Capturing Accumulated Knowledge and Learning of COVID-19 Pandemic from Front-Line Nurse

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Abstract The novel virus zoonotic virus of COVID-19 pandemic brought new waves of value-added knowledge to all health professionals due to the type and amount of unprecedented challenges they faced in just a few months since the early of 2020. Since most of the healthcare staff are nurses, this value-added knowledge needs to be captured in the right time and then transferred, or retrieved, or reconstructed to a global knowledge that could be shared for the benefit of better global preparedness. This paper investigates the type of nurses COVID-19 knowledge accumulated and then suggests through a framework way of dealing with it. The main limitation of this paper is that it is yet to be tested and refined in a different environment. The paper brings many implications among most important is that it opens a dialogue for the importance of the type of COVID-19 knowledge that needs to be utilized among health workers to the benefit of the world.

Keywords COVID-19 Pandemic, Pandemic, Nursing, Nurses, Knowledge-Assets, Knowledge-Sharing, Tacit-Knowledge, Explicit-Knowledge

1. Introduction

Management of Knowledge in healthcare has been the worries of many health strategists and government planners as it facilitates for the development and the competency of the public health preventive and corrective measures (Abijah, 2020). Nurses have always been contributors to specialist knowledge as in infectious disease, disaster management, or public health where they professionally work to provide their knowledge and expertise at the governmental level.

The COVID-19 pandemic situation brought an overwhelming demand for new knowledge expertise that meet the healthcare professionals constantly changing needs. Nurses knowledge plays a unique niche in disseminating evidence-based knowledge. (Schwerdtle et al., 2020).

Managing the COVID-19 accumulated knowledge of the healthcare professionals such as nurses produces values of treasures represented by very important new profound knowledge that could be shared, captured and communicated both in tacit- and explicit-ways. Once the pandemic knowledge intelligently shared and exploited, nurses could show their competitive advantage. The huge accumulated information and expertise of the nurses is still mostly a

tacit-knowledge. Thus, this literature review shows how to capture, acquire, organize, and communicate this COVID-19 knowledge towards more effective and productive healthcare services.

The development of nursing and their role in healthcare services knowledge before and during a pandemic are reviewed in this research. Then, the learning from the nurses' successes and challenges during COVID-19 are reviewed to see how this could be transferred to be a value-added knowledge during and after the pandemic. The authors give examples on the accumulated knowledge of 'triaging nurses' during COVID-19, the knowledge on 'safety incidences' occurred, and the 'test practices' that help to maintain the nurses' mental health and wellness, even during this devasting contagious disease.

The paper builds bridges between the accumulated nursing expertise and knowledge-assets during the emergency of the pandemic and how it could be utilized in solving complex medical problems, Buheji (2020). This utilization can be done when the nurses' knowledge is codified and then shared. The authors show that the more this knowledge comes from hardship and challenging circumstances, as suffering from the nurses' shortages during the pandemic, the more it would be valuable.

The paper indulges into how the management of nurses accumulated interprofessional relationships and multidisciplinary teamwork knowledge could help to create innovative outcomes which enhance the capacity of the

healthcare services for future pandemic response. Therefore, the researchers investigate the tacit- and explicit-knowledge that help in setting a model for reconstructing the invisible to visible knowledge of such healthcare professional and use it as a means for motivating them too.

2. Literature Review

2.1. Nurses Value-Added Knowledge and Its Role in the Development of Healthcare Services (Before and During COVID-19 Pandemic)

The nursing knowledge boundary can get enough attention once codified and standardized. Registered Nurses always showed high interest to develop and share their knowledge and improve nursing profession as an aspect of their role to their colleagues and humanity. Historically one cannot talk about healthcare services without linking it to the dedicated work of the nurses who played a pivotal role in the development of all the details of the service delivery, monitoring and measurement. But, whilst nurses have played a big role in the healthcare industry since the beginning, nurses haven't always been receiving the recognition they deserve, Barnes and Barnes (2020). In the past 50 years, nurses have been accumulating knowledge due to the role they play in delivering the healthcare services during prevention, treatment and rehabilitation. Even during natural disasters, wars and emergency situations, nurses were always in the frontline, solving problems and accumulating experiences and knowledge. (Kahr, 2019).

Nursing today makes-up the largest workforce within multidisciplinary healthcare all over the world. During a sudden outbreak that leads to escalating international emergency due to the pandemic of COVID-19, the most common body that would see most of the process and sources of knowledge-assets would be the nurses. The vital role played by nursing in developing practices, while preserving the core values of the health systems during this unprecedented global emergency give nurses the lead in both the differentiation in their amount of observed experiences, and the type of the content of these experiences, that is turned to be mostly a tacit-knowledge, and few turned to be explicit-knowledge. Both types of knowledge are considered to be sources of wealth to humanity. Buheji et al. (2014).

The literature is full of research about the common knowledge of nurses, even in the level of sub-speciality knowledge. However, the literature is still scarce in relevance to the requirements of providing emergency healthcare to contagious patients, or asymptomatic patients (Buheji and Buhiji, 2020). Thus, the profound nurses' knowledge on COVID-19 in the type of cases, processes, clinical pathways developed during the pandemic is so critical and exploiting them could enhance the nurses capacity to be even more empathetic thinkers when participating in solving complex clinical solutions. (Buheji, 2020).

2.2. Learning from the Nurses Successes and Challenges During COVID-19

During these months of the devastating pandemic, nurses have shown that they are a solid, reliable professional who can provide accountable services and work under pressure even during life-threatening situations. Despite the disruptive environment, many patients admit that they got quality of care services, in most of their critical life moments times due to nurses services. Many of these patients survived and got back to life, and others died and could not be saved. Hence, the challenges of persistent morbidity and mortality, or the high percentages of successes with a high percentage of recovering patients can be transferred to be a source of knowledge-asset which can advance both healthcare and nursing practices, by all means.

Another type of knowledge accumulated during the pandemic comes from the competences and the empowerment to work with or within teams. This would help to advance the knowledge of the future preparedness, the recovery response practices due to pandemic and similar international emergencies, and bring more innovation to both nursing and clinical leadership (Jamison et al., 2020; Gray, 2020; Papandrea, 2016).

2.3. Management of Accumulated Nurses Generations Knowledge (After the COVID-19)

Knowledge can be managed through its assets, through being captured, transferred and most importantly shared. The pandemic of COVID-19, nurses, built specific pandemic inter-regional knowledge which could facilitate more effective response strategies in the future, especially when dealing with such aggressive infections. This contagious disease outbreak, the knowledge accumulated due to the nursing, public health emergency, would help for sure improve the decisions and the past experiences (Abijah, 2020).

Nurses exhibited a vital role in battling in the frontlines confidently, without fear, to save patients' and their relatives' lives. As older nurses look toward retirement, there could be some situations in which there is a generational gap between them and the new nurses entering the profession. The difference and the mutation of the virus, besides the variety of the complications of the critical cases of Covid-19, have dramatically increased the sources of nurses' knowledge-assets worldwide (Ortega and González, 2020).

2.4. Examples for the Nurses Accumulated Knowledge

2.4.1. Knowledge of Triaging Nurses During COVID-19

Knowledge of caring, compassion, courage and resilience with the COVID‑19 are closely associated with the nursing profession. Historically, nurses have always played an important role in infection prevention, infection control, isolation, containment and public health, Kahr (2019).

The accumulated knowledge of triage nurses during COVID-19, is not similar to many assessments of patient's

symptoms for other diseases. The nurses' knowledge helps to differentiate between symptomatic patients and those asymptomatic, who carry the disease. This makes the nursing intervention a value-added process. Even the way the triage station area is designated and how patients are arranged to receive the accurate treatment is considered a unique knowledge that nurses are becoming the most competent with. The procedures for lab tests, waiting for a place, chest X-ray are all nursing care practices that adhere new protocols and procedures that help to ensure effective infection control for the benefits patients and the public (Ortega and González, 2020).

Nurses working in the emergency room they learn the power of the observation and how to capture the severe symptoms, For example, nurses would have built the knowledge of how they assess through the speed of breathing if it is too fast or too slow; if they have a cough or difficulty breathing.

2.4.2. Knowledge of 'Test Practices' of Nurses Wellness

The global nursing workforce is 27.9 million, of which 19.3 million are professional nurses, affirms the State of the World's Nursing 2020 report. In order to achieve and sustain universal health coverage by 2030, countries affected by shortages will need to increase funding to educate and employ at least 5.9 million additional nurses. Population growth and an ageing population with a chronic disease add another and drive the shortages more and more. Therefore, nurses wellness is very important for the continuous development of this profession and its attraction.

As nurses return back to their homes and their families, many nurses played the role of the health visitor that supported a mindful social distancing. These nurses helped to spread the awareness in their communities about coronavirus and how to deal with it. Nurses are responsible for creating a positive impact on the health and well-being of the patient as they are the heartbeat of any healthcare services who provide the profound knowledge 'care' within the system. (Krishnan, 2020).

Nurses experience with staffing during this pandemic, built knowledge on how to manage nursing resources in the future. This accumulated nurses knowledge would help to prevent nurses from working solely in a single clinical speciality area or ICU, instead of encouraging nurses to think and work in multi-speciality change their allocation inside the hospital several times during their career (Bambi and Iozzo, 2020).

Clinical nurses, especially those working in hospitals providing frontline care for those with COVID‑19, are not only vulnerable to a higher risk of infection but also mental health problems. They may experience fears of contagion and spreading the virus to others, including loved ones. We cannot ignore the need for timely psychological support and care specialized for those affected, psychiatric treatments and appropriate mental health services knowledge need to be provided. (Buheji, 2020).

2.4.3. Knowledge Assets in Problem Solving

In many ways, nurses are the unrecognized leads of healthcare, quietly caring for patients with compassion and professionalism. Every day around the globe, they perform their duties without display, saving lives, bringing healing to the sick and ensuring dignity for the dying. Nurses would always be seen among the first to step-forward during natural disasters and emergency situations, and even when there is great personal risk. (Buheji and Buhaid, 2020).

Nurses provide a broad range of essential health services – often, as the first and sometimes, as the only point of care in several communities. They have the potential to influence and improve the quality of care at every level of the healthcare ecosystem – from primary health care to universal health coverage and meeting the Sustainable Development Goals (SDGs). Therefore, raising their profound knowledge capacity to solve complex problems adds to them and the world great advantages.

Studies have shown that investing in nursing knowledge leads to better health outcomes. Working with unsafe nurse-patient ratios and chronic understaffing is known to adversely impact patient outcomes. However, this shortage helps the nurses knowledge to develop also further. i.e. poor outcomes among staff, such as burnout, job dissatisfaction, turnover, and absenteeism, increase the knowledge of nurses too. (Smith et al., 2020; Zhang et al., 2020).

2.4.4. Knowledge Assets Role in Building Resilient Nurses

Resilient nurses made a difference in many success stories during the war rounds with the COVID-19. Their ability to coop was and still so high and their conviction, despite many challenges and circumstances, as a shortage of staff and resources, making them unique in being able to deliver care with compassion during a very contagious disease, Barnes and Barnes (2020). Nurses are the primary source of organizational resilience since they are the most group that build workload and can adjust the rest of other groups behaviour, Takase et al. (2006).

There are four sources of resilience knowledge that come from monitoring, anticipating, responding, and learning. These sources enhance the ability of systems to succeed under varying condition (Buheji & Buhaid 2020). A great opportunity is available to increase each nurse's experience and competencies and to improve nurses' skills within multidisciplinary teams, Buheji and Ahmed (2020). Broadening competencies and skills could have beneficial effects for nurses such as higher resilience, increased practical and theoretical knowledge, a wider view of the "clinical and organizational big picture," and reduced psychological impact in case of sudden reassignment to a different clinical setting (Buheji and Ahmed, 2020; Bambi and Iozzo, 2020).

Nurses' using workload and managing patients capacity, raised their knowledge intensity. The increase in critically ill patients affected by COVID-19, which tripled the nursing workload and at the same time, tripled their knowledge.

(Bambi and Iozzo, 2020).

2.5. Knowledge Management and Innovation in Nursing Services as a Result of Multidisciplinary Teamwork

The increase of healthcare demands requires the collaboration of healthcare professionals to meet all of the patient's demands—a collaboration between nurses and medical doctors in developing the clinical knowledge results into a better-quality healthcare service. Knowledge prompt reduces ambiguity and misinformation, enhances the treatment and recovery, and improve their preventive behaviour (Kott, 2016). The expertise of leading nurse scholars and clinicians are gathered and raised significant and critical aspects of the outbreak COVID-19, moving from populations to systems, to people, incorporating both curative and palliative considerations. Nurses there need to use the multidisciplinary approach to provide practical, solution-based perspectives in a humble effort to help mitigate health risks and to strengthen the health service response. (Jamison et al., 2020).

The dramatic rise of the number of people infected with COVID-19, made many nurses suggest an innovative solution to minimize the number of the patients hospitalized due to symptoms like low blood pressure or low levels of oxygenation, deteriorated situation like pneumonia that would make certain patients be either ventilated or intubated. In certain countries, definitely, the shortage of ventilators made many nurses and in collaboration come with the best possible solutions that would help the patient survive. Buheji and Buhaid (2020); Jamison et al. (2020).

The unexpected new critical care workforce models demand more retiree nurses to exploit their previous knowledge, and experience needs to be refreshed and re-learned. (Schwerdtle et al., 2020). Similarly, to overcome staff shortage with intensive care nursing competencies, nurses knowledge need to be shared to build skill-mix in these ICUs, reducing the risks to patients' safety (Bambi, 2020).

2.6. Nurses Novelty and Knowledge-Sharing

Nurses are innovative out of necessity; however, their novelty increases with the number of knowledge-assets they contain and can share, Buheji et al. (2013). The accumulate nurses' knowledge help to improve the process of care at every opportunity (Gray, 2020). The nurses knowledge-assets can help reduce transmissions of the disease, and promote readiness while maintaining a safe environment.

The profound novel knowledge helps to develop sufficient staffing and ensure safeness and reduce cost-effectiveness (Carlisle, 2020). For example, profound knowledge would build an appropriate nursing activity to manage pandemics where the nurse to do "runner" role, and not be in an isolation room enable that a nurse can stay in a COVID-19 room without the need to doff PPE to retrieve supplies or medications. With the increase of video conferencing clinics, nurses can deliver more knowledge and accumulate new

ones too. Buheji and Buhaid (2020).

Based on the COVID-19 accumulated experiences, nurses now can help promote staff safety by making the being prepared mentally and physically. For example, nurses can bring solutions to reduce foot traffic during this contagious pandemic, while at the same time promoting staff safety and wellness. (Jamison et al., 2020).

Safety knowledge can be learnt from both current and previous global natural, or human-created crises and pandemics to best support the care of patients and health care professionals, Buheji and Buhaid (2020). This transformational knowledge is critical during this time of rapid change when policies and protocols are rapidly developing, and uncertainty is a constant matter. Nurse Leaders may change their style in response to the criticality of an event and what is believed important against urgent because of the respective timelines of acquiring, negotiating, and planning for critical items to care for patients.

2.7. Tacit- and Explicit-Knowledge

Specialized nursing skills and mastery are important parts of their professionals' knowledge. There is much similar professional expertise that is difficult to explicate and may be labelled as tacit. In fact, tacit-knowledge, as formulated by Polyani (1966) is potentially more important for professionals than explicit knowledge. Tacit knowledge involves knowledge that cannot necessarily be explicated but can be employed in practical situations. It is described as 'know-how' as opposed to 'know-that' and constitutes an important characteristic of expertise.

The more knowledge is accumulated without proper sharing at the right time, the more it would be more difficult to communicate or explicate what they have undertaken. Therefore, Heldal et al. (2019) see that knowledge development hinges on the ability to translate between tacit and explicit knowledge.

Exploiting nurses knowledge help to connect key stakeholders to existing explicit (codified) and tacit (practical) knowledge and providing platforms that facilitate their exchange, Abijah (2020).

3. Methodology

As per the literature review, the nurses COVID-19 accumulated knowledge are reconstructed to build new knowledge that can help to enhance the preparedness for future emergency challenges. Then the conclusion would be set with a framework that encourages further research to capture the nurses' knowledge and use it for further healthcare services development.

4. Reconstructing Nursing Professional Knowledge

All patient safety programs need to be constructed in order to rebuild trust after the shack-up of the COVID-19

pandemic. Many standardized systems need to be reviewed to for better patients' treatment. This means nurses should now prepare for the introduction of a new patient safety program, the explication of making more nurses' work and making it visible help to bring more valuable (Heldal et al., 2019).

Nurses can turn towards holistic care and build new knowledge and type of relationship with patients that lead to deep dialogue. The new reconstructed nursing knowledge should lead to new values proximity. Professional knowledge and identity are being challenged and changed, and what counts as good, professional nursing of high quality is being reconstructed (Heldal et al., 2019).

To keep nurses motivated, they should be encouraged to share their experience in a way to demonstrate the seriousness of their tasks during the pandemic. As frontline workers, nurses beard the responsibility of educating patients and the public on how to stay healthy and safe. They felt they are the best people to report what is going on from the front of the front line, breaking the formalities and creating a new way of history through social media.

This motivation needs to be utilized for the development of newer policies, guidelines especially for the upgraded enablers that would surely lessen the burden on the nurses in the coming years in the new normal after the pandemic. Longer shifts and stress can result in burnout for many nurses; hence new design roster needs to be brought to give the nurse the rest, the safety and adequate time to destress. (Nayyar, 2020).

5. Framework for Process of Capturing Nursing Accumulated Knowledge

This framework proposes how to optimize the high learning exposures from the nurses' successes and challenges during the COVID-19 pandemic, then how can we turn this learning exposure to an accumulate tacit-knowledge. This tacit-knowledge can be shared by the nurses during and after COVID-19.

Figure (1) shows the knowledge-sharing that come of the management of the nurses tacit-knowledge and which are turned later to both explicit- and tacit-knowledge. This would qualify the nurses to work with interprofessional relationship and multidisciplinary teamwork that brings more nurses innovative knowledge. Such innovative knowledge would help to reconstruct the nursing role and status.
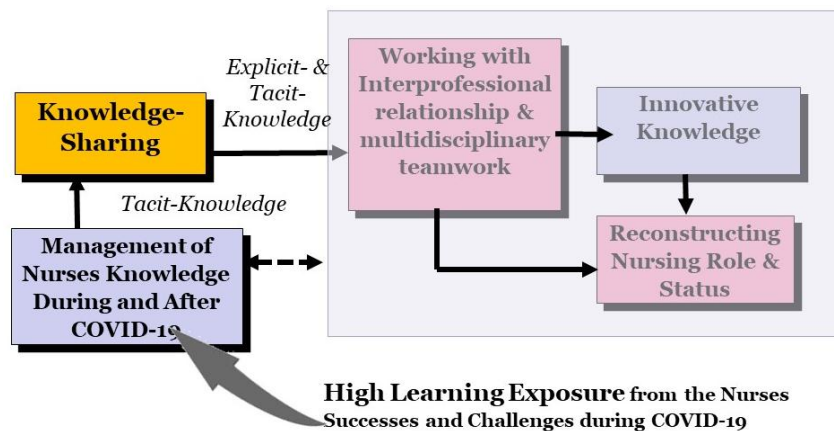

Figure (1). Proposed Process for Capturing the Nursing Accumulated Knowledge and the Exposed Learning during and after the COVID-19 Pandemic

6. Conclusions

The (COVID-19) pandemic has triggered exceptionally rapid changes in the knowledge structure and type of knowledge-asset in all the healthcare system and hospitals worldwide. The increase in critically ill patients has meant many sudden changes that are imposed on the healthcare team where the majority of the work force are nurses. This accumulated knowledge and the dynamic of the pandemic situation empower nurses to propose best ways to be totally engaged in managing the challenges, in the process of exploiting the opportunities for the development of better preparedness and response protocols, Buheji and Ahmed (2020).

The pandemic knowledge should take now nurses capacity to another level of thinking, learning, adapting, and action as a main global health workforce of high demand, Buheji et al.

(2014). Both the nurses COVID-19 pandemic tacit- and explicit-knowledge need to be retrieved and transferred carefully through keeping them engaged in development or improvement projects within multidisciplinary teams, different communities or national or international wide.

Without extracting the accumulated physical, mental, spiritual knowledge within nursing it is difficult to see what lies beyond the uncertain of future pandemics spillovers. The current nurses expertise is expected to play a potential role in defining the various aspects and challenges of healthcare.

The implications of this study is that is encourage for working with multidisciplinary health professional teams in a collaborative manner to come with a driven strategies and policies that are shared by health care stakeholders. The other practical implication of this paper is that nurses, would gain positive energy and inspiration once they see their accumulated knowledge and observations are appreciated

and transformed to support the healthcare and their other nursing colleagues worldwide.

The limitation of this study is that it did not cover what type of solutions the accumulated nurses pandemic knowledge would bring to the current hospitals and healthcare systems and people in the future which opens a great possibility for future research in this area. Focusing on research that dwell into the nursing knowledge at this point, i.e. while the pandemic knowledge is still fresh would surely bring new innovation for the way health professional and related other disciplines communicate with each other, besides it would have its influence on the way services are delivered before, during and after any global emergency situations.

REFERENCES

[1] Abijah N.M. (2020) The Role of Knowledge Management in Life-Saving Initiatives: Case of COVID-19 Pandemic. Research, Innovation and Enterprise Blog.

[2] Bambi S. and Iozzo P. (2020) New Issues in Nursing Management During the COVID-19 Pandemic in Italy. American Journal of Critical Care, July 2020, Volume 29, No. 4.

[3] Barnes B and Barnes M. (2020) Recognition is especially meaningful during the COVID-19 pandemic: The nursing world has quickly shifted attention from the World Health Organization's proclamation of the Year of the Nurse and Midwife to the COVID-19 pandemic. Nurse.com.

[4] Buheji, M (2020) COVID-19 Complex Medical Disease that Needs Multidisciplinary Mindset, International Webinar on Diagnosis, Prevention and Multiple Therapeutic Strategies of COVID 19 Disease: An Update Information", Organized by Society of Education (UP), Council of Research and Sustainable Development (UP), Agra, India, 4th -5th June.

[5] Buheji, M (2013) Knowledge Management Influence on Government Competitiveness, LAP LAMBERT Academic Publishing.

[6] Buheji, M and Ahmed, D (2020) Foresight of Coronavirus (COVID-19) Opportunities for a Better World, American Journal of Economics; 10(2): 97-108.

[7] Buheji, M, Al-Hasan, S, Thomas, B and Melle, D (2014) The Influence of Knowledge Management on Learning in Government Organisations, American Journal of Industrial and Business Management, Volume (04), pp 657-670.

[8] Buheji M. & Buhaid N. (2020) Nursing Human Factor During COVID-19 Pandemic. International Journal of Nursing Science, 2020 10(1), pp. 12-24.

[9] Gray A. (2016) Advanced or advancing nursing practice: what is the future direction for nursing? Br J Nurs.; 25(1): 8, 10, 12–8, 10, 13.

[10] Heldal F., Kongsvik T., & Haland E. (2019) Advancing the status of nursing: reconstructing professional nursing identity through patient safety work https://bmchealthservres.biomed central.com/articles/10.1186/s12913-019-4222-y.

[11] Hoeve Y.T., Jansen G. & Roodbol P. (2013) The nursing profession: public image, self-concept and professional identity. A discussion https://onlinelibrary.wiley.com/doi/full/10.1111/jan.12177.

[12] Jamison C. Newby, Madison C. Mabry, Byron A. Carlisle, DaiWai M. Olson, Blair E. Lane (2020) Reflections on Nursing Ingenuity During the COVID-19 Pandemic Journal of Neuroscience Nursing: doi: 10.1097/JNN.0000000000000 525.

[13] Kott, A. (2016). To fight zika, coordinating agencies must prioritize effective knowledge management. Johns Hopkins.

[14] Krishnan j. (2020) Nurses – the unsung heroes in fight against COVID-19 https://www.ha-asia.com/nurses-the-unsung-hero es-in-fight-against-covid-19/.

[15] Mboineki J.F, Chen C., Gerald D.D. & Boateng C.A. (2019) The current status of nurses–doctors collaboration in clinical decision and its outcome in Tanzania https://onlinelibrary.wiley.com/doi/abs/10.1002/nop2.360.

[16] Nayyar R. (2020) International Nurses Day 2020: How nurses are the heroes fighting COVID-19 pandemic. https://www.financialexpress.com/lifestyle/international-nur ses-day-2020-how-nurses-are-the-heroes-fighting-covid-19-pandemic/1956389/.

[17] Papandrea D. (2016) Nursing Is in Transformation, And That's Good For Nurses. https://nurse.org/articles/nursing-ch anges-transformations/.

[18] Ortega J. & González J. M. (2020) Nursing in the time of COVID-19: Two advanced practice nurses on the front lines of the pandemic. https://www.paho.org/en/stories/nursing-ti me-covid-19-two-advanced-practice-nurses-front-lines-pand emic.

[19] Schwerdtle P.N., Connell C. J., Lee S., Plummer V., Russo P.L., Endacott R., & Kuhn L. (2020) Nurse Expertise: A Critical Resource in the COVID-19 Pandemic Response. Annals of Global Health. 2020; 86(1): 49, 1–5. DOI: https://doi.org/10.5334/aogh.2898.

[20] Smith G.D., Ng F. & Cheung W.H. (2020) COVID‐19: Emerging compassion, courage and resilience in the face of misinformation and adversity, https://onlinelibrary.wiley.co m/doi/10.1111/jocn.15231.

[21] Kahr, S (2019) Changes and Challenges: How nursing has changed over the past 50 years. https://transparency.kununu. com/how-nursing-has-changed-over-the-past-50-years/.

[22] Takase M., Maude P. & Manias E. (2006) Impact of the perceived public image on nurses' work behaviour. Journal of Advanced Nursing 53(3), 333–343.

[23] WHO (2020) WHO and partners call for urgent investment in nurses Geneva. https://www.who.int/news-room/detail/07-04-2020-who-and-partners-call-for-urgent-investment-in-nur ses.

[24] Zhang a, M. Zhou a, F. Tang b, Y. Wang a, H. Nie a, L. Zhang a, G. You c (2020) Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China M. Journal of Hospital Infection 105, 183-187.