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RESEARCH ARTICLE

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Developing the nursing practice environment scale for home health care: A trial study in Japan

Yasuko Ogata[1] | Keiko Fujinami[1] | Sakiko Itoh[2] | Masayo Kashiwagi[3] | Nobuko Lapreziosa[4] | Yuki Yonekura[5]

[1]Gerontological Nursing and Healthcare Systems Management, Graduate School of Health Care Sciences, Tokyo Medical and Dental University (TMDU), Tokyo, Japan

[2]Nursing Career Pathway Center, Graduate School of Health Care Sciences, Tokyo Medical and Dental University (TMDU), Tokyo, Japan

[3]Department of Innovation in Fundamental and Scientific Nursing Care, Graduate School of Health Care Sciences, Tokyo Medical and Dental University (TMDU), Tokyo, Japan

[4]Jefferson Health Home Care and Hospice, Warminster, PA, USA

[5]Graduate School of Nursing Science, St. Luke's International University, Tokyo, Japan

Correspondence
Yasuko Ogata, Gerontological Nursing and Healthcare Systems Management, Graduate School of Health Care Sciences, Tokyo Medical and Dental University (TMDU), Tokyo, Japan.
Email: yogata-tky@umin.ac.jp

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Abstract

Aim: To develop the nursing practice environment scale in home health care (NPES-HHC), which measures the attractiveness of nursing practice environments in Japan.

Design: Cross-sectional study.

Methods: The answers of 1,050 mail surveys conducted for nurses at 421 home-visit nursing agencies in Japan were analysed. Exploratory and confirmatory factor analyses of the NPES-HHC's candidate items were performed. Relationships between the newly developed NPES-HHC and participants' intention to remain at the workplace, job satisfaction and quality of care were also tested.

Results: A seven-dimensional model with 37 items was obtained by exploratory factor analysis (Cronbach's alpha: 0.77–0.92). Confirmatory factor analysis supported this model. NPES-HHC scores had significant positive relations with participants' intention to remain at the workplace, job satisfaction and quality of care ($p < .01$). The NPES-HHC is a reliable and valid instrument to assess the attractiveness of the practice environment for home-visit nursing agencies.

KEYWORDS
home health care, nursing work environment, scale development, reliability, validity

1 | INTRODUCTION

Population ageing is a global phenomenon (United Nations, 2019). Some countries are already in the advanced stage of this trend; Japan's aging rate, that is, the ratio of the population aged 65 or older, is more than 28.4% (Statistics Bureau, Ministry of Internal Affairs, & Communications, 2020). More aged populations require greater amounts of health care. Home healthcare is an accepted strategy worldwide for responding to increased healthcare needs, due to its cost-effectiveness and higher patient satisfaction, and the

The surveys were carried out at a time when the first author was an associate professor at Chiba University.

resultant reduction in hospital bed occupancy rates (World Health Organization, 2015). However, the global nursing shortage (Drennan & Ross, 2019; Marc et al., 2019; World Health Organization, 2019) is affecting the home healthcare field. For instance, in 29 countries spanning Europe, Africa, North and South America and Asia, the most significant barrier to the provision of home palliative care is the shortage of nurses (Brant et al., 2019), and many European countries face home-care nurse shortages (Genet et al., 2012; Maurits et al., 2018). Therefore, it is important to retain and recruit home healthcare nurses.

In Japan, in 1991 "home-visit nursing agencies" were established. In 1994, the service was expanded to all age groups (Japanese Visiting Nursing Foundation, 2015). Since government-based Long-term Care Insurance (LTCI) was established in 2000, fees for home-visit nursing services have been paid by LTCI and by public health care insurance. Although the number of home-visit nursing agencies is increasing to meet the growing demands for home healthcare, the number of home healthcare nurses is still insufficient. For instance, jobs-to-applicants ratios for home healthcare nurses continue to be high, that is, 2.91 in 2018 (Japan Nursing Association, 2019). Retaining nurses in the workplace, that is, reducing turnover, is one of the solutions for maintaining an adequate number of home healthcare nurses.

Regarding RNs working at hospitals, many previous studies have shown that key drivers of retention are work-life balance (Edmonson et al., 2020), organizational factors, such as workplace culture, commitment, work demands and social support (Chan et al., 2013), and other characteristics of the practice environment, such as are shown in the PES-NWI (Ogata et al., 2011). Although studies of attractive work environments for home healthcare nurses are still fewer than studies of hospital RNs, the following aspects have been shown to attract nurses: "autonomy" and "variety" (De Groot et al., 2018); "family-related variables" such as work-family culture (Yamaguchi et al., 2016); and "enough time and opportunity to discuss patient care," "work-life balance," and "leadership of nurse manager" (Tanigaki et al., 2017). However, the characteristics of home-visit nursing agencies that retain nurses, either in the agency itself or in the home healthcare field in general, have not been sufficiently identified.

2 | BACKGROUND

To retain nurses in home health agencies, characteristics of the work environment, including human relationships, must be attractive. Regarding the attractive features of nursing organizations, the American Association of Critical-Care Nurses has developed and published "Standards for Establishing and Sustaining Healthy Work Environments (HWE)" (American Association of Critical-Care Nurses, 2016).

In order to identify whether or not a work environment for nurses is healthy, an instrument to measure the environment is needed. For hospital settings, there are instruments that reflect the characteristics of what were called "Magnet Hospitals" in the US, which were able to attract and retain staff nurses when that country experienced a widespread hospital nursing shortage in the late 1970s and 1980s. The characteristics were revealed through a national study to identify and evaluate ''magnet'' hospitals by the American Academy of Nursing in 1981 (American Academy of Nursing, 1983). The instruments were the Nursing Work Index (NWI; Kramer & Hafner, 1989), the Revised Nursing Work Index (NWI-R; Aiken & Patrician, 2000), and the Practice Environment Scale of the Nursing Work Index (PES-NWI; Lake, 2002). The NWI-R consists of 57 items and four subscales: Autonomy, Control over the practice setting, Nurse-physician relationship and Organizational support. The PES-NWI, which focuses solely on the practice environment, consists of 31 items and five subscales: Nurse participation in hospital affairs; Nursing foundations for quality of care; Nurse manager ability, leadership and support of nurse; Staffing and resource adequacy; and Collegial nurse-physician relations. Magnet status and a healthy work environment have a strong connection (Ritter, 2011).

Previous studies of the PES-NWI demonstrated that its scores were significantly related to nursing outcomes, patient outcomes and organizational variables (Warshawsky & Havens, 2011). There were significant relationships between the PES-NWI subscales, the composite index and nurse turnover rate in individual nursing units (Ogata et al., 2011).

For home health care settings, a previous study applied a 9-item subset of the NWI-R, called "Organizational support," for U.S. hospital-based home-care nurses. The mean score (standard deviation or *SD*), 25.94 (4.98), was slightly higher than those published for hospitals using the same measure, which was from 21.6 (0.9)–23.0 (0.9) (Flynn, 2007). The US hospital-based home-care nurses and New Zealand nurses valued the same core set of organizational traits of the NWI-R that are important to hospital-based nurses (Flynn et al., 2005). There is no specific instrument that focuses on home health care settings, as opposed to hospital settings, to our knowledge. From the point of view of retaining home healthcare nurses and improving organizational performance corresponding to home health care settings, an instrument to measure the practice environment that reflects the specific aspects of home health care settings is important. Those aspects are as follows: first, a home healthcare nurse visits a patient's home alone; second, the nurse has to deal with or solve most problems happening in the patient's home by herself/himself; third, because home healthcare is provided in a patient's home, nurses have to collaborate with various resources in the community, such as care providers and other professionals.

The purpose of this study is to develop an instrument, the Nursing Practice Environment Scale in Home Health Care (NPES-HHC), for measuring the attractiveness of the nursing work environment in home health care settings, based on a survey of home-visit nursing agencies in Japan.

3 | THE STUDY

3.1 | Design

This is a cross-sectional study that uses self-reported questionnaires for home healthcare staff nurses in Japan.

3.2 | Method

3.2.1 | Study 1: Generate an item pool

To generate an item pool for the NPES-HHC, two steps were taken in 2009. Step 1: (1) a mail survey; (2) interviews of nurses working at home-visit nursing agencies; and (3) generating an item pool by integrating the results of (1) and (2) with the dimensions of existing scales. Step 2: application of the Delphi technique to carefully select items for the NPES-HHC.

Study 1: Step 1–1 (free-description question in mail survey)

A mail survey was conducted for 300 nurse managers and 600 staff nurses working at 300 home-visit nursing agencies in cities in seven of Japan's prefectures.

Method for choosing the sample: First, seven prefectures with cities with populations of 200,000 or more were selected. (Two other prefectures that also met this criterion were sampled in step 1–2.) It was assumed that large cities have a relatively greater demand for home healthcare, and the resulting competitive demand for nurses would motivate agencies to create a work environment that attracts and retains them. Then, 300 agencies were randomly sampled from the seven prefectures.

Method of obtaining participants, and inclusion/exclusion criteria: Three persons per agency, namely, a nurse manager and two home healthcare nurses, were asked to answer the questionnaire. In each agency, a nurse manager was asked to choose the two home healthcare nurses, one more experienced and one relatively inexperienced. Both nurses must have worked more than 6 months as home healthcare nurse.

Method of delivering and returning the questionnaire: The three questionnaires per home healthcare agency were mailed to 300 agencies. Each answered questionnaire was enclosed in a reply envelope and returned to the researcher by the respondent. By replying to the questionnaire, the nurse manager or home healthcare nurse demonstrated their intention to participate in this survey. Details of the study and ethical considerations, including the fact that participation was voluntary, were explained in a letter sent with the questionnaire.

In the questionnaire, nurses were asked a free-description question about the characteristics of attractive home-visit nursing agencies. Thirty-two nurse managers (10.7%) and fifty-nine staff nurses (9.8%) answered the question. Five researchers categorized the free descriptions based on similarities in their contents.

Study 1: Step 1–2 (semi-structured interviews)

Semi-structured interviews were done for 14 nurses working at six home-visit nursing agencies regarding attractive characteristics of their workplace. Semi-structured interviews were conducted because of the low return rate of the mail survey in Step 1–1, and for the purpose of finding out more detailed information about the NPES-HHC item candidates.

Method of choosing the sample: The agencies were sampled by snowball sampling from the two prefectures excluded from the step 1–1 mail survey. The agencies with organizational traits attractive to nurses and that provided high-quality nursing care were recommended to the researcher by other agencies in the same prefecture.

Method of obtaining participants, and inclusion/exclusion criteria: Interviews were conducted when a willingness to cooperate in the research was shown by home healthcare agencies, via written and oral responses. The explanation of the survey and ethical considerations were shown to the nurses by verbal communication and written letters. Six among the seven recommended agencies showed their willingness. Candidates for interviewees were recommended by managers of each agency on the basis of nurses' willingness. Only Japanese speakers were included. The interviews were ended when no new content emerged.

The interviewees were five nurse managers and nine staff nurses. As the result of content analysis of their comments, 48 items were generated.

Study 1: Step 1–3 (integration of free-text and interview responses)

The results of step 1–1 and step 1–2 were integrated with the PES-NWI items with reference to dimensions that reflect characteristics of magnet hospitals, such as NWI, NWI-R and the PES-NWI. Items were classified based on similarities and differences among the description contents. As a result, eighty-four items were generated through these steps.

Study 1: Step 2 (Delphi technique)

A mail survey was done for five experts of visiting nursing, using the Delphi technique, in order to confirm content validity on the items of the NPES-HHC.

Method of choosing the sample: Five nurse managers who worked at agencies with organizational traits attractive to nurses were asked to join the survey. They were selected based on recommendation by other agencies.

Method of obtaining participants, and inclusion/exclusion criteria: The mail survey was conducted when a willingness to participate was shown by the expert nurses with written explanations. All of the five experts indicated a willingness to join the survey. Inclusion criteria were as follows: more than 10 years of experience as a home healthcare nurse, and experience as a nurse manager. Non-Japanese speakers were excluded. All five experts were home-visit nursing agency managers with work experience as home healthcare nurses (averaging 17.2 years), and as managers of home-visit nursing agencies (averaging 13.6 years). The explanation of the survey and ethical considerations were shown to the experts by verbal communication and by written letters.

Method of delivering and returning the questionnaire: A questionnaire that included the 84 items was mailed to each expert nurse. The answered questionnaire was mailed back to the researcher directly using an included reply envelope.

In the questionnaire, the validity, importance and feasibility of each item were asked using a 5-point Likert scale, for instance, "not valid (=1)," "neither valid nor not valid (=3)," and "valid (=5)." In the second survey, descriptive-statistic results for answers were shown to the five participants. They answered the same three questions per item, based on the descriptive statistics.

After two iterations of the Delphi technique survey, the item pool with 90 items was generated. Although the Delphi technique survey was expected to reduce the number of items, the experts strongly suggested the addition of new items as characteristics to be sought by home-visit nursing agencies. So, 90 items were generated as NPES-HHC candidates. They included those from the PES-NWI that were confirmed valid, important and feasible by the five expert home healthcare nurses.

3.2.2 | Study 2: Main questionnaire survey by mail

Participants

Method of choosing the sample: Postal mail surveys were conducted in 2009 and 2010 for 2,926 nurses of 421 home-visit nursing agencies whose directors agreed to participate, after all 5,690 home-visit nursing agencies in Japan were contacted.

Method of obtaining participants, and inclusion/exclusion criteria: All 5,690 home healthcare agencies in Japan were asked by mail whether they would join this survey. Their willingness to join was indicated to the researcher via fax. Non-Japanese speakers were excluded. As a result of this process, home healthcare nurses working at 421 agencies participated. The explanation of the survey and ethical considerations were shown to each home healthcare agency nurse in a letter sent with the questionnaire.

Method of delivering and returning the questionnaire: The questionnaires were delivered to all staff nurses working at 421 home healthcare agencies. The answered questionnaires were returned to the researcher directly using the return envelope given to them without going through the agency.

In total, 1,424 nurses of 369 home-visit nursing agencies responded to the questionnaire (response rate of 48.7%). The average number (*SD*) of nurses per agency, expressed as full-time equivalents, was 5.8 (3.2). Each home-visit nursing agency visited, on average, 74.3 (44.0) patients' homes in the month and made 415.8 (240.2) total visits in the same month (October 2009).

The 1,050 surveys in which participants answered with no missing values for variables used in the logistic regression analyses were analysed (valid response rate of 35.9%). They were employed as home healthcare staff nurses of 288 home-visit nursing agencies from 44 of the 47 prefectures in Japan. Among the 1,050 participants, 57.7% of them worked as full-time nurses, and 42.3% as part-time. Other demographic characteristics are shown in Table 1.

3.3 | Measures

3.3.1 | Items reflecting the characteristics of the nursing practice environment

In the self-report questionnaire to the nurse participants, the 90 items regarding the characteristics of a favourable nursing practice environment were asked with a 4-point response set, namely, "strongly agree," "agree," "disagree," and "strongly disagree." The 90 items were chosen to include as many items from the PES-NWI as possible.

3.3.2 | Job satisfaction and quality of care

Job satisfaction was measured using a 100-mm horizontal line as a visual analogue scale (VAS). In the questionnaire, nurses were asked "How satisfied are you with your home-visit nursing agency?" The levels of "quality of care" according to nurses' perceptions were also measured using VAS, in order to value the various aspects of nursing care as a single integrated evaluation score. Nurses were asked, "How do you evaluate the quality of care provided by your home-visit nursing agency?"

3.3.3 | Intention to remain at the current agency

Regarding nurses' intention to remain at the current agency, an original question of "intention to retain or leave the current home-visit nursing agency within the next year" was asked with a four-point response set from 1–4, namely, "Working," "Probably working," "Probably not working," and "Not working." The responses were categorized into one of two groups, "intention to remain" ("Working" or "Probably working") or "intention to leave" ("Probably not working" or "Not working").

3.3.4 | Nurse participants' characteristics

Nurse participants' demographic and professional characteristics were also asked, i.e., age, sex, educational background in nursing, years of nursing experience, and years of employment by the current home-visit nursing agency.

3.4 | Analysis

In developing the NPES-HHC, exploratory factor analyses and a confirmatory factor analysis were done. After the analyses, reliability and criterion validity testing were carried out. SPSS Statistics version 23.0 and AMOS version 23.0 were used in this study. As the cut-off for significance, a p-value of .05 was used. In the post-hoc power analysis, the powers ranged from 0.997–1.000.

3.4.1 | Exploratory factor analyses

Before the exploratory factor analyses, the following steps were taken. First, after examining the deviations of response distribution among the 90 items based on "ceiling effect" and "floor effect," items that had low Pearson's correlation coefficients ($r < .40$) with

TABLE 1 Participant characteristics ($N = 1,050$)

	Mean	(*SD*)
Age (years)	42.2	(7.4)
Nursing experience (years)	16.6	(6.9)
Work experience at the current agency (years)	4.6	(3.8)
	N	**(%)**
Gender		
Male	12	(1.1)
Female	1,038	(98.9)
Academic background		
Vocational school	826	(78.7)
Associate's degree	118	(11.2)
Bachelor's degree	49	(4.7)
Graduate program	8	(0.8)
Other	49	(4.7)
Employment status		
Full-time	606	(57.7)
Part-time	444	(42.3)

Abbreviation: *SD*, standard deviation.

the other items were eliminated, and one item remained of the items that had high correlations ($r > .70$) with the others. These decisions were made after careful discussion among the four nursing researchers. Throughout the process, items of the PES-NWI were retained in the new instrument as much as possible.

Exploratory factor analysis using 53 items was carried out with the maximum likelihood and promax rotation methods, in order to explore the structure of characteristics contributing to a favourable practice environment for home healthcare nurses. The number of factors was decided comprehensively by the number of the eigenvalues that were greater than 1.0, the scree-plot, the contribution rate and the interpretability of factors.

3.4.2 | Construct validity

Confirmatory factor analysis was done based on the results of exploratory factor analysis, that is, the number of items and factors. Model fitness was assessed with the following indices: goodness-of-fit index (GFI), normed fit index (NFI), comparative fit index (CFI) and root-mean-square error of approximation (RMSEA).

3.4.3 | Criterion-related validity

To confirm criterion-related validity, correlation coefficients between average score per item of each subscale and a composite of the NPES-HHC, job satisfaction, quality of nursing care and "intention to remain in or leave the current workplace within the next year" were calculated. The relationship between NPES-HHC and nurses' intention to remain in or leave the current agency was analysed by logistic regression analysis with nurses' intention to remain (=1) or leave (=0) as the dependent variable and each NPES-HHC subscale as the independent variable, while adjusting for nurses' age, sex (male = 1, female = 0) and educational background (i.e. whether a nurse has a university or higher-level degree (=1) or not (=0)) as independent variables. Those analyses were based on previous studies that used instruments that reflect the characteristics of original "magnet" hospitals, such as the PES-NWI. In those previous studies, subscale scores or the composite of the PES-NWI had significant positive relationships with nurse outcomes, patient outcomes, organizational variables such as nurse turnover and their job satisfaction (Ogata et al., 2011, 2018; Warshawsky & Havens, 2011).

3.4.4 | Reliability

To confirm the reliability of the instrument, Cronbach's alpha coefficients were calculated for each subscale and the composite. In order to determine whether or not each item of the developed instrument was important as a component of the instrument, we examined whether the Cronbach's alpha coefficient would become lower after the item is removed from the item-group of each subscale. An item was determined to be unimportant for the subscale if the Cronbach's alpha coefficient with the item removed is higher than the coefficient when it is present.

3.5 | Ethics (studies 1 and 2)

The study protocol and the process were reviewed and approved by the Ethics Committee of the Graduate School of Nursing of a University in Japan (Approval numbers: 20-65 and 21-24).

4 | RESULTS

4.1 | Subscale development

Exploratory factor analysis suggested seven factors based on the scree-plot and the cumulative contribution rate, and these were seen to be conceptually appropriate from the meanings of the items assigned to each factor. In the process of analysis, 16 items were eliminated. For the final model derived from the exploratory factor analysis, an instrument with 37 items and a seven-factor structure was created (Table 2). The seven subscales were: (a) Nurse manager ability, leadership and support of nurses - HHC; (b) Nursing foundations for quality of care - HHC; (c) Good relationships among multiple disciplines inside and outside of the organization; (d) System for sharing the information required for care; (e) Personnel system that enables work-life balance; (f) Collegial nurse-physician relations - HHC; and (g) Appropriate assignment of a nurse case manager.

TABLE 2 Results of exploratory factor analysis[a] of the NPES-HHC: Factor Loadings and Cronbach's alpha for seven subscales of the NPES-HHC ($N = 1,050$)

		Factor loadings of subscales						
		1	2	3	4	5	6	7
Sub[b] 1	**Nurse manager ability, leadership, and support of nurses-HHC[b].** ($\alpha^{b,c} = 0.92$)							
IT[b]1	A nurse manager who is a good manager and leader. (PES-NWI[b])	**0.939**	−0.005	−0.042	−0.075	0.023	−0.025	−0.017
IT2	Supervisors use mistakes as learning opportunities, not criticism. (PES-NWI[b])	**0.846**	0.027	0.030	−0.056	−0.043	−0.034	−0.025
IT3	A nurse manager who backs up the nursing staff in decision making, even if the conflict is with a physician. (PES-NWI[b])	**0.798**	−0.052	0.009	−0.005	−0.026	0.086	0.014
IT4	A supervisory staff that is supportive of the nurses. (PES-NWI[b])	**0.783**	−0.024	−0.042	−0.039	0.058	0.012	0.065
IT5	Managers monitor the work of staff members and support them in order to develop their ability	**0.701**	0.027	−0.054	0.223	−0.009	−0.010	−0.022
IT6	Nursing administrators consult with staff on daily problems and procedures. (PES-NWI[b])	**0.596**	0.054	0.090	0.094	−0.019	−0.015	0.020
IT7	Praise and recognition for a job well done. (PES-NWI[b])	**0.525**	0.071	0.130	−0.054	0.018	0.042	0.095
IT8	Managers apprise nursing staff of their contributions to the home care agency's revenue	**0.432**	0.157	−0.058	0.174	−0.040	0.028	−0.038
Sub 2	**Nursing foundations for quality of care-HHC[b].** ($\alpha = 0.86$)							
IT9	Active staff development or continuing education programs for nurses. (PES-NWI[b])	−0.013	**0.906**	−0.014	−0.054	0.095	−0.129	−0.052
IT10	Career development/clinical ladder opportunity. (PES-NWI[b])	0.074	**0.738**	−0.048	−0.047	−0.058	−0.072	0.118
IT11	A preceptor program for newly hired RNs. (PES-NWI[b])	−0.022	**0.622**	−0.034	0.044	−0.059	−0.004	−0.013
IT12	An active quality assurance program. (PES-NWI[b])	0.136	**0.555**	0.017	−0.034	0.110	0.118	−0.019
IT13	There is a support system for advancing your own career in a specific area	0.073	**0.550**	−0.008	0.082	−0.036	0.089	0.025
IT14	There are opportunities for all nursing staff members, full-time and part-time, for learning how to provide high-quality care. (e.g., outside seminars, in-service training, case studies.)	−0.149	**0.471**	0.200	0.200	0.044	0.013	0.006
IT15	A clear philosophy of nursing that pervades the patient care environment. (PES-NWI[b])	0.125	**0.443**	0.064	0.051	−0.024	0.114	0.035
Sub 3	**Good relationships among multiple disciplines inside and outside of the organization.** ($\alpha = 0.86$)							
IT16	The work environment allows you to share your opinions or questions based on your nursing judgment with your colleagues (nurses or other disciplines), either directly or via another person	−0.045	−0.063	**0.848**	0.025	0.002	−0.026	−0.005
IT17	The work environment allows you to share your opinions or questions based on your nursing judgment with professionals in other agencies, either directly or via another person	−0.125	0.115	**0.769**	−0.063	−0.082	0.059	0.001
IT18	The agency staff members consider mistakes as learning opportunities rather than occasions for blaming	0.291	−0.052	**0.711**	−0.017	0.026	−0.100	−0.096
IT19	The staff members of this agency help each other	0.086	−0.094	**0.660**	0.050	0.062	−0.047	0.042
IT20	The nursing staff of this agency and other disciplines work as a team	−0.004	−0.012	**0.582**	−0.001	−0.096	0.178	0.010
IT21	You are working with experienced nurses with broad knowledge of home care systems	0.039	0.109	**0.550**	0.069	0.043	−0.044	0.002
Sub 4	**System for sharing the information required for care.** ($\alpha = 0.86$)							
IT22	There is a system for dealing with complaints from patients or family members in a timely manner	−0.036	0.059	−0.061	**0.831**	0.009	0.029	−0.035

(Continues)

TABLE 2 (Continued)

		Factor loadings of subscales						
		1	2	3	4	5	6	7
IT23	There is a system for notifying case managers about concerns raised by patients or family members via phone calls	−0.066	0.080	0.004	**0.797**	−0.100	−0.012	−0.015
IT24	You can report your questions or concerns about your patient visits to your supervisor, and consult with her/him, on the same day they arise	0.131	−0.074	0.109	**0.723**	0.042	−0.073	−0.062
IT25	Your agency can give you advice immediately when you contact them as you are having problems at a patient's house	0.025	−0.014	−0.020	**0.662**	0.026	0.075	0.034
IT26	There is a system of joint visits with your peers or manager as needed	0.074	−0.050	0.017	**0.662**	0.021	−0.025	0.070
Sub 5	**Personnel system that enables work-life balance.** ($\alpha = 0.77$)							
IT27	Your current workload allows you to have enough time for your private life or family	−0.002	0.035	−0.008	−0.025	**0.786**	0.026	−0.023
IT28	Overtime work is rare	0.047	0.030	−0.140	−0.051	**0.781**	−0.032	−0.135
IT29	Your days off are assured	−0.046	0.031	0.028	−0.002	**0.592**	0.005	0.022
IT30	Your work schedule is flexible and able to be adjusted in case of emergency	−0.045	−0.057	0.088	0.081	**0.548**	0.022	0.117
IT31	Individual nurses can choose their work schedule to fit their lifestyle. (e.g., AM only, certain days of week, every day)	0.002	−0.079	0.065	0.016	**0.413**	0.065	0.190
Sub 6	**Collegial nurse-physician relations-HHC**[b]. ($\alpha = 0.77$)							
IT32	Collaboration (joint practice) between nurses and physicians. (PES-NWI[b])	−0.087	0.029	0.071	−0.014	−0.014	**0.833**	−0.017
IT33	A lot of teamwork between nurses and physicians. (PES-NWI[b])	0.068	0.013	0.000	−0.075	−0.003	**0.813**	−0.060
IT34	Physicians and nurses have good working relationships. (PES-NWI[b])	0.060	−0.145	−0.070	0.106	0.058	**0.605**	0.040
Sub 7	**Appropriate assignment of a nurse case manager**[d]. ($\alpha = 0.77$)							
IT35	A nurse case manager who visits clients can have their assigned clients switched by mutual agreement with their supervisor as needed, considering their compatibility	−0.012	−0.031	0.009	0.021	−0.005	−0.022	**0.867**
IT36	A nurse case manager who visits clients is assigned based on consideration of his or her experience, and strengths and weaknesses	0.119	0.044	−0.069	−0.035	−0.051	−0.008	**0.710**
IT37	A nurse case manager who visits clients can have their assigned clients switched by mutual agreement with their supervisor as needed, based on aspects of the maintenance or improvement of the quality of care	−0.012	0.079	0.027	−0.019	0.035	−0.020	**0.590**

Note: Items with (PES-NWI) are identical to the PES-NWI items with the same name.

[a]Maximum-likelihood method with promax rotation.

[b]α: Chronbach's alpha coefficient; Sub: Subscale; PES-NWI: The Practice Environment Scale of the Nursing Work Index; IT: Item; HHC: Home Health Care.

[c]Composite: $\alpha = 0.90$.

[d]Nurse case manager: the home healthcare nurse for patient A who has the primary responsibility for the patient.

Because three of the seven subscales were given the same names as those of the PES-NWI, "- HHC (Home Health Care)" is shown after each of those subscale names in Table 2. The four original factors specifically showed the characteristics of home health care settings. In this study, "nurse case manager" means a home healthcare nurse in the agency assigned as a patient's primary nurse.

4.2 | Reliability

Cronbach's alpha coefficients for the seven subscales ranged from 0.77–0.92 for the seven dimensions (Table 2), and 0.90 for the composite of the instrument. There was no item for which the Cronbach's alpha coefficient became higher after the item was removed from its item-group of the subscale. Mean subscale scores and Pearson's correlation coefficients for the NPES-HHC are shown in Table 3. The mean scores (*SD*) of the seven subscales were from 2.58 (0.52)–3.08 (0.43). The mean for the composite scores was 2.84 (0.38).

4.3 | Construct validity

From the confirmatory factor analysis, the goodness-of-fit indices were the following: $X^2 = 1{,}837.111$ ($df = 608$, $p < .001$), GFI = 0.909, CFI = 0.938, NFI = 0.910, RMSEA = 0.044 (Figure 1).

4.4 | Criterion-related validity

On average (*SD*), job satisfaction was 66.1 (22.9), and quality of care was 71.7 (17.8), both measured by VAS on a scale from 0–100. The proportion of nurses who would like to remain at their current agency was 86.2%. Partial correlation coefficients between job satisfaction measured by VAS and subscale scores of NPES-HHC were from 0.33–0.57, and the coefficient was 0.61 between satisfaction and the composite (Table 4). Partial correlation coefficients between the subscales and quality of care were from 0.29–0.54, and it was 0.57 between quality of care and the composite (Table 4).

Regarding the results of logistic regression analysis with "Intention to remain in the work place for the next year" as the dependent variable and the subscales and composite of the NPES-HHC as independent variables, all of the odd's ratios of seven subscales and the composite were significantly related to "Intention to remain in the work place" (Table 4).

5 | DISCUSSION

5.1 | Reliability of the NPES-HHC

The NPES-HHC seems to be reliable because Cronbach's alpha coefficients for the composite (0.90) and the subscales (0.77–0.92) were high enough (Table 2) to indicate acceptable reliability for a newly developed instrument. In previous studies of the PES-NWI, Cronbach's alpha coefficients were 0.71–0.84 for US hospital nurses (Lake, 2002), and 0.78–0.86 for Japanese hospital staff nurses (Ogata et al., 2018). The Cronbach's alpha coefficients of all subscales became lower after each item was removed in turn, for all items from its item-group of the subscale. This means that Cronbach's alpha coefficients for each of the subscales were high due to all of the items in the scale. Therefore, all of the 37 items are considered to be important for the NPES-HHC.

5.2 | Validity of the NPES-HHC

The NPES-HHC is valid because it was confirmed according to three methods: content validity, construct validity and criterion-related validity. First, it has "content validity" because all of its items reflect desired conditions for nurses in home health care settings, as obtained from free descriptions from a self-report questionnaire, interviews with nurses working at home-visit agencies, integration with dimensions of existing scales such as the PES-NWI, and the judgement of expert nurses in home health care.

Second, "construct validity" was tested by confirmatory factor analysis; GFI, CFI, NFI and RMSEA supported the model fit, although the chi-square test only marginally supported it (Figure 1). When the sample size is large, as in this study, the model is more likely to be rejected by the chi-square test, which is sensitive to sample size (Toyoda, 2011). Therefore, construct validity must be decided based on multiple indicators. The fit indices comprehensively showed that the construct validity of the seven-factor model of the NPES-HHC is acceptable (Figure 1).

Finally, "criterion-related validity" was also acceptable, based on positive significant relationships between the NPES-HHC scores and job satisfaction, quality of nursing care and "intention to remain in the current workplace next year," as self-reported by nurses (Table 4). NPES-HHC seems to reflect the features of the work environment that attract nurses because the odds ratio of the NPES-HHC composite for nurses' intention to remain in their agencies was 18.39 ($p < .01$). Therefore, having the characteristics of home-visit nursing agencies indicated by the NPES-HHC would make an agency workplace more attractive to nurses. The contents of each item in the NPES-HHC could provide managers of home-visit agencies or policy-makers with tips for creating organizations with features that attract nurses.

5.3 | Features of the NPES-HHC

While four of the seven NPES-HHC subscales consisted of original items, the other three subscales included PES-NWI items as well as original ones. The latter three subscales were "Nurse manager ability, leadership, and support of nurses - HHC," "Nursing foundations for quality of care - HHC," and "Collegial nurse-physician relations - HHC." The value of the NPES-HHC is supported by the fact that previous studies

TABLE 3 Mean subscale scores and Pearson's correlation coefficient for the NPES-HHC ($N = 1,050$)

	Subscale	Mean	(*SD*)	Correlation[a]						
				1	2	3	4	5	6	7
1	Nurse manager ability, leadership, and support of nurses -HHC	2.90	(0.55)	—	.669**	.649**	.678**	.392**	.464**	.593**
2	Nursing foundations for quality of care-HHC	3.05	(0.49)		—	.655**	.613**	.354**	.383**	.472**
3	Good relationships among multiple disciplines inside and outside of the organization	3.08	(0.43)			—	.599**	.419**	.387**	.499**
4	System for sharing the information required for care	2.66	(0.49)				—	.465**	.349**	.543**
5	Personnel system that enables work-life balance	2.58	(0.52)					—	.261**	.323**
6	Collegial nurse-physician relations-HHC	2.85	(0.54)						—	.440**
7	Appropriate assignment of a nurse case manager	2.78	(0.54)							—

Abbreviation: HHC: Home Health Care.

[a]Pearson's correlation coefficient.

**$p < .001$.

of home-care nursing agencies using an instrument based on hospital characteristics were able to capture the features of the nursing work environment (Flynn et al., 2005; Jarrin et al., 2014). Although one of the NPES-HHC's subscales, "Nursing foundations for quality of care - HHC," includes original items related to education opportunities for nurses, previous studies have also identified educational factors that affect the quality of care provided by home healthcare nurses (Flynn, 2003; Flynn & Deatrick, 2003; Mori et al., 2016; Morioka et al., 2019).

The four original subscales included in the NPES-HHC were "Good relationships among multiple disciplines inside and outside of the organization," "System for sharing the information required for care," "Personnel system that enables work-life balance," and "Appropriate assignment of a nurse case manager." These had already been identified by home healthcare nurses as important traits of their agencies in supporting nursing practice and job satisfaction (Flynn, 2003). In particular, workload and relationships with the organization, patients and peers were included as subscales of job satisfaction for home healthcare nurses (Ellenbecker & Byleckie, 2005).

Among the subscales of the NPES-HHC, the odds ratio of subscale 3, "Good relationships among multiple disciplines inside and outside of the organization," was high (13.32) in logistic regression analysis (Table 4). Although collaboration is important for health care delivery, it is difficult due to the mobility and schedule variability of home-care staff members (Pinelle & Gutwin, 2002). Because good relationships among multiple disciplines are necessary for cooperation, it seems to be a very important factor for attracting nurses to the home-care agencies.

Although the mean score of subscale 5, "Personnel system that enables work-life balance," was the lowest (2.58) among the seven subscales of the NPES-HHC, this subscale consists of items that are related to work-life balance. Previous studies have revealed that higher work-life balance was related to home healthcare nurses' intent to remain at the current agency (Tourangeau et al., 2017), and it also influenced patient satisfaction (Rosati et al., 2009).

5.4 | Limitations and future research implications

This study has several limitations. First, data used were not new, as the main survey was done almost 10 years ago. In the last 10 years, due to population ageing, the Japanese government has promoted its establishment of a "Community-based Integrated Care System," which includes health care, nursing care, prevention, housing and livelihood support in a community. So, compared to a decade ago, the role of home healthcare nurses has become more important, and nurses are now expected to collaborate with multiple other professions. Therefore, future study is needed to confirm whether the research results can be replicated.

Second, the number of items in the new instrument was relatively large. Although ideally the full-version of the NPES-HHC would be applied, a shortened version might also be useful. In future research, the development of a shortened version might be considered by using analytical methods such as exploratory factor analysis, based on newly surveyed data for current home healthcare nurses.

Third, this study's results reflected responses from nurses working at home-visit nursing agencies in Japan only. In future studies, the NPES-HHC should be tested as to its applicability to nurses working at home health care settings in other countries.

Fourth, future studies are needed to determine why the subscale scores for personnel system or staffing were relatively low among the subscales in both hospital and home health care settings in Japan. Fifth, intra-rater reliability was not examined, although Cronbach's alpha coefficients were used to confirm the reliability. In a future study, the reproducibility of the evaluation by the respondents would also need to be verified.

Finally, while the relationships between the NPES-HHC scores and outcome variables derived from self-reporting by nurses (i.e. nurses' job satisfaction and quality of care) were confirmed, future studies are needed to identify whether there are significant

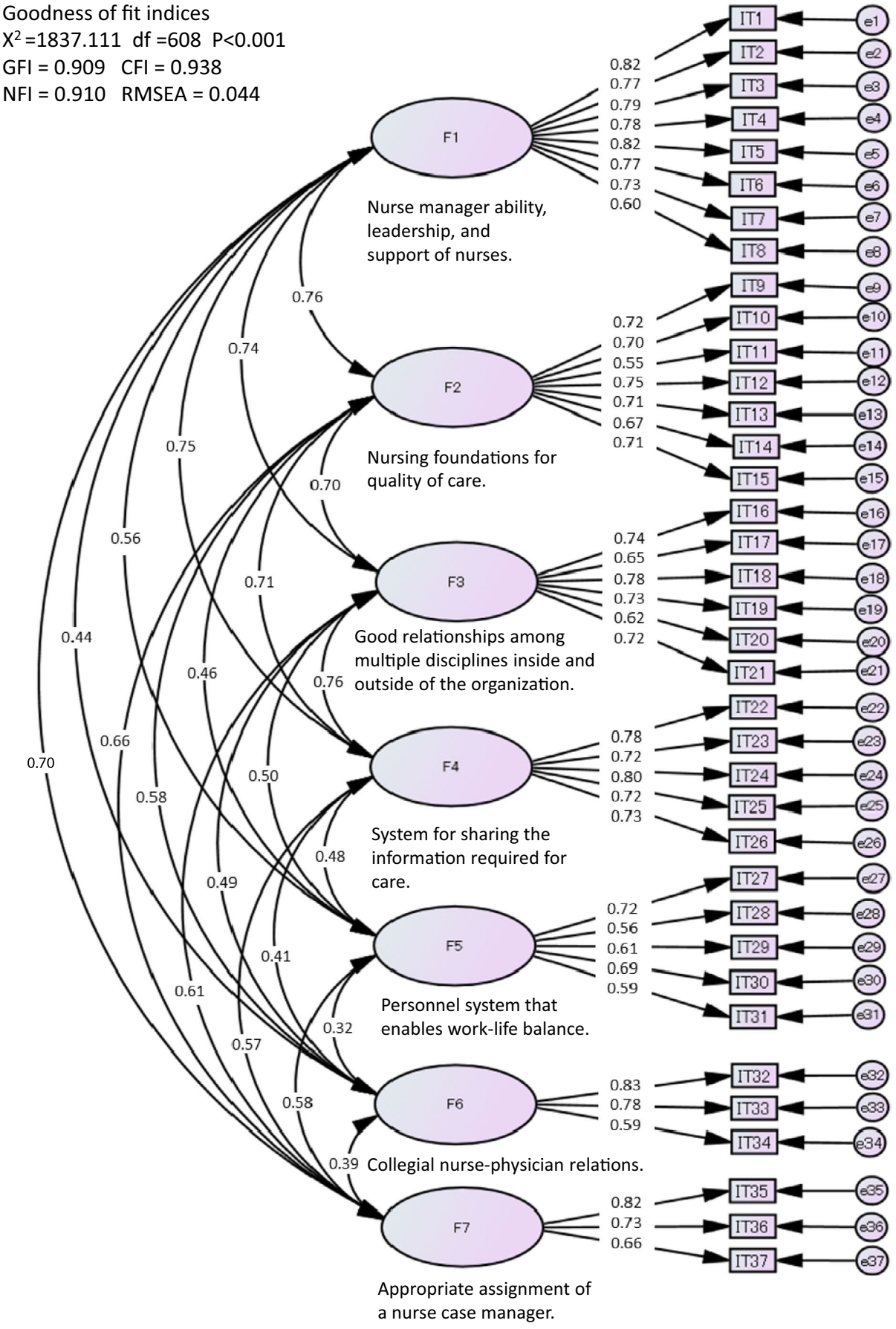

FIGURE 1 Confirmatory factor analysis of the NPES-HHC

TABLE 4 Partial correlation coefficients[a] with NPES-HHC and logistic regression analysis with subscales and composite of NPES-HHC as independent variables

	NPES-HHC	Partial correlation coefficients		*Logistic regression analysis* Dependent variable: Intention to remain in the workplace[c]		
	Subscale	Job satisfaction[b]	Quality of care[b]	Odds ratio	95% confidence interval	*p* value
1	Nurse manager ability, leadership, and support of nurses -HHC	0.57**	0.49**	4.63	(3.15–6.80)	<.001
2	Nursing foundations for quality of care-HHC	0.45**	0.46**	7.31	(4.36–12.25)	<.001
3	Good relationships among multiple disciplines inside and outside of the organization	0.52**	0.51**	13.32	(6.84–25.94)	<.001
4	System for sharing the information required for care	0.49**	0.54**	3.49	(2.35–5.19)	<.001
5	Personnel system that enables work-life balance	0.33**	0.31**	2.70	(1.78–4.10)	<.001
6	Collegial nurse-physician relations-HHC	0.44**	0.29**	3.53	(2.34–5.32)	<.001
7	Appropriate assignment of a nurse case manager	0.39**	0.38**	3.50	(2.35–5.21)	<.001
	Composite	0.61**	0.57**	18.39	(9.31–36.3)	<.001

Abbreviation: HHC, home health care.

[a]Adjusted for age, gender, educational background.

[b]Evaluated by VAS, $N = 1,050$.

[c]Excluded respondents who intended to leave their VNS for family reasons, $N = 992$.

**$p < .01$.

relationships between the NPES-HHC scores and variables obtained from resources other than nurses, such as patients.

As to future research implications, the items of the NPES-HHC can be applied by nurse administrators to create a healthy work environment. Furthermore, comparisons between different NPES-HHC scores allow the work environment to be evaluated on a relative basis. For instance, the NPES-HHC could allow comparison among different types of agencies, because in Japan there are five types of home-visit nursing agencies, namely, "nurse centered," "rehabilitation centered," "psychiatric centered," "urban centered," and "rural centered," based on the characteristics of their service delivery (Fukui et al., 2014). Recording changes in NPES-HHC scores over time would show whether or not the work environment is improving. Further research is needed to investigate whether the NPES-HHC can be used to assess home-care nursing practice environments in countries other than Japan. Comparison of NPES-HHC scores internationally should also give important information for policy-makers attempting to solve nurse-shortage problems.

6 | CONCLUSIONS

This study developed a reliable and valid instrument, NPES-HHC, to assess the attractive features of the nursing practice environment in home health care, based on the characteristics of home-visit nursing agencies in Japan. Since higher scores of subscales and the composite are associated with conditions such as higher nurse satisfaction and better quality of care, realization of better work environments as measured by the NPES-HHC should lead to higher levels of organizational performance and better outcomes. Nurse managers in home health care settings can apply the results of assessment using the NPES-HHC in order to improve the nursing practice environment and attract nurses.

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CONFLICT OF INTEREST

No conflict of interest has been discovered by the authors.

AUTHORS' CONTRIBUTIONS

All authors have agreed on the final version and meet all of the four criteria for authorship recommended by the ICMJE (http://www.icmje.org/recommendations/).

ETHICAL APPROVAL

Ethical approval number: 20-65 for step 1-1, 1-2 and 1-3 of Study 1, 21-24 for step 2 of Study 1 and Study 2.

Ethics Review Board: Ethical Review Committee of the School of Nursing, Graduate School of Nursing, Chiba University.

PATIENT CONSENT STATEMENT

This study did not need to seek patient consent.

DATA AVAILABILITY STATEMENT

Because participants of this study were told that their data would not be shared publicly, supporting data are not available.

ORCID

Yasuko Ogata https://orcid.org/0000-0002-6086-6725
Keiko Fujinami https://orcid.org/0000-0003-4879-4076
Sakiko Itoh https://orcid.org/0000-0002-1711-208X
Yuki Yonekura https://orcid.org/0000-0002-2590-2022

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