

Critical care nursing policy, practice, and research priorities: An international cross-sectional study

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Abstract

Purpose: To examine the status of critical care nursing internationally, assess the impact of the COVID-19 pandemic, and identify research priorities by surveying professional critical care nursing organizations (CCNOs) worldwide.

Design: A descriptive survey methodology was used. This study is the sixth worldwide quadrennial review to assess international critical care nursing needs and provide evidence to inform critical care nursing policy, practice and research priorities globally.

Methods: The sixth World Federation of Critical Care Nurses survey of CCNOs was emailed to potential participants from countries with CCNOs or known critical care nurse leaders. Data were collected online using Survey Monkey™. Responses were entered into SPSS version 28 software (IBM Corp.) and analyzed by geographical region and national wealth group.

Findings: Ninety-nine national representative respondents participated in the survey (70.7% response rate). The most important issues identified were working conditions, teamwork, staffing levels, formal practice guidelines, wages, and access to quality education programs. The top five CCNO services that were of most importance were providing national conferences, local conferences, workshops and education forums, practice standards and guidelines, and professional representation. Important pandemic-related services and activities provided by CCNOs included addressing emotional and mental well-being of nurses, providing guidance related to nurse staffing/workforce needs, assisting to coordinate efforts to obtain personal protective equipment supplies, serving as a country liaison with the World Health Organization's COVID-19 response activities, and assisting in the development and implementation of policies regarding standards of care. The most important contributions expected from the World Federation of Critical Care Nurses were standards for professional practice, standards for clinical practice, website resources, professional

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representation, and providing online education and training materials. The top five research priority areas were: stress levels (inclusive of burnout, emotional exhaustion and compassion fatigue); critical care nursing shortage, skill mix and workforce planning; recruitment, retention, turnover, working conditions; critical care nursing education and patient outcomes; and adverse events, staffing levels, patient outcomes.

Conclusions: The results highlight priority areas for critical care nursing internationally. The COVID-19 pandemic impacted critical care nurses as direct care providers. As a result, addressing the ongoing needs of critical care nurses remains a priority area of focus. The results also highlight important policy and research priorities for critical care nursing globally. Results of this survey should be incorporated into strategic action plans at the national and international levels.

Clinical Relevance:

- Issues of importance to critical care nurses including research and policy priorities during and following COVID-19 are now clarified through this survey.
- The impact and importance that COVID-19 has had on critical care nurses and their preferences and priorities are provided.
- Clear guidance to leaders and policy makers on where critical care nurses would like to see greater focus and attention to help strengthen the contribution of critical care nursing practice to the global healthcare agenda.

KEYWORDS

COVID-19, critical care, education, international, nursing, professional issues, research priorities, survey, workforce

INTRODUCTION

As an international nursing organization, the World Federation of Critical Care Nurses (WFCCN) represents over 600,000 critical care nurses worldwide. WFCCN provides leadership, guidance, support, and international representation to critical care nurses globally. WFCCN was established in 2001 and became a member organization of the International Council of Nurses (ICN) in 2007.

Beginning in 1999, WFCCN has conducted a worldwide survey every 4 years of all known critical care nursing organizations (CCNOs) and international critical care nursing (CCN) leaders. The first WFCCN worldwide survey of CCNOs and international CCN leaders was conducted in 1999–2001 and was used to inform the original charter of the WFCCN and the priority needs of the profession (Williams et al., 2001). Every 4 years, a similar survey has been conducted to enable evaluation of current trends and priority areas of critical care nursing to inform CCNOs and CCN leaders (Williams et al., 2020).

BACKGROUND

Past surveys of the WFCCN have highlighted workforce, education and training, representation/advocacy, and communication as constant themes of importance to CCNO and CCNs. Issues related to teamwork, research priorities, clinical protocols, and practice

standards, and concerns regarding ethical issues such as end-of-life care and decision-making invariably also arise (Williams et al., 2020).

The global burden of critical illness has been well described by Adhikari et al. (2010) and the additional challenges faced by low-resource countries add further difficulty to the roles and responsibilities of CCNs in these regions (Adhikari et al., 2010).

The WFCCN is well positioned to draw on its large global membership base and perspective, giving it an important advocacy role in explaining challenges and priorities as well as the need for change in practice at the global level. Furthermore, the global perspective of WFCCN also allows a richer discussion that can differentiate the nuances between, for example, rich and poor nations, and regional variations based on cultural, and geo-political differences between countries and their healthcare, nursing and critical care contexts. This sixth world-wide survey draws on these unique characteristics and strengths of the WFCCN and its member organizations to provide an authoritative analysis of the activities, concerns, and expectations of critical care nurse leaders and national CCNOs. Utilizing the research and findings of past surveys and contemporary works of others as comparisons, we can provide a current global perspective on critical care nursing to inform CCNOs, health care administrators, leaders and policy makers.

This sixth worldwide survey of the activities, priorities, and needs of CCNOs and CCNs comes at a time when the world is still reeling from the horrors of COVID-19. Critical care nurses were at the front line of this horror and have a perspective unlike many

others which we expect to influence the flavor and character of the discussions coming from the global critical care nursing community. The aim of this study was to examine the status of critical care nursing internationally, assess the impact of the COVID-19 pandemic, and identify policy and research priorities by surveying professional CCNOs worldwide.

METHODS

An online survey was conducted using a structured questionnaire using Survey Monkey™. Ethical approval for the study was provided by WFCCN Council: the survey was considered to be low risk, as it did not involve patients nor require the collection of individually identifiable data. Consent was implied by voluntary submission of the questionnaire. As with previous surveys conducted using this approach, for the above reasons and because the respondents were individual professionals that were not representing healthcare institutions and the data are reported in aggregate without identifiers, Institutional Review Board approval was deemed unnecessary (Williams et al., 2020).

Sample

As in previous surveys, WFCCN used its extensive international network to identify CCNOs and potential respondents worldwide. In countries where there was no known CCNO, one or more CCN leaders who could represent their national perspective were identified through advice and guidance by the WFCCN network.

Survey tool

The questionnaire was based on those used in the previous WFCCN surveys (Williams et al., 2020). After consultation with WFCCN members regarding the contemporary content of the questionnaire, it was revised with several new questions added around the impact of COVID-19 and current research priorities. The tool was piloted through a convenience sample of eight experienced WFCCN members. The main purpose of the pilot was to check that all questions and statements were easily understandable and there was no ambiguity. Only minor wording revisions were made following the pilot. The final English version was forward translated into Spanish by a bilingual member of the team with experience in translation procedures. The final Spanish version was revised by seven Spanish speaking critical care nurses from Central and South America.

The questionnaire (Figure S1) comprised 17 items in eight sections. In most sections, respondents were asked to rate the importance of items using a 10-point ordinal scale (range 1–10; 1 = *not at all important*, 10 = *very important*). Section 1 outlined the purpose and expectations of the survey and participants, while Section 2 collected demographic information including the name of the country

and the existence of a CCNO in the country. Section 3 sought information about CCNOs and the services they provided. In Section 4, all respondents, regardless of whether there was a CCNO in their country or not, were asked to rate the importance of 16 services or activities commonly provided by CCNOs, and using the same 10-point scale, respondents were asked to rate the importance of 14 CCN issues (identified in previous surveys). Additionally, respondents were asked to identify strategies that had been used by their CCNO (if applicable) to respond to specific issues. In Section 5, 12 questions were posed about various aspects of policy that had been identified in the previous WFCCN surveys. Respondents were asked to rate their importance to inform national policy or guidelines. Section 6 asked a range of questions regarding their country's and/or CCNO's provision of 10 services or activities in relation to the COVID-19 pandemic, and to rate their importance. Respondents were also asked to rate the importance of 15 issues related to the COVID-19 pandemic. Section 7 explored the participants' views on contemporary research questions, priorities, and needs, while Section 8 explored respondents' rating of the importance of 18 services and activities provided by WFCCN. The respondents were also asked to identify other services or activities and areas of nursing practice that would benefit from position statements or guidelines that could be provided by WFCCN.

Data collection and analysis

Potential respondents in 140 countries were initially contacted by e-mail (in several countries more than one contact was e-mailed to increase likelihood of a response) and requested to complete the questionnaire. Data were collected from December 2021 to April 2022. Response data were imported into SPSS™ version 28 for analysis. Respondent countries were categorized according to income, using the World Bank classification of economies into four groups: high, upper-middle, lower-middle, and low (World Bank, 2022). Mean scores with standard deviation (SD) and 95% confidence intervals (CI) were used to summarize variables and one-way analysis of variance (ANOVA) was used to compare mean scores between income groups. Significance was set at $p < 0.05$. A simplified thematic analysis, led by one author, was used to synthesize qualitative responses. This implied familiarizing with the free text comments and initial grouping in themes. The authorship team contributed to the discussion to gain consensus of the themed headings and descriptions.

RESULTS

From the initial contact sample, 99 responses were returned, giving a country response rate of 70.7% (99/140), of which most were completed fully (97.0%, $n = 96$).

Geographically, the largest group was from Europe and Central Asia ($n = 30$, 30%) and this was also the region with the greatest number of countries represented since the last survey. Twelve

countries (12%) were in the lowest economic group in the world, with gross national income (GNI) per capita of \$1045 or less in 2022 (World Bank, 2021) of which all but one were Sub-Saharan African countries. There were 20 (20%) lower-middle income countries (GNI per capita \$1046–\$4095), 25 (25%) upper-middle income countries (GNI per capita between \$4096 and \$12,695), and 42 (42%) high-income countries (GNI per capita of \$12,696 or more) (see [Table 1](#)).

Most respondents reported that they had a CCNO in their country (73%, $n = 72$). Of these, nearly half were members or associate members of WFCCN (46%, $n = 33$). All but one CCNO provided information about their membership numbers (range 20–129,000), although in just over half of cases (52%, $n = 37$) membership was estimated. Eleven CCNO had ≤ 100 members, 31 had >100 to ≤ 500 members, 13 had >500 to ≤ 1000 , and 15 had >1000 members. In total, these CCNO represented 207,334 members.

Critical care nursing organizations

Services and activities provided by CCNOs

Respondents who indicated that their country had a national CCNO ($n = 72$) were asked to identify which of 16 services and activities were provided by their national CCNO, and all respondents, regardless of whether their country had a CCNO, were asked to rate the importance of these ($n = 96$ responses). The service and activities provided by CCNO were ranked by importance (see [Table 1](#)). Although provision was variable, the top six ranked services were provided by over three quarters of all CCNOs.

When compared by income group using ANOVA, the importance of several services or activities was rated significantly differently (see [Table 2](#)). Post hoc tests revealed that six services/activities were considered lower in importance by high-income countries compared to lower-income groups: standards for educational courses ($p = 0.006$); provision of study/education grants ($p = 0.005$); conducting and leading research studies ($p = 0.022$); provision of training/skill acquisition courses ($p < 0.001$); provision of research grants ($p = 0.018$); and provision of credentialing or accreditation processes ($p = 0.002$).

Seventeen respondents highlighted other major services and activities provided by CCNOs in the verbatim statements. They were education, accreditation, and support of practice ($n = 8$), leadership and political representation ($n = 5$), and few CCNOs were not providing services because they were new emerging organizations ($n = 4$).

Other major services and activities that ought to be provided by CCNOs were highlighted by 22 respondents. These were related to education and skill training ($n = 11$), support of specialized education ($n = 4$), professional representation and regulation ($n = 3$), international collaboration ($n = 2$), and better working conditions and wages ($n = 2$).

Respondents were also asked to rate the importance of 19 services/activities provided by an international CCNO, i.e., WFCCN. All items were rated of high importance (mean score range 8.02–9.29,

$n = 96$). The top five ranked services/activities were: standards for professional practice (mean score 9.29); standards for clinical practice (mean score 9.20); website (mean score 9.17); professional representation (mean score 9.07); and provision of online education and training materials (mean score 9.07). When mean scores were compared between income groups, several significant differences were found; in the main, high-income countries scored lower than other income groups (see [Table 2](#)).

Critical care nursing issues

Respondents ($n = 97$) rated all of the critical care nursing issues as being important (range 8.55–9.32) ([Table 3](#)). Working conditions were considered to be the most important issue (mean score 9.32) followed by teamwork, staffing levels, formal practice guidelines, wages, and access to quality education programs. High-income countries scored lower than all other income groups on most items.

When CCN issues were compared by income groups using ANOVA, only one issue was statistically significantly different: formal credentialing processes ($p = 0.037$). Post hoc testing using the Games–Howell statistic revealed that the difference was only statistically significant between high-income countries (mean score 8.05, SD 2.23) and upper-middle income countries (mean score 9.21, SD 1.06; $p = 0.029$). The top eight issues have remained relatively unchanged since 2017 ([Table 4](#)).

Additionally, in the verbatim comments, respondents ($n = 54$) stated that the strategies used to address those issues were providing and recognizing specialized education ($n = 20$), engaging organizations, policy makers, media and society ($n = 21$), workforce planning and recommendations ($n = 6$), conducting research studies, developing guidelines and professional standards ($n = 4$), supporting units, and tracking COVID-19 cases ($n = 3$).

Policies, guidelines, and position statements

Respondents ($n = 96$) rated all of the critical care policies or guidelines as being important (range 8.59–9.47) (see [Table 4](#)). Recruitment and retention in critical care was considered to be the most important policy/guideline (mean score 9.47) followed by work environment safety and comfort in critical care, and staffing guidelines and ratios for critical care units. High-income countries scored lower than all other income groups on most items.

When importance of critical care nursing policies/guidelines was compared by income groups using ANOVA, four were ranked differently: accreditation standards for critical care units ($p < 0.001$); sepsis management and other infection control standards ($p = 0.024$); minimum datasets relevant to nursing in critical care ($p = 0.034$); and admission and discharge criteria for critical care ($p = 0.019$). Post hoc testing using the Games–Howell statistic revealed that the difference in importance scores of accreditation standards for critical care units and sepsis management and other infection

TABLE 1 Provision and importance of CCNO services and activities.

Activity or service	Importance of service/activity													
	Provided by CCNO		Provided by CCNO 2021		Rank 2017		Rank 2021		Overall score (n = 75)		Mean score by income group			
	(n = 53)	(n = 72)	(n = 75)	(n = 97)	(n = 75)	(n = 97)	Mean (SD)	95% CI	Range	High (n = 27)	Upper-middle (n = 30)	Lower-middle (n = 30)	Low (n = 18)	Significance p
National conferences	46 (87%)	65 (90%)	3	↑1	3	↑1	9.56 (1.09)	9.34–9.78	3–10	9.43	9.42	9.80	9.91	0.377
Local conferences	46 (87%)	64 (89%)	5	↑2	5	↑2	9.56 (1.49)	8.85–9.45	4–10	8.86	9.08	9.55	9.73	0.190
Workshops/education forums	42 (79%)	56 (78%)	2	↓3	2	↓3	9.49 (1.00)	9.29–9.70	4–10	9.29	9.54	9.65	9.91	0.238
Practice standards/guidelines	30 (57%)	51 (71%)	4	=4	4	=4	9.29 (1.37)	9.01–9.56	3–10	8.88	9.58	9.36	9.29	0.065
Professional representation	47 (89%)	60 (83%)	1	↓5	1	↓5	9.27 (1.55)	8.96–9.58	2–10	8.45	9.71	9.65	9.00	0.086
Website	38 (72%)	56 (78%)	6	=6	6	=6	9.15 (1.70)	8.74–9.40	2–10	8.95	8.75	9.35	9.73	0.324
Standards for educational courses	27 (51%)	40 (56%)	9	↑7	9	↑7	9.07 (1.67)	8.76–9.43	1–10	8.45	9.71	9.70	9.09	0.006
Training/skill acquisition course	32 (60%)	46 (64%)	7	↓8	7	↓8	8.97 (1.85)	8.60–9.34	1–10	8.02	9.58	9.75	9.82	<0.001
Study/education grants	20 (38%)	31 (43%)	11	↑9	11	↑9	8.79 (1.89)	8.41–9.17	1–10	8.07	9.54	9.45	8.73	0.005
Initiate, conduct or lead research studies	32 (62%)	44 (61%)	7	↓10	7	↓10	8.76 (2.04)	8.35–9.01	1–10	8.05	9.21	9.50	9.18	0.022
Research grants	21 (40%)	21 (29%)	10	↓11	10	↓11	8.61 (2.00)	8.21–9.01	1–10	7.90	9.08	9.40	8.82	0.018
Credentiaing or accreditation process	13 (25%)	26 (36%)	14	↑12	14	↑12	8.60 (2.20)	8.16–9.04	1–10	7.64	9.17	9.60	9.18	0.002
Journal	26 (49%)	40 (56%)	12	↓13	12	↓13	8.27 (2.32)	7.80–8.73	1–10	7.71	8.50	9.05	8.45	0.172
Newsletter	26 (49%)	39 (54%)	12	↓14	12	↓14	8.18 (2.35)	7.70–8.65	1–10	7.71	8.42	8.60	8.64	0.403
Travel scholarships	14 (26%)	22 (31%)	15	=15	15	=15	7.74 (2.27)	7.29–8.20	1–10	7.12	8.21	8.05	8.55	0.113
Industrial/union representation	20 (37%)	31 (43%)	16	=16	16	=16	7.29 (2.92)	6.07–7.88	1–10	6.50	7.92	7.50	8.55	0.094

Abbreviations: CI, confidence interval; SD standard deviation.

TABLE 2 Ranked importance of services and activities provided by WFCCN ($n = 96$).

Research area	Overall score			Mean score by income group				Significance <i>p</i>
	Mean (SD)	95% CI	Range	High ($n = 41$)	Upper- middle ($n = 24$)	Lower- middle ($n = 20$)	Low ($n = 11$)	
Standards for professional practice	9.29 (1.47)	8.99–9.59	1–10	8.95	9.67	9.75	8.91	0.090
Standards for clinical practice	9.20 (1.47)	8.90–9.50	1–10	8.71	9.71	9.80	8.82	0.007
Website	9.17 (1.52)	8.86–9.47	3–10	8.90	9.33	9.20	9.73	0.391
Professional representation	9.07 (1.58)	8.75–9.39	1–10	8.63	9.29	9.40	9.64	0.118
Providing on-line education and training materials	9.07 (1.78)	8.71–9.43	1–10	8.80	9.13	9.60	9.00	0.441
International conferences	9.05 (1.53)	8.74–9.36	2–10	8.56	9.38	9.25	9.82	0.036
Study/education grants	9.01 (1.82)	8.64–9.38	1–10	8.49	9.21	9.75	9.18	0.066
Prioritizing activities toward low-resource countries and their needs	9.00 (1.56)	8.68–9.32	3–10	8.37	9.46	9.60	9.27	0.006
Supporting professional exchange programs	8.98 (1.86)	8.60–9.27	1–10	8.41	9.38	9.60	9.09	0.066
Initiate, conduct, or lead research studies	8.82 (1.80)	8.46–9.19	2–10	8.29	9.13	9.20	9.45	0.087
Research grants	8.74 (1.90)	8.35–9.13	1–10	8.02	9.13	9.50	9.18	0.012
Helping countries establish their own CCNO	8.74 (2.09)	8.32–9.16	1–10	7.66	8.71	9.20	9.91	0.005
Journal	8.73 (1.74)	8.38–9.08	4–10	8.27	9.04	9.10	9.09	0.168
Providing more online meetings for general members	8.72 (1.81)	8.35–9.09	1–10	8.20	9.21	9.05	9.00	0.104
Helping CCNOs to become members of WFCCN	8.50 (2.23)	8.05–8.95	1–10	8.05	9.00	9.65	9.09	0.028
Annual or biannual report	8.41 (1.96)	8.01–8.62	1–10	7.73	8.92	9.00	8.73	0.032
Regular e-newsletter	8.22 (2.23)	7.77–8.67	1–10	7.56	8.63	8.85	8.64	0.094
Establishing Internet, policies, and documents in languages other than English	8.03 (2.77)	7.47–8.59	1–10	7.85	7.75	8.70	8.09	0.669
Individual membership	8.02 (2.22)	7.57–8.25	1–10	7.17	8.21	9.10	8.82.090	0.005

Abbreviations: CI, confidence interval; SD standard deviation.

control standards was significantly lower in high-income countries compared to all other income groups; the difference in minimum datasets relevant to nursing in critical care scores was only significant between high-income countries and low-income countries ($p = 0.041$); and admission and discharge criteria for critical care score were only significantly different between high-income countries and lower-middle income countries ($p = 0.001$).

Other policies and guidelines identified as important by participants ($n = 7$) in the verbatim statements were related to upskilling, skill mix and well-being ($n = 5$), communication with family, open intensive care units ($n = 1$), and use of electronic health records ($n = 1$).

Respondents were also asked to rate the importance of 14 critical care areas in which they would like position statements or guidelines to be developed by WFCCN (see Table 5). All items were ranked highly. The top five areas that respondents felt were important for WFCCN to develop position statements or guidelines were:

intensive care bundles (mean score 9.31); sepsis management (mean score 9.27); mechanical ventilation (mean score 9.23); advanced practice procedures (mean score 9.16); and early mobility of patients (mean score 9.07). However, analyses of scores between income groups using ANOVA revealed that scoring was inconsistent.

Other position statement/guidelines identified by participants ($n = 9$) in the verbatim statements were related to recruitment, staff competence, well-being, and regulation ($n = 5$), clinical guidelines on post ICU care, sedation and transport ($n = 3$), and disaster management preparedness ($n = 1$).

Research priorities

Respondents were asked to rank the importance of 21 research priority areas that had been identified in the previous WFCCN survey (see Table 6). All research areas were ranked highly ($n = 96$). The

TABLE 3 Ranked importance of critical care nursing issues (n = 97).

Issue	Rank 2017	Rank 2021	Overall score			Mean score by income group				Significance p
			Mean (SD)	95% CI	Range	High (n = 41)	Upper-middle (n = 24)	Lower-middle (n = 20)	Low (n = 11)	
Working conditions	1	=1	9.32 (1.57)	9.00–9.64	2–10	9.29	9.46	9.30	9.18	0.962
Teamwork	2	=2	9.21 (1.60)	8.88–9.53	2–10	9.07	9.63	9.15	8.91	0.510
Staffing levels	3	↑ 2	9.21 (1.78)	8.85–9.56	2–10	9.26	9.29	9.10	9.00	0.959
Formal practice guidelines/competencies	4	=4	9.16 (1.39)	8.88–9.45	2–10	8.88	9.50	9.60	8.73	0.100
Access to quality educational programs	6	↑ 5	9.08 (1.50)	8.78–9.38	2–10	8.74	9.29	9.55	8.82	0.126
Wages	5	↓ 6	9.06 (1.91)	8.68–9.45	2–10	8.83	9.50	9.00	9.09	0.602
Extended/advanced practice	7	=7	9.04 (1.71)	8.70–9.39	2–10	8.95	9.21	9.30	8.55	0.637
Work activities/roles	8	=8	8.96 (1.53)	8.65–9.27	2–10	8.79	9.21	9.40	8.27	0.166
Use of technologies	10	↑ 8	8.96 (1.55)	8.65–9.27	2–10	8.69	9.42	9.35	8.27	0.078
Facilities and equipment	12	↑ 10	8.71 (2.12)	8.28–9.14	1–10	8.62	8.67	9.10	8.45	0.825
Formal credentialing processes	11	=11	8.66 (1.87)	8.28–9.04	2–10	8.05	9.21	9.20	8.82	0.037
Relationships with doctors	9	↓ 12	8.62 (1.86)	8.24–8.99	2–10	8.26	8.79	9.10	8.73	0.375
Relationships with other health care groups	13	=13	8.59 (1.80)	8.23–8.79	2–10	8.26	8.83	9.15	8.27	0.249
Relationships with other nursing organizations	14	=14	8.55 (2.01)	8.14–8.95	2–10	8.10	8.83	9.35	8.18	0.101

Abbreviations: CI, confidence interval; SD standard deviation.

TABLE 4 Ranked importance of national policies or guidelines (n = 96).

Policy or guideline	Overall score			Mean score by income group				Significance p
	Mean (SD)	95% CI	Range	High (n = 41)	Upper-middle (n = 24)	Lower-middle (n = 20)	Low (n = 11)	
Recruitment and retention in critical care	9.47 (1.24)	9.22–9.72	2–10	9.34	9.25	9.85	9.73	0.318
Work environment safety and comfort in critical care	9.40 (1.21)	9.15–9.64	5–10	9.32	9.17	9.80	9.45	0.353
Staffing guidelines and ratios for critical care units	9.40 (1.31)	9.13–9.66	3–10	9.46	9.04	9.70	9.36	0.405
Criteria/credentials for advanced practice nurses	9.30 (1.16)	9.07–9.54	5–10	8.95	9.50	9.60	9.30	0.081
Accreditation standards for critical care units	9.25 (1.25)	9.00–9.50	5–10	8.61	9.71	9.65	9.25	<0.001
Sepsis management and other infection control standards	9.23 (1.40)	8.94–9.51	3–10	8.73	9.50	9.65	9.73	0.024
Application methods of evidence-based practice	9.20 (1.34)	8.93–9.47	3–10	8.90	9.25	9.55	9.55	0.244
Minimum datasets relevant to nursing in critical care	9.01 (1.37)	8.73–9.29	5–10	8.56	9.17	9.45	9.55	0.034
End-of-life care decision-making	8.96 (1.61)	8.63–9.28	2–10	8.83	8.79	9.30	9.18	0.658
Use and application of technology in critical care	8.91 (1.51)	8.60–9.21	3–10	8.54	9.00	9.40	9.18	0.167
Intensive care outreach to patients on ward and at home	8.76 (1.83)	8.39–9.13	1–10	8.34	8.71	9.20	9.64	0.119
Admission and discharge criteria for critical care	8.59 (2.01)	8.19–9.00	2–10	7.98	8.54	9.55	9.27	0.019

Abbreviations: CI, confidence interval; SD standard deviation.

top five research priority areas were: stress levels (inclusive of burn-out, emotional exhaustion and compassion) fatigue (mean score 9.60); critical care nursing shortage, skill mix and workforce planning

(mean score 9.53); recruitment, retention, turnover, working conditions (mean score 9.52); critical care nursing education and patient outcomes (mean score 9.48); and adverse events, staffing levels and

TABLE 5 Ranked importance of position statements or guidelines (n = 96).

Research area	Overall score			Mean score by income group				
	Mean (SD)	95% CI	Range	High (n = 41)	Upper-middle (n = 24)	Lower-middle (n = 20)	Low (n = 11)	Significance p
Intensive care bundles	9.31 (1.45)	9.02–9.61	3–10	8.68	9.58	9.95	9.91	0.002
Sepsis management	9.27 (1.35)	9.00–9.54	4–10	8.73	9.42	9.80	10	0.003
Mechanical ventilation	9.23 (1.41)	8.94–9.51	3–10	8.80	9.17	9.80	9.91	0.020
Advanced practice procedures	9.16 (1.75)	8.80–9.51	1–10	8.73	9.71	8.95	9.91	0.066
Early mobility of patients	9.07 (1.37)	8.80–9.35	5–10	8.66	9.33	9.25	9.73	0.056
Emergency care	8.93 (1.68)	8.59–9.27	3–10	8.34	9.08	10	8.82	0.003
Intravenous medication administration	8.70 (1.79)	8.34–9.06	3–10	8.22	8.75	9.20	9.45	0.088
Palliative/hospice care	8.67 (1.68)	8.33–9.01	3–10	8.29	8.92	9.05	8.82	0.298
Extra-corporeal membrane oxygenation	8.63 (2.04)	8.21–9.04	1–10	8.17	8.63	9.15	9.36	0.189
Hemodialysis	8.51 (2.06)	8.09–8.93	1–10	7.88	8.50	9.35	9.36	0.026
Criteria for ICU admission and discharge	8.50 (2.28)	8.04–8.96	1–10	7.78	8.38	9.40	9.82	0.010
Coronary care	8.49 (1.87)	8.11–8.87	1–10	7.68	8.63	9.30	9.73	< 0.001
Peri-operative care	8.43 (2.02)	8.02–8.84	1–10	7.76	8.71	9.40	8.55	0.019
Bronchial toileting	8.18 (2.12)	8.75–8.61	1–10	7.54	8.71	8.70	8.45	0.081

Abbreviations: CI, confidence interval; SD standard deviation.

patient outcomes (mean score 9.45). Furthermore, ANOVA tests revealed there were no significant differences in scores between income groups for these five items. Beyond the first five priority items there is a significant difference in the relative importance of many of the other topics when comparing high-income and other income countries (see Table 6).

COVID-19 in critical care

Pandemic-related services and activities provided by CCNOs and/or health service

Respondents were asked to identify which of 10 pandemic-related services or activities had been provided by CCNOs and/or health services. Most were provided by health services alone or in combination with CCNOs (see Table 7). Overall, every service or activity was not provided to between 5.2% and 31.3% of countries.

Respondents were asked to rank the importance of these services/activities (see Table 8). The five most important activities were considered to be:

- to address emotional and mental well-being of nurses (mean score 9.20);
- to provide guidance related to nurse staffing/workforce needs (mean score 9.15);
- assist to coordinate efforts to obtain personal protective equipment supplies (mean score 9.11);

- to serve as a country liaison with the World Health Organization's COVID-19 response activities (mean score 9.11)
- to assist in the development and implementation of policies regarding standards of care (mean score 9.08).

Across income groups, ANOVA tests revealed that there were no significant differences in scoring, with the exception of one item: to provide guidance related to nurse staffing/workforce needs ($p = 0.008$); which was ranked as the second most important activity. However, post hoc analysis using the Games–Howell test revealed that although lower-middle income countries scored this activity somewhat lower than other income groups, the differences between individual wealth groups were not statistically significant.

Participants ($n = 9$) reported in the verbatim statements other COVID-19 service activities provided by CCNOs; they were related to education, support, and training on COVID-19 management ($n = 3$), regional coordination ($n = 1$), case management and vaccination ($n = 1$), media communication on safety of critical care nurses ($n = 1$), and supply of consumables ($n = 1$).

Respondents were asked to rate the importance of 15 critical care nursing issues related to the COVID-19 pandemic. All issues were ranked at high importance (mean score range 8.31–9.47). The five most important issues were:

- specific training and upskilling for critical care nurses to be COVID-19-ready (mean score 9.47);

TABLE 6 Ranked importance of research priorities (n = 96).

Research area	Overall score			Mean score by income group				Significance p
	Mean (SD)	95% CI	Range	High (n = 41)	Upper- middle (n = 24)	Lower- middle (n = 20)	Low (n = 11)	
Stress levels, burnout, emotional exhaustion, compassion fatigue	9.60 (0.85)	9.43–9.78	6–10	9.41	9.71	10	9.36	0.053
Critical care nursing shortage, skill mix and workforce planning	9.53 (1.03)	9.32–9.74	5–10	9.44	9.58	9.75	9.36	0.667
Recruitment, retention, turnover, working conditions	9.52 (0.98)	9.32–9.72	5–10	9.46	9.25	9.75	9.91	0.191
Critical care nursing education and patient outcomes	9.48 (1.01)	9.28–9.68	5–10	9.29	9.42	9.80	9.73	0.241
Adverse events, staffing levels and patient outcomes	9.45 (1.00)	9.24–9.65	6–10	9.29	9.38	9.80	9.55	0.302
Adherence to infection prevention protocols and practices	9.38 (1.02)	9.17–9.58	6–10	8.88	9.63	9.95	9.64	< 0.001
Process of education, skill acquisition and certification of competence	9.33 (1.04)	9.12–9.54	6–10	8.95	9.33	9.85	9.82	0.004
Prevention of hospital-acquired infection	9.30 (1.13)	9.07–9.53	5–10	8.66	9.71	9.90	9.73	< 0.001
Nurse-driven protocols and patient outcomes	9.29 (1.00)	9.09–9.50	6–10	8.76	9.50	9.95	9.64	< 0.001
Communication and patient-centered care	9.24 (1.03)	9.03–9.45	6–10	8.95	9.17	9.80	9.45	0.021
Pain, sedation and delirium management	9.19 (1.23)	8.94–9.44	5–10	8.76	9.29	9.80	9.45	0.011
Transition of care, post intensive care unit follow-up	9.11 (1.23)	8.87–9.36	6–10	8.66	9.13	9.90	9.36	0.002
Intensive care unit nurse consultant, competency, and extended practice	9.08 (1.57)	8.77–9.40	2–10	8.78	9.04	9.50	9.55	0.273
Peer support, nursing resilience	9.07 (1.55)	8.76–9.39	2–10	8.71	9.25	9.60	9.09	0.179
Environmental and occupational hazards	9.05 (1.33)	8.78–9.32	4–10	8.73	8.96	9.75	9.18	0.040
Outcomes of collaborative practice	9.01 (1.36)	8.74–9.29	2–10	8.51	9.00	9.85	9.36	0.002
Patient and family participation in care	8.98 (1.59)	8.66–9.30	2–10	8.71	9.04	9.50	8.91	0.337
Family-centered care, visiting policies	8.98 (1.60)	8.65–9.30	1–10	8.90	9.25	9.05	8.55	0.660
Guidelines and workplace gap, priorities for audit practice	8.92 (1.61)	8.59–9.24	1–10	8.49	9.33	9.35	8.82	0.111
Access to information and technology	8.82 (1.69)	8.48–9.17	2–10	8.29	8.79	9.60	9.45	0.018
New models of care, advanced practice, and patient outcomes	8.76 (1.83)	8.39–9.13	1–10	8.80	9.33	9.65	9.73	0.015

Abbreviations: CI, confidence interval; SD standard deviation.

- mental health support for staff working in COVID-19 intense environments (mean score 9.44);
- specific training and upskilling of non-intensive care staff to work in intensive care units (mean score 9.33);
- lack of personal protective equipment (mean score 9.27);
- finding balance between personal and work responsibilities and demands (mean score 9.18).

DISCUSSION

The results of this international survey of CCNO's and nurse leaders identified priority areas for CCNs globally. The response from 99 countries exceeds that of previous surveys (82) with a greater response from all regions of the world. The reference to World Bank classifications will make direct comparisons with previous survey results difficult as that had not been previously used, however we

made a strategic decision to transfer to the World Bank classification as it is more universally recognized and accepted and can assist in future comparison work.

Critical care issues

The top six issues with universal constancy are working conditions, teamwork, staffing levels, formal practice guidelines/competencies, access to quality education programs and wages (Table 3). Workforce and workplace environment has shown a substantial focus in this survey. The top national policy issues globally are recruitment and retention in critical care, work environment safety and comfort in critical care, staffing guidelines, and ratios for critical care units (Table 4). The theme of workforce and work environment issues was further emphasized in the top research priorities of stress levels (inclusive of burnout, emotional exhaustion, and compassion fatigue), critical

TABLE 7 Provision and importance of COVID-19 pandemic-related services and activities (n = 96).

Service or activity	Income group	n	Provided by %			
			CCNO only	Health service only	Both CCNO and health service	Not provided
Assisted in the development and implementation of policies regarding standards of care	High	41	7.3	24.4	61.0	7.3
	Upper-middle	24	0	45.8	45.8	8.3
	Lower-middle	20	0	45.0	35.0	20.0
	Low	11	0	45.5	54.5	0
	Overall	96	3.1	36.5	51.0	9.4
Coordinated the sharing of COVID-19 pandemic-related information	High	41	19.5	14.6	56.1	9.8
	Upper-middle	24	8.3	37.5	45.8	8.3
	Lower-middle	20	0	30.0	55.0	15.0
	Low	11	9.1	27.3	63.6	0
	Overall	96	11.5	25.0	54.2	9.4
Served as a country liaison with the World Health Organization's COVID-19 response activities	High	41	16.7	21.4	26.2	34.1
	Upper-middle	24	4.2	37.5	16.7	41.7
	Lower-middle	20	5.0	35.0	15.0	45.0
	Low	11	0	54.5	36.4	9.1
	Overall	96	9.4	32.3	22.9	35.4
Assisted to coordinate efforts to obtain personal protective equipment supplies	High	41	7.3	51.2	36.6	4.9
	Upper-middle	24	0	54.2	37.5	8.3
	Lower-middle	20	5.0	45.0	45.0	5.0
	Low	11	9.1	54.5	36.4	0
	Overall	96	5.2	51.0	38.5	5.2
Provided guidance related to nurse staffing/workforce needs	High	41	17.1	29.3	46.3	7.3
	Upper-middle	24	20.8	33.3	33.3	12.5
	Lower-middle	20	10.0	35.0	35.0	20.0
	Low	11	9.1	36.4	45.5	9.1
	Overall	96	15.6	32.3	40.6	11.5
Assisted with distribution of medical equipment	High	41	4.9	65.9	17.1	12.2
	Upper-middle	24	4.2	70.8	20.8	4.2
	Lower-middle	20	5.0	50.0	25.0	20.0
	Low	11	0	54.5	35.4	9.1
	Overall	96	4.2	62.5	21.9	11.5
Assisted with distribution of COVID-19 testing kits	High	41	2.4	58.5	14.6	24.4
	Upper-middle	24	0	54.2	16.7	29.2
	Lower-middle	20	0	70.0	10.0	20.0
	Low	11	0	72.7	18.2	9.1
	Overall	96	1.0	61.5	14.6	22.9
Served to address emotional and mental well-being of nurses	High	41	9.8	26.8	51.2	12.2
	Upper-middle	24	8.3	41.7	29.2	20.8
	Lower-middle	20	10.0	35.0	35.0	20.0
	Low	11	18.2	9.1	27.3	45.5
	Overall	96	10.4	30.2	39.6	19.8
Informed response and recovery efforts by tracking the impact of COVID-19 on nursing	High	41	22.0	19.5	39.0	19.5
	Upper-middle	24	8.3	29.2	25.0	37.5
	Lower-middle	20	10.0	35.0	40.0	15.0
	Low	11	27.3	27.3	27.3	18.2
	Overall	96	16.7	26.0	34.4	22.9
Organized research related to the COVID-19 pandemic	High	41	14.6	26.8	36.6	22.0
	Upper-middle	24	12.5	33.3	12.5	41.7
	Lower-middle	20	10.0	30.0	20.0	40.0
	Low	11	18.2	36.4	18.2	27.3
	Overall	96	13.5	30.2	25.0	31.3

TABLE 8 Ranked importance of COVID-19 pandemic-related services/activities (n = 96).

Research area	Overall score			Mean score by income group				Significance p
	Mean (SD)	95% CI	Range	High (n = 41)	Upper-middle (n = 24)	Lower-middle (n = 20)	Low (n = 11)	
Served to address emotional and mental well-being of nurses	9.20 (1.83)	8.83–9.57	1–10	9.37	9.54	8.65	8.82	0.329
Provided guidance related to nurse staffing/workforce needs	9.15 (1.78)	8.79–9.51	1–10	9.44	9.50	7.95	9.45	0.008
Assisted to coordinate efforts to obtain personal protective equipment supplies	9.11 (1.76)	8.76–9.47	1–10	9.17	8.96	9.05	9.36	0.927
Served as a country liaison with the World Health Organization's COVID-19 response activities	9.11 (2.22)	7.97–8.87	1–10	8.07	8.25	9.00	9.00	0.359
Assisted in the development and implementation of policies regarding standards of care	9.08 (1.85)	8.71–9.46	1–10	9.24	9.13	8.70	9.09	0.764
Informed response and recovery efforts by tracking the impact of COVID-19 on nursing	9.06 (1.54)	8.75–9.37	3–10	9.10	9.08	9.00	9.00	0.995
Coordinated the sharing of COVID-19 pandemic-related information	9.01 (1.80)	8.65–9.37	1–10	9.12	9.00	8.85	8.91	0.952
Organized research related to the COVID-19 pandemic	8.73 (2.15)	8.29–9.17	1–10	8.63	9.00	8.25	9.36	0.499
Assisted with distribution of medical equipment	8.36 (2.35)	7.89–8.84	1–10	8.20	8.38	8.60	8.55	0.927
Assisted with distribution of COVID-19 testing kits	8.30 (1.79)	7.83–8.78	1–10	8.05	8.08	8.95	8.55	0.512

care nursing shortage, skill mix and workforce planning, recruitment, retention, turnover, and working conditions (Table 6). These themes align to a recent survey of 8080 members of the American Association of Critical care Nurses which found a documented absence of appropriate staffing by more than 60% of participants; an alarming number of physical and mental well-being issues; and one-third of the participants expressed intent to leave their current positions in the next 12 months (Ulrich et al., 2019). With an average quit rate of almost 20% and the cost of an RN turnover in the USA being \$40,000 per resignation, it is not just patient care quality at risk from high quit rates but a significant cost burden to the healthcare budget (Plescia, 2021). This problem is not unique to the USA or critical care speciality but a global issue. Prior to the pandemic, turnover rates varied across countries with the highest rate reported in New Zealand (44%) followed by the USA (27%), Canada (20%), and Australia (15%) (Duffield et al., 2014). More recently, the ICN highlighted that 20% of ICN's national nurses associations reported an increased frequency of nurses leaving the profession as did an increased intention to leave (International Council of Nurses Policy Brief, 2022).

The impact of COVID-19 on critical care and health care generally has exacerbated the need to examine and address the workforce issues that have plagued the critical care professions for decades and ever since our first worldwide survey (Khan et al., 2018; Pastores et al., 2019; Williams et al., 2001; Xu et al., 2021). WFCCN released the revision of the workforce guidelines (Bloomer et al., 2019) and critical care nursing education guidelines (WFCCN, 2020) to highlight the need for improved focus in these areas of practice, however national and local policy guidance must also be applied (Bray et al., 2010; Marshall

et al., 2021). Similarly, the authors of a literature review found CCN staffing, education, and practice standards as relevant areas of focus in Canada, Australia, United Kingdom, New Zealand, and the USA (Gill et al., 2012). To face future health needs, workforce issues of CCNs need urgent attention; governments, professional organizations, civil society, and other interested stakeholders must be involved.

There are many discussions regarding teamwork in critical care (Kvande et al., 2017; Rose, 2011) and it remains a high priority area of interest among respondents to this survey. This finding may be related to the environmental situational, and emotional demands imposed by working with the critically ill. Shared handover, responding to emergencies sometimes outside intensive care demand a concerted effort (Ervin et al., 2018). Supporting patients and family in life-death situations requires respectful communication and cooperation between the professions (Ervin et al., 2018). Thus, it is not surprising this is strong in most sectors and remains a priority for nursing.

Differences in perceptions of issues between high-income and other wealth groups remain. High-income countries have lower ratings compared to other lower-income countries with respect to accreditation standards for critical care units, sepsis management and other infection control standards, minimum datasets relevant to nursing in critical care, admission and discharge criteria for critical care (Table 2). Our assessment of these variances is that higher income countries have many of these systems and processes in place already and do not feel a need to advocate for them further. On the other hand, middle- and lower-income countries do not have many of these systems in place consistently and feel that they would add a benefit to their critical care system and patients. The important message for groups like

WFCCN is to recognize these differences and help find ways to share the protocols and processes between richer and poor nations to help elevate the practice of all to a stronger position.

Access to education, training, and advanced practice resources remains a strong focus of all regions and wealth groups globally. This is an area of practice that management can facilitate to engage and encourage excellence in the workforce. It is often difficult to change workloads and wages as they are often inside industrial agreements. Our experience suggests education, training, and advanced practice opportunities are strong motivators for many critical care nurses and provide encouragement and engagement opportunities that can be as incentivizing as wages increases. Additionally, they can contribute to advances in the standards of patient care in these complex settings and promote staff retention. The survey findings also note that national CCNOs are being encouraged to provide national (first) and local (second) conferences, workshops, and education forums (third), practice standards and guidelines (fourth), standards for educational courses (seventh), training/skill acquisition courses (eighth), and study/educations grants (ninth) (Table 1). Similar sentiments are summarized in Tables 2 and 3 for employers and WFCCN.

As the global representative of CCN and practice, WFCCN is required to be a policy leader. Among other resources, the WFCCN provides evidence-based policy statements, open-access textbook and journal, international conferences, and research studies such as this to inform the priorities that national and regional federations of CCN can pursue on behalf of their members. As previously stated, global sharing of CCN resources is to be encouraged so that knowledge equity can become a reality in developing countries (Williams et al., 2020).

Policy priorities

This survey provides global perspectives and themes that may be useful to CCNOs, however it is highly recommended that national CCNOs conduct their own survey of members and colleagues to provide a contemporary evidence base and mandate for the priorities they choose to pursue. Our findings (Table 5) suggest a strong leaning toward clinical and evidence-based guidelines being of strong interest in many countries. It is also clear that many areas of practice have a significantly different prioritization between high- and lower-income countries, further suggesting higher income countries have access to guidelines and evidence, while lower-income countries do not. As a clinically based, advanced practice specialty, this finding is to be expected and encouraged. WFCCN and CCNOs have an important role to play in facilitating and sharing access to protocols between richer and poorer countries.

Critical care nursing research priorities

Research priorities identified (Table 6) show a strong emphasis toward workforce and education issues. These findings align with

other questions in the survey around priorities for WFCCN and CCNOs as well as the issues of most importance to CCNs. The themes of workforce retentions and staffing shortages, working environment, education, and training have remained pervasive throughout this study and must be a strong priority for WFCCN, CCNOs, and employers. Research themes among critical care nurses in Europe a decade ago identified some subtle variations to our results with their five major themes being: patient safety; impact of evidence-based practice on outcomes; impact of workforce on outcomes; well-being of patients and relatives; and impact of end-of-life care on staff and practice (Blackwood et al., 2011). Under the auspices of the American Thoracic Society, an international Delphi study of 649 nurses and 188 patients/carers from 45 countries examined nursing research priorities for critical care, pulmonary, and sleep and found four areas were broadly endorsed across the three surveys: communication, education, risk reduction and psychological support (George et al., 2020).

The more recent challenges of COVID-19 have led critical care nurses to consider their needs in the context of an overburdened healthcare system unable to efficiently support nurses, their physical exhaustion, living with uncertainty, and the psychological burden of the disease (Moradi et al., 2021). ICU nurses were also challenged by working in an unfamiliar environment, lack of experience in caring for large numbers of infectious patients, anxiety about being infected, exhaustion and depression (Shen et al., 2020) coupled with reports of unprecedented and immense burden impacting the critical care nursing workforce (Cui et al., 2020; Galehdar et al., 2020; Gordon et al., 2021; Guttormson et al., 2022; Kackin et al., 2021; Karimi et al., 2020; Sharma et al., 2021; Sun et al., 2020; White, 2021). As a result, addressing the ongoing needs of critical care nurses now is needed to sustain the global critical care nursing workforce of the future.

Utilizing the research and findings of past surveys and contemporary works of others as comparisons, including the resources and networks of WFCCN, we have provided a global perspective on critical care nursing to inform CCNO's, health care administrators, leaders, and policy makers, so that future actions to strengthen the contribution of critical care nurses to the healthcare system take these findings into consideration.

Limitations

Despite our best efforts to be inclusive of all countries, some significant omissions are noted. Nevertheless, this is the largest sample of countries of any previous studies on this topic which is an improvement, though generalizations need to be made with caution. Individuals representing the CCNs in their country may not always be well-informed of the priorities of the CCNO or CCNs in their country. The survey was available in English and Spanish, which can pose a challenge to those whose native tongue is other than these two languages.

This is an unfunded study relying on volunteered time and good will. Future studies with funding may be able to utilize focus groups

and/or consumer advocates to provide richer more details descriptive information to these questions and from a larger range of countries, cultures, and language groups.

CONCLUSION

Almost half of the world's countries were identified in this sixth worldwide survey of CCNO and CCN leaders. Six surveys in 20 years with solid themes around workforce, education and training, representation/ advocacy, and communication remain constant themes with workforce environment, stress levels (inclusive of burnout, exhaustion and compassion fatigue), workforce retentions, and support for critical care nurses being particularly important themes during this COVID-19 era. Noted differences in emphasis on many themes between high-income and lesser income countries remain an important distinction that representative bodies such as WFCCN must remain cognizant of and must share the analysis of these variations carefully with emerging regional federations in Latin America, Africa, south Asia, and south-east Asia. Subtle but important variances on policy and research priorities suggest an influence from the recent experience of COVID-19 and in particular the importance of workforce burnout, development, retention, and supportive practices to enhance well-being.

The findings of this world survey will inform WFCCN policy and strategic plans and influence future priorities and activities of educators, researchers, and nursing and healthcare leaders to promote excellence in critical care nursing policy and practice at a global level.

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CONFLICT OF INTEREST STATEMENT

The authors of this study do not have any Conflict of Interest in relation to this study.

CLINICAL RESOURCES

World Federation of Critical Care Nurses: <https://wfccn.org>.

African Federation of Critical Care Nurses: <https://www.africanfccn.org>.

European Federation of Critical Care Nursing Associations: <https://www.efccna.org>.

La Federación Latinoamericana de Enfermería en Cuidados Intensivos: <http://www.fleci.org>.

South East Asia Federation of Critical Care Nurses: <http://seafcnc.com>.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Appendix S1.

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