Received: 4 June 2021 | Accepted: 29 May 2022

DOI: 10.1111/inr.12791

International Nursing Review WILEY

ORIGINAL ARTICLE

Improvements in the infrastructure for nursing research in universities in Kazakhstan

Sari Järvinen RN, PhD[1] | **Johanna Heikkilä RN, PhD, FESC**[2] | **Inesh Meyermanova MSN, PhD student**[3] | **Zhuldyz Kuanysh MMSPH, PhD student**[4] | **Vilen Molotov-Luchanskiy DMS**[5]

[1]Senior Lecturer in Health Management, School of Health and Social Studies, Research and Development and Innovation Department, JAMK University of Applied Sciences, Jyväskylä, Finland

[2]Senior Advisor, Associate Professor, Research and Development and Innovation Department, School of Health and Social Studies, JAMK University of Applied Sciences, Jyväskylä, Finland

[3]School of Nursing Education, Karaganda Medical University, Karaganda, Kazakhstan

[4]Public Relation Specialist, Karaganda Medical University, Karaganda, Kazakhstan

[5]Professor and Doctor of Medical Sciences, Professor, Department of Internal Medicine, Advisor to the Rector of the Karaganda Medical University, Karaganda, Kazakhstan

Correspondence
Sari Järvinen, RN, PhD, Senior Lecturer in Health Management, School of Health and Social Studies, Research and Development and Innovation Department, JAMK University of Applied Sciences, Piippukatu 2, 40100 Jyväskylä, Finland.
Email: Sari.jarvinen@jamk.fi

Abstract

Aim: This study aimed to describe the status and analyze the improvements made by universities in Kazakhstan to nursing research infrastructure in the following services: library, internationalization, finance, information and communication technology (ICT), and research, development, and innovation (RDI).

Background: In higher education institutions (HEIs), a strong research infrastructure is a necessity for academic education and research. In Central Asian countries, nursing is regarded as an assistive field to medicine, affecting nursing research infrastructures.

Methods: In this descriptive study, following benchmarking and a recommendations report, an interview of nursing faculty members was used to obtain data regarding nursing research infrastructure in ten universities in Kazakhstan. The SQUIRE-EDU was used to ensure the quality of reporting.

Results: The Kazakhstani universities providing nursing education are still in the process of developing their nursing research infrastructure. They have not acquired access to nursing databases, and only one textbook concerning nursing research can be found from their libraries. None of the universities have joined international nursing networks. The participation of the university staff and students in conferences with nursing themes has increased. The universities are investing in staff capacity building, but not yet in nursing research projects.

Discussion and conclusion: Kazakhstani universities have the autonomy to develop nursing research and its infrastructure. Active measures by the university management, such as financing access to nursing databases, international cooperation, and international projects, are necessary.

Implications for nursing and health policy: Research infrastructures' quality strongly impacts the development of nursing science and practice in any country. It is crucial to increase the volume of research that demonstrates the effectiveness of clinical nursing and its contribution to health outcomes. To enable the faster development of nursing science in Central Asian countries, this development should be supported through international collaboration.

KEYWORDS
Education, Higher education, Innovation research, Nursing, Nursing education, Nursing research

INTRODUCTION

Research infrastructure (RI) is defined as "an organizational structure dedicated to facilitate or conduct research, provide scientific equipment, data or services for use in basic or applied research" (OECD, 2019, p. 8). Effective research infrastructures have been characterized as open to all research communities, dynamic (Finnish Academy, 2020;

Strickland, 2017) and global (ESFRI, 2021). Globally, nursing research infrastructures have been systematically developed in highly developed countries guided by their national and global strategies (Aihara et al., 2021; Armstrong et al., 2021; Australia European Commission, 2021; Government, 2021). Involvement in global cooperation to develop health policy and evidence-based knowledge in nursing requires academic structures from the universities. Furthermore, such cooperation allows researchers affiliated with universities to join international bodies of nursing, such as the International Council of Nurses (Gimbel et al., 2017; Jakab et al., 2021). Globalization and international research collaboration and partnership with other educational institutions strengthens the evidence base for global health policy (Hazelkorn & Gibson, 2017; Jakab et al., 2021). In addition, such efforts attract specialists in certain fields from external institutions (European Commission, 2021).

Academically educated nurses can adopt broader responsibilities in the research of health systems (WHO, 2021). Research enhances nursing development by providing evidence-based information (Logsdon et al., 2017), and further development and innovation activities can contribute to improving nursing. Fostering high-quality research requires investments in associated methods and instruments (ESFRI, 2021). Furthermore, research funding (Roope et al., 2021) and up-to-date ICT tools and software also have essential roles in promoting the quality of care through research (Darvish et al., 2014; Rouleau et al., 2017). Besides pedagogical and clinical nursing skills, nurse educators must strengthen their research skills. Networking and international mobility programs have been identified to increase the research capacity (WHO, 2021).

Among the most important infrastructural components in nursing research are librarians and the research material available in libraries (Dhakal, 2018). Nursing databases have a particularly significant role in nursing research. Such databases can be used to search topics of interest and to identify areas that are understudied. The Cumulative Index to Nursing and Allied Health Literature (CINAHL) database provides access to thousands of full-text journals relating to nursing; however, several other databases also cover nursing science and research journals, i.e., Cochrane Library, ProQuest, Emerald, PubMed, Springer Link, Sage, and Web of Science, and the availability of the full texts is dependent on the licenses of the individual higher education institutions.

Several recommendations as well as strategy and policy papers for, and including, the development of RI nationally and globally have been written during the last decade (ESFRI, 2021; Finnish Academy, 2020; OECD 2020). However, the topic has been studied limitedly in the context of higher education, even in developed countries (Hazelkorn & Gibson, 2017; Strickland, 2017) and specifically in the nursing context. Currently, no research is published on the state of RI in higher education in the Republic of Kazakhstan.

CURRENT INFRASTRUCTURE FOR NURSING-RELATED RESEARCH IN UNIVERSITIES IN KAZAKHSTAN

Nursing education has undergone significant changes in the Republic of Kazakhstan since the 1990s, as evidenced in the "state educational standards" (SES), the national documents describing the obligatory details of educational programs. In 2006, an SES was created for bachelor-level education in the "nursing" specialty and in 2007, nursing faculties were opened in Kazakhstani universities. For the master level, an SES was created in 2009, and education was launched in 2011. This represented the first time in the history of Kazakhstan when nursing educational programs at both bachelor's and master's levels were available in the country. Similar processes were consequently implemented across the entire post-Soviet region (Sidorova, 2017).

The need to reform nursing in Kazakhstan had generally been recognized for many years and was proclaimed by the Ministry of Health of the Republic of Kazakhstan as early as 2010 (Ministry of Health of the Republic of Kazakhstan, 2010). Since there were, and still are, urgent problems regarding health care in Kazakhstan, the need for reform had wide support from most Kazakhstani nursing professionals. The high mortality from noncommunicable diseases as well as infant mortality was estimated to be solved by introducing a new model of nursing care. The new model of nursing care refers to the change in the role and duties of nurses from low-level workers that assist doctors to academically trained professionals with autonomous responsibility (Baygozhina et al., 2018). Furthermore, Baygozhina et al. (2017, p. 88) noted the "strong need for scientific personnel in the nursing service, and the need to enhance research and distinguish nursing science as a separate type of applied research." The authors emphasized that the undergraduate education programs for nurses, which have existed in Kazakhstan for 15 years, are designed to ensure that graduates can continue their professional development in the master's program and engage in research activities.

Several Kazakhstan-focused publications have discussed the organizational aspects of the new nursing model yet have not considered scientific research (Sedach & Sadueva, 2018). There has been no analysis of research itself as part of nurses' professional development or the role of research in the competencies provided through the master's program in nursing education. The previous SES of master's education in the specialty of nursing included four courses that were considered to concentrate on scientific research (Bolatova et al., 2014). Ospanova and Altynbekova (2018) analyzed the quality of the SES of the bachelor's nursing program but limited their scope to the clinical competencies of graduating nurses instead of focusing on the academic aspects of nursing as well. This is one example of the attitude toward nursing research in most Kazakhstani medical universities.

The "Comprehensive Plan for the Development of Nursing Care in Kazakhstan" (Order of the acting Minister of Health of the Republic of Kazakhstan, 2014) was established as part of the objectives of the State Program for HealthCare Development "Densaulyk." The plan set goals for the creation of an expert committee on nursing research in Kazakhstan. It included the target of implementing at least 10 nursing-related research projects annually and at least 20 publications in Scopus. Another goal concerned the establishment of a national journal that would publish evidence-based nursing information and research in nursing (Ministry of Health of the Republic of Kazakhstan, 2016). These national documents outline the direction for the development of RI in medical universities to not only support the development of medical science but also invest in the development of nursing science.

The lack of national and large-scale nursing research restricts the progress of the reformation and the establishment of an optimal structure for nursing care. The low competitiveness and insufficient national funding for research in medicine were noted already in 2016 (Ministry of Health of the Republic of Kazakhstan, 2016) and this fully applies to nursing research as well. The lack of nursing research can be explained by the insufficient level of research skills among nursing teachers and their consequent low activity and participation in scientific research (Alaidarova et al., 2019).

In 2019, the State Program for the Development of Healthcare in the Republic of Kazakhstan for 2020–2025 was introduced. The program plans to actively develop the human resources of nurses, measure the status of medical workers, and strengthen the status and role of nurses. Further delegation of functions to nursing staff and the expansion of the roles and tasks of nursing specialists, such as the implementation of clinical nursing guidelines, are also included. Furthermore, the action plan for implementing the State Program set many targets for the RI to develop nursing research. It is expected that the number of staff members with English language skills in universities, research institutes, and scientific centers will increase. Additionally, the number of students with English language competency enrolled in nursing education is also expected to increase (Decree of the Government of the Republic of Kazakhstan, 2019.)

The progress of nursing education contributed to the acknowledgment of nursing science and the creation of an SES for a doctoral degree in 2020. The first cohort of Ph.D. students in the academic year 2020—2021 consisted of three students. The educational program aims to train highly qualified nursing specialists who will positively impact the health of various population groups (Order of the acting Minister of Health & Social Development of the Republic of Kazakhstan, 2020).

However, we still do not know enough about the infrastructure available in universities to support and promote research. A study on the state of the nursing RI is necessary to provide accurate information for policymakers and HEI's management to make decisions based on knowledge. This study aimed to describe the current situation and to analyze the improvements introduced by Kazakhstani universities in their nursing RI based on the "Report on the Nursing Research Infrastructure in the Republic of Kazakhstan" (Järvinen et al., 2019). In addition, the wider purpose was to facilitate the improvement of the infrastructure for research and education by making its status explicit for decision-makers.

METHODS

Design

This study was part of the ProInCa project, which aimed "to develop the sustainable innovation capacity of Kazakhstan's Medical Universities for the modernization of nursing" (Heikkilä et al., 2021). The aim of this study was to describe the Kazakhstani universities' status of nursing RI in the following five services: library, internationalization, finance, information and communication technology (ICT), and research, development, and innovation (RDI), as well as to describe the improvements made in said services based on benchmarking and a recommendations report. A qualitative approach was chosen for this study since no earlier knowledge about such changes existed (Kyngäs et al., 2020, pp. 10–11).

The benchmarking was conducted in 2018 to learn from the Kazakhstani and European universities' best practices in nursing RI. Benchmarking is a quality-improvement tool, which consists of identifying, comparing, and learning from the best practices. It also stimulates change and facilitates goal setting (Scott, 2015). Based on the benchmarking, five recommendations were collaboratively formulated to support the medical universities in their systematic improvement of the nursing RI. The recommendations included suggestions regarding the procurement of teaching and learning materials and software needed in nursing research, increasing the international collaboration, cooperation in systematic capacity building, and supporting nursing research through strategic planning (Järvinen et al., 2019). This recommendation report was sent to all the medical universities' nursing faculties and discussed with all stakeholders at a local conference in May 2019.

Sample

As the study was conducted in all ten ($N = 10$) Kazakhstani universities that provide nursing education at least at the bachelor's level, a purposive sampling technique by examining the total population was used. Two of the universities are non-medical universities with a nursing specialty. The participant chosen to represent each university was a nursing faculty member responsible for developing teaching and research.

Data collection

The interview questions covering the five areas of infrastructure were formulated based on research reports concerning RIs (ESFRI, 2021; Roope et al., 2021; Rouleau et al., 2017; WHO, 2021) and the earlier benchmarking report (Järvinen et al., 2019) by the authors. Both multiple-choice and open-ended

types of questions concerning the five infrastructure areas as well as the execution of the recommendations were included in the interview.

The rectors of the targeted universities were sent a letter with information about the project and a request for their oral permission to conduct an interview. After that, negotiations were held over the phone to determine the dates and interviewees and to send them the questions in advance. The data were collected through individual interviews, which were conducted face-to-face in seven ($n = 7$) universities and via telephone in the remaining three ($n = 3$). The individual interview was an ideal data collection method to explore the views and experiences of individual respondents (Holloway & Galvin, 2017). The interviews were conducted in Russian in nine universities, and in English in one university. The respondents were mostly interviewed by two of the authors (IM and FZ), and an average of one hour was spent on each interview. All the interviews were recorded, and the Russian interviews were first transcribed into verbatim and after that translated to English.

Data analysis

Answers from open-ended types of questions were analyzed using content analysis, and quantification was used to demonstrate information (Kyngäs et al., 2020, pp. 3–4). After transcription, the next step was coding, when similar descriptive issues were identified and grouped. The codes we used for the calculation of quantitative counts (Vaismoradi et al., 2013). The results were saved in a spreadsheet program, which allowed the data to be stored in tabular format and sorted and filtered, as well as to support the quantification.

Ethical considerations and the protection of individual information

This study was related to the ProInca project, cofunded by the European Union (Heikkilä et al., 2021). All project partners had signed a partnership agreement approving the activities, including this research. According to the Finnish National Board on Research Integrity (TENK Guidelines, 2019), no ethical review prior to the data collection is needed (Ethics Committee of Jamk University of Applied Sciences, 2021). The TENK Guidelines (2019) concerning the informed consent of the universities, anonymity, and protection of the participants' identity were followed in detail. The agreement from university rectors to participate in the study was acquired based on written and oral explanations of the details of the study, specifically regarding the anonymity and voluntariness of participation. The oral participation agreement (yes/no) was documented. Interviews were recorded, transcribed verbatim and stored in a protected repository without any identifying information of the respondents. The Standards for Quality Improvement Reporting Excellence (SQUIRE-EDU) were used to ensure the quality of the reporting (Ogrinc et al., 2019).

RESULTS

The study was conducted in October 2020 and included interviews of ten ($n = 10$) nursing faculty members from ten ($N = 10$) universities in Kazakhstan. The respondents were mostly the leaders of the nursing faculty or department (dean ($n = 4$), head of department ($n = 2$), a leader ($n = 1$), a director ($n = 1$), or assistants ($n = 2$) of nursing education. Three of the respondents were male and eight were female. All respondents were familiar with the "Report of the Nursing Research Infrastructure in the Republic of Kazakhstan," which included the five recommendations for developing nursing research (Järvinen et al., 2019). Additionally, all universities acknowledged that the recommended improvements were necessary and essential for nursing research development.

First, regarding the ICT services' support for nursing research, it was noted in the interviews that the universities had not made investments to obtain qualitative analysis software, such as Atlas.ti or NVivo, to support qualitative nursing research. Moreover, the analysis of the results demonstrated that in 2020, none of the universities had CINAHL or JBI, the two primary nursing databases. The database most commonly available in the universities for searching information on previous nursing research was the Scopus database. Additionally, the universities had EBSCOhost, eLibrary, ScienceDirect, and the PubMed database, which provides free access to MEDLINE and contains biomedical topics.

Second, the results concerning the development of library services revealed that none of the university libraries possessed any English language nursing paper journals in their collection. However, one of the universities reported that they had 18 different electronic nursing journals publishing original research available in English. These consisted of journals related to specific diseases, journals from Europe, and thematic journals, such as *Biological Research for Nursing, BMC Nursing, Canadian Journal of Cardiovascular Nursing, Canadian Journal of Neuroscience Nursing, Cancer Nursing, Central European Journal of Nursing and Midwifery, Child Health Nursing Research*, and *Iranian Journal of Nursing and Midwifery Research*.

Within the previous two years, there had been no additional nursing research books purchased from the libraries. One university library retained research methodology textbooks in English. Four universities had books in English concerning the clinical skills of nursing practice.

The third infrastructure area was the internationalization services. The analysis showed that participation in international conferences had increased during 2019–2020. Four of the ten universities had sent staff or students to international nursing conferences during 2020 and one of them had had a presentation at one of the conferences. In addition, three universities participated in an international medical conference with a nursing subtheme in 2020. The presentations included public health care, nursing modernization, and nursing practice in the field of academic medicine with topics such as "Stages of evidence-based nursing practice" and "Application of key performance indicators for monitoring the nursing

service in the Republic of Kazakhstan." Slightly more than half ($n = 6$) of the universities accepted visiting professors or lecturers from foreign universities, such as from Europe.

The universities showed increased interest in international cooperation with foreign universities; in four of the ten universities, cooperation agreements had been signed, for example, with universities of applied sciences in Finland, Uzbekistan, Russia, and Lithuania. Mostly, the collaboration had been and was implemented within the framework of the Erasmus+ Capacity Building for Higher Education (CBHE) projects. Nevertheless, none of the universities belonged to any international nursing networks. There were no research projects in cooperation with international universities, although their possible positive effects on the development of research skills and the quality of students' education were identified in the answers.

The analysis of the RDI services revealed that none of the universities had a support system for project planning nor any national research or development projects in nursing being implemented. The support provided by the universities concentrated mainly on the capacity building of the faculty staff. Seven of the ten universities provided systemic capacity building for their nursing teachers, such as "Competence approach in Nursing teaching, Educate skill to be effective teacher," and six included activities for improving nursing education in the strategic plan of the university.

Almost all the universities had some teachers with a master's degree in nursing. However, in those universities where nursing education had been launched during the ongoing academic year and was provided only at the bachelor's level, the staff did not have such a degree.

Lastly, the results on the financial support for nursing research showed that more than half ($n = 6$) of the universities had not invested financially in nursing research, and none of the remaining four universities stated to have funded a research project. The examples of financial support for nursing research were mainly related to supporting the capacity building of the staff in the form of covering their travel expenses to research methodology training, participation to conferences, and academic mobility.

Eight universities answered that they had no other sources for financing nursing research than the university's own funding. In two universities, nursing research was financed with Erasmus+ and World Bank funding.

Study limitations

One of the study limitations was that the data were gathered from only one staff member from each university for all the areas of RI. To minimize this limitation, we delivered the interview questions beforehand so that the informants had the possibility to obtain full information prior to the interview. In addition, the nursing faculties in these universities are extremely small with no more than six to ten staff members, so it can be estimated that the informants were aware of the situation in their university. Therefore, we assume that the information we collected provides a precise overall view of the Kazakhstani universities' nursing RI.

The generalizability of the findings to other fields of science or to other Central Asian countries is limited. This type of study could also be conducted in other universities in Kazakhstan; however, the original recommendations were created for the field of nursing, and therefore the questions of this study cannot be applied to other contexts.

DISCUSSION

The aim of the study was to describe the current state and analyze the improvements made by Kazakhstani universities to their nursing RI during the years 2019–2020. The data were collected from ten universities providing nursing education at the bachelor's and master's levels in the Republic of Kazakhstan. Our analysis of five areas revealed that the HEIs' strategic interest and activities toward the development of nursing education and research had increased when compared with the status in 2018 (Järvinen et al., 2019).

In the future, the number of nurses with higher education will increase substantially in the Republic of Kazakhstan (Kulanchieva et al., 2019). Thus, it is necessary to develop nursing research and its infrastructure. It can be anticipated that the Ph.D. education in nursing science launched in 2020 will provide medical universities with a pool of nurse researchers and increase the universities' pressure for obtaining sufficient RI to support nursing research and the development of evidence-based nursing.

Even though the recent overall interest in developing the nursing profession and education in Kazakhstan has been evident, the financial investments of HEIs in nursing research remain low. International English language materials in university libraries have not increased substantially. Only one library in the medical universities has a textbook on research methodology. On a positive note, the number of available online journals in English has increased when compared with the situation two years ago (Järvinen et al., 2019), although none of the universities still have invested in nursing databases. Investing in the CINAHL database would help undergraduate and postgraduate nursing researchers.

As nursing research also necessitates the use of other than quantitative research methodologies, the procurement of software needed for the analysis of qualitative data is required; however, it is not yet completed by the universities. Investing in software for a more efficient analysis of research data (qualitative and quantitative) by the Kazakhstani universities would allow larger and profound data analysis and international collaboration in nursing research.

The results demonstrate that participation in conferences has increased. However, none of the Kazakhstani medical universities have yet joined international associations for nursing, nurse educators, or nursing research. The first steps toward achieving international collaboration in nursing education and research development can be achieved through Erasmus+ CBHE projects. However, it is necessary to develop the inter-

national support services in universities to support the staff in the creation of international networks that connect universities solely for nursing research purposes. Participation in nursing scientific forums worldwide and publishing nursing research in international journals would increase the appreciation of nursing research in Kazakhstan. To reach the level of publication productivity comparable with nursing faculty members in the United States can be used as a benchmark for goal setting (Broome et al., 2019). However, to reach such aspiring goals requires not only systematic planning but also a solid RI with support services.

What was notable was that more than half ($n = 6$) of the universities had not financially invested in nursing research. It seemed that investing in nursing research was merely regarded to consist of educational program development and staff capacity building, not allocation of working time to prepare grant applications, investing in the self-financing of research, or purchasing of software- or nursing-specific databases. No examples of genuine nursing research studies to produce new knowledge were obtained from the universities. The COVID-19 pandemic has shown that prior investments in RIs have created opportunities for rapid innovations needed to save lives and ease the burden of the healthcare system (Roope et al., 2021). Systematic capacity building in nursing research is needed to attract outside funding and to manage large research projects (McCreaddie et al., 2017) beyond Erasmus+ mobility and CBHE projects. Universities' intramural funding of research projects has been found efficient in increasing the success in larger outside research grants as well as in research capacity building (Kulage & Larson, 2018).

To assess how the state strategy (Decree of the Government of the Republic of Kazakhstan, 2019) is being implemented, the HEI's progress in developing its nursing RI should be monitored with further studies. After fully implementing the recommended actions for the RI development, a follow-up to the study by Alaidarova et al. (2019) could provide evidence for the improvement of the research competencies of the university nursing staff.

PRACTICAL IMPLICATIONS FOR NURSING AND HEALTH POLICY

Globally, nursing staff constitute the largest proportion of medical staff (WHO, 2021), and consequently, improvements in nursing research can have a significant impact on nursing practice and on the whole healthcare system. The Republic of Kazakhstan is facing similar challenges in developing nursing research as have been identified in the Middle East and North African countries (McCreaddie et al., 2017), where until recently nursing has been regarded as an auxiliary part of medicine and not an independent discipline. Therefore, the policy makers' and academic professionals' lack or low level of interest in nursing science and in allocating funding for the development of RI as well as for the research itself is heavily impeding the development of nursing research. To promote the role of nurses not only in Kazakhstan but also in other Central Asian countries, it is crucial to increase the volume of research on clinical nursing that demonstrates its effectiveness and contribution to health outcomes (Gimbel et al., 2017).

Investing in the HEIs' nursing research infrastructure allows the staff and students to conduct research and transfer evidence-based knowledge into practice, especially in countries where the hospitals and policlinics have yet neither the capacity nor the infrastructure for research activities. Therefore, the quality of research infrastructure has an essential impact on achieving universal health coverage, especially in Central Asian countries where nursing professionals have been traditionally seen as "doctor's assistants" (Baygozhina et al., 2018). Kazakhstan has already modernized its nursing education (Order of the acting Minister of Health & Social Development of the Republic of Kazakhstan, 2020) to correspond to the EU directive (EU Directive, 2013/55/EU), which has also been supported by authorized bodies and changes in legislation. However, the volume of master's education is too low even to produce enough nursing teachers and future doctoral students, and, therefore, it will take a decade until the new advanced practice nurses (ANPs) will be able to work in primary health care (Rosa et al., 2020).

The universities and their nursing teachers, as well as the professional nursing associations, should actively pursue a policy of joining the international nursing community, especially the International Council of Nurses. Wider participation in international nursing would highlight the role of nursing science as an independent field of science in Kazakhstan as well as speed up the modernization of the healthcare system by learning from the best international practices. To enable the faster development of nursing science in Central Asian countries, it is important to support this development through international collaboration in nursing research. Erasmus+ CBHE projects may form partnerships between universities across countries, thus increasing the capacity of Kazakhstani medical universities and supporting novice nurse researchers. In addition, national collaboration is needed to combine the scarce capacity of Kazakhstani universities to attract international research grants.

CONCLUSION

As autonomous higher education institutions, Kazakhstani universities have every opportunity to develop their nursing RI. However, more active measures from the university decision-makers, such as financing access to nursing databases, international cooperation, and international projects are necessary to improve the infrastructure and thus enhance the development of nursing science in the country. Hence, our study strongly advises further investment in HEIs' nursing research and its infrastructure.

ACKNOWLEDGMENTS

We express our heartfelt gratitude to all participants and universities whose cooperation has allowed us to conduct this study.

CONFLICTS OF INTEREST

No conflict of interest has been declared by the authors.

FUNDING

This research (project) has been funded with support from the European Commission (585811-EPP-1-2017-1-FI-EPPKA2-CBHE-SP). This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

AUTHOR CONTRIBUTIONS

Study design: JH, SJ, VM-L, ZhK, IM; data collection: SJ, VM-L, IM, ZhK; data analysis: VM-L, SJ; study supervision: JH; manuscript writing: all; critical revisions for important intellectual content: JH.

ORCID

Sari Järvinen RN, PhD https://orcid.org/0000-0002-2128-161X
Johanna Heikkilä RN, PhD, FESC https://orcid.org/0000-0001-8255-3618
Inesh Meyermanova MSN, PhD student https://orcid.org/0000-0002-9406-5002
Zhuldyz Kuanysh MMSPH, PhD student https://orcid.org/0000-0002-9578-4236
Vilen Molotov-Luchanskiy DMS https://orcid.org/0000-0001-8473-4375

REFERENCES

Aihara, H., Aranda, A., Camacho Torot, R., Cambiaso, M., Carrera, M., Carrera, E., et al. (2021) Latin American strategy for research infrastructures for high energy, cosmology, astroparticle physics. LASF4RI for HECAP. Available at: 2104.06852.pdf (arxiv.org) [Accessed 26th February 2022].

Alaidarova, M., Ibysheva, N., Sholanova, M., Moldotashev, I. & Popov, A. (2019) Evaluation of the potential for the development of researches in nursing through information resources. *Journal of Health Development*, 3(32), 20–39. Available at: http://jhdkz.org/gallery/Volume%203.%20Number%2032%20%282019%29.pdf (accessed 07 August 2021).

Armstrong, C.J., Busby, J., Gebeck Carroll, K., Jorgensen-Earp, E., Lane, I.C., Odintz, J.D., et al. (2021) American jobs plan of 2021: summary. Available at: americanjobsplansummary.pdf (hklaw.com). [Accessed 26th February 2022].

Australia Government (2021) National research infrastructure roadmap. Exposure draft. Available at: https://www.dese.gov.au/national-research-infrastructure/resources/2021-national-research-infrastructure-roadmap-exposure-draft [Accessed 12th February 2022].

Baygozhina, Z.A., Koykov, V.V. & Umbetzhanova, A.T. (2017) Experience of the reform of nursing education in the republic of Kazakhstan. *Meditsinskoye obrazovaniye i vuzovskaya nauka*, 10(2), 86–90 (in Russian). Available at: https://www.sechenov.ru/upload/iblock/5dd/meditsinskoe-obrazovanie-i-vuzovskaya-nauka-2017-2_10_.pdf [Accessed 26th April 2021].

Baygozhina, Z.A. et al. (2018) About the progress of implementation the road map of the project «modernization of medical education and science» and the comprehensive development plan for nursing in the republic of Kazakhstan. *Journal of Health Development*, S2(27), 32–37 (in Russian). Available at: http://jhdkz.org/gallery/journal_18-2(27)_suppl.pdf [Accessed 14th February 2022].

Bolatova, M.B., Zhumambaeva, R.M., Zhetmekova, J.T. & Kabidenova, N.M. (2014) "Practical skills" competence with in the scientific-pedagogical profile of master in "nursing." *Nauka i zdravookhraneniye*, 6, 107–110 (in Russian). Available at: https://cyberleninka.ru/article/n/kompetentsiya-prakticheskie-navyki-v-magistrature-po-spetsialnosti-sestrinskoe-delo-v-ramkah-nauchno-pedagogicheskogo-profilya [Accessed 26th April 2021].

Broome, M.E., Oermann, M.H., Douglas, C.E., Simmons, D.F. & Woodward, A. (2019) Publication productivity of nursing faculty in selected schools of nursing across the United States. *Journal of Nursing Scholarship*, 51(3), 346–355. https://doi.org/10.1111/jnu.12463

Darvish, A., Bahramnezhad, F., Keyhanian, S. & Navidhamidi, M. (2014) The role of nursing informatics on promoting quality of health care and the need for appropriate education. *Global Journal of Health Science*, 6(6), 11–18. https://doi.org/10.5539/gjhs.v6n6p11

Decree of the Government of the Republic of Kazakhstan (2019) The state program for the development of healthcare of the Republic of Kazakhstan for 2020–2025. December 26, 2019: No. 982 (in Russian). Available at: http://adilet.zan.kz/rus/docs/P1900000982 [Accessed 26th April 2021].

Dhakal, K. (2018) Librarians collaborating to teach evidence-based practice: exploring partnerships with professional organizations. *Journal of the Medical Library Association*, 106(3), 311–319. https://doi.org/10.5195/jmla.2018.341

Ethics Committee of Jamk University of Applied Sciences (2021) Ethical review.

European Commission (2021) Horizon Europe strategic plan 2021–2024. Available at: https://ec.europa.eu/info/sites/default/files/research_and_innovation/funding/documents/ec_rtd_horizon-europe-strategic-plan-2021-24.pdf [Accessed 27th July 2021].

EU Directive (2013)/55/EU. Available at: EUR-Lex - 32013L0055 - EN - EUR-Lex (europa.eu) [Accessed 17th April 2022].

ESFRI (2021) Strategy report on research infrastructures: roadmap 2021. Public Guide. Available at: https://www.esfri.eu/sites/default/files/ESFRI_Roadmap2021_Public_Guide.pdf [Accessed 26th July 2021].

Finnish Academy (2020) Strategy for national research infrastructures in Finland 2020–2030. Available at: aka_tik_strategia_2019_en_digi_a.pdf [Accessed 26th April 2021].

TENK Guidelines (2019) The ethical principles of research withhuman participants and ethical review in the human sciences in Finland. Available at: https://tenk.fi/sites/default/files/2021-01/Ethical_review_in_human_sciences_2020.pdf [Accessed 26th April 2021].

Gimbel, S., Kohler, P., Mitchell, P. & Emami, A. (2017) Creating academic structures to promote nursing's role in global health policy. *International Nursing Review*, 64(1), 117–125. https://doi.org/10.1111/inr.12338

Hazelkorn, E. & Gibson, A. (2017) Global science, national research, and the question of university rankings. *Palgave Communication*, 3, 21. https://doi.org/10.1057/s41599-017-0011-6

Heikkilä, J., Syzdykova, A., Colet, P. & Kalima, M. (2021) Promoting the innovation capacity of higher education in nursing during health services' transition (ProInCa). JAMK University of Applied Sciences. Available at: https://www.theseus.fi/handle/10024/409019 [Accessed 4th August 2021].

Holloway, I. & Galvin, K. (2017) Interviewing. In *I. Holloway qualitative research in nursing and healthcare*, 4th ed. West Sussex: WILEY Blackwell, pp. 87–106.

Jakab, Z., Selbie, D., Squires, N., Mustafa, S. & Saikat, S. (2021) Building the evidence base for global health policy: the need to strengthen institutional networks, geographical representation and global collaboration. *BMJ Global Health*, 6, 1–8. https://doi.org/10.1136/bmjgh-2021-006852

Järvinen, S., Serik, B., Aitmagambetov, A. & Heikkilä, J. (2019) Report of the nursing research infrastructure in the Republic of Kazakhstan. Available at: http://proinca-nursing.kz/wp-content/uploads/2020/01/d2.3.1-report-of-the-nursing-research-infrastructure-in-the-republic-of-kazakhstan.pdf [Accessed 26th April 2021].

Kulage, K. & Larson, E. (2018) Intramural pilot funding and internal grant reviews increase research capacity at a school of nursing. *Nursing Outlook*, 66(1), 11–17. https://doi.org/10.1016/j.outlook.2017.06.003

Kulanchieva, Z.h.A., Smailova, D.S., Baygozhina, Z. A. & Abenova, K.T. (2019) 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" (in Russian). Available at: Методические рекомендац.pdf (rcrz.kz) (accessed 26 April 2021).

Kyngäs, H., Mikkonen, K. & Kääriäinen, M. (2020) *The application of content analysis in nursing science research*. Switzerland: Springer Nature.

Logsdon, M.C., Kleiner, C., Oster, C.A., Smith, C. Di S., Bergman-Evans, B., Kempnich, J.M., et al. (2017) Description of nurse scientists in a large health care system. *Nursing Administration Quarterly*, 41(3), 266–274. https://doi.org/10.1097/NAQ.0000000000000237

Ministry of Health of the Republic of Kazakhstan (2010) *National healthcare program of the Republic of Kazakhstan "Salamatty Kazakhstan" for 2011–2015* (in Russian). Available at: https://extranet.who.int/nutrition/gina/en/node/14866 [Accessed 26th April 2021].

Ministry of Health of the Republic of Kazakhstan (2016) *National program for the development of healthcare of the Republic of Kazakhstan "Densaulyk", designed for 2016–2019* (in Russian). Available at: https://adilet.zan.kz/rus/docs/P1800000634 [Accessed 22nd July 2021].

McCreaddie, M., Kuzemski, D., Griffiths, J., Sojka, E.M., Fielding, M., Yateem, N. Al, et al. (2017) Developing nursing research in the United Arab Emirates: a narrative review. *International Nursing Review*, 65(1), 93–101. https://doi.org/10.1111/inr.12405

OECD (2019) Reference framework for assessing the scientific and socio-economic impact of research infrastructures. *OECD Science, Technology and Industry Policy Papers*, 3(65). Available at: oecd-ilibrary.org [Accessed 25 March 2022].

OECD (2020) *Optimizing the operation and use of national research infrastructures*. OECD Science, Technology and Industry Policy papers No.91 https://www.scienceeurope.org/media/cbchuqpj/se-oecd-policy-paper-optimising-the-operation-and-use-of-national-research-infrastructures-aug-2020.pdf (accessed 4 August 2021).

Ogrinc, G., Armstrong, G.E., Dolansky, M.A., Singh, M.K. & Davies, L. (2019) SQUIRE-EDU (standards for quality improvement reporting excellence in education): Publication guidelines for educational improvement. *Academic Medicine*, 94(10), 1461–1470. https://doi.org/10.1097/ACM

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* (in Russian). Available at: https://online.zakon.kz/Document/?doc_id=39860292#pos=1; [Accessed 26th April 2021].

Order of the acting Minister of Health and Social Development of the Republic of Kazakhstan (2020) *state compulsory standards and model professional training programs in medical and pharmaceutical specialties*. Order No. 647 (in Russian). Available at: http://adilet.zan.kz/rus/docs/V1500012007 [Accessed 26th April 2021].

Ospanova, D.A., & Altynbekova, S.A. (2018) Analysis of educational programs of higher professional education in the specialty "nursing." *Vestnik AGIUV*, 2, 62–67 (in Russian). Available at: https://cyberleninka.ru/article/n/analiz-obrazovatelnyh-programm-vysshego-professionalnogo-obrazovaniya-po-spetsialnosti-sestrinskoe-delo [Accessed 26th April 2021].

Roope, L.S.J., Candio, P., Kiparoglou, V., McShane, H., Duch, R., & Clarke, P.M. (2021) Lessons from the pandemic on the value of research infrastructure. *Health Research Policy and Systems*, 19(54), 1–4. https://doi.org/10.1186/s12961-021-00704-2

Rosa, W.E., Fitzgerald, M., Davis, S., Farley, J.E., Khanyola, J., Kwong, J. et al. (2020) Leveraging nurse practitioner capacities to achieve global health for all: COVID-19 and beyond. *International Nursing Review*, 67(4), 554–559. https://doi.org/10.1111/inr.12632

Rouleau, G., Gagnon, M.-P., Côté, J., Payne-Gagnon, J., Hudson, E., & Dubois, C.-A. (2017) Impact of information and communication technologies on nursing care: results of an overview of systematic reviews. *Journal of Medical Internet Research*, 19(4), e122. https://doi.org/10.2196/jmir.6686

Scott, R. (2015) Benchmarking: a literature review. Edith Cowan University. Available at: https://intranet.ecu.edu.au/__data/assets/pdf_file/0010/357193/Benchmarking-Literature-Review.pdf (accessed 26 April 2021).

Sedach, N.N. & Sadueva, F.H. (2018) Justification the possibility of attracting nurses to conduct patient education. Proceedings of XVIII International Scientific and Practical Conference 'World Science: Problems and Innovations, Penza, Russia, 143–145 (in Russian). Available at: https://elibrary.ru/item.asp?id=32592407 [Accessed 26th April 2021].

Sidorova, Y.O. (2017) Recognition features of the CIS medical qualifications in Russia. *Meditsinskoye obrazovaniye i vuzovskaya nauka*, 9(1), 55–59 (in Russian). Available at: https://www.sechenov.ru/upload/iblock/015/med_obr_1_9_2017_56_60.pdf [Accessed 26th April 2021].

Strickland, K. (2017) Developing an infrastructure to support clinical academic careers. *British Journal of Nursing*, 26(22), 1249–1252. 10.12968/bjon.2017.26.22.1249

Vaismoradi, M., Turunen, H. & Bondas, T. (2013). Content analysis and thematic analysis: implications for conducting a qualitative descriptive study. *Nursing and Health Sciences*, 15, 398–405. 10.1111/nhs.12048

WHO (2021) The WHO global strategic directions for nursing and midwifery (2021–2025). Available at: https://www.who.int/publications/m/item/global-strategic-directions-for-nursing-and-midwifery-2021-2025 [Accessed 27th July 2021].

How to cite this article: Järvinen, S., Heikkilä, J., Meyermanova, I., Kuanysh, Z. & Molotov-Luchanskiy, V. (2023) Improvements in the infrastructure for nursing research in universities in Kazakhstan. *International Nursing Review*, 70, 10–17. https://doi.org/10.1111/inr.12791