Journal of
Nursing Management

Volume 29 Number 8 **November 2021** ISSN 0966–0429

Editor-in-Chief **Fiona Timmins**

Online submission and peer-review at
http://mc.manuscriptcentral.com/jnm

WILEY

Journal of **Nursing Management**

Aims and scope

The Journal of Nursing Management is an international forum which informs and advances the discipline of nursing management and leadership. The Journal encourages scholarly debate and critical analysis resulting in a rich source of evidence which underpins and illuminates the practice of management, innovation and leadership in nursing and health care. It publishes current issues and developments in practice in the form of research papers, in-depth commentaries and analyses.

The complex and rapidly changing nature of global health care is constantly generating new challenges and questions. The Journal of Nursing Management welcomes papers from researchers, academics, practitioners, managers, and policy makers from a range of countries and backgrounds which examine these issues and contribute to the body of knowledge in international nursing management and leadership worldwide.

The Journal of Nursing Management aims to:

- *Inform practitioners and researchers in nursing management and leadership*
- *Explore and debate current issues in nursing management and leadership*
- *Assess the evidence for current practice*
- *Develop best practice in nursing management and leadership*
- *Examine the impact of policy developments*
- *Address issues in governance*, quality and safety

The Journal publishes papers in the following areas and often presents these in 'themed' issues which serve as authoritative and substantive analyses of nursing management and leadership globally:

- *General Management and organisational theory and its application to nursing*
- *Leadership and strategic analysis*
- *Clinical management approaches*, including role development
- *Quality*, governance, ethical and legal issues
- *Recruitment*, retention, job satisfaction and stress
- *Health policy*, finance and resource allocation
- *Health information and communication technology*
- *Evidence-based management and research methods*
- *Continuing professional and practice development*
- *Organisational culture and context in the working environment*
- *Patient empowerment*, participation and safety

This list is not exclusive and potential contributors are referred to the Journal's website to access past issues for more detailed lists of content.

Information for Subscribers

Journal of Nursing Management is published in eight issues per year. Institutional subscription prices for 2021 are:
Print & Online: €1419 (Europe), £1119 (UK), US$2064 (The Americas), US$2405 (Rest of the World). Prices are exclusive of tax. Asia-Pacific GST, Canadian GST/HST and European VAT will be applied at the appropriate rates. For more information on current tax rates, please go to www.wileyonlinelibrary.com/tax-vat. The price includes online access to the current and all online backfiles to January 1st 2017, where available. For other pricing options, including access information and terms and conditions, please visit www.wileyonlinelibrary.com/access.

Delivery Terms and Legal Title

Where the subscription price includes print issues and delivery is to the recipient's address, delivery terms are **Delivered at Place (DAP)**; the recipient is responsible for paying any import duty or taxes. Title to all issues transfers Free of Board (FOB) our shipping point, freight prepaid. We will endeavour to fulfil claims for missing or damaged copies within six months of publication, within our reasonable discretion and subject to availability.

Back issues: *Single issues from current and recent volumes are available at the current single issue price from cs-journals@wiley.com. Earlier issues may be obtained from Periodicals Service Company*, 351 Fairview Avenue – Ste 300, Hudson, NY 12534, USA. Tel: +1 518 822-9300, Fax: +1 518 822-9305, email:psc@periodicals.com

Periodical ID statement

JOURNAL OF NURSING MANAGEMENT, (ISSN 0966-0429), is published in January, March, April, May, July, September, October, and November. US mailing agent: Mercury Media Processing, LLC, 1850 Elizabeth Avenue, Suite #C, Rahway, NJ 07065, USA. Periodical postage paid at Rahway, NJ. POSTMASTER: Send all address changes to *JOURNAL OF NURSING MANAGEMENT*, John Wiley & Sons Inc., C/O The Sheridan Press, PO Box 465, Hanover, PA 17331 USA.

Publisher

JOURNAL OF NURSING MANAGEMENT is published by:
John Wiley & Sons Ltd, 9600 Garsington Road, Oxford, OX4 2DQ. Tel: +44 (0) 1865 778 315; Fax: +44 (0) 1865 471 755.

Journal Customer Services: *For ordering information*, claims and any enquiry concerning your journal subscription please go to https://hub.wiley.com/community/support/onlinelibrary or contact your nearest office.

Americas: *Email: cs-journals@wiley.com; Tel: +1 781 388 8598 or +1 800 835 6770 (toll free in the USA & Canada).*
Europe, Middle East and Africa: Email: cs-journals@wiley.com; Tel: +44 (0) 1865 778315.
Asia Pacific: *Email: cs-journals@wiley.com; Tel: +65 6511 8000.*
Japan: *For Japanese speaking support*, Email: cs-japan@wiley.com; **Visit our Online Customer Help** at https://hub.wiley.com/community/support/onlinelibrary

Abstracting and Indexing Services

The Journal is indexed in the Academic Search, Academic Search Alumni Edition, Academic Search Elite, Academic Search Premier, ASSIA, BNI, CINAHL, CSA Biological Sciences Database, CSA Environmental Sciences & Pollution Management Database, Clinical Medicine, Social & Behavioral Sciences, Ecology Abstracts, Health Source Nursing/Academic, HEED, MEDLINE/PubMed, PsycINFO/Psychological Abstracts, Science Citation Index Expanded, SCOPUS, Social Sciences Citation Index, Web of Science.

Wiley's Corporate Citizenship initiative seeks to address the environmental, social, economic, and ethical challenges faced in our business and which are important to our diverse stakeholder groups. Since launching the initiative, we have focused on sharing our content with those in need, enhancing community philanthropy, reducing our carbon impact, creating global guidelines and best practices for paper use, establishing a vendor code of ethics, and engaging our colleagues and other stakeholders in our efforts. Follow our progress at www.wiley.com/go/citizenship

ISSN 0966-0429 (Print)
ISSN 1365-2834 (Online)

For submission instructions, subscription and all other information visit: www.wileyonlinelibrary.com/journal/jonm

Statement on Research4Life

Wiley is a founding member of the UN-backed HINARI, AGORA, and OARE initiatives. They are now collectively known as Research4Life, making online scientific content available free or at nominal cost to researchers in developing countries. Please visit Wiley's Content Access – Corporate Citizenship site: http://www.wiley.com/WileyCDA/Section/id-390082.html

Online Open

Journal of Nursing Management accepts articles for Open Access publication. Please visit https://authorservices.wiley.com/author-resources/Journal-Authors/open-access/onlineopen.html for further information about OnlineOpen.

Printed in Singapore by C. O. S. Printers Pte Ltd

Summary of Guidelines for Authors

The *Journal of Nursing Management* is an established international academic nursing journal which aims to facilitate the publication of scholarly contributions to all aspects of nursing management. These include research, theory, practice, policy and education.

Some examples of suitable topics include: management and organizational theories and their application to nursing and health care; quality assurance issues; innovations in interprofessional practice development and care management; workforce planning; change management strategies; health policy and its impact on holistic care.

Please read the instructions below for brief details on the Journal's requirements for manuscripts. Please visit the journal website (http://www.wileyonlinelibrary.com/journal/jonm) for full and updated Author Guidelines and Wiley Publishing's Author Services website, http://authorservices.wiley.com/bauthor/, for further information on the preparation and submission of articles and figures. Manuscripts in an incorrect format may be returned to the author.

MANUSCRIPT SUBMISSION

The submission and review process of *Journal of Nursing Management* is handled online by Manuscript Central. To submit an article to the journal, please go to http://mc.manuscriptcentral.com/jnm, create an account and submit your article. Complete instructions on how to submit a paper are available online at the Journal website: http://www.wileyonlinelibrary.com/journal/jonm. Further assistance can be obtained from Robert Huston at the Editorial Office at +44 1243 772007 or by email at rhuston@wiley.com.

Note to NIH Grantees: Pursuant to NIH mandate, Wiley will post the accepted version of contributions authored by NIH grant-holders to PubMed Central upon acceptance. This accepted version will be made publicly available 12 months after publication. For further information, see www.wiley.com/go/nihmandate

MANUSCRIPT FORMAT AND STRUCTURE

All manuscripts submitted to *Journal of Nursing Management* should include:

Title Page: A *Title Page* **must** be submitted as part of the submission process and should contain the following:

- Manuscript title
- Word count (including abstract and references)
- Authors' names, professional and academic qualifications, positions and places of work. They must all have actively contributed to the overall design and execution of the study/paper and should be listed in order of importance of their contribution
- Corresponding author address, telephone and fax numbers and email address.
- Acknowledgements: Under Acknowledgements, please specify contributors to the article other than the authors accredited. Please also include specification of the source of funding for the study and any potential conflict of interests if appropriate. Please limit this to 50 words.

Abstract: All research, review and commentary articles must include a structured abstract of 200 words. This provides a simple way of ensuring adequate detail is provided about the contents of the study or article (what, when, why, how and so-what?).

For *research* articles please use the following headings in your structured abstract:

Aim(s) – what was the purpose of the study?

Background – why was this study important?

Method(s) – a brief description of the method(s) used, including size and nature of sample

Results – what were the main findings?

Conclusion(s) – what are the main conclusions and implications for practice?

Implications for Nursing Management – What are the implications for nurse managers and/or nursing management? And what does this add to current knowledge?

For *review* and *commentary* articles please use the following headings in your structured abstract:

Aim(s) – what is the purpose of the article?

Background – why is the article important at this time?

Evaluation – what types of information were used and/or how were these analysed or evaluated?

Key issues – what were the most important issues to emerge from the analysis?

Conclusion(s) – what are the main conclusions and implications for practice?

Implications for Nursing Management – What are the implications of the article for nurse managers and/or nursing management? And what does this article add to current knowledge?

Please use published articles in the *Journal of Nursing Management* as exemplars.

Similar headings should be used as section headings in the body of the text.

Please add up to 5 keywords after the abstract. For details of article word count limits please refer to the online version of these guidelines.

References

The Journal follows the Harvard reference style. For full details, please see the Journal website.

Tables, Figures and Figure Legends

Tables should only be used to clarify important points. Tables must, as far as possible, be self-explanatory. The tables should be numbered consecutively with Arabic numerals.

Figures: All graphs, drawings and photographs are considered as figures and should be numbered in sequence with Arabic numerals. Each figure should have a legend and all legends should be typed together on a separate sheet and numbered correspondingly. If all or parts of previously published illustrations are used, permission must be obtained from the copyright holder concerned. It is the author's responsibility to obtain these in writing and provide copies to the Publisher.

All figures and artwork must be provided in electronic format. Please save vector graphics (e.g. line artwork) in Encapsulated Postscript Format (EPS) and bitmap files (e.g. halftones) or clinical or in vitro pictures in Tagged Image Format (TIFF). Further information can be obtained at the Journal website and at Wiley Publishing's guidelines for illustrations: www.authorservices.wiley.com/bauthor/illustration.asp

Colour Charges: It is the policy of the *Journal of Nursing Management* for authors to pay the full cost for the reproduction of their colour artwork. Therefore, Wiley Publishing requires you to complete and return a colour work agreement form before your paper can be published. This form can be downloaded from http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1365-2834/homepage/JONM__SN_Sub2000_F_CoW_JONM.pdf. Any article received by Wiley Publishing with colour work will not be published until the form has been returned. If you are unable to access the internet, or are unable to download the form, please contact the Production Editor, Jovel Marie Domingo, at the following address: SPi Building, Pascor Drive, Sto. Niño, Parañaque City 1700, Manila, Philippines. Email: jonm@wiley.com

Supplementary Material: Supplementary Material, such as data sets or additional figures or tables, that will not be published in the print edition of the journal, but which will be viewable via the online edition, can be submitted. Please contact the Production Editor (jonm@wiley.com) for further details.

ACCEPTANCE OF A MANUSCRIPT FOR PUBLICATION

Copyright: If your paper is accepted, the author identified as the formal corresponding author for the paper will receive an email prompting them to login into Author Services; where via the Wiley Author Licensing Service (WALS) they will be able to complete the license agreement on behalf of all authors on the paper. The corresponding author will be presented with the Copyright Transfer Agreement (CTA) to sign. The terms and conditions of the CTA can be previewed in the samples associated with the Copyright FAQs below: http://authorservices.wiley.com/bauthor/faqs_copyright.asp

Permissions: If all or parts of previously published illustrations are used, permission must be obtained from the copyright holder concerned. It is the author's responsibility to obtain these in writing and provide copies to the Publisher.

Proofs: The corresponding author will receive an e-mail alert containing a link to download their proof as a PDF (portable document format). Corrections must be returned to the Production Editor **within 3 days of receipt.**

Offprints: Authors will be provided with a free PDF file of their article after its publication in an issue. Additional hardcopy offprints may be ordered online from https://eoc.sheridan.com/reprints/eorder/order.php?DBS=A&PUID=10089&IUID=5433&UNDO=1&SERVICE=2&ACCTUID=75. Please Email: offprint@cosprinters.com with any queries.

Author Services: For more substantial information on the services provided for authors, please see www.authorservices.wiley.com/bauthor/ default.asp

Online Open: OnlineOpen is available to authors of primary research articles who wish to make their article available to non-subscribers on publication, or whose funding agency requires grantees to archive the final version of their article. With OnlineOpen, the author, the author's funding agency, or the author's institution pays a fee to ensure that the article is made available to non-subscribers upon publication via Wiley Online Library, as well as deposited in the funding agency's preferred archive.

For the full list of terms and conditions, and the order form, see http://olabout.wiley.com/WileyCDA/Section/id-406241.html.

Prior to acceptance there is no requirement to inform an Editorial Office that you intend to publish your paper OnlineOpen if you do not wish to. All OnlineOpen articles are treated in the same way as any other article. They go through the journal's standard peer-review process and will be accepted or rejected based on their own merit.

Journal of Nursing Management

Volume 29 Number 8 November 2021

Contents continued on backmatter

This journal is indexed in the Academic Search, Academic Search Alumni Edition, Academic Search Elite, Academic Search Premier, British Nursing Database, CINAHL: Cumulative Index to Nursing & Allied Health Literature, Clinical Medicine, Social & Behavioral Sciences, Health & Medical Collection, Health Research Premium Collection, Health Source Nursing/Academic, HEED: Health Economic Evaluations Database, Hospital Premium Collection, MEDLINE/PubMed, ProQuest Central, ProQuest Central K-347, PsycINFO/Psychological Abstracts, Research Library, Research Library Prep, Science Citation Index Expanded, SCOPUS, Social Sciences Citation Index, Web of Science

WILEY

This journal is available online at *Wiley Online Library*. Visit http://onlinelibrary.wiley.com to search the articles and register for table of contents e-mail alerts

advancing knowledge and learning... improving research and practice

Received: 9 April 2021 | Accepted: 12 April 2021

DOI: 10.1111/jonm.13342

EDITORIAL

WILEY

Introducing health care professionals to systems thinking through an integrated curriculum for leading in health systems

1 | INTRODUCTION

"In the operating conditions of the 21st century it is impossible to be competent alone" (O'Hara & Leicester, 2019, p. 16). Competence in leading and managing, as in any professional practice, is best understood as the ability to work with others to meet important challenges in complex human systems (Rychen & Salganik, 2003). Systems thinkers such as Oshry (1999, 2007, 2018, 2019, 2020) recognize that competence is a function of systems and culture, that is function of relationships. This insight acknowledges the importance of being able to work effectively in group settings but goes further in recognizing that our lives are always lived in complex patterns of relationships with others (O'Hara & Leicester, 2019).

In this editorial, we discuss how Oshry's (2018, 2019, 2020) Organic Systems Framework (OSF), a theory of whole human systems, was used to design a curriculum that introduces systems thinking to health care professionals. Our aim was to develop an integrated curriculum that focuses on leadership and management as practices (Mintzberg, 2013) that take place in systems (Oshry, 2018). We believe that nurse leaders and educators are well placed to design, develop and deliver such a curriculum as nurses are ubiquitous and embedded at all levels in health systems, providing them with multiple vantage points and opportunities to effect change. Nurses are accustomed to being part of and leading interdisciplinary teams (Teeling et al., 2020) and have a deep understanding and appreciation of other health care professionals' roles. This contextual awareness and recognition of their colleagues' contributions contributes to the "sociopolitical knowing" (White, 1995, p. 83) that has long been regarded as a fundamental pattern of knowing in nursing. Oshry's (2018, 2019, 2020) human systems framework has the potential to strengthen and extend this pattern of knowing for all health care professionals.

2 | AN INTEGRATED CURRICULUM

An integrated curriculum addresses four pillars of learning: knowing, doing, being and being together (Delors et al., 1996). Health care professionals work together in teams that cross organisations' vertical silos and horizontal slabs, operational functions, occupations and professional disciplines (Mintzberg, 2013). We therefore designed an interdisciplinary curriculum for all who work in health systems, whether in clinical, technical, administrative or other key roles, and at any level, recognizing that leadership and management are not vested in particular positions of authority. Rather, they are best understood as distributed and interrelated practices (Heifetz, 1994; Mintzberg, 2013) that are always and everywhere present in an organisation (Stigter & Cooper, 2015).

In a curriculum focusing on the practices of leading and managing, it is important that students are facilitated to understand those practices in a theoretically informed way (Wolff, 2021). A focus on practice does not mean that students' learning is confined to how leadership and management are currently conducted in particular settings. Such an approach would deny students access to theoretical knowledge that can help them to think about, and make sense of, their experiences in new ways and to gain insights into the new possibilities for leading and managing that a theoretically informed understanding provides (Allais, 2014; Wheelehan, 2009).

Selecting appropriate theory is a key function of curriculum design and development in higher education (Winberg et al., 2021). We show how we introduced health care professionals to a particular way of thinking about, and practising in, health systems. The curriculum is structured by the four key pillars of learning: learning to know, learning to do, learning to be and learning to be together (Delors et al., 1996), and aligns with Wolff's (2021) four dimensions of a holistic curriculum.

Learning to know, the principles of

Here, the focus is on the abstract, the "what" of the curriculum and its underpinning theoretical principles; for example Oshry's (2019, 2020) theory of whole human systems as patterns of relationships and processes.

Learning to do, the principles for

Here, the concern is with applying key principles, the "how" of the curriculum. For example, the productive and empowering leadership and management practices that can arise from an awareness and appreciation of systemic patterns of relationships and processes in human systems (Oshry, 2018, 2019, 2020).

Learning to be, the principles within

Here, the focus is on embodying the principles, the "who" of the curriculum - the personal, human dimension. For example, reflecting on the type of leader and manager each student is in the process of becoming as their systems thinking develops.

Learning to be together—in specific practice, organisational and sociopolitical contexts—the principles 'wherein' (White, 1995, p. 83).

Here, the concern is with individual practitioners practising together in particular situations. The focus is on how students are

enabled to think with, apply and embody key principles and concepts in specific real-world situations. We now discuss each of these four pillars in turn.

3 | KNOWING: SEEING SYSTEMS

For Oshry, what so often seems personal, and is experienced by us as intensely so, is not, in fact, personal but systemic. His life's work (Oshry, 1999, 2007, 2018, 2019, 2020) has been concerned with overcoming systems blindness, a pervasive and enduring lack of awareness of how our habitual responses, and our experience of ourselves and others, which are conditioned by the systems in which we live and work. For Oshry, human systems are characterized by predictable conditions that prevail at different levels in the organisation. With great regularity, these conditions evoke predictable responses that are relatively independent of personal characteristics and dispositions. These responses can lead to behaviours that disempower individuals and weaken organisations.

Those at the top of an organisation shape the overall system. They create the conditions for it to flourish, to cope with threats and to recognize and seek out opportunities. However, they are often so overwhelmed by complexity that they are unable to think and practise strategically to realize their system's potential (Oshry, 2018, 2019; Stigter & Cooper, 2015). Instead, they become overburdened by taking on the unrelenting operational demands that the system throws at them. At the front line, Oshry (2018) highlights the vulnerability experienced by many of those directly providing services and how they often feel oppressed by what they perceive to be remote, disengaged and indifferent managers at the top and middle of their organisations. Their response is to blame their managers for their predicament.

In the middle, managers are frequently so torn between the conflicting demands and priorities of their leaders, on the one hand, and those who report to them, on the other, that they are unable to function effectively. Instead, they get stuck in the middle of multiple and intersecting interactions and exchanges between those at the top and those at the front line, and between them and service users. Meanwhile, service users, the ultimate validators of our systems, regularly feel short-changed and neglected, and complain about the inability of the system to respond appropriately to their needs. They react by viewing the system as something apart from themselves, a separate entity that they hold accountable but stand apart from.

For Oshry (2007, 2018), systems thinking helps us overcome systems blindness. He thinks of systems blindness as comprising five dimensions: positional, relational, spatial, temporal and process. We experience positional blindness when we see only fixed roles or positions clashing with other fixed positions but fail to appreciate the people occupying those roles and the uncertainty and ambiguity underlying their positions. We suffer from relational blindness when we fail to appreciate that we are always in systemic relationship to one another and that our relative position in an organisation, whether top, middle or front line, structures our relationships. Spatial blindness causes us to see only our part of the system but not the whole; we become preoccupied with what is happening to us but do not pay attention to others' experiences. Temporal blindness obscures our shared history, the story of our system that has brought it, and us, to this point.

Finally, Oshry (2019, 2020) pays particular attention to four fundamental organisational processes: differentiation, homogenization, individuation and integration. For him, process blindness results when we fail to recognize the significance and impact of these four processes. Differentiation is about harnessing and elaborating diversity, while homogenization entails identifying and articulating shared values, focusing on what unites us. Differentiation without homogenization can lead to territoriality, silos and wasted resources; homogenization without differentiation can suppress diversity and drain and enervate diminishing creativity and resilience.

Individuation is about personal autonomy and the freedom to innovate and realize one's personal potential, while integration is about creating productive teams in which members nurture and support each other's talents. Individuation without integration can result in destructive competition, while integration without individuation can lead to apathy, groupthink and reduced creativity. Process blindness results when we fail to understand the following: first, the relative balance among these four processes; second, the relative intensity with which they are expressed in different settings; and third, the part we and our professional communities play in strengthening and weakening them. In health care, understanding these processes can help us to appreciate the importance of maintaining a balance between the development and maintenance of our distinctive professional identities and expertise, on the one hand, and the need for interprofessional collaboration, on the other.

Once we begin to appreciate the impact of these patterns of systemic relationships and processes, we begin to see that there are other possibilities available to us. It is to these that we now turn.

4 | APPLYING SYSTEMS THINKING: TAKING A LEADERSHIP STAND

Oshry (2007, 2019) sets out the range of possibilities available to us as we gain an understanding of the fundamental patterns of relationships and processes at work in human systems. For those at the top, front line and middle of any system, and for service users, he discusses four leadership stands. Those in charge should create responsibility throughout the system. Among the strategies available to distribute responsibility are sharing high-quality information, providing feedback, investing in capacity building, coaching, involving others in the big issues and co-creating a compelling organisational story (Stigter & Cooper, 2015). For those directly delivering front-line services, it is important to develop a sense of ownership and responsibility for one's own condition and the condition of the overall system. Oshry (2007) refers to this as an empowerment shift, moving from victim to co-creator, initiating projects and setting out

to secure the resources and develop the networks of support to ensure that they succeed.

For those in the middle, maintaining independence of thought and action is critical so as not to get stuck in the middle of others' agendas and disputes. This requires working with others in similar positions in the system, sharing information, co-ordinating and supporting one another. It also requires contracting with their leaders and managers so as to clarify and, if necessary, expand the boundaries of their role, and to reject 'lofty leadership' for the 'engaging management' (Mintzberg, 2019, p. 15) of those at the front line. Finally, service users can take a leadership stand by building relationships with and staying close to service providers, informing themselves about how a service works and how they can make it work more effectively and efficiently for them. Service users can set clear demands and standards, and get involved as early as they can as partners, rather than after the event as judges (Oshry, 2018).

5 | BEING IN SYSTEMS

Our students are encouraged to engage in structured reflection on the personal implications of their learning. We first ask them to place themselves in a particular role or location in their organisational system and to respond to six prompts in a spirit of curiosity and self-care rather than negative self-appraisal:

1. What triggers their or others' responses and behaviours?
2. What behaviours do they observe in themselves or others?
3. What thoughts, feelings and physical sensations do they experience?
4. What concerns do they have if they stopped their current ways of working?
5. What are the personal and organisational costs of the way things are done around here?
6. What maintains current patterns of behaviour? What is the pay-off?

A later reflection activity focuses on the possibilities opened up by considering the leadership stands. Students are asked to notice the productive and empowering behaviours they and others use and to work through another six prompts:

1. What conditions enable more productive and empowering responses and behaviours?
2. What behaviours consistent with the leadership stands do they observe in themselves or others?
3. What thoughts, feelings and physical sensations do they now experience?
4. What are the possibilities if these behaviours are sustained?
5. What are the personal and organisational benefits of these behaviours?
6. What will be the overall contribution to personal flourishing and organisational strategy of distributing and sustaining these behaviours?

6 | CONCLUSIONS: BEING TOGETHER IN 21ST-CENTURY SYSTEMS

Oshry's (2020) theory of whole human systems provides nurses, midwives and all health care professionals with a framework not only to acquire knowledge, skills and self-awareness, but also to develop a critical systems literacy with the capacity to understand the dynamics of systems and groups, and appreciate their own role as leaders and managers in sustaining or productively shaping those dynamics. Systems thinking is crucial to the formation of 'persons of tomorrow' (O'Hara & Leicester, 2019).

We believe that nurses can and should take the lead in introducing other health professionals to systems thinking given the contextual awareness that nurses' ubiquity and embeddedness throughout the health system affords. Systems thinking complements the excellent technical education that health professionals receive, allowing them to develop as the leaders of tomorrow. These leaders will not be afraid to let others know who they are, what is important to them as people and as professionals, and what they need to move ahead. At the same time, they commit to seeing and supporting their colleagues, grasping who they are as individuals and as professionals, and what is important to them, enabling them to grow as authentic, effective and resilient leaders and managers.

Martin McNamara EdD, BSc, MEd, RGN, RPN, RNT, Professor
Seán Paul Teeling PhD, BSc, MBA, RGN, RSCN, Assistant Professor

UCD School of Nursing, Midwifery & Health Systems, University College Dublin, Dublin 4, Ireland

Correspondence
Martin McNamara, UCD School of Nursing, Midwifery & Health System, University College Dublin, Belfield, Dublin 4, Ireland.
Email: martin.mcnamara@ucd.ie

ORCID
Martin McNamara https://orcid.org/0000-0001-7257-9654
Seán Paul Teeling https://orcid.org/0000-0002-4102-7280

REFERENCES

Allais, S. (2014). *Selling out education: National qualifications frameworks and the neglect of knowledge*. Sense.

Delors, J., Mufti, I. A., Amagi, I., Carneiro, R., Chung, F., Geremek, B. & International Commission on Education for the Twenty-first Century (1996) *Learning: The treasure within. Report to UNESCO of the*

International Commission on Education for the Twenty-First Century. UNESCO Publishing.

Heifetz, R. A. (1994). *Leadership without easy answers*. Harvard University Press.

Mintzberg, H. (2013). *Simply managing: What managers do and can do better*. Berrett-Koehler Publishers.

Mintzberg, H. (2019). *Bedtime stories for managers*. Berrett-Koehler Publishers.

O'Hara, M., & Leicester, G. (2019). *Dancing at the edge: Competence, culture and organization in the 21st century* (2nd ed.). Triarchy Press.

Oshry, B. (1999). *Leading systems: Lessons from the power lab*. Berrett-Koehler Publishers.

Oshry, B. (2007). *Seeing systems: Unlocking the mysteries of organizational life*. Berrett-Koehler Publishers.

Oshry, B. (2018). *Context, context, context: How our blindness to context cripples even the smartest organizations*. Triarchy Press.

Oshry, B. (2019). *The organic systems framework: A new paradigm for understanding and intervening in organizational life*. Triarchy Press.

Oshry, B. (2020). What lies beneath. *Organization Development Journal*, *38*(3), 11–32.

Rychen, D. S., & L. H. Salganik (Eds.) (2003). *Key competencies for a successful life and a well-functioning society*. Hogrefe & Huber Publishers.

Stigter, M., & Cooper, C. L. (2015). *Solving the strategy delusion: Mobilizing people and realizing distinctive strategies*. Palgrave Macmillan.

Teeling, S. P., Dewing, J., & Baldie, D. (2020). A discussion of the synergy and divergence between Lean Six Sigma and person-centred improvement sciences. *International Journal of Research in Nursing*, *11*(1), 10–23. https://doi.org/10.3844/ijrnsp.2020.10.23

Wheelehan, L. (2009). The problem with CBT (and why constructivism makes things worse). *Journal of Education and Work*, *22*(3), 227–242. https://doi.org/10.1080/13639080902957913

White, J. (1995). Patterns of knowing: Review, critique, and update. *Advances in Nursing Science*, *17*(4), 73–86. https://doi.org/10.1097/00012272-199506000-00007

Winberg, C., McKenna, S., & Wilmot, K.(2021). *Building knowledge in higher education: Enhancing teaching and learning with legitimation code theory*. Routledge.

Wolff, K. (2021). From principle to practice: Enabling theory-practice bridging in engineering education. In C. Winberg, S. McKenna, & K. Wilmot (Eds.), *Building knowledge in higher education: Enhancing teaching and learning with legitimation code theory*. (181–198). Routledge.

How to cite this article: McNamara M, Teeling SP. Introducing health care professionals to systems thinking through an integrated curriculum for leading in health systems. *J Nurs Manag*. 2021;29:2325–2328. https://doi.org/10.1111/jonm.13342

Received: 25 February 2021 | Revised: 26 May 2021 | Accepted: 1 June 2021

DOI: 10.1111/jonm.13392

ORIGINAL ARTICLE

WILEY

Missed nursing care during the COVID-19 pandemic: A comparative observational study

Ann-Christin von Vogelsang RN, CNOR, PhD, Director of Nursing Development, Associate Professor[1,2] | **Katarina E. Göransson RN, Associate Professor**[3,4] | **Ann-Charlotte Falk RN, CCN, Associate Professor**[5] | **Carolin Nymark RN, PhD, Director of Nursing Development**[6,7]

[1]Heart, Vascular and Neuro Theme, Department of Neurosurgery, Karolinska University Hospital, Stockholm, Sweden

[2]Karolinska Institutet Department of Clinical Neuroscience, Stockholm, Sweden

[3]Emergency and Reparative Medicine Theme, Karolinska University Hospital, Stockholm, Sweden

[4]Department of Medicine, Karolinska Institutet, Stockholm, Sweden

[5]Department for Health Promoting Science, Sophiahemmet University, Stockholm, Sweden

[6]Department of Neurobiology, Care Sciences and Society, Karolinska Institutet, Stockholm, Sweden

[7]Heart, Vascular and Neuro Theme, Department of Cardiology, Karolinska University Hospital, Stockholm, Sweden

Correspondence
Ann-Christin von Vogelsang, Karolinska University Hospital, Heart, Vascular and Neuro Theme Eugeniavägen 6, Carolina Tower 4th floor, SE-171 76 Stockholm, Sweden.
Email: ann-christin.von-vogelsang@ki.se

Abstract

Aim: To evaluate frequencies, types of and reasons for missed nursing care during the COVID-19 pandemic at inpatient wards in a highly specialized university hospital.

Background: Registered nurse/patient ratio and nursing competence are known to affect patient outcomes. The first wave of the COVID-19 pandemic entailed novel ways for staffing to meet the expected increased acute care demand, which potentially could impact on quality of care.

Methods: A comparative cross-sectional study was conducted, using *the MISSCARE Survey*. A sample of nursing staff during the first wave of the COVID-19 pandemic ($n = 130$) was compared with a reference sample ($n = 157$).

Results: Few differences between samples concerning elements of missed care and no significant differences concerning reasons for missed care were found. Most participants perceived the quality of care and the patient safety to be good.

Conclusion: The results may be explained by three factors: maintained registered nurse/patient ratio, patients' dependency levels and that nursing managers could maintain the staffing needs with a sufficient skill mix.

Implications for nursing management: Nursing managers impact on the occurrence of MNC; to provide a sufficient registered nurse/patient ratio and skill mix when staffing. They play an important role in anticipatory planning and during infectious disease outbreaks.

KEYWORDS

COVID-19, nursing care, patient safety, quality of care, workload

1 | BACKGROUND

From a patient safety perspective, international studies have reported a correlation between registered nurses (RNs) being responsible for a high number of patients and an impaired patient outcome. Aiken and colleagues (2014) showed that if the nurse/patient ratio increased by one patient (over the ratio 1:6), the mortality increased by 7%. The impact of having lower educated personnel, for example nursing assistants (NAs), has been reported to have a less prominent effect on mortality, in comparison with the nurse/patient ratio (Ball et al., 2014, 2016). The reason why the nurse/patient ratio affects patient mortality is not fully understood but missed nursing care (MNC) has been suggested to be the mediator for this association (Ball et al., 2018).

There are several factors that contribute to the variation concerning MNC, such as the patient mix (frequency of monitoring and level of dependency) (Ball et al., 2016) and nursing skill mix, where adding support workers and diluting the skill mix can increase MNC (Griffiths et al., 2018).

Missed nursing care, also referred to as care left undone or unfinished care, is defined as any aspect of required patient care that is omitted (in part or in whole) or delayed (Kalisch et al., 2009). MNC significantly impacts patient safety and has been associated with higher 30-day mortality (Ball et al., 2018), higher in-hospital mortality (Schubert et al., 2012), lower perceived quality of care (Ball et al., 2014) and other negative outcomes such as falls (Kalisch et al., 2012), increased occurrence of pneumonia, urinary infections, sepsis, errors in medical management (Ausserhofer et al., 2013) and an increasing number of pressure ulcers and nosocomial infections (Schubert et al., 2008). Reasons for MNC are often described as relating to three factors: lacking labour resources, material resources and communication (Kalisch et al., 2009).

On 11 March 2020, the World Health Organization (WHO) declared COVID-19 as a pandemic. During this first wave of the pandemic, the description of the clinical course was incomplete, the understanding of the incubation period was limited, and risk factors for severe illness was uncertain. Health care systems and society were reported to be challenged (Cucinotta & Vanelli, 2020) by insufficient preparedness for a pandemic, shortage of personal protection equipment (PPE) and a shortage of nurses (Catton, 2020). Before the first wave of the COVID-19 pandemic, Sweden had the lowest number of in-hospital beds per capita and a growing population with complex health care needs (The Swedish National Board of Health & Welfare, 2020). In comparison with 14 other European countries, Sweden has the lowest accessibility to intensive care beds (Bauer et al., 2020). A recent study on prognostic COVID-19 disease burden among Swedish regions showed that over two million individuals have an increased risk of severe COVID-19 (Gémes et al., 2020). Thus, in the beginning of the first COVID-19 wave, novel ways for staffing in-hospital wards were needed to meet the expected increased acute care demand in many Swedish hospitals. Nursing staff were relocated to new departments to work with new colleagues and new tasks within only a few weeks (Ahlsson, 2020).

WHAT IS ALREADY KNOWN ABOUT THE TOPIC?

- MNC is any aspect of required patient care that is omitted or delayed.
- MNC has been associated with several negative patient outcomes and lower perceived quality of care.
- Several factors contribute to the variation of MNC, for instance the registered nurse/patient ratio, the nursing skill mix and the patient mix.

WHAT NEW KNOWLEDGE THIS PAPER ADDS

- The level of MNC, perceptions of quality of care and patient safety were about the same as before the pandemic, although the nursing staff reported significantly more overtime hours and absent shifts during the first wave of the pandemic.
- The results could be explained by that the nursing managers could successfully maintain the staffing needs with a sufficient skill mix of the nursing staff, the registered nurse/patient ratio was the same between the data collection periods and that most COVID-19 patients had a lower level of dependency than ordinary patients.
- Nursing managers should be aware of how MNC impact on quality of care and that they play an important role in anticipatory planning and throughout infectious disease outbreaks.

To meet the expected demand for intensive care, the Karolinska University Hospital increased the intensive care unit (ICU) bed capacity by 500%, partly by redistributing RNs and other staff (e.g., NAs, specialized nurses, physicians and physiotherapists) from non-ICU wards to the ICU wards. All non-imperative elective surgery was postponed. RNs from across the hospital (e.g., research nurses, nurses with administrative duties, nurses working in outpatient care or from children wards) were redistributed to several of the adult inpatient wards across the hospital. In addition, wards were staffed with assistants, some with previous clinical experience and some without. Some units prepared to double their usual number of patients by converting single patient rooms to double rooms. Because of the actions taken to increase patient beds, the university hospital did not suffer a shortage of patient beds during the first COVID-19 wave.

During the first pandemic wave, there was a lack of knowledge concerning how to care for hospitalized patients with COVID-19.

The most common reported symptoms such as fever, cough, dyspnoea, myalgia and fatigue (Hassan et al., 2020) were not considered problematic. More stressing was that disease progression in the literature was described to be rapid in patients with respiratory decompensation (Keller et al., 2020) and that reported complications among COVID-19 patients included acute respiratory distress syndrome (ARDS), acute cardiac injury, acute renal injury, secondary infections and multiple organ failure. Moreover, there were a growing number of studies presenting new or atypical clinical manifestations, new laboratory findings and new treatment outcomes (Tahvildari et al., 2020).

The COVID-19 pandemic entailed novel ways of staffing, relocating nursing staff to other units, forced them to work in new roles with new tasks and new colleagues. Increased numbers of patients were expected, and there was insufficient knowledge on how to care for patients with COVID-19. These circumstances could potentially impact on quality of care and patient safety.

The aim of the study was to evaluate frequencies, types of and reasons for MNC during the COVID-19 pandemic at inpatient wards in a highly specialized university hospital.

2 | METHODS

This cross-sectional study had a comparative approach, comparing the findings with a reference sample from the same university hospital.

2.1 | Setting and samples

The study was conducted at the Karolinska University Hospital in Stockholm, Sweden, across two sites (south and north) and before the pandemic held a total of 980 hospital beds.

2.1.1 | COVID-19 sample

This sample consists of nursing staff at inpatient wards within the departments of cardiology, heart surgery, vascular surgery, neurology and neurosurgery. Some wards were converted to be 'COVID-19 units', which in some wards meant that they solely cared for fairly stable COVID-19 patients (requiring monitoring and non-invasive respiratory treatment), while other wards cared for the ordinary patient mix as well as COVID-19 patients. Also, other wards (that normally treated heart or stroke patients at an intermediate level) were reorganised to manage patients that were originally treated at the medical high dependency unit. At the time for data collection, there were 235 RNs and 289 NAs working at the inpatient wards, and all were asked to fill in the MNC survey in relation to caring for COVID-19 patients in the period May–June 2020. A total of 130 choose to participate (24.8%).

2.1.2 | Reference sample

The reference sample was obtained from a baseline MISSCARE survey in October 2019 where a total of 915 nursing staff (approx. 50% were RNs) working within the departments of cardiology, heart surgery, vascular surgery, intensive care, acute and emergency care were invited to participate and 248 answered the questionnaire (27.1%). From this sample, RNs and NAs working in intensive care or emergency departments were excluded, resulting in a reference sample of $n = 157$. This selection was made to only include RNs and NAs working in inpatient wards, with a similar level of care and mix of medical/surgical patients as the COVID-19 sample.

2.2 | Measures

The instrument *MISSCARE Survey* was developed in the United States by Kalisch and Williams (2009) and has been translated into several languages. For this study, the *MISSCARE Survey-Swedish version* was used (Nymark et al., 2020).

The *MISSCARE Survey* has three sections: first, a background section with questions on demographic data such as age and sex, and background data on for instance educational level, working role, hours of overtime, number of absent shifts due to illness the past 3 months and whether they perceive the unit staffing as adequate. Also, numbers of patients cared for and numbers of admissions and discharges during the last shift are asked for. Further, there is one question regarding satisfaction with the level of teamwork on the unit, with the answering options 'very satisfied', 'satisfied', 'neutral', 'dissatisfied' and 'very dissatisfied' (Kalisch et al., 2011). Section A comprises 24 questions on elements of MNC, answered using a five-point Likert scale: 'always missed', 'frequently missed', 'occasionally missed', 'rarely missed' and 'never missed'. Section B comprises 17 questions on reasons for missed nursing care answered with a four-point Likert scale: 'significant reason', 'moderate reason', 'minor reason' and 'not a reason for missed care' (Bragadottir & Kalisch, 2018). No time reference is given for the items in section A or B; the items concerning overtime hours and absent shifts have the time frame 'the past 3 months'.

The psychometric properties of the Swedish version of the *MISSCARE Survey* have been evaluated, where test–retest reliability for section A was 0.907 and for section B 0.514. Internal consistency for section B was measured with Cronbach's alpha and was 0.769 (Nymark et al., 2020).

We also included two study-specific questions: 'How do you perceive the quality of care on the ward?' and 'How do you perceive patient safety on the ward?' to be answered using a five-point Likert scale, with the answering options 'very good', 'good', 'neutral', 'poor' and 'very poor'.

2.3 | Procedure

For the COVID-19 sample, paper questionnaires including study information and contact information of the investigators were distributed

at all inpatient units within the before-mentioned departments. Paper surveys were used to enable to reach nursing staff working within inpatient care, but not those relocated to other units. The survey was distributed once, and the nursing staff filled in the questionnaires anonymously and put them in designated mailboxes. The data collection period continued for three weeks in the period May–June 2020.

The reference sample received an email at their work email address in which they were asked to participate. The email had an individual link to the *MISSCARE Survey*, a web survey, and included study information and contact information of the investigators. One reminder was sent to non-responders' email addresses after about one week. The data collection continued for 2 weeks and was concluded in October 2019.

2.4 | Data analysis

Similar to how the instrument originator, Professor Kalisch and colleagues, (2011) defined MNC and answering options, we define MNC in section A when reported 'occasionally', 'frequently' or 'always' missed. Reported 'significant' and 'moderate' reasons in section B were considered reasons for missed nursing care. All items in sections A and B were subsequently treated dichotomously. In accordance with Bragadottir and Kalisch (2018), we also ranked the most frequently reported missed elements of MNC.

In the analysis of numbers of patient admissions and patient discharges per shift, only RNs were included since only RNs perform these nursing activities in Sweden. Satisfaction with the level of teamwork was categorized into three categories: satisfied (including answering options 'very satisfied' and 'satisfied'), neutral and dissatisfied (including 'dissatisfied' and 'very dissatisfied').

For the study-specific questions on perception of quality of care and patient safety, the answering options were categorized into three categories: good, poor and neutral.

Chi-square was used to explore differences in background characteristics (sex, unit type, academic degree, experience in role and at current unit, over time hours and absent days), satisfaction with the level of teamwork, perceptions of adequate staffing, quality of care and patient safety. Fisher's exact test was used to examine differences between samples concerning the background characteristic professional role, missed elements of care (section A) and reasons for MNC (section B). Valid percentages were used, thus excluding missing data from calculations. Missing numbers are given when presenting results in sections A and B. An independent-samples median test was used to compare age between samples. A Mann–Whitney *U* test was used to compare the distribution of numbers of patients cared for, patient admissions and patient discharges. The internal consistency for section B was evaluated with Cronbach's alpha. A two-tailed significance level was set at .05. The statistical software used was IBM SPSS Statistics version 25 (IBM, US, 2017).

2.5 | Ethical considerations

The study followed the principles outlined in the 'Declaration of Helsinki' from 1964 and its later amendments and was approved by the National Ethical Review Authority. Written information about the study was given as an introductory text to the survey, where voluntariness was emphasized and confidentiality guaranteed. By answering the questionnaire, the participants consented to participation. The researchers had access only to unidentified data.

3 | RESULTS

The COVID-19 sample reported significantly more overtime hours and more absence from work due to illness (Table 1). There were significant differences between the COVID-19 and the reference sample concerning unit type, since the majority of those in the COVID-19 sample comprised nursing staff from neurology or neurosurgery units who were not included in the reference sample. Characteristics of participants and background data are presented in Table 1.

The number of patients cared for during the last shift was similar between samples: median 5 (IQR = 2–6) in the COVID-19 sample and median 6 (IQR = 4–6) in the reference sample ($p = 1.0$). Either the number of admitted patients or the number of discharged patients per shift differed significantly between the samples. In the COVID-19 sample, patient admissions varied between none to 7 (md = 0, IQR = 0–2) in comparison with the reference sample where admissions varied between none to 20 (md = 1, IQR = 0–3) $p = .644$. The median number of patients discharged per shift in the COVID-19 sample was 0 (IQR = 0–2) and md = 1 (IQR = 0–2) in the reference sample ($p = .649$).

Missed nursing care in section A was ranked by most frequently reported element of MNC (ranked 1), and the results are presented in Table 2, including missing data. There were few significant differences when comparing missed elements of care between the samples. The COVID-19 sample reported less MNC in the item 'setting up meals for patients who feed themselves' in comparison with the reference sample and also less MNC in the item 'mouth care'. Significantly, more MNC in the COVID-19 sample was found in the item 'response to call light is initiated within 5 min'.

Reasons for MNC were ranked from the most frequently reported reason (lowest rank) to the least frequently reported (highest rank) and are presented in Table 3. The internal consistency for section B was good in both samples, with an alpha value of 0.898 in the COVID-19 sample and 0.881 in the reference sample. No significant differences were found between samples concerning reasons for MNC.

Satisfaction with the level of teamwork and perceptions of staffing, quality of care and patient safety is presented in Table 4.

TABLE 1 Characteristics of participants

Characteristic	COVID-19 sample (*n* = 130) *n* (%)	Reference sample (*n* = 157) *n* (%)	*p*
Age (years)			
Median (IQR)	34.0 (27–45)	35.5 (28–47)	.536[b]
Range	20–64	20–64	
Sex			.388[c]
Male	17 (13.1)	30 (19.1)	
Female	112 (86.2)	126 (80.3)	
Missing	1 (0.8)	1 (0.6)	
Unit type			<.001[c]
Heart or vascular	59 (45.4)	77 (49.0)	
Neurology or neurosurgery	71 (54.6)	0 (0.0)	
Short-stay medical[a]	0 (0.0)	31 (19.7)	
Short-stay surgical	0 (0.0)	10 (6.4)	
Mixed medical–surgical short stay	0 (0.0)	39 (24.8)	
Professional role			.238[d]
Registered nurse	59 (45.4)	79 (50.3)	
Nurse assistant	71 (54.6)	78 (49.7)	
Highest academic degree for RNs			.104[c]
Without academic degree	4 (6.8)	7 (8.9)	
Bachelor	46 (78.0)	55 (69.6)	
Master one-year	6 (10.2)	15 (19.0)	
Master two-year	2 (3.4)	2 (2.5)	
Licentiate	1 (1.7)	0 (0.0)	
Experience in role			.617[c]
≤6 months	6 (4.6)	6 (3.8)	
6–24 months	22 (16.9)	17 (10.8)	
2–5 years	29 (22.3)	36 (22.9)	
6–10 years	30 (23.1)	36 (22.9)	
>10 years	41 (31.5)	58 (36.9)	
Missing	2 (1.5)	4 (2.5)	
Experience at current unit			.117[c]
≤6 months	19 (14.6)	16 (10.2)	
6–24 months	38 (29.2)	39 (24.8)	
2–5 years	33 (25.4)	59 (37.6)	
6–10 years	15 (11.5)	23 (14.6)	
>10 years	24 (18.5)	19 (12.1)	
Missing	1 (0.8)	1 (0.6)	
Hours of overtime the past 3 months			
None	34 (26.6)	40 (25.6)	.006[c]
1–12 hr	46 (35.9)	82 (52.6)	
More than 12 hr	48 (37.5)	34 (21.8)	
Number of absent days or shifts due to illness, injury, etc., past 3 months			<.001[c]
None	35 (27.1)	95 (60.5)	
1 day or shift	7 (5.4)	10 (6.4)	
2–3 days or shifts	27 (20.9)	35 (22.3)	
4–6 days or shifts	18 (14.0)	11 (7.0)	
Over 6 days or shifts	42 (32.6)	6 (3.8)	

[a]Includes high dependency unit.

[b]Independent-samples median test.

[c]Chi-square test.

[d]Fischer's exact test.

4 | DISCUSSION

We only found significant differences within three items on elements of MNC, and no significant differences concerning reasons for MNC. Missed nursing care is complex, and several factors have been found having significant relationship with the occurrence of MNC (Ball et al., 2016). In this study, we found some factors that may explain why the levels of MNC were similar between the samples. First, the registered nurse/patient ratio, which is a factor that significantly increases MNC (Ball et al., 2014). In this study, the registered nurse/patient ratio was similar between our samples, and both samples also perceived the staffing to be adequate most of the time. These results can be understood by the fact that there were fewer of the ordinary patients to care for. The expected massive influx of patients was mitigated due to that some of the ordinary patients avoided seeking medical care during the first wave of the pandemic. Within the neurology and cardiology departments, we found decreasing numbers of patients with stroke and acute coronary syndromes; in some patient groups, there was a 20% decline (Ahlsson, 2020; Ntaios et al., 2020). Avoidance of seeking medical care during the COVID-19 pandemic has also been seen internationally, specifically in stroke and acute coronary syndrome patients (Boukhris et al., 2020; Nguyen-Huynh et al., 2020).

Second, the patient mix the COVID-19 sample cared for. Ball et al. (2016) have shown that the numbers of patients requiring assistance with all activities of daily living and the frequency of monitoring are factors having significant relationships with MNC. In the COVID-19 sample, most of the COVID-19 patients being treated at the participating wards were found to be in a fairly stable

TABLE 2 Missed nursing care by rank[a], numbers and valid percentages

	COVID-19 sample $n = 130$				Reference sample $n = 157$				
Items in Section A	**Rank[a]**	***n***	**(%)**	**Missing, *n***	**Rank[a]**	***n***	**(%)**	**Missing, *n***	***p***
Attend interdisciplinary care conference whenever held	1	50	(54.3)	38	2	74	(54.8)	22	1.000
Turning patient every 2 hr	2	67	(54.0)	6	1	87	(57.2)	5	0.627
Ambulation 3 times per day or as ordered	3	57	(45.2)	4	3	80	(52.2)	4	0.279
Assess effectiveness of medications	4	32	(38.6)	47	9	36	(27.3)	25	0.098
Patient discharge planning and teaching	5	40	(36.4)	20	5	62	(42.5)	11	0.367
Mouth care	6	38	(30.4)	5	4	74	(48.4)	4	0.003
IV/central line site care and assessments according to hospital policy	7	28	(30.4)	38	10	37	(26.8)	19	0.554
Emotional support to patient and/or family	8	36	(29.8)	9	6	44	(29.3)	7	1.000
Wound care	9	35	(28.7)	8	12	33	(22.3)	9	0.261
Monitoring intake/output	10	29	(23.2)	5	15	31	(20.3)	4	0.561
Patient teaching about procedures, tests, and other diagnostic studies	11	26	(22.2)	13	16	28	(18.8)	8	0.540
Feeding patient when the food is still warm	12	27	(21.6)	5	8	44	(28.9)	5	0.170
PRN medication requests acted on within 15 min	13/14	16	(20.3)	51	18	24	(18.5)	27	0.856
Medications administered within 30 min before or after scheduled time	13/14	16	(20.3)	51	7	38	(29.2)	27	0.192
Assist with toileting needs within 5 min of request	15	23	(18.5)	6	13	32	(21.3)	7	0.650
Patient assessments performed each shift	16	21	(18.1)	14	19	27	(18.0)	7	1.000
Patient bathing/skin care	17	21	(16.7)	4	14	32	(21.1)	5	0.363
Focused reassessments according to patient condition	18	17	(15.5)	20	17	27	(18.6)	12	0.616
Response to call light is initiated within 5 min	19	19	(15.4)	7	22	9	(6.0)	7	0.015
Full documentation of all necessary data	20	16	(13.0)	7	21	19	(12.8)	9	1.000
Nursing staffs' hand washing	21	15	(12.0)	5	20	20	(13.2)	5	0.857
Setting up meals for patients who feed themselves	22	9	(7.1)	3	11	36	(23.8)	6	<0.001
Bedside glucose monitoring as ordered	23	6	(4.8)	4	24	6	(4.0)	6	0.775
Vital signs assessed as ordered	24	3	(2.3)	2	23	7	(4.6)	5	0.353

[a]Rank: The ranking of reported most missed (1) to least missed nursing care elements.

condition, but in need of oxygen treatment (i.e., including Optiflow treatment and non-invasive ventilation). The patients' symptoms corresponded to those listed by Hassan et al. (2020), such as fever, cough, fatigue, dyspnoea and requiring acute care while patients that contracted complications described by Tahvildari et al. (2020), such as ARDS and organ failure, were treated at the ICU. Thus, the COVID-19 patients treated outside the ICU needed medical and nursing care but were not as highly dependent as some of the ordinary patients treated at those wards, for instance patients with acute strokes or complete spinal cord injuries. The nurses subsequently reported that many COVID-19 patients were able to maintain their own self-care and to do so to a greater extent than the nurses' ordinary patients.

Third, the skill mix among the nursing staff in the COVID-19 sample. Griffiths et al. (2018) found that if support workers are added to the work force, MNC may not decrease. On the contrary, MNC may even increase if the skill mix is diluted. In our study, the experience in the roles as RNs and NAs was similar between the samples, as was the item 'experience at the current unit' (Table 1), leading to that the skill mix seemed to be constant across the samples. This, along with the perception that staffing was adequate, indicates that the nursing managers successfully could maintain the staffing needs during the

TABLE 3 Significant and moderate reasons for missed nursing care by rank[a], numbers and valid percentages

	COVID−19 sample				Reference sample				
		n = 130				*n* = 157			
Items in section B	Rank[a]	*n*	(%)	Missing *n*	Rank[a]	*n*	(%)	Missing *n*	*p*
Unexpected rise in patient volume and/or acuity on the unit	1	91	(79.8)	16	1	102	(69.4)	10	0.065
Urgent patient situations (e.g., a patient's condition worsening)	2	86	(72.9)	12	2	91	(63.2)	13	0.112
Inadequate number of staff	3	84	(68.9)	8	3	86	(58.5)	10	0.099
Unbalanced patient assignments	4	68	(58.1)	13	5	72	(50.3)	14	0.260
Heavy admission and discharge activity	5	56	(52.3)	23	4	75	(53.6)	17	0.898
Lack of back-up support from team members	6	52	(44.4)	13	7	65	(45.5)	14	0.901
Nursing assistant did not communicate that care was not done	7	49	(43.4)	17	6	66	(46.2)	14	0.705
Medications were not available when needed	8	35	(41.7)	46	10	55	(42.3)	27	1.000
Tension or communication breakdowns within the nursing team	9	47	(39.8)	12	9	63	(44.4)	15	0.529
Supplies/equipment not available when needed	10	45	(39.8)	17	16	43	(31.6)	21	0.186
Tension or communication breakdowns with other support departments	11	44	(37.6)	13	11	59	(41.8)	16	0.525
Inadequate hand-off from previous shift or sending unit	12	44	(37.0)	11	15	47	(32.6)	13	0.515
Supplies/equipment not functioning properly	13	41	(35.7)	15	17	37	(27.0)	20	0.171
Inadequate number of assistive personnel (e.g., nursing assistants, techs etc.)	14	40	(35.1)	16	14	47	(32.9)	14	0.791
Caregiver off unit or unavailable	15	39	(33.9)	15	12	52	(37.1)	17	0.602
Other departments did not provide the care needed	16	38	(32.5)	13	13	48	(34.0)	16	0.895
Tension or communication breakdowns with the medical staff	17	36	(32.4)	19	8	63	(45.3)	18	0.051

[a]Rank: The ranking most frequently reported reason (1) to less frequently reported reason for missed care.

first wave of the pandemic, despite having to accept that some of their ordinary staff was relocated to for instance ICU.

Our results revealed that there were significantly more instances of MNC reported in the COVID-19 sample in the item 'response to call light is initiated within 5 min'. The delay in responding could be explained by the use of contact precautions and the need for the nursing staff to ensure that relevant PPE was available for the purpose of the individual situation and to put it on. Rather surprisingly, we found that two elements of care were reported to be significantly better when caring for COVID-19 patients: 'setting up meals for patients who feed themselves' and 'mouth care'. These results may be also be interpreted as due to a different patient mix, with fewer patients needing assistance with activities of daily living.

Despite lower influx of patients than expected, and not working with critically ill COVID-19 patients, caring for the completely new group of COVID-19 patients increases the strain on the nursing staff at inpatient wards (Cai et al., 2020). This can be visualized in our study by the fact that the COVID-19 sample worked significantly more overtime. Other factors contributing to emotional stress, such as rapid organisational changes, relocation to new departments and constantly being needed to work in new multidisciplinary teams due to that previous colleagues had become ill (Catania et al., 2020), were also likely evident for the nursing staff in our study. Although our results show that the pandemic did not result in an increased patient load (numbers of patients cared for were similar between samples), caring for a completely new patient group required new skill performances to keep up with the COVID-19 patients' specific care needs and possible new treatments (Hassan et al., 2020; Tahvildari et al., 2020).

Hospital management and nursing managers play an important role for the mental health of health care workers during infectious disease outbreaks. Zaçe et al. (2021) have in a systematic review summarized four categories of interventions that also may be useful for anticipatory planning: (1) provision of informational support (i.e., in-service training on guidelines and how to use PPE), (2) provision of equipment and supplies, (3) organisational support (i.e., informative leadership, transparency, realism and positive messages, to provide

TABLE 4 Satisfaction with teamwork, perceptions of staffing, quality of care and patient safety

	COVID–19 sample	Reference sample	
	(*n* = 130)	(*n* = 157)	
Item	***n* (%)**	***n* (%)**	***p***
Satisfaction with the level of teamwork on the unit			.981
Satisfied	100 (76.9)	116 (76.3)	
Neutral	22 (16.9)	27 (17.8)	
Dissatisfied	8 (6.2)	9 (5.9)	
Perception of adequate staffing on the unit			.469
100% of the time	29 (22.7)	44 (28.4)	
75% of the time	66 (51.6)	79 (51.0)	
50% of the time	19 (14.8)	23 (14.8)	
25% of the time	11 (8.6)	8 (5.2)	
0% of the time	3 (2.3)	1 (0.6)	
Perception of quality of care on the unit			.650
Good	110 (85.3)	138 (87.9)	
Neutral	10 (7.8)	12 (7.6)	
Poor	9 (7.0)	7(4.5)	
Perception of patient safety on the unit			.671
Good	105 (82.0)	126 (81.3)	
Neutral	14 (10.9)	21 (13.4)	
Poor	9 (7.0)	8 (5.2)	

sufficient rest areas) and (4) provision of emotional and psychological interventions (i.e., strategies for mental health protection and mental health teams).

This study has some limitations that need to be addressed. The data collection in the COVID-19 sample was concluded at the beginning of June 2020, while the peak in admission of COVID-19 patients at Karolinska university hospital during the first pandemic wave was in April (Ahlsson, 2020). However, a large number of patients were still being treated for COVID-19 on the wards until June.

It can be questioned whether the two samples are comparable since they differ significantly. The majority of the nursing staff in the reference sample were staff working at medical and/or surgical short-stay units, while the majority of participants in the COVID sample consisted of nursing staff within neurology and neurosurgery. These units have higher levels of specialization than the short-stay units. However, due to the extensive redistribution of nursing staff during the pandemic, a large proportion of the nursing staff were scheduled to work outside their ordinary workplace, unable to care for the patient groups they had experience of. We therefore believe that the difference in sample compositions plays a minor role when interpreting our results.

The samples in this study were small and could be interfering with the lack of variance in the study's outcomes. It would have been preferable to include the units that cared for most of the COVID-19 patients—the intensive care units and the infectious disease units. However, due to the high pressure on the nursing staff at these units, we judged that asking them to participate would further increase their stress level and this would probably likely lead to low participation. In order to make the samples comparable in size and composition, we excluded nursing staff working in intensive care or emergency departments from the reference sample. The included units in the COVID-19 sample varied considering numbers of patients being treated for COVID-19. Still, the staff were asked to answer the survey in the perspective of caring for patients with COVID-19 in general on the ward.

The samples also differed concerning hours of overtime in the past three months and in numbers of working shifts missed due to illness. These differences are explained by the pandemic; the staff were required to work more overtime and longer shifts to compensate for absent colleagues. There were more absent shifts among the nursing staff during the pandemic due to confirmed SARS-CoV-2, while others were quarantined at home with symptoms and with no possibility of obtaining viral testing. A recent study on COVID-19 among health workers in Germany showed that nurses were predominant among suspected and confirmed cases of SARS-CoV-2 (Nienhaus & Hod, 2020).

A possible shortcoming, when evaluating MNC with the *MISSCARE Survey* during the pandemic, is that the instrument (Kalisch & Williams, 2009) has no items reflecting the care of patients with infectious illnesses. Thus, there may be other reasons for MNC not covered in part B of the instrument. Some items in section A (Table 2) have rather high numbers of missing data. When analysing those items, it was evident that the reason was predominantly NAs not answering on elements of care they rarely or not at all were involved in (i.e., administration of medications, assessment of effectiveness of medications and attending interdisciplinary care conferences). The Swedish version of the *MISSCARE Survey* does not include the answering option 'not relevant' (Nymark et al., 2020), which we believe contributed to the number of missing data. A further development of the Swedish version may therefore be valuable in future studies. Moreover, we used two study-specific questions to evaluate perceptions on quality of care and patient safety that were not psychometric evaluated. The range of perceptions of satisfaction with quality of care and patient safety may not be captured with those two single items.

Another consideration is the use of different data collection methods between the samples (paper survey versus web survey). Previous research has pointed out significant differences between these data collection methods; study invitations sent to digital mailboxes have lower response rate in comparison with paper surveys. On the other hand, paper surveys more frequently have missing items (Ebert et al., 2018). In our study, the response rate was about the same between the samples and we saw no difference concerning missing items. Paper surveys were used to enable to reach out to nursing staff working within inpatient care, including those relocated from outpatient care, but not those relocated to for instance ICU. At the time of data collection in the COVID-19 sample, there were no possibilities to distinguish that a web survey would reach the intended nursing staff.

5 | CONCLUSION

The level of MNC at highly specialized wards during the COVID-19 pandemic was about the same as before the pandemic, as were the perceived reasons for MNC. The quality of care and patient safety was maintained. Three possible factors were found explaining the results: the registered nurse/patient ratio was at the same level as before the pandemic due to a lower influx of ordinary patients, most COVID-19 patients cared for were in a fairly stable condition and had a lower level of dependency than their ordinary patients and that the nursing managers successfully could maintain the staffing needs with a sufficient skill mix of the nursing staff.

6 | IMPLICATIONS FOR NURSING MANAGEMENT

Nursing managers impact on the occurrence of MNC in several ways, for instance to provide a sufficient nurse/patient ratio and skill mix when staffing. They should be aware of that MNC significantly impacts patient safety and quality of care. Hospital management and nursing managers play an important role in anticipatory planning and throughout infectious disease outbreaks. Their planning and eventual interventions can impact on the nursing staffs' mental health.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTIONS

AvV, KG, ACF and CN conceived and designed the study, reviewed and edited the manuscript and approved the final version to be submitted. AvV and CN acquired, analysed and interpreted the data. AvV wrote original draft of the manuscript. All persons entitled to authorship are listed as authors.

ETHICAL APPROVAL

This study received ethical approval from the Swedish National Ethical Review Authority, approval number 2019-04080.

DATA AVAILABILITY STATEMENT

Research data are not shared.

ORCID

Ann-Christin von Vogelsang https://orcid.org/0000-0002-3006-2443
Katarina E. Göransson https://orcid.org/0000-0002-4062-4470
Ann-Charlotte Falk https://orcid.org/0000-0003-2246-7894
Carolin Nymark https://orcid.org/0000-0003-0891-6358

REFERENCES

Ahlsson, A. (2020). Why change? Lessons in leadership from the COVID-19 pandemic. *European Journal of Cardio-Thoracic Surgery*, *58*(3), 411–413. https://doi.org/10.1093/ejcts/ezaa252

Aiken, L. H., Sloane, D. M., Bruyneel, L., Van den Heede, K., Griffiths, P., Busse, R., Diomidous, M., Kinnunen, J., Kózka, M., Lesaffre, E., McHugh, M. D., Moreno-Casbas, M. T., Rafferty, A. M., Schwendimann, R., Scott, P. A., Tishelman, C., van Achterberg, T., & Sermeus, W. (2014). Nurse staffing and education and hospital mortality in nine European countries: A retrospective observational study. *Lancet*, *383*(9931), 1824–1830. https://doi.org/10.1016/s0140-6736(13)62631-8

Ausserhofer, D., Schubert, M., Desmedt, M., Blegen, M. A., De Geest, S., & Schwendimann, R. (2013). The association of patient safety climate and nurse-related organizational factors with selected patient outcomes: A cross-sectional survey. *International Journal of Nursing Studies*, *50*(2), 240–252. https://doi.org/10.1016/j.ijnurstu.2012.04.007

Ball, J. E., Bruyneel, L., Aiken, L. H., Sermeus, W., Sloane, D. M., Rafferty, A. M., Lindqvist, R., Tishelman, C., & Griffiths, P. (2018). Post-operative mortality, missed care and nurse staffing in nine countries: A cross-sectional study. *International Journal of Nursing Studies*, *78*, 10–15. https://doi.org/10.1016/j.ijnurstu.2017.08.004

Ball, J. E., Griffiths, P., Rafferty, A. M., Lindqvist, R., Murrells, T., & Tishelman, C. (2016). A cross-sectional study of 'care left undone' on nursing shifts in hospitals. *Journal of Advanced Nursing*, *72*(9), 2086–2097. https://doi.org/10.1111/jan.12976

Ball, J. E., Murrells, T., Rafferty, A. M., Morrow, E., & Griffiths, P. (2014). 'Care left undone' during nursing shifts: Associations with workload and perceived quality of care. *BMJ Quality & Safety*, *23*(2), 116–125. https://doi.org/10.1136/bmjqs-2012-001767

Bauer, J., Brüggmann, D., Klingelhöfer, D., Maier, W., Schwettmann, L., Weiss, D. J., & Groneberg, D. A. (2020). Access to intensive care in 14 European countries: A spatial analysis of intensive care need and capacity in the light of COVID-19. *Intensive Care Medicine*, *46*(11), 2026–2034. https://doi.org/10.1007/s00134-020-06229-6

Boukhris, M., Azzalini, L., Baystrukov, V., Aloui, H., Kretov, E., Ribeiro, M. H., Araujo, G. N., Wainstain, M. V., Hillani, A., Masson, J. B., Mansour, S., Nasri, A., Sestier, M., Moritz, J. L. W., Julien, E. J. S., Souissi, S., & Addad, F. (2020). Impact of the COVID-19 pandemic on acute coronary syndrome and stroke volumes in non-Western countries. *Cardiovascular Revascularization Medicine*, *27*, 95–97. https://doi.org/10.1016/j.carrev.2020.07.017

Bragadottir, H., & Kalisch, B. J. (2018). Comparison of reports of missed nursing care: Registered Nurses vs. practical nurses in hospitals. *Scandinavian Journal of Caring Sciences*, *32*(3), 1227–1236. https://doi.org/10.1111/scs.12570

Cai, Q., Feng, H., Huang, J., Wang, M., Wang, Q., Lu, X., Xie, Y., Wang, X., Liu, Z., Hou, B., Ouyang, K., Pan, J., Li, Q., Fu, B., Deng, Y., & Liu, Y. (2020). The mental health of frontline and non-frontline medical workers during the coronavirus disease 2019 (COVID-19) outbreak in China: A case-control study. *Journal of Affective Disorders*, *275*, 210–215. https://doi.org/10.1016/j.jad.2020.06.031

Catania, G., Zanini, M., Hayter, M., Timmins, F., Dasso, N., Ottonello, G., Aleo, G., Sasso, L., & Bagnasco, A. (2020). Lessons from Italian front-line nurses' experiences during the COVID-19 pandemic: A qualitative descriptive study. *Journal of Nursing Management*, *29*(3), 404–411. https://doi.org/10.1111/jonm.13194

Catton, H. (2020). Nursing and health policy perspectives 2020 - a year to remember or one to forget? *International Nursing Review*, *67*(4), 450–452. https://doi.org/10.1111/inr.12647

Cucinotta, D., & Vanelli, M. (2020). WHO declares COVID-19 a pandemic. *Acta Biomedica*, *91*(1), 157–160. https://doi.org/10.23750/abm.v91i1.9397

Ebert, J. F., Huibers, L., Christensen, B., & Christensen, M. B. (2018). Paper- or web-based questionnaire invitations as a method for data collection: Cross-sectional comparative study of differences in response rate, completeness of data, and financial cost. *Journal of Medical Internet Research*, *20*(1), e24. https://doi.org/10.2196/jmir.8353

Gémes, K., Talbäck, M., Modig, K., Ahlbom, A., Berglund, A., Feychting, M., & Matthews, A. A. (2020). Burden and prevalence of prognostic factors for severe COVID-19 in Sweden. *European Journal of Epidemiology*, *35*(5), 401–409. https://doi.org/10.1007/s10654-020-00646-z

Griffiths, P., Recio-Saucedo, A., Dall'Ora, C., Briggs, J., Maruotti, A., Meredith, P., Smith, G. B., & Ball, J. (2018). The association between nurse staffing and omissions in nursing care: A systematic review. *Journal of Advanced Nursing*, *74*(7), 1474–1487. https://doi.org/10.1111/jan.13564

Hassan, S. A., Sheikh, F. N., Jamal, S., Ezeh, J. K., & Akhtar, A. (2020). Coronavirus (COVID-19): A review of clinical features, diagnosis, and treatment. *Cureus*, *12*(3), e7355. https://doi.org/10.7759/cureus.7355

Kalisch, B. J., Landstrom, G., & Williams, R. A. (2009). Missed nursing care: Errors of omission. *Nursing Outlook*, *57*(1), 3–9. https://doi.org/10.1016/j.outlook.2008.05.007

Kalisch, B. J., Tschannen, D., Lee, H., & Friese, C. R. (2011). Hospital variation in missed nursing care. *American Journal of Medical Quality*, *26*(4), 291–299. https://doi.org/10.1177/1062860610395929

Kalisch, B. J., Tschannen, D., & Lee, K. H. (2012). Missed nursing care, staffing, and patient falls. *Journal of Nursing Care Quality*, *27*(1), 6–12. https://doi.org/10.1097/NCQ.0b013e318225aa23

Kalisch, B. J., & Williams, R. A. (2009). Development and psychometric testing of a tool to measure missed nursing care. *The Journal of Nursing Administration*, *39*(5), 211–219. https://doi.org/10.1097/NNA.0b013e3181a23cf5

Keller, K. G., Reangsing, C., & Schneider, J. K. (2020). Clinical presentation and outcomes of hospitalized adults with COVID-19: A systematic review. *Journal of Advanced Nursing*, *76*(12), 3235–3257. https://doi.org/10.1111/jan.14558

Nguyen-Huynh, M. N., Tang, X. N., Vinson, D. R., Flint, A. C., Alexander, J. G., Meighan, M., Burnett, M., Sidney, S., & Klingman, J. G. (2020). Acute stroke presentation, care, and outcomes in community hospitals in Northern California during the COVID-19 pandemic. *Stroke*, *51*(10), 2918–2924. https://doi.org/10.1161/strokeaha.120.031099

Nienhaus, A., & Hod, R. (2020). COVID-19 among health workers in Germany and Malaysia. *International Journal of Environmental Research and Public Health*, *17*(13), 4881. https://doi.org/10.3390/ijerph17134881

Ntaios, G., Michel, P., Georgiopoulos, G., Guo, Y., Li, W., Xiong, J., Calleja, P., Ostos, F., González-Ortega, G., Fuentes, B., Alonso de Leciñana, M., Díez-Tejedor, E., García-Madrona, S., Masjuan, J., DeFelipe, A., Turc, G., Gonçalves, B., Domigo, V., Dan, G.-A., … Lip, G. Y. H. (2020). Characteristics and outcomes in patients with COVID-19 and acute ischemic stroke: The global COVID-19 stroke registry. *Stroke*, *51*(9), e254–e258. https://doi.org/10.1161/strokeaha.120.031208

Nymark, C., Göransson, K. E., Saboonchi, F., Falk, A. C., & von Vogelsang, A. C. (2020). Translation, culture adaption and psychometric testing of the MISSCARE survey-Swedish version. *Journal of Clinical Nursing*, *29*(23–24), 4645–4652. https://doi.org/10.1111/jocn.15505

Schubert, M., Clarke, S. P., Aiken, L. H., & de Geest, S. (2012). Associations between rationing of nursing care and inpatient mortality in Swiss hospitals. *International Journal for Quality in Health Care*, *24*(3), 230–238. https://doi.org/10.1093/intqhc/mzs009

Schubert, M., Glass, T. R., Clarke, S. P., Aiken, L. H., Schaffert-Witvliet, B., Sloane, D. M., & De Geest, S. (2008). Rationing of nursing care and its relationship to patient outcomes: The Swiss extension of the International hospital outcomes study. *International Journal for Quality in Health Care*, *20*(4), 227–237. https://doi.org/10.1093/intqhc/mzn017

Tahvildari, A., Arbabi, M., Farsi, Y., Jamshidi, P., Hasanzadeh, S., Calcagno, T. M., Nasiri, M. J., & Mirsaeidi, M. (2020). Clinical features, diagnosis, and treatment of COVID-19 in hospitalized patients: A systematic review of case reports and case series. *Frontiers in Medicine*, *7*, 231. https://doi.org/10.3389/fmed.2020.00231

The Swedish National Board of Health and Welfare (2020). *The condition and development in health care and dental care - Situation report 2020 [Tillståndet och utvecklingen inom hälso- och sjukvård samt tandvård – Lägesrapport 2020]*. Available from Socialstyrelsen Retrieved 1 May 2020: https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/ovrigt/2020-3-6667.pdf

Zaçe, D., Hoxhaj, I., Orfino, A., Viteritti, A. M., Janiri, L., & Di Pietro, M. L. (2021). Interventions to address mental health issues in healthcare workers during infectious disease outbreaks: A systematic review. *Journal of Psychiatric Research*, *136*, 319–333. https://doi.org/10.1016/j.jpsychires.2021.02.019

How to cite this article: von Vogelsang, A.-C., Göransson, K. E., Falk, A.-C., & Nymark, C. Missed nursing care during the COVID-19 pandemic: A comparative observational study. *J Nurs Manag*. 2021;29:2343–2352. https://doi.org/10.1111/jonm.13392

Received: 23 September 2020 | Revised: 8 June 2021 | Accepted: 22 June 2021

DOI: 10.1111/jonm.13400

ORIGINAL ARTICLE

WILEY

Associations between personal protective equipment and nursing staff stress during the COVID-19 pandemic

Dr. Manuela Hoedl MSc, BSc | Dr. Doris Eglseer MSc, BBSc | Dr. Silvia Bauer MSc, BSc

Institute of Nursing Science, Medical University of Graz, Graz, Austria

Correspondence
Manuela Hoedl, Institute of Nursing Science, Medical University of Graz, Universitaetsplatz 4/3, 8010 Graz, Austria.
Email: manuela.hoedl@medunigraz.at

Abstract

Aim: This study gives insights into the association between the use of personal protective equipment (PPE), wearing time of masks and stress among frontline nursing staff during the COVID-19 pandemic.

Background: PPE can have physical consequences like headache and pain, which could result in increased nurse stress levels.

Methods: A total of 2600 nurses participated in this online survey. The questionnaire is based on literature and includes the perceived level of stress scale.

Results: We found no significant association between the use of PPE and stress. Nurses who wore masks for more than 8 h had significant higher stress levels than those who used the masks for a shorter period.

Conclusions: The duration of wearing masks is associated with nurse's stress level. Our findings can help nurses to argue a higher frequency of breaks and a maximum duration of mask usage in their organisations.

Implications for Nursing Management: We recommend that nursing managers implement practical strategies such as a mask break task force. This task force could promote awareness for mask breaks and recommend and allocate rooms or locations such as balconies for mask breaks.

KEYWORDS
COVID-19, nurses, personal protective equipment, psychological stress

1 | INTRODUCTION

In March 2020, the Wold Health Organisation (WHO) assessed that COVID-19 and the underlying severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was characterized as a pandemic. Authors of a systematic review describe the main symptoms of COVID-19 as fever and cough followed by fatigue (Grant et al., 2020). The WHO stated on 28 June 2020 that more than 9,840,000 confirmed cases, with nearly 500,000 deaths in 216 countries/areas, had been reported (WHO, 2020c). This pandemic has been internationally recognized as the biggest pandemic since the 1918 influenza pandemic.

One main challenge for each affected country has been to protect high-risk groups and prevent a collapse of the health care system, and especially the intensive care system. This was done by, for example, social distancing, working in home office (if possible) and restricting treatments in hospitals insofar as possible.

Nevertheless, nursing staff are neither able to use social distancing nor to work in home office as preventive strategies. Beyond other health care professionals, they have to be available at the patients'

bedsides 24/7. Therefore, it is of utmost importance to provide nursing staff with personal protective equipment (PPE), such as gloves or eyewear, including surgical face masks (SFM) and filtering facepiece masks (FFP masks), as the virus is distributed by contact or droplet transmission (WHO, 2020b). (Inter-)national organisations have launched investigations on or even created regulations for the use of PPE (WHO, 2020e). An example would be McGilton et al who provide a list of considerations for infection control management in nursing homes, which might differ from, for example, acute care, based on (inter) national recommendations (McGilton et al., 2020). They noted a need to prepare and distribute videos or other resources to nursing home staff in order to provide them with information about the adequate and correct use and disposal of PPE as well as SFM/FFP masks and to update these as needed. They also recommended that experienced nurses teach nursing home staff how to follow the PPE and SFM/FFP masks guidelines and how to put on and take off the PPE and SFM/FFP masks safely. These guidelines often also include the maximum wearing time of the PPE and SFM/FFP masks. In April 2020, the WHO recommended the use of SFM masks without removing for up to 6 h during severe shortages, when caring for a cohort of COVID-19 patients (WHO, 2020e). More recently, the WHO and the International Labour Organisation have described that due to, for example, PPE shortages and high workload, wearing a PPE for extended periods of time may be required (WHO & International Labour Organisation, 2021). This is similar to the recommendations made by the National Institute for Occupational Safety and Health regarding the extended use of N95 masks (National Institute for Occupational Safety and Health, 2020). These recommendations state that such masks should be used for extended periods, as touching them less frequently might result in a lower risk of contact transmission as opposed to taking the mask off and putting the same mask back on (National Institute for Occupational Safety and Health, 2020).

On the other hand, regulations with regard to occupational safety state a maximum wearing time of FFP masks up to 2 h, depending on the type, followed by a break of 30 min (Deutsche gesetzliche Unvallversicherung, 2011). In Austria, in February 2021, a new legal provision was adopted determining a maximum wearing time for masks of 3 h, followed by a 10-min break (Federal Ministry for Labour, 2021).

However, several studies, letters and commentaries on PPE in general have been published since the COVID-19 outbreak (Cook, 2020; Lockhart et al., 2020; Ong et al., 2020). It is known that wearing PPE, and specifically SFM/FFP masks, can have physical consequences like headache and pain among frontline health care workers (Ong et al., 2020). Even though the majority (64.6%) of the before mentioned study were nurses, the authors did not report their results separated for the different frontline health care workers (nurses, doctors, etc.). In addition, studies have found an association between headache and stress (Alkhudhairy et al., 2018; Krøll et al., 2017). Therefore, the use of SFM/FFP masks can potentially increase the stress levels among nursing staff over the long run, through, for example, headache. Moreover, a recent study with 20 healthy persons showed that the stress level measured with heart rate variability was increased by wearing masks (Tian et al., 2020). However, they also highlighted that wearing the mask for a long time can cause poor breathing and even hypoxia, which can lead to an increased level of stress (Tian et al., 2020). This is of interest because high levels of perceived stress can result in burnout and increase the risk that staff leave the nursing profession, an important consideration in light of the expected worldwide nursing shortage (Catton, 2020; WHO, 2016).

However, none of these studies placed a focus on SFM/FFP masks usage and wearing time and frontline nursing staff stress, even though the use of PPE and SFM/FFP masks is considered the only way to protect frontline nursing staff against COVID-19 infection. Therefore, this study was carried out to give first insights into the association between the use of PPE including SFM/FFP masks, as well as wearing time of masks, and stress levels among frontline nursing staff, including registered nurses, nursing aids nursing students and specialized social carers, during the COVID-19 pandemic.

2 | METHODS

2.1 | Design

This study employed a cross-sectional design by using an online questionnaire. The online questionnaire was distributed through the open-source, online statistical web survey app LimeSurvey. The link for the online survey was distributed by applying a snowball sampling technique. The link was posted on the first author's personal Twitter account and the official Facebook page of the respective Institute of Nursing Science.

2.2 | Setting and sample

We included Austrian nursing staff from different settings (e.g., hospital and long-term care) who worked at the frontline during the COVID-19 pandemic. Frontline nursing staff were registered nurses, nursing aids, nursing students as well as specialized social carers. Because Austrian nurses are by law permitted to delegate certain tasks to nursing aids, we also included them in this survey. In addition, we also included, for example, nursing students, as they have also been working with COVID-19 affected persons during the COVID-19 pandemic in Austria, due to nursing staff shortage. Managers or nursing directors were not included in the data collection process, as the aim of the study was to gain insights into frontline nursing care during this pandemic.

2.3 | Data collection instrument

Data were collected on sample characteristics such as age and gender. In addition, we collected information on the type of health care institution (e.g., hospital, long-term care and rehabilitation), professional qualifications held by the staff member (i.e., registered nurse, nursing

aid, nursing student and specialized social carers) and years of nursing experience (i.e., <5, 5–10, 11–20 or >20 years) even though these professionals are, by law, not included in the group of nursing professions. However, as nurses and nursing aids are allowed to delegate certain tasks to specialized social carers, we also included them in the analysis.

The questionnaire used was developed on the basis of Donabedian's quality of health care model (Donabedian, 1966), which includes three levels: the structural, process and outcome levels. The questions asked on the structural and process levels were developed on the basis of official recommendations from the WHO (WHO, 2020a, 2020d), the Austrian Government (Federal Ministry for Social Affairs, Health Care and Consumer Protection, 2020a, 2020b), or similar guidelines extracted from international publications (Mo et al., 2020; Ong et al., 2020).

Questions on the structural level related for example to the availability of PPE, such as SFM, FFP masks and eyewear. On the process level, we asked the participants whether they were using PPE, such as the use of SFM, FFP masks and eyewear (Yes/No). In order to avoid ambiguity, we inserted pictures of the various mask types in the online survey. In addition, the following note regarding FFP masks were incorporated in the online survey: 'FFP masks are tested and licensed in Europe according to the EN 149 standard. A print on the mask indicates compliance with the EN 149 norm, the respective protective level (FFP1, FFP2 or FFP3) and the CE-sign followed by a 4-digit number.'

Moreover, we asked how long the participants wore the SFM as well as the FFP mask, before using a new one. They could choose from among the following options: less than 4 h, 4–8 h, more than 8 h or I do not use them.

On the outcome level, we used the validated perceived stress scale (PSS) to measure stress levels among the nursing staff (Cohen et al., 1983).

The PSS is available in the German language (Schneider et al., 2017) and shows good psychometric properties. Previous studies of the German PSS reported a good internal consistency with a Cronbach's alpha of 0.84 and good fit indices for construct validity (Klein et al., 2016). The Cronbach's alpha for our sample is similar with 0.866. Moreover, another study reported that the German PSS showed significant results for almost all associations with regard to concurrent validity (Reis et al., 2019). In addition, because it only includes 10 items, its use is highly practical (Klein et al., 2016). Each item was rated on a 5-point Likert scale (0 = *never*; 1 = *almost never*; 2 = *sometimes*; 3 = *fairly often*; 4 = *very often*) (Klein et al., 2016). We used the sum score of all items to differentiate between 0–13 points indicating low stress, 14–26 moderate stress and 27–40 for high-perceived stress, respectively, in accordance with various former studies (Alharbi & Alshehry, 2019; Drachev et al., 2020; Wiriyakijja et al., 2020).

The PSS has been used internationally in several studies with different samples, including pharmacy students, informal caregivers, nursing students and nursing staff (Falzarano & Siedlecki, 2021; Hirsch et al., 2020; Senocak & Demirkiran, 2020; Teresi et al., 2020).

2.4 | Data analysis

We used SPSS version 26 for data analysis (IBM Corp. Released, 2019). We expressed categorical variables as frequencies and metric variables as means. To investigate associations between the use/wearing time of SFM/FFP masks and the staff member's stress level, we performed a chi-square test. For the association between the wearing time of SFM/FFP masks and stress, we used Cramer's *V* as a measure of the effect size.

In order to give detailed insights into the results, we also performed Kruskal–Wallis tests, which can be used to make pairwise comparisons between categorical variables (wearing time less than 4 h vs. wearing time 4–8 h), with the PSS sum score as a metric variable. We considered a p value of <.05 as statistically significant.

2.5 | Ethics

The study was approved by a responsible ethical committee (32–386 ex 19/20). On the first page of the documentation provided, all participants were informed of the aim of the study, the responsible organisation and the contact persons as well as data security. All data collected were anonymized, and IP addresses were not stored. In addition, the data created were stored on the server of the Medical University of Graz. All participants were asked to provide their written informed consent in the first question of the online survey, by means of ticking the respective box, to comply with the General Data Protection Regulation issued by the European Union.

3 | RESULTS

Five participants out of the entire sample of 2602 individuals were 65 years or older, which is above the Austrian retirement age; therefore, data from these participants were excluded from this analysis. The majority of the participating nurses worked in hospitals (73.3%, $n = 1903$), followed by long-term care institutions (17.2%, $n = 447$). Almost 80% ($n = 2058$) of the participants were nurses. Table 1 displays the sample characteristics.

Table 2 describes the main variables of interest. Nearly all participating nurses used SFM (97.9%, $n = 2542$) and protective gloves (95.6%, $n = 2482$) during their daily work. In addition, about three-quarters (74.2, $n = 1927$) of the staff used FFP masks, and 55% ($n = 1450$) used protective eyewear such as glasses. Nearly half of the nursing staff wore the SFM (48.3%, $n = 1254$) and, respectively, the FFP masks (45.1%, $n = 1172$) for more than 8 h continuously. More than half of the nursing staff had moderate stress levels (56.8%, $n = 1476$), and 10.5% ($n = 272$) reported experiencing high stress levels.

We found no statistically significant association between the use of masks, eyewear, gloves or gowns and stress (Table 3). However, one-third of the nursing staff who used SFM/FFP masks experienced a low stress level (SFM 33.0%, $n = 839$; FFP mask 32.1%,

TABLE 1 Sample characteristics

	Nursing staff (N = 2597)
Female % (*n*)	83.8 (2175)
Mean age in years (SD)	38 (11)
Area of work % (*n*)	
Hospital	73.3 (1903)
Nursing home	17.2 (447)
Other	9.5 (247)
Professional qualification % (*n*)	
Nurse	79.2 (2058)
Nursing aid	11.9 (308)
Nursing student	6.5 (170)
Specialized social carers	2.3 (61)
Experience % (*n*)	
<5 years	27.1 (704)
5–10 years	19.5 (506)
11–20 years	20.9 (543)
>20 years	32.5 (844)

TABLE 2 Use of different PPE, SFM/FFP-masks-wearing time and perceived stress levels

	Nursing staff (N = 2597)
Use of PPE % (*n*)	
SFM	97.9 (2542)
FFP mask	74.2 (1927)
Protective eyewear	55.8 (1450)
Protective gloves	95.6 (2482)
Protective gowns	27.1 (1892)
Average wearing time of SFM % (*n*)	
Less than 4 h	11.3 (293)
4–8 h	38.2 (993)
More than 8 h	48.3 (1254)
I do not use them	2.3 (57)
Average wearing time of FFP mask % (*n*)	
Less than 4 h	8.0 (208)
4–8 h	24.8 (645)
More than 8 h	45.1 (1172)
I do not use them	22.0 (572)
PSS categories % (*n*)	
Low	32.7 (849)
Moderate	56.8 (1476)
High	10.5 (272)
Mean PSS sum score (SD)	16.9 (7.3)

Abbreviations: FFP mask, filtering facepiece mask; PPE, personal protective equipment; PSS, perceived stress scale; SD, standard deviation; SFM, surgical face mask.

$n = 618$). In contrast, less than 20% of nursing staff who did not wear SFM experienced a low stress level (18.2%, $n = 10$). Among the nurses who used gloves, 56% ($n = 1404$) reported experiencing a moderate stress level. This finding differed from that for nurses who did not wear gloves, of which 62% ($n = 72$) of whom experienced a moderate stress level.

Due to the fact, that even the wearing of the SFM or FFP does not influence the stress level, we also had a look at the association between the duration of wearing SFMor FFP masks and stress (Figure 1). The highest stress level was reported by nurses who wore masks for longer than 8 h (SFM 14.3%, $n = 618$; FFP mask 13.1%, $n = 618$).

According to the Kruskal–Wallis tests, comparing different wearing times with each other, we found the following results. Nurses who wore SFM masks for more than 8 h had statistically significant higher stress levels than those who used the SFM masks for less than 4 h (p value = .000) or from 4 to 8 h (p value = .000). Nurses who wore FFP masks for more than 8 h had statistically significantly higher stress levels than those who used these types of masks for less than 4 h (p value = .000) or from 4 to 8 h (p value = .000).

4 | DISCUSSION

This study was carried out to investigate the association between the use of PPE including SFM/FFP masks, as well as wearing time of masks, and stress among nursing staff during the COVID-19 pandemic.

Nearly all staff who participated in our online survey used SFM, and nearly 75% used FFP masks. The fact that not all participants wore masks is in contrast with the findings of a recent study, in which health care workers from a national university hospital in Singapore were investigated, placing a focus on PPE use and headaches (Ong et al., 2020). In this study, all participants wore FFP masks.

One possible reason for the differences in the use of masks is that most of the health care workers in the former study worked on high-risk hospital wards, such as the isolation wards, emergency rooms—including a fever facility—and the medical intensive care unit (Ong et al., 2020). In contrast, our study included all types of health care institutions and wards. This might explain the higher rate of wearing masks and eyewear in the Singapore study.

In addition, we show that more than two-thirds of the participants had moderate or even high-perceived stress levels. There might be three possible explanations for not identifying a statistically significant association between the use of SFM/FFP masks and stress.

First, wearing masks and gloves is common in nursing practice, and wearing SFM and FFP masks has been/is mandatory during the COVID-19 pandemic. Nurses generally have to be fully aware of the importance of PPE usage because it constitutes the only way to protect both themselves and the patients and residents they are caring for from infectious diseases. We are drawing on literature pertaining to norovirus to illustrate our points, as nurses are familiar with it and building knowledge around Covid-19 is still ongoing. Being familiar with infectious viruses may be the reason

TABLE 3 Association of the use of different PPE and stress level

	Nursing staff perceived stress level % (n)				
	Low	Moderate	High	p value of effect size	Effect size Cramer
Use of SFM					
Yes ($n = 2542$)	33.0 (839)	56.6 (1438)	10.4 (265)	.069	0.045
No ($n = 55$)	18.2 (10)	69.1 (38)	12.7 (7)		
Use of FFP mask					
Yes ($n = 1927$)	32.1 (618)	57.5 (1108)	10.4 (201)	.462	0.024
No ($n = 670$)	34.5 (231)	54.9 (368)	10.6 (71)		
Use of protective eyewear					
Yes ($n = 1436$)	32.6 (472)	57.2 (830)	10.2 (148)	.831	0.011
No ($n = 1141$)	32.9 (377)	56.3 (646)	10.8 (124)		
Use of protective gloves					
Yes ($n = 2482$)	32.8 (814)	56.6 (1404)	10.7 (264)	.306	0.030
No ($n = 115$)	30.4 (35)	62.6 (72)	7.0 (8)		
Use of protective gowns					
Yes ($n = 1892$)	32.8 (620)	57.1 (1080)	10.1 (192)	.663	0.017
No ($n = 705$)	32.5 (229)	56.2 (396)	11.3 (80)		

Abbreviations: FFP mask, filtering facepiece mask; PPE, personal protective equipment; SFM, surgical face mask.

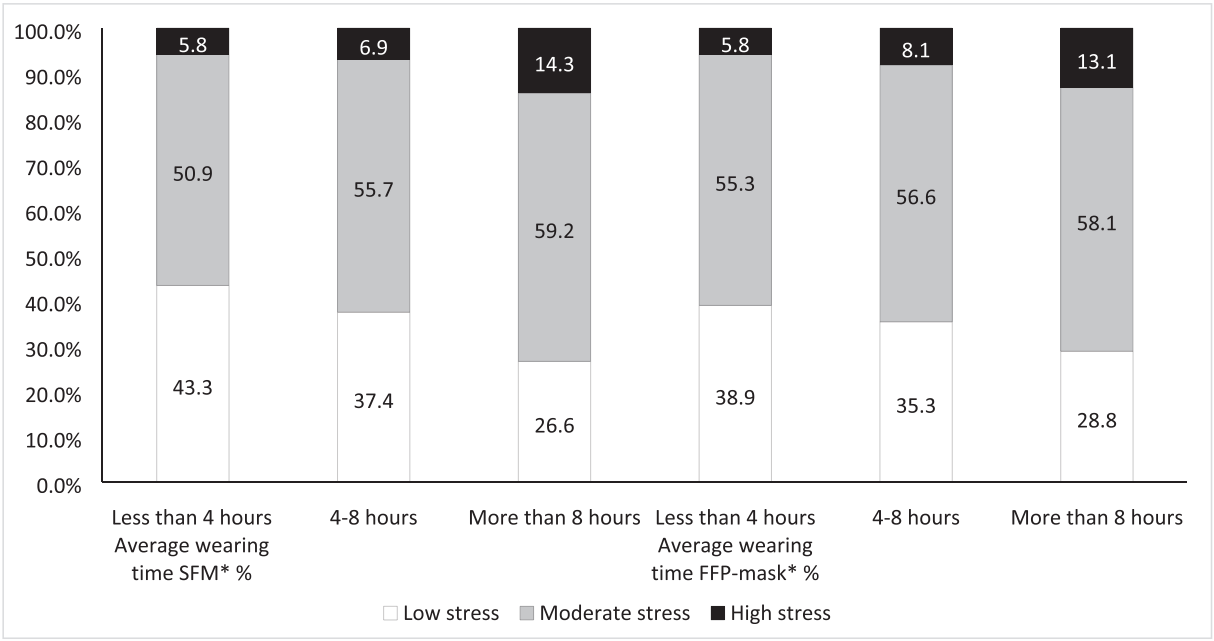


FIGURE 1 Association of duration of SFM/FFP-mask usage and stress (*p value < .05). FFP mask, filtering facepiece mask; SFM, surgical face mask

why the usage of PPE itself was not associated with the perceived stress of nursing staff. Additionally, the pandemic itself might have caused stress for the nursing staff, which the usage of PPE might have not increased.

Second, viral illnesses are a highly prevalent in the hospital as well in the nursing home setting, in which more than 90% of our participating nursing staff were working. As an example, in a UK nursing home study, 257 outbreaks with a single viral cause pathogen were identified, of which 181 (70.4%) were caused by norovirus (Inns et al., 2019). So we assume that most of the participating staff is familiar with being exposed to a virus and therefore, not perceived the wearing of PPE as a stressful event.

Third, the interventions, recommended for limiting the spread of norovirus the prevention, include the use of gloves and masks, for example, when cleaning up vomit (Barclay et al., 2014), but also gowns and goggles, if a risk of splashing exists (Barclay et al., 2014). Being used to wearing PPE and being familiar with exposition to a virus was also frequently mentioned from nursing home staff, in an interview study, which is currently being analysed (Hoedl & Schoberer, 2020).

However, we could show that a statistically significantly association existed between the duration of the use of masks and stress.

Most of our study participants wore SFM and the FFP masks for more than 4 h (86.5% vs. 69.9%). This finding is in line with those for the health care staff working in high-risk wards, who stated that they used the N95 masks on average 5.9 h each day (Ong et al., 2020). Such N95 masks can be considered as comparable with the FFP masks from the European Union (3M Personal Safety Division, 2020).

Two studies have been carried out to investigate the wearing time of N95 masks among health care workers (Radonovich et al., 2009; Rebmann et al., 2013). In the first study, the sample included 27 health care workers, 22 of which were nursing staff, and the median wearing time for eight different N95 masks ranged between 4.1 and 7.7 h (Radonovich et al., 2009), findings that are in line with our results focusing on FFP masks. The second study was carried out to investigate the levels of compliance regarding mask usage and compare this with physiological effects and subjective symptoms (Rebmann et al., 2013). In this study, 10 nurses participated, who had an average of 11 years of experience with wearing an N95 mask (Rebmann et al., 2013). The authors reported that the daily average wearing time ranged between 2.5 and 3.7 h and that 90% of the nurses tolerated the use of the mask for two 12-h shifts (Rebmann et al., 2013). This different finding could be explained by the fact that our study was conducted during the COVID-19 pandemic, when the risks and consequences of wearing or not wearing the masks were onmipresent. The former study by Rebmannet al., in contrast, was performed in 2013 at a time when no worldwide pandemic was ongoing; therefore, the results are not completely comparable.

We could show that nurses who wore a SFM less than 4 h and up to 8 h per day reported lower stress levels more often than nurses who wore the FFP mask for a longer time period. Similar results were found by Rebmann et al., which show that the daily average wearing time of an N95 mask alone was higher than the combination of wearing an N95 with a mask overlay (Rebmann et al., 2013). This finding might be explained by the fact that the N95 mask described by Rebmann et al. is thinner than an FFP mask in our study. In addition, these authors showed that wearing an N95 masks with an extra overlay statistically significantly increases CO_2, nausea and visual challenges as compared with wearing a N95 mask alone (Rebmann et al., 2013).

Among the nursing staff, between 5.8% and 14.3% experienced high stress levels. Regardless of the type of masks, the perceived level of stress was statistically significant and positively correlated with the increased mask-wearing time. Other studies have shown that mask-wearing for more than 4 h per day is associated with headaches (Ong et al., 2020), increased levels of CO_2, perceived exertion, shortness of breath, reported headaches, dizziness and communication difficulties (Rebmann et al., 2013). All of these effects can lead to discomfort, pain and consequently, an increase in the stress levels of nursing staff.

In another study, 59% of the participating nurses refused to wear the masks for more than 8 h. Their stated reasons included an intolerance to heat, pressure, or pain, dizziness, difficulties concentrating and interference with communication (Radonovich et al., 2009). Nevertheless, we conducted this study to provide an insight into the use of SFM/FFP masks in Austrian health care institutions during the COVID-19 pandemic. We did not specifically assess the reasons for compliance or non-compliance with the rules for PPE use or the reasons for limiting this use, which highlights the need to carry out qualitative studies on this topic in the future.

4.1 | Strengths and limitations

The first strength of this study is that it is the first one, to our knowledge, that describes the influence of wearing PPE during the COVID-19 pandemic in Austria. Another strength is that our sample included more than 2500 nurses. One limitation of our study might be that we started the survey in mid-May, nearly 2 months after the COVID-19 pandemic had begun in Austria. Because we asked nurses retrospectively about their SFM/FFP mask usage during the COVID-19 pandemic, some perceptions could have been distorted. We also have to mention that working during the pandemic as a frontline nurse might be stressful, independently of wearing a PPE or not. This could have influenced our results, as the high stress level might be a result of the 'new pandemic' and not only of PPE. Another aspect that should be mentioned is that we did not ask explicitly whether the nurses had opportunities to take a break, when wearing a mask for a longer period of time. However, we specifically asked the nursing staff how long they wore their masks before using a new one, which implies at least a short break.

Another limitation that has to be mentioned is that our data were obtained via an online survey that had been distributed mainly by using social media and a snowball technique. Therefore, it might have been possible that somebody participated in the study even if they were not frontline nursing staff during the COVID-19 pandemic in Austria. We also have to mention that we did not stratify this analysis by the participant's professional qualification. This was decided for two reasons. As the aim was to obtain first insights into the association between the use of PPE, as well as the wearing time of masks, and stress levels among frontline nursing staff, analysing associated factors that predispose to the use of PPE among nursing staff was beyond the scope of the paper. However, we want to add that we are currently analysing data from the first and the second COVID-19 waves that might answer this specific question. Second, as the use of masks is and was mandatory in Austrian health care institutions during

the COVID-19 pandemic, all health care providers were legally obliged to wear masks. Therefore, the level of qualification did not seem to constitute a confounder.

We also have to mention that we did not include physical consequences, such as headache and dizziness, even though this might have strengthened the study. However, we were able to conduct two interview studies, one with nursing staff from hospitals and one with nursing home staff, focusing on physical, psychological and social consequences for nursing staff during this pandemic. The results of these studies are currently in process of being analysed to be published at a later stage.

5 | CONCLUSIONS

This study was carried out to investigate the association between PPE as well as wearing time of masks and stress levels among nursing staff during the COVID-19 pandemic in Austria. Nearly all participating nurses used SFM or FFP masks. This might be an indication of a high level of compliance among Austrian nurses regarding the national as well as international regulations and highlights the key role played by nurses in such pandemics. Our results also show that increased mask-wearing time led to increased levels of stress. These results suggest that (inter-)national regulations on how and when to use masks should also include a maximum duration of time for wearing each type of mask. Such regulations could help to prevent work-related stress, particularly in the case of future epidemics, and avoid nurses leaving their jobs. The consequences of both of these negative outcomes should be considered in light of the predicted future shortage of health care workers.

6 | IMPLICATIONS FOR NURSING MANAGEMENT

Even when it is mandatory to wear PPE in times of a pandemic, our findings highlight that nursing managers should introduce a maximum wearing time for masks in their organisations, specifically in times of PPE shortage, when (inter-)national recommendations cannot be followed anymore. Additionally, nursing managers could implement practical strategies such as a mask break task force. This task force could promote awareness for mask breaks and recommend and allocate rooms or locations such as balconies for mask breaks. This can help them, especially in times of an (inter-)national nursing shortage, to increase work satisfaction and consequently to keep nurses in their organisation.

CONFLICT OF INTEREST

None declared.

FUNDING INFORMATION

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

AUTHOR CONTRIBUTIONS

All above listed as authors (M. Hoedl, D. Eglseer & S. Bauer) are qualified for authorship by meeting all four of the following criteria:

- Have made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data;
- Been involved in drafting the manuscript or revising it critically for important intellectual content;
- Given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content; and
- Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

DATA AVAILABILITY STATEMENT

Due to legal regulations, data cannot be made available.

ORCID

Manuela Hoedl https://orcid.org/0000-0001-9829-2766

REFERENCES

3M Personal Safety Division. (2020). Comparison of FFP2, KN95, and N95 filtering facepiece respirator classes. Retrieved from https://multimedia.3m.com/mws/media/1791500O/comparison-ffp2-kn95-n95-filtering-facepiece-respirator-classes-tb.pdf:

Alharbi, H., & Alshehry, A. (2019). Perceived stress and coping strategies among ICU nurses in government tertiary hospitals in Saudi Arabia: A cross-sectional study. *Annals of Saudi Medicine*, 39(1), 48–55. https://doi.org/10.5144/0256-4947.2019.48

Alkhudhairy, M. W., Al Ramel, F., Al Jader, G., Al Saegh, L., Al Hadad, A., Alalwan, T., Al Shaikh, D., & Al Bandar, M. (2018). A self-reported association between temporomandibular joint disorders, headaches, and stress. *Journal of International Society of Preventive & Community Dentistry*, 8(4), 371–380. https://doi.org/10.4103/jispcd.JISPCD_177_18

Barclay, L., Park, G. W., Vega, E., Hall, A., Parashar, U., Vinjé, J., & Lopman, B. (2014). Infection control for norovirus. *Clinical Microbiology and Infection*, 20(8), 731–740. https://doi.org/10.1111/1469-0691.12674

Catton, H. (2020). Global challenges in health and health care for nurses and midwives everywhere. *International Nursing Archive*, 67(1), 4–6. https://doi.org/10.1111/inr.12578

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24(4), 385–396. https://doi.org/10.2307/2136404

Cook, T. M. (2020). Personal protective equipment during the coronavirus disease (COVID) 2019 pandemic—A narrative review. *Anaesthesia*, 75(7), 920–927. https://doi.org/10.1111/anae.15071

Deutsche gesetzliche Unvallversicherung. Benutzung von Atemschutzgeräten (DGUV Regel 112–190), (2011).

Donabedian, A. (1966). Evaluating the quality of medical care. *The Milbank Memorial Fund Quarterly*, 44(3), 166–206.

Drachev, S. N., Stangvaltaite-Mouhat, L., Bolstad, N. L., Johnsen, J.-A. K., Yushmanova, T. N., & Trovik, T. A. (2020). Perceived stress and associated factors in Russian medical and dental students: A cross-sectional study in north-West Russia. *BMC Oral Health*, 17(15), 5390. https://doi.org/10.3390/ijerph17155390

Falzarano, F., & Siedlecki, K. L. (2021). Differences in cognitive performance between informal caregivers and non-caregivers.

Neuropsychology, Development, and Cognition. Section B, Aging, Neuropsychology and Cognition, 28(2), 284–307. https://doi.org/10.1080/13825585.2020.1749228

Federal Ministry for Social Affairs, Health Care and Consumer Protection. (2020a). *Übersicht Einsatzbereiche verschiedener Maskenarten und Mund- Nasen-Schutzes im Gesundheits- /Sozialbereich*. Vienna: Republic Austria Retrieved from. https://www.sozialministerium.at/Informationen-zum-Coronavirus/Coronavirus—Fachinformationen.html

Federal Ministry for Social Affairs, Health Care and Consumer Protection. (2020b). Empfehlung zu COVID-19 Schutzmaßnahmen für Pflege und Betreuung [in German]. Retrieved from https://www.sozialministerium.at/Informationen-zum-Coronavirus/Coronavirus—Fachinformationen

Grant, M. C., Geoghegan, L., Arbyn, M., Mohammed, Z., McGuinness, L., Clarke, E. L., & Wade, R. G. (2020). The prevalence of symptoms in 24,410 adults infected by the novel coronavirus (SARS-CoV-2; COVID-19): A systematic review and meta-analysis of 148 studies from 9 countries. *PLoS ONE*, 15(6), e0234765. https://doi.org/10.1371/journal.pone.0234765

Hirsch, J. D., Nemlekar, P., Phuong, P., Hollenbach, K. A., Lee, K. C., Adler, D. S., & Morello, C. M. (2020). Patterns of stress, coping and health-related quality of life in doctor of pharmacy students. *American Journal of Pharmaceutical Education*, 84(3), 7547. https://doi.org/10.5688/ajpe7547

Hoedl, M., & Schoberer, D. (2020). ARbeitsanfOrderungen von PflegeperSonen im PflEgeheim während der COVID-19 PaNdemie (ROSEN-Projekt).

IBM Corp. Released. (2019). *IBM SPSS statistics for windows version 26.0*. NY: IBM Corp.

Inns, T., Wilson, D., Manley, P., Harris, J. P., O'Brien, S. J., & Vivancos, R. (2019). What proportion of care home outbreaks are caused by norovirus? An analysis of viral causes of gastroenteritis outbreaks in care homes, north East England, 2016–2018. *BMC Infectious Diseases*, 20(1), 2. https://doi.org/10.1186/s12879-019-4726-4

Klein, E. M., Brähler, E., Dreier, M., Reinecke, L., Müller, K. W., Schmutzer, G., Wölfling, K., & Beutel, M. E. (2016). The German version of the perceived stress scale—Psychometric characteristics in a representative German community sample. *BMC Psychiatry*, 16, 159. https://doi.org/10.1186/s12888-016-0875-9

Krøll, L. S., Hammarlund, C. S., Westergaard, M. L., Nielsen, T., Sloth, L. B., Jensen, R. H., & Gard, G. (2017). Level of physical activity, well-being, stress and self-rated health in persons with migraine and co-existing tension-type headache and neck pain. *The Journal of Headache and Pain*, 18(1), 46. https://doi.org/10.1186/s10194-017-0753-y

Lockhart, S. L., Duggan, L. V., Wax, R. S., Saad, S., & Grocott, H. P. (2020). Personal protective equipment (PPE) for both anesthesiologists and other airway managers: Principles and practice during the COVID-19 pandemic. *Canadian Journal of Anesthesia*, 67(8), 1005–1015. https://doi.org/10.1007/s12630-020-01673-w

McGilton, K., Escrig-Pinol, A., Gordon, A., Chu, C., Zúñiga, F., Sanchez, M., Boscart, V., Meyer, J., Corazzini, K. N., Jacinto, A. F., Spilsbury, K., Backman, A., Scales, K., Fagertun, A., Wu, B., Edvardsson, D., Lepore, M. J., Leung, A. Y. M., Siegel, E. O., … Bowers, B. (2020). Uncovering the devaluation of nursing home staff during COVID-19: Are we fuelling the next health care crisis? *Journal of the American Medical Directors Association*, 21(7), 962–956. https://doi.org/10.1016/j.jamda.2020.06.010

Mo, Y., Deng, L., Zhang, L., Lang, Q., Liao, C., Wang, N., Qin, M., & Huang, H. (2020). Work stress among Chinese nurses to support Wuhan for fighting against the COVID-19 epidemic. *Journal of Nursing Management*, 28, 1002–1009. https://doi.org/10.1111/jonm.13014

National Institute for Occupational Safety and Health. (2020). Recommended guidance for extended use and limited reuse of N95 filtering facepiece respirators in healthcare settings. Retrieved from: https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/decontamination-reuse-respirators.html

Ong, J., Bharatendu, C., Goh, Y., Tang, J. Y., Sooi, K., Tan, Y., Tan, B. Y. Q., Teoh, H.-L., Ong, S. T., Allen, D. M., & Sharma, V. (2020). Headaches associated with personal protective equipment—A cross-sectional study among frontline healthcare workers during COVID-19. *Headache*, 60, 864–877. https://doi.org/10.1111/head.13811

Radonovich, L. J. Jr., Cheng, J., Shenal, B. V., Hodgson, M., & Bender, B. S. (2009). Respirator tolerance in health care workers. *Journal of the American Medical Association*, 301(1), 36–38. https://doi.org/10.1001/jama.2008.894

Rebmann, T., Carrico, R., & Wang, J. (2013). Physiologic and other effects and compliance with long-term respirator use among medical intensive care unit nurses. *American Journal of Infection Control*, 41(12), 1218–1223. https://doi.org/10.1016/j.ajic.2013.02.017

Reis, D., Lehr, D., Heber, E., & Ebert, D. D. (2019). The German version of the perceived stress scale (PSS-10): Evaluation of dimensionality, validity, and measurement invariance with exploratory and confirmatory bifactor modeling. *Assessment*, 26(7), 1246–1259. https://doi.org/10.1177/1073191117715731

Schneider, E. E., Schönfelder, S., Wolf, M., & Wessa, M. (2017). All stressed out? Introducing a German version of the perceived stress scale: Validation, psychometric properties and sample differences in healthy and clinical populations. *Psychoneuroendocrinology*, 83, 21. https://doi.org/10.1016/j.psyneuen.2017.07.296

Senocak, S. U., & Demirkiran, F. (2020). Subjective well-being and influencing factors in Turkish nursing students: A cross-sectional study. *Journal of the Pakistan Medical Association*, 70(4), 630–635. https://doi.org/10.5455/jpma.11398

Teresi, J. A., Ocepek-Welikson, K., Ramirez, M., Kleinman, M., Ornstein, K., Siu, A., & Luchsinger, J. (2020). Evaluation of the measurement properties of the perceived stress scale (PSS) in Hispanic caregivers to patients with Alzheimer's disease and related disorders. *International Psychogeriatrics*, 1–12. https://doi.org/10.1017/s1041610220000502

Tian, Z., Kim, B.-Y., & Bae, M.-J. (2020). A study on the effect of wearing masks on stress response. *International Journal of Engineering Research and Technology*, 13, 807–813. https://doi.org/10.37624/IJERT/13.4.2020.807-813

WHO. (2016). The global strategic directions for strengthening nursing and midwifery: 2016–2020. Retrieved from Geneva: https://www.who.int/hrh/nursing_midwifery/global-strategic-midwifery2016-2020.pdf?ua=1

WHO. (2020a). Advice on the use of masks in the context of COVID-19: Interim guidance, 6 April 2020. Retrieved from https://apps.who.int/iris/handle/10665/331693

WHO. (2020b). Coronavirus disease (COVID-19): How is it transmitted?

WHO. (2020c). COVID-19 dashboard. Retrieved from https://covid19.who.int/?gclid=EAIaIQobChMIo53W7Zaa6wIVg9eyCh2t4wnHEAAYASAAEgliN_D_BwE:

WHO. (2020d). Infection prevention and control during health care when COVID-19 is suspected: Interim guidance, 19 March 2020. Retrieved from https://www.who.int/publications/i/item/10665-331495https://www.who.int/publications/i/item/10665-331495

WHO. (2020e). Rational use of personal protective equipment for coronavirus disease (COVID-19) and considerations during severe shortages: Interim guidance, 6 April 2020. Retrieved from https://www.who.int/publications/i/item/rational-use-of-personal-protective-equipment-for-coronavirus-disease-(covid-19)-and-considerations-during-severe-shortageshttps://www.who.int/publications/i/item/rational-use-of-personal-protective-equipment-for-coronavirus-disease-(covid-19)-and-considerations-during-severe-shortages

WHO & International Labour Organisation. (2021). COVID-19: Occupational health and safety for health workers Interim guidance. Retrieved from https://www.who.int/publications/i/item/WHO-2019-nCoV-HCW_advice-2021.1:

Wiriyakijja, P., Porter, S., Fedele, S., Hodgson, T., McMillan, R., Shephard, M., & Ni Riordain, R. (2020). Validation of the HADS and PSS-10 and a cross-sectional study of psychological status in patients with recurrent aphthous stomatitis. *Journal of Oral Pathology & Medicine*, 49(3), 260–270. https://doi.org/10.1111/jop.12991

How to cite this article: Hoedl M, Eglseer D, Bauer S. Associations between personal protective equipment and nursing staff stress during the COVID-19 pandemic. *J Nurs Manag*. 2021;29:2374-2382. https://doi.org/10.1111/jonm.13400

Received: 17 June 2021 | Revised: 12 July 2021 | Accepted: 2 August 2021

DOI: 10.1111/jonm.13440

ORIGINAL ARTICLE

WILEY

Compliance and barriers to the use of infection prevention and control measures among health care workers during COVID-19 pandemic in Qatar: A national survey

Muna Abed Alah MD, Resident Doctor[1] | Sami Abdeen MD, Resident Doctor[1] | Nagah Selim DrPhD, Associate Program Director[2] | Dhouha Hamdani MSc, Infection control specialist[3] | Eman Radwan MD, Risk Management Analyst[3] | Nahla Sharaf MD, Infection control specialist[3] | Huda Al-Katheeri MSc, Director of Strategic Planning and Performance department[4] | Iheb Bougmiza MD, MPH, Program Director, Consultant, Associate Professor[5,6]

[1]Community Medicine Department, Hamad Medical Corporation (HMC), Doha, Qatar

[2]Department of Family and Community Medicine, Primary Health Care Corporation, Doha, Qatar

[3]Health Care Quality Management and Patient Safety Department, Ministry of Public Health (MOPH), Doha, Qatar

[4]Department of Strategic Planning and Performance, Ministry of Public Health (MOPH), Doha, Qatar

[5]Community Medicine Department, Primary Health Care Corporation (PHCC), Doha, Qatar

[6]Community Medicine Department, College of Medicine, Sousse University, Tunisia

Correspondence
Muna Abed Alah, Community Medicine Department, Hamad Medical Corporation (HMC), Doha, Qatar.
Email: mabedalah@hamad.qa

Funding information
Qatar National Library (QNL)

Abstract

Aim: To assess health care workers' compliance with infection prevention and control measures in different health care sectors in Qatar during COVID-19 pandemic.

Background: Being the first line of defence against COVID-19 infection, health care workers are particularly at increased risk of getting infected. Compliance with infection prevention and control measures is essential for their safety and the safety of patients.

Methods: A web-based national survey was conducted between November 2020 and January 2021 targeting all health care workers in governmental, semi-governmental and private health care sectors.

Results: Of 1,757 health care workers, 49.9% were between 30 and 39 years of age; the majority (47.5%) were nurses. Participants reported a significant increase in the median self-rated compliance scores during the pandemic compared with before it ($p < .001$). During the pandemic, 49.7% of health care workers were fully compliant with personal protective equipment (PPE) use; 83.1% were fully compliant with hand hygiene. Overall, 44.1% were fully compliant with infection prevention and control measures (PPE and hand hygiene). Nationality, health sector, profession and frequency of interactions with suspected or confirmed COVID-19 cases were significantly associated with compliance with overall infection prevention and control measures. The most reported barriers were work overload and shortages of PPE and handwashing agents.

Conclusions: Compliance of health care workers with infection prevention and control measures needs further improvement.

Implications for Nursing Management: Frequent quality checks, provision of adequate supplies and behaviour change interventions are recommended strategies for hospital and nursing administrators to improve health care workers' compliance.

KEYWORDS
compliance, COVID-19, hand hygiene, infection prevention and control, personal protective equipment

1 | BACKGROUND

With the evolving spread of the coronavirus disease (COVID-19), health care systems, resources and capacities worldwide become overwhelmed dealing with the rising numbers of infected persons. Health care workers—the first line of defence in the fight against COVID-19—are particularly at risk of getting infected while taking care of infected patients (Gholami et al., 2021). A recent systematic review and meta-analysis showed that the percentage of health care workers who tested positive for COVID-19 among 28 studies was 51.7%, with a 15% rate of hospitalization and a 1.5% death rate (Gholami et al., 2021). In Qatar, the rates of COVID-19 infection and hospitalization among health care workers are 10.6% and 11.6%, respectively (Alajmi et al., 2020). Standard precautions such as proper use of personal protective equipment (PPE), proper hand hygiene and respiratory hygiene practices are essential preventive measures against the spread of the infection in health care facilities. The large number of COVID-19 infected cases among health care workers was attributed to inadequate personal protection of health care workers at the beginning of the pandemic, shortage of PPE, and inadequate training of health care workers on the appropriate infection prevention and control measures (Shanghai International Forum for Infection Control and Prevention, 2020).

Low compliance with infection prevention and control measures may have negative consequences for workers, patients and institutions such as the occurrence of occupational accidents, health care-associated infections and institutional damage (Askarian et al., 2004; I. Jeong et al., 2008; Oliveira et al., 2009; World Health Organization [WHO], 2011). Health care-associated infections can result in prolonged hospital stays, long-term disability, massive additional costs for health systems and organizations, and unnecessary deaths (WHO, 2011). Compliance with PPE among health care workers during COVID-19 pandemic varied among different studies, ranging from 54% to over 95% (Ashinyo et al., 2021; Darwish et al., 2021; Michel-Kabamba et al., 2020; Neuwirth et al., 2020).

According to current evidence, the SARS-CoV 2 virus is transmitted between people through respiratory droplets and contact routes. Transmission can occur by direct contact with infected people and indirect contact with surfaces in the immediate environment (Chan et al., 2020; Huang et al., 2020; Li et al., 2020; Liu et al., 2020). The World Health Organization (WHO) recommended droplet and contact precautions (including the use of a medical mask, eye protection (goggles) or facial protection (face shield), a clean, non-sterile, long-sleeved gown and gloves) for health care workers caring for suspected or confirmed COVID-19 patients, and airborne precautions using N95 respirator or equivalent in addition to contact precautions for settings in which aerosol generating procedures (AGPs) are performed. It also emphasized the importance of practicing hand hygiene (WHO, 2020a). Qatar formulated national infection prevention and control guidelines for COVID-19 in accordance with the WHO and Centers for Disease Control's (CDC) recommendations.

To the best of our knowledge, studies assessing compliance with the proper use of infection prevention and control measures among health care workers during this pandemic are limited, particularly in the Middle East. This is the first national study in Qatar to address this issue. It is expected that compliance with the use of PPE and hand hygiene practices changes after an epidemic, as this was evident from previous infectious outbreaks when significant improvements in compliance were noted (G. Jeong et al., 2016; Wong & Tam, 2005). So, addressing the changes in compliance during the current pandemic is worth investigating. We aimed to assess health care workers' compliance with the proper use of PPE and hand hygiene practices in different health care sectors in Qatar (governmental, semi-governmental and private sectors) during COVID-19 pandemic and explore the barriers to the proper use of such measures.

2 | METHODS

2.1 | Study design, setting and the target population

A national web-based cross-sectional study was conducted between November 2020 and January 2021. The target population included health care workers at governmental, semi-governmental and private health care sectors. In Qatar, health care services are provided by these three sectors. The governmental sector provides primary health care services at the level of Primary Health Care Corporation (PHCC) through 27 health centres distributed all over the country, and secondary and tertiary care through Hamad Medical Corporation with a number of designated hospitals. The semi-governmental sector includes six health care facilities. The private sector includes over

40 private hospitals and clinics. We included health care workers in clinical positions (physicians, nurses, dentists, pharmacists and allied health professionals), while excluded those in administrative positions.

2.2 | Study procedure

A web-based self-administered survey was developed using Microsoft Forms software. Because of the low response rate generally encountered in web-based surveys and in order to improve the external validity of our study, we invited all eligible health care workers in PHCC (representing a major part of the governmental sector), semi-governmental and private facilities to take the survey. They were contacted via e-mail with an information letter and a link to the electronic version of the questionnaire. The letter stated the purpose of the study, and that the participation is voluntary. Taking the survey implied informed consent, and participants were free to terminate the survey at any time they desired. The survey was anonymous, and confidentiality of information was assured. Weekly reminders were sent to maximize the response rate.

2.3 | Study questionnaire

We developed a questionnaire that was adopted from different surveys (Chia et al., 2005; Majeed, 2018; Schwartz et al., 2014; Shimokura et al., 2006; WHO, 2020c) in English. Face and content validities were assured by experts in the field. It consisted of three sections. The first one addressed the socio-demographic data for the participants (age, gender, nationality, profession, clinical experience and health care facility), in addition to general COVID-19-related information such as having a friend or a relative infected with COVID-19, the status of training on proper use of PPE and hand hygiene practices, and the frequency of dealing with suspected or confirmed COVID-19 cases. The second and third sections assessed health care workers' compliance with the proper use of infection prevention and control measures (PPE and hand hygiene) using a checklist adopted from WHO risk assessment tool for health care workers in the context of COVID-19 (WHO, 2020c), and the barriers to the proper use, respectively.

2.4 | Study variables

To assess the compliance of health care workers with infection prevention and control measures, they were asked about the frequency of using each PPE item when dealing with suspected or confirmed cases or while performing an AGP for a suspected or confirmed case using a five-point-Likert scale (always as recommended, often, sometimes, seldom, never). And were asked about the frequency of performing hand hygiene (using similar Likert scale) at five moments that are as follows: before touching a patient, before any clean or aseptic procedure is performed, after exposure to body fluid, after touching a patient and after touching patient's surroundings. Health care workers who answered all the questions as 'always as recommended' were considered as fully compliant. We also asked the participants to rate their overall perceived compliance with proper use of PPE and hand hygiene before and during the pandemic on a ten-point scale (from 0 to 9, on which 0 indicates no compliance, and 9 indicates full compliance). Barriers to the appropriate use of infection prevention and control measures as recommended were assessed by asking health care workers to select one or more options from a list of barriers for PPE and hand hygiene separately. They were also able to specify other barriers that were not listed.

2.5 | STATISTICAL ANALYSIS

Data analysis was performed using IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp. Descriptive statistics were presented as frequencies and percentages for categorical variables. Continuous not normally distributed variables were presented as medians and interquartile ranges. Chi-square test was used to determine the differences between categorical variables. The Wilcoxon signed rank test was used to test the differences in the self-rated compliance with infection prevention and control measures before and during COVID-19 pandemic taking into consideration the self-rated compliance on the ten-point scale as an ordinal dependent variable. Rank biserial correlation was calculated to measure the effect size for these comparisons (small 0.10 to <0.30, medium 0.30 to <0.50, large ≥0.50). Three multivariable logistic regression models were executed to determine the predictors of full compliance with infection prevention and control measures, one for appropriate use of PPE, one for hand hygiene, and one for overall infection prevention and control measures (both PPE and hand hygiene). The associations between risk factors and outcomes were presented as adjusted odds ratios (ORs) and 95% confidence intervals (95% CIs). Goodness of fit was assessed using Hosmer–Lemeshow test. p values less than .05 were considered significant.

2.6 | Ethical approval

This study was performed in line with the principals of Declaration of Helsinki. Approval was obtained from the relevant health institutions under protocol ID PHCC/DCR/2020/07/073.

3 | RESULTS

3.1 | Socio-demographic characteristics and general information

As shown in Table 1, the survey was completed by 1,757 health care workers: of them, 757 (43.1%) from the governmental sector (PHCC), 480 (27.3%) from the semi-governmental sector, and 520 (29.6%)

from the private sector. Majority (49.9%) were between 30 and 39 years of age; 1,192 (67.8%) were females. Over 60 nationalities were reported, with the top three being Filipino (29.8%), Indian (27.4%) and Egyptian (6.4%). Only 32 (1.8%) Qatari health care workers participated in this study. Nurses accounted for the majority of health care workers (47.5%), followed by allied health professionals (22%) and physicians (20.1%). Of all participants, 1,573 (89.5%) reported five years or more of clinical experience. 91.3% and 95.6% of health care workers admitted receiving a training on proper PPE use and proper hand hygiene practices in the preceding year, respectively. Over one third (35.2%) of health care workers reported frequent interactions with suspected or confirmed COVID-19 cases (every work shift or most of their work shifts). And about three quarters (77.1%) were aware of a relative, friend or colleague diagnosed with COVID-19.

3.2 | Compliance with infection prevention and control measures

When participants were asked to rate their compliance with infection prevention and control measures on a ten-point scale, before and during the pandemic, there was a significant increase in the median self-rated compliance scores during the pandemic compared with before it (median score: 7 before and 9 during, for PPE), and (median score: 8 before and 9 during, for hand hygiene), with p values < .001 and large effect sizes ($r = .87$ and .89), respectively. We assessed compliance with infection prevention and control measures using a checklist adopted from WHO risk assessment tool for health care workers in the context of COVID-19 (WHO, 2020c). According to this checklist, 52.6% (95% CI: 49.9–55.4) were fully compliant with PPE use during patient interactions with suspected or confirmed COVID-19 cases, 73.2% (95% CI: 70.4–76.0) while performing an AGP for a suspected or confirmed COVID-19 case, and 49.7% (95% CI 46.5–52.8) during both patient interactions and while performing an AGP. Regarding compliance with hand hygiene, 83.1% (95% CI 81.3–84.8) of health care workers were fully compliant with hand hygiene during the five moments. Overall, 44.1% (95% CI: 41.0–47.2) were fully compliant with infection prevention and control measures (with both PPE and hand hygiene).

3.3 | Predictors of compliance with infection prevention and control measures

Three multivariable logistic regression models were executed to determine the predictors of compliance with infection prevention and control measures. One for compliance with PPE (during both interactions with suspected or confirmed COVID-19 cases and while performing an AGP), one for compliance with hand hygiene at the five moments, and a third one for compliance with overall infection prevention and control measures (with both PPE and hand hygiene). All models were of good fit and were statistically significant (p values < .001) compared to the null model. The selection of independent variables to be included in the models was based on clinical and statistical relevance. In the first model (Table 2), nationality, health sector, profession and frequency of interactions with suspected or confirmed COVID-19 cases were found to be significantly and independently associated with compliance with PPE. The following were less likely to be fully compliant: nationalities of Middle Eastern–North African origin compared to those of Asia-Pacific origin (OR 0.44, 95% CI 0.30–0.65, p < .001), pharmacists compared to physicians (OR 0.16, 95% CI 0.07–0.38, p < .001), and health care workers at the private sector compared to those at the governmental sector (PHCC). On the other hand, dentists were more likely to be fully compliant with PPE compared to physicians (OR 6.23, 95% CI 2.37–16.38, p < .001), so as health care workers who deal with suspected or confirmed COVID-19 cases frequently (every shift) compared to those who never deal with such cases (OR 1.99, 95% CI 1.18–3.36, $p = .010$). In the second model (Table 3), compliance with hand hygiene was significantly associated with gender, nationality, profession and previous training on hand hygiene. Males were less likely to be compliant than females (adjusted OR 0.71, 95% CI: 0.52–0.95, $p = .022$), as well as those with nationalities of all origins compared to those with nationalities of Asia-Pacific origin. On the other hand, allied health professionals were more likely to be compliant with hand hygiene compared to physicians (adjusted OR 2.06, 95% CI: 1.32–3.20, $p = .001$), and health care workers who received previous training on hand hygiene were more than two times more likely to be compliant compared to those who did not (adjusted OR 2.42, 95% CI: 1.44–4.07, $p = .001$). In the third model (Table 4), the overall compliance with infection prevention and control measures (both PPE and hand hygiene) was also significantly associated with nationality, profession, health sector and frequency of interactions with suspected or confirmed COVID-19 cases. Health care workers of Middle Eastern, North African and Sub-Saharan African origins were less likely to be compliant compared to those of Asia-Pacific origin. Dentists were about six times more likely to be compliant compared to physicians (adjusted OR 5.84, 95% CI: 2.44–14.00, p < .001). Compared to health care workers in the governmental sector, those working in the semi-governmental sector were more likely to be fully compliant with infection prevention and control measures (adjusted OR 1.63, 95% CI: 1.09–2.43, $p = .026$), whereas those in the private sector were less likely to be fully compliant (adjusted OR 0.63, 95% CI: 0.43–0.92, $p = .017$). Those dealing frequently (every shift) with suspected or confirmed COVID-19 cases were about two times more likely to be fully compliant than those who never deal with such cases (adjusted OR 2.02, 95% CI: 1.19–3.42, $p = .009$).

3.4 | Barriers to proper use of infection prevention and control measures

Regarding the barriers to the proper use of PPE, the most reported barriers were shortage of PPE (37.7%), discomfort caused by PPE such

TABLE 1 Socio-demographic profiles and background information of the participants by health care sector

Variable		Health sector				
		Governmental $n = 757$ No (%)	Private $n = 520$ No (%)	Semi-governmental $n = 480$ No (%)	Totals $N = 1757$ No (%)	χ^2 test p value
Age categories	<30	66 (8.7)	77 (14.8)	45 (9.4)	188 (10.7)	<.001
	30–39	380 (50.2)	307 (59.0)	189 (39.4)	876 (49.9)	
	40–49	212 (28.0)	98 (18.8)	147 (30.6)	457 (26.0)	
	≥50	99 (13.1)	38 (7.3)	99 (20.6)	236 (13.4)	
Gender	Female	475 (62.7)	376 (72.3)	341 (71.0)	1,192 (67.8)	<.001
	Male	282 (37.3)	144 (27.7)	139 (29.0)	565 (32.2)	
Nationality[a] (by regional classification)	Asia-Pacific	417 (55.1)	436 (83.8)	207 (43.1)	1,060 (60.3)	<.001
	Americas	6 (0.8)	6 (1.2)	51 (10.6)	63 (3.6)	
	Europe	36 (4.8)	37 (7.1)	132 (27.5)	205 (11.7)	
	Middle East–North Africa	240 (31.7)	38 (7.3)	62 (12.9)	340 (19.4)	
	Sub-Saharan Africa	58 (7.7)	3 (0.6)	28 (5.8)	89 (5.1)	
Profession	Allied health professional	213 (28.1)	64 (12.3)	109 (22.7)	386 (22.0)	<.001
	Dentist	30 (4.0)	19 (3.7)	1 (0.2)	50 (2.8)	
	Nurse	267 (35.3)	315 (60.6)	252 (52.5)	834 (47.5)	
	Pharmacist	97 (12.8)	20 (3.8)	17 (3.5)	134 (7.6)	
	Physician	150 (19.8)	102 (19.6)	101 (21.0)	353 (20.1)	
Clinical experience	Less than 1 year	20 (2.6)	9 (1.7)	1 (0.2)	30 (1.7)	<.001
	1–4 years	67 (8.9)	67 (12.9)	20 (4.2)	154 (8.8)	
	5 or more years	670 (88.5)	444 (85.4)	459 (95.6)	1,573 (89.5)	
Frequency of interaction with COVID-19 suspected or confirmed patients	Never	86 (11.4)	136 (26.2)	170 (35.4)	392 (22.3)	<.001
	Some of the shifts	226 (29.9)	276 (53.1)	245 (54.0)	747 (42.5)	
	Most of the shifts	99 (13.1)	60 (11.5)	30 (6.3)	189 (10.8)	
	Every shift	346 (45.7)	48 (9.2)	35 (7.3)	429 (24.4)	
Training on proper PPE use in the past year	No	89 (11.8)	51 (9.8)	13 (2.7)	153 (8.7)	<.001
	Yes	668 (88.2)	469 (90.2)	467 (97.3)	1,604 (91.3)	
Training on proper hand hygiene practices in the past year	No	47 (6.2)	24 (4.6)	6 (1.3)	77 (4.4)	<.001
	Yes	710 (93.8)	496 (95.4)	474 (98.8)	1,680 (95.6)	

Abbreviation: χ^2, chi square; PPE, personal protective equipment.
[a]More than 60 different nationalities were reported.

as N95 respirators or face shields (31.3%), and work overload and lack of time (23.9%). For hand hygiene, skin irritation caused by handwashing agents was the most reported barrier (22.7%), followed by work overload and lack of time (19.1%), and shortage of handwashing agents (14.7%). On the other hand, 32.8% and 50.6% of participants reported no barriers at all for PPE use or practicing hand hygiene, respectively (Figure 1). Higher proportions of health care workers reported shortages of PPE and handwashing agents as barriers in the governmental sector compared to the other sectors. Proportions of health care workers who reported shortage of PPE were 42.3%, 33.7% and 35% for governmental, private and semi-governmental sectors, respectively, whereas 18.4%, 12.3% and 11.5% reported shortage of handwashing agents.

4 | DISCUSSION

Being the first line of defence against COVID-19 infection, health care workers are particularly at increased risk of getting infected. Compliance with infection prevention and control measures is critically essential for their safety and the safety of their patients. In this study, we assessed health care workers' compliance in different health care sectors with proper use of PPE and hand hygiene practices as reported by them. The majority of health care workers in this study were nurses, with nurse: physician ratio of 2.4:1 reflecting almost the same ratio in the health care workers' population in Qatar, which is about 2.8:1. We found a significant improvement in health care workers' perceived compliance with infection prevention and control

TABLE 2 Determinants and predictors of full compliance with PPE using chi-square test and multiple logistic regression analysis

Variable		PPE compliance[a]			
		Fully compliant No (%)[b]	χ^2 test *p* value	Multivariable regression analysis	
				AOR (95% CI)	*p* value
Age categories	<30	39 (39.0)	.280	1 (reference)	
	30–39	256 (49.0)		1.13 (0.69–1.85)	.641
	40–49	136 (50.6)		1.18 (0.67–2.07)	.565
	≥50	70 (59.3)		1.66 (0.87–3.17)	.125
Gender	Female	336 (50.2)	.611	1 (reference)	
	Male	165 (48.5)		0.98 (0.71–1.34)	.879
Nationality (by regional classification)	Asia-Pacific	323 (52.7)	<.001	1 (reference)	
	Americas	22 (66.7)		1.30 (0.57–3.03	.546
	Europe	69 (56.1)		0.80 (0.49–1.32)	.389
	Middle East-North Africa	71 (36.2)		0.44 (0.30–0.65)	<.001
	Sub-Saharan Africa	16 (36.4)		0.54 (0.26–1.13)	.101
Profession	Allied health professional	81 (43.8)	<.001	0.72 (0.45–1.16)	.175
	Dentist	28 (82.4)		6.23 (2.37–16.38)	<.001
	Nurse	276 (53.5)		1.00 (0.65–1.54)	.99
	Pharmacist	7 (11.9)		0.16 (0.07–0.38)	<.001
	Physician	109 (50.7)		1 (reference)	
Health sector	Governmental	257 (51.1)	<.001	1 (reference)	
	Private	93 (37.1)		0.50 (0.34–0.72)	<.001
	Semi-governmental	151 (59.2)		1.41 (0.94–2.10)	.094
Clinical experience	Less than 1 year	11 (52.4)	.076	1 [reference]	
	1–4 years	30 (37.5)		0.84 (0.29–2.43)	.747
	5 or more years	460 (50.7)		1.01 (0.39–2.62)	.987
Relative or friend diagnosed with COVID-19	No	110 (51.6)	.513	1 (reference)	
	Yes	391 (49.1)		0.90 (0.65–1.26)	.541
Frequency of interaction with COVID-19 suspected or confirmed patients	Never	48 (41.7)	.007	1 (reference)	
	Some of the shifts	208 (47.8)		1.33 (0.84–2.11)	.227
	Most of the shifts	58 (44.3)		1.33 (0.75–2.36)	.323
	Every shift	187 (57.0)		1.99 (1.18–3.36)	.010
Training on proper PPE use in the past year	No	27 (36.5)	.019	1 (reference)	
	Yes	474 (50.7)		1.08 (0.61–1.90)	.797

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; PPE, personal protective equipment; χ^2, chi square.

[a]The outcome of the regression model is overall compliance with PPE ($N = 1{,}009$) including compliance during interaction with suspected or confirmed COVID-19 cases and while performing an aerosol generating procedure for suspected or confirmed COVID-19 case.

[b]These are row percentages (fully compliant/[fully compliant + not fully compliant]) for each variable subcategories.

measures since the start of the pandemic. This might have resulted from the heightened awareness of the importance of complying with PPE and hand hygiene during COVID-19 at international and national levels, and from the greater perceived threat health care workers are experiencing during this emerging serious infection. This finding matches what was reported in a study in China (Lai et al., 2020). Comparing our results with those of a recently published study conducted in Ghana that utilized the same assessment tool (WHO checklist), the compliance of health care workers with PPE in our study was found to be lower during both patient interactions (52.6%) and while performing an AGP (73.2%) compared with 90.6% and 97.5% in the other study respectively (Ashinyo et al., 2021), whereas similar compliance rates were found with hand hygiene practices (Ashinyo et al., 2021). On the other hand, the compliance with PPE during patient interactions in our study was similar to what was reported in another study in the Democratic Republic of the Congo (Michel-Kabamba et al., 2020) and was much higher while performing AGPs compared to another study in the United States (Darwish et al., 2021). In this

TABLE 3 Determinants and predictors of full compliance with hygiene using chi-square test and multiple logistic regression analysis

Variable		Hand hygiene compliance[a]			
		Fully compliant No (%)[b]	χ^2 test *p* value	Multivariable regression analysis AOR (95% CI)	*p* value
Age categories	<30	155 (82.4)	.35	1 (reference)	
	30–39	749 (85.5)		1.56 (0.71–1.88)	.562
	40–49	371 (81.2)		1.34 (0.78–2.31)	.293
	≥50	185 (78.4)		1.30 (0.70–2.39)	.405
Gender	Female	1,020 (85.6)	<.001	1 (reference)	
	Male	440 (77.9)		0.71 (0.52–0.95)	.022
Nationality (by regional classification)	Asia-Pacific	950 (89.6)	<.001	1 (reference)	
	Americas	49 (77.8)		0.39 (0.20–0.79)	.009
	Europe	158 (77.1)		0.45 (0.28–0.71)	.001
	Middle East-North Africa	244 (71.8)		0.38 (0.27–0.55)	<.001
	Sub-Saharan Africa	59 (66.3)		0.26 (0.15–0.44)	<.001
Profession	Allied health professional	338 (87.6)	<.001	2.06 (1.32–3.20)	.001
	Dentist	42 (84.0)		1.70 (0.74–3.93)	.212
	Nurse	727 (87.2)		1.45 (0.98–2.16)	.064
	Pharmacist	96 (71.6)		1.28 (0.77–2.11)	.345
	Physician	257 (72.8)		1 (reference)	
Health sector	Governmental	606 (80.1)	.005	1 (reference)	
	Private	452 (86.9)		1.25 (0.86–1.84)	.246
	Semi-governmental	402 (83.8)		1.28 (0.87–1.89)	.212
Clinical experience	Less than 1 year	26 (86.7)	.263	1 (reference)	
	1–4 years	121 (78.6)		0.73 (0.23–2.34)	.600
	5 or more years	1,313 (83.5)		1.07 (0.35–3.22)	.910
Relative or friend diagnosed with COVID-19	No	344 (85.4)	.167	1 (reference)	
	Yes	1,116 (82.4)		0.83 (0.60–1.15)	.258
Frequency of interaction with COVID-19 suspected or confirmed patients	Never	331 (84.4)	.658	1 (reference)	
	Some of the shifts	615 (82.3)		0.84 (0.59–1.20)	.348
	Most of the shifts	161 (85.2)		1.12 (0.66–1.89)	.673
	Every shift	353 (82.3)		1.02 (0.56–1.59)	.921
Training on proper hand hygiene practices in the past year	No	48 (62.3)	<.001	1 (reference)	
	Yes	1,412 (84.0)		2.42 (1.44–4.07)	.001

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; χ^2, chi square.

[a]The outcome of the regression model is the compliance with hand hygiene ($N = 1757$).

[b]These are row percentages (fully compliant/[fully compliant + not fully compliant]) for each variable subcategories.

study, pharmacists were found less likely to be fully compliant with proper use of PPE than physicians, which is consistent with the results of Ghana study (Ashinyo et al., 2021). One explanation might be that pharmacists are less likely to have direct contact with patients in general and with suspected or confirmed COVID-19 cases. In addition, the duration of their contact is usually short and in most cases like in hospitals, patient's family or friends are the ones who attend the pharmacy for medication pick up upon discharge not the patient him/herself. Also, at almost all pharmacies in Qatar, most of the contacts happen through glass shields that might be perceived as protective by many pharmacists against countering infection. On the other hand, dentists were found more likely to be compliant with PPE and with overall infection prevention and control measures than physicians. This might be explained by the closer contact dentists have with their patients while managing them, as their job involves more contact with aerosols and droplets produced during many dental procedures that have the potential to spread the infection to dental personnel. This will force dentists to be more fully compliant with infection prevention and control measures in a step to protect themselves from getting infected. Health care workers in the governmental

TABLE 4 Determinants and predictors of full compliance with overall IPC measures using chi-square test and multiple logistic regression analysis

Variable		Overall IPC compliance[a]			
		Fully compliant No (%)[b]	χ^2 test *p* value	Multivariable regression analysis AOR (95% CI)	*p* value
Age categories	<30	34 (34.0)	.130	1 (reference)	
	30–39	230 (44.1)		1.18 (0.71–1.95)	.522
	40–49	123 (45.7)		1.51 (0.86–2.67)	.155
	≥50	58 (49.2)		1.80 (0.94–3.45)	.076
Gender	Female	298 (44.5)	.692	1 (reference)	
	Male	147 (43.2)		1.11 (0.81–1.54)	.519
Nationality (by regional classification)	Asia-Pacific	304 (49.6)	<.001	1 (reference)	
	Americas	15 (45.5)		0.57 (0.26–1.27)	.167
	Europe	58 (47.2)		0.64 (0.39–1.06)	.081
	Middle East-North Africa	55 (28.1)		0.35 (0.24–0.53)	<.001
	Sub-Saharan Africa	13 (29.5)		0.43 (0.20–0.90)	.026
Profession	Allied health professional	76 (41.1)	<.001	1.00 (0.61–1.62)	.989
	Dentist	25 (73.5)		5.84 (2.44–14.00)	<.001
	Nurse	252 (48.8)		1.27 (0.82–2.00)	.284
	Pharmacist	7 (11.9)		0.28 (0.12–0.82)	.005
	Physician	85 (39.5)		1 (reference)	
Health sector	Governmental	225 (44.7)	<.001	1 (reference)	
	Private	87 (34.7)		0.63 (0.43–0.92)	.017
	Semi-governmental	133 (52.2)		1.63 (1.09–2.43)	.026
Clinical experience	Less than 1 year	11 (52.4)	.074	1 (reference)	
	1–4 years	26 (32.5)		0.65 (0.22–1.88)	.421
	5 or more years	408 (44.9)		0.78 (0.30–2.04)	.619
Relative or friend diagnosed with COVID-19	No	98 (46.0)	.528	1 (reference)	
	Yes	347 (43.3)		0.93 (0.67–1.29)	.666
Frequency of interaction with COVID-19 suspected or confirmed patients	Never	44 (38.3)	.005	1 (reference)	
	Some of the shifts	177 (40.7)		1.16 (0.73–1.84)	.537
	Most of the shifts	53 (40.5)		1.36 (0.77–2.41)	.295
	Every shift	171 (52.1)		2.02 (1.19–3.42)	.009
Training on proper PPE use in the past year	No	22 (29.7)	.010	1 (reference)	
	Yes	423 (45.2)		1.08 (0.57–2.06)	.811
Training on proper hand hygiene practices in the past year	No	13 (27.7)	.020	1 (reference)	
	Yes	432 (44.9)		1.29 (0.59–2.82)	.520

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; IPC, infection prevention and control; PPE, personal protective equipment; χ^2, chi square.
[a]The outcome of the regression model is the overall compliance with IPC measures (both PPE and hand hygiene) ($N = 1{,}009$).
[b]These are row percentages (fully compliant/[fully compliant + not fully compliant]) for each variable subcategories.

sector showed higher compliance rates with overall infection prevention and control measures and with PPE than those in the private sector. This can be explained by the fact that health care workers in the governmental sector in Qatar deal more frequently with suspected or confirmed COVID-19 cases than other sectors as shown in Table 1. In Qatar, COVID-19-positive cases are managed in the governmental sector. Private health care facilities deal with suspected cases, but such cases are transferred to the governmental sector once confirmed. This finding is also supported by another finding in our study that showed that those who deal more frequently with suspected or confirmed cases were more likely to be compliant, which is also consistent with established findings in the literature (Brooks et al., 2020). We found that lack of time, discomfort caused by certain types of PPE, shortage of PPE, and skin irritation caused by handwashing

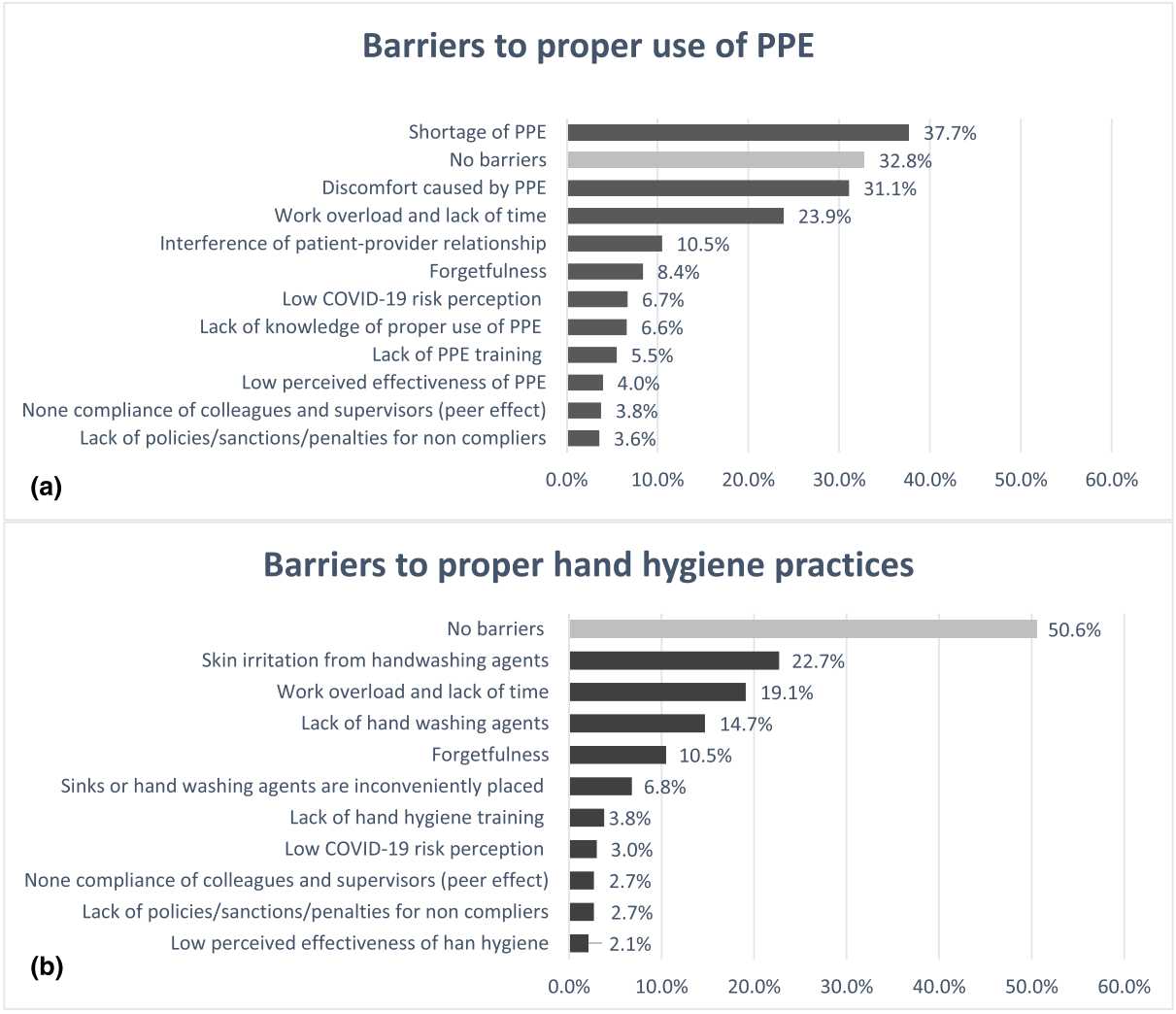


FIGURE 1 Barriers to infection prevention and control measures ((a) to proper personal protective equipment [PPE] use and (b) to proper hand hygiene practices)

agents as barriers for health care workers' compliance with infection prevention and control measures similar to the existing literature (Ahmed et al., 2020; Ataiyero et al., 2019; Fan et al., 2020; Houghton et al., 2020; WHO, 2009). We found higher proportions of health care workers reporting shortages of PPE and handwashing agents in the governmental sector compared with other sectors. This finding is expected in the light of global shortages of PPE and the greater burden of patients at the governmental sector where all positive COVID-19 cases are managed compared to other sectors. WHO has warned that shortages of PPE caused by increasing demand, panic buying, and misuse is putting the lives of health care workers at risk from the current COVID-19 pandemic and other infectious diseases. Assuring appropriate usage of PPE by health care workers and avoiding overuse are critically important. For this, the WHO issued guidance for rational use of PPE in health care settings and the effective management of supply chains (WHO, 2020b). Despite the emergence of COVID-19 vaccines, compliance with proper infection prevention and control measures by all health care workers is of paramount importance, as these vaccines are still surrounded by uncertainties and under continuous investigation.

4.1 | Strengths and limitations

This study had several strengths. First, it is the first national study in Qatar, and one of the few studies worldwide to address this important issue during the current COVID-19 pandemic. Second, we were able to recruit an acceptable number of health care workers from all health care sectors strengthening our confidence in generalizing our results to the health care workers population in Qatar. Although this study provides new insights on the use of infection prevention and control measures by health care workers during this emerging challenging pandemic of COVID-19, we do acknowledge some limitations. First, the data were collected by self-reporting by health care workers not by direct observation of their practices, which might lead to recall, and social-desirability

bias. So, the detected compliance rates should be viewed cautiously. However, online surveys were the only and safest means to collect data for research purposes in light of national recommendations of keeping physical distancing as a way to contain the spread of the infection. Second, with the cross-sectional design of this study, we could not establish how compliance with infection prevention and control measures translates into lower incidence of COVID-19 infection. Lastly, individual institutional infection prevention and control recommendations and instructions might influenced health care workers' compliance and affected our results.

5 | CONCLUSION

Despite the significant improvement in the perceived self-rated compliance of health care workers with different infection prevention and control measures (PPE and hand hygiene), their compliance with overall infection prevention and control measures was found to be moderate (44.1%). The highest compliance rate was found with hand hygiene at the five moments (83.1%), and the lowest with PPE during patient interactions (52.6%). This study shows gaps in infection prevention and control compliance across different health professional groups with higher compliance rates among dentists and lower compliance with pharmacists compared to physicians. Health care sector, nationality and frequency of dealing with suspected or confirmed COVID-19 cases were found to be predictors of compliance with PPE and with overall infection prevention and control measures. On the other hand, gender, nationality, profession and previous training on hand hygiene were found to be associated with hand hygiene compliance. Several barriers were reported to the proper use of infection prevention and control measures including work overload and shortages of PPE and handwashing agents. Compliance of health care workers with infection prevention and control measures needs to be further improved.

5.1 | Implications for nursing management

Frequent quality checks, continuous monitoring, provision of adequate supplies (PPE, and handwashing agents) and behaviour change interventions are top strategies that can be enforced by policymakers, safety managers of health care institutions, hospital and nursing administrators to improve compliance. Conducting further research that involves direct observation of infection prevention and control related practices is needed.

ACKNOWLEDGMENTS

Qatar National Library (QNL) funded the publication of this article.

CONFLICT OF INTEREST

None.

FUNDING INFORMATION

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ETHICAL APPROVAL

This study was performed in line with the principals of Declaration of Helsinki. Approval was obtained from the Institutional Review Board of the Primary Health Care Corporation (PHCC) under protocol ID PHCC/DCR/2020/07/073 to carry out the survey at PHCC level, and an exempt certificate was obtained from The Health Research Governance Department at Ministry of Public Health (MOPH) to carry out the survey at the semi-governmental and private sectors.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Muna Abed Alah https://orcid.org/0000-0003-3091-9483

REFERENCES

Ahmed, J., Malik, F., Memon, Z. A., Bin Arif, T., Ali, A., Nasim, S., Ahmad, J., & Khan, M. A. (2020). Compliance and knowledge of healthcare workers regarding hand hygiene and use of disinfectants: A study based in Karachi. *Cureus*, 12(2). https://doi.org/10.7759/cureus.7036

Alajmi, J., Jeremijenko, A. M., Abraham, J. C., Alishaq, M., Concepcion, E. G., Ajwad Butt, A., & Abou-Samra, A.-B. (2020). COVID-19 infection among healthcare workers in a national healthcare system: The Qatar experience. *International Journal of Infectious Diseases*, 100, 386–389. https://doi.org/10.1016/j.ijid.2020.09.027

Ashinyo, M. E., Dubik, S. D., Duti, V., Amegah, K. E., Ashinyo, A., Asare, B. A., Ackon, A. A., Akoriyea, S. K., & Kuma-Aboagye, P. (2021). Infection prevention and control compliance among exposed healthcare workers in COVID-19 treatment centers in Ghana: A descriptive cross-sectional study. *PLoS ONE*, 16(3 March), 1, e0248282–13. https://doi.org/10.1371/journal.pone.0248282

Askarian, M., Honarvar, B., Tabatabaee, H. R., & Assadian, O. (2004). Knowledge, practice and attitude towards standard isolation precautions in Iranian medical students. *Journal of Hospital Infection*, 58, 292–296. https://doi.org/10.1016/j.jhin.2004.07.004

Ataiyero, Y., Dyson, J., & Graham, M. (2019). Barriers to hand hygiene practices among health care workers in sub-Saharan African countries: A narrative review. In *American Journal of Infection Control*, 47(5), pp. 565–573. Mosby Inc. https://doi.org/10.1016/j.ajic.2018.09.014

Brooks, S. K., Greenberg, N., Wessely, S., & Rubin, G. J. (2020). Factors affecting healthcare workers' compliance with social and behavioural infection control measures during emerging infectious disease outbreaks: Rapid evidence review. *medRxiv*. https://doi.org/10.1101/2020.05.27.20114744

Chan, J. F. W., Yuan, S., Kok, K. H., To, K. K. W, Chu, H., Yang, J., Xing, F., Liu, J., Yip, C. C. Y., Poon, R. W. S., Tsoi, H. W., Lo, S. K. F., Chan, K. H., Poon, V. K. M., Chan, W. M., Ip, J. D., Cai, J. P., Cheng, V. C. C., Chen, H., … Yuen, K. Y. (2020). A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: A study of a family cluster. *The Lancet*, 395(10223), 514–523. https://doi.org/10.1016/S0140-6736(20)30154-9

Chia, S. E., Koh, D., Fones, C., Qian, F., Ng, V., Tan, B. H., Wong, K. S., Chew, W. M., Tang, H. K., Ng, W., Muttakin, Z., Emmanuel, S.,

Fong, N. P., Koh, G., & Lim, M. K. (2005). Appropriate use of personal protective equipment among healthcare workers in public sector hospitals and primary healthcare polyclinics during the SARS outbreak in Singapore. *Occupational and Environmental Medicine*, 62(7), 473–477. https://doi.org/10.1136/oem.2004.015024

Darwish, O. A., Aggarwal, A., Karvar, M., Ma, C., Haug, V., Wu, M., Orgill, D. P., & Panayi, A. C. (2021). Adherence to personal protective equipment guidelines during the COVID-19 pandemic among healthcare personnel in the United States. *Disaster Medicine and Public Health Preparedness*, 1–3. https://doi.org/10.1017/dmp.2021.12

Fan, J., Jiang, Y., Hu, K., Chen, X., Xu, Q., Qi, Y., Yin, H., Gou, X., & Liang, S. (2020). Barriers to using personal protective equipment by healthcare staff during the COVID-19 outbreak in China. *Medicine*, 99(48), e23310. https://doi.org/10.1097/MD.0000000000023310

Gholami, M., Fawad, I., Shadan, S., Rowaiee, R., Ghanem, H. A., Hassan Khamis, A., & Ho, S. B. (2021). COVID-19 and healthcare workers: A systematic review and meta-analysis. *International Journal of Infectious Diseases*, 104, 335–346. https://doi.org/10.1016/j.ijid.2021.01.013

Houghton, C., Meskell, P., Delaney, H., Smalle, M., Glenton, C., Booth, A., Chan, X. H. S., Devane, D., & Biesty, L. M. (2020). Barriers and facilitators to healthcare workers' adherence with infection prevention and control (infection prevention and control) guidelines for respiratory infectious diseases: A rapid qualitative evidence synthesis. *Cochrane Database of Systematic Reviews*, 4(4), 1–55. https://doi.org/10.1002/14651858.CD013582

Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., Zhang, L., Fan, G., Xu, J., Gu, X., Cheng, Z., Yu, T., Xia, J., Wei, Y., Wu, W., Xie, X., Yin, W., Li, H., Liu, M., … Cao, B. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet*, 395(10223), 497–506. https://doi.org/10.1016/S0140-6736(20)30183-5

Jeong, G., Lee, T. R., Hwang, S. Y., Cha, W. C., Shin, T. G., Sim, M. S., Jo, I. J., Song, K. J., Rhee, J. E., & Jeong, Y. K. (2016). Emergency department Workers' perceptions of effectiveness and reported compliance of infection control measures after Middle East respiratory syndrome outbreaks. *Journal of the Korean Society of Emergency Medicine*, 27(4), 328–335.

Jeong, I., Cho, J., & Park, S. (2008). Compliance with standard precautions among operating room nurses in South Korea. *American Journal of Infection Control*, 36, 739–742. https://doi.org/10.1016/j.ajic.2008.04.253

Lai, X., Wang, X., Yang, Q., Xu, X., Tang, Y., Liu, C., Tan, L., Lai, R., Wang, H., Zhang, X., Zhou, Q., & Chen, H. (2020). Will healthcare workers improve infection prevention and control behaviors as COVID-19 risk emerges and increases, in China? *Antimicrobial Resistance and Infection Control*, 9(1), 1–9. https://doi.org/10.1186/s13756-020-00746-1

Li, Q., Guan, X., Wu, P., Wang, X., Zhou, L., Tong, Y., Ren, R., Leung, K. S. M., Lau, E. H. Y., Wong, J. Y., Xing, X., Xiang, N., Wu, Y., Li, C., Chen, Q., Li, D., Liu, T., Zhao, J., Liu, M., … Feng, Z. (2020). Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *New England Journal of Medicine*, 382, 1199–1207. https://doi.org/10.1056/nejmoa2001316

Liu, J., Liao, X., Qian, S., Yuan, J., Wang, F., Liu, Y., Wang, Z., Wang, F.-S., Liu, L., & Zhang, Z. (2020). Community transmission of severe acute respiratory syndrome coronavirus 2, Shenzhen, China, 2020. *Emerging Infectious Diseases*, 26(6), 1320–1323. https://doi.org/10.3201/eid2606.200239

Majeed, P. (2018). Hand hygiene practices among health care workers in Rizgary Teaching Hospital. *Polytechnic Journal*, 8(3), 190–202. https://doi.org/10.25156/ptj.2018.8.3.279

Michel-Kabamba, N., Ngatu, N., Leon-Kabamba, N., Katumbo-Mukemo, A., Mukuku, O., Ngoyi-Mukonkole, J., Ngoie-Mwamba, G., Kilolo-Ngoie, E., Bwana-Kangulu, I., Kafusthi-Mukemo, D., Banza-Ndala, D., Kabila-Mutombo, D., Balela-Kabasu, M.-C., Kanyiki-Katala, M., Syed-Mahfuz, A., Murakami, A., Kanda, K., Mashima, Y., Oscar-Luboya, N., & Hirao, T. (2020). Occupational COVID-19 prevention among Congolese healthcare workers: Knowledge, practices, PPE compliance, and safety imperatives. *Tropical Medicine and Infectious Disease*, 6(1), 6. https://doi.org/10.3390/tropicalmed6010006

Neuwirth, M. M., Mattner, F., & Otchwemah, R. (2020). Adherence to personal protective equipment use among healthcare workers caring for confirmed COVID-19 and alleged non-COVID-19 patients. *Antimicrobial Resistance and Infection Control*, 9(1), 199. https://doi.org/10.1186/s13756-020-00864-w

Oliveira, A. C., Marziale, M. H. P., Paiva, M. H. R. S., & Lopes, A. C. S. (2009). Knowledge and attitude regarding standard precautions in a Brazilian public emergency service: A cross-sectional study. *Revista Da Escola de Enfermagem Da USP*, 43, 313–319. https://doi.org/10.1590/s0080-62342009000200009

Schwartz, D., Shapira, S., & Bar-Dayan, Y. (2014). Health care workers' knowledge and confidence in personal protective equipment during the H1N1 pandemic in Israel. *Disaster Medicine and Public Health Preparedness*, 8(2), 150–157. https://doi.org/10.1017/dmp.2014.25

Shanghai International Forum for Infection Control and Prevention. Rational, scientific and standardized protection is the core of infection prevention and control in medical institutions. (2020). https://mp.weixin.qq.com/s/G5Nwdd9kW9yVD-hTdwsKtg

Shimokura, G., Weber, D. J., Miller, W. C., Wurtzel, H., & Alter, M. J. (2006). Factors associated with personal protection equipment use and hand hygiene among hemodialysis staff. *American Journal of Infection Control*, 34(3), 100–107. https://doi.org/10.1016/j.ajic.2005.08.012

Wong, T. W., & Tam, W. W. S. (2005). Handwashing practice and the use of personal protective equipment among medical students after the SARS epidemic in Hong Kong. *American Journal of Infection Control*, 33(10), 580–586. https://doi.org/10.1016/j.ajic.2005.05.025

World Health Organization (WHO). (2009). WHO guidelines on hand hygiene in health care: First global patient safety challenge clean care is safer care. Hand hygiene practices among health-care workers and adherence to recommendations. https://www.ncbi.nlm.nih.gov/books/NBK144026/

World Health Organization (WHO). (2020a). Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected. https://www.who.int/publications/i/item/10665-331495

World Health Organization (WHO). (2020b). Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19). February, 1–7.

World Health Organization (WHO). (2020c). Risk assessment and management of exposure of health care workers in the context of COVID-19. https://apps.who.int/iris/bitstream/handle/10665/331496/WHO-2019-nCov-HCW_risk_assessment-2020.2-eng.pdf?sequence=1&isAllowed=y

World Health Organization (WHO) (2011). WHO|The burden of health care-associated infection worldwide. Retrieved April 8, 2020, from https://www.who.int/infection-prevention/publications/burden_hcai/en/

How to cite this article: Abed Alah M, Abdeen S, Selim N, et al. Compliance and barriers to the use of infection prevention and control measures among health care workers during COVID-19 pandemic in Qatar: A national survey. *J Nurs Manag*. 2021;29:2401-2411. https://doi.org/10.1111/jonm.13440

Received: 31 March 2021 | Revised: 11 June 2021 | Accepted: 23 June 2021

DOI: 10.1111/jonm.13404

ORIGINAL ARTICLE

WILEY

Nurses and midwives' experiences with peer-group clinical supervision intervention: A pilot study

Vera Mc Carthy PhD, MA, PGDTLHE, BSc (Hons), RGN, Lecturer[1] | John Goodwin PhD, MA, PGDip, BSc (Hons), BA (Hons), ALCM, PG Cert TLHE, Dip Mgmt, RPN, Lecturer[1] | Mohamad M. Saab PhD, MSc, PGDTLHE, RGN, University Lecturer[1] | Caroline Kilty PhD, RMN, Lecturer[1] | Elaine Meehan PhD, Post-Doctoral Researcher[1] | Sinead Connaire MSc, RGN, MA Clinical Supervision, PGD Supervision, PGD Counselling & Psychotherapy, RGN NMPD Officer[2] | Carmel Buckley MSoc Sc, MSc, BSc, Dip PHN, Dip Nursing Management, RGN, RM, Area Director Nursing & Midwifery Planning & Development, HSE South[2] | Anne Walsh MSc, H. Dip., RGN, RM, Director, Nursing & Midwifery Planning & Development, HSE South (Cork/Kerry)[2] | James O'Mahony PhD, MBA, MSc, BSc, Lecturer in Cognitive & Behavioural Psychotherapy[1] | Aine O'Donovan PhD, RPN, Senior Lecturer[1]

[1]Catherine McAuley School of Nursing and Midwifery, University College Cork, Cork, Ireland

[2]Nursing and Midwifery Planning and Development Unit, Health Service Executive, Dublin, Ireland

Correspondence
Aine O'Donovan, PhD, RPN, Senior Lecturer, Catherine McAuley School of Nursing and Midwifery, University College Cork, College Road, Cork T12 AK54, Ireland.
Email: aine.odonovan@ucc.ie

Funding information
Nursing and Midwifery Planning and Development Unit, Health Service Executive South (Cork and Kerry)

Abstract

Aim: This study aimed to evaluate differences in supervisees' understanding of clinical supervision and their perceptions of organisational functioning before and after engaging in peer-group clinical supervision.

Background: Protected reflective time allows discussion of complex issues affecting health care. Peer-group clinical supervision is one model of clinical supervision that could facilitate this, but it is poorly understood.

Methods: A pre–post intervention pilot study was performed. The intervention was delivered over a 12-month period. Data were collected using surveys on demographic and work-related factors and experience of clinical supervision pre- and post intervention.

Results: Adaptability increased significantly between the pre- and post surveys. The post survey data showed finding time for clinical supervision scoring lowest with open-ended comments reinforcing this. The supervisees found the sessions to offer a safe place despite initial concerns.

Conclusion: The peer-group model of clinical supervision allowed supervisees to build a rapport and trust with their colleagues and share experiences.

Implications for Nursing Management: The benefits to participating in peer-group clinical supervision traversed the individual and organisation. These data support the implementation of such sessions while addressing workload and time pressures to aid participation.

KEYWORDS
clinical supervision, intervention, nursing, peer group, pilot study

1 | BACKGROUND

Clinical supervision has been defined as a formal regular event, supervised by trained individuals, in which qualified nurses can reflect on their clinical practice with the purpose of advancing their care (Cleary et al., 2010). Clinical supervision is internationally recognized as being an integral part of professional health care practice (Gonge & Buus, 2015) and recommended as a process of learning and professional support (Fowler, 2010). In Ireland, national policy recommends its use with all mental health nurses (O'Shea et al., 2019), and indeed, the Irish health service has made recommendations for its implementation across all health and social care disciplines (Health Service Executive [HSE], 2015) similar to Australia (Australian College of Nursing, 2019) and the United Kingdom (Nursing and Midwifery Council, 2018). Despite these mandates, there is limited empirical evidence on the format, nature and outcomes of clinical supervision for nurses (Markey et al., 2020; Pollock et al., 2017).

While it has been well established that nurses require clinical supervision throughout their career (Driscoll et al., 2019), Pollock et al. (2017) found the majority of studies have been conducted in mental health or counseling settings, with limited research from a broader nursing perspective. Further, there is a paucity of research on the direct benefits of clinical supervision for patients (Rousmaniere et al., 2016), but there is evidence to suggest that clinicians benefit from enhanced self-awareness, self-efficacy and increased knowledge (Watkins, 2011; Wheeler & Richards, 2007).

The role of clinical supervision on the functioning of the organisation is an important consideration (Best et al., 2014; Martin et al., 2019). Organisational functioning refers to the core activities conducted in that organisation, and clinical supervision can highlight organisational factors that need improving, such as resources or organisational climate. Establishing staffs' views of organisational factors and determining if these are improved through clinical supervision can be informative for the organisation, particularly in directing resources for the delivery of high-quality care. Conversely, organisational factors, such as staffing, are important to the effective delivery of clinical supervision (Gonge & Buus, 2016). However, nurses and midwives' understanding of clinical supervision is not fully known, and there is a lack of obvious measurable benefits for organisations (Dilworth et al., 2013; Saab et al., 2020).

There is no one model of clinical supervision that suits all settings (Milne et al., 2008; Saab et al., 2020). Peer-group clinical supervision, where staff at the same or similar levels support each other in the advancement of clinical practice, is a form of clinical supervision. It is poorly defined in the literature, and as a result, facilitated peer-group clinical supervision is understudied with little published research on its effect or impact on clinical practice (Borders, 2012).

2 | AIM

This study aimed to evaluate differences in supervisees' understanding of clinical supervision and perceptions of organisational functioning before and after engaging in 12 months of peer-group clinical supervision.

3 | MATERIALS AND METHODS

3.1 | Design

A quantitative pilot study using a pre–post intervention design was conducted. Data were collected, using structured surveys with some open-ended questions, before and after the intervention. The EQUATOR network recommendations for quantitative data (STROBE) were used in the reporting of this study (Vandenbroucke et al., 2007).

3.2 | Intervention

The intervention was the delivery of peer-group clinical supervision to nurses and midwives (Nursing and Midwifery Planning and Development Unit, 2018) using Proctor's model (Proctor, 2008). Proctor's model delineates the purpose of formative, restorative and normative functions in clinical supervision (Figure 1), which linked well with the goal of the intervention to enable lifelong learning through reflection for nurses and midwives.

In total, twelve sessions were held, one a month over a 12-month period. Each session lasted an hour. The focus of the sessions was on the role of the individual staff member to enable effective professional practice and included sessions addressing quality of work, decision-making, information receipt/delivery and work issues (Nursing and Midwifery Planning and Development Unit, 2018). Staff were nominated for the intervention by their direct manager. Before the intervention began, the supervisors and supervisees (participants) agreed and signed a document relating to learning goals, legal and

FIGURE 1 Proctor's model of clinical supervision

ethical considerations, working relationships and feedback from the intervention (Nursing and Midwifery Planning and Development Unit, 2018).

The sessions were facilitated by four supervisors who held appropriate accreditation for this role. Although supervisor-led peer-group clinical supervision is unusual, it was the structure chosen for the intervention due to limited numbers of supervisees with clinical supervision experience (Sheppard et al., 2018). Supervisees were given the chance to relay their experiences with colleagues and get feedback from both their colleagues and the experienced supervisors. This process was adopted in order to improve teamwork, team cohesion and quality of work (Nursing and Midwifery Planning and Development Unit, 2018). Supervisors maintained written records of the sessions, and supervisees were advised to keep a reflective journal.

3.3 | Setting and sample

The sessions took place at a work-based location that was free from distraction and offered privacy from the participants' day-to-day activities. As this was an intervention being delivered to staff, there were restrictions on group size and delivery. Supervisees were invited from four different service areas (Figure 2). The service areas represented were acute care five groups, $n = 29$ supervisees; intellectual disability nursing two groups, $n = 12$ supervisees; public health nursing (community) two groups, $n = 11$ supervisees; mental health nursing one group, $n = 5$ supervisees. Therefore, peer-group clinical supervision was offered to 10 groups of staff across nine sites in the south of Ireland, beginning in September 2018.

All supervisees were eligible to participate in this study ($n = 57$). Attendance rates at each of the sessions ranged from 50% to 87% at the various sites throughout the 12-month period. Each of the 10 groups consisted of 4–6 staff of the same grade. Five supervisees did not complete the full 12 months due to leave (maternity, sick), and one supervisee joined a group after the project began.

3.4 | Procedures

Prior to the start of the peer-group clinical supervision intervention, supervisees were told that the outcomes of the project were being evaluated using research methods, and they were not obliged to participate. They were reassured that non-participation in the research would not affect their participation in the sessions. All supervisees were provided with a written information leaflet that gave further details of the study. Participation in the research study involved completing a survey before the commencement of the peer-group clinical supervision intervention (pretest) and after completing the intervention (post-test).

Once consent was obtained, the project lead distributed the surveys to consenting supervisees. Data were confidential, and no identifying information appeared on the surveys. To ensure anonymity but to enable pre- and post intervention data to be matched, supervisees were asked to complete a unique code using the first letters of their parents' names and the last three digits of their mobile phone number.

3.5 | Ethics

The Clinical Research Ethics Committee affiliated to the researchers' university granted ethical approval (Reference Number: ECM 4 (m) 03/07/18). All participants gave written informed consent.

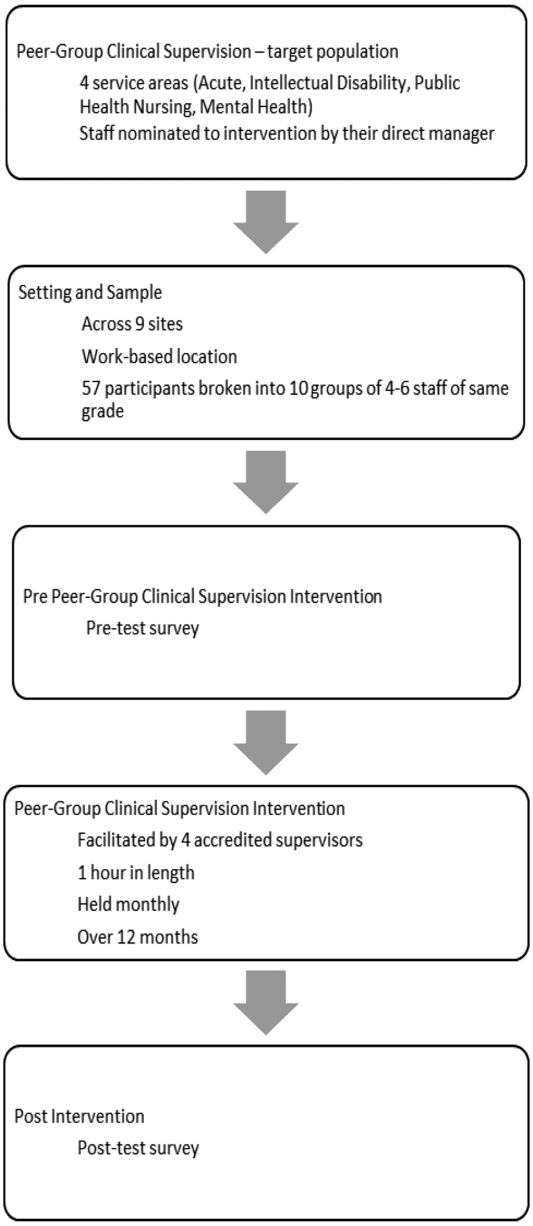


FIGURE 2 Study process

3.6 | Data sources/measurement

The survey was purposefully designed comprising of standardized and validated instruments and was reviewed by experts in relation to content before use. The pre-intervention survey included several demographic and work-related questions in addition to questions about supervisees' prior experience of clinical supervision.

Supervisees' perceptions of how their organisation functions were measured using selected items from the Survey of Organisational Functioning (SOF) (Institute for Behavioral Research, 2008). This is a standardized tool with subscales from the Organisational Readiness to Change instrument, which have been validated and demonstrate good internal consistency (Lehman et al., 2002). Five scales were used: Motivation for change, Resources, Staff attributes, Organisational Climate and Job attitudes, and these accounted for 19 subscales (Table 1). Items were scored on a 1–5 Likert scale with 1 = *strongly disagree* and 5 = *strongly agree*.

Four open-ended questions sought information on supervisees' understanding of clinical supervision: reasons for participating in peer-group clinical supervision, concerns around their participation and what they would like to achieve from the process.

3.7 | Post-intervention data

Supervisees' perceptions of organisational functioning were remeasured, using the SOF, post-intervention. In addition, their overall experiences of participating in peer-group clinical supervision were measured using the 26-item version of the Manchester Clinical Supervision Scale© (MCSS-26©) (Winstanley & White, 2011). The MCSS-26© is a validated measure of the effectiveness of clinical supervision and contains twenty-six items (divided into six subscales), scored on a 5-point Likert scale, with 0 = *strongly disagree* through to 4 = *strongly agree*, and a theoretical range of 0–104. The total scale score was calculated by summing all six subscales (Table 1). The MCSS-26© is only suitable for use after a participant has gone through the clinical supervision process (Winstanley & White, 2019) and was included in the post-intervention survey only.

Finally, three open-ended questions were asked enquiring about the meaning of clinical supervision to supervisees, the benefits (if any) of participation in peer-group clinical supervision and the perceived facilitators and inhibitors to participation in peer-group clinical supervision.

3.8 | Data analysis

All statistical analyses were performed using SPSS Version 26 (IBM, Armonk, NY, USA). Age was categorized (21–30; 31–40; 41–50; 51–60; >60 years). A small number of items had missing data in the SOF and MCSS scales. These were replaced by item mean substitution (for SOF, no more than five responses were missing for any one item, one supervisee had not completed any of the MCSS scale, and they were eliminated from the analysis).

Scores on the SOF were reversed for 12 items, and total scores for each subscale were calculated by adding together the scores for each set of items, dividing the sum by the number of items included and multiplying by 10 to rescale the final scores. As a result, total scores for each subscale ranged from 10 to 50.To test for differences between pre- and post-survey responses, paired samples *t* tests were performed.

Scores on the MCSS-26© were reversed for nine items, and total scores for each subscale were calculated by adding the scores for each item together. As a result, the range of raw scores for each subscale differed.

Data from open-ended responses were subjected to analysis for commonly recurring themes (Braun & Wilkinson, 2003).

TABLE 1 Survey of organisational functioning and Manchester Clinical Supervision Scale©—Scales, subscales, pre- and post-test scale reliability (Cronbach's α)

Instrument, scales and subscales	Items	Pretest α	Post-test α
Survey of organisational functioning (SOF)			
Motivation for change			
Programme needs	8	.85	.80
Pressures for change	7	.65	.64
Resources			
Staffing	6	.74	.70
Training	4	.74	.65
Computer access	7	.47	.57
e-Communications	4	.70	.58
Staff attributes			
Growth	5	.85	.81
Efficacy	5	.60	.65
Influence	6	.81	.71
Adaptability	4	.62	.54
Organisational climate			
Mission	5	.64	.69
Cohesion	6	.81	.83
Autonomy	5	.60	.54
Communication	5	.73	.58
Stress	4	.81	.77
Change	5	.72	.63
Job attitudes			
Burnout	6	.78	.75
Satisfaction	6	.73	.76
Director leadership	9	.97	.96
Manchester Clinical Supervision Scale© (range 0–104)	26	--	.88
Importance/value of clinical supervision (range 0–20)	5	--	.68
Finding time (range 0–16)	4	--	.80
Trust/rapport (range 0–20)	5	--	.34
Supervisor advice/support (range 0–20)	5	--	.76
Improved care/skills (range 0–16)	4	--	.81
Reflection (range 0–12)	3	--	.74

4 | RESULTS

4.1 | Sample characteristics

A total of 51 supervisees completed pretest surveys (Table 2). The majority ($n = 48$; 94%) were female aged between 31 and 60 years ($n = 47$; 92%). Most had a bachelor's or a master's level qualification in nursing ($n = 36$; 71%), and almost all had >5 years of nursing/midwifery experience. Most supervisees were working in a clinical nurse/midwife manager role ($n = 42$; 82%). Over half were working in general acute nursing settings ($n = 26$; 51%), and 49% ($n = 25$) had been in their current role for >5 years.

4.2 | Perceptions of organisational functioning

A total of 36 supervisees completed pre- and post-surveys (29% lost to follow-up). There was a significant increase in adaptability for supervisees between the pre- and post-surveys. However, albeit non-significant, mean scores for cohesion and training decreased between the measurements and communication increased (Table 3).

Table 4 gives details on the supervisees' perceptions of the effectiveness of clinical supervision. These data were collected in the post-intervention survey. Overall, the total mean score on the MCSS-26© for all supervisees was 80.3, which is above the indicative threshold (mean 73.0) for efficacious clinical supervision provision

TABLE 2 Sample characteristics ($n = 51$)

	n	(%)
Sex		
Female	48	(94)
Male	3	(6)
Age		
21–30 years	3	(6)
31–40 years	17	(33)
41–50 years	16	(31)
51–60 years	14	(28)
>60 years	1	(2)
Level of education		
Apprenticeship nurse training	7	(14)
Diploma in nursing/midwifery	8	(16)
Degree	31	(60)
Masters	5	(10)
Experience in nursing		
4–5 years	1	(2)
Over 5 years	50	(98)
Current role		
Staff nurse/midwife	4	(8)
Clinical nurse/midwife manager	42	(82)
Clinical nurse/midwife specialist	4	(8)
Advanced nurse/midwife practitioner	1	(2)
Current area of practice		
General acute nursing	26	(51)
General community nursing	10	(20)
Midwifery	1	(2)
Mental health nursing	5	(10)
Intellectual disability nursing	9	(17)
Length of time in current job		
Under 6 months	4	(8)
6–11 months	6	(12)
1–3 years	13	(25)
4–5 years	3	(6)
Over 5 years	25	(49)
Prior experience of clinical supervision		
Yes	6	(12)

(Winstanley & White, 2019). The subscale 'Finding Time' obtained the lowest mean score although still above benchmark data.

4.3 | Open-ended question themes—Pre-peer-group clinical supervision

A total of 51 supervisees provided responses to the four open-ended questions. Almost all supervisees understood clinical supervision as one or more of the following: a means of giving/getting support to/from colleagues, a means of reflecting on their practice, shared learning through discussion or developing professional knowledge. One supervisee reported not having any understanding of clinical supervision. Two themes were identified from the data: fears around role/position and feasibility to complete peer-group clinical supervision and positives peer-group clinical supervision would bestow on supervisees.

4.3.1 | Theme 1: Fears around role/position and feasibility to complete peer-group clinical supervision

Several supervisees identified isolation in their role/area of work or being new to a team/role as a reason for participating in peer-group clinical supervision. Others reported the sharing of information, development of practice, learning from and liaising with others and reducing stress as their reason for participation. Eight supervisees reported being involved because their line manager selected them, or they wanted to help others or to get 'time off the floor.' However, some supervisees had concerns about participating in clinical supervision. Two major concerns reported were maintaining confidentiality and not having the time to commit to supervision. Supervisees who expressed concerns about confidentiality were worried that they would feel 'judged by fellow group members.' Concerns about time were related to the apprehension about not being able to commit to supervision, but some supervisees viewed supervision as an addition to their workload: 'Current workload very demanding, having anything extra to do on top of this may add extra stress.'

4.3.2 | Theme 2: Positives peer-group clinical supervision would bestow on them

Supervisees had expectations in relation to the positive results peer-group clinical supervision would bestow on them. The main expectation held by supervisees was that engagement in clinical supervision would help to improve their practice. One supervisee commented that through developing 'better self and professional awareness,' they could become 'a better manager and caregiver.' Other supervisees sought support from their peers, highlighting the importance of 'greater bonding and understanding, ability to support and be supported.' Four supervisees voiced concerns about occupational stress and hoped that clinical supervision would result in experiencing 'less stress' at work. A small number of supervisees felt their role was ill-defined or that they felt invalidated in their role. One supervisee hoped that engagement in clinical supervision would result in 'greater understanding of [their] role,' whereas another had no expectations for the process and that they were only engaging in clinical supervision in order 'to appease management.'

TABLE 3 Survey of organisational functioning—Differences in responses pre- and post-participation in peer-group clinical supervision, mean and standard deviation (SD) ($n = 36$)

	Presurvey mean (SD)		Postsurvey mean (SD)		Mean difference	Significance[a]	
						t	*p*
Motivation for change							
Programme needs	34.5	(7.5)	33.7	(7.7)	−0.8	0.59	.56
Pressures for change	34.8	(5.8)	34.0	(6.2)	−0.8	0.72	.48
Resources							
Staffing	28.1	(7.5)	28.1	(7.2)	0	0.00	1.00
Training	32.0	(9.4)	30.8	(8.8)	−1.2	0.91	.37
Computer access	27.9	(5.4)	27.9	(5.7)	0	−0.11	.92
e-Communications	34.4	(9.3)	33.6	(7.8)	−0.8	0.75	.46
Staff attributes							
Growth	32.6	(9.7)	33.4	(8.4)	0.8	−0.75	.46
Efficacy	39.5	(4.9)	40.2	(4.9)	0.7	−0.96	.34
Influence	39.1	(5.6)	39.6	(5.0)	0.5	−0.80	.43
Adaptability	37.6	(5.6)	39.2	(5.2)	1.6	−2.24	.03*
Organisational climate							
Mission	32.4	(6.8)	32.7	(6.6)	0.3	−0.30	.77
Cohesion	37.9	(7.0)	36.1	(7.4)	−1.8	1.82	.08
Autonomy	33.7	(6.7)	33.1	(6.2)	−0.6	0.62	.54
Communication	30.1	(7.3)	32.2	(7.4)	2.1	−1.96	.05
Stress	37.6	(8.8)	36.7	(8.4)	−0.9	0.77	.44
Change	32.8	(7.4)	32.8	(6.3)	0	−0.07	.95
Job attitudes							
Burnout	28.7	(7.9)	28.3	(6.9)	−0.4	0.36	.72
Satisfaction	37.5	(6.7)	37.5	(6.4)	0	0.52	.96
Director leadership	35.5	(10.8)	35.6	(9.6)	0.1	−0.06	.95

[a]*t* statistic and *p* value from paired sample *t* tests.
*$p \leq .05$ statistically significant.

TABLE 4 Mean scores and standard deviation (SD) on MCSS-26© for supervisees in addition to benchmark MCSS-26© scores $n = 46$

MCSS© 26 factor	(Minimum, maximum)	Mean (SD)	Benchmark data from MCSS-26©
Importance/value of clinical supervision	(10, 20)	16.8 (2.8)	15.8
Finding time	(0, 16)	9.2 (3.9)	8.6
Trust/rapport	(9, 20)	16.1 (2.9)	15.7
Supervisor advice/support	(6, 20)	14.9 (3.4)	14.1
Improved care/skills	(4, 16)	12.9 (2.8)	12.2
Reflection	(6, 12)	10.5 (1.6)	10
Total score	(48, 103)	80.3 (12.6)	73

Abbreviation: MCSS©, Manchester Clinical Supervision Scale©.

4.4 | Post-peer-group clinical supervision

A total of 47 supervisees provided responses to the three open-ended questions in the post-intervention survey. Two overarching themes were identified: shared experiences and other demands.

4.4.1 | Theme 1: Shared experiences

Supervisees reported peer-group clinical supervision sessions to represent a space to meet with their colleagues and peers to engage in discussion and reflect on any issues and concerns that

they may have in their workplace settings. Many saw it as a 'safe place' and as an opportunity to learn from their colleagues' experiences. Key words that frequently arose in supervisees' responses were 'support,' 'reflect,' 'sharing,' 'learning,' 'safe' and 'confidential.'

The main perceived benefit of peer-group clinical supervision was that it offered staff dedicated and protected time to share their clinical experiences, problems and vulnerabilities with colleagues. Supervisees valued the opportunity to work as a group to solve problems, rather than in isolation. For many, participation in peer-group clinical supervision lessened feelings of isolation, where everyone was 'in the same boat.' Three supervisees commented specifically that participation made them better understand the limitations of their role.

Peer-group clinical supervision also offered supervisees the opportunity to get to know colleagues, including those that may work in different departments, with one supervisee commenting that supervision 'allowed me to get to know and spend time with my peers … gave deeper understanding of our colleagues' pressures and stresses' and another stating that it helped in 'developing a good working relationship with colleagues from different departments within the hospital.'

4.4.2 | Theme 2: Other demands

'Time' was a frequent response for supervisees when asked about factors that facilitated and inhibited their participation in peer-group clinical supervision. The provision of protected time and an acceptance of this by line managers was identified as one of the most important facilitators for attending peer-group clinical supervision sessions. Travel time to attend the sessions was an issue for those who worked outside of the settings in which the intervention took place. Other factors that were perceived to inhibit participation were heavy workloads, competing demands and difficulties 'coming off the floor,' with one supervisee commenting that there are 'plenty of jobs to be done instead.' Factors that were perceived to facilitate participation in the sessions were having rooms booked and dates planned out well in advance.

5 | DISCUSSION

5.1 | Summary

The aim of this pilot study was to evaluate supervisees' understanding of clinical supervision and their perceptions of organisational functioning prior to and following engaging in peer-group clinical supervision for 12 months. The pre-intervention data suggest that nurses and midwives have a limited understanding of peer-group clinical supervision and may not fully appreciate the benefits of this process. However, concerns around confidentiality and being 'judged' expressed prior to engaging in peer-group clinical supervision were alleviated, with supervisees perceiving peer-group clinical supervision as a safe, confidential space and reporting an enhanced sense of trust and rapport amongst colleagues. Furthermore, the item 'importance/value of clinical supervision' obtained the highest mean score on the MCSS-26©, indicating that peer-group clinical supervision was experienced as a meaningful and important process for supervisees.

5.2 | Comparison with previous knowledge

Although 'clinical supervision' as a concept is poorly understood (Sheppard et al., 2018), it is known that this process is highly valued by attendees (Cook et al., 2020; Martin et al., 2019; Saab et al., 2020). The current study suggests that such benefits also extend to the group model of clinical supervision. However, given the lack of research around peer-group clinical supervision (Borders, 2012; Pollock et al., 2017) and the benefits available to nurses and midwives, this process needs to be further promoted, and prejudices challenged.

Engaging in peer-group clinical supervision was perceived to enhance organisational adaptability. Organisational adaptability relates to its staff members' willingness to embrace new approaches and procedures, in addition to the speed at which they are comfortable making changes. Health care organisations are often criticized for how slow they are to adapt or how reluctant they are to implement changes (Bermúdez-Tamayo et al., 2017; Brooks, 2017; Côté-Boileau et al., 2019; Dugstad et al., 2019). Interventions that have a positive impact on organisational adaptability, such as peer-group clinical supervision, should be embraced within health care to ensure patients receive the highest quality evidence-based care. Further, Proctor's model facilitated a structured and organized delivery of peer-group clinical supervision (Turner & Hill, 2011).

Although our data did not show a statistically significant change in communication, there was an improvement to this. Conversely, mean scores for both cohesion and training decreased post-intervention, though both were non-significant. Open-ended responses indicate that supervisees felt a sense of cohesion within the group and commented positively on how they were able to support one another and share information with each other. This discrepancy suggests that some of the direct benefits of peer-group clinical supervision were limited to supervisees and may not impact on the health care organisation itself. It should be noted that clinical supervision can benefit multiple stakeholders, including patients, organisations and the health care staff themselves (Martin et al., 2019). Furthermore, although supervisees may not have observed changes, satisfied staff members have a positive effect on organisational performance (Kuzey, 2018). Future studies on peer-group clinical supervision should consider a longitudinal approach to identify how engaging in supervision indirectly benefits the health care system over an extended period.

5.3 | Implications for nursing management

Prior to the intervention, supervisees expressed concerns about their ability to commit to supervision, citing time as a significant perceived barrier. Despite the protected time afforded to supervisees, our data indicated that 'finding time' was still a challenge. Having protected time is a crucial component of supervision (Hall, 2018); nevertheless, staff who have engaged in clinical supervision (Cook et al., 2020; Dawson et al., 2012; Martin et al., 2016, 2019) and peer-group clinical supervision (Buus et al., 2018) consistently report time to engage as challenging. Dawson et al. (2012) reported that although those who engage in supervision are afforded protected time, the commitment to attend supervision increases work-related pressure. In order to reduce such pressures, it has been recommended that additional staff members are employed, thus allowing for adequate time to engage in supervision (Martin et al., 2016); however, ensuring adequate staffing can be a challenge for any health service (Bridges et al., 2019). A paradigm shift is necessary, with provisions made to accommodate nurses and midwives in attending clinical supervision and considerations made for how this impacts on workload.

5.4 | Strengths and limitations

This pilot study has allowed the evaluation of a peer-group clinical supervision intervention and provided valuable information in relation to how this could be rolled out on a larger scale. Future studies on peer-group clinical supervision should adopt a longitudinal design to assess if the benefits of supervision are prolonged rather than surveying participants at only one point in time. Researcher observation of the peer-group clinical supervision sessions may allow reflexivity on the issues raised in the open-ended responses (Williams, 2008); however, this may also have a negative effect on the sessions. The pilot study was conducted in one area in the south of Ireland with a small sample size, limiting its generalizability of results to other settings. Males were underrepresented, as were advanced nurse/midwife practitioners and midwives.

5.5 | Conclusion

With clinical supervision becoming standard practice within health care settings, it is crucial that staff members are more aware of its purpose. Participants in this pilot study displayed initial skepticism towards peer-group clinical supervision; however, after participating in this process, several benefits were reported. These included direct benefits (shared knowledge with peers, support) and benefits to the organisation (enhanced adaptability). The implementation of peer-group clinical supervision requires further development as supervisees perceived their attendance as supplemental to their role and struggled to maintain their usual practices. Such practical concerns need to be considered when embedding a sustainable model of clinical supervision within nursing and midwifery roles.

ETHICAL CONSIDERATIONS

Ethical approval was granted by the Clinical Research Ethics Committee of the Cork Teaching Hospitals (Reference Number: ECM 4 (m) 03/07/18).

ACKNOWLEDGEMENTS

The authors would like to thank all the participants of this study. This work is funded by the Nursing and Midwifery Planning and Development Unit, Health Service Executive South (Cork and Kerry).

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

Research data are not shared.

ORCID

Vera Mc Carthy https://orcid.org/0000-0001-7573-7961
John Goodwin https://orcid.org/0000-0002-2044-1861
Mohamad M. Saab https://orcid.org/0000-0002-7277-6268
Aine O'Donovan https://orcid.org/0000-0001-6377-4140

REFERENCES

Australian College of Nursing. (2019). *Clinical Supervision for Nurses and Midwives (Joint) Position Statement – 2019*. ACN. https://www.midwives.org.au/sites/default/files/uploaded-content/field_f_content_file/20190408_clinicalsupervision_final.pdf

Bermúdez-Tamayo, C., Ruiz, E. F., Moreno, G. P., Maroto-Navarro, G., Garcia-Mochon, L., Perez-Ramos, F. J., Caño-Aguilar, A., & del Pilar Velez, M. (2017). Barriers and enablers in the implementation of a program to reduce cesarean deliveries. 14(1), 106.

Best, D., White, E., Cameron, J., Guthrie, A., Hunter, B., Hall, K., Leicester, S., & Lubman, D. I. (2014). A model for predicting clinician satisfaction with clinical supervision. *Alcoholism Treatment Quarterly*, 32(1), 67–78. https://doi.org/10.1080/07347324.2014.856227

Borders, L. D. (2012). Dyadic, triadic, and group models of peer supervision/consultation: What are their components, and is there evidence of their effectiveness? *Clinical Psychologist*, 16, 59–71. https://doi.org/10.1111/j.1742-9552.2012.00046.x

Braun, V., & Wilkinson, S. (2003). Liability or asset? Women talk about the vagina. *Psychology of Women Section Review*, 5(2), 28–42.

Bridges, J., Griffiths, P., Oliver, E., & Pickering, R. M. (2019). Hospital nurse staffing and staff–patient interactions: An observational study. *BMJ Quality & Safety*, 28(9), 706–713. https://doi.org/10.1136/bmjqs-2018-008948

Brooks, B. A. (2017). A way forward: How higher education can learn from health care. *Change: The Magazine of Higher Learning*, 49(2), 61–66. https://doi.org/10.1080/00091383.2017.1286220

Buus, N., Delgado, C., Traynor, M., & Gonge, H. (2018). Resistance to group clinical supervision: A semistructured interview study of non-participating mental health nursing staff members. *International Journal of Mental Health Nursing*, 27(2), 783–793. https://doi.org/10.1111/inm.12365

Cleary, M., Horsfall, J., & Happell, B. (2010). Establishing clinical supervision in acute mental health inpatient units: Acknowledging the challenges. *Issues in Mental Health Nursing*, 31(8), 525–531. https://doi.org/10.3109/01612841003650546

Cook, O., Phuong, H., & Yeganeh, L. (2020). Australian specialist and advanced practice cancer nurses' engagement in clinical supervision—A mixed methods study. *Australian Journal of Cancer Nursing*, 21(2), 21–27. https://oi.org/10.33235/ajcn.21.2.21-27

Côté-Boileau, É., Denis, J. L., Callery, B., & Sabean, M. (2019). The unpredictable journeys of spreading, sustaining and scaling healthcare innovations: A scoping review. *Health Research Policy and Systems*, 17(1), 84. https://doi.org/10.1186/s12961-019-0482-6

Dawson, M., Phillips, B., & Leggat, S. G. (2012). Effective clinical supervision for regional allied health professionals—The supervisee's perspective. *Australian Health Review*, 36(1), 92–97. https://doi.org/10.1071/AH11006

Dilworth, S., Higgins, I., Parker, V., Kelly, B., & Turner, J. (2013). Finding a way forward: A literature review on the current debates around clinical supervision. *Contemporary Nurse*, 45(1), 22–32. https://doi.org/10.5172/conu.2013.45.1.22

Driscoll, J., Stacey, G., Harrison-Dening, K., Boyd, C., & Shaw, T. (2019). Enhancing the quality of clinical supervision in nursing practice. *Nursing Standard*, 34, 43–50. https://doi.org/10.7748/ns.2019.e11228

Dugstad, J., Eide, T., Nilsen, E. R., & Eide, H. (2019). Towards successful digital transformation through co-creation: A longitudinal study of a four-year implementation of digital monitoring technology in residential care for persons with dementia. *BMC Health Services Research*, 19(1), 366. https://doi.org/10.1186/s12913-019-4191-1

Fowler, J. (2010). Implementing clinical supervision: Case studies from Leicestershire, United Kingdom. In J. R. Cutcliffe, K. Hyrkas, & J. Fowler (Eds.), *Routledge Handbook of Clinical Supervision: Fundamental International Themes* (1st ed.). London: Routledge. https://doi.org/10.4324/9780203843437

Gonge, H., & Buus, N. (2015). Is it possible to strengthen psychiatric nursing staff's clinical supervision? RCT of a metasupervision intervention. *Journal of Advanced Nursing*, 71(4), 909–921. https://doi.org/10.1111/jan.12569

Gonge, H., & Buus, N. (2016). Exploring organizational barriers to strengthening clinical supervision of psychiatric nursing staff: A longitudinal controlled intervention study. *Issues in Mental Health Nursing*, 37(5), 332–343. https://doi.org/10.3109/01612840.2016.1154119

Hall, I. (2018). Implementing a sustainable clinical supervision model for isles nurses in Orkney. *British Journal of Community Nursing*, 23(3), 136–139. https://doi.org/10.12968/bjcn.2018.23.3.136

Health Service Executive (HSE). (2015). HSE HR Circular 002/15: Supervision Guidelines for Health & Social Care Professionals. https://www.hse.ie/eng/staff/resources/hr-circulars/circ00215.pdf

Institute for Behavioral Research. (2008). The Survey of Organizational Functioning (TCU SOF). Fort Worth. 4th December 2020 http://ibr.tcu.edu/wp-content/uploads/2013/06/SOF-sg.pdf

Kuzey, C. (2018). Impact of health care employees' job satisfaction on organizational performance support vector machine approach. *Journal of Economics and Financial Analysis*, 2(1), 45–68. https://doi.org/10.1991/jefa.v2i1.a12

Lehman, W. E. K., Greener, J. M., & Simpson, D. D. (2002). Assessing organizational readiness for change. *Journal of Substance Abuse Treatment*, 22(4), 197–209. https://doi.org/10.1016/S0740-5472(02)00233-7

Markey, K., Murphy, L., O'Donnell, C., Turner, J., & Doody, O. (2020). Clinical supervision: A panacea for missed care. 28(8), 2113–2117. https://doi.org/10.1111/jonm.13001

Martin, P., Baldock, K., Kumar, S., & Lizarondo, L. (2019). Factors that contribute to high-quality clinical supervision of the rural allied health workforce: Lessons from the coalface. *Australian Health Review*, 43(6), 682–688. https://doi.org/10.1071/AH17258

Martin, P., Kumar, S., Lizarondo, L., & Tyack, Z. (2016). Factors influencing the perceived quality of clinical supervision of occupational therapists in a large Australian state. *Australian Occupational Therapy Journal*, 63(5), 338–346. https://doi.org/10.1111/1440-1630.12314

Milne, D., Aylott, H., Fitzpatrick, H., & Ellis, M. V. (2008). How does clinical supervision work? Using a "best evidence synthesis" approach to construct a basic model of supervision. *The Clinical Supervisor*, 27(2), 170–190. https://doi.org/10.1080/07325220802487915

Nursing and Midwifery Council. (2018). *The Code: Professional Standards of Practice and Behaviour for Nurses*. Midwives and Nursing Associates. NMC. https://www.nmc.org.uk/standards/code/

Nursing and Midwifery Planning and Development Unit. (2018). Peer group clinical supervision framework for nurses and midwives working in HSE South Cork/Kerry. H. S. E. (HSE). http://hdl.handle.net/10147/627799

O'Shea, J., Kavanagh, C., Roche, L., Roberts, L., & Connaire, S. (2019). *Clinical Supervision for Nurses Working in Mental Health Services: A Guide for Nurse Managers, Supervisors and Supervisees*. H. S. E. Office of the Nursing and Midwifery Services Director. https://www.lenus.ie/handle/10147/626949?show=full

Pollock, A., Campbell, P., Deery, R., Fleming, M., Rankin, J., Sloan, G., & Cheyne, H. (2017). A systematic review of evidence relating to clinical supervision for nurses, midwives and allied health professionals. *Journal of Advanced Nursing*, 73(8), 1825–1837. https://doi.org/10.1111/jan.13253

Proctor, B. (2008). *Group supervision: A guide to creative practice* (2nd ed.). London: Sage. https://www.doi.org/10.4135/9781446221259

Rousmaniere, T. G., Swift, J. K., Babins-Wagner, R., Whipple, J. L., & Berzins, S. (2016). Supervisor variance in psychotherapy outcome in routine practice. *Psychotherapy Research*, 26(2), 196–205. https://doi.org/10.1080/10503307.2014.963730

Saab, M. M., Kilty, C., Meehan, E., Goodwin, J., Connaire, S., Buckley, C., Walsh, A., O'Mahony, J., McCarthy, V. J. C., & Horgan, A. (2020). Peer group clinical supervision: Qualitative perspectives from nurse supervisees, managers, and supervisors. *Collegian*. https://doi.org/10.1016/j.colegn.2020.11.004

Sheppard, F., Stacey, G., & Aubeeluck, A. (2018). The importance, impact and influence of group clinical supervision for graduate entry nursing students. *Nurse Education in Practice*, 28, 296–301. https://doi.org/10.1016/j.nepr.2017.11.015

Turner, J., & Hill, A. (2011). Implementing clinical supervision (part 2): Using Proctor's model to structure the implementation of clinical supervision in a ward setting. *Mental Health Nursing (Online)*, 31(4), 14–19.

Vandenbroucke, J. P., von Elm, E., Altman, D. G., Gotzsche, P. C., Mulrow, C. D., Pocock, S. J., Poole, C., Schlesselman, J. J., Egger, M., & STROBE Initiative. (2007). Strengthening the reporting of observational studies in epidemiology (STROBE): Explanation and elaboration. *Epidemiology*, 18(6), 805–835. https://doi.org/10.1097/EDE.0b013e3181577511

Watkins, C. (2011). Does psychotherapy supervision contribute to patient outcomes? Considering thirty years of research. *The Clinical Supervisor*, 30, 235–256. https://doi.org/10.1080/07325223.2011.619417

Wheeler, S., & Richards, K. (2007). The impact of clinical supervision on counsellors and therapists, their practice, and their clients. A systematic review of the literature. *Counseling and Psychotherapy Research*, 7(1), 54–65. https://doi.org/10.1080/14733140601185274

Williams, A. (2008). Ethnography. In R. Watson, H. McKenna, S. Cowman, & J. Keady (Eds.), *Nursing research designs and methods* (1st ed.). London: Churchill Livingstone Elsevier.

Winstanley, J., & White, E. (2019). *MCSS-26 User Manual©*. Cheshire, United Kingdom: White Winstanley Ltd.

Winstanley, J., & White, E. (2011). The MCSS-26 revision of the manchester clinical supervision scale using the rasch measurement model. *Journal of Nursing Measurement*, 3, 160–178. https://doi.org/10.1891/1061-3749.19.3.160

How to cite this article: Mc Carthy V, Goodwin J, Saab MM, et al. Nurses and midwives' experiences with peer-group clinical supervision intervention: A pilot study. *J Nurs Manag*. 2021;29:2523-2533. https://doi.org/10.1111/jonm.13404

Received: 2 March 2021 | Revised: 27 June 2021 | Accepted: 8 July 2021

DOI: 10.1111/jonm.13416

ORIGINAL ARTICLE

WILEY

Development of management structures for future nursing services in the Republic of Kazakhstan requires change of organizational culture

Hannele Tiittanen LicNSc, MSc(Ed), RN, Principal lecturer[1] |
Johanna Heikkilä PhD, RN, Senior Advisor[2] |
Zaure Baigozhina PhD, MD, Head of the Department for the Development of Medical Education[3]

[1]LAB University of Applied Sciences, Lahti, Finland

[2]JAMK University of Applied Sciences, Jyväskylä, Finland

[3]Republican Center for Health Development, Ministry of Health of the Republic of Kazakhstan, Nur-Sultan, Kazakhstan

Correspondence
Hannele Tiittanen, LAB University of Applied Sciences, Lahti, Finland.
Email: hannele.tiittanen@lab.fi

Abstract

Aim: This study's aim was to describe the development of new management structures for nursing services in pilot public healthcare organizations in the Republic of Kazakhstan by focusing on cultural change from the former Soviet system to the modern nursing management system.

Background: Because organizational culture plays an essential role in developing nursing management processes, the challenge in Kazakhstan is to change the deep-rooted Soviet administration practices, such as top-down management and the absence of a career structure in nursing, to meet the new public management system's requirements.

Method: Participatory method was used to generate organizational culture change in 31 pilot organizations.

Results: The organizational structures were reorganized with new nursing positions. Changes concerning nurses' job descriptions and educational requirements were introduced to the legislation. Workforce planning and work division between the healthcare professionals were suggested, allowing new operational functions for nurses. The implemented changes facilitate the culture change in the healthcare and nursing service system.

Conclusion: The shift of healthcare organizations towards a modern nursing management system has started in Kazakhstan.

Implications for Nursing Management: Good understanding and competence of cultural issues related to the change processes are critical in countries that are undergoing fundamental reforms in their healthcare systems.

KEYWORDS
Central Asia, delivery of healthcare, Kazakhstan, nursing management, organizational culture

1 | INTRODUCTION

Healthcare organizations have traditionally been authoritarian, top-down governed, but as this model has become more and more ineffective, their change into organizations that emphasized shared vision, inside and outside collaboration, as well as patient participation and empowerment has begun (Kickbusch & Gleicher, 2012). This is challenging healthcare organizations to redefine their strategies and operational functions at all levels. Organizational structure defines the way in which functions are organized, and roles, responsibilities, power and authority are assigned individuals and groups within organizations, so that the organizations are able to reach their goals (Janićijević, 2013; Lunenburg, 2012).

In addition, organizational strategy, structures, systems and management practices are related to the organizational culture. Mannion and Davies (2018) remark that healthcare organizational culture can be addressed through three layers. The first layer consists of the visible manifestations that are observable and communicated in practice, including the way services and roles are divided as well as staffing, reporting, a rewarding system and facilities. The second layer includes the shared ways of thinking, the values and beliefs that make everything justified, and the third layer the deeper shared assumptions that are taught in early education (hidden professional curriculum), containing national culture (Mannion & Davies, 2018). Organizational culture is relatively stable and helps people behave in an expected manner in their organization. Moreover, organizational culture is an essential concept for understanding people's behaviour within organizations as it is related to the performance and motivation people have in the organization (Janićijević, 2013), whereas workplace culture refers to the specific identifiable subculture of a department or employee group, such as doctors and nurses (Braithwaite et al., 2017). The culture is key in either facilitating or inhibiting the development processes in all parts of the organization.

Because nurses and midwives represent over 50% of the health workforce in healthcare organizations (WHO, 2016), an essential question is: What is the nurses' role in healthcare organizations, and how are they led? Modern leadership approaches have been found to positively affect nurses' job satisfaction, engagement and innovation, and there is clear evidence that nurse leaders have a positive impact on creating a patient-centred healthcare delivery system, for example, increasing patient safety as well as satisfaction and the quality of patient care (Hughes, 2018). Workplace culture among nurses has been studied, for example, in operating rooms (Eskola et al., 2016), psychiatric care (Kurjenluoma et al., 2017) and primary healthcare (Hahtela et al., 2015) through the constructs of job stress, job satisfaction and practice environment. The findings by Arundell et al. (2017) suggest that students' learning in clinical practice is affected by the workplace culture. Some studies also demonstrate a connection between workplace culture and patient outcomes (Braithwaite et al., 2017; Hahtela et al., 2017). In addition, organizational culture has been found to affect implementation of evidence-based practice (Li et al., 2018).

In Western countries, the need for nurse leaders is recognized, and they have been accorded positions within organizations' strategic management, whereas the situation is not the same in most of the post-Soviet countries. After the Soviet Union collapsed in 1991, although some of the former Soviet countries have made major reforms in their healthcare management systems, there are still countries that have not done so. Typically, the Soviet system was a centralized top-down government with strict norms and guidelines. The same top-down model—with ministry guidance, implementation monitoring and heavy reporting—has continued, even in its current healthcare facilities, maintaining authoritative organizational culture. This detailed reporting implies increased workload for individual physicians, and failure to follow protocols leads to legal consequences. In general, in former Soviet countries, the status of medical professionals other than doctors, especially nurses, has remained poor. Generally, nurses' education has been imparted in vocational colleges rather than higher education institutions, licensing is not a requirement, and nursing is still not considered a professional career (WHO, 2014).

Healthcare organizations need to respond to global societal changes and the population's healthcare needs, for example, ageing and pandemics (He et al., 2016; WHO, 2020). Further, globalization is posing a challenge to healthcare facilities, especially because the past structures and strategies are not guaranteeing the new required results. For leading the change, the new situation needs good strategies and competent leaders, who are capable change agents. The nation's cultural background affects the culture and structure of organizations and how they are managed and led. When faced with global challenges, innovative nations and organizations respond to changes better than the non-innovative ones (Strychalska-Rudzewicz, 2016).

Moonen's (2017) survey on the impact of culture on the innovative strength of European Union nations showed that moderate innovators belonged to countries—like Lithuania, Latvia and Romania—having a Soviet background, whereas the innovation leaders were from countries like Denmark, Finland, Germany and Sweden. Although this survey has not specifically reported the innovation situation in healthcare, nonetheless, it can be considered that correspondingly healthcare organizations, reflecting the national culture, to be capable to respond to the populations' care needs by innovations. Organizational structures having more flexibility and freedom will enable professionals to innovate solutions to the new demands of services in their work. Moreover, Wagner et al. (2014) reported that organizational structures that support care innovations are linked to advanced quality management systems in European hospitals. Furthermore, positive organizational and workplace culture has been found to be positively associated with patient outcomes in North American and European hospitals (Braithwaite et al., 2017).

The Republic of Kazakhstan has made ambitious reforms to its education and healthcare systems. Both the European Observatory on Health Systems and Policies and Glonti (2015) had reported attempts at increasing hospitals' managerial autonomy in comparison with other post-Soviet countries. The current Social Health Insurance Project has three components, in which the second component encompasses supporting the improvements in population services,

developing the health facility network, improving evidence-based healthcare delivery and management in the health sector and developing the human resources policy (Kamzebayeva, 2019).

The Republic of Kazakhstan joined the Bologna process, which supported it in modernizing its medical and nursing education. In 2015, the government set the aim of increasing its public health system's effectiveness through extensive nursing care reform, and the creation of new position of nurses to meet the modern societal challenges and international requirements, based on the European Commission's directive (2013/55/EU) concerning the requirements of nursing education and qualifications (European Commission, 2013).

In the Comprehensive plan for the development of nursing in the Republic of Kazakhstan, until 2020, the aim was to reform the healthcare organization structures on the basis of parallel and equal management structures, where nurses and physicians could work independently while being a part of a multidisciplinary team. In healthcare, neither legislations concerning nursing professionals' positions nor organizational structures had supported nurses in having top-level management positions in organizations. Medical doctors lead healthcare organizations, and nurses have been more to assist doctors and perform technical skills. Furthermore, at the management level, chief nurses were subordinates of a chief doctor. This situation has not made full use of the potential of both nurses and medical doctors. Nurses had been working as subsidiaries to physicians, and their general education levels in leadership positions had been low compared with international practice (Order of the Acting Minister of Health, 2014).

The strategic aims for development of nursing services are closely guided and monitored at the ministerial level, which, in this case, means that the required changes in nurses' new positions in healthcare settings are significantly changing nurses' roles in a relatively short time (Order of the Acting Minister of Health, 2014). One of the barriers was the population's cultural mentality, which aims to avoid uncertainty and therefore relies on traditions, resists reforms and does not trust the new nursing service model in medical organizations (Nezhina & Ibrayeva, 2013). In addition, representatives of medical organizations (doctors and administration heads) were used to seeing nurses as doctors' assistants, reflecting the model of medical care, which was formed in the countries of the Soviet period (Baygozhina et al., 2018).

Based on the nursing education reforms in 2018, the first group of nurses graduated with competences fulfilling the European Commission's Directive (2013/55/EU) requirements, which are defined in Kazakhstan as a nurse with extended practice (bachelor's in nursing). The increase in the proportion of nurses with extended practice is determined by the key indicator of the State Program for the Development of Healthcare for 2020–2025. Until 2025, the need to increase the share of nurses with extended practice in the total number of nursing personnel in the healthcare system of the Republic was determined as up to 18% (Order of the Minister of Health, 2019).

This study's aim is to describe the development of new management structures for nursing services in the Republic of Kazakhstan's pilot public healthcare organizations in seven regions of Kazakhstan. Its focus is mainly on cultural changes from the former Soviet system to the modern nursing management system.

2 | METHODS AND DESIGN

A participatory development process was used to facilitate the new management structures' development for nursing services during 2018–2019. The participatory development process entails the involvement of ordinary people (here chief physicians, chief and senior nurses) in a development process leading to change. From the institutional point of view, participation was used as a tool to achieve the pre-existing goals defined by the Ministry of Healthcare: From the social point of view, it was used to empower the people to handle challenges and influence the direction of their own life. The aim was to build the ownership by the participating people and organizations to ensure relevant outcomes and impact for the health services (Tufte & Mefalopulos, 2009.)

The goals were set in the national strategies and outlined in the development project's objectives by representatives of the Ministry of Healthcare to support the reorganization of the 31 pilot organizations' management structure and the division of work between the physicians and nurses; enhance the knowledge of the contemporary management systems in healthcare; and build a common understanding of the reorganized structure and management system in pilot organizations.

The process consisted of Finnish experts' continuous discussions with representatives of the Ministry of Healthcare and Republican Center for Health Development (RCHD); local working groups nominated for this purpose; providing two workshops for the management of pilot organizations; expert advice in the form of reports with recommendations to the Ministry of Healthcare; and expert reviews of created methodological recommendations. Actions are described in more detail in Table 1.

During the workshops, international examples with illustrations and figures on various organizational structures, positions, job descriptions, staffing and other issues were presented to clarify the changes in practice. The work was organized in small groups with mixed professionals to make regional comparison and networking with same types of organizations possible. The majority of the time was used to discuss, reflect and work with future organizational structures, the job descriptions of the new positions and workforce planning.

The Ministry of Healthcare chose and appointed 31 pilot organizations from seven different regions of Kazakhstan, where the first graduates with internationally comparable nursing education graduated in 2018. The pilot organizations represented all the main types of the Kazakhstan public healthcare system: perinatal centres, multiprofile hospitals, polyclinics and paediatric hospitals. During the development process, the pilot organizations' chief doctors ($n = 8$) as well as chief and senior nurses ($n = 32$) worked together to solve the challenges related to the organizations' issues for achieving the set strategic goals of the Comprehensive plan for the development of nursing until 2020.

TABLE 1 Phases and activities of the participatory development process

Phases	Activities
Groundwork	Goal setting in the strategy documents
	Order of the Minister of Health on the pilot and the organizations
	Legislative changes in the education system and financing system of healthcare facilities (HCF)
	World Bank development project SHIP
Planning	Discussions with the MoH, RCHD and World Bank on the needed changes and the implementation of the activity concerning management system changes in HCFs
Organization of the Workshop I in 2018 (5 days)	Outlining the development process and requirements for participants
	Choosing the methodology and creation of working templates
	Collection of basic data from each organization
Reflection in the pilot organizations	Creation of future organizational structures, positions, job descriptions and staffing tables
Organization of the Workshop II in 2019 (3 days)	Presentations of organizational solutions
	Collection of problems to be solved in legislative documents
Disseminating and ensuring sustainability	Writing a report with recommendations
	Expert feedback on the methodological guidelines

3 | RESULTS

During the first workshop, an agreement was formulated with the identification of changes needed in regulatory documents. The best international practices and examples on the issues of nursing management were presented to create a common understanding and outline possible future directions, followed by groups working on changes needed in the regulatory documents with similar organizational settings from different regions. The results and suggestions through group work were processed through a consensus discussion.

The new organizational structures were designed by firstly describing the current organizational structures of the pilot organizations and the positions at different levels and secondly suggesting the future structure to the participants with the changes needed for including the new nursing positions. The chief doctors as well as the chief and senior nurses defined the nursing management positions in their organizations at the strategic apex and middle line levels. Mintzberg's organization theory was used as a framework for the positions (Lunenburg, 2012).

Job descriptions with educational requirements were also identified from the regulatory documents. The participants composed concrete examples of the new functions of nurses with extended practice in the pilot organizations and proposed the quantities of physicians, nurses and other personnel needed at different organizational levels in each organization for the successive years until 2025. The pilot public healthcare organizations' chief doctors as well as chief and senior nurses defined the division of work and created new staffing. For the participants, it was challenging to conduct systematic assessments and anticipate the needed nursing workforce, as it required a deep understanding of nurses' roles, skill mix and regional demographics.

Overall, because the participatory way of working was relatively new for the chief doctors as well as the chief and senior nurses, realizing the genuine possibilities to change the organization structures and positions was difficult for the participants. The discussions might first have reflected the authorial organization culture they were representing. However, one week of intensive working and discussing in an open atmosphere, which allowed critical opinions, was productive, and the participants slowly understood the possible impact of their work to the future management system.

As a result of the development process, large organizations agreed to have the new position of Deputy Vice Director in nursing, along with other Vice Directors at the strategic apex level. The tasks of these positions would focus on strategic planning and monitoring the progression towards the organization's vision and targets. In smaller organizations, it was agreed that the highest position of nursing leaders situated in the middle level would be the Chief Nurse, whose tasks would focus on organizing the nursing work in departments. It was also agreed that there should be more chief nurses to have a strong team of chief nurses to develop and support the new model of working and implement evidence-based nursing and that senior nurses would belong to the middle level, by virtue of being at the frontline to lead daily nursing work in the departments. It was proposed that nurses with extended practice would be eligible to apply for senior nurse positions. At the operative level, they would work as team leaders with nurses and junior nurses. These new positions allow completely new operational functions for nurses (e.g. leadership and decision-making responsibilities and independent duties in organizations).

During the second workshop, the participants presented their organizations' progress and created recommendations for proposed changes in the organizational structure based on the new orders (Nos. 775, 791 and 1043), in terms of the parallel structure of the medical and nursing services, positions of the chief and senior nurses, introduction of extended practice nurses and the nursing team. To support the understanding of organizational changes and its implementation, a guideline of unified recommendations for practical healthcare organizations on the effectuation of a model for the organization of nursing services (Kulanchieva et al., 2019) was formulated.

Since 2019, within the framework of the National Project "Consulting Services for the Development of the Professional Environment of Nursing Professionals and Improvement of the Nursing Retraining Systen", a new nursing service management system has been introduced in 31 pilot medical organizations in seven regions of the Republic. Figure 1 summarizes the results of participatory working.

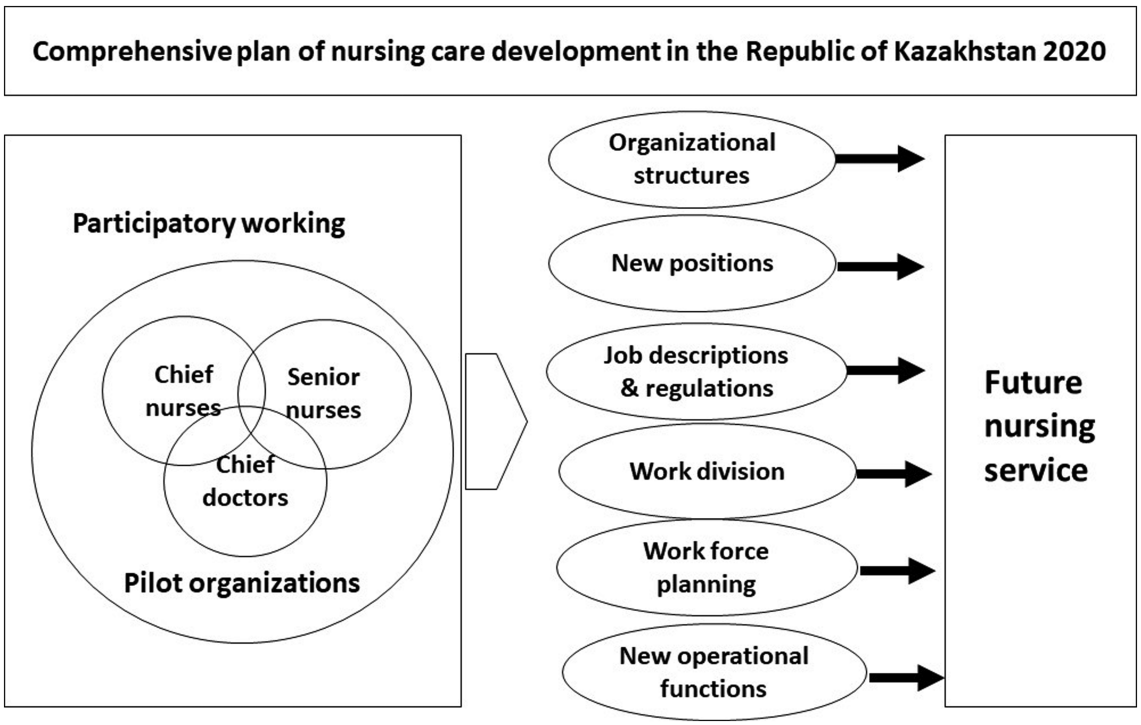


FIGURE 1 Results of participatory working

4 | DISCUSSION

The participatory development process of new management structures for nursing services in the pilot public healthcare organizations in Kazakhstan has led to legislative changes, recommendations and policy papers, confirming that nurses currently have the prospect for new, more independent positions at all levels in healthcare organizations. The created national fundamentals for the nursing management system are the visible manifestations for the new organizational culture; however, it will require time for the shared ways of thinking and the deeper assumptions to change. It is good to remember that legislative changes by themselves do not guarantee a successful change in healthcare organizations, unless the top management does not determine the need for culture change and consider culture management as a crucial management competency (Őnday, 2016).

Monobayeva and Howard (2015) pointed out the difficulties in changing the deep-rooted Soviet administration practices to meet the new public management requirements. For example, at the organizational level, it means that ongoing control does not encourage innovations or the development of managerial capacities but discourages people from responding to challenges and adapting to changes (ICN, 2016). During the participatory development process, it was challenging for the chief nurses and doctors to comprehend that they could influence by participating and giving their suggestions for the regulatory documents and that their opinions on the practical problems in staff positions and requirements would be considered. As many of the participants were senior staff members with experience of the former Soviet culture, they expected the solutions to come from the ministry or from the foreign experts.

Among the post-Soviet Central Asian countries, the Republic of Kazakhstan has been the most active and ambitious to reform its public administration (Monobayeva & Howard, 2015). Its health system reforms and nursing system development have significantly strengthened the role of nurses in healthcare. It has reformed its nursing education at all levels—vocational and higher levels of education—to fulfil the European nursing education requirements and established masters' and doctoral degree programmes (Order of the Minister of Health, 2020). Educational reforms give a totally new status and offer career possibilities for nurses. The new educational programmes contain courses on nursing management and support the new generation's shared way of thinking as well as the deeper shared assumptions on the role of nurses and their power in the management of services (Mannion & Davies, 2018). The reforms in nursing education have been fast, and as nurses with the new status graduate and enter healthcare organizations, it starts to disturb the old culture in organizations. However, the education of other healthcare professionals, especially medical professionals, needs to address these changes as well to support the organizational culture change.

An additional challenge to overcome in reforms is the organization's external culture. A study by Nezhina and Ibrayeva (2013) emphasized that despite a cultural heritage of Soviet times, a society

tends to withstand modernization. Because healthcare service clients in Kazakhstan and other Central Asian post-Soviet countries are used to consulting specialized physicians, not nurses, in connection with their health issues (WHO, 2014), the external culture is not supporting nurses to have more independent roles, or even more, to have their own appointments. Nurse leaders play a key role of interacting with the public to build trust between the clients and the service system, because they have competences to respond the clients' care needs. Such external relationships are important to support resilient healthcare services for the population (ICN, 2016).

5 | CONCLUSIONS

The development of new management structures for nursing services in the Republic of Kazakhstan is gradually progressing in all healthcare organizations, and not just in pilot public healthcare organizations. The organizational culture change has started from the post-Soviet system to the modern nursing management system, where the nurse leaders have recognized positions at all levels of healthcare organizations. The approach used to generate the organizational culture change in pilot organizations was a participatory method where the chief physicians and chief nurses of the pilot organizations defined the division of work and staffing in cooperation. As the changes needed in nursing service systems are fundamental, the strength of the development process was that the chief physicians and chief nurses were working together to achieve a common understanding of the needed changes. The commonalities of their work led to legislative changes that guarantee the sustainability of nursing service development.

The Republic of Kazakhstan is showing other post-Soviet countries in Central Asia the way for nursing service development, which is important to make the culture influence visible in change situations. O'Donell and Boyle (2008) state that when organizations are implementing major reforms, cultural issues are particularly important, especially if the reforms change the old culture and value traits, and therefore, cannot be underestimated. The cultural changes described here have a profound impact on the healthcare system, as the roles of nurses change to respond to the modern understanding of nurses' competences and independent roles. This also has an impact on the people living in Kazakhstan, as in the future, they can also receive health services from nurses. In post-Soviet countries, improvements in the quality and safety of healthcare are strongly dependent on the development of nursing work. This means that nursing education needs to be at a higher level so that nurses can work at their full potential, especially because in healthcare organizations, there are nurse leaders leading the nursing work at all levels in the organization.

Prior research relevant to nursing leadership and culture influence in the post-Soviet country context is very limited, and therefore, more research is needed in the future in this area. Further research utilizing internationally validated questionnaires (e.g. Eskola et al., 2016; Hahtela et al., 2015) would help nurse leaders to focus on cultural issues when developing nursing services. This is especially important in post-Soviet countries, where history and external culture strongly influence the healthcare system, and nursing work in particular. The described development process has potential limitations related to the participatory methodology and its implementation. Although the main development aims were achieved, the effect of cultural issues on the transition phase of the pilot organizations was not emphasized enough, which can hinder the progress of nursing service modernization.

6 | IMPLICATIONS FOR NURSING MANAGEMENT

Effective nursing management requires a good understanding of cultural issues and competences related to change processes. Nurse leaders drive change processes (WHO, 2016), and an integral component of successful change is to understand the importance of the assessment of cultural influences and have adequate culture competences to lead the change process. Developing cultural competences among nurse leaders is of critical importance, especially in countries where fundamental reforms are implemented or planned to be implemented in healthcare systems. However, there are considerable barriers in developing the nurse leaders' culture competences when the top management does not understand the importance of the impact of cultural issues on modernization or there is controversy between the different healthcare professionals. Future strategies should recognize culture as an important element that needs to be developed systematically in the organization to support the change processes and overall organizational strategy. As the focus on nursing service development is crucial in Central Asian post-Soviet countries, the recognition of nurse management education and nurse management positions will be of increasing importance.

ACKNOWLEDGEMENTS

We would like to thank specialist Jonna Reinikainen for her assistance. This development process was supported by the Kazakhstan Social Health Insurance Project—Modernization of Education System for Nurses.

CONFLICTS OF INTEREST

The authors declare no conflicts of interests.

ETHICAL STATEMENT

No ethical approval was required for this article.

DATA AVAILABILITY STATEMENT

Data sharing not applicable—no new data generated.

ORCID

Hannele Tiittanen https://orcid.org/0000-0002-7694-6842
Johanna Heikkilä https://orcid.org/0000-0001-8255-3618
Zaure Baigozhina https://orcid.org/0000-0001-7098-6782

REFERENCES

Arundell, F., Mannix, J., Sheehan, A., & Peters, K. (2017). Workplace culture and the practice experience of midwifery students: A meta-synthesis. *Journal of Nursing Management*, 26(3), 302–313. https://doi.org/10.1111/jonm.12548

Baygozhina, Z. A., Koikov, V. V., Shalkharova, Zh. S., Umbetzhanova, A. T., & Bekbergnova, Zh. B. (2018). Внедрение новой модели управления сестринской службой в организациях здравохранения для повышения эффективности деятельности специалистов сестринского дела и их вклад в охрану здоровья населения в РК [Implementation of a new model of nursing service in health care organizations to improve the efficiency of nursing specialists and their contribution to protecting the health of the population of the Republic of Kazakhstan]. Astana. http://www.rcrz.kz/docs/Policy%20brief/ВНЕДРЕНИЕ НОВОЙ МОДЕЛИ УПРАВЛЕНИЯ СЕСТРИНСКОЙ СЛУЖБОЙ В ОРГАНИЗАЦИЯХ ЗДРАВООХРАНЕНИЯ.pdf. Accessed December 18, 2020.

Braithwaite, J., Herkes, J., Ludlow, K., Testa, L., & Lamprell, G. (2017). Association between organizational and workplace cultures, and patient outcomes: Systematic review. *BMJ Open*, 7, e017708. https://doi.org/10.1136/bmjopen-2017-017708

Eskola, S., Roos, M., McCormack, B., Slater, P., Hahtela, N., & Suominen, T. (2016). Workplace culture among operating room nurses. *Journal of Nursing Management*, 24(6), 725–734. https://doi.org/10.1111/jonm.12376

European Commission. (2013). Directive 2013/55/EU of the European parliament and of the council of 20 November 2013 amending directive 2005/36/EC on the recognition of professional qualifications and regulation (EU) no 1024/2012 on administrative cooperation through the internal market information system ('the IMI regulation'). http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:354:0132:0170:en:PDF. Accessed September 8, 2020.

European Observatory on Health Systems and Policies, & Glonti, K. (2015). Challenges in specialised and inpatient services in former Soviet countries. *Eurohealth*, 21(2), 7–10.

Hahtela, N., McCormack, B., Doran, D., Paavilainen, E., Slater, P., Helminen, M., & Suominen, T. (2017). Workplace culture and patient outcomes: What's the connection? *Nursing Management*, 48(12), 36–44. https://doi.org/10.1097/01.NUMA.0000526910.24168.ee

Hahtela, N., Paavilainen, E., McCormack, B., Helminen, M., Slater, P., & Suominen, T. (2015). Nurses' perceptions of workplace culture in primary health care in Finland. *International Nursing Review*, 62(4), 470–478. https://doi.org/10.1111/inr

He, W., Goodkind, D., & Kowal, P. (2016). An aging world: 2015. International Population Reports, P95/16-1. U.S. Census Bureau, Washington, DC. https://www.census.gov/content/dam/Census/library/publications/2016/demo/p95-16-1.pdf. Accessed April 22, 2021.

Hughes, V. (2018). What are the barriers to effective nurse leadership? A review. *Athens Journal of Health*, 5(1), 7–20. https://doi.org/10.30958/ajh.5-1-1

ICN. (2016). Nurses: A force for change: Improving health systems' resilience. International Nurses Day 2016. International Council of Nurses. https://www.mzcr.cz/wp-content/uploads/2013/04/IND_Kit_2016.pdf. Accessed November 7, 2020.

Janićijević, N. (2013). The mutual impact of organizational culture and structure. *Economic Annals*, 58(198), 35–60. https://doi.org/10.2298/EKA1398035J

Kamzebayeva, L. (2019). Kazakhstan - EUROPE AND CENTRAL ASIA- P152625- social health insurance project: Improving access, quality, efficiency and financial protection - procurement plan (English). Washington, D.C.: World Bank Group. Document Date: 2019/09/16. http://documents.worldbank.org/curated/en/145441568641890316/Kazakhstan-EUROPE-AND-CENTRAL-ASIA-P152625-Social-Health-Insurance-Project-Improving-Access-Quality-Efficiency-and-Financial-Protection-Procurement-Plan. Accessed December 15, 2020.

Kickbusch, I., & Gleicher, D. (2012). *Governance for Health in the 21st Century*. Geneva: World Health Organization. https://www.euro.who.int/__data/assets/pdf_file/0019/171334/RC62BD01-Governance-for-Health-Web.pdf

Kulanchieva, Zh. A., Smailova, D. S., Baygozhina, Z. A., & Abenova, K. T. (2019). Единые рекомендации организациям практического здравоохранениядо внедрению модели организации сестринских услуг (Методические рекомендации) [Unified recommendations for practical healthcare organizations on the implementation of a model for the organization of nursing services]. Ministry of Health of the Republic of Kazakhstan. Project "Social Health Insurance". http://www.rcrz.kz/files/Методические рекомендац.pdf. Accessed December 15, 2020.

Kurjenluoma, K., Rantanen, A., McCormack, B., Slater, P., Hahtela, N., & Suominen, T. (2017). Workplace culture in psychiatric nursing described by nurses. *Scandinavian Journal of Caring Sciences*, 31(4), 1048–1058. https://doi.org/10.1111/scs.12430

Li, S.-A., Jeffs, L., Barwick, M., & Stewens, B. (2018). Organizational contextual features that influence the implementation of evidence-based practices across healthcare settings: A systematic integrative review. *Systematic Reviews*, 7, 72. https://doi.org/10.1186/s13643-018-0734-5

Lunenburg, F. C. (2012). Organizational structure: Mintzberg's framework. *International Journal of Scholarly, Academic, Intellectual Diversity*, 14(1), 1–7.

Mannion, R., & Davies, H. (2018). Understanding organisational culture for healthcare quality improvement. *BMJ*, 363, k4907. https://doi.org/10.1136/bmj.k4907

Monobayeva, A., & Howard, C. (2015). Are post-soviet republics ready for the new public management? The case of educational modernization in Kazakhstan. *International Journal of Public Sector Management*, 28(2), 150–164. https://doi.org/10.1108/IJPSM-08-2014-0102

Moonen, P. (2017). The impact of culture on the innovative strength of nations. A comprehensive review of the theories of Hofstede, Schwartz, Boisot and Cameron and Quinn. *Journal of Organizational Change Management*, 30(7), 1149–1183. https://doi.org/10.1108/JOCM-08-2017-0311

Nezhina, T. G., & Ibrayeva, A. R. (2013). Explaining the role of culture and traditions in functioning of civil society organizations in Kazakhstan. *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, 24(2), 335–358. https://doi.org/10.1007/s11266-011-9256-7

O'Donell, O., & Boyle, R. (2008). Understanding and managing organisational culture. CPMR Discussion Paper. Institute of Public Administration, Dublin, Ireland.

Őnday, Ö. (2016). Organization culture theory: From organizational culture of Schein to appreciative inquiry of Cooperrider & Whitney. *Elixir Human Research Management*, 92, 39002–39008.

Order of the Acting Minister of Health of the Republic of Kazakhstan. (2014). Comprehensive plan for the development of nursing in the Republic of Kazakhstan until 2020. https://online.zakon.kz/Document/?doc_id=39860292#pos=1;-63

Order of the Minister of Health of the Republic of Kazakhstan. (2019). On the approval of conceptual approaches to the development of human capital in health care until 2025. https://online.zakon.kz/Document/?doc_id=39918202#pos=0;66.4000015258789. Accessed November 14, 2020.

Order of the Minister of Health of the Republic of Kazakhstan. (2020). On amendments to the order of the Acting Minister of Health and Social Development of the Republic of Kazakhstan dated July 31, 2015 No. 647 "On approval of state compulsory standards and standard professional training programs in medical and pharmaceutical specialties". http://adilet.zan.kz/rus/docs/V2000020071. Accessed November 14, 2020.

Strychalska-Rudzewicz, A. (2016). The impact of national culture on the level of innovation. *Journal of Intercultural Management*, 8(1), 121–145. https://doi.org/10.1515/joim-2016-0006

Tufte, T., & Mefalopulos, P. (2009). Participatory communication. A practical guide. World Bank Working Paper No. 170. https://openknowledge.worldbank.org/handle/10986/5940. Accessed April 22, 2021.

Wagner, C., Mannion, R., Hammer, A., Groene, O., Arah, O. A., Dersarkissian, M., & Suñol, R. (2014). The associations between organizational culture, organizational structure and quality management in European hospitals. *International Journal for Quality in Health Care*, 26(S1), 74–80. https://doi.org/10.1093/intqhc/mzu027

WHO. (2014). In R. Bernd, E. Richardson, & M. McKee (Eds.), *Trends in health systems in the former Soviet countries*. Observatory Studies Series, 35. European Observatory on Health Systems and Policies.

WHO. (2016). Global strategic directions for strengthening nursing and midwifery 2016–2020. https://www.who.int/hrh/nursing_midwifery/global-strategic-midwifery2016-2020.pdf. Accessed September 26, 2020.

WHO. (2020). COVID-19: Operational guidance for maintaining essential health services during an outbreak. https://apps.who.int/iris/bitstream/handle/10665/331561/WHO-2019-nCoV-essential_health_services-2020.1-eng.pdf?sequence=1&isAllowed=y Accessed 22.4.2021

How to cite this article: Tiittanen H, Heikkilä J, Baigozhina Z. Development of management structures for future nursing services in the Republic of Kazakhstan requires change of organizational culture. *J Nurs Manag*. 2021;29:2565-2572. https://doi.org/10.1111/jonm.13416

Received: 28 January 2021 | Revised: 23 June 2021 | Accepted: 15 July 2021

DOI: 10.1111/jonm.13424

ORIGINAL ARTICLE

WILEY

Nursing staff ratio and skill mix in Swedish emergency departments: A national cross-sectional benchmark study

Maria A. Amritzer RN, CNS (Emerg Care), PhD student[1,2] |
Åsa Muntlin RN, CNS (Emerg Care), PhD, Associate Professor[3,4,5] |
Lena M. Berg RN, PhD, Associate Senior Lecturer of Caring Sciences[6] |
Katarina E. Göransson RN, PhD, Associate Professor[2,7]

[1]Emergency and Reparative Medicine Theme, Karolinska University Hospital Huddinge OO H, Stockholm, Sweden

[2]Department of Medicine, Karolinska Institutet, Stockholm, Sweden

[3]Department of Emergency Care and Internal Medicine, Uppsala University Hospital, Uppsala, Sweden

[4]Department of Medical Sciences/Clinical Epidemiology, Uppsala University, Uppsala University Hospital, Uppsala, Sweden

[5]Department of Public Health and Caring Sciences/Health Services Research, Uppsala University, Uppsala, Sweden

[6]School of Education, Health and Social Studies, Dalarna University, Falun, Sweden

[7]Emergency and Reparative Medicine Theme, Karolinska University Hospital, Stockholm, Sweden

Correspondence
Maria A. Amritzer, Karolinska University Hospital Huddinge OO H, Emergency and Reparative Medicine Theme, Hälsovägen 13, S-141 57 Huddinge, Stockholm, Sweden.
Email: maria.amritzer@ki.se

Funding information
Uppsala University Hospital, Department of Emergency Care and Internal Medicine; Karolinska University Hospital, Emergency Medicine Function

Abstract

Aim: The aim of this study is to describe ratio and skill mix for nursing staff in Swedish emergency departments over a specific 24-h period.

Background: The link between number of patients per nursing staff and missed nursing care is well described within the in-hospital setting, showing association with negative outcomes such as increased mortality. Potential association within the emergency department setting is still unexplored.

Method: This is a national descriptive cross-sectional benchmark study.

Results: The majority ($n = 54$; 89%) of Swedish emergency departments participated. The patients-per-registered nurse ratio varied between the shifts, from 0.3 patients to 8.8 patients (mean 3.2). The variation of patients per licenced practical nurse varied, from 1.5 to 23.5 patients (mean 5.0). The average skill mix was constant at around 60% registered nurses and 40% licenced practical nurses.

Conclusion: The varying ratios for patient per registered nurse and licenced practical nurse in Swedish emergency departments are noteworthy. Furthermore, the patient flow and nursing staff numbers did not match one another, resulting in higher nursing staff ratios during the evening shift.

Implications for Nursing Management: Findings can be used to improve rosters in relation to crowding, to manage the challenging recruitment and retention situation for nursing staff and to improve patient safety.

KEYWORDS
emergency departments, nursing staff hospital, patient safety, registered nurse, workload

Maria A. Amritzer and Åsa Muntlin shared first authorship.

1 | INTRODUCTION

The association between patients-per-registered nurse (RN) ratio (the amount of patients each RN tends to) and patient outcome at in-hospital wards is well documented (Lankshear et al., 2005). For example, one well-cited multicentre study including in-hospital wards at 300 hospitals in nine European countries identified that an increase in the workload of nurses by one patient (above a 6:1 ratio) increased the likelihood of inpatient hospital mortality by 7% (Aiken et al., 2014). The likelihood of death decreases by 7% with a 10% increase in bachelor degrees among the nurses (Aiken et al., 2014). Moreover, a study by Needleman et al. (2011) found a significant association between increased mortality in patients and locations where the number of RNs was below the estimated target level (Needleman et al., 2011).

Missed nursing care is believed to be a mediator of the association between patients-per-RN ratio and mortality at in-hospital wards, as the amount of missed nursing care is associated to the number of patients under one RN's care (Ball et al., 2014). Missed nursing care, also known as care left undone, is defined as any aspect of required patient care that is omitted (in part or in whole) or delayed (Kalisch et al., 2009). One study identified that a 10% increase in missed nursing care was associated with a 16% increase in the likelihood of 30-day inpatient mortality (Ball et al., 2018). Frequently found reasons for missed nursing care are lack of staffing, material resources and miscommunication (Kalisch & Xie, 2014). Another study, Ball et al. (2014) showed that when RNs reported lack of time, for example, when caring for six or more patients simultaneously, the level of missed nursing care increased.

The amount of missed nursing care does not decrease if surrounding functions, such as increase in support staff, because this care seems to be closely connected to the level of RNs (Ball et al., 2014, 2016; Griffiths et al., 2018). Support staff can have different competences and roles, such as being unregistered nurses/licenced practical nurses (LPNs), and deliver nursing care, although RNs are responsible for the provided nursing care. A literature review around skill mix (proportion of RNs to unregistered nurses, i.e., LPNs) at in-hospital wards favours a higher proportion of RNs to LPNs, as research indicates that RNs are the key group in achieving patient safety (Griffiths et al., 2014). A simultaneous low RN and support staff level is correlated with risk for patients (Needleman et al., 2020).

International studies and literature reviews state that crowding is a patient safety risk in the emergency department (ED) (af Ugglas et al., 2020; Berg et al., 2019; Morley et al., 2018; Rasouli et al., 2019). Crowding occurs when the identified need for emergency services exceeds available resources for patient care (American College of Emergency Physicians, 2019). The association between crowding and mortality has yet not been fully understood. Based on the knowledge that the amount of missed nursing care is associated with the number of patients under one RN's care (Ball et al., 2014), there is a reason to believe that missed nursing care might be a mediator between crowding and mortality. Research on patients-per-RN ratios and skill mix, as well as their associations with patient safety outcomes, are to a large extent unexplored in the ED setting (Recio-Saucedo et al., 2015). One recently published study investigated staffing levels, among other things, at five prespecified time points during a 24-h period found an average of 2.6 patients per RN and 4.6 per LPN (Wretborn et al., 2020). Nelson et al. (2018) identified that higher levels of RN staffing in the ED were associated with better patient care experience ratings. ED length of stay also seems to be affected by the RN ratio, because time to diagnostic evaluation increased significantly when RNs cared for a higher number of patients (Shindul-Rothschild et al., 2017). Staffing decisions are complex, and there is no evidence to suggest that a ratio based solely on the number of patients is sufficient. Patient acuity, nursing experience and skill mix should also guide the staffing decisions (Wolf et al., 2017).

Therefore, it is important to continue to investigate patients-per-RN ratio in the EDs. We designed this study as a first step around understanding the association between ED crowding and mortality and based on the knowledge from in-hospital wards. Because information from EDs to a large extent is lacking in the scientific community, this study is aiming to describe ratio and skill mix for nursing staff in Swedish EDs over a specific 24-h period.

2 | METHODS

2.1 | Study design

This is a descriptive cross-sectional design utilizing a study protocol.

2.2 | Sample and setting

All Swedish hospital-based EDs ($N = 61$) were eligible for participation. These EDs are open every day, 24 h, and primarily see patients with somatic conditions. Some of the EDs included may also see paediatric patients and patients with mental health conditions. Exclusion criteria were single speciality emergency care clinics, children-only EDs and EDs not within a hospital.

Sweden, with a population of 10 million, is divided into municipalities and regional councils. The Swedish health care system is primarily tax funded, making health care accessible to all Swedish citizens (Swedish Institute, 2021). In the present study, we refer to the hospital categories used in the annual ranking of Swedish hospitals: university hospitals, mid-size hospitals (ED open 24/7 including maternity and obstetric care) and small hospitals (ED open 24/7 without maternity and obstetric care) (Dagens Medicin, 2020). Bedside staff at Swedish EDs consist primarily of physicians, RNs and LPNs. The RNs have a bachelor's degree in Nursing and are responsible for nursing care. RNs and physicians with specialist training in emergency nursing/emergency medicine are still rare, because these are fairly new specialties in Sweden. LPNs have a high school diploma and are assistants to physicians and RNs.

2.3 | Data collection

All EDs eligible for participation were contacted by telephone or email to inform them about the study, ask for verbal consent and identify a contact person (to fill out the study protocol). The initial contact was made with the head nurse or manager of the ED. They identified contact persons to fill out the protocol (often the nurse in charge of the shift). Prior to the data collection, the study protocol and written informed consent (to be signed and returned) was sent via email to the contacts at the study sites.

For data collection, a study-specific protocol (see Data S1) was designed by members of the Scientific Advisory Board at the Swedish Emergency Nurses Association (SENA), based on previous research on RN-to-patient ratios and a Swedish study around ED crowding (Wretborn et al., 2020). Prior to data collection, a pilot test was conducted, resulting in minor changes in the study protocol. The protocol comprised of two parts. Part A is composed of rows for 24 consecutive hours (from 07:00 on 16 September to 06:59 on the 17 September 2019), where the number of patients, RNs and LPNs, respectively, present at the ED at one time point for each hour was documented. Each time point was chosen by the person dedicated to fill out the protocol and could be any time during each 1-h interval. All RNs and LPNs on duty at the ED during the chosen time point were included, including those working in triage, resuscitation rooms and as charge nurses. Nursing staff with strictly administrative roles without patient contact or engagement in daily operations, staff under introduction and students were excluded. Part B covered data on ED characteristics such as type of hospital, annual number of patients, ordinary number of nursing staff per shift (day, evening and night shifts and staffing across shifts, e.g., special shifts from 16:00 to 02:00) and the organization's perception as to whether the patient level was representative on the day of the study.

2.4 | Data analysis

For data analysis, the hospitals were grouped into the three previously mentioned categories (Dagens Medicin, 2020). Hospitals with multiple sites were registered as separate hospitals. IBM SPSS Statistics 25 software was used to collate and analyse the data. Data were analysed through descriptive statistics analysis, and to enable comparison to previous research, mean and standard deviation (SD) were used to describe the central tendency. Also, minimum–maximum was presented, to further visualize the spread of data and facilitate clinical understanding. Means over time periods (24 h and different shifts) were calculated by adding total number of patients and dividing them by the total number of RNs or LPNs working during the same time period. Two hospitals did not have LPNs during night shift, and one did not have LPNs during evening shift, and those hospitals were therefore excluded in the patient per LPN calculations.

2.5 | Ethical considerations

Ethical approval was obtained from the regional Ethical Review Board in Stockholm (2019-02704), and the management staff of the EDs gave their written consent for the data to be collected. To ensure confidentiality, findings were presented on a group level.

3 | RESULTS

3.1 | Demographic data

A total of 89% ($n = 54$) of the hospital-based EDs in Sweden took part in this study. The hospitals were representative for the Swedish

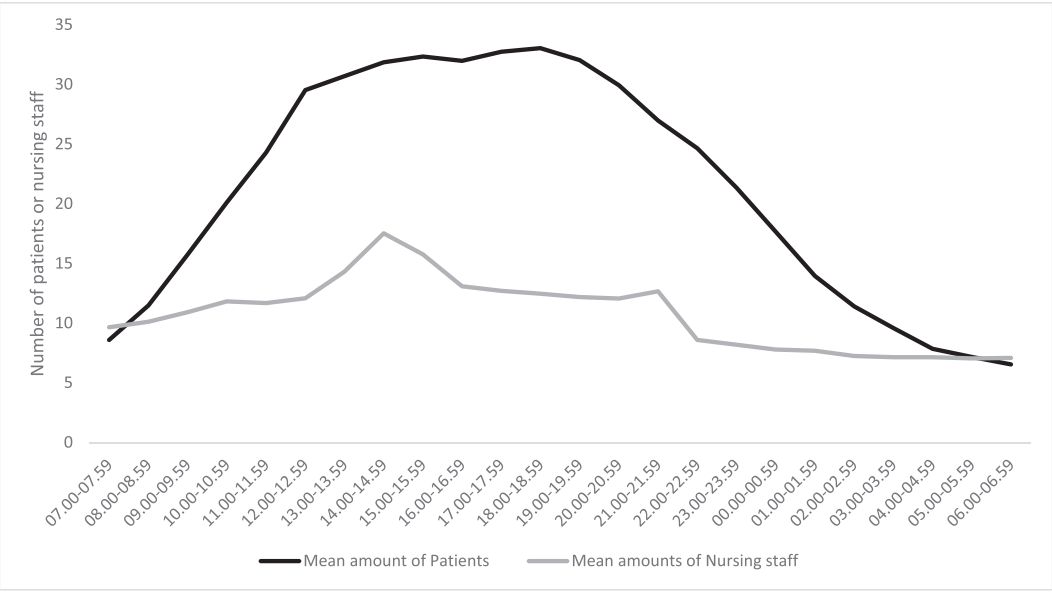


FIGURE 1 Mean number of patients and nursing staff (registered nurses and licenced practical nurses) in 54 Swedish emergency departments over a specific 24-h period

ED context with regard to hospital category as nine of 10 university hospitals, 30 of 34 mid-sized hospitals and 15 of 17 smaller hospitals took part. The EDs were geographically spread across the country, and the majority (94%, $n = 51$) were staffed by both RNs and LPNs while the remaining EDs limited nursing staff to RNs at some shifts. A total of 42 (76%) of the hospitals reported that they schedule RNs in special shifts to address patient flow patterns while special shifts for LPNs were applied by 26 (49%) hospitals. The majority of the hospitals reported the estimated level of patients in their ED as normal (28/54) or above normal (10/54), while about one third (16/54) estimated fewer patients than normal during the day of data collection. By hospital category, the university hospitals deviated from the others by reporting a higher proportion of normal level.

The patient flow during the 24-h study period is visualized in Figure 1. As seen, the highest number of patients present at the EDs occurs around lunch time until late evening where a decrease commences from around 20:00. Nursing staff also increase during the day but during the evening hours deviate from the patient pattern.

3.2 | Patients-per-nursing staff ratios in Swedish EDs

The pattern of ratios per nursing staff category was similar, and both patients-per-RN ratio and patients-per-LPN ratio peaked at three times during the 24-h period (Figure 2). On average, RNs cared for three patients per RN while LPNs cared for five (Table 1).

3.2.1 | Patients-per-RN ratios

Per shift, the highest patients-per-RN ratio was found during the evening shift regardless of category of hospital (Table 1). The ratios varied considerably within the shifts, even within each hospital category. For the evening shift, the largest range was found among the mid-sized hospitals where the ratio ranged from two patients per RN to nearly nine per RN.

Per hospital category, the smaller hospitals had the lowest ratios across the evening and night shifts as well as over the entire 24-h period. Smaller and mid-sized hospitals followed a common pattern with the lowest ratios during the night shift followed by the day shift while the university hospitals demonstrated an opposite pattern.

Patients-per-RN ratio varied across the 24-h period also on an hour-to-hour basis and not just on a shift level (Figure 3). The curve illustrates a lower patients-per-RN ratio during the early morning hours, with increasing ratio from around 10:00 and continuously high ratio until after midnight. As the shift changed from day to evening, around 13:00–15:00, the patients-per-RN ratio decreased as most hospitals have a double workforce in place for a number of hours.

3.2.2 | Patients-per-LPN ratios

Fifty-one of the included EDs (94%) scheduled for LPNs during the entire 24-h period. The patients-per-LPN ratios per shift were highest during the evening shift for each hospital type (Table 1). Like the RN ratio, it varied within the shifts, and largest variation was found during the evening shift where it ranged from two to

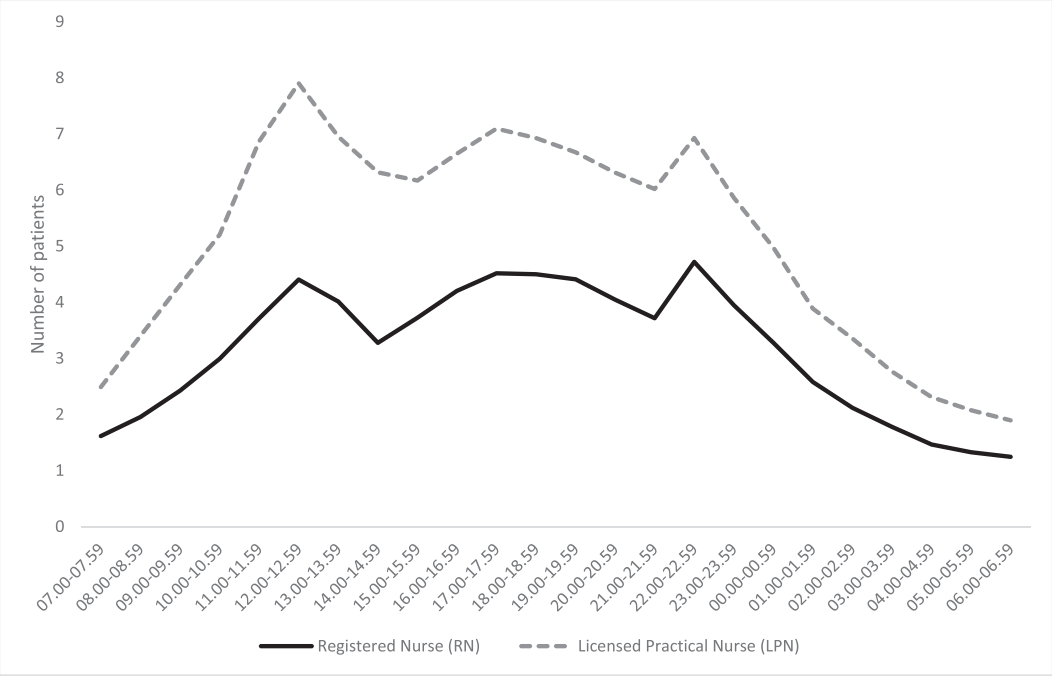


FIGURE 2 Patients-per-nursing staff ratio in Swedish emergency departments ($n = 54$) over a specific 24-h period

TABLE 1 Patients-per-nursing staff ratios in Swedish emergency departments, presented as an average ratio during a 24-h period and by shift

Average patients-per-RN/hospital category	All hospitals ($n = 54$)	University hospitals ($n = 9$)	Mid-size hospitals ($n = 30$)	Smaller hospitals ($n = 15$)
During 24 h				
Mean (SD, min–max)	3.2 (1.1, 1.0–6.1)	3.6 (1.3, 2.2–6.1)	3.3 (1.1, 1.9–5.9)	2.8 (1.1, 1.0–4.9)
During day shift[a]				
Mean (SD, min–max)	3.0 (1.0, 1.1–6.0)	3.1 (1.5, 1.8–6.0)	3.0 (0.8, 1.8–4.4)	3.1 (1.2, 1.1–6.0)
During evening shift[a]				
Mean (SD, min–max)	4.1 (1.5, 1.1–8.8)	4.3 (1.4, 3.0–7.6)	4.3 (1.7, 2.0–8.8)	3.4 (1.1, 1.1–5.3)
During night shift[a]				
Mean (SD, min–max)	2.6 (1.5, 0.3–6.5)	3.5 (1.4, 1.7–6.2)	2.8 (1.5, 0.4–6.5)	1.6 (0.9, 0.3–3.0)
Average patients-per-LPN/hospital category	All hospitals ($n = 51$)	University hospitals ($n = 9$)	Mid-size hospitals ($n = 29$)	Smaller hospitals ($n = 13$)
During 24 h				
Mean (SD, min–max)	5.0 (2.2, 1.5–11.9)	6.9 (2.4, 4.6–10.9)	4.8 (2.1, 2.3–11.9)	4.3 (1.8, 1.5–8.0)
During day shift[a]				
Mean (SD, min–max)	5.2 (3.5, 1.7–23.4)	7.5 (6.2, 3.2–23.4)	4.6 (2.4, 1.7–11.3)	5.1 (2.7, 1.7–10.6)
During evening shift[a]				
Mean (SD, min–max)	6.4 (3.3, 1.5–23.4)	8.8 (5.8, 4.7–23.36)	5.9 (2.2, 2.4–11.9)	5.5 (2.6, 1.5–11.8)
During night shift[a]				
Mean (SD, min–max)	3.9 (2.6, 0.7–13.1)	6.3 (1.7, 4.5–10.2)	3.9 (2.6, 0.9–13.1)	2.1 (1.3, 0.7–4.8)

Abbreviations: LPN, licenced practical nurse; RN, registered nurse; SD, standard deviation.
[a]Day shift = 07:00–14:59, evening shift = 15:00–21:59 and night shift = 22:00–06:59.

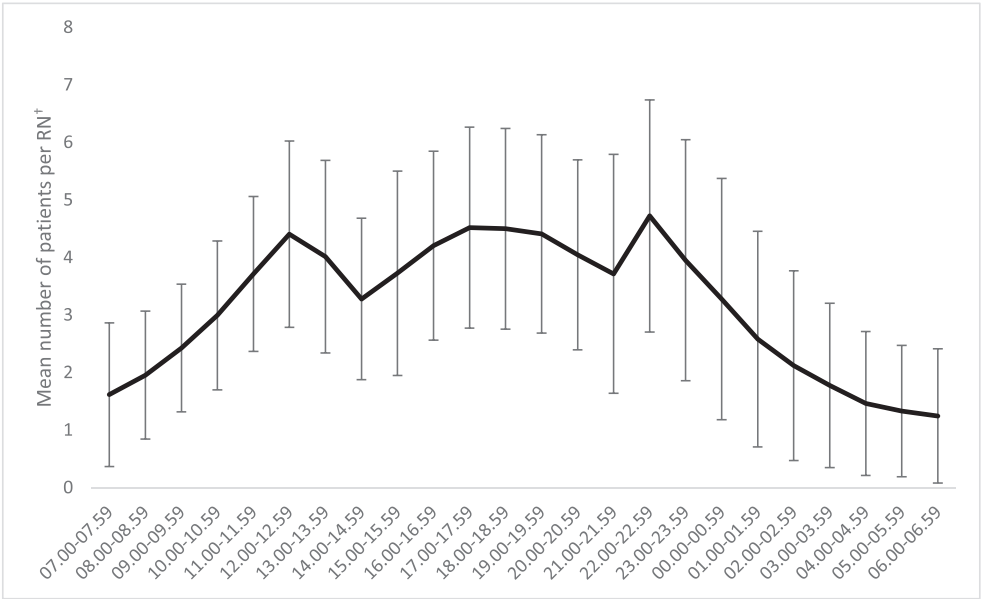


FIGURE 3 Patients-per-RN† ratio (including standard deviation) in Swedish emergency departments ($n = 54$) over a specific 24-h period. †Registered nurse

23 patients per LPN. Per hour, the ratios varied considerably, ranging from, for example, zero to 13 during early afternoon (14:00–14:59) (Figure 4). Highest patients-per-LPN ratio was found at the university hospitals. All hospital categories followed the pattern of lowest ratios during the night shift followed by day shift and the highest during the evening shift.

3.3 | Skill mix in Swedish EDs

The skill mix, that is, the proportion of RNs and LPNs reported, was close to constantly 60% RNs and 40% LPNs across the entire 24-h period. As illustrated in Figure 5, mid-sized hospitals had the lowest proportion of RNs.

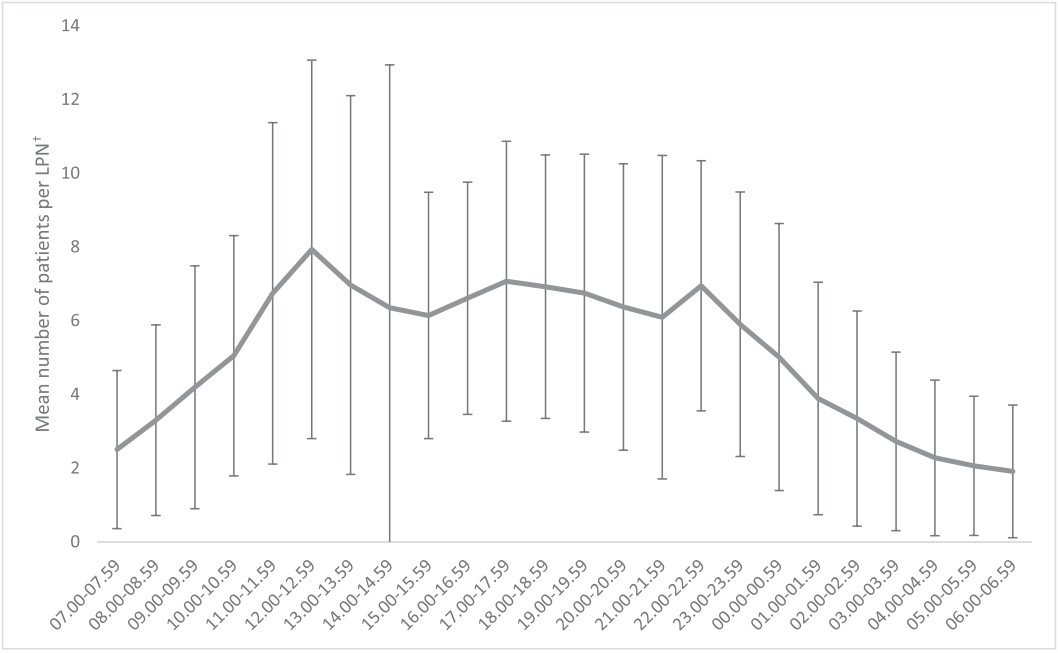
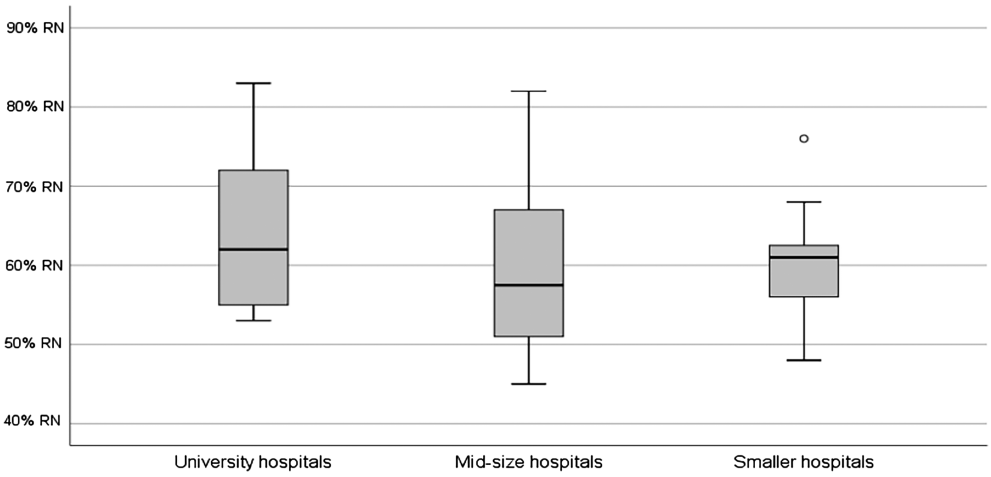


FIGURE 4 Patients-per-LPN† ratio (including standard deviation) in Swedish emergency departments ($n = 51$) over a specific 24-h period. †Licenced practical nurse

FIGURE 5 Nursing staff skill mix per hospital type in Swedish emergency departments ($n = 54$) reported as proportion of registered nurses



4 | DISCUSSION

This study, one of few studies investigating patients-per-nursing staff ratios in the ED setting, showed that ratios varied largely across the types of hospitals and time of the day, with increased ratios during the evening shift regardless of the type of hospital. Main findings showed that ratios per nursing staff category peaked at three times during the 24-h period. However, the number of nursing staff did not match the flow of patients visiting the ED. The patients-per-RN ratios varied between the shifts, with a mean of 3.2. The ratio for patients per LPN varied even larger and had a mean of 5.0 patients. Also, these findings need to be further discussed in light of the presented skill mix at Swedish EDs, where the average nursing staff mix was 60% RNs and 40% LPNs regardless of time of day.

There is a lack of studies describing ED staffing and its impact on patient outcome (Recio-Saucedo et al., 2015), and comparisons with other studies and countries are therefore difficult to make. However, our findings can support evidence for the need to highlight patients-per-RN ratio to ensure a high nursing care quality, even within the ED field. We do know that there is an association between increased RN workload and in-hospital mortality (Aiken et al., 2014) and it is possible that a similar association occurs in the ED setting. More studies are needed to investigate the impact of nursing staff ratios on the direct patient care as it is known that in situations where RNs tend to have a high number of patients, the level of missed nursing care increases (Ball et al., 2014). Failure to rescue also increases, as does mortality among patients on in-hospital wards (Aiken et al., 2002; Lankshear et al., 2005). A recent study

supports the hypothesized link between a high number of RNs and better patient outcomes (Musy et al., 2021). To address the importance of RNs in the ED and the impact such care has on in-hospital mortality is still an unexplored area. Therefore, it would be interesting to investigate the level of missed nursing care in the ED context and the relationship between missed nursing care and the patients-per-RN ratio. To further understand missed nursing care within this context, patients-per-RN ratio and the amount of time spent at patient care should be studied.

Even though more than half of the included EDs reported that they had special shifts for RNs and LPNs to address the patient flow, our findings illuminated that the patients-per-nursing staff ratio did not match the patient flow. However, the lower ratio at night in EDs might be a direct reflection of the need for emergency preparedness, which needs to be considered 24/7. It would be worthwhile to study patient flow patterns in more detail, because these findings can support the development of systems for better scheduling of nurses in the ED. The number of patients is not the only decisive variable when organizing an appropriate roster—the workload and variations therein should also be considered (Wundavalli et al., 2019). Our study illuminated that a few of the included EDs did not schedule LPNs for evening and night shifts, which may have negative impact on present RNs' workload as they have to perform all nursing work tasks. We do not know the arguments for the variation in baseline rostering at the included EDs. Given that appropriate baseline staffing is necessary and higher baseline rosters have been shown to be more cost-effective, this needs to be further elaborated and evaluated within the ED context (Emergency Nurses Association, 2018; Griffiths et al., 2021; Needleman et al., 2011).

In order to fully address questions concerning an appropriate staffing of EDs, support staff and health care professionals within the team around the patient needs to be addressed better. Cunningham et al. (2019) showed that most studies use an intraprofessional perspective when studying nursing staff mix, where others used a more interprofessional perspective on this topic. The review highlights that skill mix should not be exclusive to the nursing profession (Cunningham et al., 2019). The present study included both RNs and LPNs as these two categories make up the majority of the staff in Swedish EDs. Within the Swedish context, there are some similarities between these two categories but more important to highlight some major differences, particularly regarding education and responsibilities. These differences and similarities need to be considered more in the further work around skill mix at EDs. The complexities around skill mix are addressed in a conceptual model for skill mix presented by Cunningham et al. (2019). The model demonstrates three dimensions of the concept (i.e., atomization, transversality of practice [intraprofessional] and transversality of practice [interprofessional]). The model addresses attributes of skill mix and various relationships between these attributes, which may support implications for practice. Twigg et al. (2019) also highlighted that there is an ambiguity in the definition of skill mix, which makes it difficult to evaluate the impact of changes in skill mix. Internationally, little is known about skill mix in EDs because there is a lack of research (Recio-Saucedo et al., 2015). In order to get a comprehensive picture of appropriate skill mix in EDs, all areas of health care professionals (i.e. RNs, LPNs and physicians) ought to be researched. Skill mix in Swedish EDs is determined independently at each individual hospital, and its impact on patient outcomes has not been explored. The skill mix in this study, 60% RNs, is in line with previous skill mix studies from Swedish in-hospital wards (58%) (Aiken et al., 2013). However, the Organisation for Economic Co-operation and Development (OECD, 2019) report Health at a Glance for 2019 shows that Sweden has few RNs compared with other OECD countries and especially compared with the Nordic countries. Given the large differences and variations in patient ratios in the present study, more research on this topic and how skill mix affects the provision of nursing care in EDs is warranted. A clear definition of skill mix and a deeper understanding of the term are necessary to enable managers to embrace the use of skill mix and implement it into clinical practice (Cunningham et al., 2019).

4.1 | Strengths and limitations

The present benchmark study has both strengths and limitations, and findings might be general to northern parts of Europe with similar health care systems. A strength of this study is that a large majority of the Swedish EDs took part (89%). This gives a good overview of the national situation. It was considered important to prioritize the response rate and provide a user-friendly study protocol, rather than undertaking an in-depth survey during this first step. A few of the potential participants declined participation as they had limited resources or were too busy with reorganization. However, the present study highlights that a more explorative study design regarding patients-per-nursing staff ratios and impact on provision of care is also needed. The choice of Monday as the day for data collection, usually seen as the busiest day in many EDs, could be questioned as not showing ratios representative to the entire week. But, given a usually busy day with a high number of patients, the number of nursing staff could be expected to be adjusted to this. This might be supported by the findings showing that majority of the EDs assessed the number of patients for the period as normal. Another limitation is that the exact time points between the hours could vary between the EDs. The present study shows the patients-per-nursing staff ratio for every hour, in contrast to Wretborn et al. (2020), who used only five prespecified time points during a 24-h period. No data loss was seen which strengthens the decided way of collecting data for each time point. The self-reporting way of collecting data was considered feasible, as EDs have different rostering systems and different working roles for the nursing staff. With more similar health record systems and rostering systems, routinely collected data could have been an option for this study. A good contact with the individual contact persons facilitated the data collection process.

A limiting factor regarding the ratios could be that only strictly administrative roles without any patient contact have been excluded. This means that the patients-per-nursing staff ratios may include

nursing staff that have additional tasks apart from working bedside such as operational management, responding to telephone calls, educational tasks or overseeing patient flow in the ED. Therefore, the actual number of nursing staff working bedside might be lower in some hospitals. However, reviewing each individual member of staff was not possible in the present study. In terms of being able to compare this study with international patients-per-RN ratios, this study is limited by the fact that it only included the number of patients, without linking it to triage levels, patient dependency, number of trauma patients or patients in need of resuscitation or critical care. Finally, as skill mix is more than just comparing different groups of staff, it would have been interesting to elaborate their experiences, education levels and functions. This was not possible given limited resources but important to address to add value to the evidence around skill mix and impact on the provision of safe and high-quality patient care in EDs.

5 | CONCLUSIONS

The wide variation of the patients-per-nursing staff ratios in Swedish EDs is noteworthy. Also, the nursing staff ratios did not align with the patient flow, resulting in higher nursing staff ratios during the evening shift. Further benchmarking to highlight appropriate patients-per-nursing staff ratios and skill mix in the ED setting is warranted to ensure the quality of nursing care and patient safety.

6 | IMPLICATIONS FOR NURSING MANAGEMENT

Findings can be used by nursing managers to consider the baseline staffing rates and support improvement of rosters in relation to ED crowding and time of day, to manage the challenging recruitment and retention situation for RNs and further to improve patient safety.

ACKNOWLEDGEMENTS

The authors are grateful for the valuable support provided by their points of contact for each emergency department included in the study. The study is funded by Karolinska University Hospital, Emergency Medicine Function and by Uppsala University Hospital, Department of Emergency Care and Internal Medicine.

ETHICS STATEMENT

Ethical approval was obtained from the regional Ethical Review Board in Stockholm (2019-02704).

CONFLICT OF INTEREST

There are no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data are available on request due to privacy/ethical restrictions.

ORCID

Maria A. Amritzer https://orcid.org/0000-0003-4935-6086
Åsa Muntlin https://orcid.org/0000-0002-7221-2876
Lena M. Berg https://orcid.org/0000-0003-1815-799X
Katarina E. Göransson https://orcid.org/0000-0002-4062-4470

REFERENCES

af Ugglas, B. D. T., Ljungman, P. L. S., & Holzmann, M. J. (2020). Emergency department crowding associated with increased 30-day mortality: A cohort study in Stockholm Region, Sweden, 2012 to 2016. *JACEP Open*, 2020, 1–8.

Aiken, L. H., Clarke, S. P., Sloane, D. M., Sochalski, J., & Silber, J. H. (2002). Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *Jama*, 288(16), 1987–1993. https://doi.org/10.1001/jama.288.16.1987

Aiken, L. H., Sloane, D. M., Bruyneel, L., Van den Heede, K., Griffiths, P., Busse, R., Diomidous, M., Kinnunen, J., Kozka, M., Lesaffre, E., McHugh, M. D., Moreno-Casbas, M. T., Rafferty, A. M., Schwendimann, R., Scott, P. A., Tishelman, C., van Achterberg, T., Sermeus, W., & RN4CAST consortium. (2014). Nurse staffing and education and hospital mortality in nine European countries: A retrospective observational study. *Lancet*, 383(9931), 1824–1830.

Aiken, L. H., Sloane, D. M., Bruyneel, L., Van den Heede, K., Sermeus, W., & RN4CAST consortium. (2013). Nurses' reports of working conditions and hospital quality of care in 12 countries in Europe. *International Journal of Nursing Studies*, 50(2), 143–153.

American College of Emergency Physicians. (2019). Crowding. Policy statement. In *Advancing emergency care*. ACEP.

Ball, J. E., Bruyneel, L., Aiken, L. H., Sermeus, W., Sloane, D. M., Rafferty, A. M., Lindqvist, R., Tishelman, C., Griffiths, P., & RN4CAST consortium. (2018). Post-operative mortality, missed care and nurse staffing in nine countries: A cross-sectional study. *International Journal of Nursing Studies*, 78, 10–15. https://doi.org/10.1016/j.ijnurstu.2017.08.004

Ball, J. E., Griffiths, P., Rafferty, A. M., Lindqvist, R., Murrells, T., & Tishelman, C. (2016). A cross-sectional study of 'care left undone' on nursing shifts in hospitals. *Journal of Advanced Nursing*, 72(9), 2086–2097. https://doi.org/10.1111/jan.12976

Ball, J. E., Murrells, T., Rafferty, A. M., Morrow, E., & Griffiths, P. (2014). 'Care left undone' during nursing shifts: Associations with workload and perceived quality of care. *BMJ Quality & Safety*, 23(2), 116–125. https://doi.org/10.1136/bmjqs-2012-001767

Berg, L. M., Ehrenberg, A., Florin, J., Ostergren, J., Discacciati, A., & Goransson, K. E. (2019). Associations between crowding and ten-day mortality among patients allocated lower triage acuity levels without need of acute hospital care on departure from the emergency department. *Annals of Emergency Medicine*, 74, 345–356. https://doi.org/10.1016/j.annemergmed.2019.04.012

Cunningham, J., O'Toole, T., White, M., & Wells, J. S. G. (2019). Conceptualizing skill mix in nursing and health care: An analysis. *Journal of Nursing Management*, 27(2), 256–263. https://doi.org/10.1111/jonm.12673

Dagens Medicin. (2020). Bästa sjukhuset - Topplistorna.

Emergency Nurses Association. (2018). Staffing and productivity in the emergency department.

Griffiths, P., Ball, J., Drennan, J., James, L., Jones, J., Recio, A., & Simon, M. (2014). The association between patient safety outcomes and nurse/healthcare assistant skill mix and staffing levels & factors that may influence staffing requirements. (N.I.f.C.a.H.E. (NICE) ed.).

Griffiths, P., Recio-Saucedo, A., Dall'Ora, C., Briggs, J., Maruotti, A., Meredith, P., Smith, G. B., Ball, J., & Missed Care Study Group. (2018). The association between nurse staffing and omissions in nursing care: A systematic review. *Journal of Advanced Nursing*, 74(7), 1474–1487. https://doi.org/10.1111/jan.13564

Griffiths, P., Saville, C., Ball, J. E., Jones, J., Monks, T., & Safer Nursing Care Tool study team. (2021). Beyond ratios—Flexible and resilient nurse staffing options to deliver cost-effective hospital care and address staff shortages: A simulation and economic modelling study. *International Journal of Nursing Studies*, 117, 103901. https://doi.org/10.1016/j.ijnurstu.2021.103901

Kalisch, B. J., Landstrom, G. L., & Hinshaw, A. S. (2009). Missed nursing care: A concept analysis. *Journal of Advanced Nursing*, 65(7), 1509–1517. https://doi.org/10.1111/j.1365-2648.2009.05027.x

Kalisch, B. J., & Xie, B. (2014). Errors of omission: Missed nursing care. *Western Journal of Nursing Research*, 36(7), 875–890. https://doi.org/10.1177/0193945914531859

Lankshear, A. J., Sheldon, T. A., & Maynard, A. (2005). Nurse staffing and healthcare outcomes—A systematic review of the international research evidence. *Advances in Nursing Science*, 28(2), 163–174. https://doi.org/10.1097/00012272-200504000-00008

Morley, C., Unwin, M., Peterson, G. M., Stankovich, J., & Kinsman, L. (2018). Emergency department crowding: A systematic review of causes, consequences and solutions. *PLoS ONE*, 13(8), e0203316. https://doi.org/10.1371/journal.pone.0203316

Musy, S. N., Endrich, O., Leichtle, A. B., Griffiths, P., Nakas, C. T., & Simon, M. (2021). The association between nurse staffing and inpatient mortality: A shift-level retrospective longitudinal study. *International Journal of Nursing Studies*, 120, 103950. https://doi.org/10.1016/j.ijnurstu.2021.103950

Needleman, J., Buerhaus, P., Pankratz, V. S., Leibson, C. L., Stevens, S. R., & Harris, M. (2011). Nurse staffing and inpatient hospital mortality. *New England Journal of Medicine*, 364(11), 1037–1045. https://doi.org/10.1056/NEJMsa1001025

Needleman, J., Liu, J., Shang, J., Larson, E. L., & Stone, P. W. (2020). Association of registered nurse and nursing support staffing with inpatient hospital mortality. *BMJ Quality & Safety*, 29, 10–18.

Nelson, D., Hearld, L. R., & Wein, D. (2018). The impact of emergency department RN staffing on ED patient experience. *Journal of Emergency Nursing*, 44(4), 394–401. https://doi.org/10.1016/j.jen.2018.01.001

OECD. (2019). Health at a Glance 2019—OECD Indicators. https://www.oecd.org/health/health-at-a-glance-19991312.htm

Rasouli, H. R., Esfahani, A. A., Nobakht, M., Eskandari, M., Mahmoodi, S., Goodarzi, H., & Farajzadeh, M. A. (2019). Outcomes of crowding in emergency departments; a systematic review. *Archives of Academic Emergency Medicine*, 7(1), e52. https://doi.org/10.22037/aaem.v7i1.332

Recio-Saucedo, A., Pope, C., Dall'Ora, C., Griffiths, P., Jones, J., Crouch, R., & Drennan, J. (2015). Safe staffing for nursing in emergency departments: Evidence review. *Emergency Medicine Journal*, 32(11), 888–894. https://doi.org/10.1136/emermed-2015-204936

Shindul-Rothschild, J., Read, C. Y., Stamp, K. D., & Flanagan, J. (2017). Nurse staffing and hospital characteristics predictive of time to diagnostic evaluation for patients in the emergency department. *Journal of Emergency Nursing*, 43(2), 138–144. https://doi.org/10.1016/j.jen.2016.07.003

Swedish Institute. (2021). Heathcare in Sweden.

Twigg, D. E., Kutzer, Y., Jacob, E., & Seaman, K. (2019). A quantitative systematic review of the association between nurse skill mix and nursing-sensitive patient outcomes in the acute care setting. *Journal of Advanced Nursing*, 75(12), 3404–3423. https://doi.org/10.1111/jan.14194

Wolf, L. A., Perhats, C., Delao, A. M., Clark, P. R., & Moon, M. D. (2017). On the threshold of safety: A qualitative exploration of nurses' perceptions of factors involved in safe staffing levels in emergency departments. *Journal of Emergency Nursing*, 43(2), 150–157. https://doi.org/10.1016/j.jen.2016.09.003

Wretborn, J., Henricson, J., Ekelund, U., & Wilhelms, D. B. (2020). Prevalence of crowding, boarding and staffing levels in Swedish emergency departments-a National Cross Sectional Study. *BMC Emergency Medicine*, 20(1), 50. https://doi.org/10.1186/s12873-020-00342-x

Wundavalli, L., Kumar, P., & Dutta, S. (2019). Workload indicators of staffing need as a tool to determine nurse staffing for a high volume academic Emergency Department: An observational study. *International Emergency Nursing*, 46, 100780.

SUPPORTING INFORMATION

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

How to cite this article: Amritzer MA, Muntlin Å, Berg LM, Göransson KE. Nursing staff ratio and skill mix in Swedish emergency departments: A national cross-sectional benchmark study. *J Nurs Manag*. 2021;29:2594-2602. https://doi.org/10.1111/jonm.13424