ANALYSIS OF LONG COVID IN HEALTH PERSONNEL: COMPARING GENDER AND WORK FACTORS

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Abstract

Introduction: This study aimed to describe the reported prevalence of post-COVID-19 syndrome and its characteristics by gender, profession, and other determinants among health care workers.

Methods: A cross-sectional study was conducted among health workers with a history of COVID-19 in Latin America, and the 2030 responses from Argentina were selected for this analysis. Sociodemographic information, as well as data on initial course of COVID-19, and the persistence of 21 symptoms beyond the first month, their severity, clinical evolution, and health care demands were collected.

Results: The reported prevalence of post-COVID-19 syndrome was higher in women for each of the symptom clusters studied. Severity of the initial symptoms, female gender, nursing profession, multi-employment, and working in emergency areas were all independent variables.

Discussion: The greater strain of health care workers during the pandemic -highly feminized- and the associated gender conditions may partially explain these findings.

Key words: post-acute COVID-19 syndrome, health-care workers, gender and health

Resumen

Análisis del síndrome post-COVID-19 en personal de salud: comparación sobre condiciones de género y trabajo

Introducción: El objetivo del estudio fue describir la prevalencia del reporte de síndrome post-COVID-19 y sus características según género, profesión y otros determinantes sociales, en personal de salud.

Métodos: Se realizó un estudio de corte transversal en profesionales de salud con antecedentes de COVID-19 en América Latina, y para este análisis se seleccionaron las 2030 respuestas de Argentina. Se recolectaron datos sociodemográficos, información sobre el curso inicial de la enfermedad COVID-19, y persistencia de 21 síntomas más allá del primer mes, su gravedad, evolución clínica y requerimiento de servicios de salud.

Resultados: Se identificó que la prevalencia reportada de síndrome post-COVID-19 fue mayor en mujeres para cada uno de los grupos de síntomas explorados. La gravedad del cuadro inicial, el género femenino, la profesión de enfermería, el multiempleo y trabajar en áreas de emergencia fueron variables independientes.

Discusión: La mayor sobrecarga del personal de salud durante la pandemia –altamente feminizado– y las

determinaciones de género asociadas podrían explicar parcialmente estos hallazgos.

KEY POINTS

- Post-COVID syndrome has been reported with variable frequencies, predominantly in women, although the morbimortality of acute phase is higher in men. Biological and psychosocial hypotheses have been postulated to explain this paradox. The analysis of the survey of health personnel in Argentina has shown that it is associated with female gender, with the nursing profession over the medical profession, with multiple employment, with work in intensive care and with the severity of the initial symptoms. It is essential to understand this reality in order to plan policies that help prevent it in the workplace and institutionally.

In March 2020, the World Health Organization (WHO) declared COVID-19 disease, caused by the SARS-CoV-2 virus, a pandemic. Acute involvement is highly variable, ranging from an asymptomatic course to severe respiratory compromise that can lead to death and, in most cases, resolves within a few weeks[1]. Early in the pandemic's spread, it became evident that symptoms could persist or even appear anew weeks or months after the initial infection. This condition, variously termed prolonged COVID-19, long-COVID-19, post-COVID-19 syndrome, or post-COVID-19 condition[2], affects a significant portion of the population, with studies reporting an incidence range of 20% to 87%[3-5].

Although the rate of COVID-19 infection is similar in both genders, more severe symptoms are seen in the acute stage in males[6,7], and a higher incidence of post-COVID-19 syndrome in females[8-12]. The reported symptoms involve various systems and domains, their duration is variable and can extend up to more than a year[13-15], with consequences on work activity and quality of life.

Health workers were one of the population groups most affected by the pandemic, both because of the higher proportion of infections compared to the general population[16] and because of work overload and the effects on mental health[17-19]. Among the determinants of stress and burnout in health workers in the context of the pandemic, factors such as female gender, age and family composition were identified[20].

In Argentina, the health sector shows a high feminization in the professions of nursing, psychology and social work, which in recent years has also extended to medicine[21]. The structure of feminization has changed in recent years, with a massive incorporation of women into professional positions[21-23]. Gender is understood as the set of social relations, historically constructed around sexual differences and constituting relations of inequality and power between men and women[24-26], which have been extensively studied in relation to their impact on integral health[27]. Although gender relations go beyond the male-female dichotomy[28,29], only this difference is analyzed in this paper, based on the survey results.

The aim of this paper was to analyze the reported prevalence of post COVID-19 syndrome among in healthcare personnel in Argentina, and to explore its differential characteristics based on gender, profession and other determinants.

Materials and methods

A survey was conducted among healthcare professionals with a self-reported history of COVID-19 confirmed by polymerase chain reaction (PCR). The survey was anonymous, self-administered and administered in Latin American countries through the Intramed® social network in October 2021, the overall results of which were published[30]. Of the 4673 valid responses obtained, the 2030 responses corresponding to professionals in Argentina were selected for this study. In summary, sociodemographic data and data on the clinical course of the COVID-19 episode, including its impact on work activity, were collected. We inquired about the persistence of 21 symptoms compatible with COVID-19 beyond the month of the acute episode, its severity, clinical course and the need for health services due to persistent symptoms. The symptoms were selected as the most frequently reported in the literature and are summarized in Table 1. For each symptom, severity, duration and eventual persistence

were asked. A subjective scale from 1 to 4 (mild, moderate, severe, very severe) was used to define severity, except for dyspnea - assessed with the scheme proposed by the UK Medical Research Council[31] - and for headache, where a scale of 1 to 10 was used.

Symptoms were grouped into five syndromic categories: 1) cardio-respiratory: dyspnea, fatigue, precordial pain, palpitations and cough; 2) cognitive: attention and memory problems; 3) psycho-emotional: anxiety, depression and insomnia; 4) neuro-peripheral: tinnitus, vertigo, anosmia, headache, paresthesia, myalgia, rash; 5) digestive: nausea, diarrhea, anorexia. Additional studies performed after the acute episode of COVID-19 were asked about.

Statistical analysis

Uni- and multivariate analyses were performed to adjust different variables for the relationship between gender, reported prevalence and evolution. Quantitative variables were reported as mean/standard deviation or median/interquartile ranges according to their distribution. Discrete variables were reported as number and percentage, and 95% confidence intervals (95% CI). Analysis of association between discrete variables was performed with contingency tables and that of quantitative variables with parametric or non-parametric methods. For multivariate logistic regression analyses, statistically significant variables were selected in the univariate analyses. For these models the variable profession was entered in 3 categories: nursing, medicine and other. R and Rstudio were used for all statistical analyses[32, 33].

Ethical considerations: All study procedures were conducted in accordance with international ethical norms and standards, including the principles of the Declaration of Helsinki and current regulations[34]. The original research from which the data for the present study were extracted was approved by the Research Ethics Committee (REC) of the Hospital El Cruce (Ethics Evaluation Report 0117/2022).

Results

The majority of participants were female (n = 1477; 72.7%), age 48 ± 12 (males 52 vs. females 47, p < 0.001).

The most represented professions were medicine (n = 1233, 60.7%) and nursing (n = 304, 15%). In relation to the work setting, 36.8% (n = 737) of the respondents reported working in more than one facility, combining the public and private health sub-sector. Table 1 provides the summary of the reported job combinations, type of work, and information on the severity of the initial episode of COVID-19, separated by gender.

The initial episode of COVID-19 was asymptomatic in 168 participants (8.27%), with mild symptoms in 797 (39.2%), with moderate symptoms without hospitalization in 794 (39.1%) and with hospitalization in 227 (11.2%), and with severe symptoms requiring mechanical ventilation in 21 (1.03%). Males had a higher frequency of moderate or severe symptoms requiring hospitalization.

Symptoms, demand for health services and impact on work activity, by gender and profession

The median number of symptoms reported was 6 (RIC 3-10), higher in women (7, RIC 4-10) than in men (5, RIC 2-8), p < 0.01. Of the 21 symptoms surveyed, 15 were reported more frequently among females. These were: dyspnea, fatigue, chest pain, palpitations, cough, anosmia, insomnia, headache, impaired concentration, slowness, impaired memory, depression, anxiety, nausea and dizziness. The frequency of reporting severe symptoms was higher in women for 10 of the 17 symptoms for which severity was queried, as summarized in Table 2.

Women more frequently required medical consultation (48% vs 35%; p<0.01), psychotherapy (19% vs 10%; p < 0.01) and anxiolytic medication (15% vs 11.5%; p = 0.029). Chest X-ray, laboratory and electrocardiogram were performed more frequently in females, while cardiac catheterization was more frequent in males (Table 3).

The median time off work was 14 days (RIC 10-20), with no differences by gender (p = 0.28). Ninety three percent of participants reported full recovery of their work activity after the acute episode, 4.8% reported partial recovery and 1.8% had not yet returned to work at the time of the survey, with no gender differences (p = 0.44). Fifteen percent reported a change of work activity with no gender differences (p = 0.4).

Symptoms were more frequent in nurses, with the exception of appetite disturbance, cough and anosmia. The median number of symptoms in nurses was 9 (RIC 5-12) and in physicians was 6 (RIC 3-9), p < 0.01 (Table 4).

Table 1 | Characteristics of participants

Variables	Total n = 2030	Females n = 1477 (72.7%)	Males n = 553 (27.3)	p
Age. mean (SD)	48.5 (+/-11.1)	47.12 (+/-10.4)	52.3 (+/-12.0)	<0.01
Physicians	1233 (60.7%)	817 (55.3%)	416 (75.2%)	<0.01
Nurses	304 (15%)	248 (16.8%)	56 (10.1%)	<0.01
Sub-sector of the health system in which you work:				<0.001
More than one facility. combining sub-sectors	737 (36.8%)	494 (33.9%)	243 (44.6%)	
More than one facility. only public sub-sector	118 (5.9%)	91 (6.2%)	27 (5%)	
More than one establishment. only private. social security or insurance subsector	170 (8.5%)	119 (8.2%)	51 (9.4%)	
Only one centre. private. social security or insurance	302 (15.1%)	220 (15.1%)	82 (15%)	
Only one centre. public sub-sector	477 (23.8%)	392 (26.9%)	85 (15.6%)	
Only in private practice	198 (9.9%)	141 (9.7%)	57 (10.5%)	
Predominant type of work:				0.059
Care work in critical care area*	344 (17.2%)	242 (16.6%)	102 (19%)	
Care work in emergency care**	510 (25.6%)	356 (24.4%)	154 (28.6%)	
Clinical course of the initial episode of COVID-19:				<0.01
Asymptomatic	168 (8.4%)	117 (8.0%)	51 (9.4%)	
Mild	797 (39.7%)	596 (40.7%)	201 (37.2%)	
Moderate without hospitalisation	794 (39.6%)	612 (41.7%)	182 (33.6%)	
Moderate with hospitalisation	227 (11.3%)	133 (9.1%)	94 (17.4%)	
Severe with mechanical ventilation	21 (1.0%)	8 (0.5%)	13 (2.4%)	

Critical Area: includes Intensive Care Unit. Intensive Care Areas. Coronary Care Unit. Intensive Care Unit. Intensive Care Nursery. Intensive Care Unit. Coronary Unit
** Emergency: includes Outpatient Ward*

Female doctors suffered more frequently than their male colleagues from 11 of the 21 symptoms explored, with no differences in the number of consultations or complementary studies, with the exception of cardiac catheterization, 5 men and no women (p = 0.008). Female nurses reported 12 of the 21 symptoms more frequently than their male colleagues, while there were no differences in the performance of complementary studies. When compared by profession, the number of symptoms was highest in female nurses (9.5 RIC 5-13) followed by female physicians (6, RIC 3-10), male nurses (6, RIC 1.7-9.2) and finally male physicians (5 RIC 2-8), p < 0.01. In the comparison between women of the two professions with the highest participation in the survey, all symptoms were more frequent in nurses, with the exception of anosmia (Table 5).

Distribution of symptoms grouped into syndromic categories

The frequency of reporting of the 5 syndromic categories was higher in women than in men (Fig. 1).

Cardiorespiratory syndrome: It was associated with a more severe initial clinical course (p<0.01) and with profession (p = 0.009), with no age differences (48.3 vs 48.9). Analysis by profession and gender showed a higher frequency in female nurses (89%), and a decreasing frequency in female physicians (79%), male nurses (72%) and male physicians (69%), p < 0.01 (Fig. 2). The average number of leave days was 25 (+/- 56), p < 0.001) and was associated with a greater change in work activity, 16.6% vs. 9.3% in those without (p < 0.001) this syndrome. In multivariate analysis it was associated with female gender (OR 1.9), nursing profession (OR 1.95), severe

Table 2 | Reported prevalence and severity of symptoms reported by health workers

Symptom	Total n = 2030	Symptoms in general		p	Severe symptoms		p
		Females n = 1477	Males n = 553		Females	Males	
Dyspnea, n (%)	675 (33.3)	512 (34.7)	163 (29.5)	0.033	38 (2.6)	11 (2.0)	0.548
Fatigue, n (%)	1380 (68.0)	1063 (72.0)	317 (57.3)	<0.001	296 (20.0)	78 (14.1)	0.003
Chest pain, n (%)	510 (25.3)	403 (27.4)	107 (19.7)	<0.001	NE*	NE*	
Palpitations, n (%)	636 (31.3)	504 (34.1)	132 (23.9)	<0.001	NE*	NE*	
Cough, n (%)	549 (27.0)	418 (28.3)	131 (23.7)	0.043	NE*	NE*	
Anosmia, n (%)	849 (42.1)	682 (46.4)	167 (30.4)	<0.001	347 (23.5)	72 (13.0)	<0.001
Insomnia, n (%)	775 (38.3)	588 (40.0)	187 (34.0)	0.016	219 (14.8)	50 (9.0)	0.001
Headache, n (%)	651 (32.2)	530 (36.1)	121 (22.0)	<0.001	322 (21.8)	47 (8.5)	<0.001
Tinnitus, n (%)	310 (15.3)	235 (16.0)	75 (13.6)	0.204	62 (4.2)	13 (2.4)	0.067
Decreased appetite, n (%)	230 (11.4)	168 (11.4)	62 (11.3)	0.981	44 (3.0)	10 (1.8)	0.192
Paresthesia, n (%)	497 (24.6)	379 (25.8)	118 (21.5)	0.054	NE	NE	
Difficulty concentrating n (%)	959 (47.5)	740 (50.3)	219 (39.7)	<0.001	359 (24.4)	83 (15.1)	<0.001
Myalgia, n (%)	768 (38.2)	576 (39.4)	192 (35.0)	0.079	214 (14.5)	61 (11.0)	0.051
Slowness, n (%)	1050 (51.9)	823 (55.9)	227 (41.2)	<0.001	345 (23.4)	89 (16.2)	<0.001
Memory impairment, n (%)	1161 (57.4)	893 (60.7)	268 (48.6)	<0.001	308 (21.0)	76 (13.8)	<0.001
Depression, n (%)	753 (37.2)	595 (40.4)	158 (28.6)	<0.001	158 (10.7)	38 (6.9)	0.012
Anxiety, n (%)	820 (40.6)	635 (43.1)	185 (33.7)	<0.001	185 (12.5)	38 (6.9)	<0.001
Diarrhoea, n (%)	220 (10.9)	168 (11.4)	52 (9.5)	0.241	41 (2.8)	11 (2.0)	0.400
Nausea, n (%)	156 (7.7)	132 (9.0)	24 (4.3)	0.001	22 (1.5)	4 (0.7)	0.252
Dizziness, n (%)	374 (18.6)	303 (20.7)	71 (12.9)	<0.001	67 (4.5)	12 (2.2)	0.020
Skin rash, n (%)	249 (12.3)	188 (12.8)	61 (11.1)	0.323	46 (3.1)	13 (2.4)	0.445

*NE: not explored

Table 3 | Complementary studies and health services required, by gender

Complementary studies	Total n = 2030	Females n = 1477	Males n = 553	p
Chest X-ray, n (%)	442 (21.8)	339 (23.0)	103 (18.6)	0.041
Laboratory, n (%)	690 (34.0)	526 (35.6)	164 (29.7)	0.014
Electrocardiogram, n (%)	578 (28.5)	439 (29.7)	139 (25.1)	0.047
Echocardiogram, n (%)	480 (23.6)	365 (24.7)	115 (20.8)	0.073
Chest CT scan, n (%)	349 (17.2)	241 (16.3)	108 (19.5)	0.101
Spirometry, n (%)	253 (12.5)	189 (12.8)	64 (11.6)	0.505
Holter, n (%)	157 (7.7)	112 (7.6)	45 (8.1)	0.747
Functional stress assessment*, n (%)	203 (10.0)	152 (10.3)	51 (9.2)	0.528
Cardiac catheterisation, n (%)	6 (0.3)	1 (0.1)	5 (0.9)	0.008
Endoscopy, n (%)	38 (1.9)	28 (1.9)	10 (1.8)	1.000
Cognitive evaluation, n (%)	51 (2.5)	36 (2.4)	15 (2.7)	0.847
Neurological studies, n (%)	111 (5.5)	88 (6.0)	23 (4.2)	0.140

*Includes stress electrocardiogram (graded ergometric test) and imaging techniques (stress-echo and gamma camera

Table 4 | Reported prevalence of symptoms by profession

Variables	Total n = 2030	Nurses n = 304	Physicians n = 1233	Other professions n =493	p
Age, mean (SD)	48.55 (11.17)	46.07 (9.29)	49.02 (11.64)	48.90 (10.88)	<0.001
Dyspnea, n (%)	675 (33.3)	129 (42.4)	383 (31.1)	163 (33.1)	0.001
Fatigue, n (%)	1380(68.0)	237 (78.0)	799 (64.8)	344 (69.8)	<0.001
Chest pain, n (%)	510 (25.3)	118 (39.6)	269 (21.9)	123 (25.2)	<0.001
Palpitations, n (%)	636 (31.3)	144 (47.4)	362 (29.4)	130 (26.4)	<0.001
Cough, n (%)	549 (27.0)	97 (31.9)	321 (26.0)	131 (26.6)	0.114
Anosmia, n (%)	849 (42.1)	132 (43.7)	490 (39.9)	227 (46.4)	0.039
Insomnia, n (%)	775 (38.3)	141 (46.5)	444 (36.2)	190 (38.6)	0.004
Headache, n (%)	651 (32.2)	153 (50.5)	353 (28.7)	145 (29.7)	<0.001
Tinnitus, n (%)	310 (15.3)	71 (23.6)	159 (12.9)	80 (16.3)	<0.001
Decreased appetite, n (%)	230 (11.4)	46 (15.2)	131 (10.7)	53 (10.8)	0.079
Paresthesia, n (%)	497 (24.6)	121 (40.3)	248 (20.2)	128 (26.1)	<0.001
Difficulty concentrating, n (%)	959 (47.5)	172 (57.0)	555 (45.2)	232 (47.3)	0.001
Myalgia, n (%)	768 (38.2)	161 (53.3)	427 (35.0)	180 (36.8)	<0.001
Slowness, n (%)	1050 (51.9)	184 (60.9)	601 (48.9)	265 (53.9)	0.001
Memory impairment, n (%)	1161 (57.4)	215 (71.4)	665 (54.1)	281 (57.3)	<0.001
Depression, n (%)	753 (37.2)	141 (46.7)	434 (35.3)	178 (36.1)	0.001
Anxiety, n (%)	820 (40.6)	157 (51.8)	466 (38.0)	197 (40.1)	<0.001
Diarrhoea, n (%)	220 (10.9)	51 (16.8)	119 (9.7)	50 (10.2)	0.001
Nausea, n (%)	156 (7.7)	42 (13.9)	74 (6.0)	40 (8.2)	<0.001
Dizziness, n (%)	374 (18.6)	90 (30.1)	177 (14.5)	107 (21.8)	<0.001
Skin rash, n (%)	249 (12.3)	61 (20.3)	130 (10.6)	58 (11.8)	<0.001

initial COVID-19 (OR 3.9), and working in more than one sub-sector of the health system (OR 1.4).

Cognitive syndrome: It was associated with female gender (p < 0.001), area of work performance (p = 0.03), profession (p < 0.001.) and initial severe COVID-19 course (p<0.001). The highest frequency was found in female nurses (80%) and female physicians (67%), followed by male physicians and male nurses in equal proportion (57%), p < 0.001 (Fig. 2). In the multivariate analysis, the variables associated with a higher risk of suffering from cognitive syndrome were female gender (OR 1.9), nursing profession (OR 1.7), initial severe course (OR 2.3) and working in emergency areas (OR 1.35).

Psycho-emotional syndrome: It was associated with female gender (p < 0.001), profession (p < 0.001) and initial severe clinical course (p < 0.001). Female nurses were most affected (73.2%), followed by female physicians (62.2%),

male physicians (55%) and male nurses (50%), p < 0.001 (Fig. 2). In multivariate analysis, female gender (OR 1.59), older age (OR 1.01) and severe course of initial infection (OR 2.39) were associated.

Neuro-peripheral syndrome: It was associated with female gender (p<0.001), profession (p=0.009) and initial severe course of the disease (p<0.001). It was more frequent in female nurses (87%) and physicians (78%), followed by male nurses (71%), and physicians (68%), p < 0.001. In multivariate analysis, women (OR 1.98) and the initial severe course of the disease (OR 2.28) were more likely to be associated with a 25% decrease in the likelihood of developing the disease (OR 0.75).

Digestive syndrome: was associated with older age (50.1 vs 48.0, p < 0.001), female gender (p=0.04), professional area of work (p=0.004), profession (p<0.001) and more severe initial course (p<0.001). Female nurses were most af-

Table 5 | Reported prevalence of symptoms in doctors and nurses

Variables	Total n = 1477	Female Nurses n = 248	Female Physicians n = 817	p
Age, mean (SD)	47.12 (10.47)	45.89 (9.42)	46.94 (10.65)	0.164
Dyspnea, n (%)	512 (34.7)	109 (44.0)	266 (32.6)	0.001
Fatigue, n (%)	1063 (72.0)	204 (82.3)	561 (68.7)	<0.001
Chest pain, n (%)	403 (27.4)	103 (42.0)	197 (24.2)	<0.001
Palpitations, n (%)	504 (34.1)	124 (50.0)	268 (32.8)	<0.001
Cough, n (%)	418 (28.3)	87 (35.1)	219 (26.8)	0.015
Anosmia, n (%)	682 (46.4)	115 (46.7)	369 (45.3)	0.739
Insomnia, n (%)	588 (40.0)	126 (51.0)	302 (37.1)	<0.001
Headache, n (%)	530 (36.1)	131 (53.0)	266 (32.7)	<0.001
Tinnitus, n (%)	235 (16.0)	60 (24.5)	108 (13.3)	<0.001
Decreased appetite, n (%)	168 (11.4)	39 (15.8)	83 (10.2)	0.023
Paresthesia, n (%)	379 (25.8)	103 (42.0)	167 (20.5)	<0.001
Difficulty concentrating, n (%)	740 (50.3)	148 (59.9)	390 (48.0)	0.001
Myalgia, n (%)	576 (39.4)	141 (57.3)	282 (34.9)	<0.001
Slowness, n (%)	823 (55.9)	158 (64.2)	434 (53.3)	0.003
Memory impairment, n (%)	893 (60.7)	183 (74.7)	469 (57.5)	<0.001
Depression, n (%)	595 (40.4)	125 (50.8)	319 (39.2)	0.002
Anxiety, n (%)	635 (43.1)	137 (55.5)	328 (40.3)	<0.001
Diarrhoea, n (%)	168 (11.4)	41 (16.6)	85 (10.4)	0.012
Nausea, n (%)	132 (9.0)	37 (15.0)	59 (7.2)	<0.001
Dizziness, n (%)	303 (20.7)	80 (32.9)	128 (15.8)	<0.001
Skin rash, n (%)	188 (12.8)	54 (22.0)	84 (10.3)	<0.001

Figure 1 | Reported prevalence of symptoms grouped into syndromic categories by gender
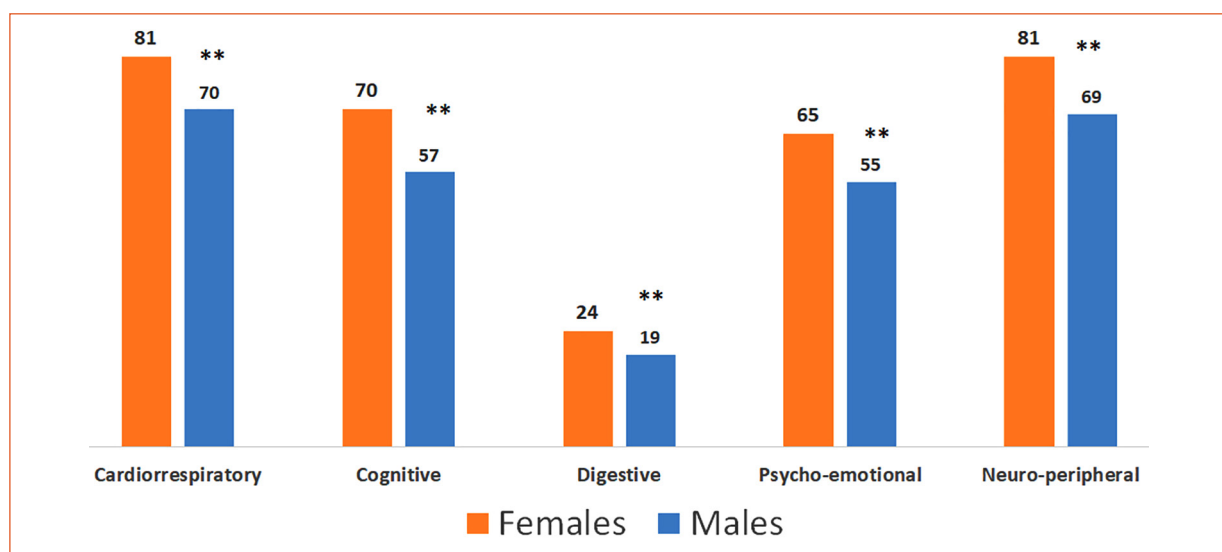
Expressed in percentages
**p< 0.001

Figure 2 | Reported prevalence of different syndromes according to gender and profession
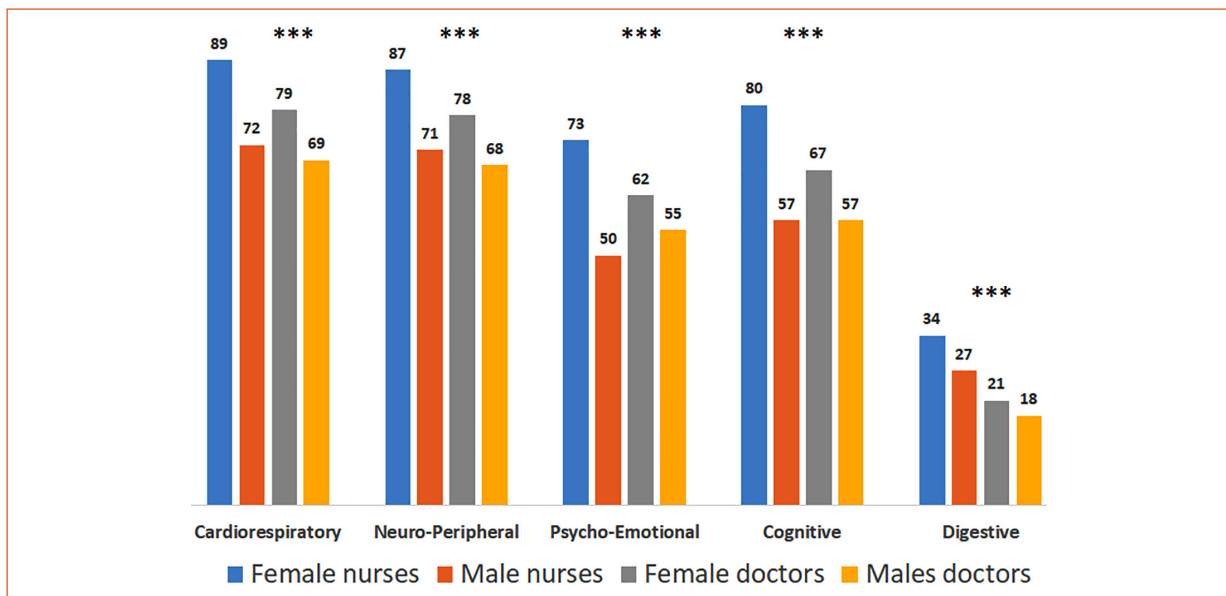
^Expressed in percentages
*** p<0.001

fected (33.7%), followed by male nurses (26.8%), female physicians (20.6%) and male physicians (18.5%), p<0.001. In multivariate analysis there was an association with more severe course of initial infection (OR 1.95), female gender (OR 1.46), nursing profession (OR 1.46), working in the emergency department (OR 1.3) and age (OR 1.02). Figure 2 summarizes the reported prevalence of each syndromic category according to gender and profession, medicine or nursing.

Discussion

The study identified a high reported prevalence of post-COVID-19 syndrome in healthcare workers, with higher frequency and severity in women, associated with higher severity of the initial picture and working conditions. The most affected professional group was nurses. The correlation observed in this study between the reported prevalence of post-COVID-19 syndrome and gender, professional and working conditions makes it possible to identify some phenomena that cross the health sector and that go beyond the COVID-19 pandemic, but which the latter has made visible. This visibility - and its study - could contribute to the implementation and/or adaptation of human resources policies in the context of our country's health system.

A first observation is that the participation of health personnel in the survey was mostly female, which coincides with other publications of self-administered surveys[35-38].

The reported prevalence of post-COVID-19 syndrome was high in our population, which could be biased by voluntary participation. One review reported an overall prevalence of 43%, reaching 54% in those who had required hospitalization and 34% in those who had not[39]. Other studies have reported widely varying frequencies and in most series, it was not possible to determine the possible pre-existence of symptomatology. In a Dutch cohort - with 76,422 participants - the pre-existence of symptoms was explored. They observed a prevalence of post-COVID-19 symptomatology of 21.4%, pre-existing symptoms of 8.7%, which would reduce new symptomatology to 12.7%[40]. With this caveat, which was not explored in this survey, the systematic review of observational series reports prevalence similar to our findings[32, 33].

The higher prevalence of persistent symptoms reported by women is consistent with other studies, both in the general population and in health-

care workers[35-38,41,42]. In a systematic review of 20 post-internment follow-up cohorts, the OR for women was 1.52 [43]. This finding contrasts with the higher incidence of severe cases and mortality in males during the acute phase reported in all series[44]. Also, in our survey, the reference to a greater need for initial hospitalization, related to the greater severity of the condition, was 9.6% in females and 19.8% in males. Even in patients who did not require hospitalization, the prevalence of post-COVID-19 syndrome in other studies was high and coincides with our findings[45].

Multiple symptomatology has been a frequent post-COVID-19 finding similar to our study. The most frequently reported symptom was fatigue, 68%, a finding consistent with other studies[35,36,46], with higher prevalence in females.

To explain the paradox that initial COVID-19 infection has higher severity and acute mortality in males - while post-COVID-19 syndrome has higher prevalence and severity in females - different hypotheses have been postulated, which we could schematically group into biological and socio-cultural[47]. Biological differences in immunological aspects linked to vulnerability to viral infection, as well as hormonal mechanisms, have been reported[48].

As for the socio-cultural hypotheses, this study may contribute relevant information to characterize it. In multivariate analyses, the reported prevalence was associated with the severity of the initial episode, which we could consider within the biological explanation, and with factors related to female gender, profession - with a great disadvantage for nursing with respect to medicine, performance in emergency areas and multi-employment in some syndromes. Female nurses had the highest number of symptoms, followed by female doctors, male nurses and lastly male doctors. In this study, being female and working as a nurse was an independent risk factor for post-COVID-19 syndrome. This finding is consistent with a multicenter study which showed an association between the nursing profession and post-COVID-19 syndrome[40], although no studies were found that assessed the association between gender, profession and the prevalence of post-COVID-19 syndrome.

Gender intersectionality, understood as the connection or interaction between gender and other social relations of inequality - such as social class, migratory origin, race/ethnicity - avoids a simplistic approach to the issue by considering the female collective as heterogeneous[49]. In this paper, the implications of the post-COVID-19 syndrome cannot be captured integrally by either gender or profession separately, but intersectionally by both categories. In light of these findings, the disadvantage of being female and working as a nurse is evident, compared to the least impacted group: being male and working as a doctor. These results show a continuity with previous studies carried out in Argentina during the pandemic on nurses, which showed how the gendering of nursing work as feminine resulted in subordination or a place of subalternity[50].

One of the possible explanations from a gender perspective is that women have - irrespective of the cultures they come from - a greater self-perception of the processes they experience in their bodies[26]. This is linked both to the reporting of symptoms and to the higher frequency of medical consultations and complementary studies observed in female health workers compared to their male colleagues, which is consistent with what has been described in other contexts[51]. Different explanations have been postulated for women's greater use of health services[52]. Among the explanatory hypotheses put forward, differential gender socialization - in which men perceive illness and care-seeking as manifestations of weakness and loss of masculinity, while women have a social role as "caregivers"[26] - includes self-care, which is why women tend to consult at all stages of life more frequently. This condition could be reinforced in the women in the study, considering the "double role of caregivers" as health workers and - from a broader perspective - of professional and domestic care overload, to which would be added the compromise of one's own health, including the unequal possibility of convalescence[53].

According to what was observed in the Argentine National Time Use Survey (ENUT) published in 2022, Argentine women spend an average of 6:07 hours on care tasks versus 3:30 hours for men, and 4:06 hours versus 2:38 hours for domestic work, respectively, while women spend 7:34 hours and men 9:06 hours on paid work[54]. This allows us to conjecture that the partici-

pants in this study - all health workers, in many cases with multiple jobs - had a higher average number of hours of paid work than the average for the general population of the ENUT. The paid workload of health personnel increased after the pandemic by between 60% and 83% according to other studies in Argentina, one of which also found a self-reported increase in the number of jobs among nurses in the province of Buenos Aires [55,56]. This increase in work tasks would overlap with the higher rate of care, possibly more complex during the pandemic period due to the interruption of intergenerational care chains, the lack of support from domestic staff due to confinement and the fact that they are essential personnel with a travel permit.

Several reports from international organizations drew attention to the increase in the number of hours dedicated to caregiving during the pandemic, which involved women to a greater extent [57]. The worsening of working conditions was also reported, particularly in the nursing profession -highly feminized- which added to the overload of care hours, which also fell more heavily on women [58]. In any case, the relationship between the variables multiemployment, profession, gender and caregiving responsibility in health personnel is complex. A self-administered survey of non-medical health personnel working in privately managed health institutions in the metropolitan area of Buenos Aires (AMBA) showed that the incidence of moonlighting was different by gender, with 43% of men having more than one job compared to 26% of women, but this relationship was inversely proportional to caregiving tasks [59].

In this study, it was observed that working in more than one subsector of the health system –public, private and social security– was a risk factor for the development of post-COVID-19 cardiorespiratory syndrome, and that working in emergency areas was associated with the risk of suffering two of the five syndromic categories analyzed. Different publications have highlighted the high work stress of professionals in emergency areas during the pandemic, particularly nurses [60, 61]. In the exploration of symptoms such as insomnia - with an overall frequency of 38% in our survey - a higher

frequency has been reported, related to work stress and to having suffered COVID-19 as independent variables [62].

Post-COVID-19 syndrome had an impact on work activity, with 15% of respondents reporting a change in their activity and 6.6% who had not fully recovered from work at the time of the survey. Although women - both nurses and physicians - were at greater risk of post-COVID-19 syndrome, no differences were found in the median number of days of medical leave or in the incidence of change in work activity, compared to men. There are many studies in the literature that reflect the impact of post-COVID-19 syndrome at work. In a study carried out in the United States on health personnel, it was found that 1.8% had to restrict their work activity because of the syndrome [38]. Another cohort study conducted in patients with persistent symptoms after COVID-19 infection, where 32% of the participants were healthcare personnel, 95% had to be absent from work for a median of 180 days (RIC 41-308) [43]. In another analysis carried out in the United Kingdom, more than 50% of the participants reported that they had missed at least one day of work in the previous month due to post-COVID-19 syndrome [63]. No studies were found that evaluated gender differences in this regard.

Limitations: The survey was conducted through a social network, and the decision to respond or not could be conditioned by the presence of symptomatology, which biases towards a higher prevalence. The Intramed® network has several thousand registered members distributed in different countries, therefore, although we have a large number of responses, it implies an important bias and limits the possibility of establishing the real prevalence of the syndrome. However, detailed reporting has allowed us to analyze its severity and evolution. As for the recording of gender, we asked only whether respondents were identified as male or female, assuming they were cisgender. Although SARS-CoV-2 disease affects both genders indiscriminately, two-thirds of the survey participants were female. Vaccination status was not asked as this was not part of the study objectives and the length of the questionnaire was optimized. During 2020, no vaccines were available,

but in 2021 most countries in the region developed mass vaccination projects starting with the most at-risk groups and prioritizing health workers. Although there is agreement on the ability of vaccination to prevent infections and their serious complications, data on its usefulness in preventing post-COVID-19 syndrome are not yet consistent[64].

In conclusion, among health care workers participating in the study, the reported prevalence of post-COVID-19 syndrome was higher in women for each of the symptom clusters explored. The severity of the initial symptoms, nursing profession, multi-employment and working in emergency areas were independent variables associated with increased risk of post-COVID-19 syndrome, findings consistent with other studies. The greater overload of health personnel during the pandemic –highly feminized– and the associated gender conditions could partially explain these results, so it would be pertinent to investigate the relationship between the incidence of post-COVID-19 syndrome and the burden of care in future projects.

Conflict of interest: None to declare

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