The COVID-19 pandemic impact on health, social, and finances in clinical nutrition practitioners of Latin-American: An international survey

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ABSTRACT

Background & aim: Between July and November 2021, the Latin American region affronted the fourth COVID wave. The impact of the pandemic on health, social, and finances among nutrition practitioners is unknown. This study aimed to explore and describe the effects of the COVID-19 pandemic on the health, social, and finances wellbeing of Latin-American clinical nutrition practitioners. **Methods**: A international cross-sectional survey study was carried out. A 70-item web survey was self-completed by the nutrition community in 18 Latin American countries, including physicians, nutritionists, and nurses. Variable measured involve self-perception of repercussions on health, social, and finances wellbeing. Participated 398 health professionals including 63.1% dietitians/nutritionists, 25% physicians, and 12.1% nurses. **Results**: Median age was 37 years and 78.6% were female. The median of the COVID-19 care experiences was 12 months. Participants noted negative pandemic effects on health (85%), family/social life (82.7%), and personal finances (63.6%). Shortage of staff, equipment deficiency, and limited work experience correlated ($p<0.05$) with adverse impacts on health, social life, and finances. **Conclusions**: The impact of COVID-19 on nutrition practitioners in Latin America is a pressing issue that demands targeted support. We must ensure their health, social well-being, and financial stability to foster resilience and improve nutrition services and public health readiness for future pandemics.

Key words: COVID-19; Health Personnel; Physicians; Nurses; Nutritionists.

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El impacto de la pandemia de COVID-19 en la salud, lo social y las finanzas de los profesionales de la nutrición clínica en América Latina: una encuesta internacional

RESUMEN

Antecedentes y objetivo: Entre julio y noviembre de 2021, Latinoamérica enfrentó la cuarta ola de COVID. Se desconoce el impacto de la pandemia en la salud, lo social y las finanzas entre los profesionales de la nutrición. Este estudio tuvo como objetivo explorar y describir los efectos de la pandemia de COVID-19 en el bienestar sanitario, social y financiero de los profesionales de la nutrición clínica latinoamericanos. **Métodos**: Se llevó a cabo un estudio tipo encuesta. Profesionales en el área de nutrición de 18 países latinoamericanos, incluidos médicos, nutricionistas y enfermeras, completaron una encuesta web de 70 ítems. Las variables medidas fueron la autopercepción de las repercusiones en el bienestar sanitario, social y financiero. Participaron 398 profesionales de la salud, entre ellos 63,1% dietistas/nutricionistas, 25% médicos y 12,1% enfermeras. **Resultados**: La mediana de edad fue 37 años y el 78,6% eran mujeres. La mediana de las experiencias de atención de la COVID-19 fue de 12 meses. Los participantes notaron efectos negativos de la pandemia en la salud (85%), la vida familiar/social (82,7%) y las finanzas personales (63,6%). La escasez de personal, la deficiencia de equipos y la experiencia laboral limitada se correlacionaron ($p<0,05$) con impactos adversos en la salud, la vida social y las finanzas. **Conclusiones**: El impacto del COVID-19 en los profesionales de la nutrición en América Latina es un tema apremiante que exige un apoyo específico. Se debe garantizar su salud, bienestar social y estabilidad financiera para fomentar la resiliencia y mejorar los servicios de nutrición y la preparación de la salud pública para futuras pandemias.

Palabras clave: COVID-19; Personal sanitario; Médicos; enfermeras; Nutricionistas.

INTRODUCTION

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-Cov-2) caused Coronaviruses Disease 2019 (COVID-19). It reached a pandemic status in March 2020 due to the globally spread after the first report in Wuhan-China in December 2019. Up to July 15, 2023, more than 767 million cases and 6.9 million deaths have been confirmed worldwide (1). Between July and November 2021, the Americas region affronted the fourth COVID-19 wave (1) that was exacerbated by an excessive trust in intensive vaccination schemes, the increased amount of tourism during the summer vacation period, and the elimination of travel restrictions and lockdowns. Since the beginning of the COVID-19 pandemic, nutrition has been a critical factor in preventing, managing, and recovering from COVID-19. For instance, malnutrition and overnutrition are crucial determinants for adverse clinical outcomes (2–4) and nutritional therapy and dietary counseling contribute to preventing and managing COVID-19 and its consequences (3–5).

The evidence highlights that healthcare workers (HCWs) in the front line of COVID-19 care experienced high health, social, and financial burdens; however, the impact of these outcomes is still unknown among clinical nutrition practitioners. Mental health has multiple dimensions, including emotional, cognitive, and behavioral elements. Literature reports that HCWs' mental health has been affected by depression, anxiety, burnout syndrome, and *post*-traumatic stress disorder (6,7). The mental health of HCWs has received a lot of attention during the COVID-19 pandemic. The scientific evidence emphasizes that the prevalence of mental health illnesses across HCWs during the first year of the COVID-19 pandemic reached 25%−75% (8,9).

Family and social functioning of HCWs was disturbed by the COVID-19 care due to the fear of contracting the disease in the workplace and transmitting it to family members (25%−90%), the death of some relative or close friend, the appearance of family conflicts, issues related to childcare and household management, social distancing, and having to adapt the unique needs of some family members to the "new reality" (*e.g.*, children with special requirements or person with the demand of physical support at home) (6,8,10). Healthcare providers' finances were also affected by the COVID-19 pandemic. Between 25%−38% of HCWs suffered of at least one financial issue during the pandemic. Some of the reasons cited in the literature include unpaid leaves and furloughs during the lockdown period, unpaid work due to workplace financial constraints, job insecurity, compulsive buying, and the financial crisis triggered by the pandemic itself (6,8,10).

The COVID-19 pandemic has impacted on the social support, finances, and health of HCWs; nevertheless, scientific evidence has either excluded or failed to stratify their analyses for clinical nutrition practitioners. The present work aims to comprehensively investigate and describe the effects of the COVID-19 pandemic on the health, social interactions, and financial circumstances of Latin-American clinical nutrition practitioners.

MATERIALS AND METHODS

Study Design

A cross-sectional international survey study was carried out. The recruitment period was between July and November 2021 in 18 Latin American countries. All participants realized a written informed consent. This report follows the recommendation of the Strengthening the Reporting of Observational Studies in Epidemiology—Nutritional Epidemiology (STROBE-nut) (11).

Ethical statement

This project followed local and international guidelines on ethics in human research. According to local regulations, this study has been classified as low risk, and as such, it is exempt from requiring approval from an Institutional Review Board to carry out the survey.

Population

Physicians, nutritionists, and nurses working in a public or private hospital in Latin American Region were invited to participate. The inclusion criteria involved at least one month of clinical experience in COVID care in 2021 and experience or education in nutrition care. Surveys with incomplete data or unusual information were excluded. Due to the lack of information about the research topic in the region, a convenience sample size and sampling method were carried out.

Measures

A 70-item survey was designed. The survey was produced by two researchers and reviewed separately by two clinical nutrition research experts in Latin America. A pilot study was carried out to verify the survey's data collection process and performance (12).

The survey contained demographic characteristics (age, sex, profession, postgraduate education, years of clinical and nutrition experience, months of experience in COVID-19 care, number of work hospitals places), hospital features (number of beds, number of Intensive Care Units (ICU) beds, public or private institution), vaccination *status*, and previous COVID-19 infections. A five-point Likert Scale of agreement tested the impact perceived on health, social and family life, and personal finances related to the effects of COVID-19

Data Collection

The survey was loaded into the Google Formularies platform and electronically distributed to clinical nutrition practitioners through national and Latin-American professional and scientific associations of Nutrition. The survey was completely anonymous. Participants

signed an electronic consent form agreeing to provide the required information. The instrument was programmed to end when participants did not agree to sign the informed consent form at the beginning of the survey.

Statistical analyses

Percentages were used to summarize categorical variables. Quantitative variables were tested for normality with the Kolmogorov-Smirnov test. Since none of the continuous variables were normally distributed, the median and interquartile range (IQR) were used as descriptors. The total number of hospital beds was separated into tertiles to determine the size (small, medium, and large respectively) of the health institution. Distributions over two categories (self-perceptions agree/disagree) were compared using the Mann-Whitney test, and distributions over more than two categories were compared using the Kruskal-Wallis rank test adjusted for ties. Associations between categorical variables were tested using the Pearson χ^2 test.

A Latent Profile Analysis (LPA) (13) was performed to classify participants based on age, total clinical experience, clinical nutrition experience, experience in COVID-19 patients, number of hospitals working, and hospital size. Models based on two, three, and four categories were built. Model selection was based on the Akaike Information Criterion (AIC) and algorithm convergence. Data was analyzed on STATA17.

RESULTS

Health professionals (n=927) accessed the survey and 42.9% (n = 398) fulfilled the selection criteria. Most of the participants in the study came from Mexico (21.4%) and Perú (20.1%), while only 7.5% were from Chile, Ecuador, Nicaragua, the Dominican Republic, and Honduras (Figure 1). The distribution by health profession was 63.1% dietitians/nutritionists, 25.0% physicians, and 12.1% nurses. The median age was 37 years and 78.6% were females. The median years of clinical nutrition experience among the participants in this study were eight years. Additionally, their experience in providing care related to COVID-19 was 12 months. Other demographic characteristics are showed in Table 1.

The algorithm for LPA converged for a model with two latent categories (junior and senior clinicians) that described clinical experience. Compared to senior clinicians, junior clinicians were younger, less experienced in the clinical setting, and worked in smaller hospitals (low number of beds). Junior clinicians were also more likely to be dietitians or nutritionists and were less likely to have graduate education (Table 2).

Our findings show that 36% of the participants had tested positive for the infection, and nearly 55% of them perceived that they acquired the virus in the hospital setting. These findings were independent of the participant's profession (P >0.05). Around 44% of the participants reported having a close family member who tested positive for COVID-19 during the pandemic. Testing positive for COVID-19 was significantly associated with having a close family member who tested positive for COVID-19 (P<0.001), but not with

the type of institution where participants worked (*P* = 0.976). Seniority was independent from testing positive for COVID-19 during the pandemic (*P* = 0.310), having been infected with COVID-19 at the hospital (*P* = 0.471), having had a close family member with COVID-19 (*P* = 0.928), and having a complete COVID-19 vaccination scheme (*P* = 0.823).

Most participants perceived that the COVID-19 pandemic harmed their health (85%), their family and social life (82.7%), and their finances (63.6%). These perceptions did not differ between physicians, dietitians/nutritionists, and nurses. Perceiving staff shortages and a lack of equipment and work supplies were associated with agreeing that COVID-19 hurt health, family and social life, and personal finances. Moreover, having less work experience was associated with agreeing that the COVID-19 pandemic negatively impacted family and social life and personal finances. Furthermore, catching COVID-19 at the hospital was associated with agreeing that the COVID-19 pandemic hurt health. Finally, those who decided that the pandemic had an undesirable impact on their finances were also more likely to have a close family member who tested positive for COVID-19 (Table 3).

DISCUSSION

The effect of the COVID-19 pandemic on HCWs' outcomes has received substantial consideration. However, the evidence so far has not analyzed the consequences of the pandemic on clinical nutrition practitioners as a separate group. According to our knowledge, this is the first study to relate to health, social function, and personal finances in this segment of HCW's during the fourth wave of the COVID-19 pandemic in Latin America. We found that more than 80% of the participants felt that the pandemic disrupted their overall health (including mental health) and their family and social lives. In comparison, over 60% reported that it affected their finances. This was particularly true for more junior clinicians and participants who perceived lacking work supplies and equipment or staff shortages.

Previous studies during the first year of the pandemic emphasized the high burden of COVID-19 on different outcomes among specific populations of HCWs in the Latin American Region. A study looking at the effects of the pandemic on orthopedic surgeons from 14 Latin American countries (14) found that 92% and 58% of the participants felt concerned about their finances and some degree of psychological distress, respectively. Another study among spinal surgeons (15) reported that 48.5% of the participants felt that their physical and mental health was negatively affected during the pandemic. One survey among Latin American HCWs found that participants were negatively impacted by their mental health: anxiety (10%−77%), depression (27%−81%), and stress (16%−89%) (16). To date, no studies have examined the impact of the COVID-19 pandemic on family and social relationships in Latin America.

The high burden of the COVID-19 pandemic on HCWs has been described on previous reports. We believe that the impact of the pandemic has changed through time and it is possible that the experience of HCWs during the first months of the pandemic was a much harsher one than what it is shown by our results. A previous study has demonstrated that

the consequences of the COVID-19 pandemic on health, family and social life, and personal finances have indeed improved in time (10). Some possible explanations have to do with the General Adaptation Syndrome (GAS), resilience, coping, and the expectations placed on the development of new vaccines at the time (10,17,18).

Our study highlights the relationship between lack of clinical experience, limited work supplies and equipment, and staff shortages with the feeling that the COVID-19 pandemic has disturbed health, family and social life, and personal finances of clinical nutrition practitioners. Previous studies show that increased duties and responsibilities, facing the unknown consequences of new behaviors, challenges in interpersonal relationships, and lack of resources to work have required sacrifice from HCWs and can contribute to burnout and Moral Injury among HCWs. Moral injury involves the challenges on the emotional well-being that are brought by imposed disruptions in the values system of an individual as a result of adverse situations or transgressive acts (19).

The epidemics will continue to affect the mental health of HCWs, as demonstrated in past and recent epidemics and pandemics (7,20). As mentioned, working under adverse conditions and without sufficient resources can be seen as a moral injury that can result in burnout-like symptoms (19). This can be particularly challenging in junior practitioners who still need to develop more tacit knowledge and expertise in order to take complex clinical decisions and make the most out of limited resources.

Implications for Research and Practice

This study looked at the effect of the pandemic on the well-being of clinical nutrition practitioners. It would be interesting to explore further how these HCWs followed the Nutrition Care Process with limited resources. Furthermore, more qualitative research will be needed to explore the emerging themes and values of clinical nutrition practitioners during the COVID-19 pandemic and establish learned lessons that could be translated into policies that improve clinical nutrition practice in Latin America. Tied to this, it is important to determine new ways to streamline the development of tacit knowledge and clinical judgment among junior clinical nutrition practitioners so that they can perform better under different kinds challenging situations that can arise in the clinical setting.

Strengths

This research has two strengths. First, our findings allowed to describe the COVID-19 impact on health, family, and finances among clinical nutrition practitioners during the second year of the Pandemic and at the beginning of vaccinations. Second, this one has a larger sample size in Latin American region and involves health workers who were systematically excluded from past researchers, such as nutritionists. These advantages permit our results to be the baseline for future analysis of the implications of the pandemics on HCWs' wellness.

Limitations

The survey was conducted by clinical nutrition societies in Latin American countries, so the number of participants who answered the questions is restricted to those who are in touch with these societies. This sample excludes clinical nutrition practitioners who faced the pandemic in many smaller and rural settings and those who did not work at the hospital. For this reason, this study neglects the effect of the lockdowns on those clinical nutrition practitioners who rely primarily on private patients or who work in outpatient clinics. Additionally, some countries are over-represented while others are under-represented in the sample. Therefore, the results in this study are more skewed toward the perception of participants coming from over-represented countries.

CONCLUSIONS

The four COVID-19 waves negatively impacted clinical nutrition practitioners (nutritionists, physicians, and nurses) at health, family/social life, and finances level. These findings were related to staff shortages, lack of equipment and work supplies, and less work experience. Future efforts should focus on learning about the difficulties that arise from future pandemics and improving these aspects to ensure better performance and greater job satisfaction among healthcare workers. This study contributes to the understanding of the effects of the COVID-19 pandemic on Latin-American clinical nutrition practitioners, highlighting the need for targeted interventions to support their health, social well-being, and financial stability. By addressing these challenges, healthcare systems and policymakers can promote the resilience and well-being of clinical nutrition practitioners, ultimately enhancing the quality of nutrition services and public health outcomes to afront future pandemics.

Author contributions

GD: methodology, software, validation, formal analysis, investigation, resources, data curation, writing-original draft, writing-review & editing, visualization. **FVG:** methodology, proper analysis, data curation, writing-review & editing, visualization. **LGR:** writing-original draft, writing-review & editing, visualization. **VFT:** conceptualization, methodology, validation, investigation, resources, writing - review & editing, visualization, supervision, and project administration. All authors reviewed and commented on subsequent drafts of the manuscript.

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Conflicts of interest disclosures

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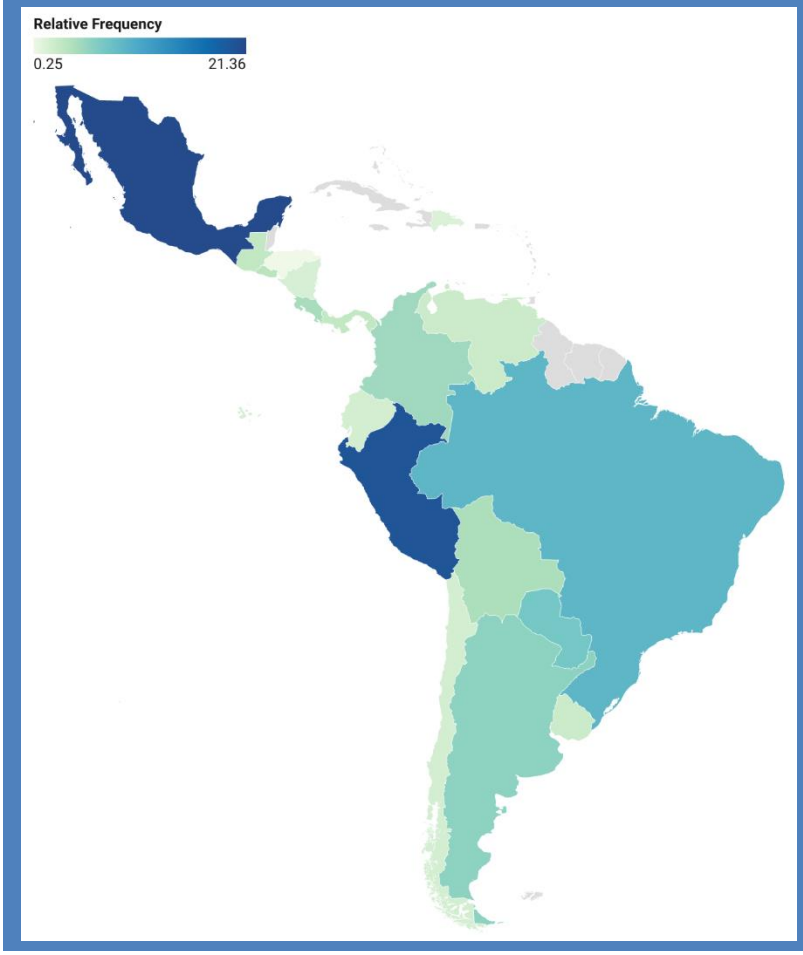
Figure 1. Distribution of Latin American clinical nutrition professionals evaluated in relation to the impact of COVID on their physical, social and financial wellbeing.



País	**%**
México	20.29
Colombia	6.15
Perú	18.85
Paraguay	8.40
Brasil	7.58
Argentina	6.56
Guatemala	4.71
Costa Rica	4.51
Bolivia	3.69

El Salvador	3.48
Ecuador	2.87
Panamá	2.66
Uruguay	2.46
Venezuela	2.25
República Dominicana	2.05
Chile	1.84
Nicaragua	1.48
Honduras	0.20
TOTAL	100

Table 1. Demographics characteristics of Latin American clinical nutrition professionals evaluated in relation to the impact of COVID on their physical, social and financial wellbeing

Characteristics	**Total** n=398	**Nutrition and Dietetics** n=251	**Medicine** n=99	**Nursing** =n48	**p-value**
Gender, Female/Male, n	313/92	115/25	48/16	18/6	0.431[a]
Age, years ǂ	37 (16)	35 (11)	45 (21)	40 (18.5)	<0.001[b]
Clinical experience, years ǂ	11.0 (14.0)	10.0 (10.0)	16.0 (20.0)	15.5 (15.8)	<0.001[b]
Clinical experience in nutrition, years ǂ	8.0 (11.3)	8.0 (10.0)	10.0 (17.0)	9.0 (11.0)	0.199[b]
Clinical experience in COVID-19 care, months ǂ	12.0 (10.0)	12.0 (10.0)	14.0 (8.0)	12.0 (10.8)	0.031[b]
Postgraduate education ϕ					
Graduate Diploma	245 (61.6)	123 (49.0)	87 (87.9)	35 (72.9)	<0.01[a]
Master's Degree	146 (36.7)	85 (33.9)	52 (52.5)	9 (18.8)	<0.01[a]
PhD Degree	12 (3.0)	6 (2.4)	5 (5.1)	1 (2.1)	<0.01[a]
Type of hospital ϕ					
Public	250 (62.8)	170 (67.7)	48 (48.5)	32 (66.7)	0.001[a]
Private	106 (26.6)	65 (25.9)	30 (30.3)	11 (22.9)	
Mixed	42 (10.6)	16 (6.4)	21 (21.2)	5 (10.4)	
Number of job places ϕ					
1	284 (71.4)	209 (83.3)	48 (48.5)	27 (56.3)	
2	90 (22.6)	34 (13.6)	38 (38.4)	18 (37.5)	
3	13 (3.3)	4 (1.6)	7 (7.1)	2 (4.2)	
4	7 (1.8)	2 (0.8)	4 (4.0)	1 (2.1)	<0.01[a]
>4	4 (1.0)	2 (0.8)	2 (2.0)	0 (0.0)	
Hospital size ϕ					
Small	98 (33.8)	64 (36.2)	23 (29.9)	11 (30.6)	
Medium	108 (37.2)	66 (37.3)	26 (33.8)	16 (44.4)	0.476 [a]
Large	84 (29.0)	47 (26.6)	28 (36.4)	9 (25.0)	

ǂ values are presented as median (interquartile range)
ϕ values are presented as frequency (%)
a Pearson Chi ^{2} test
b Kruskal-Wallis rank test adjusted for ties

Table 2: Parameters of clinical experience of professionals in the area of clinical nutrition in Latin America

Parameter	Junior Clinicians n=285	Senior Clinicians n=113	p-value
Age, years ǂ	35 (9)	55 (10)	<0.0001 [a]
Clinical Experience, years ǂ	8 (7)	25 (11.5)	<0.0001 [a]
Clinical nutrition experience, years ǂ	6 (7)	20 (10)	<0.0001 [a]
Clinical COVID-19 experience, months ǂ	12 (10)	15 (8.5)	0.0003 [a]
Number of hospital beds ǂ	138 (221.5)	200 (251.5)	0.0215 [a]
Number of ICU beds ǂ	18 (30)	18.5 (20)	0.4608 [a]
Profession Φ			
Physicians	50 (17.5%)	49 (43.4%)	
Dietitians/Nutritionists	204 (71.6%)	47 (41.6%)	<0,001 [b]
Nurses	31 (10.9%)	17 (15.0%)	
Postgraduate education Φ			
Diploma	159 (55.8%)	86 (76.1%)	
Master degree	95 (33.3%)	51 (45.1%)	<0,001 [b]
PhD	3 (1.1%)	9 (8.0%)	

ǂ values are presented as median (interquartile range)
Φ values are presented as frequency (%)
a Mann-Whitney test
b Pearson Chi ^{2} test

Table 3. Perception of the COVID-19 impact of clinical nutrition practitioners in Latin American (n = 398)

Characteristics	Health		Family and social life		Personal finances	
	No impact	**Impact**	**No impact**	**Impact**	**No impact**	**Impact**
Gender, Females ϕ	13 (92.9)	147 (77.4)	18 (85.7)	146 (89.5)	39 (86.7)	103 (74.6)
Age, years ǂ	37.0 (26.0)	38.0 (15.0)	44.5 (21.0)	36.0 (14.0) *	40.0 (19.5)	37.0 (15.0)
Profession ϕ						
Physicians	6 (26.1)	81 (24.0)	11 (32.4)	82 (24.9)	24 (32.9)	59 (23.3) *
Dietitians/Nutritionist	15 (65.2)	215 (63.6)	21 (61.8)	206 (62.6)	46 (63.0)	157 (62.1) *
Nurses	2 (8.7)	42 (12.4)	2 (5.9)	41 (12.5)	3 (4.1)	37 (14.6) *
Postgraduate education ϕ						
Graduate Diploma	11 (47.8)	211 (62.4)	22 (64.7)	201 (61.1)	49 (67.2)	156 (61.7)
Master's degree	8 (34.8)	125 (37.0)	15 (44.12)	119 (36.2)	26 (35.6)	92 (36.4)
PhD	1 (4.4)	6 (1.8) *	3 (8.8)	6 (1.8) *	2 (2.7)	6 (2.4)
Worx experience ǂ						
Clinical, years	14.0 (23.0)	11.0 (12.0)	17.0 (20.8)	10.0 (12.0) *	15.0 (15.5)	10.0 (12.0) *
Clinical nutrition, years	12.0 (20.0)	8.0 (10.0)	15.0 (15.5)	8.0 (10.0) *	12.0 (11.5)	8.0 (10.0) *
COVID-19 care, months	14.0 (10.0)	12.0 (10.0)	15.0 (8.3)	12.0 (10.0) *	16.0 (5.5)	12.0 (10.0) *
Seniority ϕ						
Junior	13 (56.5)	249 (73.7)	17 (50.0)	248 (75.4) *	45 (61.6)	189 (74.7)
Senior	10 (43.5)	89 (26.3)	17 (50.0)	81 (24.6)	28 (38.4)	64 (25.3)
Hospital size ϕ						
Small	5 (31.3)	80 (32.8)	6 (23.1)	84 (35.3) *	14 (24.1)	67 (37.2)
Medium	8 (50.0)	92 (35.7)	17 (65.4)	82 (34.5) *	25 (43.1)	63 (35.0)
Large	3 (18.8)	72 (29.5)	3 (11.5)	72 (30.3) *	19 (32.8)	50 (27.8)
Perceived lack of ϕ						
Personnel	12 (52.2)	274 (81.1) *	20 (58.8)	267 (81.2) *	44 (60.3)	211 (83.4) *
Mechanical ventilation	13 (56.5)	215 (63.6) *	18 (52.9)	211 (64.1) *	30 (41.1)	172 (68.0) *
IV infusion equipment	8 (34.8)	192 (56.8) *	11 (32.4)	187 (56.8) *	24 (32.9)	150 (59.3) *
EN infusion equipment	5 (21.7)	169 (50.0) *	8 (23.5)	166 (50.5) *	15 (20.6)	141 (55.7) *
EN formulas	6 (26.1)	154 (45.6) *	7 (20.6)	152 (46.2) *	16 (21.9)	129 (51.0) *
PN solutions	4 (17.4)	81 (24.0)	2 (5.9)	80 (24.3) *	10 (13.7)	68 (26.9) *

IV intravenous; EN enteral nutrition; PN Parenteral nutrition; ǂ values are presented as median (interquartile range); ϕ values are presented as frequency (%); * *P* value < 0.05, comparison disagree *versus* agree.