Global Nursing Research Center
Graduate School of Medicine, The University of Tokyo

GNRC Conference 2021

Abstract Book

The Global Nursing Research Center
Graduate School of Medicine, The University of Tokyo

E-mail：gnrc-office@umin.ac.jp
TEL：03-5841-3690
URL：http://gnrc.m.u-tokyo.ac.jp/en/

The Global Nursing Research Center Conference 2021

Date: February 14 (Sun) 14:00-16:30
Site: Zoom Webinar
Register/ Information: Global Nursing Research Center Website
http://gnrc.m.u-tokyo.ac.jp/en/

The Global Nursing Research Center Conference 2021

Abstract Book

Graduate School of Medicine
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Greetings from the Global Nursing Research Center

We express our heartfelt welcome to the Global Nursing Research Center Conference 2021. We also express sincere gratitude to many for their understanding and collaboration which we have been honored to receive in preparation for this event. Here we would like to introduce an overview of the conference.

The Global Nursing Research Center (GNRC) was established in April 2017. This is Japan's first center specializing in nursing research with the aim of promoting interdisciplinary innovative nursing research and fostering young nursing researchers who will lead the future of care innovation.

March 2021 marks a milestone for GNRC. After one year in preparation and four years of active work, the five-year funding secured initially will expire. Thanks to you, the activities have been recognized and the center has been chosen to continue as a permanent part of The University of Tokyo. To commemorate this achievement, we would like to showcase our general activities so far and welcome overseas guest speakers to consider the future development of nursing science and research.

Due to the limitations on large-scale meetings in place for COVID-19 infection control, this conference will be held online. An avatar will appear and welcome you to the conference' s virtual reality world. This conference will allow attendees to enter the virtual reality world with a personal avatar, which hopefully enhances the experience of being part of the conference. You may also visit the GNRC through the virtual reality world as an avatar after the conference.

GNRC has two divisions, the Division of Care Innovation and the Division of Nursing Systems, and conducts research activities in eight fields. In this conference, we will introduce representative projects and showcase the laboratories and offices from each field. We hope to create an environment where we can discuss with you about the innovation achieved here.

In addition, as a guest from overseas we have invited Professor Ardith Doorenbos, PhD, RN, FAAN from the faculty of nursing at the University of Illinois Chicago to speak on "Building Nursing Resilience for the Future" . Professor Doorenbos is the Director of Palliative Care at the University of Illinois Cancer Center and co-leader of cancer prevention and control programs. She is deeply involved in clinical work along with her research and teaching. She has given lectures and consultations as a Project Professor since August 2020.

The COVID-19 pandemic poses an unprecedented threat and challenge for healthcare professionals. As Professor Doorenbos says, we must stay resilient, be flexible, share wisdom, support each other, build new systems, and move forward with a broader vision to respond to change and face these adversities and stresses. We hope each and every one of us may build confidence and believe in our potential, thereby protecting the well-being of many more.

Please refer to the GNRC website to register in advance.
http://gnrc.m.u-tokyo.ac.jp/

We look forward to your participation from 14:00 to 16:30 on Sunday, February 14th, 2021. We anticipate many will enjoy a new experience at this conference while learning about the development of nursing science. We hope the activities of this center and the lectures at this conference will encourage the training of young researchers who will carry this work into the future.

Last but not least, we would like to express our sincere gratitude to everyone whose great efforts helped to establish and operate this center, and we ask for your continued support in the future.

Global Nursing Research Center

Director Hiromi Sanada
Deputy Directors Kiyoko Kamibeppu
Noriko Yamamoto

Opening remarks

Nobuhito Saito, *MD, PhD*

Dean
Graduate School of Medicine, The University of Tokyo

The Global Nursing Research Center (GNRC) was established in April 2017, as the third research center in the Graduate School of Medicine of The University of Tokyo, following the International Research Center for Medical Education, and the Center for Disease Biology and Integrative Medicine.

The vision of The University of Tokyo is, to strategically develop academic fields, that challenge new value creation and to promote the expansion and establishment of internationally outstanding research bases.

GNRC made a request and was granted a five-year budget to realize this vision. With the establishment of GNRC, the cooperation among the nursing department, the medical department and UTokyo Hospital has been further promoted, and new research has progressed through the fusion.

This great contribution to the realization of the vision was recognized, and it was decided this year, that GNRC will be positioned as a permanent research center, rather than a temporary center with a five-year time-limit. This is truly a great achievement. All these achievements were made as the result of the efforts of many members, including its Director Prof. Sanada, and Deputy Directors Prof. Kamibeppu and Prof. Yamamoto. And it could never have been accomplished, "without the great support and cooperation of many people in Japan and overseas. I would like to express my sincere gratitude to you all.

GNRC will further develop interdisciplinary research, which is one of its strengths and a major feature, and actively implement the academic achievements in society. We believe that it will lead to the achievements of SDGs, which is advocated by the United Nations, such as "promotion and building a foundation for industry and technological innovation", and "formation of a sustainable society".

Finally, once again, I would like to express my heartfelt gratitude to all those involved, who have shown a great deal of understanding of GNRC's efforts, and have generously provided a wide range of warm support. We ask for your continued cooperation and support, so that GNRC can continue to achieve its goals.

Nobuhito Saito, *MD, PhD*

Dean, Faculty of Medicine & Graduate School of Medicine, The University of Tokyo
Professor and Chairman, Department of Neurosurgery
A member of the organizing committee of the Global Nursing Research Center

1987 Graduated from The University of Tokyo, Faculty of Medicine
1987 Resident in Department of Neurosurgery, The University of Tokyo and Affiliated Hospitals
1989 Visiting fellow, Stroke Branch, NINDS, NIH, USA
1997 Ph.D. The University of Tokyo
2000 Assistant professor, Department of Neurosurgery, Gunma University School of Medicine
2002 Professor and Chairman, Department of Neurosurgery, Gunma University Graduate School of Medicine
2006 Professor and Chairman, Department of Neurosurgery, Graduate School of Medicine, The University of Tokyo
2011 Vice Director of The University of Tokyo Hospital
2015 Director of The University of Tokyo Hospital
2019 Dean, Faculty of Medicine & Graduate School of Medicine, The University of Tokyo

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1. Teranishi Y, Miyawaki S, Hongo H, Dofuku S, Okano A, Takayanagi S, et al. Targeted deep sequencing of DNA from multiple tissue types improves the diagnostic rate and reveals a highly diverse phenotype of mosaic neurofibromatosis type 2. J Med Genet. 2020. doi: 10.1136/jmedgenet-2020-106973
2. Kitagawa Y, Tanaka S, Kuriki Y, Yamamoto K, Ogasawara A, Nejo T, et al. Spray fluorescent probes for fluorescence-guided neurosurgery. Front Oncol. 2019;9:727.
3. Shono N, Kin T, Nomura S, Miyawaki S, Saito T, Imai H, et al. Microsurgery simulator of cerebral aneurysm clipping with interactive cerebral deformation featuring a virtual arachnoid. Oper Neurosurg (Hagerstown).
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5. Nomura M, Mukasa A, Nagae G, Yamamoto S, Tatsuno K, Ueda H, et al. Distinct molecular profile of diffuse cerebellar gliomas. Acta Neuropathol. 2017;134(6):941-56.
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8. Johnson BE, Mazor T, Hong C, Barnes M, Aihara K, McLean CY, et al. Mutational analysis reveals the origin and therapy-driven evolution of recurrent glioma. Science. 2014;343(6167):189-93.
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10. Miyawaki S, Imai H, Takayanagi S, Mukasa A, Nakatomi H, Saito N. Identification of agenetic variant common to moyamoya disease and intracranial major artery stenosis/occlusion. Stroke. 2012;43(12):3371-74.
11. Kin T, Nakatomi H, Shojima M, Tanaka M, Ino K, Mori H, et al. A new strategic neurosurgical planning tool for brainstem cavernous malformations using interactive computer graphics with multimodal fusion images. J Neurosurg. 2012;117(1):78-88

Global Nursing Research Center
Past, Present, Future

Hiromi Sanada, *PhD, RN, WOCN, FAAN*
Director, Global Nursing Research Center

First of all, I would like to express my sincere gratitude to the many medical professionals who are working at the front line during the second wave of the pandemic.

With the declining birthrate and aging society in Japan, there is a demand for a major shift from curative medical care to curative and supportive medical care. In order to realize this supportive medical care and extend healthy life expectancy, it is essential for nursing science, which plays a central role in care, to establish a new academic field aiming to solve various problems by utilizing the latest technologies. The key to this is not only to promote interdisciplinary research, but to also implement it in society through industry-academia collaboration and to develop global human resources who can expand it to the world. With that in mind, the Global Nursing Research Center (GNRC) was established four years ago in April 2017 with the aim to further develop nursing research in Japan. With funds from the Ministry of Education, Culture, Sports, Science and Technology in 2016, we are pioneering new fields of nursing that promote interdisciplinary innovation and training young researchers who will lead it into the future.

At GNRC, we have set up the Division of Care Innovation and the Division of Nursing Systems. In the Division of Care Innovation, we have integrated developed medicine, medical engineering, life sciences and technology, and molecular biology to create care products. These care products use AI, robots, and biomarkers to support symptom relief. In addition, the Division of Nursing Systems combines educational psychology, philosophy, policy science, information engineering, etc. to build nursing theories that support high-quality practices. We are also accumulating evidence for new policy proposals. These studies have produced many patents, theses and even products.

Over the past four years, we have invited a number of world-class nursing researchers to directly train our young researchers. We shared these opportunities with off-campus researchers as well. I am convinced that these postdocs and young researchers will influence the future of nursing science more than they can imagine. Even from a global perspective, I believe Japan will produce many researchers who will open new doors in nursing science.

Based on these achievements, we plan to disseminate these new systems by cooperation between the Division of Care Innovation and the Division of Nursing Systems in the future. In other words, by growing interdisciplinary innovative nursing research, which is the most important feature and strength of GNRC, we will develop a social implementation system for our research results. This implementation system will use academia-industry collaboration to benefit our community. We will promote the development of manufacturing and nursing systems and share these globally. Due to the Coronavirus pandemic, the circumstances around nursing science are changing drastically. For many recovery patients, it is now difficult to give meaningful bed-side care, which was a key aspect of nursing work.

Therefore, the creation of new remote nursing science strategies will become an important theme for GNRC research in the future.

As mentioned earlier, we will discuss our aims established at the beginning, our current activities, and the future directions of the GNRC. Essentially our past, present, and future. By developing care science, we further aim to help the elderly to enjoy a life full of independence, autonomy, and wellbeing far into the future.

Hiromi Sanada, *PhD, RN, WOCN, FAAN*
Professor, Department of Gerontological Nursing / Wound Care Management
Director, Global Nursing Research Center
Graduate School of Medicine, The University of Tokyo, Japan

Professor Hiromi Sanada received her bachelor degree in nursing from St. Luke's College of Nursing in 1979.
In 1987, she completed enterostomal therapist program at Cleveland Clinic St. Luke's Branch.
From 1989 to 1990, Professor Sanada participated in a training program at University of Illinois at Chicago. She received her PhD in medicine from Kanazawa University in 1997. She became a professor of nursing at Kanazawa University in 1998 and moved to The University of Tokyo as a professor of Department of Gerontological Nursing, Division of Health Sciences and Nursing, Graduate School of Medicine in 2003. She established the Department of Wound Care Management in 2006 and has been served as a professor. From 2011 to 2012 Professor Sanada acted as a head of the division and from 2015 to 2016 she was appointed as a head of School of Integrated Health Sciences at the undergraduate course. From 2017, she has been the director of Global Nursing Research Center. In 2019,
she was named a fellow of the American Academy of Nursing. In 2020, She was honored with Healthy Society Award.

Publication list

Department of Robotics Nursing

1. Nagata T, Noyori S, Noguchi H, Nakagami G, Sanada H. Skin tear classification using machine learning from digital RGB image. J Tissue Viability. 2021. doi: https://doi.org/10.1016/j.jtv.2021.01.004
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3. Noyori S, Nakagami G, Noguchi H, Mori T, Sanada H. Unintentional body movement parameters and pulse rate variability parameters are associated with the desire to void. Med Eng Phys. 2019;68:116-21.

Department of Biological Nursing

1. Nakagami G, Schultz G, Kitamura A, Minematsu T, Akamata K, Suga H, et al. Rapid detection of biofilm by wound blotting following sharp debridement of chronic pressure ulcers predicts wound healing: a preliminary study. Int Wound J. 2020;17(1):191-96.
2. Goto T, Nakagami G, Minematsu T, Tomida S, Shinoda M, Iwata K, et al. Topically injected adrenocorticotropic hormone induces mechanical hypersensitivity on a full-thickness cutaneous wound model in rats. Exp Dermatol. 2019;28(9):1010-16.
3. Minematsu T, Nakagami G, Mugita Y, Tamai N, Sanada H. Development of a distribution analysis method for metalloproteinase activity by combining wound blotting and zymography techniques: a pilot study in mice. J Nurs Sci Eng. 2018;5(2):58-64.

Department of Visualized Nursing

1. Tamai N, Minematsu T, Ikeda M, Mugita Y, Sanada H. Effects of improved hypoallergenic fabrics in medical wigs in breast cancer patients with chemotherapy-induced alopecia: a randomized clinical trial. BMJ Support Palliat Care. 2021. doi: 10.1136/bmjspcare-2020-002309
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3. Miura Y, Nakagami G, Yabunaka K, Tohara H, Noguchi H, Mori T, et al. A randomized controlled trial to investigate the effectiveness of the prevention of aspiration pneumonia using recommendations for swallowing care guided by ultrasound examination. Healthcare (Basel). 2018;6(1):15.

Department of Clinical Nursing Technology

1. Takahashi T, Murayama R, Abe-Doi M, Miyahara-Kaneko M, Kanno C, Nakamura M, et al. Preventing peripheral intravenous catheter failure by reducing mechanical irritation. Sci Rep. 2020;10(1):1550.
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3. Murayama R, Uchida M, Oe M, Takahashi T, Oya M, Komiyama C, et al. Removal of peripheral intravenous catheters due to catheter failures among adult patients. J Infus Nurs. 2017;40(4):224-31.

Department of Reverse Translational Research

1. Oe M, Sasaki S, Shimura T, Takaki Y, Sanada H. Effects of multilayer silicone foam dressings for the prevention of pressure ulcers in high-risk patients: a randomized clinical trial. Adv Wound Care (New Rochelle). 2020;9(12):649-56.
2. Oe M, Yotsu RR, Arisandi D, Suriadi, Sakai Y, Imran, et al. Validity of DMIST for monitoring healing of diabetic foot ulcers. Wound Repair Regen. 2020;28(4):539-46.

Division of **Care Innovation**

Gojiro Nakagami, *PhD, RN*

Associate Professor

Department of Gerontological Nursing/Wound Care Management

The Division of Care Innovation promotes research and development that directly approaches clinical needs by making full use of various technologies such as robotics, biology, and imaging technology in order to develop and disseminate care products that alleviate the disadvantages of daily life caused by health problems in individuals.

The Division of Care Innovation has four departments.

Department of **Robotics Nursing**

This department conducts research through the development of software for communication robots, and the development, prototyping, and testing of nursing equipment and measurement devices, and apply them to clinical settings. In particular, the members are promoting research with the main target of implementing robotics technology in the field of home care.

Department of **Biological Nursing**

The members are creating new nursing science and nursing techniques that clarify the mechanisms of the problems that nurses confront and identify intervention targets that match the nature of the problems. They approach the patient as a living organism and understand phenomena such as dry skin, skin maceration, and incontinence-associated dermatitis in the elderly based on the nature of each element. An understanding of the phenomenon leads to the development of essential care and the proposal of new nursing techniques, such as skin blotting, based on laboratory techniques.

Department of **Visualized Nursing**

This department builds a new system that combines imaging technology and information technology, and establish a methodology to introduce it into clinical medicine and home settings. The department' s goal is to establish imaging nursing technology that is based on clinical practice through the development and implementation of technologies that support nursing assessment by using artificial intelligence to realize automatic image processing technology.

Department of **Clinical Nursing Technology**

In this department, the members work together with interdisciplinary professionals and university nursing faculty to resolve nursing issues that arise in hospitals and other clinical settings. In addition, they collaborate with corporate researchers to develop new nursing devices, evaluate them in the clinical setting, and practice the process of further improvement. We aim to provide new nursing technologies that meet clinical needs in a speedy manner.

Gojiro Nakagami, *PhD, RN*

Associate Professor, Department of Gerontological Nursing/Wound Care Management
Graduate School of Medicine, The University of Tokyo

Dr. Gojiro Nakagami received his bachelor's degree in nursing from Kobe University in 2004 and received his PhD in health sciences from The University of Tokyo in 2009.
While in his PhD course, he served as Research Fellow (DC2), Japan Society for the Promotion of Science.
He had started his career as a nursing faculty at The University of Tokyo since 2009.
He has worked as a visiting scholar at University of California at Los Angeles in 2013.
He has been working at The University of Tokyo as an associate professor since 2017.

Publication list

1. Nakagami G., Yokota S., Sanada H. (2021) Real-World Data-Based Care Innovation: Lessons Learned from Nursing Science. In: Matsushita H. (eds) Health Informatics. Translational Systems Sciences, vol 24. Springer, Singapore.
2. Nakagami G, Morita K, Matsui H, Yasunaga H, Fushimi K, Sanada H. Association between pressure injury status and hospital discharge to home: a retrospective observational cohort study using a national inpatient database. Ann Clin Epidemiol. 2020;2(2):38-50.
3. Kimura N, Nakagami G, Minematsu T, Sanada H. Noninvasive detection of local tissue responses to predict pressure ulcer development in mice model. J Tissue Viability. 2020;29(1):51-7.
4. Nakagami G, Schultz G, Kitamura A, Minematsu T, Akamata K, Suga H, et al. Rapid detection of biofilm by wound blotting following sharp debridement of chronic pressure ulcers predicts wound healing: a preliminary study. Int Wound J. 2020;17(1):191-6.
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7. Bates-Jensen BM, McCreath HE, Nakagami G, Patlan A. Subepidermal moisture detection of heel pressure injury: the pressure ulcer detection study outcomes. Int Wound J. 2018;15(2):297-309.
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Division of Care Innovation

Department of **Robotics Nursing**

Professor, Hiromi Sanada *PhD, RN, WOCN, FAAN*
Associate Professor, Gojiro Nakagami *PhD, RN*
Project Assistant Professor, Toshiaki Takahashi *PhD, RN*
Assistant Professor, Aya Kitamura *PhD, RN*
Researcher, Shiho Higashimura *PhD, RN*

Department Introduction

In Department of Robotics Nursing, we are conducting various research projects based on engineering ideas to establish robotics nursing as a new nursing science. In particular, we are investigating effective monitoring devices and prevention equipment which will help elucidate causes of diseases and prevent injuries caused by common daily activities. This nursing engineering project includes the development of devices that watch over or measure human behavior. We are advancing the development of a new field where nursing science and robotics are integrated based on principles from computer science, mechatronics, and robotics.

Innovations from our Department

The main topics in this field stem from issues arising in clinical settings. These topics include promoting telemedicine systems through online consultation, predicting patient outcomes through machine learning analysis of bigdata including electronic medical / health records and nurse call logs, monitoring everyday living environments using communication robots and estimating lifestyle patterns and variations through algorithms, developing biometric monitoring mattresses, and robotic mattresses that can prevent pressure injuries.

Our research will help us cope with the situation where nursing at home is difficult due to COVID-19. In particular, we are developing a tele-consultation system for severe pressure injuries and a simple vital monitoring device that will work with communication robots and can be used in the daily living environment. We are also developing a new system that automatically links self-care devices such as blood pressure monitors and thermometers to communication robots to promote self-care behavior and predict changes in health condition. The data obtained through this system will be stored and utilized for predicting patient outcomes as part of a new nursing science bigdata database.

In this way, we are developing new technologies to improve subject wellbeing and support higher quality, more efficient nursing care through the monitoring device s and automatic processes of the sensor data based on machine learning.

Publication list

1. Nagata T, Noyori S, Noguchi H, Nakagami G, Kitamura A, Sanada H. Skin tear classification using machine learning from digital RGB image. J Tissue Viability. 2021. doi: https://doi.org/10.1016/j.jtv.2021.01.004
2. Nakagami G, Morita K, Matsui H, Yasunaga H, Fushimi K, Sanada H. Association between pressure injury status and hospital discharge to home: A retrospective observational cohort study using a national inpatient database. Ann Clin Epidemiol. 2020;2(2):38-50.
3. Noguchi H, Oe M, Takehara K, Mori T, Sanada H. Onsite visualization of shoe fitting for education of the people with diabetes using 3D scanner: A pilot study. J Nurs Sci Eng. 2020;7:162-9.
4. Koyano Y, Noguchi H, Sanada H. Can the use of a human-shaped communication robot enhance motivation for inpatient rehabilitation? J Nurs Sci Eng. 2020;7:170-76.
5. Koyano Y, Nakagami G, Tamai N, Sugama J, Sanada H. Morphological characteristics of skin tears to estimate the etiology-related external forces that cause skin tears in an elderly population. J Nurs Sci Eng. 2020;7:68-78.
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8. Takahashi T, Murayama R, Yabunaka K, Tanabe H, Sanada H. Using Tablet-type ultrasonography to assess peripheral veins for intravenous catheterization: A pilot study. J Assoc Vascular Access. 2019;24(3):1-6.
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11. Kitamura A, Yoshimura M, Nakagami G, Yabunaka K, Sanada H. Changes of tissue images visualised by ultrasonography in the process of pressure ulcer occurrence. J Wound Care. 2019;28(sup4):18-22.
12. Noyori S, Nakagami G, Noguchi H, Mori T, Sanada H. Unintentional body movement parameters and pulse rate variability parameters are associated with the desire to void. Med Eng Phys. 2019;68:116-21.
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15. Bates-Jensen BM, McCreath HE, Nakagami G, Patlan A. Subepidermal moisture detection of heel pressure injury: The pressure ulcer detection study outcomes. Int Wound J. 2018;15(2):297-309.
16. Shikama M, Nakagami G, Noguchi H, Mori T, Sanada H. Development of personalized fitting device with 3-dimensional solution for prevention of NIV oronasal mask-related pressure ulcers. Respir Care 2018;63 (8):1024-32.
17. Watanabe A, Noguchi H, Oe M, Sanada H, Mori T. Development of a plantar load estimation algorithm for evaluation of forefoot load of diabetic patients during daily walks using a foot motion sensor. J Diabetes Res. 2017;2017:5350616.
18. Noyori S, Nakagami G, Noguchi H, Yabunaka K, Mori T, Sanada H. A new ultrasonographic image displaying system to support vein detection, J Robotics Mechatron. 2017;29(2): 306-16.
19. Koyano Y, Nakagami G, Iizaka S, Sugama J, Sanada H. Skin property can predict the development of skin tears among elderly patients: a prospective cohort study. Int Wound J. 2017;14(4):691-7.
20. Takahashi T, Murayama R, Oe M, Tanabe H, Yabunaka K, Arai R, et al. Is thrombus with subcutaneous edema detected by ultrasonography related to short peripheral catheter failure? A prospective observational study. J Infus Nurs. 2017;40(5):313-22.

Division of Care Innovation

Department of **Biological Nursing**

Project Associate Professor, Takeo Minematsu *PhD*
Project Senior Assistant Professor, Misako Dai *PhD, RN*
Postdoctoral Fellow, Sofoklis Koudounas *PhD*

Cooperative Department

Professor, Hiromi Sanada *PhD, RN, WOCN, FAAN*
Associate Professor, Gojiro Nakagami *PhD, RN*

Department Introduction

This department aims to establish biological nursing, which is a new methodology of nursing science based on basic biological research. Biological nursing study includes the following steps.

1) Reproduction of clinical problems in experimental animals or cell cultures.
2) Detailed observation from macroscopic to microscopic level. In this step, research hypotheses are generated.
3) Testing these hypotheses by molecular, biological and biochemical methods.
4) Translation of findings into clinical studies to show applicability, validity, and efficacy.

Innovations from our Department

Here, we introduce our innovations, which are non-invasive point-of-care tests including wound blotting and skin blotting. Conventionally, skin disorders are diagnosed by histological examination of biopsy samples or blood tests. However, these are invasive, painful and time-consuming. Our innovations overcome these limitations as they are non-invasive, painless, and rapid tests, which can be easily performed at the bedside.

Wound blotting is a simple method to collect wound exudate based on a blotting technique, which is a common laboratory technique to analyze proteins and nucleic acids. The blotting membrane, which is a filter paper with a positive charge, can capture negatively charged molecules. The component of the wound exudate reflects the pathophysiological state of the wound. We also identified several biomarkers useful for wound assessment. Among them, a biofilm detection kit was commercialized last year and enabled point-of-care biofilm testing.

Skin blotting is another non-invasive innovative skin assessment technique. Biomarkers can be adsorbed from the deeper layer of the skin by applying blotting membrane. We have identified markers to assess and predict skin disorders. Recently, we modified this technique to identify chronic dehydration with high accuracy, suggesting that skin blotting can be an alternative examination to blood testing.

Publication list

1. Dai M, Minematsu T, Nakagami G, Sugama J, Sanada H. Awareness and attitudes of lymphoedema patients toward compression stockings in the summer: a cross-sectional questionnaire survey. J Lymphoedema. 2020;15(1):49-53.
2. Kunimitsu M, Nakagami G, Kitamura A, Minematsu T, Koudounas S, Ogai K, et al. Temporal changes in the diversity and composition of the bed microbiota of patients with pressure ulcers. J Jpn Soc Wound Ostomy Continence Manag. 2020;24(4):366-78.
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Division of Care Innovation

Department of **Visualized Nursing**

Project Associate Professor, Nao Tamai *PhD, RN*
Project Senior Assistant Professor, Masaru Matsumoto *PhD, RN*
Project Assistant Professor, Yuka Miura *PhD, RN*
Collaborative Researcher, Mikihiko Karube
Collaborative Researcher, Mayumi Handa

Cooperative Department
Professor, Hiromi Sanada *PhD, RN, WOCN, FAAN*
Associate Professor, Gojiro Nakagami *PhD, RN*

Department Introduction

The goal in Visualized Nursing is “The realization of ‘safe, secure, and comfortable nursing care through the technique of imaging nursing science.” There are several projects underway in visualized nursing including the utilization of imaging technologies, such as ultrasonography for the standardization of nursing assessment, the development of educational programs for nurses, and the evaluation of nursing care using new imaging technologies. We hope to increase the social implementation of nursing care using our new imaging technologies.

Innovations from our Department

Our main work is the development of educational programs for learning ultrasonographic techniques and using an ultrasound device enhanced by artificial intelligence (AI).

Ultrasonography for nurses requires two basic elements: acquisition of ultrasonographic images and image interpretation. Nurses can learn ultrasonographic techniques in a one-week self-study period using our new educational program. This program includes e-learning, technical workshops, objective clinical competency tests, and a consultation system using ICT technology.

Our developed ultrasound device, with AI, can help nurses with image interpretation. With the assistance of the AI ultrasound device, nurses are able to achieve an accurate assessment and provide proper care in a short period of time. This device was developed in collaboration with Fujifilm corporation and was already released in December of 2019. This device is wireless, portable, has high image quality, AI assistance, and a long-lasting battery.

Visualized nursing can also provide appropriate nursing care for patients through physical assessment using imaging technology that captures the inside of the body.

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Division of Care Innovation

Department of Clinical Nursing Technology

Project Associate Professor, Ryoko Murayama *PhD, RN*
Project Assistant Professor, Mari Abe *RN, MHS*
Visiting Researcher, Hidenori Tanabe *MS*

Cooperative Department
Professor, Hiromi Sanada *PhD, RN, WOCN, FAAN*

Department Introduction

Nursing skill development and implementation are expected to accompany the progress of medical diagnostic technologies and treatments. Although university nursing researchers have grasped clinical issues and have found measures that improve the quality of nursing, they have not been able to smoothly proceed through the translational research cycle and implement their findings in clinical settings. This has led to an evidence-practice gap. Our department has set up a laboratory in a hospital, and we are able to observe the on-site needs in real time and consider them from a scientific point of view. We are developing nursing technologies and devices with the researchers not only in hospitals and universities, but also in collaboration with industry and across various fields. Through the clinical evaluation and implementation of our work, we are making translational nursing research fast-paced.

Innovations from our Department

We will introduce an innovative care device we have developed through our translational research for use in infusion therapy management that uses a peripheral intravenous catheter.

According to our research, around 20% of inpatient peripheral intravenous catheterizations result in catheter failure; prematurely removed due to complications including swelling or pain. We revealed that most of the catheterized sites in patients who experience catheter failure have thrombi and subcutaneous edema. Through the investigating potential causes and prevention strategies against catheter failure, we found that reducing mechanical stress to the vessel wall is effective for preventing thrombus and subcutaneous edema formation. Based on these findings, we established that selecting a vein with a large diameter, increasing the success rate of catheterization on the first attempt, and securing the catheter in a position that does not cause vessel wall irritation are important for preventing peripheral intravenous catheter failure. We collected these important points and defined them as a “care-bundle” that will guide a successful infusion therapy management.
To help clinical nurses implement these care-bundle principles, we built an algorithm for the process, created an educational program, and developed a needle-insertion assisting method that uses ultrasonographic technology. This project has increased successful catheterizations rates and dramatically decreased catheter failure rates.

Also, we conducted research on outpatients undergoing chemotherapy by observing the temperature changes at the skin surface surrounding the catheter insertion site using thermal imaging. A fan-shaped lower temperature area was identified and found to be significantly associated with the development of subcutaneous indurations observed during follow-up examinations.This finding showed that it may be useful as an early detection tool of complications. Therefore, with collaboration from a medical device development company, we developed a thermosensitive liquid crystal film.

We aim to spread these innovative care technologies we have developed through translational nursing research to clinical practice.

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Division of **Nursing Systems**

Yuki Miyamoto, *PhD*, *RN*, *PHN*
Associate Professor,
Department of Psychiatric Nursing

The Division of Nursing Systems aims at providing nursing practice solutions that reflect important cultural and social concerns, constructing Japan-origin nursing knowledge that supports high quality practices and making policy proposals.

The division of Nursing Systems has two departments.

Department of Care Quality Management

Nursing is a caring profession in which highly contextual, individualized and integrated service is provided.

Conventional scientific approach often fails to capture its essential meanings; innovative approach combining conventional science and humanity should be explored to further develop nursing knowledge.

The Department of Care Quality Management continues to promote quality improvement in nursing and healthcare extending knowledge base for healthcare and nursing policy.

Department of Health Quality and Outcome Research

Developing a methodology to evaluate health quality and complex interactions among patients, their family, and healthcare professionals is essential.

It aims to create new nursing care and nursing system to improve health quality of the whole family: in each person's own perspective based on their diverse background. By doing that we believe we can improve QOL and Health Quality of the whole family.

And then we can develop preventive care and its system for current and future health problems among patients and their family.

Yuki Miyamoto, *PhD*, *RN*, *PHN*
Associate Professor, Department of Psychiatric Nursing
Graduate School of Medicine, The University of Tokyo, Japan

Dr Yuki Miyamoto received her bachelor's degree in health sciences from The University of Tokyo in 1995 and received her PhD in health sciences from the University of Tokyo in 2002.
She had worked at Gunma University and Tokyo Musashino Hospital before becoming a faculty member at Graduate School of Medicine, The University of Tokyo.

Publication list

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Division of Nursing Systems

Department of Care Quality Management

Department Introduction

At the Department of Care Quality Management, research is conducted to contribute to the super-aged society by promoting continuous quality improvement and extending the knowledge base for healthcare and nursing policy. We explore innovative research methodologies, taking both micro (e.g., case study research, community based participatory research) and macro (e.g., big data analysis) perspectives. At its core, nursing is a caring profession in which highly contextual, individualized and integrated service is provided. The conventional scientific approach often fails to capture this essential core; an innovative approach, combining conventional science and humanity, should be explored to further develop nursing knowledge. At the same time, nursing is not provided in a vacuum. Improving the environment and social system in which nursing is provided is an important aspect of managing care quality. The macro approach allows us to address significant issues that would contribute to policy decisions in healthcare and nursing.

Care Quality Management for Older People Study Group

Professor, Noriko Yamamoto-Mitani *PhD, RN*
Associate Professor, Ayumi Igarashi *PhD, RN, PHN*
Assistant Professor, Maiko Noguchi-Watanabe *PhD, RN, PHN*
Mariko Sakka *PhD, RN, PHN*
Project Assistant Professor, Chie Fukui *PhD, RN, PHN*
Postdoctoral Fellow, Sameh Eltaybani *PhD*

An Example of our Research

The VENUS project is a one-year follow-up study aimed at visualizing the effects of long-term care. In 2018, we created an eight-area long-term care quality index following Gordon's functional health pattern framework. Next, to visualize the care practices we created process indicators to assess each separately. After that, the quality indicators framework (areas, outcome indicators, process indicators) were refined by an expert panel of researchers and practitioners from various occupations.

In 2019, using the developed and refined index, we began a prospective cohort study of 1,450 elderly patients and their families. The subjects either received home-visit nursing care or were nursing-home residents aged 75 and older. We analysed data collected over a 6-month period for factors that prevented or promoted clinically undesirable events. This survey is the first large-scale study in Japan showing the effects of nursing care. We believe that these results will improve and help standardize the quality of practices for elderly caregivers living at home.

Furthermore, we are working on the development of a database system that automatically collects information on the quality of long-term care from daily nursing records. We aim to improve the quality of long-term care at home and in long-term care facilities by applying our findings.

Care Quality Management for Community Study Group

Professor, Noriko Yamamoto-Mitani *PhD, RN*
Senior Assistant Professor, Takashi Naruse *PhD, RN, PHN*
Assistant Professor, Riho Iwasaki *PhD, RN, PHN*
Chikako Honda *PhD, RN, PHN*
Project Assistant Professor, Yuka Sumikawa *PhD, RN, PHN*

An Example of our Research

Through our regular research and educational activities we have established a collaboration with the Bunkyo Ward Public Health Center located near our GNRC facilities in Tokyo.

In 2020, due to the novel coronavirus spread, our partners at the Bunkyo Public Health Center experienced a shortage of public health nurses and personnel to manage and analyze the daily accumulating infectious disease data. The GNRC and the Department of Health Sciences and Nursing at the University of Tokyo's Graduate School of Medicine have been dispatching volunteers to the Health Center since March 2020 to work at the telephone counseling center. Until April the volunteers worked in the telephone counseling center and during May they mainly entered and analyzed the Health Center’ s data records. We analyze the telephone consultation data and conduct interviews with public health nurses, to assess the problems in public health centers and local medical institutions. It will contribute to a community health care system that can respond to the spread of infectious diseases. This collaboration with the Health Centers is an exploratory approach for using nursing science to address the unprecedented health threats in modern society. We believe it is a pioneering way of conducting research, not as an abstract research exercise, but as a way of addressing real-world issues and responding to the critical needs of the field.

Care Quality Management for Patients and Nurses Study Group

Associate Professor, Yukie Takemura *PhD, RN, PHN*
Assistant Professor, Naoko Ichikawa *PhD, RN, PHN*
Ryohei Kida *RN, MNS*
Hiroe Koyanagi *RN, MHS*

An Example of our Research

Nursing manager leadership is an important factor influencing the outcomes of patients and nursing staff and it impacts nursing care quality. We explore key factors for effective nursing organization management and develop methodologies to support this leadership. For example, in a study of nursing department managers in Tokyo hospitals, managers at small hospitals experienced hardship in managing the organization and care quality. We revealed that these managers tended to burn out, not because of the scale of the work, but because their work environment offered less support and fewer opportunities. These results suggest that providing support and opportunities outside the hospital may improve the operation and organization of nursing in small hospitals.

We advised an outreach consultation support project for nursing managers conducted by the Tokyo Metropolitan Government. We studied the development of the program and how it altered the nursing organization. This program is unique in that it continued to empower nursing managers after the end of the support period. This project was a valuable collaboration between the local government and the university where we developed and provided methodologies that will change the nursing organization. We will continue to support high-quality care and the well-being of patients and nursing staff by generating knowledge that will improve the management of nursing organizations.

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Division of Nursing Systems

Department of Health Quality and Outcome Research

Department Introduction

We aim to improve the quality of life in patients receiving care by investigating life and death from an intimate patient based research perspective. Health quality assessment requires methods that reflect systematic effects that go beyond the individual care recipient. We identify a need for strategies that improve the health quality of the entire family and ways to evaluate that level of care throughout the nursing system. We have developed a methodology that can better evaluate health quality and incorporates patient assessments as outcomes. Our research incorporates these optimal outcomes to develop effective outcome-based nursing systems.
Three groups are conducting research on each of these pertinent outcomes.

Health Quality and Outcome for Family Study Group

Professor, Kiyoko Kamibeppu *PhD, RN, PHN, FAAN*
Senior Assistant Professor, Iori Sato *PhD, RN, PHN*
Assistant Professor, Sachiko Kita *PhD, CNM, RN, PHN* Takafumi Soejima *PhD, RN*
Project Assistant Professor, Hiromi Tobe *PhD, RN, PHN*
Postdoctoral Fellow, Mayumi Morisaki-Nakamura *PhD, RN, PHN*
Project Researcher, Rei Oshiro *PhD, RN, PHN*

An Example of our Research

As an example of our research, we will introduce the work from our Transition Support Project. Many patients with chronic childhood diseases that have reached adulthood experience issues while they transition from pediatric care to adult care. In 2016, in collaboration with the Department of Family Nursing at The University of Tokyo, a transition outpatient clinic was established at The University of Tokyo Hospital.
In order to accelerate and improve these transitions in the clinical settings, we must evaluate the patient's readiness and perform interventions to better prepare them as needed. For this reason, we first developed the Japanese version of TRANSITION-Q, which measures readiness (self-management, consultation behavior, etc.).

We confirmed the tool's reliability, validity, and feasibility for clinical application. In addition, we developed My Health Passport to effectively improve transition preparedness and investigated the influence of the intervention using My Health Passport on patient's preparedness. The group using the My Health Passport was more prepared than the control group even at 6 months after use, suggesting the effectiveness of the My Health Passport. We will continue to use My Health Passport in the transition outpatient clinic and employ cost-effectiveness verification of its use. Through this study, we developed a new tool for measuring the health quality of transitioning patients and introduced better clinical care improving the health quality in the nursing system.

We hope to continue to create nursing systems that improve the health quality and health outcomes of families depending on their life stages.

Health Quality and Outcome for Women Study Group

Professor, Megumi Haruna *PhD, RNM*
Assistant Professor, Emi Sasagawa *PhD, RNM,*
Kaori Yonezawa *PhD, RNM*
Yuriko Usui *PhD, RNM*

An Example of our Research

Fear of childbirth is a general term for anxiety and fear related to pregnancy and childbirth. It is of concern because severe fear of childbirth during pregnancy is associated with caesarean section and increases the physical risk for mother and child. Women who had a fear of childbirth during pregnancy tend to have a negative view of the childbirth experience. Reportedly, this negativity is associated with postpartum post-traumatic stress disorder symptoms and postpartum depression. Healthcare professionals must identify women who are afraid of childbirth and provide appropriate care from conception forward. Therefore, we developed a Japanese version of the Wijma Delivery Expectancy / Experience Questionnaire (JW-DEQ) and validated its reliability and credibility. A survey was conducted aiming to identify qualitatively distinct group of women who experience a fear of childbirth among pregnant women. This JW-DEQ study identified a group of women with a fear of childbirth that impaired daily living and decreased health-related quality of life. Consequently, advanced interventions different from ordinary care may be necessary. We defined a cut-off value of JW-DEQ and related factors for best identifying women with a more severe fear of childbirth. In the future, we hope to establish specific care strategies for women who have severe anxiety and fear of pregnancy and childbirth to build an effective midwifery care system.

Mental Health Quality and Outcome Study Group

Associate Professor,Yuki Miyamoto *PhD, RN, PHN*
Assistant Professor, Akiko Inagaki *PhD, RN, PHN*
Utako Sawada *PhD, RN*

An Example of our Research

Our group focuses on "recovery" as one of the outcomes for evaluating mental health quality. Recovery refers to the quality of life, health, and daily activity for those who have used mental health services. It is a dynamic concept that includes the recovery or development of that person' s personality or life goals and desires.

Our group works to develop scales that measure how well mental health services facilitate recovery as evaluated by those who have experienced the services. We are also developing care strategies to elevate the mental health quality of those who are using mental health services.

Our research is a cross-disciplinary survey of people who have experienced mental health difficulties either themselves or in their families, people involved in supporting the wellbeing of health care professionals, and those in administrative positions.
By promoting and disseminating this research and the practices developed from our diverse perspectives, we hope to contribute to better mental health and medical welfare, and the realization of a society in which each person is respected.

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Building Nursing Resilience for the Future

Ardith Z. Doorenbos, *PhD, RN, FAAN*

Professor, Department of Biobehavioral Health Science,
College of Nursing, University of Illinois, Chicago
Project Professor, Global Nursing Research Center

2020 was designated by the World Health Organization as the “International Year of the Nurse and the Midwife in honor of the 200th anniversary of Florence Nightingale’ s birth. 2020 has also put nursing under stress in ways not seen for generations. The year has been a test of resilience beyond anything in recent memory, due to the COVID-19 pandemic. The resilience potential of each individual, community, and society is an essential focus of nursing care and research.

Resilience can be defined as the capacity to maintain physical and psychological well-being in the face of stress or adversity. Resilient individuals often exhibit characteristics of commitment, dynamism, and humor in the face of adversity. Resilience is both a state and a teachable construct. Because an individual’ s self-perception of health and well-being is an important predictor of many relevant outcomes, nurse scientists are now considering the role resilience plays in influencing health, well-being, and quality of life. For optimal outcomes, people with chronic conditions must reliably manage their self-care. People’ s ability to carry out this task is affected by interpersonal, community and societal factors. Research that identifies effective ways to promote the development of resilience can help nurses better prepare individuals for the journey of living with a chronic condition.

Personal resilience is also imperative for nurses. The American Nurses Association suggests important future research themes in nursing are personal and relational integrity and buoyancy (i.e., resilience). For example, 4-weeks of mindfulness training in first-responders demonstrated an increase in psychological resilience and was associated with increased task attention and positive affect. Nurse scientists, whose perspectives on identifying and shaping scientific questions are influenced by their experience of caring for individuals, communities and societies, are uniquely positioned to perform research that directly benefits individuals, interpersonal relationships, communities, and societies. To achieve the goal of healthier individuals, communities and societies, it’ s important to promote wellness and resilience among nurse scientist trainees, especially among trainees from diverse or unique social backgrounds (e.g., racial/ethnic minorities, LGBT persons) associated with increased exposure to stress in academic and professional settings.

Nurses who can increase their resilience usually feel naturally energized, motivated, and capable of taking on more responsibilities. Those who are resilient in nature will generally have a higher sense of self-awareness, persistence, and the energy to sustain their mind and body. Resilience is also thought of as part of the foundation to becoming emotionally intelligent, as it requires emotional flexibility, adaptability, a positive outlook and being able to reach out to others for open communication. Nurse scientists grounded in personal resilience can apply resilient models to research and intervention plans to drive the body of nursing knowledge forward faster and more consistently.

Nursing absolutely requires resilience. Keeping strong and confident in body, mind, and spirit can positively reflect on nurses and increase productivity, work relationships, and energy levels. Nurses can focus on building their resilience to thrive in both their professional and personal lives. 2021 continues to be a year of challenges and growth; however, as nurses we have risen to the challenge and will continue to build resilience.

Ardith Z. Doorenbos, *PhD, RN, FAAN*

Professor, Department of Biobehavioral Health Science,
College of Nursing, University of Illinois, Chicago
Director, Palliative Care Program, University of Illinois Cancer Center
Co-leader, Cancer Prevention and Control Program, University of Illinois Cancer Center

Prof. Ardith Z. Doorenbos received her Master’s degree in Nursing from Wayne State University in 2000, her PhD in Nursing and Medical Anthropology from Wayne State University in 2002.
Dr. Doorenbos’ research is centered on palliative care, pain andsymptom management.
Her grant portfolio is funded by the National Institute of Health, Centersfor Disease Control and Prevention, Congressionally Directed Medical Research Programs, and other professional sources.
She has sustained record of over 150 peer-reviewed, data-based publications in nursing and multidisciplinary journals.
In 2010, she was named a Fellow of theAmerican Academy of Nursing and in 2018, was inducted into the Sigma Theta Tau, International Nurse Researcher Hall of Fame.

Publication list

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GNRC and the Future of Nursing at The University of Tokyo: To the Visionary of Nursing in Japan and the World

Noriko Yamamoto-Mitan, *PhD, RN*
Deputy Director, Global Nursing Research Center,

A few years ago, The University of Tokyo Nursing defined our mission and visions as follows.

Mission: To foster leaders who can change conventional healthcare and share it with the world to support people's health and life.

Vision:
- Incorporate all necessary research fields from basic research to clinical research, and build a discipline that directly approaches people's health at the forefront.
- We will sharpen our inquisitive minds to reach every corner of the world in need of nursing care, and develop and disseminate practices, education, and research not only in Japan but globally.
- Promote independent learning in students by creating a place for academics where faculty members and students from diverse backgrounds can work together on equal footing.

Now that we have spent several years working to realize these visions, we would like to move forward to realize our next dream. Our next aspiration is for The University of Tokyo Nursing and GNRC to become the visionary of global nursing, the forward-looking organization. We will anticipate the future of society and people's health, devise the best possible solutions through top-notch research activities, and prepare nursing to best contribute to people's well-being. We would like to have concrete visions as follows.

- We would like to serve as a hub for innovative healthcare research. Nursing innovation should help create new and better healthcare for people around the world. We would like to play a leading role in pursuing new areas for knowledge development in nursing research in Japan and around the world.
- We would like to actively raise funds for the education of nursing researchers and collaborate not only within The University of Tokyo Nursing but also with other graduate schools to foster a culture of research throughout Japanese nursing.
- We would like to provide an open window to the world for Japanese nursing researchers. Nursing and nursing researchers in Japan have much to offer to the world. We believe that we need to make them more known to the world.

We are at the starting point to achieve the new future vision of The University of Tokyo Nursing. We look forward to your continued guidance and encouragement in The University of Tokyo Nursing.

Noriko Yamamoto-Mitani, *PhD, RN*
Professor, Department of Gerontological Home-Care & Long-term Care Nursing
Deputy Director, Global Nursing Research Center
Graduate School of Medicine, The University of Tokyo, Japan

Professor Noriko Yamamoto-Mitani finished the undergraduate course at School of Health Sciences, Faculty of Medicine, The University of Tokyo in 1986 and received a bachelor degree in health sciences. After working as a staff nurse and Hakujuji Hospital, Tokyo (medical ward) and Toranomon Hospital, Tokyo (medical/surgical), she entered the graduate school at The University of Tokyo and received her master degree in 1991.
She got her PhD in nursing from University of California, San Francisco School of Nursing in 1994 and became an assistant professor at the University of Tokyo in 1995.
In 2001 she moved to Los Angeles to enter a post-master nurse practitioner program at University of California, Los Angeles.
From 2003 to 2004, she worked as a home care nurse at Saitama Medical College Medical Center and became an associate professor at School of Nursing, Chiba University in 2004.
She became a professor of nursing at Graduate School of Health Care Sciences, Tokyo Medical and Dental University in 2007 and moved to Graduate School of Health Sciences and Nursing, Faculty of Medicine, The University of Tokyo as a professor in 2012.
Since 2017, she has been the deputy director of Global Nursing Research Center.
Since 2018, she has been the head of School of Integrated Health Sciences at the undergraduate course.

Publication list

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Closing remarks

Kiyoko Kamibeppu, *PhD, RN, PHN, FAAN*

Deputy Director, Global Nursing Research Center

During our time together at the Global Nursing Research Center Conference 2021, we have had the opportunity to experience the Global Nursing Research Center (GNRC) by learning about its history, current activities, and the vision with which it holds. I hope that you have had a pleasurable experience. Although this center started its activities back in April 2017 after a few years of preparation, it still feels like yesterday since the doors opened. Through this time, it has come to be such a fulfilling and exciting journey.

Since the official approval of the GNRC opening in 2016, there has been a tremendous increase in the international exchanges within our major. Director Sanada has helped point out the details, but overall, faculty members have reported that our relationship with other universities has deepened, graduate students from North America have begun participating in our summer programs, and active professors from overseas have joined in. Through these exchanges between faculty members, postdocs, and graduate students, co-authored papers were born and international joint research began. Along with this, some international students have become postdocs making English the unofficial official language amongst our postdocs.

As I mentioned earlier, we have been able to carry out a lot of novel research. This was made possible not because of the blessed environment of The University of Tokyo but actually quite the contrary. From a rather disadvantaged environment we were able to create new ideas and expound upon them. No matter the adversity, we held onto our dreams and persevered together, demonstrating that resilience will continue to produce the best kind of science.

Over the past year the world has been subject to the effects of COVID-19 and with that every country has experienced hardships. Even when faced with such adversity, it is important to never give up! I think that COVID-19, ICT, and AI all pose a big challenge to nursing. Looking forward toward the future, we will focus on doing the things we can control and at the same time, we will orchestrate the science of nursing to answer this heavy problem.

Thank you so much for participating in this conference today. I hope that through learning about the GNRC today, you will continue helping support our program.
Thank you.

Kiyoko Kamibeppu, *PhD, RN, PHN, FAAN*

Professor, Department of Family Nursing
Deputy Director, Global Nursing Research Center
Graduate School of Medicine, The University of Tokyo, Japan

Professor Kiyoko Kamibeppu finished the undergraduate course at School of Health Sciences, Faculty of Medicine, The University of Tokyo in 1978 and received a bachelor degree in health sciences. She got her PhD course credits from Graduate School of Medicine, The University of Tokyo in 1983. Since 1983, she had worked at the Toranomon Hospital, National Children's Castle, and the Tokyo Jikeikai Hospital. In 1993, she received her PhD from Graduate School of Medicine, The University of Tokyo. From 2002, she started to work as an associate professor at the Department of Family Nursing, Division of Health Sciences and Nursing, Graduate School of Medicine, The University of Tokyo. In 2012, she has promoted to a professor of the department and she served as the head of the division from 2013 to 2015 and from 2017 to 2021. She also acts as a deputy director of Global Nursing Research Center. In 2019, she was named a fellow of the American Academy of Nursing..

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1. Suetsugu Y, Haruna M, Kamibeppu K. A longitudinal study of bonding failure related to aspects of traumatic birth experience among Japanese mothers. BMC Pregnancy Childbirth. 2020;20(434).
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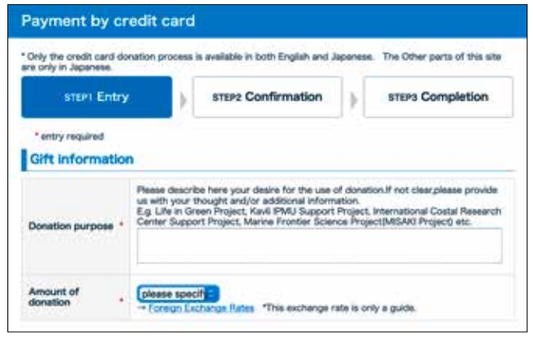

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E-mail:kikin.adm@gs.mail.u-tokyo.ac.jp
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