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CONTENTS

Volume 5, Number 3, 2023

CONTENTS (Continued)

COVER PHOTO OF THIS ISSUE

Even after the COVID-19 pandemic, difficulties in health care remain, due to its unforeseen long-term physical and mental effects as well as any risks of recurrent of pandemic or new unforeseen new issues in a super-aged society. As health professionals, we are called upon to reflect on the current nursing practices and systems and to improve them in order to provide improved and more effective support to patients, their family, and nurses and healthcare professionals. There is no end to our journey to pursue a better and sustainable quality of nursing for the future.

Foreseeing the Unforeseen: Towards a New Era of Nursing
Guest Editors: Prof. Mami Kayama, President, National College of Nursing, Japan.
Prof. Shigeaki Watanuki, National College of Nursing, Japan.

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EDITORIAL

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Foreseeing the unforeseen: Towards mental health and gerontic nursing perspectives

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Abstract: With the theme of "Foreseeing the Unforeseen: Towards a New Era of Nursing", this special issue on nursing includes a variety of articles from different countries and institutions. Several key features of this issue include: *i*) the impact and responses/countermeasures to the coronavirus disease (COVID-19) pandemic; *ii*) innovative nursing practice, management, education, research, and policy in response to the issues raised; *iii*) nursing toward a low fertility and a super-aged society, internationalization, or cultural diversity; and *iv*) human resource development, systems development, and policy recommendations for health, medical care, and welfare in the next era. In this Editorial article, we summarize the issues during the COVID-19 pandemic and the implications for the next era, particularly in the fields of mental health and gerontic nursing. We also provide several perspectives on mental health issues in the general population and for nurses, as well as gerontic nursing issues related to older adults.

***Keywords*:** COVID-19, mental health, psychiatric nursing, gerontic nursing

The theme of this special issue on nursing is "Foreseeing the Unforeseen: Towards a New Era of Nursing". Articles of this issue are from different countries and institutions, including the up-to-date practice reports and research reports during and after the coronavirus disease (COVID-19) pandemic era.

The COVID-19 pandemic has changed various aspects from day-to-day living to human healthcare policy and society. Considering the possibility of unforeseen pandemic or health crisis may reoccur in the future, we should "foresee the unforeseen" and be better prepared for the next critical situations. Even in the midst of change or uncertainty, we should keep in mind that we have "things that won't change", including the foundations of nursing and the spirit of caring. Every day, as health professionals, we will keep asking ourselves what is more important and what is a higher priority.

In order for us to better reflect on the past and prepared for the future, the authors summarize the issues during the COVID-19 pandemic and the implications for the next era through narrative literature review. We particularly focused on the fields of psychiatric and gerontological nursing that are our areas of expertise. We also provide several perspectives on mental health issues in the general population and for nurses, as well as gerontic nursing issues related to older adults.

Mental health issues and implications during and after COVID-19 era

The COVID-19 pandemic had diverse effects on mental health. There were the effects of the COVID-19 itself on the brain and the effects of social isolation and segregation. Both effects were problematic in different populations, even for those who were not directly affected by COVID-19.

In a paper on the mental health, the impact of COVID-19 on the general population published by October 2020, cohort data from the United States (U.S.) database, as compared to pre-pandemic data, showed an increase in the number of people diagnosed with mental illness within 90 days of a COVID-19 diagnosis. Additionally, mental health risks were reported to be greater for women, those living with children, or those aged 18–34 in the United Kingdom (UK). Digital and non-digital services were developed and used in many hospitals to provide psychological support to nursing staff. These interventions are being evaluated and are reported in several case reports and descriptive studies. Reporting and sharing of the effectiveness of these initiatives and how they can support vulnerable populations is further desired (*1*).

An umbrella review of papers published through August 2022 found a slight increase in depression and anxiety (and some post-traumatic stress disorders) symptoms compared to pre-pandemic levels, with depressive symptoms having a longer-lasting impact than anxiety. Women and younger generations, children aged 5 to 13 were noted that they were more affected

by limited social functioning. There were regional differences in these effects, with stronger effects reported in areas where social restrictions were greater (*2*).

A review of the mental health of nursing staff working on the front lines of caring for patients affected by COVID-19 reported a diverse range of uncertainties as a burden, such as feeling neglecting non-infectious patients with other diseases; long hours and physical exhaustion due to understaffing; a sense of unfairness caused by differences in conditions in different departments; caring for critically ill patients without established procedures; anxiety due to a sense of unpreparedness; inability to participate proactively in changing procedures; and a sense of guilt. Patients themselves are not able to participate in the process of disease management. On the other hand, when nurses take pride in their own contribution to disease management, they feel the great value of working on the front lines, the professional dedication to be on the front lines without hesitation in the face of danger, maximum effort to maintain quality of care, and maintaining the element of human caring in a unique environment, while also keeping in mind the care for family members. Positive feelings of increased professional accomplishment and other positive emotions are also reported when nurses are able to maintain the essence of human caring in their unique environment, while keeping in mind the care for family members (*3*).

Among healthcare professionals, higher mental health risks have been noted among those with fewer years of education, younger age, and female (*4*). Nurses on the front lines have many of these characteristics as risk factors, and they are required to maintain their own mental health as professional caregivers. Further research is needed to understand the details accurately and to develop effective strategies to address these issues.

Gerontic nursing issues including frailty of older adults

COVID-19 pandemic and subsequent social isolation affected many vulnerable older adults, especially in terms of physical, mental, and social isolation and function decline. One of the most common complications in elderly COVID-19 survivors was malnutrition, due to loss of appetite, altered taste and smell, respiratory failure, or pre-existing geriatric syndromes such as delirium or dementia. Sarcopenia is also highly prevalent in this population due to inflammatory processes, immobilization, and malnutrition, therefore, there is a need for geriatric rehabilitation programmes specifically adapted to the needs of older COVID-19 survivors (*5*).

The COVID-19 pandemic affected the level of physical activity and the incidence of frailty among older adults in the community. For example, a follow-up survey in Japan (*6*) was conducted to investigate the initially non-frail older adults. They compared the physical activity time before and during the surge of COVID-19 pandemic. The total physical activity time during the pandemic decreased from the pre-pandemic by approximately 30–40%. In particular, for those older adults who were living alone and socially inactive showed a significant decrease compared to the pre-pandemic period. Those older adults were at a significantly higher risk of incident frailty than those who were not living alone or were socially active (*6*).

As a countermeasure to address these issues, many intervention studies have been conducted. An umbrella review (*7*) of effective interventions for community-dwelling older adults suggested to be an exercise combined with nutritional intervention (protein supplementation) that had the highest odds of decreasing frailty, as compared to nutritional intervention of proteins alone at 3–4 months of follow-up survey. Likewise, hand grip strength significantly improved when study subjects participated in exercise programs and took protein supplements. Physical activity interventions also improved social functioning and reduced social isolation and loneliness. However, conflicting evidence and inadequate reporting of results, and limited findings related to minority groups were identified as issues to determine the intervention effectiveness (*7*).

Community-based intervention programs may have the potential for effective dissemination and future sustainable implementation of novel programs. A feasibility study (*8*) was conducted with a single-arm intervention for 69 community-dwelling older women. The study participants were recruited from community salons for frailty prevention and were followed up for a three-month home-based exercise program to prevent the progression of older adults' frailty during COVID-19. The intervention program included components of strengthening, balance improvement, and inactivity prevention, which were adapted from a pre-existing 10-miutes daily home-based exercise program for older adults. Approximately 90% of the participants completed the intervention program, with 87% of the participants performed the exercise during the intervention period. For health-related outcomes, the five times sit-to-stand test, an indicator of functional lower extremity strength, transitional movements, balance and fall risk prevention, exhibited significant improvement after the intervention among other indicators (*8*). The results indicated the program's feasibility. Further studies are needed for confirming the intervention effectiveness.

Even after the COVID-19 pandemic, difficulties in health care remain, due to its unforeseen long-term physical and mental effects as well as any risks of recurrent of pandemic or new unforeseen new issues in a super-aged society. We will continue to discuss what we can do to address these critical situations based on our practice experiences as well as research findings. As health professionals, we are called upon to generate more necessary evidence from practice-based research in this rapidly changing society. We are called upon to

reflect on the current nursing practices and systems and to improve them in order to provide improved and more effective support to patients, their family, and nurses and healthcare professionals. There is no end to our journey to pursue a better and sustainable quality of nursing for the future.

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Future perspective of psychiatric home-visit nursing provided by nursing stations in Japan

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Abstract: Psychiatric home-visit nursing supports the lives of people with mental disorders in the community and plays an important role in the "community-based integrated care system" which is rapidly being implemented in Japan. Although the number of responsive home-visit nursing stations (HVNS) is increasing, the current situation of service provision has not yet been clarified. This study aimed to investigate the characteristics and difficulties of psychiatric home-visit nursing provided by HVNS. We further discussed future care provisions and service improvements. We conducted a questionnaire survey of 7,869 member stations of the National Association for Visiting Nurse Service; of this number 2,782 facilities (35.4%) responded. Of the 2,782 facilities, 1,613 (58.0%) provided psychiatric home-visit nursing. The HVNS that provided psychiatric home-visit nursing were diverse, and the percentage of users with mental disorders ranged widely. Majority of the HVNS reported having "difficulty in caring for users/families who refuse care" (56.3%), "difficulty in care for psychiatric symptoms" (54.0%), and "difficulty in assessment of psychiatric symptoms" (49.1%), with differences in difficulty depending on the percentage of psychiatric users. As user needs and HVNS characteristics diversify, it is necessary to take advantage of the characteristics of each station to develop consultation and training systems and collaborative network platforms within each community for future sustainable service provision.

***Keywords*:** psychiatric home-visit nursing, community care, psychiatric nursing

Introduction

Transition of care in the mental health policy in Japan

One of the mental health care challenges in Japan is the large number of psychiatric beds (245.27 beds/100,000 people) (*1*) and the prolonged inpatient stays (average length of stay in psychiatric beds is 263.3 days) (*2*). To alleviate this issue, psychiatric care in Japan is shifting from hospital-based settings to community-based care in response to the de-institutionalisation policies and establishment of community-based integrated care systems (*3*).

Psychiatric home-visit nursing plays an important role in this system, supporting the recovery of patients through physical and mental status assessments, symptom management, psychological care, lifestyle support, and user empowerment (*4*). Lower admission rates and longer community stays have been reported among users receiving psychiatric home-visit nursing (*5,6*). In addition, the effectiveness of the service has been widely recognised among users, families, and care providers. Since reimbursement of the cost of home-visit nursing for people with mental disorders by medical insurance began in 1986, the number of users has been increasing every year and has nearly tripled over the past 10 years, from 58,000 in 2009 to 156,000 in 2020 (*7,8*). Japan has a universal health insurance system, and medical insurance operates as fee-for-service; thus, the use and implementation of services are influenced by the insurance reimbursement system.

There are two main providers of psychiatric home-

visit nursing services under the medical insurance system including psychiatric hospitals and clinics, and home-visit nursing stations (HVNS). The latter now provides services to two-thirds of users with mental disorders (*7*).

Development of the home-visit nursing system and home-visit nursing stations

HVNS were first established in 1992 as agencies that will provide home-visit care for the elderly in response to the super-ageing Japanese population. The manager of a station must be a nurse with at least 2.5 nurse staff. Home-visit nursing care provided by HVNS was included in the medical reimbursement system in 1994, and HVNS began to provide services to people with physical and mental illnesses of all ages (*9-11*). In 2000, a new insurance scheme, namely long-term care insurance, was established. This resulted in the spread of HVNS across the country, as agencies began providing care under both long-term care insurance and medical insurance. The number of HVNS increased from 4,730 in 2000 to 14,000 in 2022 (*12*), and HVNS users, including the elderly; people with terminal illnesses, neurological diseases, mental disorders; and children *etc*, have become more diverse (*13*). Consequently, HVNS vary according to the type and combination of users (Figure 1) (*10,13*).

Psychiatric home-visit nursing provided by HVNS

Regarding the mental health policy, "The Reform Vision of Mental Health and Welfare" was declared in 2004 with the slogan "hospital-based medical treatment to community-based care" (*14*). Policies have been implemented to promote the discharge of long-term inpatients by improving community support systems, and psychiatric home-visit nursing has been adopted as an essential social resource.

These policies and the recognition of the effectiveness of the service have enhanced the need for more psychiatric-specialised assessment and care provision by HVNS. Subsequently, "Psychiatric home-visit nursing" was separately included under medical insurance in 2012. Service is required to be provided "by staff with working experience or defined training (> 20 h) in psychiatric nursing", "to users with mental disorders and their family", and "under the direction of a psychiatrist". Currently, the number of HVNS providing psychiatric home-visit nursing is expanding, reaching 4,669 facilities with 129,754 users in 2021 (*7*).

Given the above, the situation and context of care provision in psychiatric home-visit nursing differ among HVNS. However, the current situation and difficulties faced by each station in providing psychiatric home-visit nursing services have not yet been clarified.

This study aimed to investigate the current situation of HVNS providing psychiatric home-visit nursing and the differences between the agencies in terms of their characteristics, difficulties, and future requests. We conducted a nationwide survey of HVNS and discussed the support and systems necessary for HVNS to implement and improve the quality of service.

Materials and Methods

Subjects

The potential subjects were 7,869 member stations of the National Association for Visiting Nurse Services in Japan. The survey, including the purpose, methods, ethical considerations, and information protection, was sent and explained to the director of each Home Visit Nursing station *via* fax and e-mail. We then asked the participants to fill out and return the questionnaire using a web form or fax. The returned questionnaire was valid if the participants agreed to participate. The survey was conducted from September to October 2022.

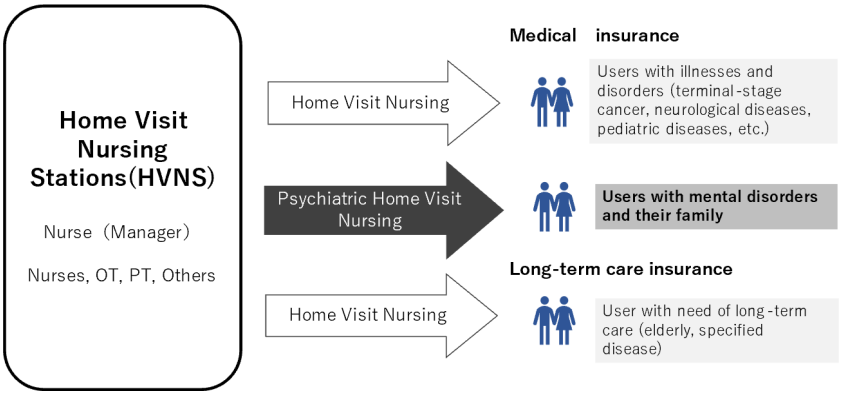

Figure 1. Users of home-visit nursing stations (HVNS). HVNS serve users under both medical and long-term care insurance. Psychiatric home-visit nurses provide medical insurance to users with mental disorders and their families. The number of users vary based on the HVNS.

Contents of the Questionnaire

The questionnaire included questions about whether they have medical facilities in the same corporation, number of home-visit users, number of psychiatric service users, number of nurses and other professionals, perceived difficulties in psychiatric home-visit nursing (13 items), and perceived need for support (nine items).

Analysis

Descriptive statistics were calculated in relation to the characteristics of HVNS. Respondents were grouped according to the percentage of psychiatric services users among all users. Subsequently, comparisons were made among the groups in terms of facility characteristics, perceived difficulties, and support needs. Comparative analysis was performed using analysis of variance and chi-square test. The SPSS software (IBM) was used for all the analysis. The significance level was set at 5%.

Ethics

Letters explaining the survey, including details that participation in the survey was voluntary, data would be managed with an ID, and publication would not include identifying information were sent to potential stations. Consent was assumed to have been given based on subject's completion and return of the survey questionnaire.

This study was approved by the review board of the National Center for Global Health and Medicine in Japan (approval No. NCGM-S-004521-00).

Results

Characteristics of the HVNS that responded to the survey

The questionnaire was distributed to 7,869 HVNS, of which 2,909 were returned with 2,782 valid responses (35.4%). Table 1 provides an overview of the responding facilities. The number of HVNS with medical facilities in the same corporation was 1,158 (41.6%), of which 300 (10.8%) had psychiatric departments. Most of the HVNS had users under both long-term care insurance (2,464; 88.6%) and medical insurance (2,579; 92.7%). The number of HVNS providing psychiatric home-visit nursing was 1,613 (58.0%). The average number of users per HVNS was 98.6, of which 62.1 (standard deviation [SD] = 109.2) were under long-term care insurance (elderly) and 38.1 (SD = 51.6) were under medical insurance. The average number of psychiatric users was 17.0 (SD = 46.6). The average number of staff members per HVNS were as follows; 7.8 (SD = 9.2) Nurses, among whom 4.0 (SD = 4.8) were eligible for psychiatric home visit nursing, 0.8 (SD = 1.5) Occupational Therapists, 1.7 (SD = 2.9) Physical Therapists or Speech-Language-Hearing Therapists, and 0.03 (SD = 0.3) Psychiatric Social Workers.

Table 1. Characteristics of responding home-visit nursing stations (HVNS) (*n* = 2,782)

Characteristics	*n*	%
Having medical facilities in the same corporation	1,158	41.6%
Psychiatry or psychosomatic department	300	10.8%
Other departments	892	32.1%
Having users under the Long-term care Act	2,464	88.6%
Having users under medical insurance	2,579	92.7%
Having users of psychiatric home-visit nursing	1,613	58.0%
24 h service delivery	2,453	88.2%
	Av	SD
Number of users under the Long-term care Act	62.1	109.2
Number of users under medical insurance	38.1	51.6
Number of users of psychiatric home-visit nursing	17.0	46.6
Number of nurses	7.8	9.1
Number of nurses eligible for psychiatric care	4.0	4.8
Number of OTs	0.8	1.5
Number of PTs & STs	1.7	2.9
Number of PSWs	0.03	0.26

OT, occupational therapist; PT, physical therapist; ST, speech-language-hearing therapist; PSW, psychiatric social worker.

Characteristics of HVNS providing psychiatric home-visit nursing

The percentage of psychiatric home-visit users varied from 0 to over 80%. The frequency distribution was bimodal, as 1,065 (38.3%) HVNS had no psychiatric users, 1,028 (37.0%) had less than 20% of users, 131 (4.7%) had 20–40% users, 54 (1.9%) had 40–60% users, 29 (1.0%) had 60–80% users and 282 (10.1%) had over 80% users. Based on these proportions, we assumed that the characteristics of HVNS could be divided into four groups and classified HVNS into the following four groups: no users, less than 20% of users, between 20 and 80% of users (214, 7.7%), and more than 80% of users.

Table 2 shows the comparison of characteristics between the HVNS by the percentage of psychiatric home-visit nursing users. HVNS with no psychiatric users were mostly affiliated to medical facilities (55.0%). On the other hand, most HVNS with more than 80% psychiatric users (95.8%) were affiliated with psychiatric medical facilities, and those providing a 24-h service delivery were low (50.7%). The higher the percentage of users with mental disorders, the lower the percentage of users under long-term care insurance, the lower the numbers of physical and speech therapists, and the higher the number of psychiatric social workers.

Perceived difficulties in psychiatric home-visit nursing and need for support

The most common difficulties perceived in psychiatric home-visit nursing were "caring for users/families who refused care" (56.3%), "caring for psychiatric symptoms"

(54.0%), and "assessing psychiatric symptoms" (49.1%) (Figure 2). There were differences in responses to difficulties depending on the percentage of psychiatric users (Table 3). The HVNS with 80% and more users with mental disorders had more difficulties in "caring for users/families that refused care" (70.6%), "caring for users with physical illness" (46.5%), and "cooperating with welfare facilities" (18.9%) than that experienced by the other groups.

On the other hand, the three HVNS groups with no, less than 20%, or 20–80% of psychiatric users reported more difficulties in "caring for psychiatric symptoms" (66.0%, 54.5%, and 52.8%, respectively), "assessing psychiatric symptoms" (56.3%, 52.5%, and 51.9%, respectively), and "building relationships and communication with users" (43.4%, 34.8%, and 41.1%,

Table 2. Comparison of home-visit nursing stations (HVNS) by percentage of psychiatric home-visit nursing users

Characteristics	None (*n* = 988)	Under 20% (*n* = 1,028)	20–80% (*n* = 214)	Over 80% (*n* = 282)	Statistic value	*p* value
	n (%)	*n* (%)	*n* (%)	*n* (%)	χ2	
Affiliated medical facilities	543 (55.0)	366 (35.4)	65 (30.4)	98 (34.4)	104.42	< 0.001
Affiliated psychiatric department	63 (11.8)	78 (22.0)	42 (65.6)	93 (95.9)	354.31	< 0.001
24 h service delivery	917 (93.0%)	990 (95.9%)	195 (90.7%)	145 (50.7%)	120.8	< 0.001
	Av (SD)	Av (SD)	Av (SD)	Av (SD)	F	
Users under long-term care insurance	60.3 (57.6)	85.4 (154.6)	37.7 (45.7)	2.5 (4.2)	50.77	< 0.001
Users under medical insurance	21.2 (25.5)	34.6 (38.6)	46.9 (45.7)	102.7 (95.1)	244.5	< 0.001
Users of psychiatric home visit nursing	-	6.2 (7.7)	34.2 (39.4)	101.7 (94.9)	717.3	< 0.001
No. of nurses	7.1 (11.2)	8.8 (7.7)	7.4 (5.0)	7.5 (6.3)	6.71	< 0.001
No. of nurses eligible for psychiatric care	1.2 (2.3)	5.8 (4.6)	6.2 (4.4)	7.1 (6.5)	318.8	< 0.001
No. of OTs	0.7 (1.4)	1.0 (1.7)	0.6 (1.5)	0.6 (1.5)	9.55	< 0.001
No. of PTs & STs	1.7 (2.8)	2.3 (3.2)	0.9 (2.3)	0.05 (0.28)	51.57	< 0.001
No. of PSWs	0.004 (0.06)	0.004 (0.06)	0.03 (0.19)	0.19 (0.72)	46.53	< 0.001

degree of freedom = 3. OT, occupational therapist; PT, physical therapist; ST, speech- language-hearing therapist; PSW, psychiatric social worker.

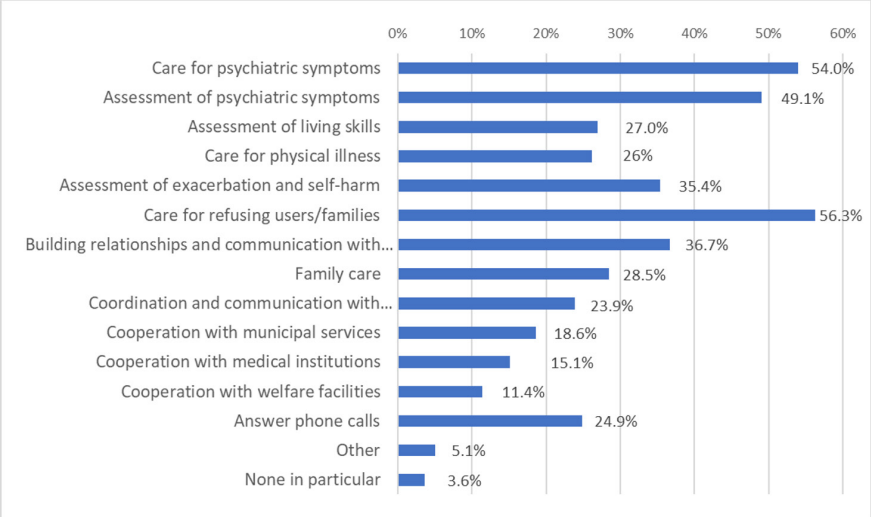

Figure 2. Perceived difficulties in psychiatric home-visit nursing provided by home-visit nursing stations (HVNS). This figure shows the percentage of HVNS who perceived each difficulty.

respectively). "Caring for users/families who refuse care" was relatively high among all the groups (57.4% [no users], 53.9% [less than 20% of users], 66.4% [20–80% of users], and 70.6% [more than 80% of users]).

Figure 3 shows the perceived need for future support. The most needed support was a "community system for collaboration" (67.6%), followed by "consultation with psychiatrists" (59.6%) and "consultation with expert nurses" (45.4%). There were significant differences among the four groups as the HVNS with no psychiatric users reported more need for "consultation from expert nurses" (55.4%, $\chi^2 = 44.6$, df = 3, $p < 0.001$), and the HVNS with more than 80% psychiatric users reported higher need for a "community system for collaboration" (81.8%, $\chi^2 = 43.0$, df = 3, $p < 0.001$).

Discussion

Dissemination of psychiatric home-visit nursing and characteristics of responding HVNS

Psychiatric home-visit nursing provided by HVNS has been increasing in Japan since the establishment of reimbursement in 1994, with the promotion of home care among a super-ageing Japanese population, increase in HVNS, and shift to community care in the psychiatric care policy.

The percentage of HVNS that provided psychiatric home-visit nursing services was 57.4% of the HVNS that responded, a significant increase from the survey conducted within the same association in 2007 (41.0%) (*15*) and approximately the same in a recent study conducted nationwide in 2016 (58.3%) (*11*). HVNS providing psychiatric home-visit nursing were mostly affiliated with psychiatric medical facilities, and 24 h service delivery was less common, which was consistent with the results of previous studies (*11,13*). The percentage of HVNS affiliated with psychiatric medical institutions (10.8%) has increased since the 2007 survey (7.0%) (*15*), indicating that many medical institutions have opened HVNS as they recognise the effectiveness

Table 3. Perceived difficulties in psychiatric home-visit nursing

Items	Percentage psychiatric home-visit nursing users				χ square value	*p* value
	0% *n* = 951	Less than 20% *n* = 1,028	20–80% *n* =214	More than 80% *n* = 282		
Caring for psychiatric symptoms	66.0%	54.5%	52.8%	29.7%	120.8	< 0.001
Assessing psychiatric symptoms	56.3%	52.5%	51.9%	30.8%	58.21	< 0.001
Assessing living skills	27.5%	28.6%	29.4%	25.2%	1.64	0.65
Caring for physical illness	22.1%	24.7%	36.9%	46.5%	79.61	< 0.001
Assessing exacerbation and self-harm	39.2%	36.0%	42.5%	32.5%	7.49	0.06
Caring for refusing users/families	57.4%	53.9%	66.4%	70.6%	31.91	< 0.001
Building relationships and communication with users	43.4%	34.8%	41.1%	31.1%	23.0	< 0.001
Family care	25.7%	30.3%	37.4%	32.9%	15.03	0.002
Coordination and communication with psychiatrists	18.3%	30.7%	24.8%	26.9%	41.00	< 0.001
Cooperation with municipal services	15.2%	21.8%	22.9%	22.4%	17.56	0.001
Cooperation with medical institutions	14.2%	16.9%	15.0%	17.5%	3.58	0.31
Cooperation with welfare facilities	8.0%	14.0%	11.2%	18.9%	31.33	< 0.001

degree of freedom = 3.

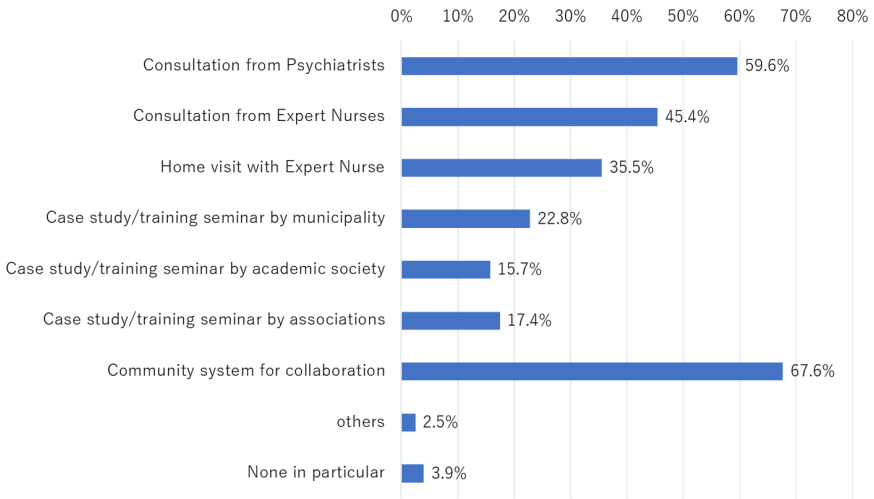

Figure 3. Perceived need for support. This figure shows the percentage of home-visit nursing stations (HVNS) who perceived each need for future support.

of and need for this service. Furthermore, given the rapid growth in the total number of HVNS, there is also a growing number of standalone HVNS providing psychiatric home-visit care.

For psychiatric home-visit nursing, nurses are required to have psychiatric care experience or completed a defined training programme about assessment and care of people with psychiatric disorders (over 20 h). Training programmes have been widely ongoing, and this has supported the implementation of this service. However, many HVNS still reported difficulties in assessing and caring for users with psychiatric symptoms. This may be due to the diversity of users' diagnoses, ageing of the population, and increasing complexity of their needs, including physical complications, social withdrawal (hikikomori), and perinatal mental health (*16*). Since the HVNS with no psychiatric users reported the need for consultation with psychiatrists or expert nurses, developing a consultation system from psychiatric hospitals or expert nurses and ensuring more opportunities for ongoing training would encourage HVNS to provide psychiatric home-visit nursing care.

Perceived difficulties and needs for future support

The HVNS that primarily providing psychiatric home-visits care (> 80% of users), accounted for approximately 10% of the total HVNS. Fukui *et al.* (*13*) classified HVNS into five types based on a cluster analysis; one of the types was "psychiatric-centred" (7.0%) with characteristics of ownership of a medical facility and more users under medical insurance. This result is consistent with our study; however, the novelty of our study was that the surveyed HVNS reported a high degree of difficulty in caring for users with physical illnesses and those who tend to refuse support.

Psychiatric patients with physical illnesses have difficulty understanding and receiving physical treatment, which makes decision-making on their treatment more difficult (*17,18*). Nurses' attitudes and confidence have been reported to be significant predictors of user participation in managing physical conditions (*19,20*). Therefore, specialised training in physical assessment and care (*21*) and a system for consultation about physical care are needed to enhance nurses' confidence, which will lead to better outcomes for users.

The HVNS with fewer psychiatric users reported more difficulties in assessing psychiatric symptoms, caring for users with psychiatric symptoms, and communicating with users. They also reported more need for consultation from expert nurses. These HVNS provide care to various users, including the elderly, those with cancer, and those with neurological diseases and are considered to have limited staff responsiveness to psychiatric home-visit nursing. Therefore, opportunities to learn about the assessment of psychiatric symptoms and care for users with psychiatric symptoms, such as ongoing training, case conferences, and consultations from outside professionals with expertise in psychiatric nursing, are required.

Furthermore, over half of the HVNS reported difficulties with interacting with the families of users who tended to refuse support. People with mental disorders tend to feel anxious and refuse interactions with others because of their psychiatric symptoms, beliefs, or previous experiences. For such users, it is important for home-visit nurses to develop a gradual relationship with them while respecting their wishes and rights to reassure them of their safety (*16*). Katakura *et al.* (*22*) suggested an additional education programme for home-visit nurses to reflect on their preconceptions and have an equal footing with users, which was found to be effective in improving users' outcomes. Thus, educational training and consultations with experts are expected to enhance this scope of nursing care.

Goodson (*23*) reported that partnerships between professional consultants and home-visit staff enhanced their capacity to identify and address the mental health needs of service recipients. Care conferences and consultations are time- and labour-intensive, which may be burdensome for HVNS, especially for the small agencies. For this reason, supporting individual HVNS financially and systematically to attend case conferences and access consultations for service delivery would enhance the abilities and confidence of visiting nurses and improve their quality of care.

Perspective of community assessment and building

In Japan, both medical institutions and HVNS providing psychiatric care are often private facilities, and each HVN station is required to respond to different needs. Developing a network between each HVN station and other service providers, including cooperation with municipalities, is crucial for meeting community needs. Networking and management should be tailored to community characteristics, and the characteristics and strengths of each HVN station should be leveraged to ensure that all HVNS work together. More HVNS are expected to actively participate in discussions on regional medical and health planning, which is also promoted by the community-based integrated care system (*3*).

One limitation of our survey was that the locations of the HVNS were unknown. Medical and welfare resources vary among regions and prefectures; accordingly, the function of each HVN station differs among regions. In urban areas, the number of HVNS is large and dense, whereas in rural areas, the number is limited; therefore, a single HVN station might cover a wider area and have broader functions. Further analysis should consider regional characteristics such as population, medical and welfare resources, and

transportation access.

In the future, health resources and conditions in each region and community are expected to be visualised and shared by residents, service users, and care providers (*24*). Databases such as the Regional Mental Health Resources and Database (ReMHRAD: *https://remhrad.jp/*) (*25*), which publishes the status of local mental health resources online by mapping HVNS, psychiatric institutions, and mental health welfare services, would be utilised. In the era of VUCA (Volatility, Uncertainty, Complexity and Ambiguity), home-visit nursing is also becoming more fluid and complex in moving toward a community-based integrated care system. Thus, it is important to continuously investigate the functions and roles of psychiatric home-visit nursing and share information with citizens, HVNS staff, and other service providers to co-create sustainable community care in the future.

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Service contents and recovery orientation of psychiatric home-visit nursing evaluated by users in Japan

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Abstract: The aim of this study was to clarify the differences perceived by users of home-visit nursing care between providers from medical institutions and services from independent home-visit nursing stations, as well as to examine the recovery orientation from the perspectives of the users. We conducted a questionnaire survey of 32 home-visit nursing stations and 18 medical institutions. From these facilities, 10 users of psychiatric home-visit nursing services who were being treated for schizophrenia and bipolar disorder were selected. With regard to the care that they thought was good, the home-visit nursing station users responded more often than users of home-visit nursing care provided by medical institutions regarding "help with hobbies and fun" and "support to empower you". Regarding what users wanted from home-visit nursing care, a statistically significant difference was found between users of home nursing stations who answered, "I want the same person to come", and users of home-visit nursing services provided by medical institutions, who answered, "I want various people to come". Brief INSPIRE-J score for study participants was 81.9 (standard deviation; SD 18.1) for users of home-visit nursing care services from medical institutions and 83.7 (SD 15.5) for home-visit nursing station users. It is conceivable that the care provided by psychiatric home-visit nursing services may have a greater potential for promoting recovery. However, since the characteristics of users and facilities may differ, future research is needed to clarify which recovery factors are effectively promoted by each service.

***Keywords*:** psychiatric home-visit nursing, perspectives of users, recovery orientation

Introduction

The number of psychiatric beds per population and the average length of a hospital stay are still high in Japan, even after successive system revisions (*1,2*). Against this backdrop, the Ministry of Health, Labour and Welfare (MHLW), in its 2004 "Vision for the Reform of Mental Health and Medical Welfare", set forth the principle of "shifting from a focus on inpatient care to a focus on community life", and efforts are currently underway to transition people with mental disorders from hospital.

Specific efforts are being made to expand support systems and services for people with mental illnesses who are living in the community to help them with psychosocial rehabilitation and provide early discharge support after hospitalization. Psychiatric home-visit nursing care plays a major role. Psychiatric home-visit nursing is a core service supporting community psychiatric care that has been reimbursed since 1986. Services are provided by nurses, occupational therapists, and other medical staff who visit patients in their homes. The number of home-visit nursing care services to persons with mental illness was approximately 640,000 in 2009. This number increased to approximately 2.16 million in 2019 (*3*). While psychiatric home-visit nursing continues to expand quantitatively, the quality of services provided and outcomes must improve.

To date, the effectiveness of psychiatric home-visit nursing has been evaluated using objective indicators, such as relapse rate (readmission rate), number of days spent in the community, employment rate, and social reintegration rate (*4,5*). However, in recent years, in

addition to objective indicators, the importance of subjective evaluations by service users, such as recovery orientation and satisfaction with services, has been highlighted (*6*). Recovery-oriented services are mental health services from the perspective of the service user and encompass five factors that serve as a conceptual framework for personal recovery: connectedness, hope and optimism about the future, identity, meaning in life, and empowerment (*7,8*).

However, there are few studies in Japan in which users of psychiatric home-visit nursing care evaluated the services they received (*9,10*), and no quantitative studies exist. In addition, none have evaluated whether services are recovery-oriented.

Although there are two systems of psychiatric home-visit nursing care in Japan, it is unclear how the differences in providers are perceived by users of home-visit nursing care from medical institutions (hospitals and clinics) and services from independent home-visit nursing stations. The aim of this study was to clarify the services received in psychiatric home-visit nursing and check the recovery orientation from the perspectives of service users.

Materials and Methods

Subjects

Of the facilities belonging to two organizations related to psychiatric home-visit nursing (Japan Psychiatric Nurse Association and National Association for Visiting Nurse Service), 32 home-visit nursing stations and 18 medical institutions were selected through convenience sampling. From these facilities, 10 users of psychiatric home-visit nursing services who were being treated for schizophrenia and bipolar disorder were selected.

The selection criteria for users were a diagnosis of schizophrenia or bipolar disorder, the criteria for Severe Mental Illness (SMI) with chronic symptoms and high severity, and utilizing psychiatric home nursing services. The reason for this was that the individuals with SMI have high support needs and constitute approximately half of all users receiving psychiatric home-visit nursing.

Exclusion criteria were people who were judged by the administrator/facility director (department head) to have difficulty responding to the survey due to fluctuating symptoms, comprehension, or judgment and those who were judged by the administrator/facility director (department head) to be likely to experience disadvantages, such as fluctuating symptoms or a psychological burden, as a result of responding.

Contents of questionnaire and measures

The questionnaire used in this study addressed the duration of participants' use of home-visit nursing care, support received from home-visit nursing care and support they considered good, what they wanted from home-visit nursing care, the personal recovery orientation of home-visit nursing services, and loneliness felt in life situations.

The duration of home-visit nursing care was categorized as follows: less than six months, less than one year, 1–2 years, 2–5 years, 5–10 years, and more than 10 years.

For each of the care items extracted by previous study (*11*), respondents were asked whether they received such care (yes or no) and whether they thought the care was good (yes or no).

Personal recovery orientation of home-visit nursing services was measured using a shortened Japanese version of the INSPIRE-J (Brief INSPIRE-J). This scale is a five-item shortened version of the 27-item INSPIRE (*12*), with higher scores indicating higher recovery orientation. The Brief INSPIRE-J has shown high reliability and adequate validity (*13*).

Loneliness felt in life situations was measured using a shortened version of the UCLA (University of California, Los Angeles) Loneliness Scale (three items). Higher total scores indicate higher levels of loneliness. The original version (*14-16*) and Japanese version (*17*) have been assessed as reliable and valid.

Desire for home-visit nursing care was measured with the items used in the Japan Psychiatric Nursing Association Report (*18*). For each item, possible responses were "desire" or "do not desire".

Analysis

Prior to the analysis, the study participants were divided into two groups: users of services from medical institutions and users of services from home-visit nursing stations. After calculating descriptive statistics for each item for each group, statistical significance was tested using an analysis of variance and the chi-square test. For loneliness (three-item UCLA Loneliness Scale) and recovery orientation of service received (Brief INSPIRE-J), the total scores were calculated according to the guidelines for each scale, and the statistical significance of the differences between the two groups was also tested. The probability of significance was set at 5%, and SPSS version 28 (IBM Corp.) was used for all analyses.

Ethical considerations

A self-administered questionnaire was distributed to selected users, along with a written explanation of the study. The questionnaire was unsigned, answered only by those who agreed to cooperate in the study, and mailed directly to the researcher without going through the facility providing the service.

This study was approved by the Review Board of the National Center for Global Health and Medicine in Japan

(approval No. NCGM-S-004521-00).

Results

Fifty facilities were asked to cooperate; ultimately, 27 facilities cooperated. The questionnaire was distributed to 270 people, and 118 responded (47.3% response rate). Fifty-eight responses containing missing values were excluded, so responses from 60 individuals were analyzed (valid response rate: 22.2%).

Duration of use of psychiatric home-visit nursing services

Table 1 shows the duration of use of psychiatric home-visit nursing services by the study participants. There were no statistically significant differences between the two groups.

Users' perceptions of psychiatric home-visit nursing

Table 2 shows the care users perceived from home-visit nursing, the care that they thought was good, and what they wanted from home-visit nursing services. First, there was no statistically significant difference between the two groups regarding the care they received.

Second, with regard to the care that they thought was good, the home-visit nursing station users responded more often than users of home-visit nursing care provided by medical institutions regarding "help with hobbies and fun" (13.5% and 39.1%, respectively) and "support to empower you" (56.8% and 82.6%, respectively). These differences were statistically significant ($p = 0.02$, $p = 0.04$, respectively).

Third, regarding what users wanted from home nursing care, a statistically significant difference was found between users of home-visit nursing stations who answered, "I want the same person to come" (16.2% and 47.8%, respectively), and users of home-visit nursing services provided by medical institutions, who answered, "I want various people to come" (43.2% and 17.4%, respectively). The difference between the two groups was statistically significant ($p = 0.01$, $p = 0.04$, respectively). Although there was no statistically significant difference ($p = 0.053$), a greater percentage of users of home nursing services provided by medical institutions responded that "they would like to talk to make them feel better" (51.4% and 26.1%, respectively) than users of home-visit nursing stations did ($p = 0.01$, $p = 0.04$).

Loneliness felt by study participants in their daily life situations

Table 3 shows the levels of loneliness felt by the study participants in life situations according to the three-item UCLA Loneliness Scale. Recent studies using the same scale are also listed as references. The overall scores for the study participants were 5.22 (standard deviation; SD = 1.98), 4.81 (SD = 1.73) for users of home-visit nursing services from medical institutions and 5.87 (SD 2.22) for home-visit nursing station users.

Recovery orientation of psychiatric home-visit nursing

Table 4 shows the results of the recovery orientation of the services rated by the study participants as measured by the Brief INSPIRE. Recent studies using the same scale have been conducted for reference. The overall score for study participants was 82.6 (SD 17.0), 81.9 (SD 18.1) for users of home-visit nursing care services from medical institutions and 83.7 (SD 15.5) for home-visit nursing station users.

Discussion

Duration of study participants' use of psychiatric home-visit nursing services

There was no significant difference in the duration of home-visit nursing use among the participants in this study between the two groups. Additionally, the duration of use was similar to that of psychiatric home-visit nursing users in the previous study (*19*). Despite the limitations indicating low valid response rates among the participants in this study, they can still be considered as an adequate representative sample.

Table 1. Duration of psychiatric home-visit nursing use of survey participants ($n = 60$)

Items	Total		Users of services from medical institutions		Users of services from home-visit nursing stations		χ^2	n
	n	%	n	%	n	%		
Duration of use of psychiatric home-visit nursing							2.098	0.835
less than six months	2	3.3%	1	2.7%	1	4.3%		
less than one year	5	8.3%	4	10.8%	1	4.3%		
1–2 years	5	8.3%	4	10.8%	1	4.3%		
2–5 years	21	35.0%	12	32.4%	9	39.1%		
5–10 years	18	30.0%	10	27.0%	8	34.8%		
more than ten years	9	15.0%	6	16.2%	3	13.0%		

Table 2. The care users perceived from home-visit nursing, the care that they thought was good, and what they wanted from home nursing services (*n* = 60)

Items	All		Users of services from medical institutions		Users of services from home-visit nursing stations		χ^2	*p*
	n	%	*n*	%	*n*	%		
The care they received								
Help with daily life	14	23.3	8	21.6	6	26.1	0.16	0.69
Help with hobbies and fun	17	28.3	8	21.6	9	39.1	2.14	0.14
Mental Health Care	57	95.0	35	94.6	22	95.7	0.03	0.85
Help with symptoms	49	81.7	29	78.4	20	87.0	0.70	0.40
Physical care	55	91.7	34	91.9	21	91.3	0.01	0.94
Help with medication	46	76.7	28	75.7	18	78.3	0.05	0.82
Support to empower you	44	73.3	24	64.9	20	87.0	3.54	0.06
Help with socializing	30	50.0	17	45.9	13	56.5	0.64	0.43
Support for your family	25	41.7	14	37.8	11	47.8	0.58	0.45
Others	6	10.0	3	8.1	3	13.0	0.38	0.54
The care that they thought was good								
Help with daily life	10	16.7	4	10.8	6	26.1	2.38	0.12
Help with hobbies and fun	14	23.3	5	13.5	9	39.1	5.20	0.02*
Mental Health Care	54	90.0	32	86.5	22	95.7	1.32	0.25
Help with symptoms	43	71.7	25	67.6	18	78.3	0.80	0.37
Physical care	50	83.3	31	83.8	19	82.6	0.01	0.91
Help with medication	41	68.3	25	67.6	16	69.6	0.03	0.87
Support to empower you	40	66.7	21	56.8	19	82.6	4.27	0.04*
Help with socializing	28	46.7	16	43.2	12	52.2	0.46	0.50
Support for your family	23	38.3	13	35.1	10	43.5	0.42	0.52
Others	2	3.3	2	5.4	0	0.0	1.29	0.26
What they wanted from home-visit nursing services								
I want you to come to me more often	9	15.0	6	16.2	3	13.0	0.11	0.74
I want the same person to come	14	23.3	7	18.9	7	30.4	1.05	0.31
I want the same person to come	17	28.3	6	16.2	11	47.8	6.98	0.01*
I want various people to come	20	33.3	16	43.2	4	17.4	4.27	0.04*
I want the same person to come	25	41.7	19	51.4	6	26.1	3.73	0.05
I want the same person to come more often	9	15.0	6	16.2	3	13.0	0.11	0.74
I want you to tell me about my medicine	7	11.7	4	10.8	3	13.0	0.07	0.79
I want someone to accompany me when I go out	8	13.3	5	13.5	3	13.0	0.00	0.96
I want a lower fee	11	18.3	6	16.2	5	21.7	0.29	0.59
Cooperate with hospital staff, etc.	11	18.3	7	18.9	4	17.4	0.02	0.88
Help my family understand my condition	10	16.7	7	18.9	3	13.0	0.35	0.55
Others	13	21.7	6	16.2	7	30.4	1.69	0.19

*Significant at the 0.05 level, two-sided test.

Table 3. Loneliness felt by study participants in their daily life situations (*n* = 60)

Participants	This study						cf. 1 (Saito *et al*., 2019) (*16*)		cf. 2 (Alhalaseh *et al*., 2022) (*17*)	
	Users of psychiatric home-visit nursing (Japan)						older adults living in public housing (Japan)		community-living older adults during the COVID-19 pandemic (Jordan)	
	All		Users of services from medical institutions		Users of services from home-visit nursing stations					
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total score of 3-item Loneliness Scale	5.22	1.98	4.81	1.73	5.87	2.22	4.30	1.65	5.33	1.67

SD, standard deviation.

Users' perceptions of psychiatric home-visit nursing

No statistically significant difference was noted for service users from medical institutions and those from home nursing stations in terms of the type of psychiatric home-visit nursing service they perceived themselves as receiving. As several previous qualitative studies (*9,10*) have not shown differences in items of care perceived by users depending on the type of entity, this study is considered quantitatively supportive of previous studies.

Table 4. Recovery orientation of psychiatric home-visit nursing (*n* = 60)

Participants	This study						cf. 3 (Kotake *et al*., 2020) (*11*)		cf. 4 (Williams *et al*., 2014) (*10*)	
	Users of psychiatric home-visit nursing (Japan)						Users of community mental health services (Japan)		Users of community mental health teams (UK)	
	All		Users of services from medical institutions		Users of services from home-visit nursing stations					
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total score of Brief INSPIRE	82.6	17.0	81.9	18.1	83.7	15.5	78.5	19.3	73.0	18.8

SD, standard deviation.

A statistically significant, higher percentage of participants who received home-visit nursing care from a home-visit nursing station responded "good" for two items: "help with hobbies and fun" and "support to empower you". Many users who received home visits from a medical facility were originally hospitalized and received home-visit nursing care from the same facility after being discharged (*6*). Although dependent on how long they were hospitalized, it is possible that the longer they were hospitalized, the longer they were away from the hobbies and pleasures they enjoyed before hospitalization and might not have pursued hobbies and pleasures after discharge. Therefore, home-visiting nurses should actively listen to what their patients used to do in terms of hobbies or pleasures before hospitalization or what they would like to do following discharge and support the realization of these hobbies or pleasures through "support to empower you".

Users' desires for psychiatric home-visit nursing care

As for what they wanted from home nursing care, a large percentage of the home-visit nursing station users said they wanted the same person to come, whereas a large percentage of the medical institution home-visit nursing users said they wanted a variety of people to come. The two groups showed contrasting results, possibly because home-visit nursing stations often visit one patient without assigning a staff to the patient (*20*), whereas home-visit nursing care from medical institutions is often assigned to the same staff. It is conceivable that this could be a managerial decision, but further research is needed to support this consideration, as there are no objective statistical data to indicate this premise.

Loneliness felt by psychiatric home-visit nursing users

The scores for loneliness experienced by psychiatric home-visit nursing users were higher than those of Japanese older adults (*18*), especially among home-visit nursing station users. This score is close to that of older Jordanians during the coronavirus disease 2019 (COVID-19) pandemic (*21*). Although comparisons with previous studies are difficult because of various background factors, it is possible that psychiatric home-visit nursing care users live with a stronger sense of loneliness than others. Although users need support in their daily lives because of their disabilities, they are often estranged from support resources, such as family and friends. In addition, a sense of distance from society, such as a lack of employment opportunities and stigma, may also increase feelings of loneliness. Thus, visiting nurses must help their patients connect with society and others and support communication in order to reduce the loneliness of users as much as possible.

Users' evaluations of the recovery orientation of psychiatric home-visit nursing care

The Brief INSPIRE-J score, which measures the recovery orientation of services, is higher than that assessed by users of community mental health services in Japan (*13*) and the UK (*12*). The main goals of psychiatric home-visit nursing care are to support stable daily living, contribute to symptom control, and simultaneously provide care in the user's living environment, so that the user's desired lifestyle can be achieved to the extent possible. It is conceivable that the care provided by psychiatric home-visit nursing services may have a greater potential for promoting recovery than day care services. However, since the characteristics of users may differ, future research is needed to clarify which recovery factors are effectively promoted by each service.

Limitations

This study has several limitations. First, the institutions that were asked to cooperate in this study were selected using convenience sampling; thus, a selection bias existed. Second, data on several factors that might be relevant to the results of this study were not collected; these include user characteristics, such as age, sex, and diagnosis. Further, it was not possible to verify the impact of these factors on the results. Third, the valid response rate in this study was considerably lower than in previous studies (*12,13*). This may have had an impact

on the results, largely due to the exclusion of 58 cases from the analysis due to missing responses. This suggests the need for improvements in response precautions and providing assistance to respondents who experience difficulty in answering the questions.

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Comparison of the clinical competency of nurses trained in competency-based and object-based approaches in the Democratic Republic of the Congo: A cross-sectional study

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Abstract: In the Democratic Republic of the Congo (DRC), the object-based approach (OBA) still remains mainstream in the basic nursing education program, despite the intention of the Ministry of Public Health to expand the competency-based approach (CBA) nationwide. This study aimed to compare the clinical competency of nurses trained with CBA and OBA. A cross-sectional, mixed study was conducted. We developed a self-assessment questionnaire consisting of an individual demographic information, a clinical competency assessment scale and the General Self-efficacy Scale. Nurses trained with CBA or OBA and currently working in health facilities with two to five years of clinical experience were purposively selected from ten cities across nine provinces in the DRC. We also conducted key informant interviews with the clinical supervisors at health facilities. In a comparison of 160 nurses trained with CBA and 153 with OBA, 3 competency domains ("establishing professional communication", "making decisions about health problems", and "performing nursing interventions") of the 5 domains required for nurses had significantly higher scores in the CBA group. The key informant interviews supported these results while revealing various issues in the basic nursing education program. The results support the strategic direction of the Ministry of Public Health in the DRC to expand CBA. Collaboration among education institutions, health facilities, and administrative bodies is crucial for clinical nurses to fully engage their competencies for the population. Other low- and middle-income countries with scarce resources can refer to the developed and implemented competency assessment method applied in this study.

***Keywords*:** clinical nurses, clinical supervisors, competency assessment, expansion of the competency-based approach, low- and middle-income countries

Introduction

Nurses contribute to realizing the goal of "leave no one behind" and achieving the Sustainable Development Goals and Universal Health Coverage (*1*). To optimize the nursing workforce, the World Health Organization recommends that a global standard for basic nursing education be established to assure outcomes that are based on evidence and competency (*2*). Effective educational programs are one of the policy priorities under the Global Strategic Direction for Nursing and Midwifery 2021–2025 (*3*).

Historically, the object-based approach (OBA) has mainly been applied to the basic nursing education program because of the ease of learning setting and evaluating learning objectives (*4*). This approach was designed according to a biomedical context, focusing on pathology and technicality to produce healthcare professionals with high levels of technical skills (*5*). However, the competency-based approach (CBA) has gained increasing recognition as an effective learning approach to achieve clinical performance goals and has replaced OBA in basic nursing education programs worldwide (*6*). Competency has been described by Dreyfus as a developmental model of skill acquisition (*7*), and Schwirian has found a high correlation between the quality of nursing services and clinical competency (*8*). Bennar has developed a nursing theory based on the Dreyfus model, which established 31 longitudinal and graded competencies in 7 domains (*7*). Clinical competency is defined as the integration of knowledge, skills, attitude, and the ability to effectively meet the needs of the population to provide safe and appropriate care without any support from supervisors (*9*). The evaluation of nurses' clinical competency is vital in providing quality-assured nursing services to

a population (*10*). Several competency assessment instruments have been developed for various countries' contexts, first in high-income countries in the 2000s and later in low- and middle-income countries in 2010s (*11-15*).

The Democratic Republic of the Congo (DRC) is a French-speaking lower-income country located in sub-Saharan Africa, with a population of 98.3 million as of 2021 (*16*). Rural residents accounted for 53.7% of the population in 2021 (*17*). The physician-to-population ratio was 3.6 per 10,000 people and the ratio for nurses and midwives was 10.7 per 10,000 people in 2018 (*18*). Amid this serious shortage of health workforce in the DRC, nurses have the critical role of providing health care in front line health facilities, especially in rural areas. The Ministry of Public Health in the DRC developed the national clinical competency for nurses in 2005 and updated it in 2009 to respond to the health needs of the population and improve health indicators. The national clinical competency for nurses in the DRC comprises the following five domains: Domain 1 "establishing professional communication", Domain 2 "making decisions about health problems", Domain 3 "performing nursing interventions", Domain 4 "managing resources", and Domain 5 "engaging in professional development" (*19*). The Ministry of Public Health has promoted its adaptation nationwide; however, as of 2022, approximately 81% (393 of the 487 nursing education institutions under the jurisdiction of the Ministry of Public Health) continue to use OBA because of insufficient budgets and a shortage of educators who are trained in CBA methodology (Data released by the Ministry of Public Health in the DRC).

This study aimed to compare the clinical competency of nurses who completed their basic nursing education in either of the two types of approaches — CBA and OBA — under the jurisdiction of the Ministry of Public Health. The difference between CBA and OBA is that on-campus exercises (situational simulation) are introduced in CBA, while these are not included in OBA. Additionally, CBA uses active learning methods as a teaching method, while OBA uses lecture-based learning methods (Table 1). Furthermore, this study aimed to identify the challenges and constraints in adherence to CBA. We conducted a literature review of PubMed, CINAHL, and ScienceDirect using keyword as "Democratic Republic of the Congo", "competency", and "nurse". However, no relevant previous studies were found. Therefore, we expect the findings of this study to assist the Ministry of Public Health in the DRC in analyzing the issue of nurses' clinical competency and identifying effective policy options.

Materials and Methods

Design, setting, and participants

This is a cross-sectional and mixed methods study. Ten cities in nine out of 26 provinces, namely Bukavu in Sud-Kivu, Goma in Nord-Kivu, Kananga in Kasaï-Central, Kinshasa in capital, Kisantu in Kongo Central, Kolwezi in Lualaba, Lubumbashi in Haut-Katanga, Mosango in Kwilu, Muji-Mayi in Kasaï-Oriental, and Yassa-Bonga in Kwilu, in the DRC were selected on the basis of transport accessibility (*16*) and safety considerations. The study participants included nurses working in health facilities, with two to five years of clinical experience, and who had graduated after 2012 from nursing education institutions under the jurisdiction of the Ministry of Public Health in the DRC. The nursing education institutions applying CBA and the ones applying OBA co-exist in the 10 cities in nine provinces. The selected nursing education institutions are located in both urban and rural areas of the DRC, with a total enrolment of approximately 53–

Table 1. Overview of CBA and OBA*

Items	CBA	OBA
Overview of the nursing program	4,878 hours in total (in 4 years) Lesson: 2,380 hours On-campus exercises (situational simulation): 358 hours Clinical training: 2,140 hours	4,593 hours in total (in 4 years) Lesson: 2,293 hours Clinical training: 2,300 hours
Curriculum	Curriculum based on the competencies required of nurses, as defined by the MoH. (Nurses who can provide nursing care for priority diseases and the health needs of the population in the DRC.)	Curriculum based on educational objectives (knowledge, skills, and attitudes) to be achieved at the end of four years of education.
Learning cycle	Lesson On-campus exercises (situational simulation) Clinical training Reflection on post-practice nursing	Lesson Clinical training
Teaching method	Active learning methods (Place nursing students at the center of educational activities and encourage their autonomy)	Lecture-based learning methods

*Data Source: Official documents released by the Ministry of Public Health in the Democratic Republic of the Congo, not available online. CBA: competency-based approach, OBA: object-based approach.

280 students per institution (total enrolment in nursing education institutions). Nursing education institutions can also be categorized as public, private, and religious. We selected 400 participants: 200 nurses trained with CBA and 200 nurses trained with OBA. The purposive sampling method was applied using the list of graduates provided by the Ministry of Public Health; each participant had to be accessible at the time of the study, be able to travel to the questionnaire distribution site, and provide their consent to participate in the study.

To complement and triangulate the information collected in the quantitative study, key informant interviews with selected clinical supervisors at health facilities were also conducted about the differences between the nurses educated by CBA and OBA, as well as challenges in supervising them. In general, most clinical supervisors were educated using OBA. In addition, the health facilities to which those clinical supervisors belong can be classified into three categories: public, private, and religious.

Measurement instrument

We developed an original Congolese competency assessment scale in French for this study based on the national clinical competency for nurses in the DRC, consisting of five domains (Table 2). This self-assessment instrument regarding the frequency of implementation of each clinical competency adopted a 7-point Likert scale (0 = not at all, 1= very rarely, 2 = occasionally, 3 = sometimes, 4 = very often, 5 = almost always, and 6 = always). The instrument was pilot tested and finalized to ensure clarity, after which minor changes were made to the wording of some questions.

Based on the original Congolese assessment scale of clinical competency, the surface and content validity of the developed scale were reviewed by experts, including Congolese administrators from the Department of Health Science Education in the Ministry of Public Health, supervisors from health facilities, and educators from nursing education institutions. Reliability was also verified, and Cronbach's alpha coefficient was 0.92.

The French version of the General Self-efficacy Scale was included in the questionnaire in addition to the clinical competency assessment. This is because general self-efficacy influences knowledge acquisition, skills development, and career progression in nursing (*20-22*). It is a valid indicator of competency because it may influence the behaviors that nurses perceive (*23*). The scale's reliability and validity were confirmed (*24-26*). Individual demographic information was also included in the questionnaire. For the semi-structured key informant interviews with clinical supervisors, an interview guide was developed in French.

Data collection and ethical considerations

Data were collected from January to September 2021. The research team was divided into ten groups, each comprising one national administrator from the Department of Health Science Education in the Ministry of Public Health and two local collaborators from the basic nursing education division in the provincial health authority. Participants completed the clinical competency assessment and the General Self-efficacy Scale by themselves. For the qualitative data collection, the research group conducted the interviews in French with the supervisors of the nurses.

Ethical approval was obtained from the ethics committees of the National Center for Global

Table 2. National clinical competencies for nurses in the Democratic Republic of the Congo

Domain	Description
Competency 1. Establishing professional communication	Initiate professional communication with a client and/or a small group in situations involving simple daily life issues
	Maintain a trusting relationship with an adult client, a family, and/or a small group
	Interact with a client, family, and/or extended group
	Establish professional communication
Competency 2. Making decisions about health problems	Identify the steps of the nursing process
	Identify health problems in simple and common situations
	Use the nursing approach
	Make decisions regarding health issues
Competency 3. Performing nursing interventions	Conduct nursing interventions in simple and common situations related to daily life
	Perform nursing interventions in simple and routine situations in internal medicine and surgery
	Perform nursing interventions in simple and routine situations in gynecology, obstetrics, pediatrics, and mental health and in complex situations in internal medicine and surgery
Competency 4. Managing resources	Identify the resources available
	Use the resources
	Manage the necessary resources
	Manage all resources
Competency 5. Engaging in professional development	Hold the position of a healthcare professional
	Participate in professional development activities
	Build a professional identity
	Engage with a development professional

Health and Medicine, Japan, in August 2019 (NCGM-G-004023-00) and the Ministry of Public Health, DRC, in October 2019 (No137/CNES/BN/PMMF/2019). The questionnaire and key informant interviews were administered after obtaining informed consent.

Data analysis

The quantitative data analysis was performed using SPSS Windows 28.0.1.0 Program (SPSS: An IBM Company, Chicago, IL, USA). Mann-Whitney's *U* test was used to compare the two groups of nurses in terms of demographic characteristics, general self-efficacy, and clinical competency. Pearson's correlation coefficient was used to check the degree of correlation between general self-efficacy and clinical competency. In all cases, statistical significance was set at $p < 0.05$.

Key informant interviews were recorded and transcribed into text files. Transcripts were analyzed manually by reading and were related to the quantitative data. In accordance with the descriptive method of the qualitative study, phrases from the interview records were coded and reviewed. The codes were further analyzed to distinguish similarities and differences to form categories (*27*).

Results

Quantitative study

Quantitative responses were obtained from a total of 367 participants: 186 in the CBA group and 181 in the OBA group. Of these, 54 did not meet the inclusion criteria and were excluded, resulting in a total of 313 nurses (160 in the CBA group and 153 in the OBA group) to be included in the analysis.

The sample comprised 141 men (45.1%) and 170 women (54.3%); the average age was 27.7 ± 6.42 standard deviation (SD) years, and the average years of experience was 3.4 ± 1.08 SD. There were 238 nurses (76.0%), 35 chief nurses (11.2%), and 33 nursing directors (10.5%). There were no significant differences between the CBA and OBA groups regarding gender, age, years of experience, and position in the health facilities. In total, 100 (62.5%) and 131 (85.8%) nurses worked at a primary health facility in the CBA and OBA groups, respectively. The rate of CBA and OBA groups, respectively, by facility type were 46 (28.8%) *vs.* 46 (30.1%) in public, 56 (35.0%) *vs.* 23 (15.0%) in Catholic, and 50 (31.3%) *vs.* 81 (52.9%) in private (Table 3).

The mean overall scores for general self-efficacy were 34.5 and 32.3 for the CBA and OBA groups, respectively ($p < 0.01$) (Table 4). In the general self-efficacy and competency domains, Pearson's correlation coefficients were 0.35 for the CBA group and 0.44 for the OBA group (Table 5).

A comparison of the CBA and OBA groups based on the 5 domains comprising 69 competencies showed significant differences in 3 domains: Domain 1

Table 3. Demographic characteristics ($n = 313$)

Variables	Number (%)			Mean ± SD	*p* value
	Total	CBA	OBA		
Education program	313 (100.0%)	160 (51.1%)	153 (48.9%)		
Gender					0.507
Women	170 (54.3%)	84 (52.5%)	86 (56.2%)		
Men	141 (45.1%)	75 (46.9%)	66 (43.1%)		
Age (years)				27.7 ± 6.42	0.936
20–29	224 (71.6%)	120 (75.0%)	104 (68.0%)		
30–39	66 (21.1%)	29 (18.1%)	37 (24.2%)		
40–49	19 (6.1%)	9 (5.6%)	10 (6.5%)		
50–59	2 (0.6%)	1 (0.6%)	1 (0.7%)		
Level of healthcare facility					< 0.001
Primary	231 (73.8%)	100 (62.5%)	131 (85.8%)		
Secondary	82 (26.2%)	60 (37.5%)	22 (14.4%)		
Type of healthcare facility					0.020
Public	92 (29.3%)	46 (28.8%)	46 (30.1%)		
Catholic	79 (25.2%)	56 (35.0%)	23 (15.0%)		
Private	131 (41.9%)	50 (31.3%)	81 (52.9%)		
Years of experience				3.4 ± 1.08	0.241
2	79 (25.2%)	47 (29.4%)	32 (20.9%)		
3	103 (32.9%)	49 (30.6%)	54 (35.3%)		
4	71 (22.7%)	34 (21.3%)	37 (24.2%)		
5	60 (19.1%)	30 (18.8%)	30 (19.6%)		
Position					0.676
Nurse	238 (76.0%)	123 (76.9%)	115 (75.2%)		
Chief	35 (11.2%)	17 (10.6%)	18 (11.8%)		
Director	33 (10.5%)	19 (11.9%)	14 (9.2%)		

Mann-Whitney *U* test. CBA: competency-based approach, OBA: object-based approach, SD: standard deviation.

"establishing professional communication", Domain 2 "making decisions about health problems", and Domain 3 "performing nursing interventions". However, no significant differences were found in Domain 4 "managing resources" and Domain 5 "engaging in professional development" (Table 6).

Comments of clinical supervisors

A total of 20 clinical supervisors responded to the key informant interviews. Many of them reported that the most observable differences between the CBA and OBA groups pertained to their communication skills toward patients.

CBA group communicates with the patient first and then explains how the nursing care will be provided. In contrast, OBA group provides nursing care without any explanation to the patient. (Supervisor 1)

CBA group communicates with patients and families in a respectful manner. (Supervisor 2)

Differences in their decision-making process were also observed by the clinical supervisors.

CBA group consults a physician or other healthcare professional about the need for treatment, but OBA group does not do this. (Supervisor 3)

Differences were also identified with respect to performing nursing interventions.

OBA group performs the procedure immediately with only a few observations when a patient arrives, whereas CBA group takes longer to perform the procedure because it collects various types of information before providing nursing care. (Supervisor 4)

The interviewees also expressed their challenges in

Table 4. General self-efficacy score (*n* = 313)

	Full points	Mean	SD	Median	Range	*p* value
CBA	40	34.5	3.68	35	22–40	< 0.001
OBA		32.3	4.51	33	15–40	

Mann-Whitney *U* test. CBA: competency-based approach, OBA: object-based approach, SD: standard deviation.

Table 5. Correlation between general self-efficacy and clinical competency (*n* = 313)

Domains	CBA		OBA	
	Pearson's correlation coefficient	*p* value	Pearson's correlation coefficient	*p* value
1. Establishing professional communication	0.42	< 0.001	0.51	< 0.001
2. Making decisions about health problems	0.41	< 0.001	0.38	< 0.001
3. Performing nursing interventions	0.28	< 0.001	0.31	< 0.001
4. Managing resources	0.14	0.093	0.31	< 0.001
5. Engaging in professional development	0.36	< 0.001	0.26	< 0.001
Total points of each domain	0.35	< 0.001	0.44	< 0.001

CBA: competency-based approach, OBA: object-based approach.

Table 6. Comparison of the competencies of nurses trained in CBA and OBA (*n* = 313)

Domains: Number of competencies	Total score (Mean ± SD) Score range for each competency (Mean ± SD: minimum – maximum) (Full points for each competency = 7)		*p* value
	CBA	OBA	
Domain 1: Establishing professional communication: 19 competencies	117.1 ± 12.2 5.61 ± 1.82 – 6.76 ± 0.70	109.6 ± 15.6 5.14 ± 2.06 – 6.41 ± 1.16	< 0.001
Domain 2: Making decisions about health problems: 18 competencies	112.0 ± 22.4 5.89 ± 1.50 – 6.70 ± 0.74	103.7 ± 29.7 5.41 ± 1.91 – 6.26 ± 1.22	< 0.001
Domain 3: Performing nursing interventions: 10 competencies	63.9 ± 7.3 5.97 ± 1.44 – 6.58 ± 0.88	62.2 ± 6.8 5.78 ± 1.47 – 6.59 ± 0.89	< 0.001
Domain 4: Managing resources: 11 competencies	64.8 ± 11.1 5.08 ± 2.18 – 6.46 ± 1.10	63.9 ± 10.5 5.08 ± 2.07 – 6.12 ± 1.25	0.255
Domain 5: Engaging in professional development: 11 competencies	66.9 ± 8.7 5.25 ± 1.73 – 6.81 ± 0.72	64.6 ± 10.0 5.41 ± 1.83 – 6.64 ± 0.99	0.071

Mann-Whitney *U* test. CBA: competency-based approach, OBA: object-based approach, SD: standard deviation.

supervising nurses educated with CBA.

Our observations of educators' performance from education institutions were unsatisfactory in terms of teaching methods. (Supervisor 5)

Some supervisors have taken CBA in-service training, but their level of understanding is limited, and what they learned in the training is not reflected in their lesson plans and content. (Supervisor 6)

There are few instructional materials to implement and prepare lessons that are effective and aligned with CBA. (Supervisor 7)

Few supervisors have taken CBA in-service training, and the majority have not yet had the opportunity to take part in it. (Supervisor 8)

The objective of CBA training is often not shared in advance between the nursing education institutions and the health facility. As a result, supervision is insufficient during clinical training at health facilities. (Supervisor 9)

Discussion

Based on our literature review, this is the first study to examine the clinical competency of nurses working in health facilities in the DRC using the newly developed clinical competency assessment tool that aligns with the DRC's context.

The total clinical competency and self-efficacy of the CBA group were statistically higher than those of the OBA group. This implies that nurses who were educated with CBA had higher confidence in their abilities to handle themselves when faced with difficulties in a clinical setting than those in the OBA group. These results are consistent with the findings of Lauder *et al*., who found that nurses trained in CBA have higher learning effects on clinical skills (*28*). The results are also consistent with those of Uys *et al*., who found that nurses trained through CBA gained greater competency in their practice settings (*29*).

Out of five competency domains, the CBA group had significantly higher mean scores in the following three domains: Domain 1 "establishing professional communication", Domain 2 "making decisions about health problems", and Domain 3 "performing nursing interventions". According to Oliver and Butler, clinical practice in nursing requires competencies in clinical judgment, reasoning, and decision-making (*30*); the results of Domains 2 and 3 are consistent with these findings. The key informant interviews supported these results. Many supervisors expressed that the CBA group had better communication skills toward patients, a better decision-making process, and performed nursing interventions better. The statistical significance of Domain 1 suggests that the CBA group was more confident in handling difficult situations through communication strategies and skills than the OBA group. Communication skills are important to ensure patient safety (*31*). Inadequate communication between patients and nurses is reported to cause anxiety in both parties (*32*). Nurses with effective communication skills can provide interventions that correspond to specific health and disease conditions (*33*). The results of this study imply that the introduction and promotion of CBA has contributed to strengthening nurses' critical clinical competencies in the DRC. In contrast, no significant differences were found for Domain 4 "managing resources" and Domain 5 "engaging in professional development". No significant differences in Domain 4 may be because the participants in this study had limited experience and skills in resource management as they had graduated two to five years before data collection. This result is consistent with the fact that management ability comprises factors such as experience and interpersonal skills (*34*). The lack of significant differences in Domain 5 could indicate that professional development is not related to CBA or OBA but is primarily driven by external conditions, such as support systems from clinical supervisors and the working environment. Thus, competencies related to Domains 4 and 5 must be complemented with continuous education (*35*).

The key informant interviews revealed various problems with the basic nursing education in the DRC such as lack of teaching staff and teaching materials, inadequate understanding of CBA among educators and clinical supervisors in health facilities, and a lack of cooperation between nursing education institutions and health facilities. To improve the quality of basic nursing education offered at both nursing education institutions and health facilities, consideration should be given to the ongoing monitoring and evaluation of the implementation of CBA at all levels of the health system. It is necessary to raise awareness of CBA among clinical supervisors in health facilities and strengthen their pedagogical capacities. Additionally, it is essential to establish a framework for collaboration between nursing education institutions and health facilities. To make CBA mainstream and strengthen the basic nursing education system in the DRC, these suggestions should be reflected in policies and strategic and operational plans at all levels of the health system.

Although competency assessments using instruments that reflect the country's context have been conducted in various countries, there are still some research gaps. First, competency assessment reports from low-income countries, especially from sub-Saharan and French-speaking African countries, are extremely limited (*36,37*). Second, most of the assessments target students undergoing basic nursing education (*38-40*), not clinical nurses who actually provide care services at health facilities. Third, typical assessment instruments are self-administrative (*41*), which are relatively handy but the results are less objective. Our study is epoch-making in that it

fills various research gaps: *i*) the country-specific assessment tool was developed by the Ministry of Public Health itself in the DRC, a low-income French-speaking country in sub-Saharan Africa, *ii*) the assessment targeted clinical nurses to evaluate their competencies in their daily health care provision, and *iii*) the self-administrative clinical competency instrument, the General Self-efficacy Scale, and key informant interviews with clinical supervisors at health facilities were combined into one assessment package to improve objectivity. Objective Structured Clinical Examination (OSCE) is well known to assesses competency based on objective testing through direct observation, and 360-degree feedback is another well-known method of objective performance evaluation. However, routine implementation of OSCE or 360-degree feedback is time- and resource-consuming for the Ministry of Health in a low-income country such as the DRC, where basic human resources and budget are scarce. The combined assessment method in this study is simpler to develop and implement; thus, other low- and middle-income countries can refer to it to assess their own nurses' clinical competencies that are critical to improving the quality of health care.

The results of this study support the strategic direction of the Ministry of Public Health in the DRC. However, for nurses in health facilities to fully perform the competencies acquired in education institutions and to meet the needs of the population, it is desirable for education institutions, health facilities, and the administrative bodies responsible for them to cooperate to improve the quality of basic and continuous nursing education. The establishment of supporting rules and regulations by professional governing bodies is also critical (*42*). In the DRC, these efforts have begun and may serve as a reference for other low- and middle-income countries facing challenges (*43*) in similar health systems and basic nursing education systems.

The main limitation of this study is its purposive sampling method. Therefore, the generalizability of the results must be carefully considered. In addition, broader challenges and constraints to develop and sustain competent nurses in the nursing education system and health system could be identified through interviews with educational professionals. Likewise, because competency development also depends on the working environment and colleagues at health facilities after graduation from education institutions, analyses of these aspects should also be considered in future studies.

Conclusions

The clinical competencies of nurses trained with CBA and OBA in the DRC were compared using practical instruments developed by the Ministry of Public Health in the DRC. Of the five competencies, nurses trained with CBA scored significantly higher in the areas of establishing professional communication, making decisions about health problems, and performing nursing interventions. This reveals the significance of the national expansion of CBA in the DRC. It is necessary to implement continuous education for complementing nurses' competencies, to increase the number of educators trained in CBA methodology, to improve educational materials and equipment, and to promote the understanding of CBA in clinical practice. The practical combined assessment method, its assessment results, and suggested policy directions of this study can be referred by other low- and middle-income countries to assess their own nurses' competencies and improve the quality of health care in the long term.

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A retrospective analysis of coping competence among community health centers during the COVID-19 pandemic in Shanghai, China: Coping strategies for future public health emergency events

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Abstract: This study aims to investigate the coping competence of 12 community health centers through nursing workforce, emergency preparation, emergency response training, and emergency support in a district of Shanghai during the coronavirus disease 2019 (COVID-19) pandemic in 2022 to propose coping strategies and implication for Future Public Health Emergency Events for community health centers. A cross-sectional survey was conducted on June 2022, and 12 community health centers (servicing a population of 104,472.67 ± 41,421.18, with 125 ± 36 health care providers per center) were then divided into group A (n = 5, medical care ratio ≥ 1:1) and group B (n = 7, medical care ratio < 1:1) according to collected data, and the nursing human resources management and coping competence of the centers with COVID-19 of both groups were retrospectively analyzed. Nursing shortages were obvious across all 12 centers. Certain deficiencies in the coping competence of community health centers with emergencies must be addressed (possession rate < 70% in both groups, $p > 0.05$). Community health centers need to enhance hospital-to-hospital collaboration and the ability to transport emergency staff to the post promptly during outbreaks. Emergency coping assessments, emergency drills at different levels, and mental health support need to be implemented regularly among community health centers, and effective donation management should be pursued as well. We expect that this study could support efforts by leaders of community health centers to conclude coping strategies including increasing nursing workforce, optimizing human recourse management, and identifying areas of improvement of centers for emergency coping during public health events.

Keywords: COVID-19, community health centers, competence, coping strategies, nursing workforce

Introduction

Omicron has the characteristics of a short incubation period and rapid transmission. Patients may either experience respiratory tract infection, fever, and fatigue as the main clinical symptoms or an asymptomatic disease course, and the proportion of mild cases has increased and the hospitalization rate has decreased (*1-3*)

During the omicron pandemic in China, nucleic acid screening became the focus of diagnostic work, bringing severe challenges to primary healthcare institutions. Community health nurses are the main force of pandemic prevention at the primary level. They are responsible for significant tasks, such as nucleic acid sampling, specimen sorting and transportation, materials preparation, and donation management, which collectively require a significant workforce. At present, the nursing workforce of primary healthcare institutions is relatively insufficient. Especially in response to emergencies, it is urgent to have an efficient emergency nursing team (*4*).

Following the outbreak of omicron in Shanghai during April and May 2022, Shanghai faced huge challenges. This study investigated the coping status in the community health service in a district of Shanghai during the coronavirus disease 2019 (COVID-19) pandemic in 2022 and proposes coping strategies to provide inspiration and reference for the future management of public health emergencies.

Materials and Methods

General information

In June 2022, a questionnaire was delivered to assess the coping status with COVID-19 among 12 community health centers in a district of Shanghai. The subjects of the investigation comprised the director at each center, all of whom provided informed consent and were willing to cooperate with this study. To avoid interference with the results by suburban regional differences, the healthcare institutions included in this investigation were all urban

community health centers. In this paper, the research area and research unit are anonymized.

Methods

Survey tool

i) General information from the community health center investigation: The collected information included the service population of each community health center; the number of subordinate stations; the distance from stations to the center; the numbers of physicians, registered nurses; the staff structure; and the nursing workload during the pandemic, *etc.*

ii) Investigation of the coping status with COVID-19: The questionnaire was designed based on the Competency Index System of Reserve Team for emergency response to public health emergencies (*5*), an evaluation index of the coping competence of primary healthcare institutions, and an evaluation index of community competence in responding to public health emergencies (*6-8*). The questionnaire covered 3 aspects: emergency preparation, emergency response training, and emergency support. Among them, emergency preparation included 8 items, such as emergency post responsibilities, hospital–hospital cooperation, regular coping assessment, and prompt arrival of healthcare staff; emergency response training included 7 items, such as emergency plan manual, emergency training, emergency drill, and specialist in charge; and emergency support included 7 items, such as timely allocation of materials, effective transportation of positive patients, effective donation management, and mental health support. Each item could be responded to with "yes" or "no".

Data-collection method

The questionnaire was distributed using an online application called Questionnaire Star (Ranxing Information Technology Co.Ltd., Changsha, China). The researcher introduced the survey purpose, significance, and relevant filling instructions and sent the survey instructions and QR code through WeChat (Tencent Holdings Ltd., Shenzhen, China). An answer was required for each item. A total of 12 questionnaires were sent out and all 12 were recovered, as such, the questionnaire response rate was 100%.

Statistical method

SPSS version 27.0 (IBM Corporation, Armonk, NY, USA) was used for statistical analysis. Normally distributed measurement data are represented by mean and standard deviation values. An independent-samples *t* test was used for comparison between the groups. The measurement data and rank data that did not conform to a normal distribution are represented by Median (P25, P75), and the comparison of both groups was conducted by rank-sum testing of a pair of independent samples. The count data are represented by *n* (%). The chi-squared test was used for comparison between the 2 groups, and the test level was $\alpha = 0.05$.

Ethical statement

This study was performed in accordance with the ethical standards of Declaration of Helsinki and its later amendments, and reviewed and approved by the ethical review board of Xinhua Hospital affiliated with Shanghai Jiaotong University School of Medicine, China. All participants gave their informed consent before data collection. This survey was conducted anonymously to ensure full protection of individual and organization privacy.

Results

General information on the nursing workforce in the community health centers

The service population of the 12 community service centers in this investigation totaled 104,472.67 ± 41,421.18 people. Each center had 5 ± 2 stations, and the total number of health care providers in each center was 125 ± 36, which included 47.92 ± 22.41 physicians and 45.08 ± 15.28 registered nurses. The average medical and nursing ratio was 1:0.97, which is lower than the required standard medical care ratio of 1:1.5 for community hospitals set by the National Health Commission (*9*).

In this study, the 12 community health centers were divided into 2 groups according to the state of their nursing workforce, as follows: group A ($n = 5$, medical care ratio ≥ 1:1) and group B ($n = 7$, medical care ratio < 1:1). In this study, the average medical care ratio of group A was 1:1.06, while that of group B was 1:0.89.

Nursing workforce of the community health centers during the COVID-19 pandemic

During the study period, in addition to their original nursing work, the nurses of the surveyed centers were also responsible for nucleic acid sampling of outpatient patients, nucleic acid sampling and screening of residents, specimen sorting and transportation, and management and preparation of materials and goods. As such, the nursing workload during the study period greatly exceeded the original (pre-pandemic) workload. As a result, each center has received support from nurses from other hospitals and community volunteers to complete these additional tasks.

The average number of support nurses from other hospitals at the 12 community health centers was 150 ± 61, which was 3.3 times the average number of registered nurses in the centers. Also, the average number of volunteers (by community recruitment) at the 12 centers was 16. During the study period, all the volunteers were

primarily conducting non-medical work, such as QR code scanning and order maintenance. In addition, 3 community health service centers had hired retirees from the healthcare system (doctors/nurses) to participate in the support work; these retirees were mainly performing nucleic acid sampling. Only 4 of the 12 community health service centers (2 in group A and 2 in Group B) indicated that they had the capacity to send their nurses to other hospitals for support, while the remaining 8 centers indicated that they did not have the capacity to do so.

Nursing workload during the COVID-19 pandemic

During the COVID-19 pandemic, 29,251 ± 6,271 nucleic acid samples were collected by health service centers per day, and 937 ± 134 samples were collected by each community health nurse per day. The average time of nucleic acid sampling undertaken by each center was 9.45 ± 1.70 h, with the longest sampling time being 12.5 h and the shortest being 6.7 h. Community health nurses worked 8.08 ± 1.14 h/day, with the longest working time being 10.5 h/day and the shortest being 6.5 h/day. Comparisons of the nursing workforce and workload between groups A and B during the study period are shown in Table 1, and no statistical differences were apparent between the 2 groups ($p > 0.05$). Both groups presented a trend that the workload of nucleic acid sampling was heavy yet the nursing workforce was insufficient, and the capacity of the community health centers to send their nurses to support other hospitals needed to be improved.

Staff structure of nurses

The staff structure of nurses in these 12 centers and support nurses from other hospitals is shown in Table 2. The results show that up to 78% of the support nurses had the title of nurse or nurse practitioner (junior title), and 75.5% of the support nurses had < 10 working years. In other words, young nurses appear to have been the main force of pandemic support.

Coping status with the COVID-19 pandemic among community health services centers

The questionnaire assessing coping status with the COVID-19 pandemic covered emergency preparation (8 items), emergency response training (7 items), and emergency support (7 items), as previously stated. All 22 items were summarized into good indexes (possession rate ≥ 70%) and insufficient indexes (possession rate < 70%) according to responses from the 12 health service centers.

The results showed that the coping competence with the COVID-19 pandemic among the 12 community health centers needs to be improved. The specific results of the analysis are as follows. In the category of emergency preparation, the possession rate of both groups was 85.71%–100% in the aspects of establishing healthcare staffs' responsibilities during the pandemic, having access to emergency reporting, and completing routine work during the pandemic. Conversely, 3 centers (60%) in group A and 2 centers (28.57%) in group B had the capacity to cooperate with other hospitals and send staff to the post in the case of emergencies promptly, while the other centers could not complete these actions ($p > 0.05$). Additionally, only 1 center (20%) in group A and 1 center (14.28%) in group B assessed the coping competence with emergencies regularly, while the

Table 2. Nursing staff structure of 12 centers and support nurses from other hospitals

Nursing staff structure	Constituent ratio (%)	
	Nurses of the centers	Nurses from other hospitals
Professional title		
Nurse	41.6	36.7
Nurse Practitioner	32.9	41.3
Supervisor Nurse	23.3	21.9
Associate Professor/ Professor of Nursing	2.2	0.1
Working years		
≤ 5	13.5	33.8
6–10	22.9	41.7
11–20	29.3	19.5
21–30	22.4	4.9
> 30	11.9	0.1

Table 1. Comparison of nursing workforce and workload between the 2 groups during the COVID-19 pandemic

Index	Group A ($n = 5$) Median (P25, P75)	Group B ($n = 7$) Median (P25, P75)	z/χ^2 value	p
Number of nurses in the center	45 (45, 51)	42 (32, 55)	1.311	0.190
Number of support nurses	150 (25, 475)	150 (15, 200)	0.407	0.684
Sampling persons/day/center	26,700 (22,784.5, 35823.5)	31,984 (23,562, 35,360)	0.081	0.935
Sampling persons/day/nurse	879 (822, 927)	996 (853, 1134)	1.218	0.223
Working hours/day/center	9.5 (8.75, 11.25)	10 (7.5, 11)	0.410	0.682
Working hours/day/nurse	7.5 (6.75, 9.75)	8.5 (7.5, 9)	0.331	0.741
Has the capacity to send their nurses for support?			-	> 0.999
Yes	2	2		
No	3	5		

remaining centers did not ($p > 0.05$). In the category of emergency response training, both groups had 85.71%–100% possession rates ($p > 0.05$) for the following: having an emergency plan manual, having a personal protection manual, being able to look up the plan online, carrying out emergency training and drills regularly, and having a specialist in charge. In contrast, no centers in either group carried out emergency drills at different levels to meet the varying needs of the pandemic; moreover, the contents of the current emergency drills were fixed, without accommodating situational changes ($p > 0.05$). Finally, in the category of emergency support, both groups had 71.42%–100% possession rates ($p > 0.05$) for rational deployment of protective materials, emergency equipment, medicines and goods, effective transportation of positive patient, and the transformation of infectious wards. However, only 2 centers (40%) in group A and 3 centers (42.85%) in group B indicated that they had effective donation management, while the remaining centers did not report having an effective plan, and only 2 centers (40%) in group A and 1 center (14.28%) in group B were providing mental health support for staffs ($p > 0.05$). Detailed data are shown in Table 3.

Discussion

Nursing workforce in community health centers

This study found that there was an insufficient nursing workforce at the 12 surveyed community health centers, and the ratio of medical care was lower than the national standard of 1:1.5. In recent years, with the rapid development of national public health care, community health centers, as the bottom units of the "tri-level medical service system," are an important kind of institution from which community residents can obtain basic health care and public health services. The health care workforce is the first resource in the work of community health centers, among which the nursing workforce is an integral component (*10*).

Nursing shortages are highlighted as one of the biggest challenges to the effectiveness of health care systems. By the end of 2019, the number of registered nurses in China was 444,047, among which 202,408 were registered nurses working at community health centers; this number only accounts for 4.55% of the total number of registered nurses in China (*11*). According to Rui Wang's research, the ratio of community nursing staff in a district of Shanghai in 2020 was 1:1.09; although this ratio increased from that of 1:1.06 in 2016, it remained lower than the 1:1.5 required standard ratio set by the National Health Commission. Therefore, the current workforce of community nursing staff in China cannot meet the needs of residents desiring public health services (*12*).

During public emergencies, the nursing workforce of health care systems should be demand-oriented. During the COVID-19 pandemic, community health centers in Shanghai have faced great challenges. As

Table 3. Competence of coping with the COVID-19 pandemic of the study groups

Index	Group A (n = 5, %)	Group B (n = 7, %)	p
	Yes	No	
Emergency preparation			
Set up pandemic prevention posts	5 (100.00)	7 (100.00)	-
Set up position responsibilities	5 (100.00)	6 (85.71)	> 0.999
Set up hospital-hospital cooperative relationship	3 (60.00)	2 (28.57)	0.558
Has access to get emergency information	5 (100.00)	7 (100.00)	-
Has emergency reporting paths	5 (100.00)	6 (85.71)	> 0.999
Assesses coping competence regularly	1 (20.00)	1 (14.28)	> 0.999
Emergency staff can be transported to the post promptly	3 (60.00)	2 (28.57)	0.558
Completes routine work during pandemic	5 (100.00)	6 (85.71)	> 0.999
Emergency response training			
Has emergency plan manual	5 (100.00)	7 (100.00)	-
Has personal protection manual	5 (100.00)	7 (100.00)	-
The emergency plan can be looked up online	5 (100.00)	6 (85.71)	> 0.999
Holds emergency training regularly	5 (100.00)	7 (100.00)	-
Holds emergency drills regularly	5 (100.00)	7 (100.00)	-
Organizes emergency drills at different levels	0 (0.00)	0 (0.00)	-
Specialist in charge for relevant training	5 (100.00)	6 (85.71)	> 0.999
Emergency support			
Rational deployment of protective materials	5 (100.00)	7 (100.00)	-
Rational deployment of emergency equipment	4 (80.00)	5 (71.42%)	> 0.999
Rational deployment of emergency medicines and goods	5 (100.00)	7 (100.00)	-
Effective transportation of COVID-19–positive patients	4 (80.00)	6 (85.71)	> 0.999
Effective transformation to infectious ward	4 (80.00)	6 (85.71)	> 0.999
Effective donation management	2 (40.00)	3 (42.85)	> 0.999
Mental health support for healthcare staffs	2 (40.00)	1 (14.28)	0.523

pandemic work and routine work continue to coexist, community health nurses face superimposed workloads and significant work pressure, which places greater stress on nursing human resource management. This study found that, in the case of emergencies, 7 of the 12 surveyed community health service centers lacked hospital–hospital cooperation, 7 centers could not send staff to the post promptly, and there was a shortage of sending center nurses to other hospitals for support. Recruiting volunteers, retirees, and nurses from other hospitals has been an indispensable way to secure external support for primary healthcare institutions during the pandemic situation.

Under the current situation where sufficient community health nurses cannot be recruited in the short term, this study proposes to establish hospital–community cooperation in emergencies to promote hierarchical referral (*13*). It is suggested to use the human resources of general comprehensive hospitals to alleviate the shortage of community nurses and set up volunteer reserve teams. It is also necessary to organize regular emergency training for volunteers to strengthen their job cognition and personal protection knowledge.

Analysis of staff structure for support nurses

This study found that all 12 surveyed health service centers accepted nurses from other hospitals to participate in pandemic work, with 78% of the support nurses being nurses or nurse practitioners (junior title) and 75.5% of the support nurses having < 10 working years. The reasons for why most support nurses were junior nurses are as follows: the COVID-19 outbreak in Shanghai is more serious than prior COVID-19 outbreaks, and the need for support is huge. General hospitals with supporting capacity undertake many specialized tasks within the hospital, and nurses with specialized competence mainly include those with supervisor nurse titles and above, with working lives of > 10 years. Therefore, due to a high number of dispatched support tasks, hospitals usually adopt the mode of "bringing the new with the old" to ensure the routine operation of clinical specialties in the hospital. Throughout the COVID-19 pandemic, the common problem of community health centers and general hospitals has been exposed: faced with more severe public health emergencies, healthcare institutions have been unable to provide sufficient specialist nurses in a short time. This paper proposes that nursing managers attach great importance to the training of specialized nurses, establish an effective reserve team of specialists in emergencies (*14*), and strengthen the promotion of young nurses' specialized competence so as to improve their clinical competency as a whole.

Coping strategies with emergencies based on our survey of community health centers

This study found that the coping competence with emergencies at community health centers should be further improved. The results of this study showed that community health centers have deficiencies in organizing emergency drills at different levels and have ineffective management of donations, consistent with the results of previous research contending that organizational management, post division of workforce, staff response, emergency training, and materials management are the main weakness of primary healthcare institutions (*15,16)*. Furthermore, this study found that the centers had deficiencies in coping assessment and mental health support of staffs, which are discussed as follows.

Assessment of coping with emergencies

This study found that 10 community health centers did not organize assessments of coping with emergencies. Nursing staff, who take on the largest proportion of work related to the COVID-19 outbreak, are the primary employees facing risks. Therefore, coping with emergencies is an important factor affecting the quality and efficiency of the work done during public health events (*17*). In 2001, the U.S. Centers for Disease Control and Prevention and the Columbia University School of Nursing cooperated to construct a coping competence framework in emergencies, which includes assessing theoretical knowledge, skill level, and specialized competency (*18*). Lin Y, *et al.* proposed in the evaluation index of the rescue competence of community health centers in public health emergencies that solid theoretical knowledge and rescue skills form an important basis for the rescue of public health emergencies, and a quantifiable evaluation of the response capacity is necessary for community health centers to optimize training content so as to improve the competence of coping with emergencies (*18*).

This paper suggests that community health centers should regularly evaluate the nursing response with emergencies. One possible evaluation tool is the Emergency Preparedness Information Questionnaire, which was developed by the Wisconsin Nurses Association in collaboration with the Department of Public Health and the Nursing Alliance. The Cronbach's α coefficient of this scale was verified to be 0.97, indicating good reliability and validity (*19*). Regular competence assessment can help leaders to identify deficiencies in the emergency response of a hospital so as to further optimize the content and mode of emergency training in community health centers.

Organize emergency drills at different levels

This investigation found that all 12 community health centers had emergency plans and carried out emergency drills, but they had not developed drills at different levels. It is a normal component of training at hospitals to formulate emergency plans and carry out corresponding drills. However, the current emergency plan content

is too simple, being mostly for the simulation of infectious patient transportation. This paper suggests that community health centers should organize more diverse emergency drills, including those covering mass screenings during outbreaks, regular screenings in non-key areas, and coping strategies for different symptom levels.

Effective management of donated medicines and goods

This study found that 8 community health service centers did not have a complete donation management plan. Since the Ministry of Civil Affairs issued the Notice on Charitable Donations under the Normal Situation of Epidemic Prevention and Control on May 14, 2020, social organizations have made a large number of charitable donations to medical institutions in accordance with the law and in an orderly way (*20*).

During the COVID-19 pandemic, community health centers, as the primary locations of large-scale nucleic acid testing, received donations for epidemic prevention and sympathy supplies (food and daily necessities) from people from all walks of life. In the face of such a large number of donations, it was a great challenge for centers to accept, distribute, place, and reserve them by reasonable and compliant management. This paper suggests that medical institutions establish a multi-departmental cooperation mechanism by referring to the donation management scheme proposed by Guo X, *et al.*, which might cover the assessment and approval of donated materials before use, registration during use, and in-hospital supervision after use. Effective closed-loop donation management can ensure the rational and efficient use of donated materials, thus improving the competence of coping with emergencies (*21*).

Mental health support for healthcare staffs

This study found that 9 community health centers did not set up mental guidance groups for healthcare staffs. The competence of coping with stress is an important aspect of mental health for health staffs, especially nursing staffs (*22*). Public emergency events are characterized by sudden disease outbreaks and high workloads, which can easily lead to a series of mental problems among healthcare staffs, such as anxiety, insecurity, and occupational burnout. Tomaszewska K, *et al.* investigated 118 front-line clinical nurses and found that high workloads, hospital and social expectations, separation from family members and working with COVID-19 is related to experiencing symptoms of burnout during pandemic (*23*). Wanat M, *et al*. pointed out that workload, working time, and working environment have been primary stressors in the work of frontline staffs during the COVID-19 pandemic. Healthcare institutions should pay close attention to the occupational burnout of frontline staffs under epidemic situations and take precise measures to provide mental health support to healthcare staffs (*24*).

It is highlighted by experiences with the COVID-19 pandemic that mental coping strategies and extensive prevention measures should be introduced. Special attention should be given to staffs who are younger and have less working experience (*25*). This study suggests that all centers set up mental counseling groups and conduct regular mental evaluations. Multi-disciplinary teams can be set up in community health centers to assist healthcare staffs with mental stress reduction, including by encouraging them to talk about possible concerns and confusion before support, regularly tracking the mental dynamics and mental needs actively receiving support, and assessing the mental status after they receive support (*26*). Healthcare institutions should implement psychological crisis interventions and provide professional mental counseling and emotional support so as to improve the psychological coping competence of healthcare staffs during emergencies.

Conclusion

There exists a nursing shortage in community health service centers in a district of Shanghai. Hospital–hospital cooperation and prompt staff transportation to posts in emergencies need to be strengthened. These centers should regularly implement coping assessments, organize emergency drills at different levels, develop effective donation management protocols, and set up mental guidance groups so as to effectively improve the competency of coping with emergencies in community health centers to ensure that primary healthcare institutions play a more effective role in future public health emergencies.

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Parental loneliness, perceptions of parenting, and psychosocial factors among parents having new children during the COVID-19 pandemic

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Abstract: Individuals who had new children during the coronavirus disease 2019 (COVID-19) pandemic became parents in challenging situations, starting from pregnancy and continuing to after birth. This study aimed to clarify the characteristics of parental loneliness, perceptions of parenting, and psychosocial factors among parents having new children during the COVID-19 pandemic. The participants comprised a first-child group (523 parents; those who had their first child) and a second-child group (621 parents; those who had their second or subsequent child). We used web-based questionnaires to explore parental loneliness, perceptions of parenting, and psychosocial factors (distress, parental burnout, well-being, marital satisfaction, and social isolation). Participants answered the questionnaires in November 2022, during the eighth COVID-19 wave in Japan. We compared the groups and subgroups according to parental sex and determined the relationship between variables. The parents in the first-child group felt lonelier than the parents in the second-child group ($p < 0.05$), and their loneliness was correlated with psychosocial factors. Significantly, more mothers in the second-child group answered "agree" to negative perceptions of parenting than mothers in the first-child group. Additionally, parenting difficulties were correlated with a negative perception of parenting and parental burnout in both groups. Furthermore, providing parental support may improve parenting and promote parents' health.

***Keywords*:** COVID-19, loneliness, parents, parenting

Introduction

The coronavirus disease 2019 (COVID-19) has affected parents' daily lives in raising children for long periods. Currently, approximately 3 years have passed since the initial pandemic, and many countries are no longer enforcing measures, including lockdowns, to prevent COVID-19 infection because of increased vaccination rates or the accumulation of knowledge about COVID-19 (*1,2*). People are slowly returning to their pre-pandemic state. However, most Japanese, including parents, maintain practices that help prevent COVID-19 infection, such as wearing a mask, washing their hands, or avoiding closed spaces voluntarily, in accordance with the recommendations of the Japanese government (*3,4*). In other words, parents maintained unusual social situations longitudinally during the pandemic.

Many studies of parents having children during the COVID-19 pandemic have suggested several unique characteristics. For example, some studies reported that parents experienced positive changes, such as increased association and familiarity between parents and children, because they spent more time at home (*5-7*). On the other hand, other studies reported that parents showed dangerous characteristics such as increased mental distress regarding parenting or increased violence towards their children (*8-12*). It is possible that the results of these studies reflect the psychosocial context of parents during the COVID-19 pandemic.

Individuals who had new children during the COVID-19 pandemic became parents in challenging situations, starting from pregnancy and continuing to after birth. They experienced cancelled maternity classes, limited partner-accompanied births, or parenting with little interpersonal interaction to prevent COVID-19 infection in Japan (*13,14*). Previous studies also reported that they experienced high parenting stress or marital problems due to a lack of social support for parenting or opportunities to rejoice with others at the birth of a child (*15-18*). Additionally, we conducted a pilot study on parents who had new children during the COVID-19 pandemic. We clarified that parents who had their first child during the pandemic felt lonelier than parents who had their second or subsequent child and that parental loneliness was correlated with negatively perceived parenting (*19*). Parental social isolation and loneliness

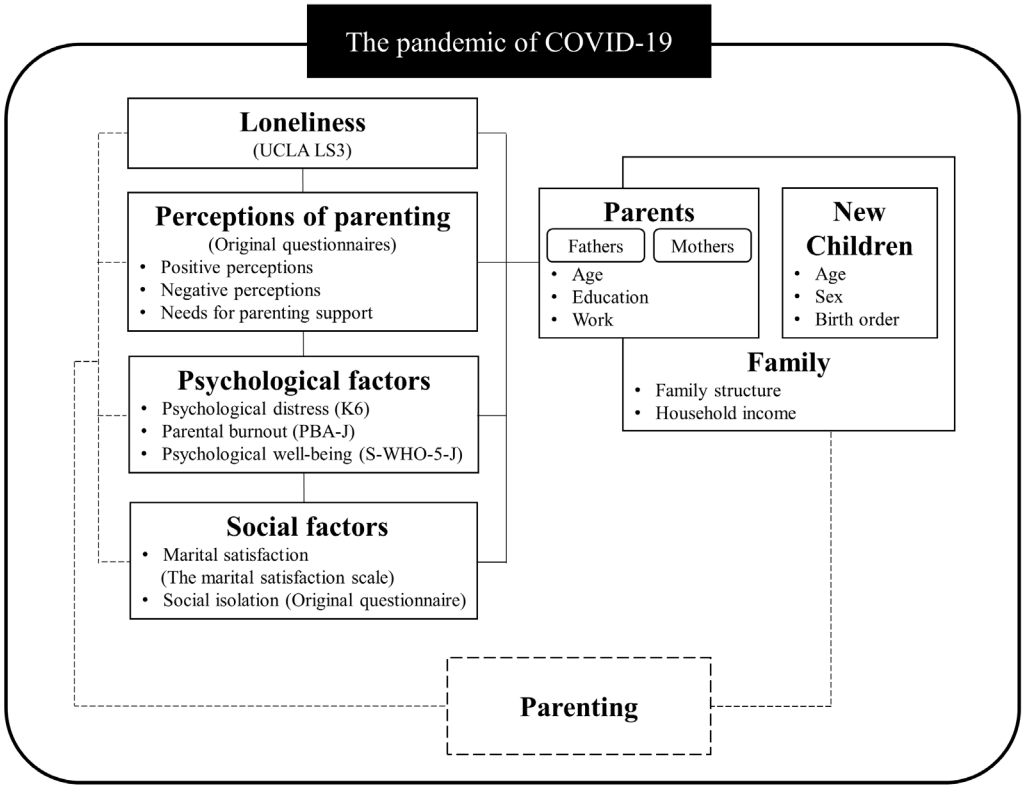

Figure 1. Conceptual framework. The scales measured each variable were shown in parentheses.

during the COVID-19 pandemic are likely to cause poor mental health or negative feelings toward their children (*20,21*). Moreover, these are risk factors that reduce parental coping skills and trigger inadequate behavior in children (*22-24*). We believe that it is important to understand the psychosocial context and parenting perceptions of parents who had new children during the pandemic to provide more appropriate support for them. In addition, it is desirable that parents receive support based on the needs of each father and mother because they do not necessarily have similar needs (*25-28*). However, studies on these factors and their characteristics are lacking. It has not been clarified yet which measures should be taken to support these parents in the process of recovering from the pandemic.

This study aimed to clarify the characteristics of parental loneliness, perceptions of parenting, and psychosocial factors among parents who had new children during the COVID-19 pandemic (Figure 1). We also focused on differences and similarities in these characteristics between fathers and mothers.

Materials and Methods

Design

This study employed a cross-sectional observation design.

Participants and recruitment

We conducted a web-based survey using an online panel; approximately thirteen million panelists (general Japanese people aged 15–99 years) were invited by a web research company (iBRIDGE Corporation) in Japan. First, we selected 1,425 participants from 7,000 online panel registers after checking the appearance ratio of participants who satisfied the following criteria: *i*) their age was over 18 years, *ii*) they had at least one new child during the pandemic, *iii*) their children did not have severe diseases or disabilities, and *iv*) they lived in Tokyo, which was the area in Japan with the most COVID-19 infection. Parents were excluded from the study if their children were born before March 2020, when the COVID-19 pandemic was confirmed in Japan, or if they answered malapropos such as selecting the same number in all questions. Participants responded to the questionnaire in November 2022, during the eighth wave of COVID-19 in Japan (*29*).

The participants were divided into two groups based on the birth order of children born during the pandemic. The first-child group were parents who had their first child during the pandemic, and the second-child group were those who had their second or subsequent child during the same period.

Measures

Socio-demographic data

Parents provided socio-demographic information, including parental age, years of education, employment status, family structure, annual household income,

children's age in months, and sex.

Parental loneliness

The Japanese version of the UCLA Loneliness Scale Version 3 (UCLA LS3) was used to evaluate parental loneliness. The reliability and validity of the UCLA LS3 have been previously verified (*30*). The UCLA LS3 comprises 20 items rated on a four-point Likert scale ranging from never (1) to always (4). The higher the scores, the lonelier respondents feel.

Perceptions of parenting

We assessed perceptions of parenting using questionnaires created for this study based on a longitudinal national survey in Japan (*31*). Parents responded to nine items regarding their positive and negative perceptions of parenting. Regarding positive perceptions, parents were asked the following questions: *i*) enjoy interacting with my child, *ii*) expansion of my circle of interaction among parents, *iii*) pleasure seeing my child grow, and *iv*) proactive involvement in parenting. Regarding negative perceptions, parents were asked the following questions: *i*) parenting fatigue, *ii*) increased expenses due to parenting, *iii*) cannot have much free time on my own, *iv*) little involvement in parenting with my partner, *v*) parenting difficulties. However, parents who had no partners did not answer question *iv*) of the negative perception. Participants responded on a four-point Likert-type scale ranging from strongly disagree (1) to strongly agree (4). We also explored the need for parenting support using the same scale.

Psychosocial factors

Parents were asked about psychological distress, burnout, well-being, marital satisfaction, and social isolation as psychosocial factors.

The Japanese Version of the K6 was used to evaluate parental psychological distress. The reliability and validity of K6 have been previously verified (*32*). The K6 comprises six items regarding the frequency of experiencing symptoms of psychological distress in the last month on a five-point Likert scale ranging from none of the time (0) to all of the time (4). Higher scores indicate greater psychological distress.

The Japanese version of the Parental Burnout Assessment (PBA-J) was used to measure parental burnout. The reliability of the PBA-J has been previously verified (*33*). The PBA-J comprises 23 items rated on a seven-point Likert scale ranging from never (0) to every day (6). Higher scores indicate higher levels of parental burnout.

A simplified Japanese version of the WHO-5 Well-Being Index (S-WHO-5-J) was used to evaluate parental psychological well-being. The reliability and validity of the S-WHO-5-J have been previously verified (*34*). The S-WHO-5-J comprised five items regarding parental well-being in the last 2 weeks on a four-point Likert scale ranging from at no time (0) to all of the time (3). Higher scores indicate better psychological well-being.

A marital satisfaction scale was developed based on the Quality of Marriage Index (*35*). The reliability and validity of this scale have been verified (*36*). The marital satisfaction scale comprises six items rated on a four-point Likert scale ranging from strongly disagree (1) to strongly agree (4). Higher scores indicate better marital satisfaction. Parents with no partners did not respond to this scale.

Parental social isolation was assessed using a questionnaire based on our pilot study. Parents subjectively responded to the number of people who became acquainted with them because they had children on a scale of 1 to 10 ranging from none (0) to many acquaintances (10).

Statistical analysis

To calculate the appropriate sample size for comparison between the two groups, we assumed an effect size using the result of a previous study that reported parental loneliness, which assessed parents with infants using the UCLA LS3 (*37*). Assuming a two-tailed test, an effect size of 0.175, a significance level of 0.05, and a statistical power of 0.8, we needed to enroll 513 parents in each group. To allow for responses that included missing values, the sample size was set to 520 in each group.

We performed the following analyses to determine statistical differences between the first-child and second-child groups: *i*) socio-demographic data were examined using the Mann–Whitney *U* test and the chi-square test, *ii*) differences in medians of parental loneliness, perceptions of parenting, and psychological factors were assessed using the Mann–Whitney *U* test. We used *r*, which was calculated by dividing the z-score (derived from each test statistic) by the square root of the sample size for the Mann–Whitney *U* test. Additionally, we explored the differences and similarities in parental characteristics during the COVID-19 pandemic using a subgroup analysis based on sex.

The Spearman rank correlation coefficient was used to determine the relationship between parental loneliness, perceptions of parenting, and psychosocial factors in the first- and second-child groups. Furthermore, we used "proactively involved in parenting", "parenting fatigue", and "parenting difficulties" as variables for perceptions of parenting based on our pilot study.

Two-tailed p values < 0.05 were considered significant. All analyses were performed using IBM SPSS Statistics ver. 28 and R version 4.1.3.

Ethical considerations

An explanation concerning this study, including voluntary participation, no disadvantage because of non-

participation, anonymous survey, and data management security, was given to participants before the survey. All participants provided informed consent before response to the questionnaire. The study was reviewed and approved by the Institutional Review Board of the National Center for Global Health and Medicine (approval no: NCGM-S-004562-00).

Results

We requested 1,425 participants to answer a web-based questionnaire and obtained answers from 1,212 participants (participation rate: 85.1%). In total, 1,144 participants responded (valid response rate: 80.3%). The first-child group included 523 parents (243 fathers and 280 mothers), and the second-child group included 621 parents (282 fathers and 339 mothers).

Socio-demographic data

Table 1 shows the participants' socio-demographic characteristics. There were significant differences in parental age ($p < 0.01$), family structure ($p < 0.05$), and children's ages ($p < 0.05$) between the first- and second-child groups. However, the effect size of the children's age was small. Most participants in both groups were in the middle or higher class.

Parental loneliness

Table 2 reports on parental loneliness. There was a significant difference in parental loneliness between the two groups ($p < 0.01$). Subgroup analysis also showed that the first-child group had a significantly higher loneliness score than the second-child group for both fathers ($p < 0.05$) and mothers ($p < 0.01$). All comparisons between the groups indicated effect sizes > 1.0.

Perceptions of parenting

Figure 2 shows parents' positive perceptions of parenting. There were significant differences and effect sizes > 1.0 in these two items between the two groups. According to the results of the subgroup analysis, those who answered "agree" to "expanded my circle of interaction among parents through my child" was significantly lower for both parents in the first-child group than for both parents in the second-child group ($p < 0.01$).

Figure 3 shows parents' negative perceptions of parenting. There were significant differences and effect sizes > 1.0 in the three items between the two groups. According to the results of the subgroup analysis, those who answered "agree" to "increased expenses due to parenting" ($p < 0.05$), "cannot have much free time on my own" ($p < 0.05$), and "little involvement in parenting with my partner" ($p < 0.01$) were significantly lower among mothers in the second-child group than mothers in the first-child group.

Psychosocial factors

Table 2 shows the parental psychosocial factors. There were significant differences in parental burnout ($p < 0.01$) and social isolation ($p < 0.01$) between the two groups. According to the results of the subgroup analysis, fathers' burnout scores were higher in the first-child group than in the second-child group; however, mothers' burnout scores were significantly higher in the second-child group than in the first-child group.

Table 1. Participants' socio-demographic data

Characteristics	First-child Group		Second-child Group		$p^{\dagger}$	$r^{\ddagger}$
	n (%)	Median (IQR)	*n* (%)	Median (IQR)		
Parent						
Age (years)		35 (31–40)		37 (33–41)	< 0.001	0.13
Education (years)		16 (14–16)		16 (14–16)	0.05	0.06
Employment Status						
Employment	437 (83.6)		523 (84.2)		0.76	
Non-employment	86 (16.4)		98 (15.8)			
Family structure						
Single parent and children	44 (8.4)		27 (4.3)		0.02	
Two parents and children	471 (90.1)		581 (93.6)			
Three generation family	8 (1.5)		13 (2.1)			
Annual household income (ten thousand yen)						
< 300	30 (5.7)		45 (7.2)		0.23	
300–1,000	332 (63.5)		410 (66.0)			
> 1,000	161 (30.8)		166 (26.7)			
Children						
Age (months)		18 (11–27)	17 (7–26)		0.01	0.08
Sex						
Boy	269 (51.4)		318 (51.2)		0.94	
Girl	254 (48.6)		303 (48.8)			

† Mann–Whitney *U* test and chi–square test. ‡ Effect size: *r* was calculated by dividing the z-score (derived from each test statistic) by the square root of the sample size.

Table 2. Comparison of parental loneliness and psychosocial factors between the first-child and second-child groups

Characteristics	All				Fathers				Mothers			
	First-child Group Median (IQR)	Second-child Group Median (IQR)	$p^{\dagger}$	$r^{\ddagger}$	First-child Group Median (IQR)	Second-child Group Median (IQR)	$p^{\dagger}$	$r^{\ddagger}$	First-child Group Median (IQR)	Second-child Group Median (IQR)	$p^{\dagger}$	$r^{\ddagger}$
Loneliness	48 (42–53)	47 (38–51)	< 0.001	0.14	48 (42–53)	48 (40.8–51)	0.02	0.10	48 (41–53.8)	45 (36–50)	< 0.001	0.17
Psychological factors												
Psychological distress	3 (0–6)	3 (0–8)	0.41	0.02	3 (0–7)	3 (0–9)	0.27	0.05	3 (0–6)	3 (0–7)	0.94	0.00
Parental burnout	10 (1–30)	14 (3–37.5)	< 0.001	0.10	6 (0–25)	11 (0–34)	0.08	0.08	12.5 (3–31)	17 (6–41)	< 0.001	0.12
Psychological well-being	9 (7–10)	9 (6–10)	0.51	0.02	9 (6–10)	9 (6–10)	0.98	0.00	9 (7–10)	9 (6–10)	0.37	0.04
Marital satisfaction	18 (16–22)	18 (15–21)	0.04	0.06	18 (15.3–21.8)	18 (15–20)	0.26	0.05	18 (16–22)	18 (15–22)	0.07	0.07
Social isolation	3 (1–6)	5 (2–7)	< 0.001	0.20	3 (1–5)	4 (2–6)	< 0.001	0.14	3 (1–6)	5 (3–8)	< 0.001	0.25

†Mann–Whitney *U* test and chi–square test. ‡Effect size: *r* was calculated by dividing the z-score (derived from each test statistic) by the square root of the sample size.

Correlations between parental loneliness, perceptions of parenting, and psychosocial factors

Table 3 and Table 4 present the correlation coefficients between parental loneliness, perceptions of parenting, and psychosocial factors in the first- and second-child groups. Significant correlations were observed between multiple variables in both groups. In the first-child group, parental loneliness had a slightly stronger correlation with psychological distress (ρ = 0.31, p < 0.01), parental burnout (ρ = 0.33, p < 0.01), and social isolation (ρ = -0.33, p < 0.01). In the second-child group, parental loneliness had strong correlations with psychological distress (ρ = 0.48, p < 0.01), parental burnout (ρ = 0.43, p < 0.01), psychological well-being (ρ = -0.46, p < 0.01), and marital satisfaction (ρ = -0.44, p < 0.01). Psychological distress had the strongest positive correlation with parental burnout for both parents in the first-child (ρ = 0.64, p < 0.01) and second-child (ρ = 0.67, p < 0.01) groups.

Discussion

This study aimed to determine the characteristics of parental loneliness, perceptions of parenting, and psychosocial factors among parents having new children during the COVID-19 pandemic. There were clear differences between parents in the first- and second-child groups. Parents in the first-child group felt lonelier than those in the second-child group, and their loneliness correlated with psychosocial factors such as social isolation. Parents in the second-child group had more negative parenting perceptions, such as greater expenses because of parenting, and felt higher parental burnout than parents in the first-child group. Additionally, parenting difficulties were correlated with a negative perception of parenting and parental burnout in both groups.

In terms of loneliness, there was a significant difference between the two groups; both fathers and mothers in the first-child group felt lonelier than parents in the second-child group. This finding is similar to that of previous studies (*19,38*). Moreover, the scores of all groups in this study were nearly 10 points higher than those of a previous study that assessed the loneliness of parents raising infants before the pandemic (*39*). Although there was an overall increase in loneliness among parents of new children during the pandemic, parents who had their first child felt lonelier. Parental interaction or social isolation related to loneliness was also higher in the first-child group than in the second-child group. Basically, parents who had their first child were more likely to feel isolated. They experienced limited opportunities to interact with separated families or limited contact with family support workers, for example, public health nurses, because of the COVID-19 pandemic (*40,41*). In other words, changes in social interactions due to the pandemic spurred loneliness in

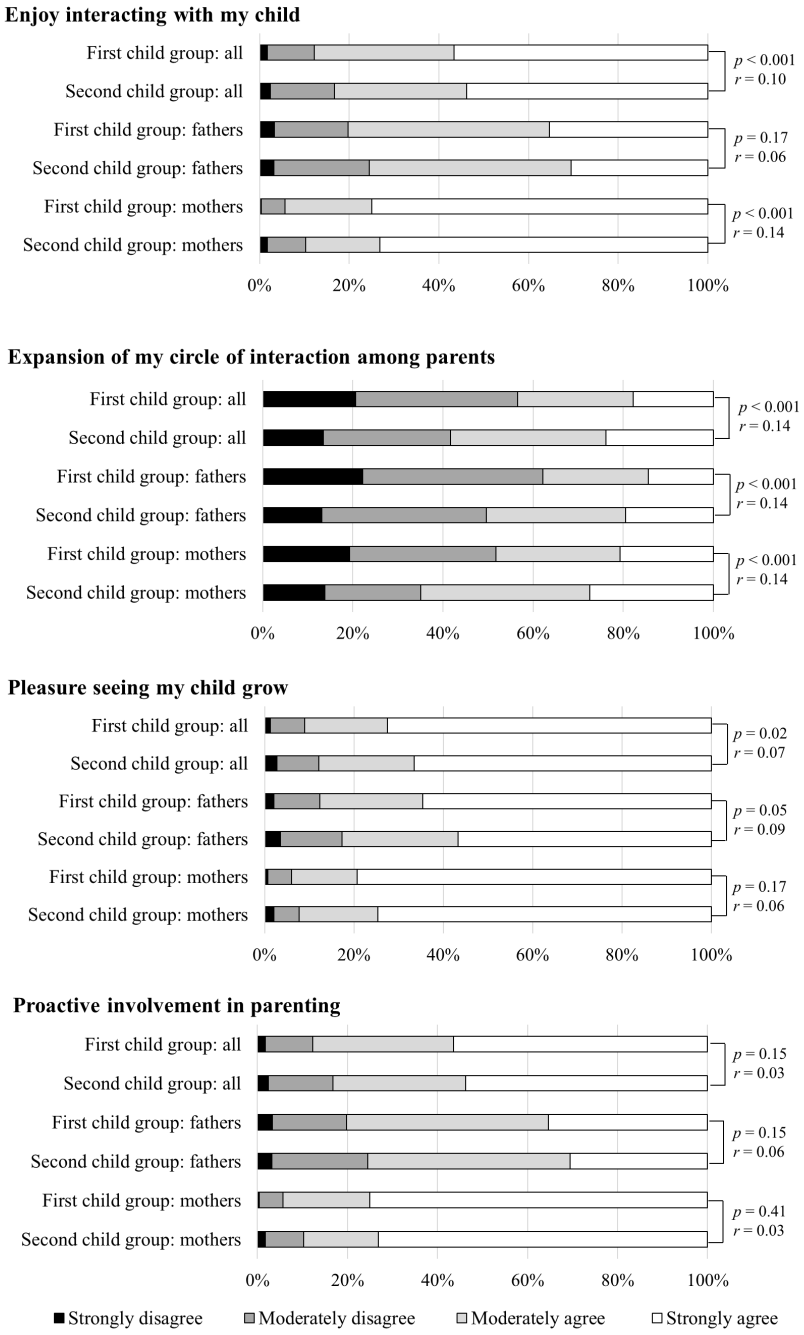

Figure 2. Positive perceptions of parenting. Mann–Whitney *U* test. Effect size: *r* was calculated by dividing the z-score (derived from each test statistic) by the square root of the sample size.

parents, and loneliness might be particularly evident in parents in the first-child group because they had limited social connections after becoming parents. Additionally, previous studies have reported that isolated parents have difficulty receiving support to help with parenting, which exacerbates their parenting difficulties or mental health problems (*42,43*). This study also showed that parental loneliness correlated with parenting difficulties and psychosocial problems, including high levels of psychological distress. This result emphasized that resolving parental loneliness is useful for maintaining parental psychosocial factors and improving parenting health. However, it is possible that parents will feel anxious about being infected with COVID-19 and will need time to start interacting with others because they want to avoid COVID-19. Thus, we recommend that family support workers provide support to promote parental interactions using appropriate strategies, such as providing a place where parents can have relationships without worrying about COVID-19.

There were significant differences in the parenting perceptions between the two groups. In particular, we observed clear differences between fathers and mothers in the second-child group. Mothers in this group had less interaction with their children, had little free time for themselves, and were less involved in parenting

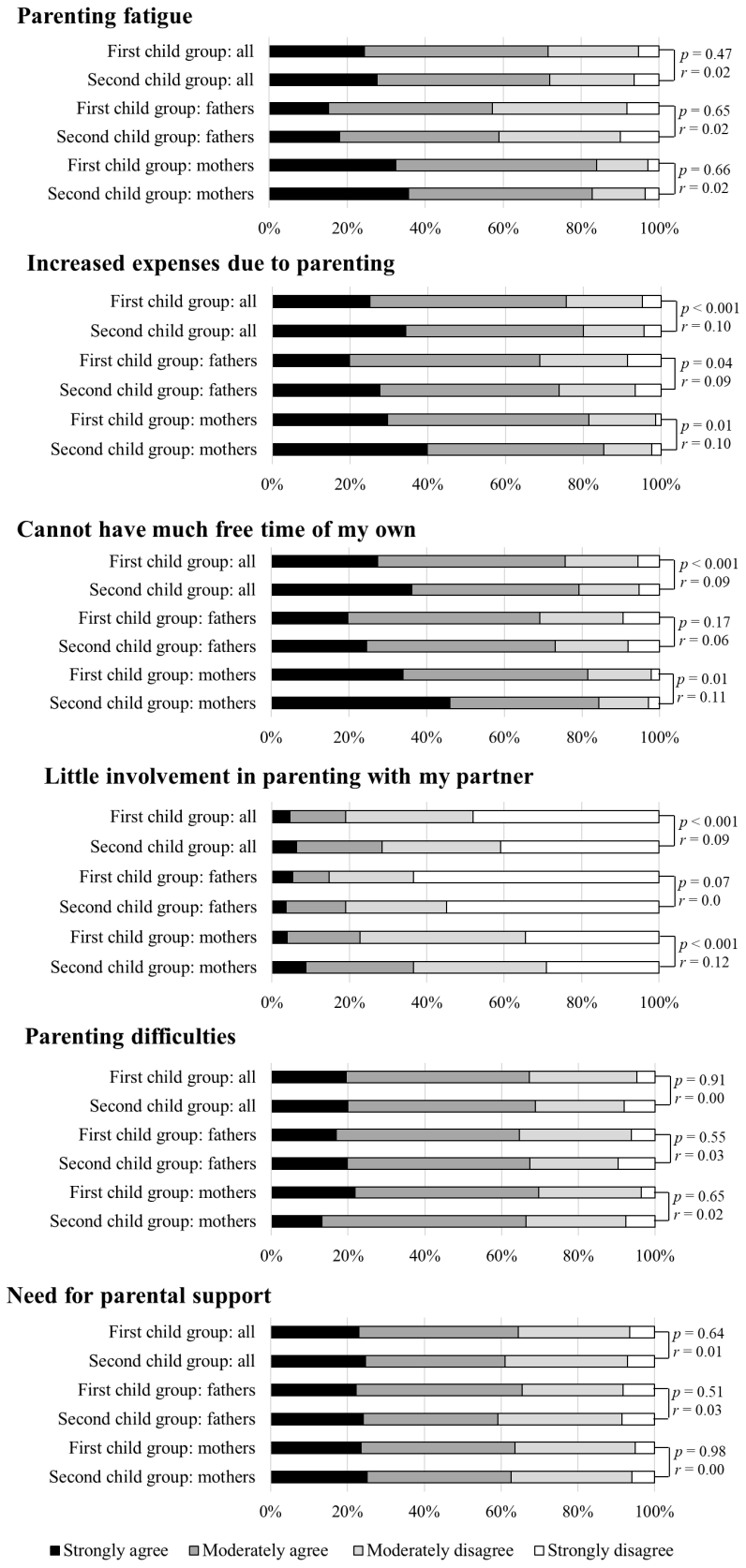

Figure 3. Negative perceptions of parenting. Mann–Whitney *U* test. Effect size: *r* was calculated by dividing the z-score (derived from each test statistic) by the square root of the sample size.

with their partners than mothers in the first-child group. These characteristics were not observed in fathers in the second-child group. Previous studies reported that the more children parents had, the more parenting time was required (*44*), and fathers became less involved in parenting as birth order decreased (*45*). In other words,

Table 3. Correlations between parental loneliness, perceptions of parenting, and psychosocial factors in the first-child group

Characteristics	Loneliness	Proactive involvement in parenting	Parenting fatigue	Parenting difficulties	Psychological distress	Parental burnout	Psychological well-being	Marital satisfaction
Loneliness	—							
Proactive involvement in parenting	- 0.17	—						
Parenting fatigue	0.12	0.32	—					
Parenting difficulties	0.24	0.04	0.31	—				
Psychological distress	0.31	- 0.18	0.23	0.19	—			
Parental burnout	0.33	- 0.19	0.37	0.30	0.64	—		
Psychological well-being	- 0.27	0.28	- 0.20	- 0.24	- 0.42	- 0.44	—	
Marital satisfaction	- 0.24	0.29	- 0.01	- 0.04	- 0.24	- 0.30	0.32	—
Social isolation	- 0.33	0.08	- 0.04	- 0.16	0.03	0.00	0.20	- 0.04

Spearman's rank correlation coefficient.

Table 4. Correlations between parental loneliness, perceptions of parenting, and psychosocial factors in the second-child group

Characteristics	Loneliness	Proactive involvement in parenting	Parenting fatigue	Parenting difficulties	Psychological distress	Parental burnout	Psychological well-being	Marital satisfaction
Loneliness	—							
Proactive involvement in parenting	- 0.32	—						
Parenting fatigue	0.09	0.38	—					
Parenting difficulties	0.18	0.06	0.35	—				
Psychological distress	0.48	- 0.26	0.15	0.20	—			
Parental burnout	0.43	- 0.17	0.31	0.32	0.67	—		
Psychological well-being	- 0.46	0.28	- 0.09	- 0.15	- 0.46	- 0.43	—	
Marital satisfaction	- 0.44	0.31	0.03	- 0.05	- 0.32	- 0.32	0.42	—
Social isolation	- 0.32	0.17	- 0.02	- 0.06	- 0.11	- 0.05	- 0.05	0.09

Spearman's rank correlation coefficient.

mothers with more children had a greater parenting burden. It is possible that many mothers in the second-child group answered "agree" with little free time for them and little involvement of their partners in parenting because they experienced similar situations. Lack of free time or parenting cooperation from their partners led to an increase in maternal exhaustion or stress, especially during the COVID-19 pandemic, which was a stressful situation. In fact, mothers in the second-child group had significantly higher parental burnout, resulting in chronic and overwhelming parental stress (*46*), than parents in the first-child group. Moreover, some of them did not enjoy interacting with their children. There was concern about relationships with their children because parental burnout was more likely to result in child abuse and neglect (*47*). Therefore, it is important to help mothers who give birth to their second or subsequent child to reduce their parenting burden through support such as providing better childcare services or promotion of co-parenting.

There were no significant differences in parenting difficulties between the two groups. According to correlation coefficients between parenting difficulties and other variables, parenting difficulties had slightly stronger correlations with parenting fatigue and parental burnout. These results indicate that the physical and mental strain of parenting causes parents to experience parenting difficulties. They may also reflect parental situations that increase the parental burden, poor support for parents, or greater difficulty in accessing parental support during the pandemic. Previous studies have reported that parents who had new children during the pandemic have unique parenting support needs because they gave birth and are parenting with many restrictions, and faced challenging situations as parents (*48,49*). It is important to further expand parenting support to reduce the parental burden and meet the needs of these parents.

This study had several limitations. We did not control for differences in situations due to the COVID-19 pandemic, including the state of emergency; therefore, there may be some variations in the parenting status of the participants. This study was conducted using an online panel to prevent the spread of COVID-19. Thus, there was a risk of limited participation of parents who had difficulty accessing the Internet. The possibility of selection bias cannot be excluded because the majority of parents said that they were proactively involved in parenting. They may have participated in the study because they were interested in parenting on a daily basis. Furthermore, it is difficult to understand concrete parenting difficulties and support needs using quantitative data alone. Next, we plan to analyze parenting difficulties and parental support needs using the free texts collected in this study. Future studies should apply longitudinal methods to explore changes in parental loneliness, perceptions of parenting, and psychosocial factors or provide specific measures of parental support in the process of recovering from the pandemic.

In conclusion, parents who had their first child during the COVID-19 pandemic felt lonelier or more isolated, and mothers who had a second or subsequent child had more negative perceptions of parenting and parental burnout. The results suggest that parents in both groups required more support than they were provided. Furthermore, providing parental support may improve parenting, promote parental health, and promote good parent-child relationships.

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Experiences of nurses in charge of COVID-19 critical care patients during the initial stages of the pandemic in Japan

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Abstract: The fatality rate of the coronavirus disease (COVID-19) at the beginning of the pandemic was as high as 8.5%, and it was considered to be an intractable infectious disease. Reports regarding early experiences are essential for improving nurses' quality of care, patient safety, and working conditions during future pandemics. Therefore, this study aimed to describe the experiences of nurses who were in charge of critically ill COVID-19 patients during the early stages of the pandemic in Japan. This was a qualitative study. Participants were nurses who were in charge of critically ill COVID-19 patients in an emerging contagious disease ward between February and April 2020. Interviews were conducted in groups of 2–3 persons based on an interview guide using an online conferencing application to prevent infection. Consent to participation was obtained from 19 nurses. Five categories of experiences were generated from the analysis: "Fear of risk to my own life and to those of others around me", "The shock of finding myself amid an infectious disease pandemic", "Anxiety about unknown challenges", "Driven by a sense of purpose", and "Growth as nurses". Working under harsh conditions where nurses' safety is threatened may affect the quality of care and nurses' mental health. Therefore, nurses should receive both short-term and long-term support.

***Keywords*:** COVID-19, critical care, nurse, qualitative study, experience

Introduction

The coronavirus disease (COVID-19) is a contagious respiratory disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The virus was first identified in Wuhan, China, in December 2019 and quickly spread worldwide; the World Health Organization (WHO) declared it a pandemic on March 11, 2020 (*1*). All continents reported cases of COVID-19, and as of January 15, 2023, the cumulative number of confirmed cases exceeded 662 million and deaths exceeded 6.7 million (*2*). During this period, the number of new infections has increased and then decreased, partly due to the emergence of mutant strains of COVID-19. In addition to managing increased patient loads, health workers have been at the frontlines of exposure to SARS-CoV-2. The WHO estimates that 116,000 health workers died from COVID-19 between January 2020 and May 2021 (*3*).

The fatality rate of COVID-19 at the beginning of the pandemic was as high as 8.5% (*4*), and it was considered to be an incurable infectious disease. In addition, approximately 5% of COVID-19 patients became critically ill, requiring intensive care (*5*). The most common reasons for intensive care admission were acute respiratory distress syndrome and the need for a ventilator (*6*). In the most severe cases, the use of extracorporeal membrane oxygenation (ECMO) was also necessary.

The COVID-19 pandemic posed unprecedented challenges to healthcare systems worldwide (*7*), with Japan bring similarly disrupted. The number of ICU beds in Japan was four per 100,000 people, less than the 7 beds per 100,000 people in Europe and 24 beds per 100,000 people in the United States (*8*). As a result, non-intensive care nurses often had to manage critically ill patients (*9*). Intensive care is considered complex and uncertain even under normal circumstances; however, this complexity and uncertainty further increased during the pandemic. In addition, the physical and psychological burden on nurses caring for patients with COVID-19 has been reported to be high because the interventions required to care for these patients are primarily performed by nurses (*10-19*). Unfortunately, only a few nurses have reported their experiences with severely ill COVID-19 patients in the early days of the COVID-19 pandemic. Reports regarding early experiences are essential to improving nurses' quality

of care, patient safety, and working conditions during future pandemics.

This study aimed to describe the experiences of nurses in charge of critically ill COVID-19 patients during the early stages of the pandemic in Japan.

Materials and Methods

Study design

This study examined nursing practices for patients with emerging infectious diseases. Research in this field is still limited, and potential problems needed to be identified. Therefore, the use of qualitative research methodologies was considered essential to addressing this issue.

Participant selection

The participants were nurses in charge of COVID-19 patients on ECMO in a new infectious disease ward of a designated medical facility for specified infectious diseases in central Tokyo, Japan, from February to April 2020. In Japan, the Ministry of Health, Labour, and Welfare designates certain medical facilities to legally accept patients with signs of new infectious diseases, category one infectious diseases such as Ebola hemorrhagic fever, category two infectious diseases such as Middle East respiratory syndrome (MERS), or infectious diseases such as new strains of influenza. There are only four such hospitals in Japan. A new infectious disease ward is only opened when an outbreak results in an applicable patient's hospitalization. The hospital has received patients with H1N1 influenza, as well as SARS, Ebola, and MERS pseudo-infections. During normal times, new infectious disease nurses are assigned to the wards; once a month, they share information, review manuals, and conduct training to don and doff personal protective equipment (PPE) . In addition, drills are held jointly with the administration and other facilities three times a year to prepare for the acceptance of patients (*20*). From February to March 2000, only 48 COVID-19 patients had ECMO in Japan (*21*). In other words, the study facility received severely ill patients equipped with ECMO in the early stages of the pandemic.

Twenty-three nurses were initially registered in the new infectious disease ward. Six additional nurses from the ICU and other facilities were assigned to work there in response to the COVID-19 pandemic. Of the 29 nurses, one was transferred to another hospital, one retired, and four were this study's researchers. Therefore, 23 eligible participants were contacted to participate in this study by email.

Settings

Data were collected between April and June 2020 in online meetings using Microsoft Teams rather than in person to prevent infection and were in the form of focus group interviews. We chose focus group interviews because of the synergistic nature of the group, the ability to collect more extensive and coherent data than in individual interviews, the fact that group discussions of the topic can be more stimulating, and because a group setting can be more comfortable and promote honest responses (*22*). Each session included 2–3 participants and an interviewer. An interview guide was presented to the participants in advance and included questions such as: "How did you feel when you were in charge of COVID-19 patients?", "How did you feel when caring for patients on ECMO?", and "What were your biggest concerns?". Depending on how the interviews proceeded and the participants' responses, we changed the questions and the order in which they were asked to allow the participants to speak in their own words as much as possible. The interviews were recorded, with the participants' consent.

In addition, to obtain background information on the participants, information regarding age, sex, highest level of education, nursing experience, previous critical care experience were collected on paper before the interviews began.

Researcher characteristics and reflexivity

The interviewers were the authors: UA, BH, and IS. They were nurses working in the same hospital, including those who had worked together in the new infectious disease ward. Therefore, they had established personal relationships with the participants and were in a position to understand the situations they had experienced. The interviewers, one with a Ph.D. and two with MSNs, were all female: one (UA) was a certified nurse specialist in critical care nursing, one (IS) was a certified nurse specialist in infection control nursing, and two (UA and BH) were trained in qualitative research and had previously authored papers. A psychological counselor (MS) joined the analysis to add a multidimensional perspective.

Data analysis

Written transcripts of the recordings were prepared, and qualitative content analysis was performed based on work by Graneheim & Lundman (*23*).

The study was conducted in four steps using MAXQDA Analytic Pro2020 (Release 20.4.2): *i*) The transcripts were read repeatedly in their entirety to grasp the full picture, and the portions representing the research question were extracted as units of record; *ii*) For each unit of record, the meaning was read and expressed in a brief sentence to generate a code; *iii*) Codes were compared, and similar codes were combined to form a subcategory; *iv*) Subcategories were compared,

and similar subcategories were integrated and extracted as categories. The first author, UA, conducted the initial analysis of Steps 1 and 2. MS participated beginning with Step 3.

The Results section presents categories and subcategories, followed by representative narratives.

Rigor and trustworthiness

The results were evaluated using the following four criteria: Credibility, Transferability, Dependability, and Confirmability. Two researchers made decisions regarding coding, analysis, and interpretation. In addition, the transcripts were reviewed by the participants to ensure that their opinions were accurately expressed. Transferability was confirmed by carefully describing context, as knowledge of the nurses' actions and experiences, and their backgrounds, making the given information more meaningful to the reader. Finally, to ensure Dependability and Confirmability, the logic of the research process was documented so that the two co-researchers could track the data and their sources and understand their interpretations (*24*).

Ethical considerations

This study was approved by the Ethics Review Committee of the National Center for Global Health and Medicine (No. 3561). Participants were informed orally and in writing that they were free to participate in the study and to refuse or withdraw from participation, that anonymity would be maintained, and that the data would not be used for any purpose other than research. Consent was obtained in writing. Participants were recruited *via* email to avoid coercion. Interviews were conducted online with ethical considerations regarding infection prevention.

Results

Characteristics of study participants

Of the 23 nurses contacted *via* email, 19 agreed to participate in this study. The demographic data of the participants are shown in Table 1. Seventeen participants were female (89.4%) and two were male (10.6%); two were in their 20s (10.6%), nine were in their 30s (47.3%), seven were in their 40s (36.8%), and one was in her 50s (5.2%); the average years of nursing experience and standard deviation was 15.5 ± 5.4 years; 16 (84.2%) were assistant nurse managers; and nine had critical care experience. A total of eight group interviews were conducted, averaging a length of 81 minutes (60–102 minutes).

Five categories and 12 subcategories were generated regarding the experiences of nurses in charge of critically ill COVID-19 patients during the early stages of the COVID-19 pandemic in Japan. The five categories were: "Fear of risk to my own life and to those of others around me", "The shock of finding myself amid an infectious disease pandemic", "Anxiety about unknown challenges", "Driven by a sense of purpose", and "Growth as a nurse" (Table 2).

Category 1: Fear of risk to my own life and to those around me

This category was generated from the subcategories "Fear of a possible infection" and "Fear of becoming a source of infection myself". All of the participants talked about their fear of becoming infected at any moment.

Fear of a possible infection

During the early stages of the COVID-19 pandemic, participants provided care without evidence. In addition, we were working amid daily news reports of many deaths worldwide. All participants spoke of their fear of infection. The following is a representative narrative.

"I still fear that there is no established treatment for COVID-19, that the probability of infection has yet to be determined, and that if I were to transfer, I would actually end up in such a situation like the person in front of me....." – (N)

"At first, there was much discussion about whether COVID-19 was airborne or not. There were some aspects in which this was true. In addition, I had yet to learn how long the virus would take to lose its infectivity once it had taken hold. I had no idea how long the virus would take to lose its infectivity, so that was a little scary. Unknown infections are different from the usual." – (K)

Fear of becoming a source of infection myself

Table 1. Participants' demographic data

Characteristics	*n* (%)	Mean (SD)
Gender[*a]		
Female	17 (89.4)	
Male	2 (10.6)	
Age		
20–29	2 (10.6)	
30–39	9 (47.3)	
40–49	7 (36.8)	
50–59	1 (5.2)	
Nursing experience (years)		15.5 (5.4)
Critical care experience (years)[*b]		4.0 (21.1)
Job title		
Registered nurse	3 (15.8)	
Assistant head nurse	16 (84.2)	
Highest Level of Education		
Master's	1 (5.2)	
Bachelor	10 (52.6)	
Junior college	1 (5.2)	
Vocational school	7 (36.8)	

[*a]Gender: Female: A, B, C, D, E, F, G, I, J, K, L, M, N, O, P, Q, S; Male: H, R. [*b]Have experience in critical care: Yes: B, C, G, H, I, J, P, Q, R; No: D, E, F, K, M, N, O, S.

Table 2. Categories, subcategories, and codes generated based on analysis of the data

Category	Subcategory	Code
Fear of risk to my own life and to those around me	Fear of a possible infection	Fear of becoming severely ill like the patient I am caring for
		Fear of getting infected
		Doubts regarding infection prevention measures
		Fear of the unknown virus
		Fear of facing a PPE shortage
		People around me worrying about me
		Fear of becoming a source of infection yourself
		Anxiety about infecting my children
		Restricting my children's activities to prevent the spread of infection
	Fear of becoming a source of infection myself	Fear of becoming a source of infection myself
		Anxiety about infecting my children
		Restricting my children's activities to prevent the spread of infection
The shock of finding myself amid an infectious disease pandemic	The shock of isolation at the end of life	The shock associated with a lonely death
		Frustration with visitation restrictions
	Extreme exhaustion and harsh working conditions	Doing strenuous work while wearing protective clothing
		Extreme exhaustion
		Significant damage to mental health
	Fear of discrimination	Fear of falling out of favor with those around me due to caring for COVID-19 patients
		Fear of being discriminated against
Anxiety about unknown challenges	Anxiety about caring for critical patients	Unfamiliar life-support equipment
		Fear of being unable to respond in an eventuality
		Fear of not being able to save a patient
		Insecurity of whether or not I can perform my duties
		Fear arising from a lack of experience in nursing severely ill patients
		Tension of being in an isolated space
	Impromptu team building	Difficulty in impromptu team building
		Frustration with not being able to work proactively in a team
Driven by a sense of purpose	Driven by a sense of purpose	In "battle mode"
		The day I am finally called upon
	Striving to fulfill my nursing duties	Considering every patient's individual personality as much as possible, even under difficult conditions
		Incorporating everyday elements into the treatment space
	Motivating myself	Considering the pandemic as an opportunity to put my experience to use
		Having a strong will
		Having a positive attitude to hold myself together
		Utilizing previous earthquake-related experience
	Seeking something trustworthy	Trusting in the infection control team
		Examining the flood of incoming information
		Checking my own physical condition
		Continuously trusting basic techniques
		The self-confidence developed through training
Growth as a nurse	Growth as a nurse	Using this experience to propel my career
		Opportune time to learn from other nurses
		Feeling the excitement of working in intensive care

Participants feared becoming infected. They also feared infecting others around them.

"This is a story about family relations. When I was working in the new infectious disease ward, the entire time I was working there, my father was nearly dying. After everything, he passed away in early April. I couldn't see my father, who was near death, because I felt that I might pass on the virus. I didn't want to be the one to infect him further and become the final blow. I couldn't go home." – (G)

Category 2: The shock of finding myself amid an infectious disease pandemic

This category consisted of three subcategories: "The shock of isolation at the end of life", "Extreme exhaustion and harsh working conditions", and "Fear of discrimination". Due to the pandemic, nurses were shocked to face situations that they would not usually experience in the healthcare field.

The shock of isolation at the end of life

Family members were not allowed to visit for fear of spreading infection. Such meetings occurred exclusively online. One nurse caring for a dying patient was profoundly shocked by how the patient died. His passing was outside of her normal experience.

"The last part is already too sad. That is a special white bag.... I forgot its name, but it was a cadaver bag. I don't remember the name, but it was a special white

cadaver bag. When I saw him coming back in that bag, it really showed me the cruelty... It was so sad to see him being sent off like this. It really brought tears to my eyes. I dwelled on that event for a while." – (I)

Extreme exhaustion and harsh working conditions

The long working hours, involving delicate work in protective clothing, were extremely physically and mentally demanding.

"I have big ears, and because of that, my N95 mask slips off. The N95 mask and the face shield would slide out of place. It was really stressful, and I had pressure sores in my ears." – (F)

"It was very stressful, you know. I had a strange feeling that I would get an itch when I entered the infected room or that my mask was somehow slipping off. It's a strange experience. The stress must have dulled my senses." – (P)

Fear of discrimination

The pandemic also presented phenomena that nurses usually do not need to confront. Most participants were dedicated to providing direct patient care but were concerned about their everyday conditions.

"I see a lot of discrimination against medical personnel on TV... I think it's probably okay. I don't want people to think that way about me. I didn't dare to talk about it, so I didn't tell anyone." – (H)

Category 3: Anxiety about unknown challenges

This category consisted of two subcategories: " Anxiety about caring for critical patients" and "Impromptu team building". Because of the pandemic, a mixed team of nurses whose typical duties did not include critical care was assigned to care for the most severely ill patients with COVID-19 who received ECMO.

Anxiety about caring for critical patients

Because of the pandemic, some participants performed duties outside their typical responsibilities in situations they had not previously experienced.

"I had never seen ECMO itself, so it was scary and incomprehensible!" – (O)

"My experience in critical care, such as in the HCU and ICU, was insufficient. I had no experience with critical care. I was afraid of being unable to imagine how I would care for patients." – (M)

Impromptu team building

Because of the pandemic, participants formed impromptu teams consisting of members with whom they did not work daily, such as doctors, clinical engineers, and nurses. They then had to perform at their best to save patients. In addition, participants felt daunted by taking on new challenges in an unfamiliar setting and with unknown members.

"I had to work in a situation where trust had yet to be established, and the other staff had no idea to what extent I could handle the situation. I reported closely to them as if I were a new nurse. I consciously made it a point to inform others of my situation." – (K)

Category 4: Driven by a sense of purpose

This category consisted of four subcategories: "Driven by a sense of purpose", "Striving to fulfill my nursing duties", "Motivating myself", and "Seeking something trustworthy". None of the participants refused to perform their duties under difficult circumstances. Many nurses described motivations that prompted them to do so.

Driven by a sense of purpose

The participants were nurses managing a new infectious disease ward at a specified medical facility for infectious diseases. Therefore, they knew their roles when a new patient with a contagious disease was admitted.

"When the call came, I knew that I had been training daily and was a team member. I felt like my time had come. I felt like I was finally arriving." – (E)

Striving to fulfill my nursing duties

The participants tried to fulfill their nursing responsibilities, even in a specialized and unfamiliar environment.

"It is a world without sound, isn't it?" Particularly in an infectious disease ward, the ward is closed off. Without the sound of alarms around you, it is just the sound of the ventilator and ECMO running. And the ECMO is under negative pressure, so there is always the sound of the machine's fan.

"I thought that it might be nice to hear some voices, I thought it would be nice to have a place where people could experience their daily lives in such an unusual setting, even if it was just the sound of people talking to someone." – (P)

Motivating myself

Despite the harsh and unsafe working conditions, the participants were able to push themselves to fulfill their responsibilities as nurses.

"I still wonder if I'm infected, if I'm going to die, or if I'm going to get something worse. I think we talked about not thinking about such things. We were all in the break room together, and I thought it was like a folk remedy, that I would not get infected. Of course, I strongly felt I would not get infected." – (Q)

Seeking something trustworthy

In an uncertain world, participants sought any reliable information they could find.

"The Internet was at the center. But so much

information was being broadcast not only on the Internet but also on TV. Whenever I looked at the information, I still could not determine which information was correct and which leads the medical community needed to believe. But I was afraid to shut out the information....." – (R)

Category 5: Growth as a nurse

Some participants who completed their mission to provide direct care to COVID-19 patients said that the experience was both a hardship and an opportunity for them to grow as nurses.

"Working with the ICU staff taught me many things, and I realized that I could not care for patients because I feared them. I don't think I have much perspective, but I learned a lot. So, it was a valuable experience, and I think it was a valuable experience for me to have." – (K)

Discussion

Results indicated that caring for critically ill patients in the early stages of the COVID-19 pandemic was a very difficult mission under physically and emotionally stressful conditions. However, results also indicated that the nurses were highly motivated to care for patients even under such conditions. The participants in this study were characterized by two features. First, they were assigned to COVID-19 critical patients in the early phase of the disease, before the WHO declared it a pandemic. Second, they were nurses working in and who had roles in a designated medical facility for specified and emerging infectious diseases.

Duty under challenging conditions

The surveyed nurses were routinely prepared for infectious diseases. However, the most frequently mentioned fear was still that they might become infected or become vectors and transmit the infection to others around them. Many previous studies have also noted the same fear of the disease (*10-12,25*). This study supports the findings of previous studies, which reported that 90% of nurses who worked with COVID-19 were concerned about spreading COVID-19 to family members (*26*), 30% were afraid to go to work because of inadequate protection and risk of infection, and 40% were afraid to care for patients (*27*). Infectious disease care is a health risk that is not only associated with the healthcare provider themselves but also with the patient's health. Therefore, infectious disease care is a mission under conditions where healthcare providers and their families may become infected. Even nurses with previous roles and training in handling emerging infectious diseases still feared unknown diseases. They spoke of their readiness to undertake the mission as if they were going into battle.

In addition, as noted in previous studies (*11,13,28-30*), long working hours with unfamiliar colleagues and in an unfamiliar environment while wearing PPE took a heavy toll on the nurses physically and mentally. Crowe & Howard (*13*) found that 38% of nurses who cared for COVID-19 patients reported severe symptoms of PTSD, 57% reported severe depression, 67% reported anxiety, and 54% reported stress, suggesting that the nurses in this study were also under significant psychological strain and pressure.

In addition to fear of possible infection, many spoke of the fear of discrimination by society. For example, in a previous study, 30% of nurses working on the frontlines during the COVID-19 pandemic reported being threatened or harassed (*31*). This study also revealed concerns regarding societal stigma.

Motivation

Despite the challenging circumstances, none of the nurses in this study refused to perform their duties. Moreover, the nurses were motivated by a sense of mission and strove to fulfill their nursing duties. Despite the uncertainty of the situation, each was searching for something to believe in and keep themselves going, similar to the findings of previous studies in which nurses remained in the workplace despite their fear and vulnerability (*32*), they shouldered the greater risk of infection to their families and themselves, and they remained steadfast in their commitment to care for their patients (*33,34*). Nurses' deep desire to provide quality and proper care (*35*) has been emphasized in professional ethics. This influence was reflected in the results of this survey. Most participants talked about their trust in their organizations. Because they were working during the early stages of the pandemic, little reliable evidence was available, and a variety of information flowed from the media. While daily reports of many deaths in foreign countries increased tension, most said that they trusted the information provided by the infection control team of the hospital where they worked, whose mission was to address infectious diseases. Providing nurses with reliable information is crucial to reducing their psychological burden. A previous study has suggested that providing nurses with adequate information and resources to protect themselves may help alleviate the fear associated with infection (*26*).

In addition, the participants were nurses whose responsibilities included responding to emerging infectious diseases, so they regularly received training in infectious diseases, giving them confidence in their responses. Therefore, training to prepare for contingencies is still necessary.

Growth as nurses

Despite the challenging situation and negative emotions,

such as a sense of burden, the nurses also had positive feelings, remarking that they were able to grow through experiences they could only have had in this situation.

These findings corroborate previous studies which found that nurses, despite the difficulties during the COVID-19 pandemic, were happy (*36*) and had positive feelings (*17*), saying that they were able to experience things that they could only experience in such a situation.

This situation is not unique to COVID-19; nurses who dealt with MERS patients reported overcoming extreme situations with the feeling that they were growing as nurses and were more robust than before (*37*).

Post-traumatic growth (PTG) is a "positive psychological change in the aftermath of a traumatic event" (*38*). Many professions whose primary job is to protect human life, such as police, fire, and first responders, have reported learning how a traumatic event can lead to growth. However, fear is undoubtedly also present (*39*,*40*). One study claims that it is low (*38*). Most studies use a timeline of months to years, and the consensus view is that growth occurs only after coping and psychological struggle (*38*). However, the development process still needs to be explored in-depth. A limited number of studies (*41-43*) examining PTG related to COVID-19 examined the changes in PTG scale scores. The nurses in the current study were able to recognize their own stress, but whether they had reached the point of experiencing PTG remains unclear. In retrospect, the pandemic had just begun during the survey, and a strong sense of social uncertainty existed. Therefore, we can surmise that many participants may not have reached the point of PTG.

Creating a supportive environment, providing rewards, encouraging self-disclosure and intentional ruminations, and supporting the discovery and pursuit of life's meaning (*44*) were necessary for PTG for the nurses who took on enough challenges to experience it.

Limitations

This survey was conducted with nurses who were routinely responsible for responding to emerging infectious diseases in a medical facility in Japan. The facility was designated to handle these specified infectious diseases. Accordingly, we should be cautious about generalizing the results. However, their experiences are still similar to those of nurses who responded to the needs of COVID-19 patients worldwide, as reported in previous studies. Therefore, we believe that this study's findings will be useful during future emerging infectious disease pandemics.

In addition, this study was completed during the early stages of the COVID-19 pandemic, so the interviews were conducted when confusion prevailed regarding circumstances overseas. To prevent infection, we conducted the interviews online. However, online meetings were not common at the time. Therefore, the interview setting may have been unfamiliar to the participants. Moreover, COVID-19 is ongoing, so participants may still be processing their experiences. The limitations of this study are that the interviews were conducted in the early stages of the pandemic when social uncertainty was substantial. Moreover, its design was short-term and retrospective. Therefore, nurses' PTG or their recovery could not be ascertained.

Conclusion

Results indicated that working during a pandemic has severe consequences for nurses. Working under harsh conditions while their own safety is threatened may affect the quality of care they provide. It may also affect nurses' mental health. Therefore, nurses should receive both short-term and long-term support to help mitigate these concerns.

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Introduction and roll-out of self-learning App for midwifery during the COVID-19 pandemic and its sustainability in Cambodia

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Abstract: Similar to other countries, coronavirus disease (COVID-19) pandemic significantly impacted not only the ability of midwives to deliver high quality maternal care, but also their ability to access professional development opportunities, including in-service training in Cambodia. In response, we developed a Cambodian version of Safe Delivery App (SDA), aligned to Cambodia's clinical guidelines. The SDA is a free digital job aid and learning platform for skilled birth attendants developed by Maternity Foundation that works offline and is used in more than 40 countries after adapting to the country context. In the year and a half since its launch in June 2021, SDA has become established in Cambodia, with more than 3,000 people, accounting for nearly half the number of midwives in Cambodia, downloading and using it on their devices, and 285 people having completed its self-learning modules. The review of the introduction process revealed that publicity on the professional association's social networking sites, in-person in-depth hands-on training, and troubleshooting in a managed social networking group were useful in promoting the use of the application, and that the Continuing Professional Development Program accreditation has been a strong motivator for completing the self-study program. On the other hand, the COVID-19 pandemic has led to increased use of digital tools, but it is important to prevent the expansion of the digital divide when implementing new digital tools, including SDA.

Keywords: Safe Delivery App, self-learning digital tool, continuous professional development, COVID-19, sustainability, digital divide

Introduction

Cambodia is recognized as one of the few countries that have achieved the Millennium Development Goals related to maternal and child health, and has made significant improvements in maternal and child health-related indicators in the past (*1*). However, the results of the latest Demographic and Health Survey show that while there has been significant improvement in child health-related indicators such as neonatal deaths, the maternal mortality rate has remained stagnant, which has been recognized as a challenge (*2*). As the health facility delivery rate has reached 97.5% and the Skilled Birth Attendance rate has reached 98.7%, the need to address quality of service is beginning to be recognized for further improvement.

In Cambodia, one of the main strategies to improve maternal and child health services has been to increase coverage of Emergency Obstetric and Newborn Care (EmONC) facilities (*3*), and a review conducted in 2020 showed that coverage is improving, although gaps remain (*4*). On the other hand, evaluations of Skilled Birth Attendance practices in Cambodia reported that they were not always consistent with evidence-based guidelines (*5,6*), indicating an urgent need to improve the knowledge and skills of Skilled Birth Attendance.

A review of factors that influence the provision of intrapartum and postnatal care by skilled birth attendants in low- and middle-income countries found that many factors, including access to training and supervision; staff numbers and workloads; salaries and living conditions; and access to well-equipped, well-organized healthcare facilities with water, electricity, and transport, were found to have a significant impact on the quality of care (*7*). Thus, in Cambodia, EmONC and other training programs on intrapartum and postnatal care had been actively conducted (*8*). Japan International Cooperation Agency (JICA), has been supporting human resource development in maternal and child health in Cambodia through technical cooperation projects, and had been implementing a project to strengthen perinatal care with a focus on neonatal care since 2016 (Table 1).

Table 1. Project Design Matrix of "Project for Improving Continuum of Care with focus on Intrapartum and Neonatal Care in Cambodia"

Overall Goal

Reduce the neonatal mortality at target provinces

Project Purpose

Contiuum of Care with focus on intrapartum and neonatal care is strengthened at target provinces

Outputs

1. Training and supervision on Intrapartum and Immediate Newborn Care (INC) for MNCH staff is strengthened.
2. Management of sick newborns and preterm/low birth weight (LBW) infants is improved.
3. Follow-up for neonates (especially those showing danger signs) is strengthened.
4. Health systems, which are essential to improve Continuum of Care for better MNCH services, are strengthened
5. Findings, lessons learned and evidence for MNCH services focused on intra-partum and newborn care are reflected on national policies/ strategies/guidelines.

Period of Project: 6 years (from May 2016 to May 2022). Project Site: National Maternal and Child Health Center (NMCHC), Kampong Cham Province (KCM) and Svay Rieng Province (SVR). Target Group: Health Professionals working for intrapartum and newborn care services in NMCHC, KCM Province and SVR Province.

However, the coronavirus disease (COVID-19) pandemic has led to restrictions on face-to-face training programs (*9*). Therefore, we decided to work on the development and rollout of a Cambodian version of Safe Delivery Apps as a digital tool to enable midwives to continue to strengthen their capacity during the COVID-19 pandemic. The purpose of this study is to describe and analyze the process, with a focus on sustainability.

Materials and Methods

Development of Cambodian version of Safe Delivery Apps

The Safe Delivery App (SDA) is a digital tool developed by the Maternity Foundation, the University of Copenhagen and the University of Southern Denmark that provides healthcare workers (HCWs) with access to evidence-based and up-to-date clinical guidance based on WHO guidelines (*10*). It can be used as self-learning tool, training material, and job aid, and consist of videos, action cards, MyLearning platform for self-directed learning, and drug information. The material consists of 13 modules, including COVID-19, Normal Labour and Birth, Active Management of Third Stage of Labour, Prolonged Labour, Postpartum Hemorrhage, Maternal Sepsis, Neonatal Resuscitation, and Newborn Management. It is used in more than 40 countries around the world, and evaluations of its effectiveness have demonstrated its effectiveness in improving healthcare worker knowledge and skills (*11-13*). It is available in global versions in French, English, Arabic and Portuguese and has been adapted into numerous national versions translated into local languages and aligned with national clinical guidelines, but there was no Cambodian version. Therefore, we developed Cambodian version of the SDA in Khmer language in with collaboration with Maternity Foundation, as part of JICA's technical cooperation project activities (*14*).

In developing the Cambodian version, a committee of Cambodian experts was established at the National Center for Maternal and Child Health to review the Cambodian translation of the script of the global version in light of the national guidelines. The committee held a series of meetings to check all educational videos, action cards, and drug lists one by one, and to revise scripts based on drugs available in the site and diagnostic criteria in national guidelines, and to correct errors in Khmer translations. After the final Cambodian script was approved by the Ministry of Health, the audio of the video lectures was recorded and provided to the Maternity Foundation for integration into the application. Finally, the Cambodian version was officially launched in June 2021 and is available for free download from both Google and Apple app stores.

Data collection and assessment

The SDA aggregates user data to monitor usage including user profiles, daily downloads, MyLearning usage, and other information. We collected and analyzed the data from the dashboard on the number of downloads of the SDA Cambodia version and the number of MyLearning users who had completed the final Champion Certificate exam from the official launch in June 2021 to November 2022. We also have compiled our reflections s from the app development and rollout process, including the factors both challenging and promoting usage.

Results and Discussion

The number of downloads of the Cambodian version of the SDA since its official launch on June 3 is shown in Figure 1. The first few months after the launch were the highest in terms of average downloads, thanks in part to an online workshop held on June 9 to which all provincial health departments were invited and which was shared by the Midwives Association on its social networking group. In several states, voluntary workshops and other events were held, which also played a role in the rollout of the SDA. In addition, as a JICA technical

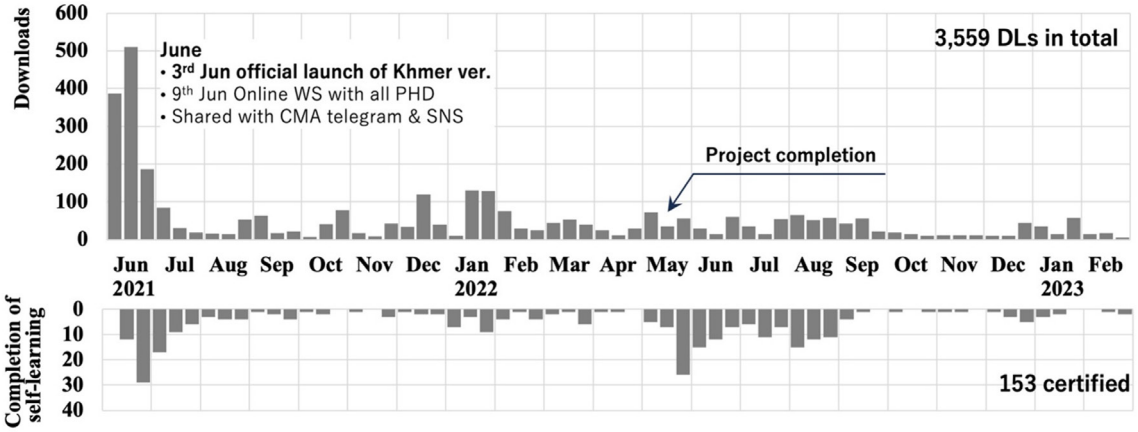

Figure 1. Number of downloads of Safe Delivery App and number of people who certified successful completion of self-learning in Cambodia.

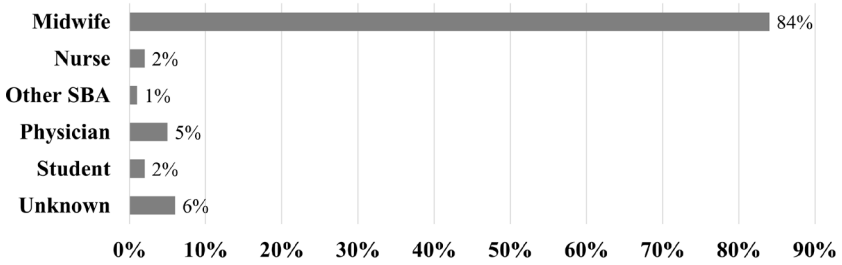

Figure 2. User profile – Profession. SBA, Skilled Birth Attendant

cooperation project, face-to-face induction training was conducted for all midwives at the National Center for Maternal and Child Health and for all midwives in the two provinces that were the target of the activities. In addition, there are 18 midwifery training schools in Cambodia, 6 public and 12 private, and the project conducted face-to-face induction training for teachers at 7 of these schools.

The project ended in May 2022, but downloads continued to average 3 per day thereafter. Finally, as of 25th February, 2023, a total of 3,559 downloads were observed. According to WHO's Global Health Workforce statistics database, there were approximately 7,000 midwives in Cambodia in 2019 (*15*). Figure 2 shows the SDA users profile, most of whom are midwives, indicating that nearly half of all midwives in Cambodia have downloaded the SDA. Many of them also work in primary health care facilities. Follow-up by the project found that the app is being used as a teaching tool for in-service training, such as Midwifery Coordination Alliance Team (MCAT) meetings, and for self-learning as part of Continuing Professional Development Program for license renewal, as well as being used for pre-service education, such as midwifery students.

In addition, the number of people who successfully completed the final Champion Certificate in the MyLearning platform, since its official launch on June 3 is shown in Figure 1. The number of SDA certificate holders has also been consistently and continuously increasing. As of 25th February, 2022, 302 people had completed the certificate exam. Among those, 153 were certified after the project ended in May 2022, indicating that it is becoming a well-established self-study tool in Cambodia.

Collaboration with Cambodia Midwifery Association and careful support for introduction

Following the official launch of the app, the most effective intervention in promoting the use of the app was that undertaken by the Cambodian Midwives Association (CMA) who publicized the app on their own social networking group. The CMA is a professional association of midwives with more than 5,000 members that also provides training to strengthen the capacity of midwives (*16*). It is registered as one of the training providers for Continuing Professional Development program, which is described below, and since the COVID-19 pandemic, it has also been conducting online training via Zoom. The Chairperson was also a member of the technical committee in developing the application and was active in promoting the application and its influence on the membership was significant.

In addition, as mentioned above, the project has

conducted in-person hands-on introduction training as well as providing online materials when introducing the application. Identifying SDA champions who were well versed in the use of the application, as well as including it in pre-graduate education at midwifery training schools, were also effective strategies in promoting its use.

To overcome technical challenges faced when the application was first introduced, we created an SNS group for troubleshooting, appointed an administrator, and set up a system to teach each other. We feel that this has been effective in terms of both promoting and sustaining utilization.

Continuing Professional Development Program

In January 2021, Cambodia enacted a Continuous Professional Development (CPD) Program for five professions – physicians, dentists, nurses, midwives, and pharmacists – linked to registration with the Professions Council and to renewal of their licenses every three years in order to improve their skills (*17*). As a result, the five health professions are now required to register with the Professions Council and present a record of attendance at a training program approved by the Professions Council at the time of their license renewal every three years.

For midwives, the Cambodian Midwives Council has issued guidelines and begun reviewing training programs to approve the CPD points required for license renewal, with 60 CPD points required over a three-year period for license renewal (*18,19*). The review is based on detailed regulations, including training content, the organization conducting the training, and the experience of the instructor. The basic formula is 1 point for 1 hour of study. In regards to the SDA, the National Maternal and Child Health Center, which is a medical institution and also a national maternal and child health administration and educational institution, also has responsibility for implementing the SDA in Cambodia. It applied to the Cambodian Midwives Council for CPD points to be awarded to midwives who successfully complete the final exam within the MyLearning platform. As a result, Cambodia Midwifery Council has approved the granting of 20 CPD points to those who have completed all 13 modules of MyLearning and passed the Champion Certificate exam.

The CPD program appears to have motivated healthcare professionals to learn (*20*), and the accreditation of CPD points seems to have been a key driver.

Lesson Learnt

Eighteen months since the launch of SDA Cambodian version, constant downloads are continuing to be observed and nearly half of all registered midwives have downloaded the app, strongly suggesting that the tool has become popular in Cambodia beyond "early adopters".

While the impact of COVID-19 promoted the use of digital tools, alongside this there is also a growing concern about the digital divide (*21,22*). There are significant disparities in IT literacy and other skills among healthcare professionals, and differences are beginning to emerge in opportunities for skill and career advancement with those with high IT literacy able to access more opportunities, while those with low IT literacy are inhibited (*23,24*). The "gray digital divide", especially as it relates to older people, is often observed in our activities and requires careful support (*25*).

Conducting in-person hands-on training to introduce digital tools has been effective in overcoming this digital divide. For example, while many participants easily downloaded the app, they often encountered difficulties in registering as a user, which is required to obtain a MyLearning completion certificate. In particular, many medical professionals do not use e-mail, and some had difficulty in obtaining an e-mail address which is required for registration, so it was necessary to create educational materials on obtain a free e-mail address. This insight was also reinforced through the face-to-face training sessions.

The flexible nature of the MyLearning platform means that midwives can undertake learning independently in their own time, which may address some of the issues that have been observed with conventional face-to-face training, such as midwives needing to take time away from service delivery to attend trainings and regional disparities in training opportunities. In addition, compared to in-person training, training costs, such as daily allowances and travel expenses for participants and instructors can be reduced and the same training can be used repeatedly as long as the guidance is not changed. On the other hand, there are many limitations compared to face-to-face hands-on training in terms of acquiring practical skills. Some reports indicate that online training is comparable to face-to-face training in terms of knowledge and skill development (*26-28*). However, further research is required to explore and document of the unique characteristics and benefits of each training method.

Conclusion

In Cambodia, the Safe Delivery App has become established as a self-learning tool for midwives, continuing beyond the COVID-19 pandemic. Engagement with the SDA has been driven in large part by its accreditation as part of the Continuing Professional Development Program accreditation by the Cambodian government. Additionally, promotion of its use has been further facilitated by its promotion by professional associations through social media, in-person in-depth hands-on training, and troubleshooting in managed social networking group. Such careful support is especially

important when introducing new digital tools, including SDA, to avoid widening the digital divide.

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A 15-year follow-up report of an elderly diabetic foot with multiple recurrences leading to toe amputation and thoughts on the model of care for diabetic foot ulcer

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Abstract: Diabetic foot ulcer (DFU) is one of the most serious complications of diabetes. Elderly diabetic patients are a high prevalence of diabetic foot ulcers, and their high recurrence, disability, and mortality rates impose a heavy economic burden on families and society. This paper reports a case of an elderly patient with a diabetic foot ulcer who was admitted in April 2007 and discharged after recovery from comprehensive diabetic foot treatment. Due to intermittent foot care and lack of home care, the patient's foot ulcers recurred after repeated healing during home rehabilitation, eventually resulting in the amputation of the right bunion. After the patient was discharged from the hospital with an amputated toe, the whole-process seamless management model of "hospital - community - family" was implemented. The hospital provides specialized foot support and guidance, and the community is responsible for daily disease management and referrals. The family is responsible for the implementation of home rehabilitation programs, and family caregivers need to identify and provide feedback on foot abnormalities promptly. As of May 2022, the patient had not experienced ulcer recurrence. This paper reports the whole process of "ulcer development → ulcer healing → ulcer recurrence healing → toe amputation → continuous care management" experienced by the patient in 15 years, aiming to reflect on the significance of the whole-process seamless foot care management model of "hospital-community-family" for diabetic foot ulcer rehabilitation through the case.

***Keywords*:** elderly, diabetic foot ulcer, recurrence, toe amputation, care

Introduction

According to statistics from the International Diabetes Federation (IDF) in 2019 (*1,2*), there are approximately 135.6 million elderly diabetes patients aged over 65 years worldwide. The prevalence of diabetes is increasing globally due to the aging population. Elderly diabetic patients are particularly vulnerable to diabetic foot (*3*), as risk factors for diabetic foot, such as peripheral vascular disease, foot deformity, and peripheral arterial disease, increase with age and are highly susceptible to the development of foot ulcers. A study (*4*) revealed that patients with diabetic foot ulcers have a very high recurrence rate, which can lead to serious consequences, such as amputation (toe) and death.

This paper reports a case of a diabetic foot ulcer patient admitted in April 2007 who experienced the whole process of "ulcer occurrence → ulcer healing → recurrent ulcer occurrence, healing → toe amputation → continued care management" during the past 15 years, as reported below. Informed consent was obtained from the patient.

Case characteristics

The patient, a 79-year-old female, who can take care of herself and lives with her daughter. She has been diagnosed with type 2 diabetes for 31 years and has a history of hypertension for 30 years. She is currently taking antihypertensive medications, and her blood pressure is controlled within the range of 120–140/70–90 mmHg. Her hypoglycemic regimen includes Youmirin 70/30 38 u–28 u (subcutaneous injection 30 minutes before breakfast), Gewazhi 250 mg (before breakfast), and Genovil 100 mg (before breakfast). The target fasting blood glucose level is 7–9 mmol/L, and blood glucose levels should be maintained at around 15 mmol/L 2 hours after meals.

The patient underwent electromyography which revealed peripheral neuropathy. Additionally, a color

Doppler angiography showed diffuse thickening of the intima arteriae of both lower limbs with multiple sclerotic plaques, indicating peripheral vascular disease. An ophthalmic consultation suggested retinopathy, a common complication of diabetes. Furthermore, the patient's albumin/creatinine ratio was elevated, measuring up to 22.16 mmol/L, suggesting diabetic nephropathy.

Treatment and care

Phase 1

In April 2007, the patient was admitted to the endocrine ward due to severe onychomycosis infection stemming from poor glycemic control and deformed hyperplasia of a right foot toenail, which compressed adjacent tissues and formed toe ulcers. The patient's random blood glucose was measured at 15.8 mmol/L and glycosylated hemoglobin at 7.5%. The patient complained of foot numbness and foot examination revealed that the right bunion was thickened and hypertrophied, the toenail was thickened, and an ulcer was seen at the end of the toe, measuring approximately 4.5 cm × 3.5 cm × 0.5 cm, with a yellowish wound surface and oozing fluid (Figure 1, A).

The patient was initially diagnosed with a diabetic foot ulcer, Wagner grade 2. The foot treatment involved trimming the thickened toenail and ingrown nail, changing the dressings for the ulcer, and administering terbinafine ointment for antifungal infection. The patient was discharged and continued outpatient wound care for 6 weeks, after which the ulcer healed.

Phase 2

In March 2013, the patient was living alone and her daughter was the primary family caregiver and visits her once a week. The patient has impaired vision due to diabetic retinopathy, resulting in insufficient self-care ability. The patient was not receiving good foot care at this stage due to limited self-care and lack of family care.

In September 2013, when the patient's daughter came for a weekend visit, she noticed oozing on the sock of the patient's right foot and immediately examined the foot, which had a recurrence of the foot ulcer. The patient came to the clinic immediately and measured fasting blood glucose of 10 mmol/L, glycated hemoglobin of 7.9%, and the urinary albumin/creatinine ratio of 10.7 mg/mmol. The patient reported experiencing numbness and pain in the affected foot, as well as recurrent edema in the lower extremity. Physical examination revealed thickening and hypertrophy of the right bunion, a 4.6 cm × 3.5 cm × 0.4 cm ulcer with yellowish discharge and odor, and a Wagner Grade 2 ulcer (Figure 1, B). After debridement, local anti-infective treatment, systemic glucose regulation therapy, and administering terbinafine ointment for antifungal infection, the ulcer wound healed within eight weeks. This recurrence was due to the patient's lack of self-care and family care, and the failure to detect the recurrence of the ulcer in time, resulting in a delayed visit to the clinic.

Figure 1. Multiple recurrent foot ulcers in the patient. First ulcer **(A)**: The patient was initially found to have a fungal infection (red arrow), gray toenail (blue arrow), and exudate from the ulcer (yellow arrow) on the right bunion, diagnosed with Wagner grade 2; Second recurrence **(B)**: yellowish keratinized tissue with fluctuating sensation (blue arrow) was seen in the right bunion. Toe thickening, high skin temperature (red arrow), and loosening of the base of the gray toe metacarpal (yellow arrow), Wagner grade 2; Third recurrence **(C)**: thickened and swollen right bunion with fluctuating sensation and elevated skin temperature (red arrow), fungal infection of the foot with gray toenail (yellow arrow), recurrence of the ulcer in the same location (blue arrow), Wagner grade 2; Toe amputation **(D)**: The patient healed after toe amputation with a clean, dry foot, no fungal infection, and no ulcers (red arrows).

Phase 3

On February 19, 2014, the patient was admitted to our hospital with a fever and a temperature as high as 39.6℃. The patient had self-soaked her right bunion after it had broken due to barefoot walking a week ago and failed to seek medical attention in a timely manner, resulting in a traumatic infection causing bacteremia. Upon admission, the patient's blood routine examination showed elevated levels of white blood cells and neutrophils, as well as a 2-hour postprandial glucose level of 15 mmol/L, glycosylated hemoglobin level of 6.6%, and a urinary albumin/creatinine ratio of 35.41 mg/mmol.

The patient complained of numbness and pain in the affected foot, and upon examination, we observed a thickened and hypertrophied right bunion with an ulcer measuring 3.2 cm × 4.5 cm × 0.4 cm. The wound was exuding pale red exudate and had a Wagner grade 2 classification (Figure 1, C). The patient received anti-infective, nerve nutrition, and glucose-regulating treatment, continued with terbinafine ointment for antifungal infection, and intensive dressing changes for

the foot wound. The ulcer wound healed in 6 weeks.

Phase 4

In April 2014, the patient was alone at home soaking her feet, which caused swelling and breakdown in her right toe. The patient did not recognize the occurrence of the ulcer at the first time and continued to soak her feet, resulting in a severe infection of the ulcer wound complicating osteomyelitis, Wagner grade 3. Due to untimely medication, the patient's fungal infection and gray toenail problems persisted, and the patient continued to soak her feet despite impaired skin integrity this time, aggravating the infection, so the ulcer recurred faster and more severely than the last time. For this recurrence, the orthopedic surgeon recommended toe amputation. In May 2014, the patient underwent a bunion amputation on her right foot, which was successful and the patient made a full recovery after the operation (Figure 1, D).

Phase 5

During the period from the patient's discharge from the hospital with an amputated toe in May 2014 and rehabilitation at home in May 2022, we implemented a continuous "hospital-community-family" linkage management, prompt identification and prevention of foot risk factors, and enhanced blood glucose management, which effectively prevented the recurrence of diabetic foot ulcers. In this model, the hospital provides professional foot support and guidance, the community is responsible for daily disease management and referrals, and the family is responsible for implementing a home rehabilitation program. Family caregivers are required to identify and provide feedback on foot abnormalities promptly. Community nurses regularly educate patients and their caregivers on diabetic foot care, including self-examination after diabetic foot amputation, regular application of the antifungal ointment, and tips on proper toenail trimming to improve patients' self-management skills. When patients have deformed toenails or a recurrence of ulcers, the community hospital assists them in making online appointments at the diabetic foot clinic of a tertiary hospital for further specialized treatment.

The last follow-up visit was on May 20, 2022, when the patient came to the hospital for a review, which showed clean and dry feet, no fungal infections, neatly trimmed toenails, good blood flow to the feet, and no recurrence of ulcers. As a result of eight years of the whole-process seamless management of "hospital - community - family", the patient's foot is now in good condition.

Discussion

The high recurrence rate of diabetic foot in the elderly and the urgency of improving self-care skills

Elderly diabetic patients with progressive disease and aging may experience peripheral circulation disorders, resulting in lower extremity sensory abnormalities, making them a high-risk population for diabetic foot ulcers (*3*). Unfortunately, due to the lack of knowledge related to foot ulcer care, many of these patients fail to discover and seek medical treatment in a timely manner, leading to high rates of amputation and mortality (*5*), as well as increased risk of recurrence (*4*).

When the patient first presented with a foot ulcer in 2007, she underwent good home care, adhering to the use of terbinafine ointment for antifungal infection and standardized toenail trimming, and was able to have regular rechecks, and the ulcer eventually healed. During 2013-2014, the patient lacked family care support and had insufficient self-care skills when living alone. Due to a lack of attention and knowledge of diabetic foot ulcer care, the patient soaked her own feet after walking barefoot, which led to skin breakdown, however, the patient did not first notice the ulcer occurring and continued to soak her feet, which eventually led to severe osteomyelitis infection and had to be treated by toe amputation. Therefore, it is urgent to improve the self-care ability of elderly patients with diabetic foot ulcers.

It is very crucial to establish a seamless continuous nursing model for senile diabetic high-risk feet

Continuing care is the process of extending care beyond hospitalization to ensure patients receive ongoing and individualized healthcare services across different healthcare settings. This approach emphasizes continuity of care over time and is an effective extension of routine care. Although patients often receive comprehensive medical services during hospitalization, lack of knowledge about diabetic foot ulcer care, poor self-management abilities after discharge, and insufficient supervision and management by medical and nursing staff can seriously impact healing.

For instance, patients may not seek medical attention at a time when ulcers recur due to repeated foot infections during home rehabilitation, which can lead to delayed disease progression, ulcer deterioration, and ultimately, toe amputation. To address this issue, we implemented an eight-year "hospital-community-home" linkage extended management model after the patient's discharge to establish a seamless connection between in-hospital care and out-of-hospital care. This approach has effectively prevented discontinuity of care and ensured the best possible continuity of care.

Since the patient's toe amputation, the ulcers have not recurred and we continue to monitor the patient's progress. This continuous model of care allows us to identify and prevent foot risk factors promptly, enhance blood glucose management, effectively prevent the recurrence of diabetic foot ulcers and reduce the incidence of toe amputation in our patients.

Conclusion

Continuity of care plays a crucial role in reducing the recurrence rate and amputation rate among patients with diabetic foot ulcers, while also improving their quality of life (*6*). The progress of wound healing in patients with diabetic foot ulcers is directly linked to their self-management and medical expertise, as well as the continuity of care provided. To ensure optimal continuity of care, the "hospital-community-family" model is recommended. This model enhances patient education and guidance, supports family caregivers, and improves patients' self-management ability. By implementing this model, healthcare professionals can achieve "whole-course management and seamless link" for patients with diabetic foot ulcers.

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Lessons learned from practices during the initial response to COVID-19 on the cruise ship Diamond Princess

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Abstract: The battle against coronavirus disease 2019 (COVID-19) still continues three years after the onset of the pandemic, but there are concerns about the next emerging infectious disease. This study reports the practices during the initial response to COVID-19 on the cruise ship Diamond Princess and lessons learned from a nursing perspective. During these practices, one of the authors dealt with a sample collection team from the Self-Defense Forces and collaborated with the Disaster Medical Assistance Team (DMAT), Disaster Psychiatric Assistance Team (DPAT), and other teams. They mentioned the passengers' state and the distress and fatigue of the personnel assisting them. This revealed the specifics of emerging infectious diseases and their commonalities, regardless of the disaster. Results identified three crucial points: *i*) predicting the impact of lifestyle changes on health due to isolation and implementing preventive measures, *ii*) protecting individual human rights and dignity even in health emergencies, and *iii*) support for personnel providing assistance.

***Keywords*:** COVID-19, initial response, nursing, lessons learned

Introduction

Globally, various disasters occur frequently, including natural disasters, emerging infectious diseases, and compound disasters. Moreover, there are concerns about the next emerging infectious disease, Disease X (*1*). This article reports the practices during the initial response to coronavirus disease 2019 (COVID-19) on the Diamond Princess and the lessons learned from a nursing perspective for future disasters.

Practices on the Diamond Princess

On February 3, 2020, the Diamond Princess docked in Yokohama with 3,711 passengers and crew (*2*). The passengers and crew underwent health examinations without disembarking from the ship for 14 days (*2*).The number of people with symptoms increased, conducting polymerase chain reaction (PCR) testing for COVID-19 was difficult (*3*), and medical transportation to Japan was difficult. This caused confusion among the quarantined, passengers, crew, and also medical personnel.

The Government of Japan decided to respond with administrative and healthcare personnel who implemented border control, infection control, and treatment of patients (*4*). Based on the Japanese Government's decision, one of the authors of this article participated in the initial mission, which was to assess the status of COVID-19 and to create a system to facilitate sample collection and data compilation as an epidemiology team in mid-February 2020 (Figure 1). At the same time, the author responded to inquiries about test results from the Disaster Medical Assistance Team (DMAT), which was in charge of transporting positive patients and examining those with symptoms. The Self-Defense Forces, which collected samples, asked the epidemiology team about improving the testing procedure and contact list.

Distress and fatigue of the personnel providing assistance

The DMAT, the Self-Defense Forces, and doctors on the ship were physically and mentally exhausted from the difficult situations. The Self-Defense Forces and DMAT were considered to be at a higher risk of infection than other personnel because they directly interacted with passengers to conduct PCR testing and to examine symptomatic people, such as those with a fever. Moreover, there was tension regarding the risk of infection related to emerging infectious diseases and difficulty in maintaining personal protective equipment.

Figure 1. Mapping new fevers and infected people (color-coded onboard map).

At the time, the prospects for dispatching subsequent medical personnel from the DMAT were uncertain because of the problem of returning to work at hospitals after returning from the ship. The only "people" who symptomatic passengers were able to interact with were only the DMAT or the Self-Defense Forces. As frontline medical personnel, they fielded complaints, criticisms, and questions from passengers.

The medical personnel were greatly concerned about their prospects for the future, quarantine standards, and they were distressed by repeated questions with no ability to offer answers. We responded to the disaster like Eid-Heberle *et al*. later suggested (*5*), trying to understand those personnel, respecting them, and discussing the limitations of and issues with data collection at the time. Mindful of the psychological changes after a disaster, we also listened carefully and expressed gratitude as necessary.

Passengers' state

Passengers were in extremely serious condition as reported by the DMAT, DPAT, and other teams. Symptomatic passengers expressed anxiety and resentment regarding the order and waiting time for sample collection as well as concerns and uncertainty. Children were no longer laughing. The situation was even more difficult for people in rooms without windows, who were at their mental limit; no one explained what would happen in the future and they were worried that they might be infected. Passengers complained of a variety of physical ailments, and some passengers showed signs of exacerbation of chronic illnesses.

In the confusion, they only received regular medications for their chronic illnesses while in quarantine, and no additional support was provided to maintain their health while in isolation.

Lessons learned

These practices revealed the specifics of emerging infectious diseases and their commonalities, regardless of the disaster. This was because COVID-19 was an emerging infectious disease, all of the passengers and related parties were apprehensive, and the DMAT dispatched to the disaster site could not be instructed by their directors to return to normal work (*6*). That said, victims' anxiety and the need for personnel to provide assistance were consistent, regardless of the disaster.

From a nursing perspective, three lessons were learned to better prepared for future disasters.

i) *Predicting the impact of lifestyle changes on health due to isolation and implementing preventive measures*. From a nursing perspective, lives that could have been saved during a disaster may be lost due to disaster-related deaths. To prevent such situations, timely support must be provided so that people can maintain their health and prepare for recovery and reconstruction (*5*). Consequently, support to maintain health even if isolation is necessary, and support to alleviate stress in response to movement restrictions (exercises to maintain health, interventions that can monitor mental aspects, consultation with a psychiatrist, when necessary, ways to change mood, *etc*.) is possible.

ii) *Protecting individual human rights and dignity even in health emergencies*. For those infected with emerging infectious diseases, the interests of the group are prioritized over those of the individual, and there may be a lack of explanations and considerations for the individual during the initial response to a public health emergency. Passengers had mental problems such as anxiety and sadness, and they complained of uncertainty about their future. Mental health support needs to be provided immediately after a disaster and information needs to be provided to those affected. Further steps need to proceed so that individual considerations can be made.

iii) *Support for personnel providing assistance*. Personnel dealing with emerging infectious diseases are at risk of infection, experience a huge psychological impact (*7,8*), and encounter dilemmas (*9*), such as being unable to return to work immediately after providing assistance, unlike during a normal disaster response. Personnel who provide frontline treatment need support and understanding. The status and activities of personnel providing assistance and their subsequent compensation must be addressed in the future.

In conclusion, these lessons can be drawn from when dealing with emerging infectious diseases. Moreover, nurses comprise the largest portion of healthcare personnel and are expected to play a crucial role in prevention, preparedness, the response to, and recovery from health crises.

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LETTER

The COVID-19 pandemic triggered a change in continuing education in nursing: From face-to-face to online education

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Abstract: Prior to and up to 2019, the Training Center for Nursing Development, National College of Nursing, Japan (NCNJ) had provided education for nurses working at policy-based medical facilities in a face-to-face format. Since 2020 however, all on-campus courses have been cancelled due to the coronavirus disease (COVID-19) pandemic. The nursing directors of all participating facilities were subsequently surveyed; based on their responses, online education was implemented on a trial basis. As a result, all training since 2021 has been provided as online education. Online education has many advantages, such as there is no risk of contracting COVID-19 or other infectious diseases, no need for commuting or accommodations, courses can be attended remotely, and time can be used effectively. That said, there are some disadvantages. Potential improvements should be identified in the future.

***Keywords*:** continuing education, policy-based medical facility, face-to-face education, online education

Function of the Training Center for Nursing Development and conditions prior to coronavirus disease (COVID-19)

The Training Center for Nursing Development of the National College of Nursing, Japan (NCNJ) seeks to improve the quality of practical clinical nursing, clinical nursing research, nursing management, and nursing education for the nursing staff working in the specialized field of policy-based healthcare at the National Medical Research Center for Advanced and Specialized Medical Care (NC), the National Hansen's Disease Sanatorium (NHDS), and the National Hospital Organization (NHO). It also seeks to foster personnel who can play leadership roles in nursing in the field of policy-based medical care.

Education by the NCNJ is provided as short- or long-term courses. Short-term courses last 1-3 days, and long-term courses last 8 weeks.

In 2019, the year before the COVID-19 pandemic, 11 short-term courses and 1 long-term course were conducted. Approximately 600 nurses from all over Japan, from Hokkaido in the north to Okinawa in the south, participated. Courses were conducted face-to-face at the NCNJ's campus in the City of Kiyose, Tokyo.

Impact of the COVID-19 pandemic and trial online education

When planning its courses for 2020, the Training Center for Nursing Development naturally expected to conduct training as usual. However, all planned training was cancelled due to COVID-19. With all future prospects uncertain, the Training Center had to plan and implement alternative training courses.

First, the nursing directors of all 162 participating facilities were surveyed. The questionnaire asked about training needs during the COVID-19 pandemic and the extent to which online courses were ready. Approximately 70% of the facilities responded to the survey.

Responses revealed that training many other facilities, and not just at the NCNJ, had been cancelled due to the spread of COVID-19, educational opportunities for nurses decreased significantly, and nurses ardently wanted to receive online education, with more than 70% responding that they would like to participate.

That said, the Nursing Department did not have much experience with online education, and some nurses were concerned about insufficient preparation of the equipment and how to operate it.

Seeking to address the requests identified by the survey as much as possible, the Training Center began developing a new training plan and application guidelines from scratch. Online education would be implemented on a trial basis, equipment would be prepared and maintained, a website site would be arranged, and other preparations proceeded.

Eventually, the trial was to consist of 5 short-

term courses via online education. Online education included simultaneous interactive education, on-demand training where videos were distributed and participants could watch them as many times as they wanted within the time period designated, and training where the participants were directed to watch the content in advance. There were 242 participants in total. The participants commented that they were equally satisfied with the program, even when compared to face-to-face education thus far.

Aspects of online education (specific methods, what was wanted, and participants' reactions)

Based on experience with the trial, the decision was made to conduct both short- and long-term courses via online education starting in 2021. This in turn gave rise to many new issues, as discussed in previous studies (*1,2*).

Notably, more than 80% of the participants answered "The place was quiet and allowed us to focus" and "Communication was not a problem". In contrast, some participants answered "There were some network instability issues, which were a problem", "The network was unstable at times", "A glitch occurred during group training", and "There were occasional dropouts in audio".

First, the participants' varied circumstances had to considered, such as preparations so that all participants could sit in front of a computer and so that the courses could be conducted without problems. For example, an explanatory document on how to connect to online education had to be prepared, a method of performing a connection test for participants had to be devised and the schedule had to be adjusted before the course began, the course had to be implemented as scheduled, individual support had to be provided to participants who had trouble connecting their microphone or camera, an explanatory document on the protection of copyright and portrait rights had to be prepared and distributed, and consent had to be obtained. In addition, the Training Department personnel who conducted the training had to acquire relevant knowledge and skills, such as operating a computer, broadcasting, understanding copyright laws, and preparing for stable distribution.

Ultimately, 12 short-term courses and 1 long-term course were conducted without incident. A total of 449 nurses participated.

Advantages and disadvantages of online education and plans for the future

After the online education, participants, nursing departments of the medical facility where they worked, and faculty members of the NCNJ who served as training instructors were surveyed. A total of 165 respondents (104 participants, 34 nursing departments, and 27 faculty members of the NCNJ who served as training instructors) provided the feedback below. The following is a list of the most representative findings in order.

Advantages of the online education were: *i*) There is no risk of COVID-19 or other infectious diseases; *ii*) Commuting and accommodations are not needed, courses can be attended remotely, and time can be used effectively (nurses who provide nursing care while raising children can participate); *iii*) Expenses for commuting or accommodations are not incurred; *iv*) The environment is such that everything is done by the participant him/herself; there is a greater level of autonomy; *v*) In group training, tasks can proceed by sharing data; *vi*) For the Nursing Department, the participants' reactions can be judged immediately after they take the course; and *vii*) Instructors also can participate from anywhere, such as a training site.

That said, there were disadvantages and requests: *i*) Participants and instructors have difficulty interacting and *ii*) There were course interruptions due to broadcasting problems, operational errors, and unskilled computer operation.

Notwithstanding these findings, face-to-face education has more than enough advantages, and direct communication is the best. This is a major disadvantage for online education. Opportunities to actively and deliberately interact need to be created, and especially in long-term training, as noted in other studies (*3-5*).
However, the advantages of online education differ from those of face-to-face education. Although online education began as a response to the COVID-19 pandemic, this method should continue to be utilized in the future.

In conclusion, due to the COVID-19 pandemic, education changed from conventional face-to-face training to online education. This fiscal year will mark the end of three full years of online education, including the trial. Whether education is face-to-face or online, the Training Center for Nursing Development, NCNJ should continue to consider further improvements in training.

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Kokudo N, Hara T. "History, Tradition, and Progress": The ceremony of 150th Anniversary of the National Center for Global Health and Medicine held in Tokyo, Japan. BioSci Trends. 2019; 13:105-106.

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Darby S, Hill D, Auvinen A, *et al*. Radon in homes and risk of lung cancer: collaborative analysis of individual data from 13 European case-control studies. BMJ. 2005; 330:223.

Example 3 (Sample book reference):
Shalev AY. Post-traumatic stress disorder: Diagnosis, history and life course. In: Post-traumatic Stress Disorder, Diagnosis, Management and Treatment (Nutt DJ, Davidson JR, Zohar J, eds.). Martin Dunitz, London, UK, 2000; pp. 1-15.

Example 4 (Sample web page reference):
World Health Organization. The World Health Report 2008 – primary health care: Now more than ever. *http://www.who.int/whr/2008/whr08_en.pdf* (accessed March 20, 2022).

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