24-hour shifts (43.7%), which correlate with prolonged exposure to COVID-19. Consequently, these extended

shifts were considered significant risk factors for COVID-19 infection.

Furthermore, Linh T. Phan et al. highlighted that inadequate use of personal protective equipment (PPE) poses significant risks; incorrect removal procedures were reported in 90% of cases, including issues with sequence, technique, and selection of appropriate PPE (20). During the COVID-19 pandemic, Hoedl et al. emphasized the widespread use of face masks and gloves in nursing practice, with face mask usage being mandatory (21). In the current study, 93% (n=132) of participants reported access to PPE, indicating some shortcomings in timely access to these devices for all personnel.

Regarding immunizations, by 2022, boosters up to the fourth dose were available. However, in the present study, only 64.8% of professionals had received the second booster to mitigate disease severity. This contrasts with findings from a study involving 28,356 participants, which demonstrated a decrease in the likelihood of prolonged COVID-19 symptoms following vaccination (22). This discrepancy may be attributed to inadequate awareness among surveyed personnel regarding the importance of booster doses.

Different phenotypes of post-COVID-19 conditions may exist, although the exact causes, management, and outcomes remain unknown (23). This study revealed a significant bilateral relationship among the various dimensions of the Post-COVID-19 functional status scale. Notably, higher or lower scores in the physical (p=0.216) and emotional (p=0.290) dimensions corresponded to similar alterations in the social dimension.

In the context of the physical dimension, these symptoms are more prevalent, as highlighted in the literature, which underscores their high frequency and heterogeneity following COVID-19. Studies have documented a wide range of symptoms persisting up to six months after the acute phase of the illness (24). While many of these symptoms may resolve over time, some are enduring and can profoundly impact daily life (25). Therefore, timely consideration of these symptoms is crucial to prevent their progression into chronic conditions with significant implications for quality of life, economics, and public health (13)

In the context of the emotional dimension, healthcare workers often experience ongoing pressure (26). They frequently report high emotional exhaustion, depersonalization, and low professional fulfillment, which are compounded by factors such as decision-making under moral duress in critical work situations (26). Moreover, the severity of COVID-19 patient conditions, increased workload, and human resource shortages have consistently compromised the emotional well-being of healthcare workers (27). Therefore, emotional support for healthcare workers is essential to address these challenges.

Peer review

The manuscript underwent blind peer review and was promptly approved by the Editorial Team of the INSPILIP journal.

Los datos que sustentan este manuscrito están disponibles bajo requisición al autor correspondiente.

Availability of Data and Materials

The data supporting the findings of this study are available upon request from the corresponding author.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

All authors equally contributed to the different phases of the research process.

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Previous presentations or publications

This research has not been previously published or presented at any conferences.

Bibliographic References

- Lu H, Stratton CW, Tang Y. Outbreak of pneumonia of unknown etiology in Wuhan, China: The mystery and the miracle. *J Med Virol*. April, 2020; 92(4):401-2. [cited May 5, 2023]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7166628/>.
- Fernández-Garza LE, Marfil A. Neurological aspects that should not be forgotten during the COVID-19 pandemic. *Interam J Med Health [Internet]*. 2020 [Cited May , 2023]. Available from: <https://iajmh.emnuvens.com.br/iajmh/article/view/89>
- Herrera-Añazco P, Urrunaga-Pastor D, Benites-Zapata VA, Bendezu-Quispe G, Toro-Huamanchumo CJ, Hernandez AV. COVID-19 symptomatology and compliance with community mitigation strategies in Latin America early during the COVID-19 pandemic. *Prev Med Rep*. February 1, 2022;25:101665. [Cited May 1, 2023]. Disponible en: <https://www.sciencedirect.com/science/article/pii/S2211335521003569>.
- Medina Hernández EJ, Muñoz Olite JL, Barco Llerena E. Análisis multidimensional de la evolución de la pandemia de la COVID-19 en países de las Américas. *Rev Panam Salud Pública*. April 28, 2023;46:e49. [Cited May 1, 2023]. Available from: <https://www.scielo.org/article/rpsp/2022.v46/e49/es/>.
- Guerra JBA, Pin T del RM, Chiriboga MEV, Cedeño MPM, Vélez KGL. Desgaste profesional en enfermeras durante la COVID-19, Hospital de segundo nivel en Ecuador. *RECIMUNDO*. January 31, 2022;6(1):289-300. [Cited May 1, 2023]. Available from: <https://recimundo.com/index.php/es/article/view/1527>.
- Montes-Berges B, Fernández-García E, Montes-Berges B, Fernández-García E. El efecto de la pandemia en la salud y Síndrome de Burnout en profesionales de enfermería de UCI. *Enferm Glob*. 2022;21(66):1- 27. [Cited October 3, 2022]. Available from: https://scielo.isciii.es/scielo.php?script=sci_abstract&pid=S1695-61412022000200001&lng=es&nrm=iso&tlng=es.
- Manzano García G, Ayala Calvo JC. The threat of COVID-19 and its influence on nursing staff burnout. *J Adv Nurs*. 2021;77(2):832- 44. [Citado November 21, 2022]. Available from: <https://onlinelibrary.wiley.com/doi/abs/10.1111/jan.14642>
- Peraza de Aparicio CX. Salud laboral frente a la pandemia del COVID-19 en Ecuador. *MediSur*. junio de 2020;18(3):507-11. [Cited May 2, 2023]. Available from: http://scielo.sld.cu/scielo.php?script=sci_abstract&pid=S1727-897X2020000300507&lng=es&nrm=iso&tlng=es
- Lorca LA, Leão Ribeiro I, Torres-Castro R, Sacomori C, Rivera C. Propiedades psicométricas de la escala Post-COVID-19 Functional Status para adultos sobrevivientes de COVID-19. *Rehabilitacion (Madr)*. 2022 Oct-Dec;56(4):337-343. Available from: <https://www.sciencedirect.com/science/article/pii/S0048712021000748>.
- Klok FA, Boon GJAM, Barco S, Endres M, Geelhoed JJM, Knauss S, et al. The Post- COVID-19 Functional Status scale: a tool to measure functional status over time after COVID-19. *Eur Respir J [Internet]*. 1 de julio de 2020 [cited September 27, 2022];56(1). Available from: <https://erj.ersjournals.com/content/56/1/2001494>.
- Lorca LA, Torres-Castro R, Ribeiro IL, Benavente P, Pizarro M, San Cristobal B, et al. Linguistic Validation and Cross-Cultural Adaptation of the Post-COVID-19 Functional Status Scale for the Chilean Population. *Am J Phys Med Rehabil* 2021;100:313–320 [Cited May 1, 2023]. Available from: <https://osf.io/uhcbj/download?version=2&displayName=PCFS%20VERSION%20ESPA%C3%91OL%20-CHILE-2020-07-28T19%3A48%3A24.827019%2B00%3A00.pdf> .
- Pant P, Joshi A, Basnet B, Shrestha BM, Bista NR, Bam N, et al. Prevalence of Functional Limitation in COVID-19 Recovered Patients Using the Post COVID-19 Functional Status Scale. *JNMA J Nepal Med Assoc*. enero de 2021;59(233):7-11. [Cited May 2, 2023]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7893391/>
- Benkalfate N, Eschapasse E, Georges T, Leblanc C, Dirou S, Melscoet L, et al. Evaluation of the Post-COVID-19 Functional Status (PCFS) Scale in a cohort of patients recovering from hypoxemic SARS-CoV-2 pneumonia. *BMJ Open Respir Res*. March 9, 2022;9(1):e001136. [Cited May1, 2023]; Available from: <https://pubmed.ncbi.nlm.nih.gov/35264326/>.

14. Organización Internacional del Trabajo. Trabajadores de la salud en Ecuador: situación actual y desafíos generados por la COVID-19. [Internet]. OIT, 2022 [Cited May 2, 2023]. Available from: http://www.ilo.org/lima/sala-de-prensa/WCMS_842439/lang--es/index.htm.
15. Carter SJ, Baranauskas MN, Raglin JS, Pescosolido BA, Perry BL. Functional Status, Mood State, and Physical Activity Among Women With Post-Acute COVID-19 Syndrome. *Int J Public Health*. 2022 Jun 9;67:1604589. doi: 10.3389/ijph.2022
16. La feminización de la Enfermería no se refleja en sus puestos de mando [Internet]. Redacción Médica. [Cited May 2, 2023]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9218064/>.
17. Bolzán YH. Los roles de género en Enfermería: Una perspectiva histórica de la división del trabajo. *Vis Enferm Actual*. 2017;45-53. [Cited May 2, 2023]. Available from: <http://fi-admin.bvsalud.org/document/view/6pxvt>.
18. Medicina O. La situación de los profesionales de la enfermería en Ecuador [Internet]. *Oceano Medicina*. 2022 [Cited May 2, 2023]. Available from: <https://ec.oceanomedicina.com/nota/enfermeria-ec/ecuador-todavia-no-alcanza-el-numero-de-profesionales-de-enfermeria-recomendado-por-la-oms/>.
19. Hoogendoorn ME, Brinkman S, Bosman RJ, Haringman J, de Keizer NF, Spijkstra JJ. The impact of COVID-19 on nursing workload and planning of nursing staff on the Intensive Care: A prospective descriptive multicenter study. *Int J Nurs Stud*. 2021 Sep;121:104005. doi: 10.1016/j.ijnurstu.2021.104005. Epub 2021 Jun 21. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8215878/>.
20. Linh T. Phan, Dayana Maita, Donna C. Mortiz, Rachel Weber, Charissa Fritzen- Pedicini, Susan C. Bleasdale, Rachael M. Jones & para el Programa de Epicentros de Prevención de los CDC (2021) Prácticas de retiro del equipo de protección personal para personal sanitario, *Journal of Occupational and Environmental Hygiene*, 18:sup1, S53-S60, DOI: 10.1080/15459624.2021.1877056 Available from: <https://www.tandfonline.com/doi/full/10.1080/15459624.2021.1877056>.
21. Hoedl M, Eglseer D, Bauer S. Associations between personal protective equipment and nursing staff stress during the COVID-19 pandemic. *J Nurs Manag*. noviembre de 2021;29(8):2374-82. [Cited May 2, 2023]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8420325/>
22. Ayoubkhani D, Bermingham C, Pouwels KB, Glickman M, Nafilyan V, Zaccardi F, et al. Trajectory of long covid symptoms after covid-19 vaccination: community based cohort study. *BMJ*. May 18, 2022;377:e069676. [Citado 2 de mayo de 2023]. Available from: <https://www.bmj.com/content/377/bmj-2021-069676/>
23. Laskovski L, Felcar JM, Fillis MMA, Trelha CS. Risk factors associated with limited functional status among out-of-hospital patients 30 days and one year after a diagnosis of COVID-19: a cohort study. *Nature Scientific Reports*. March 3, 2023;13:3584. [Cited May 2, 2023]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9982776/>.
24. Bouza E, Moreno RC, De Lucas Ramos P, García-Botella A, García-Lledó A, Gómez-Pavón J, et al. Síndrome post-COVID: Un documento de reflexión y opinión. *Rev Esp Quimioter*. 2021;34(4):269-79. [Cited Septiembre 27, 2022]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8329562/>
25. Havervall S, Rosell A, Phillipson M, Mangsbo SM, Nilsson P, Hober S, et al. Symptoms and Functional Impairment Assessed 8 Months After Mild COVID-19 Among Health Care Workers. *JAMA*. May 18, 2021;325(19):2015-6. [Cited May 7, 2023]. Available from: <https://royalsocietypublishing.org/doi/10.1098/rsos.201199>.
26. OPS/OMS. Consideraciones psicosociales y de salud mental durante el brote de COVID-19. [Internet]. Washington, D.C.: OPS/OMS; 2020. Available from: <https://www.paho.org/es/documentos/consideraciones-psicosociales-salud-mental-durante-brote-covid-19>.
27. Villagran CA, Dalmolin G de L, Barlem ELD, Greco PBT, Lanes TC, Andolhe R. Association between Moral Distress and Burnout Syndrome in university-hospital nurses. *Rev Lat Am Enfermagem*. January 30, 2023;31:e3747. [Cited May 2, 2023]. Available from: <http://www.scielo.br/j/rlae/a/MckTp4VV-TYx4YKCKdtFTH7k/?lang=en>.