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DACUM Job Development for Nurses in Child Daycare Centers: Strengthening Expertise in Infant and Toddler Health Care

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Purpose: This study aimed to enhance healthcare for children in daycare centers by analyzing the job development and educational needs of daycare nurses and presenting foundational data on their duties and tasks.
Methods: This descriptive study focused on defining daycare nurses' roles and developing their duties and tasks. The DACUM committee included 10 daycare nurses, with 61 nurses participating in a field survey to validate their duties and analyze educational needs. The analysis employed the coefficient of determination, paired t-test, IPA, Borich Needs Assessment Model, and Locus for Focus Model.
Results: Job analysis identified 10 major duties and 50 tasks for daycare nurses, including monitoring children's health, screening for growth and development, health and safety education, child abuse prevention, infectious disease management, staff health management, environmental hygiene, and professional development. Tasks with the highest educational need were 'Health management for children with chronic diseases and disabilities' and 'Child abuse prevention education.' The role of nurses in child daycare centers is defined as the planning and implementation of health and safety measures to promote children's growth, development, and overall well-being.
Conclusion: The definition of daycare nurses identified in this study provides the qualifications, goals, and guidelines for job performance that daycare nurses in South Korea should possess. The analysis of the educational needs of the identified duties and tasks not only provides the foundation for the target training program for daycare nurses but also offers the priorities for the job training program that must be established as the most important and urgent.

Keywords: Child day care centers; Nurses; Job description; Nursing evaluation research

Introduction

Background

In the current modern society, many children are using daycare facilities due to the increased economic activities of parents and a decrease in the average number of household members. In Korea, as of 2023, approximately 28,000 child daycare centers for infants and young children under age 7 are being operated nationwide, and the utilization rate of child daycare centers among infants and young children in Korea is 49.6% as of 2021, with approximately 1.18 million infants and young children using child daycare centers [1,2]. Children using daycare centers are reported to spend 7 hours and 27 minutes per day on average at daycare centers, indicating that they spend most of the day excluding sleeping time at daycare centers [2]. This means that child daycare centers are an important environment that supports children's health care and development.

Childhood is a very important period in terms of growth and

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development as well as health, and it also involves many health risk factors [3]. More specifically, childhood is a critical period in which physical development occurs most rapidly and the foundation for growth and development is formed, but at the same time, because of the incomplete development of the immune system and lack of self-coping ability for health management, children are at risk of exposure to various infectious diseases, such as colds, the hand-foot-and-mouth disease (HFMD), and emerging viruses [4]. In view of these characteristics of children and the childcare environment, the role of daycare nurses, who are professional personnel who systematically manage the health of children in child daycare centers, is very important [5]. The importance of the role of nurses in daycare centers lies in the fact that daycare nurses can carefully monitor the health status of children in daycare centers, respond quickly when health problems in children occur, interact with the children's families, and provide support for health management so that the systematic management of children's health, such as vaccinations and early childhood health examinations, will be continuously carried out [3,6].

The legal regulations in Korea require that child daycare centers with 100 or more children should have a nurse (including a nursing assistant) as a full-time staff member [7]. However, it has been reported that the majority of child daycare centers, approximately 92% of them, look after less than 100 children, and that only 5% or less of daycare facilities have a nurse as a staff member [1]. In other words, child daycare centers with less than 100 children have no obligation to place a professional nursing staff member in daycare centers [2]. As a result, childcare teachers are currently performing health management and infectious disease prevention as well as childcare [8]. Although it is important for childcare teachers to have knowledge about infectious disease management [9], it has been reported that childcare teachers experienced great physical and emotional difficulties in performing both childcare and infectious disease management at the same time in the situations of large-scale infectious disease outbreaks such as the COVID-19 pandemic [10]. These research results suggest that child daycare centers should have a professional nurse as a full-time staff member, as in schools, and there is a need to systematically establish the roles of daycare nurses.

As described above, there are limitations in childcare teachers' coping with the situations of large-scale infectious disease outbreaks, and at the same time, the need and demand for the prevention and management of infectious diseases in children attending daycare centers are currently increasing. In addition, since children have immature cognitive and expressive abilities, it is difficult for them to accurately communicate their illness or pain, and they also have limitations in recognizing dangerous situations. Furthermore, children with chronic diseases, such as asthma, diabetes, allergies, and seizures, require continuous observation by nurses and childcare teachers, and social and emotional problems related to specific developmental stages, such as separation anxiety, ADHD, and autism spectrum disorder, also commonly occur in young children, so it is important to take into account child development in the management of children's health and the creation of an environment for children [7]. However, although daycare nurses play an essential role in the health management of children in daycare centers, their duties and tasks have not yet been accurately defined. Therefore, as a prerequisite for effective management of children's health, it is required to clearly understand the roles, duties, and duties of nurses working in child daycare centers, and in the current situation where nurses' work is being diversified in various areas, it is essential to definitely establish the duties and tasks of nurses in child daycare centers.

Job analysis is the process of systematically deriving the duties and tasks required for a specific job, and the results are used as basic data for human resource development, construction of a human resource management system, and design of a job training system [11,12]. In particular, the DACUM (Developing A Curriculum) technique is widely used as a practical method for deriving duties and tasks through workshops where experienced workers with practical experience engaged in the relevant job participate [13]. As described above, the results of job analysis can be used in the area of human resource development to train employees and develop their capabilities, and can also be employed to construct a human resource management system. In addition, an analysis of educational needs for job training can be used to identify the current and desired levels of duties and tasks and determine educational priorities, and the results of educational needs analysis can be used as basic data for designing a job training system [12]. However, in Korea, neither a widely accepted, clear definition of the roles of daycare nurses nor standardized guidelines for their duties and tasks are currently available. Therefore, first of all, it is necessary to define the roles of daycare nurses and develop the standardized duties and tasks that they should perform. The development of a standardized job description not only provides guidelines for the duties and tasks that daycare nurses should perform, but is also useful in identifying the areas where job training for daycare nurses is needed.

Therefore, this study aimed to clearly define the roles of the current daycare nurses and present standards for their duties and tasks through the development of the job description of daycare

nurses by applying the DACUM technique. In addition, this study also intended to identify educational priority areas where job training for daycare nurses is required through educational needs analysis. Through this research, the present study sought to provide data that can serve as a basis for making policies related to daycare nurses and developing job training and capacity development programs for daycare nurses with the aim of contributing to the management and promotion of the health of children in child daycare centers.

Objectives

The specific objectives of this study are as follows:

1) To clearly define the roles of nurses in child daycare centers;
2) to develop the job of nurses in child daycare centers, that is, their duties and tasks by using the DACUM technique;
3) to verify the validity of the developed duties and tasks of nurses in child daycare centers, and identify their educational needs.

Methods

Research design and process

This study is a descriptive study to develop the duties and tasks of nurses in child daycare centers by using the DACUM technique. The research process consists of the development process of the duties and tasks of daycare nurses using the DACUM technique and the evaluation process, which includes the validity evaluation of the developed job description and the identification of educational needs for job training and educational priorities of the duties and tasks of daycare nurses (Figure 1).

The levels of importance, performance, and difficulty of each of the duties and tasks of nurses in child daycare centers were analyzed. Based on the analysis results, the determination coefficients, paired t-test, Importance-Performance Analysis (IPA), Borich's needs assessment model, and the Locus for Focus (LF) model were comprehensively used to analyze the educational needs for job training among daycare nurses, and determine the educational priorities of the duties and tasks of daycare nurses.

Procedures

1. Composition of the DACUM committee

In order to recruit the members of the DACUM committee, recruitment notices were posted in the child daycare centers located in Seoul where at least one nurse with an RN license was currently working. The researcher explained the purpose of the study to the participants who expressed their intention to voluntarily participate in the study and obtained written informed consent from them. As a result, nurses who had at least 6 months of experience of working as a nurse in a child daycare center were selected as the subject matter experts who acted as the members of the DACUM committee.

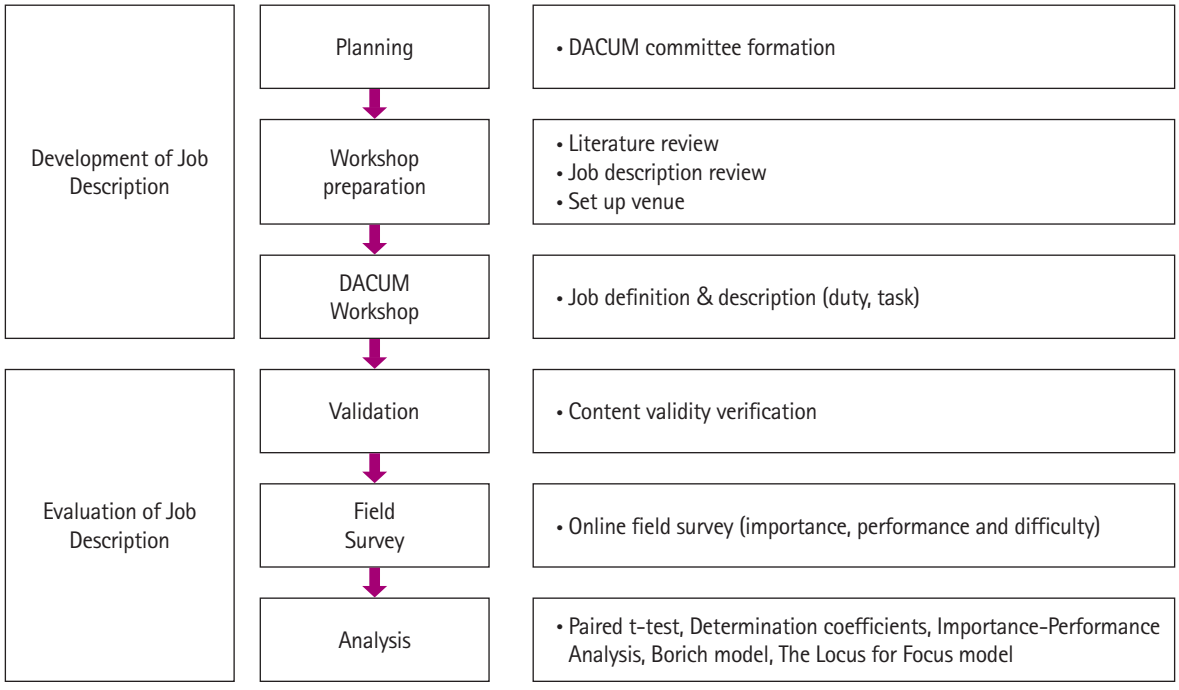

Figure 1. Research process.

2. Preparation for the DACUM workshop

In order to smoothly carry out the DACUM face-to-face workshop, a list of key questions to be asked during the workshop was provided in advance to the DACUM committee members, and the list of questions was created based on a literature review and the definitions of relevant duties and tasks. In addition, how the DACUM workshop would be carried out was also explained in advance to the participants of the DACUM workshop.

3. Implementation of the DACUM Workshop

The DACUM face-to-face workshop was held for 3 hours on November 2, 2023, by renting the main auditorium of a building. After an orientation on the DACUM job analysis was given to the participants, the facilitator proceeded with the DACUM workshop to develop the definition of the role of daycare nurses as well as their duties and tasks.

The seminar room was organized in a way that the chairs were placed to allow the participants to face each other and look at the whiteboard in the front, and the facilitator of the DACUM workshop used the Padlet program to display tasks and duties on Padlet whenever they were derived, and coordinated the DACUM committee members' opinions to rearrange, modify, and delete the tasks and duties of daycare nurses.

4. Verification of content validity

The verification of content validity for the definition of the role of daycare nurses and the 10 duties and 50 tasks of daycare nurses developed through the DACUM workshop was conducted by 8 related experts: 2 directors of child daycare centers, 1 child daycare center visiting nurse, 1 university hospital infection control nurse, 2 nursing professors, and 2 child daycare center nurses. To verify content validity, the Content Validity Index (CVI) was calculated, and revisions of the definition and duties and tasks of daycare nurses were made based on the feedback of the experts.

5. Field survey

A field survey was conducted among nurses working at child daycare centers located in Seoul to assess the importance, performance, and difficulty levels of each of the 10 duties and 50 tasks of daycare nurses, which were developed in this study through the process described above. The level of importance of each of the duties and tasks was measured on a 5-point Likert scale ranging from 'Not important at all' to 'Very important', and regarding the reliability of the importance assessment scale, the value of Cronbach's α was .97. The level of performance of each of the duties and tasks was rated on a 5-point Likert scale ranging from 'Never' to 'Always', and for the reliability of the performance assessment scale, the value of Cronbach's α was .95. The level of difficulty of each of the duties and tasks was measured on a 5-point Likert scale ranging from 'Very easy' to 'Very difficult', and for the reliability of the difficulty assessment scale, the value of Cronbach's α was .949.

6. Analysis of educational needs of child daycare nurses

In order to present the educational priorities of the duties and tasks of daycare nurses regarding job training, this study conducted educational needs analysis for job training. Educational needs analysis for the duties and tasks of daycare nurses was conducted using the coefficient of determination using the levels of importance and difficulty, paired t-test for the levels of importance and performance, IPA, Borich's needs assessment model, and the LF model. In consideration of the fact that when interpreting the results of IPA, if there is a high correlation between the importance and performance levels of each item, the results tend to show a skewed pattern in the IPA matrix, Borich's need assessment model and the LF model were used together to maintain the objectivity of the results [14,15]. In particular, Borich's needs assessment [14] was used to prioritize educational needs by analyzing the gap between the desired and current competencies, and the following formula was used.

$$Borich\ needs\ score = \frac{\Sigma\left(RCL - PCL\right) \times \overline{RCL}}{N}$$

$$\mathrm{RCL} = \text{importance score}; \mathrm{PCL} = \text{performance score}; \mathrm{N} = \text{total number of items}.$$

Participants

1. DACUM committee

In accordance with the guideline that the DACUM committee for the DACUM workshop should consist of 5 to 12 members engaged in the relevant occupation [16], the participants of the DACUM workshop consisted of a total of 14 people: 1 facilitator, 10 subject matter experts corresponding to the DACUM committee members, and 3 recorders. The subject matter experts were selected from people who had a nurse (RN) license, had at least 6 months of experience of working as a nurse in child daycare centers, and were currently working in a child daycare center. Regarding the career length of the subject matter experts, the average length of nurse career was 7 years, and the average length of child daycare center nurse career was 6 years. The general characteristics of the participants are shown in Table 1.

2. Participants of the field survey

The field survey on the importance, performance, and difficulty levels of the developed duties and tasks was conducted, based on the initial information that a total of 96 nurses were working at child daycare centers located in Seoul as of 2022, and a survey of the 96 nurses was conducted. The survey was carried out from January to June, 2024 by mailing the online link and QR code for the survey along with the participant information sheet to child daycare centers with 100 or more children. A total of 96 copies of the questionnaire were collected online, but a total of 61 copies were included in the analysis after excluding 35 copies, which included 5 copies with insincere responses and 30 copies from people without a RN license (nursing assistants).

Ethical considerations

This study was conducted after receiving approval from the Institutional Review Board of Korea University (IRB No. KUIRB-2023-0309-02). In accordance with the content of approval, people who wished to participate in the study were asked to participate in the questionnaire survey through an online link to the survey provided in the notice. Before participating in the survey, participants were asked to read check the personal information collected and detailed explanations about research through the participant information sheet, and they were asked to check "Agree" if they agreed to participate in order to confirm their voluntary participation in this study. It was explained to the participants that even after a person has signed the informed consent form for research participation, he or she can withdraw from the study at any time without any disadvantages if her or she does not wish to participate. The participants were also given explanations about the guarantee of confidentiality and anonymity of research data and the fact that the survey data would not be used for any purpose other than research.

Data analysis

Data analysis was performed using Microsoft Excel and IBM SPSS/WIN 26.0. The general characteristics of the participants were analyzed using descriptive statistics by calculating percentages, frequencies, means, and standard deviations. To verify the content validity of the developed duties and tasks, the CVI was calculated through the validity assessments by a group of experts, and the I-CVI was calculated. For job analysis, the means and standard deviations of the performance, importance, and difficulty levels of the developed duties and tasks were calculated. Also, for educational needs analysis, the coefficient of determination was calculated by multiplying the level of importance by the level of difficulty, and for the performance and importance levels, the paired-t-test, IPA, Borich's needs assessment, and the LF model were used for analysis.

Results

Definition of child daycare nurses and development of their duties and tasks

1. Definition of child daycare nurses

To define the duties and tasks of daycare nurses through the DACUM workshop, definitions of similar occupations such as school nurses, visiting nurses of child daycare centers, and general nurses were reviewed. Through the consensus of the DACUM workshop committee, the explicit definition of a daycare nurse was derived as "a nurse who makes health and safety plans and implements health and safety measures to promote the growth and development and health of infants and young children in child daycare centers." In the verification of content validity by a

Table 1. Demographic Characteristics of Subject Matter Expert (*N*=10)

No.	Age (years)	Education	Type of child Day care center	Nurse career (years)	Child day care center nurse career (years)
Expert 1	39	University	Private	11	3.7
Expert 2	58	University	Public	12	12.0
Expert 3	58	University	Public	17	4.0
Expert 4	49	University	Private	3	3.0
Expert 5	51	Master	Public	3	18.5
Expert 6	41	Master	Private	3	2.0
Expert 7	42	Master	Workplace	3	5.0
Expert 8	45	University	Public	5	6.0
Expert 9	39	University	Private	0	3.0
Expert 10	54	University	Workplace	10	2.0

panel of experts, the content validity of the derived duties and tasks was found to be adequate with an I-CVI of 1.0.

2. Job of child daycare nurses: Duties and tasks

Through the discussion processes during the DACUM workshop, the initial draft of daycare nurses' job description consisting of 10 duties and 50 tasks was created. The developed draft was refined through meetings of the research team, and then its content validity was verified by 8 relevant experts. During the verification of content validity, no duties or tasks that were eliminated based on the criterion that an I-CVI value of .78 or higher indicates good content validity [17]. The average I-CVI of all items was 0.98, and the descriptions of duties and tasks were revised to reflect other opinions of experts (Table 2).

Analysis of educational needs and priorities of child daycare nurses

1. General characteristics of child daycare nurses

Among the daycare nurses who participated in the field survey, 60 people were female and 1 person was male, and the average age of the participants was 39.2 years. In terms of marital status and parenting experience, married people with parenting experience accounted for the highest proportion at 57.4%. Regarding the types of child daycare centers where they were currently working, the proportion of workplace daycare centers was highest at 68.9%, followed by public daycare centers (21.3%), private daycare centers (6.6%), and corporate/organizational daycare centers (3.3%). The average length of nurse career was 5 years and 4 months, and the average length of child daycare center nurse career was 4 years. 16.4% of the participants had both a RN license and a childcare teacher license, and 23% had the experience of child daycare center nurse job-related training, while 77% did not (Table 3).

2. Performance, importance, and difficulty levels of the duties and tasks of child daycare nurses

The analysis results of the performance, importance, and difficulty levels of the duties and tasks of daycare nurses are shown in Table 4. Regarding the duties and tasks of daycare nurses, the average level of importance was 4.42 ± 0.41 points, the average level of performance was 4.22 ± 0.55 points, and the average level of difficulty was 2.67 ± 0.55 points. In other words, the mean scores of importance and performance were higher than 4 points, and the mean score of difficulty was above 2 points but less than 3 points.

Among the 10 duties, the duty with the highest level of importance was 'Infectious disease management' (4.67 ± 0.43 points), the duty with the highest level of performance was 'Professional development' (4.80 ± 0.33 points), and the duty with the highest level of difficulty level was 'Child abuse prevention and management' (3.17 ± 0.79 points). On the other hand, the duty with the lowest level of importance was 'Health monitoring of infants and toddlers' (4.03 ± 0.59 points), and the duty with the lowest level of performance was also 'Health monitoring of infants and toddlers' (2.97 ± 0.86 points). The duty with the lowest level of difficulty was 'Professional development' (2.16 ± 0.68 points). With respect to the importance, performance, and difficulty levels of tasks, among the 50 tasks, the task with the highest level of importance was 'Response and action in case of health issues or emergencies (including first aid)' (4.89 ± 0.37 points). Tasks with the highest level of performance were 'H-1. Management of the health room and medical supplies' (5 points) and 'I-2. Completion of mandatory daycare center training' (5 points). The task with the highest level of difficulty was 'A-2. Oral health monitoring' (4.03 ± 3.74 points). Meanwhile, tasks with the lowest level of importance were 'A-2. Oral health monitoring' and 'A-3. Periodic vision screening', both of which had a low mean score for importance between 3 and 4 points. These two tasks also had the lowest level of performance, and their mean scores for performance were less than 3 points and less than 2 points, respectively. Some tasks had a mean score for difficulty lower than 2 points and these tasks rated as having a low level of difficulty were as follows: 'A-1. Measurement and recording of body temperature', 'H-1. Management of the health room and medical supplies', 'J-3. Purchasing and managing medical supplies and medication records', and 'J-4. Recording and managing health logs (medication, first aid, education, etc.)'.

3. Coefficients of determination of the duties and tasks of child daycare nurses

In order to determine the relative values of the developed duties and tasks, the coefficients of determination (DC: importance × difficulty) of each duty and task are presented in Table 4. A higher value of coefficient of determination indicates a relatively higher value or a higher level of importance of the duty or task [18]. Among the 10 duties, 'E. Child Abuse Prevention and Management' had the highest determination coefficient, followed by 'B. Growth and development screening of infants and toddlers' and 'D. Health Management and Recommendation with Medical Institutions' in descending order. However, the following duties had a low coefficient of determination: 'H. Environmental and Hygiene Management' and 'I. Professional Development.' Among the 50 tasks, 'E-1. Monitoring children suspected of be-

Table 2. Duty and Task of Child Daycare Nurses

Duty (10)	Task (50)
A. Health monitoring of infants and toddlers	1. A-1. Measurement and recording of body temperature
	2. A-2. Oral health monitoring
	3. A-3. Periodic vision screening
	4. A-4. Sharing health status of infants and toddlers with staff and parents
B. Growth and development screening of infants and toddlers	5. B-1. Physical measurements and records
	6. B-2. Developmental screening test
	7. B-3. Communication, consultation, and recommendation with parents in case of delayed growth and development
C. Health and safety education for infants, toddlers, and parents	8. C-1. Safety education (fine dust, medication safety, falls, burns)
	9. C-2. Education on proper health habits (handwashing, tooth brushing, healthy eating)
	10. C-3. Gender sensitivity education
	11. C-4. Parent education on health and safety for infants and toddlers (hygiene, child abuse, gender sensitivity)
	12. C-5. Planning educational programs and developing materials
	13. C-6. Collaboration with external organizations for education (waterworks, fire station, etc.)
D. Health management and recommendation with medical institutions	14. D-1. Response and action in case of health issues or emergencies (including first aid)
	15. D-2. Health management of infants and toddlers with chronic illnesses or disabilities
	16. D-3. Guidance on health checkups, reviewing results, and consultations
	17. D-4. Medication administration as per prescription request
	18. D-5. Hospital transfer and recommendation with medical institutions for emergency patients
	19. D-6. Early detection of socio-emotional and behavioral issues, and recommendation with relevant agencies
	20. D-7. Verification and guidance on vaccinations
	21. D-8. Communication with parents about emergencies and health concerns
	22. D-9. Consultation with teachers and parents regarding major health issues in early childhood
E. Child abuse prevention and management	23. E-1. Monitoring children suspected of being abused
	24. E-2. Reporting to relevant authorities when signs of abuse are detected
	25. E-3. Child abuse prevention education (for child, parents, and childcare staff)
F. Infectious disease management	26. F-1. Arrangement of children and contacts in case of an infectious disease outbreak
	27. F-2. Securing isolation areas during infectious disease outbreaks
	28. F-3. Reporting and notifying the situation during infectious disease outbreaks
	29. F-4. Application of transmission blocking and infection control methods based on guidelines during infectious disease outbreaks
	30. F-5. Identifying transmission routes and contacts during infectious disease outbreaks
	31. F-6. Providing updates on infection status (via notices, Kid's Note app, etc.)
	32. F-7. Informing parents of attendance criteria for preventing infection during outbreaks
	33. F-8. Supporting daycare center sanitation and disinfection management
G. Education and health management of daycare staff	34. G-1. Health consultations for staff
	35. G-2. Guidance and management of staff health checkups
	36. G-3. Education on major infant and toddler diseases (infectious diseases, febrile seizures, SIDS, CPR, and AED)
	37. G-4. conducting simulation training for infection prevention
H. Environmental and hygiene management	38. H-1. Management of the health room and medical supplies
	39. H-2. Safety management of facilities (supervision of cleaning and disinfecting equipment, and requesting repairs)
	40. H-3. Indoor air quality management
I. Professional development	41. I-1. Completion of continuing education for nurses
	42. I-2. Completion of mandatory daycare center training
	43. I-3. Research on the latest health information (public health agency, local government announcements, etc.)
J. Administrative tasks	44. J-1. Planning, budgeting, and evaluation of the annual health management plan
	45. J-2. Development and management of daycare center health records (allergy, diseases, etc)
	46. J-3. Purchasing and managing medical supplies and medication records
	47. J-4. Recording and managing health logs (medication, first aid, education, etc.)
	48. J-5. Writing accident reports in case of safety incidents (for the Childcare Center Safety & Insurance Association)
	49. J-6. Preparing and distributing health-related newsletters for families
	50. J-7. Managing health room supplies and drafting requisition reports

Table 3. Demographic Characteristics of Child Daycare Nurses (*N*=61)

Characteristics	Categories	N (%)	M ± SD
Gender	Male	1 (1.6)	
	Female	60 (98.4)	
Age (yrs)	< 30	9 (14.8)	39.2 ± 8.79
	30-39	18 (30.0)	
	40-49	27 (43.7)	
	≥ 50	7 (11.5)	
Marital and parenting experience	Single	16 (26.2)	
	Married (no parenting experience)	10 (16.4)	
	Married (with parenting experience)	35 (57.4)	
Level of education	College (2~3years)	20 (32.8)	
	University (4 years)	39 (63.9)	
	Above graduate school	2 (3.3)	
Type of child daycare centers	Public	13 (21.3)	
	Corporate·organizational	2 (3.3)	
	Workplace	42 (68.9)	
	Private	4 (6.6)	
Nurse career (months)			65.36 ± 6.62
Child day care center nurse career (months)			48.57 ± 5.98
License†	Nurse	61 (100.0)	
	Daycare teacher	10 (16.4)	
Child daycare nurse job-related training experience	Yes (training experience)	14 (23.0)	
	No (no training experience)	47 (77.0)	

†Multiple responses.

Table 4. Importance, Performance, and Difficulty of Child Daycare Nurses Job (*N*=61)

Duty and task	Importance	Performance	Difficulty	DC	DC rank
	M ± SD	M ± SD	M ± SD		
A. Health monitoring of infants and toddlers	4.03 ± 0.59	2.97 ± 0.86	3.04 ± 1.06	12.25	4
A-1	4.52 ± 0.65	4.34 ± 0.89	1.97 ± 0.89	8.90	47
A-2	3.59 ± 0.88	2.69 ± 1.30	4.03 ± 3.74	14.48	6
A-3	3.52 ± 0.87	1.89 ± 1.13	3.72 ± 0.88	13.12	14
A-4	4.49 ± 0.65	4.59 ± 0.76	2.43 ± 0.92	10.90	30
B. Growth and development screening of infants and toddlers	4.33 ± 0.58	3.61 ± 1.00	3.03 ± 0.66	13.11	2
B-1	4.33 ± 0.60	4.66 ± 0.95	2.23 ± 0.86	9.65	41
B-2	4.28 ± 0.61	3.21 ± 1.40	3.23 ± 0.80	13.82	8
B-3	4.38 ± 0.71	2.95 ± 1.33	3.64 ± 0.93	15.93	3
C. Health and safety education for infants, toddlers, and parents	4.32 ± 0.57	3.92 ± 0.99	2.78 ± 0.81	12.01	5
C-1	4.33 ± 0.75	4.41 ± 1.04	2.43 ± 0.90	10.50	33
C-2	4.49 ± 0.62	4.43 ± 1.02	2.26 ± 0.85	10.16	37
C-3	4.39 ± 0.64	3.59 ± 1.39	3.00 ± 1.08	13.18	13
C-4	4.39 ± 0.69	3.59 ± 1.37	2.89 ± 1.02	12.68	20
C-5	4.33 ± 0.68	3.77 ± 1.23	3.10 ± 0.91	13.41	12
C-6	4.00 ± 0.91	3.72 ± 1.46	3.00 ± 1.20	12.00	24

(Continued to the next page)

Table 4. Continued

Duty and task	Importance	Performance	Difficulty	DC	DC rank
	M ± SD	M ± SD	M ± SD		
D. Health management and recommendation with medical institutions	4.58 ± 0.40	4.26 ± 0.69	2.79 ± 0.81	12.78	3
D-1	4.89 ± 0.37	4.95 ± 0.22	2.82 ± 0.81	13.77	9
D-2	4.44 ± 0.62	3.80 ± 1.21	3.43 ± 0.76	15.22	5
D-3	4.34 ± 0.73	4.20 ± 1.39	2.49 ± 0.79	10.83	31
D-4	4.80 ± 0.44	4.82 ± 0.74	2.00 ± 0.77	9.61	42
D-5	4.82 ± 0.39	4.89 ± 0.32	2.80 ± 0.95	13.51	10
D-6	4.34 ± 0.68	2.93 ± 1.48	3.67 ± 0.72	15.95	2
D-7	4.44 ± 0.70	4.33 ± 1.40	2.15 ± 0.85	9.54	43
D-8	4.72 ± 0.52	4.62 ± 0.90	2.85 ± 1.01	13.47	11
D-9	4.41 ± 0.62	3.75 ± 1.32	2.89 ± 1.03	12.72	18
E. Child abuse prevention and management	4.62 ± 0.57	4.13 ± 0.99	3.17 ± 0.79	14.65	1
E-1	4.70 ± 0.53	4.21 ± 1.08	3.43 ± 1.04	16.12	1
E-2	4.69 ± 0.53	4.36 ± 1.05	3.30 ± 0.90	15.45	4
E-3	4.48 ± 0.79	3.82 ± 1.49	2.80 ± 0.87	12.55	21
F. Infectious disease management	4.67 ± 0.43	4.62 ± 0.62	2.52 ± 0.71	11.77	6
F-1	4.69 ± 0.50	4.67 ± 0.65	2.70 ± 0.86	12.68	19
F-2	4.75 ± 0.47	4.64 ± 0.73	2.59 ± 0.97	12.31	22
F-3	4.62 ± 0.52	4.62 ± 0.82	2.38 ± 0.82	10.99	28
F-4	4.74 ± 0.48	4.69 ± 0.67	2.57 ± 0.85	12.19	23
F-5	4.59 ± 0.56	4.56 ± 0.76	2.85 ± 0.96	13.09	15
F-6	4.67 ± 0.54	4.59 ± 0.86	2.21 ± 0.93	10.34	34
F-7	4.69 ± 0.50	4.62 ± 0.78	2.34 ± 0.91	10.99	27
F-8	4.59 ± 0.56	4.57 ± 0.85	2.48 ± 0.79	11.36	26
G. Education and health management of daycare staff	4.36 ± 0.55	4.07 ± 0.67	2.67 ± 0.55	11.64	7
G-1	4.34 ± 0.68	4.49 ± 0.77	2.49 ± 0.67	10.83	31
G-2	4.56 ± 0.53	4.80 ± 0.54	2.13 ± 0.74	9.71	40
G-3	4.41 ± 0.67	4.30 ± 1.02	2.61 ± 0.74	11.49	25
G-4	4.11 ± 0.75	2.70 ± 1.44	3.44 ± 0.87	14.17	7
H. Environmental and hygiene management	4.41 ± 0.50	4.62 ± 0.55	2.30 ± 0.63	10.14	9
H-1	4.61 ± 0.49	5.00 ± 0.00	1.95 ± 0.74	8.99	46
H-2	4.38 ± 0.64	4.69 ± 0.76	2.36 ± 0.98	10.33	35
H-3	4.25 ± 0.65	4.16 ± 1.36	2.57 ± 0.83	10.93	29
I. Professional development	4.34 ± 0.69	4.80 ± 0.33	2.16 ± 0.68	9.37	10
I-1	4.34 ± 0.77	4.74 ± 0.70	2.16 ± 0.86	9.40	44
I-2	4.36 ± 0.78	5.00 ± 0.00	2.00 ± 0.77	8.72	49
I-3	4.31 ± 0.70	4.66 ± 0.66	2.31 ± 0.74	9.97	38
J. Administrative tasks	4.31 ± 0.59	4.44 ± 0.61	2.43 ± 0.67	10.47	8
J-1	4.10 ± 0.79	3.79 ± 1.32	3.18 ± 1.02	13.03	17
J-2	4.31 ± 0.76	3.79 ± 1.39	3.03 ± 0.97	13.08	16
J-3	4.39 ± 0.69	4.90 ± 0.30	1.97 ± 0.80	8.64	50
J-4	4.51 ± 0.60	4.93 ± 0.25	1.95 ± 0.74	8.79	48
J-5	4.56 ± 0.59	4.56 ± 1.20	2.18 ± 0.87	9.94	39
J-6	4.16 ± 0.73	4.30 ± 1.42	2.46 ± 0.94	10.24	36
J-7	4.15 ± 0.79	4.84 ± 0.45	2.21 ± 0.90	9.18	45

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ing abused' had the highest coefficient of determination, followed by 'D-6. Early detection of socio-emotional and behavioral issues, and recommendation with relevant agencies' and 'B-3. Communication, consultation, and recommendation with parents in case of delayed growth and development' in descending order. On the other hand, the following tasks had a low coefficient of determination: 'I-2. Completion of mandatory daycare center training', and 'J-3. Purchasing and managing medical supplies and medication records.'

4. Analysis of educational needs of child daycare nurses and prioritizaton of educational needs

The difference or gap between the importance and performance of each of the duties and tasks of daycare nurses and the results of the paired t-test are shown in Table 5. Among the 10 duties, 'A. Health Monitoring of Infants and Toddlers' ($t = 8.72$, $p < .001$) had the lowest level of performance compared to the level of importance. In terms of the level of performance compared to the level of importance, 'F. Infectious Disease Management' and 'J. Administrative Tasks' did not show a statistically significant difference. 'I. Professional Development' ($t = -5.69$, $p < .001$) was the duty with the highest level of performance compared to the level of importance. With respect to tasks with a low level of performance compared to the level of importance, among the 50 tasks, the task with the lowest level of performance compared to the level of importance was 'A-3. Periodic vision screening', followed by 'G-4. Conducting simulation training for infection prevention' and 'B-3. Communication, consultation, and recommendation with parents in case of delayed growth and development' in that order. As for tasks with a high level of performance compared to the level of importance, the task with the highest level of performance compared to the level of importance was 'I-2. Completion of mandatory daycare center training', followed by 'J-7. Managing health room supplies and drafting requisition reports' and 'H-1. Management of the health room and medical supplies.'

In the results of Borich's needs assessment, among the 10 duties, the duty with the highest educational need was 'A. Health Monitoring of Infants and Toddlers,' and 'B. Growth and development screening of infants and toddlers' and 'E. Child abuse Prevention and Management' were the duties with the second and third highest educational needs, respectively. Regarding the educational needs of tasks, the task with the highest educational need was 'B-3. Communication, consultation, and recommendation with parents in case of delayed growth and development', followed by 'D-6. Early detection of socio-emotional and behavioral issues, and recommendation with relevant agencies', 'G-4. Conducting simulation training for infection prevention', 'A-3.

Table 5. Analysis of The Difference In Importance And Performance of Child Daycare Nurses (N=61)

Task	Gap (P-I)		Borich model		IPA	LF model
	M ± SD	t	Need score	Rank		
A. Health monitoring of infants and toddlers	1.06 ± 0.94	8.783***	0.428	1		
A-1	0.18 ± 1.02	1.37	0.02	18	KU	LH
A-2	0.90 ± 1.32	5.31***	0.07	8	LP	HL
A-3	1.63 ± 1.14	11.23***	0.12	4	LP	HL
A-4	-0.09 ± 0.90	-0.85	-0.01	38	KU	LH
B. Growth and development screening of infants and toddlers	0.72 ± 1.06	5.272***	0.312	2		
B-1	-0.32 ± 1.09	-2.35*	-0.03	43	PO	LL
B-2	1.06 ± 1.45	5.70***	0.09	5	LP	HL
B-3	1.42 ± 1.32	8.42***	0.13	1	LP	HL
C. Health and safety education for infants, toddlers, and parents	0.40 ± 0.91	3.449**	0.175	4		
C-1	-0.08 ± 1.05	-0.61	-0.01	37	PO	LL
C-2	0.06 ± 0.96	0.53	0.01	27	KU	LH
C-3	0.80 ± 1.31	4.77***	0.07	6	LP	HL
C-4	0.80 ± 1.40	4.48***	0.07	6	LP	HL
C-5	0.55 ± 1.36	3.20**	0.05	12	LP	HL
C-6	0.27 ± 1.19	1.82	0.02	17	LP	HL

(Continued to the next page)

Table 5. Continued

Task	Gap (P-I)		Borich model		IPA	LF model
	M ± SD	t	Need score	Rank		
D. Health management and recommendation with medical institutions	0.32 ± 0.66	3.787***	0.148	5		
D-1	-0.06 ± 0.40	-1.27	-0.01	36	KU	LH
D-2	0.63 ± 1.25	3.99***	0.06	11	CH	HH
D-3	0.14 ± 1.44	0.80	0.01	19	PO	LL
D-4	-0.01 ± 0.74	-0.17	-0.00	34	KU	LH
D-5	-0.06 ± 0.47	-1.07	-0.01	35	KU	LH
D-6	1.40 ± 1.38	7.96***	0.12	2	LP	HL
D-7	0.11 ± 1.40	0.64	0.01	21	KU	LH
D-8	0.09 ± 0.76	1.00	0.01	23	KU	LH
D-9	0.65 ± 1.35	3.79***	0.06	10	CH	HL
E. Child abuse prevention and management	0.49 ± 1.03	3.728***	0.227	3		
E-1	0.49 ± 1.13	3.39**	0.05	13	KU	HH
E-2	0.32 ± 1.09	2.35*	0.03	15	KU	HH
E-3	0.65 ± 1.41	3.63**	0.06	9	CH	HH
F. Infectious disease management	0.04 ± 0.70	0.521	0.022	7		
F-1	0.01 ± 0.78	0.16	0.00	30	KU	LH
F-2	0.11 ± 0.85	1.04	0.01	20	KU	LH
F-3	0.00 ± 0.94	0.00	0.00	32	KU	LH
F-4	0.04 ± 0.80	0.48	0.01	28	KU	LH
F-5	0.03 ± 0.81	0.31	0.00	29	KU	LH
F-6	0.08 ± 0.98	0.65	0.01	24	KU	LH
F-7	0.06 ± 0.87	0.59	0.01	26	KU	LH
F-8	0.01 ± 0.86	0.15	0.00	31	KU	LH
G. Education and health management of daycare staff	0.28 ± 0.64	3.409**	0.123	6		
G-1	-0.14 ± 0.81	-1.42	-0.01	40	PO	LL
G-2	-0.24 ± 0.69	-2.75**	-0.02	41	KU	LH
G-3	0.11 ± 1.03	0.87	0.01	22	KU	LL
G-4	1.40 ± 1.22	8.95***	0.12	3	LP	HL
H. Environmental and hygiene management	-0.20 ± 0.57	-2.838**	-0.092	9		
H-1	-0.39 ± 0.49	-6.24***	-0.04	46	KU	LH
H-2	-0.31 ± 0.71	-3.38**	-0.03	42	PO	LL
H-3	0.08 ± 1.24	0.52	0.01	25	PO	LL
I. Professional development	-0.45 ± 0.63	-5.690***	-0.199	10		
I-1	-0.39 ± 0.78	-3.94***	-0.03	45	PO	LL
I-2	-0.63 ± 0.77	-6.44***	-0.06	49	PO	LL
I-3	-0.34 ± 0.81	-3.30**	-0.03	44	PO	LL
J. Administrative tasks	-0.13 ± 0.52	-1.943	-0.057	8		
J-1	0.31 ± 1.17	2.07*	0.03	16	LP	HL
J-2	0.52 ± 1.25	3.25**	0.05	14	LP	HL
J-3	-0.50 ± 0.72	-5.50***	-0.05	48	PO	LL
J-4	-0.42 ± 0.56	-5.93***	-0.04	47	KU	LH
J-5	0.00 ± 1.15	0.00	0.00	32	KU	LH
J-6	-0.13 ± 1.24	-0.82	-0.01	39	PO	LL
J-7	-0.68 ± 0.76	-7.03***	-0.06	50	PO	LL

*p<.05, **p<.01, ***p<.001; LF model=locus for Focus model; IPA=importance-performance analysis; P=performance; I=importance; M=mean; SD=standard deviation; HH=high discrepancy/high importance; HL=high discrepancy/low importance; LL=low discrepancy/low importance; LH=low discrepancy/high importance; KU=keep up the good work; CH=concentrate here; LP=low priority; PO=possible overkill.

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Periodic vision screening', and 'B-2. Developmental screening test' in descending order.

The results of IPA are shown in Figure 2. A four-quadrant matrix was created based on the average level of importance (4.42 out of 5 points) and the average level of performance (4.22 out of 5 points) of the duties and tasks of daycare nurses according to the criteria presented by previous studies [18,19]. In the Importance-Performance Analysis (IPA), Quadrant 1 (Keep up the good work; KU) represents the areas that have a high level of importance and a high level of performance, and thus need the maintenance of the current status, and KU Quadrant included the following tasks: A-1, A-4, C-2, D-1, D-4, D-5, D-7, D-8, E-2, F-1, F-2, F-3, F-4, F-5, F-6, F-7, F-8, G-2, H-1, J-4, and J-5. Quadrant 2 (Concentrate Here; CH) represents the areas that have a low level of performance compared to the level of importance and thus need concentrated efforts for improvement through job training, and CH Quadrant included the following tasks: D-2, E-1, and E-3. Quadrant 3 (Low Priority; LP) represents the areas that have a low level of importance and a low level of performance and thus are classified as low priorities, and LP Quadrant included the following tasks: A-2, A-3, B-2, B-3, C-3, C-4, C-5, C-6, D-3, D-6, D-9, G-4, H-3, J-1, and J-2. Quadrant 4 (Possible Overkill; PO) represents the areas that have a high level of performance compared to the level of importance, indicating that excessive effort is made, and the following tasks were located in PO Quadrant: B-1, C-1, G-1, G-3, H-2, I-1, I-2, I-3, J-3, J-6, and J-7.

The results of applying the LF model are shown in Figure 3. The average level of importance (4.42 out of 5 points) and the average degree of discrepancy (0.20 points) in this study were used as axes to create a four-quadrant matrix. Quadrant 1 (High discrepancy/High importance; HH) represent the areas that should be considered as the first highest priority areas due to a high level of importance and a high level of discrepancy, and the following tasks were located in HH Quadrant: D-2, E-1, E-2, and E-3. Quadrant 2 (High discrepancy/Low importance; HL) represents the tasks classified as the second highest priority areas because they have a low level of importance but a higher level of discrepancy than the average discrepancy level, and HL quadrant included the following tasks: A-2, A-3, B-2, B-3, C-3, C-4, C-5, C-6, D-6, D-9, G-4, J-1, and J-2. Quadrant 3 (Low Discrepancy/Low Importance; LL) represents the lowest priority areas due to both a low level of importance and a low level of discrepancy, and the fol-

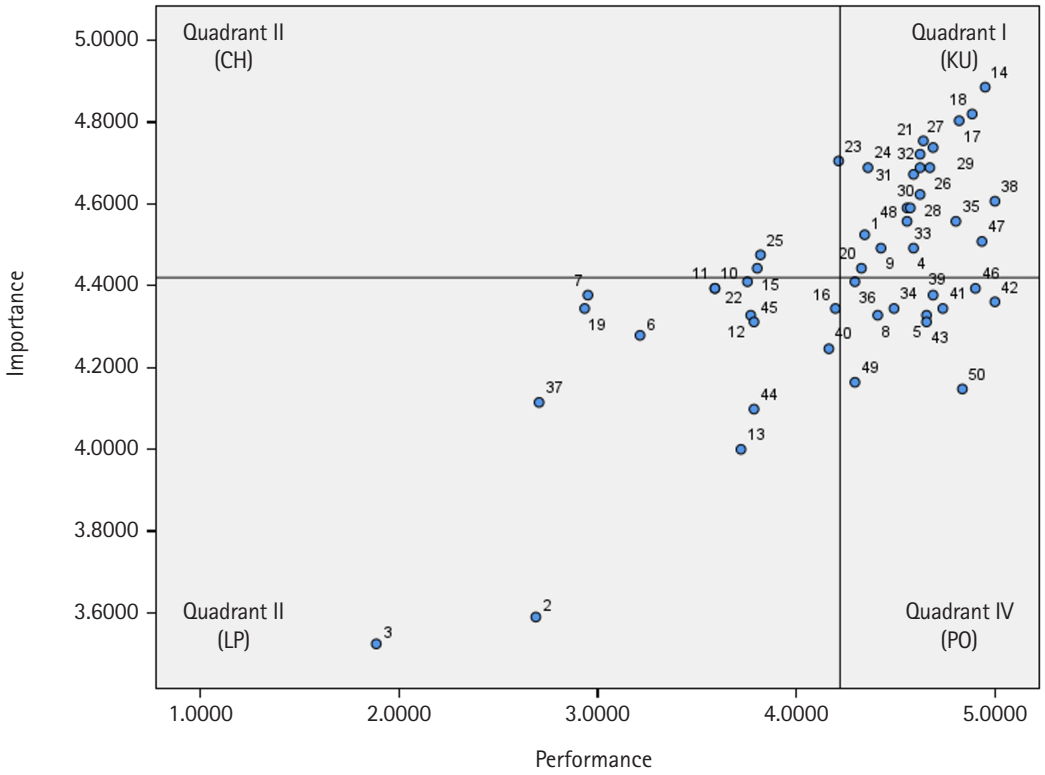

Figure 2. IPA matrix of child daycare nurses tasks.
IPA=importance-performance analysis; P=performance; I=importance; M=mean; KU=keep up the good work; CH=concentrate here; LP=low priority; PO=possible overkill.

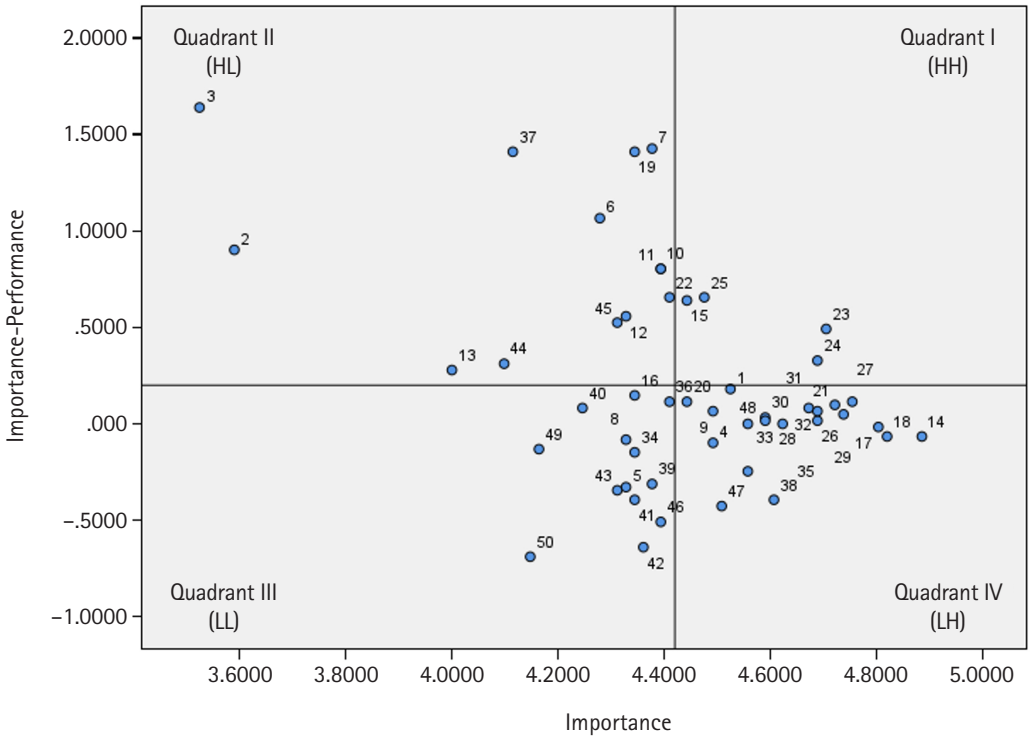

Figure 3. LF model of child daycare nurses tasks.
LF model=locus for focus model; HH=high discrepancy/high importance; HL=high discrepancy/low importance; LL=low discrepancy/low importance; LH=low discrepancy/high importance.

lowing tasks were included in this LL Quadrant: B-1, C-1, D-3, G-1, G-3, H-2, H-3, I-1, I-2, I-3, J-3, J-6, and J-7. Quadrant 4 (Low discrepancy/High importance; LH) represents the areas that have a high level of importance but a lower level of discrepancy than the average discrepancy level, and the following items were located in this LH quadrant: A-1, A-4, C-2, D-1, D-4, D-5, D-7, D-8, F-1, F-2, F-3, F-4, F-5, F-6, F-7, F-8, G-2, H-1, J-4, and J-5.

Educational needs were prioritized by comprehensively considering the results of the above analyses of educational needs of daycare nurses. For the first priority items with the highest educational need, the tasks that were located in the HH quadrant of the LF model and were included among the top 4 items in Borich's needs assessment were classified as the items with the highest educational need according to the criteria of a previous study [13]. However, in this study, no tasks meeting these criteria were found. For the second priority items, the tasks that were located in the HH quadrant of the LF model and in the CH Quadrant of the IPA matrix were classified as the items with the second highest educational need, and the following tasks were identified as the items that met the above two criteria: 'D-2. Health management of infants and toddlers with chronic illnesses or disabilities' and 'E-3. Child abuse prevention education (for children, parents, and childcare staff).' As for the third priority items, the tasks that were included among the top 4 items of Borich's needs analysis or were located in the HH Quadrant of the LF model were classified as the third priority items, and as a result, the following tasks were included in this group: 'A-3. Periodic vision screening', 'B-3. Communication, consultation, and recommendation with parents in case of delayed growth and development', 'D-6. Early detection of socio-emotional and behavioral issues, and recommendation with relevant agencies', 'E-1. Monitoring children suspected of being abused', 'E-2. Reporting to relevant authorities when signs of abuse are detected', and 'G-4. Conducting simulation training for infection prevention.'

Discussion

This study attempted to define the roles of daycare nurses and develop the duties and tasks of daycare nurses by applying the DACUM technique, and analyzed educational needs among daycare nurses through the analysis of the levels of importance, performance, and difficulty of the developed duties and tasks in order to provide basic data that can serve as a basis for making policies and developing job training and capacity development

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programs for daycare nurses in the future.

Through the DACUM workshop, a child daycare nurse was defined as "a nurse who plans health and safety measures and performs health activities for the growth and development and health promotion of infants and toddlers in child daycare centers." This definition is considered valid because it specifies the goals and job performance of daycare nurses, and includes the definite target group and health activities that are activities included in the definition of nursing. In particular, health activities are important activities in the duties of school health teachers, and are also specifically stated in Articles 14 and 15 of the School Health Act. In addition, specific health activities such as operation of the health room, health management, and health education have been identified through DACUM job analysis [20]. Thus, it is thought that the duties that should be performed by daycare nurses are clearly reflected in the definition presented in this study.

The 10 duties and 50 tasks of daycare nurses developed through the DACUM workshop were all found to have an adequate level of validity through the verification of content validity by eight experts. The 10 duties developed in this study are as follows: 'A. Health Monitoring of Infants and Toddlers', 'B. Growth and development screening of infants and toddlers', 'C. Health and Safety Education for Infants, Toddlers, and Parents', 'Health Management and Recommendation with Medical Institutions', 'E. Child Abuse Prevention and Management', 'F. Infectious Disease Management', 'G. Education and Health Management of Daycare Staff', 'H. Environmental and Hygiene Management', 'I. Professional Development', and 'J. Administrative Tasks.' A comparison of the job analysis results of this study with the job analysis results of visiting nurses in child daycare centers in a previous study showed that while the job of visiting nurses is linked to evaluations of health activities [21], the job of daycare nurses are composed of direct and continuous duties. In particular, it is a significant result of this study that infectious disease management was defined as a large duty area, and this result is thought to show the importance of infectious disease management for daycare nurses in the future. In this connection, a job analysis of school health teachers reported that infectious disease management was found to be the duty with the largest number of tasks [20]. Similarly, in this study, infectious disease management was the duty including the second largest number of tasks, and considering that the occurrences of infectious diseases are increasing, infectious disease management is considered an important duty in the current era. Therefore, it is suggested that further research should be conducted to develop duties concerning infectious disease management that can be customized according to childcare or education situations such as child daycare centers, and develop the related contents of in-service training programs.

In addition, the degrees of importance, performance, and difficulty of each of the developed duties and tasks were assessed through a survey among daycare nurses. The tasks rated as the most important ones by daycare nurses were 'D-1. Response and action in case of health issues or emergencies (including first aid)' and 'D-5. Hospital transfer and recommendation with medical institutions for emergency patients', and the tasks with the highest level of performance were 'H-1. Management of the health room and medical supplies' and 'I-2. Completion of mandatory daycare center training.' These results can be explained by the fact that the items with a high level of importance or a high level of performance are high-risk tasks that directly affect health and safety. These tasks are considered top priority tasks since they are directly related to life or are required to be performed by law or regulations, and this identification of high priority tasks helps daycare nurses to set priorities and respond efficiently. The above results show that the presence of a clear manual and nurses' clear recognition of their roles tend to increase the level of performance of tasks [22]. The items with a low level of importance were identical to those with a low level of performance, and the tasks whose degrees of importance and performance were both lowest were 'A-2. Oral health monitoring' and 'A-3. Periodic vision screening.' The fact that the low performance level of 'Oral health monitoring' can be attributed to structural limitations in that nurses in child daycare centers cannot easily get access to the relevant knowledge, standardized guidelines, or assessment tools regarding oral health, and thus need to rely on their own individual efforts without institutional support [23]. Actually, a previous study pointed out that factors hindering the proper integration of oral health promotion programs of kindergarten nurses were low awareness of nurses' role, an insufficient budget, lack of support at the institutional level, and excessive workloads [22]. 'A-3. Periodic vision screening' was identified as the task with the highest level of difficulty, and this means that although this task is not frequently performed in practice, it is an area that requires education due to its high level of difficulty. In addition, the evaluation of 'A-3. Periodic vision screening' as a very difficult task among daycare nurses indicate that nurses in child daycare centers have difficulty performing vision screening. Actually, a previous study reported that economic barriers, time constraints, and technical difficulties were found to be the main obstacles to performing vision screening [24]. A child's eyesight develops gradually, and reaches normal vision at the age of 5-6, and children's

eyesight development is completed at the age of 8-9, after which vision development does not occur [25], so early vision screening is important. In addition, as children start using digital devices at increasingly younger ages, vision screening is becoming more important because the use of digital devices may cause visual loss or various eye diseases [26]. Although vision measurement is conducted for children aged four or older in the National Early Childhood Health Checkup Service, it seems essential to add vision screening to the content of future job training for nurses in child daycare centers because early detection of vision problems or color blindness is important [23].

In order to analyze the educational needs for the duties and tasks of the developed job description of daycare nurses, the results of the t-test, Borich's needs assessment, IPA, and LF model were examined and synthetically analyzed, based on the levels of importance and performance of the duties and tasks of daycare nurses. As a result, the following items were identified as tasks with the highest educational needs among daycare nurses: 'D-2. Health management of infants and toddlers with chronic illnesses or disabilities' and 'E-3. Child abuse prevention education (for child, parents, and childcare staff).' Recently, in Korea, while the birth rate is decreasing, the number of children with chronic diseases is increasing and the severity of children's chronic diseases is also increasing [27]. Regarding the status of hospital utilization of children and adolescents, a prior study reported that children aged 1-6 showed the highest hospital utilization rate, and among children under 6 years of age, patients with cardiovascular disease accounted for the largest proportion, but among children aged 7-12, patients with congenital and genetic diseases showed the highest hospital utilization rate, and among children aged 13-19, patients with metabolic diseases showed the highest hospital utilization rate [27]. In particular, metabolic diseases, such as diabetes and hypertension in children, are diseases for which prevention is very important, and recently, chronic disease prevention education on proper eating habits and exercise has been implemented in child daycare centers [28]. Therefore, considering that the demand for the management of chronic diseases in children or related education for children attending child daycare centers is currently increasing, it is thought that it is necessary to provide appropriate job training for daycare nurses on the management of children with chronic diseases, and for this purpose, qualifications for nursing professionals are required to maintain in-service training on health and disease. In particular, there are 173 specialized child daycare centers for children with disabilities and 1,464 integrated child daycare centers for children with disabilities nationwide, and these specialized and integrated daycare centers are reported to look after 5,997 and 6,678 children, respectively [1]. However, although special education teachers and therapists are included in the staff of specialized child daycare centers for children with disabilities, nursing professionals are not included in the staff of such facilities. Only in Gyeonggi-do and some other regions, nurses are assigned to specialized daycare centers for children with disabilities. In addition, the number of children with disabilities being cared for in general daycare centers is not small, reaching 931 in 2023 [1]. The results of a job analysis of health teachers regarding the health management of infants and young children showed that no activities related to chronic diseases or children with disabilities was included in the duties and tasks of health teachers, and that management of infectious diseases and responding to the occurrence of allergic reactions were identified as the most difficult tasks [6]. Therefore, educational programs and in-service training should be implemented to enhance daycare nurses' professional expertise on chronic diseases and disabled children.

In this study, the tasks with the second highest educational needs were as follows: 'A-3. Periodic vision screening', 'B-3. Communication, consultation, and recommendation with parents in case of delayed growth and development', 'D-6. Early detection of socio-emotional and behavioral issues, and recommendation with relevant agencies', 'E-1. Monitoring children suspected of being abused', 'E-2. Reporting to relevant authorities when signs of abuse are detected', 'G-4. Conducting simulation training for infection prevention.' The tasks related to child abuse were included both in the items with the highest educational needs and in those with the second highest educational needs, and these results indicate high educational needs for the items related to child abuse. In addition, daycare nurses showed high educational needs for child development and growth, vision screening, and social and emotional health, which correspond to primary medical goals for children [29]. In a previous study of the difficulty levels of the duties and tasks of visiting nurses in child daycare centers, 'B-3, D-6. Early detection of socio-emotional and behavioral issues, and recommendation with relevant agencies' and 'E-3. Child abuse prevention education (for children, parents, and childcare staff)' were identified as tasks with a high level of difficulty [21], and these results indicate the need for implementing continuous and specific job training for the tasks. Meanwhile, in a study on the importance and performance levels of health management of infants and young children among childcare teachers in child daycare centers, the items 'B-3. Early detection of developmental delays in infants and toddlers' and 'E-1. Early detection of signs of abuse in infants and toddlers' were found to have a

high level of importance but a significantly low level of performance [30], and it was also reported that childcare teachers in child daycare centers perceived such tasks as burdensome tasks, and showed low self-efficacy and lack of confidence regarding responding to infectious diseases and performing first-aid [6]. These findings indicate that they are important tasks that should be performed not by teachers but by daycare nurses, and it is thought that provision of support and systematic establishment of related protocols are required to ensure that linkage with related institutions and reporting to related authorities will be carried out smoothly in the future.

The job analyses of health teachers in elementary, middle, and high schools have been continuously conducted, but in the case of child daycare centers, job analysis of visiting nurses was conducted in 2012 as part of the child daycare center visiting nurse project implemented by the Seoul Metropolitan Government, and since 2015, nursing work in child daycare centers has been performed in accordance with the nurse placement standards that require child daycare centers with 100 or more children to have a nurse as a full-time staff member according to the Child Care Act, but development of the job description of daycare nurses has not yet been conducted. Thus, this study is thought to have significance in that the present analysis is the first research in Korea to clearly define the roles of nurses in child daycare centers and develop their duties and tasks by applying scientific methods. In particular, as health management in child daycare centers has become more important with the appearance of emerging infectious diseases, it is also a significant outcome of the present study that this job analysis has provided directions for the capacity development and training of nurses in child daycare centers.

Conclusions

This study is the first research in Korea that attempted to clearly define child daycare nurses in terms of their roles and comprehensively explain their duties and tasks. The definition of daycare nurses derived in this study presents professional qualifications required of daycare nurses in Korea as well as the purpose and guidelines for the performance of their duties and tasks.

The 10 duties and 50 tasks of daycare nurses developed in this study are consistent with the health-related tasks that people responsible for health management are required to perform in educational settings for children and adolescents in Korea, and each duty has been clearly defined in this study. In addition, the detailed tasks included in each duty comprehensively include not only health activities that need to be directly provided to children but also the areas that may indirectly affect them, such as environmental factors and professional development. The developed duties and tasks not only present directions and a basis for a job training program for daycare nurses, but also provide priorities for the identification of the most important and urgently needed items of job training programs. Furthermore, the results of this study are expected to serve as a basis for policy makers to establish policies regarding the placement of healthcare workers for health management in child daycare centers and the distribution of resources for child daycare centers. In particular, the results of this study are expected to contribute to activating discussion on the issue of hiring nurses in daycare centers with less than 100 children, which is currently under discussion.

In addition, the detailed descriptions of duties and tasks developed in this study will provide important motivation for daycare nurses to participate in lifelong education courses to maintain and develop their professional competencies. In follow-up studies, further research should be conducted to develop practical and regular in-service training programs, guidelines for the duties and tasks of daycare nurses, and manuals for each task, based on the duties and tasks developed in this study. In addition, further research is needed to verify the effectiveness of applying the developed job description in the field. Lastly, it should be emphasized again that the standardized performance of the duties and tasks of daycare nurses is a very important requirement for ensuring the protection of children in a safe environment and promotion of their health.

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Conflict of interest

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Authors' contributions

Kyunghee Lee contributed to conceptualization, data curation, project administration, resources, writing - review & editing, and validation. Won-Oak Oh contributed to conceptualization, funding acquisition, methodology, project administration, writing - original draft, review & editing, supervision and validation. Jihee Han contributed to data curation, writing - review & editing, software and validation. Myung Jin Jung, You-Jin Heo, and Eunji Lee contributed to data curation, writing - review & editing and validation.

Data availability

Please contact the corresponding author for data availability.

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