



# Factors associated with professional confidence in Japanese public health nurses: A cross-sectional survey

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## Abstract

**Objectives:** To clarify factors associated with professional confidence in Japanese public health nurses (PHNs) and to examine the relationship between professional confidence and professional competency.

**Design:** A cross-sectional study.

**Sample:** Public health nurses ( $N = 1,512$ ) working in local government agencies.

**Measurements:** An anonymous, self-administered questionnaire with questions on demographic characteristics (sex, age, experience as a PHN, educational background, affiliation, and position) and 34 items on professional confidence developed by the researchers based on a literature review was administered. Factors associated with the professional confidence were extracted through an exploratory factor analysis, and construct validity of the confidence was verified through a confirmatory factor analysis.

**Results:** In total, 883 responses (response rate, 58.4%) were received; only 467 (30.9%) of them were valid. On the basis of the exploratory factor analysis results, professional confidence included 17 items, with the following four factors: "technical practice," "effortful learning," "exploring the evidence," and "educators in workplace." The goodness-of-fit model in the confirmatory factor analysis proved the construct validity of professional confidence.

**Conclusions:** Professional confidence was gained by self-improvement that reflects on public health practice. Professional confidence underpinned the generalist level of professional competency among PHNs.

## KEYWORDS

local government, professional competency, public health nurse, workplace

## 1 | BACKGROUND AND HYPOTHESES

In Japan, public health nurses (PHNs) have been granted a national license different from that of nurses for more than 70 years. A national license system for health professionals would be a significant milestone in health systems development, as it would

help ensure competency by means of a national examination, continuing professional development, and the revoking of licenses when appropriate (Sonoda et al., 2017). Public health nurses help improve people's health standard by offering health services on personal, family, community, and social levels. Health promotion and prevention of disease in community by PHNs reduced the

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tuberculosis and infant mortality in Japan after the Second World War (Kanbara, Yamamoto, Sugishita, Nakasa, & Moriguchi, 2017). In Japan, the mortality rate from tuberculosis in 1950 was 146.4 in 100,000 but this improved to 15.4 in 100,000 by 1970 (National Institute of Population & Social Security Research, 2019). The infant mortality rate in 1950 was 60.1 in 1,000 but by 1970 it had reduced to 13.1 in 1,000 and in 2017 it was 1.9 in 1,000, the lowest in the world (Ministry of Health, Labor, & Welfare, 2019; OECD Health Statistics, 2019a). In Japan, the average life expectancy at birth was 84.2 years in 2017, which is the longest in the world (OECD Health Statistics, 2019b). Researchers believe that the current health standard in Japan is one of the best in the world. Furthermore, it is without regional disparities and is influenced by public health nursing education and professional development maintained by the national license system. Worldwide, only a few countries grant a national license, such as Japan, to nurses who are engaged in public health care; however, PHNs globally develop health activities targeting an individual, a family, a community, and a population (Nigenda, Magaña-Valladares, Cooper, & Ruiz-Larios, 2010; Schoenfeld & MacDonald, 2002; Yeh, 2014). The PHNs' approach to residents is diverse globally.

In numerous developed countries, aging populations, increasing health care costs, and the rising burden of chronic diseases pose challenges to health systems and require innovations for improving and maintaining population health (Jambroes et al., 2014). Japan's universal health care system emphasizes on implementing health activities to reduce medical expenses on aging- and lifestyle-related diseases. Health activities classify respondents who offer services based on risk, such as preventive long-term care and specific health guidance, and require efficient and effective health guidance. The long-term care insurance system in Japan provides care-need certificates at seven levels, namely, support levels 1 and 2, and care-need levels 1 (least disabled) to 5 (most disabled). The care-need is arrived at using questionnaires that obtain data on activities of daily living. Elderly people who are judged to require support levels 1 and 2 are provided services based on preventive care (Iwagami & Tamiya, 2018). In specific health guidance, based on the results of specific health checkups, individuals who have abdominal obesity and two or more additional metabolic syndrome risk factors are provided services such as intensive health guidance, while individuals with one risk factor are provided motivational health guidance (Tushita et al., 2018).

Public health nurses are the professionals who prompt residents to improve their living habits through a direct approach such as health consultation and education. PHNs need highly effective guidance techniques to improve the residents' lifestyle. PHNs, unlike any other nursing specialization, care for people of their own community and establish a comfortable relationship with people of all socioeconomic levels (Janie & Musarrat, 2014). However, nurses engaged in public health in developed countries exhibit a low sense of job satisfaction and high burnout scores (Curtis & Glacken, 2014; Graham, Davies, Woodend, Simpson, & Mantha, 2011; Imai, Nakano, Tsuchiya, Kuroda, & Katoh, 2004). Although PHNs contribute to the population health status by serving in collaborative leadership with other public

health disciplines, the visibility of their activities and contributions to the population is low (Schaffer, Keller, & Reckinger, 2015). To enhance PHNs' careers, not only training that provides special knowledge and skills but also continuing education that recognizes their professional value and promotes self-confidence is required.

Self-confidence is defined as confidence in one's abilities, qualities, and judgment (Oxford English Dictionary, 2019). Self-confidence exists in various aspects of life and has a wide range of concepts. Self-confidence in psychology is considered as one of the aspects of personality development (Cramer, 2018; Shih-Chieh, Yin-Hui, Chai-Jung, & Yu-Ting, 2013). Self-confidence based on practice in health professionals in occupational therapy is defined as professional confidence, which is different from self-confidence; professional confidence is a dynamic, maturing personal belief held by a professional or student (Holland, Middleton, & Usy, 2012, 2013).

However, PHN's definition of professional confidence was not clear, and no studies have addressed professional confidence levels such as "What is the role of confidence in PHNs?" or "What kind of experience leads to confidence?" Related factors of professional confidence also remain unknown. To develop an education system that will promote a PHN's professional confidence level, self-confidence should be defined on a professional level and not based on personality.

Several studies conducted on competence, performance, and skills in health professionals considered these aspects as those contributing to self-confidence (Farrand, MaMullan, Jowett, & Humphreys, 2005; Sergeev et al., 2012; Ulrich et al., 2010). Self-confidence in practice of PHNs was used to assess whether it was an effective training to enhance their practical skills (Chiu, Polivka, & Stanly, 2011; Pfister-Minogue & Salveson, 2010; Yeh et al., 2006).

Professional confidence in occupational therapy underpins competence, and confidence and competence are linked with professional identity (Holland, Middleton, & Usy, 2012). Nurses' self-confidence in public health nursing practice has been associated with job satisfaction (Yamashita, Takase, Wakabayashi, Kuroda, & Owatari, 2009) and public health nursing capacity (Underwood et al., 2009). Therefore, we presumed that professional confidence in PHNs is a concept that underpins competence, and is linked to professional identity. Professional competence of PHNs has been defined by the Quad Council Coalition (2018), and professional competency consists of core competency based on the following eight skills: assessment and analytic skills; policy development/program planning skills; communication skills; cultural competency skills; community dimensions of practice skills; public health science skills; financial planning, evaluation, and management skills; and leadership and systems thinking skills. Furthermore, professional competency levels of mastery are separated into the following three tiers: generalist, management or supervisory, and senior management or leadership (Quad Council Coalition, 2018). Clarifying the relationship between professional confidence and professional competency (such as "what level of competency does professional confidence support?" or "which public health nursing skills does professional confidence affect?") will contribute to continuing education as gaining professional confidence will lead to enhancing professional competency.

This study aims to clarify factors related to professional confidence, and analyze the relationship between professional confidence and professional competency.

## 2 | METHODS

### 2.1 | Design and sample

This was a cross-sectional study on 2,977 PHNs working in 390 local government agencies all over Japan. Japanese PHNs may be affiliated to one of three possibilities, namely, municipalities, prefectures, or special wards/cities (The Japan Association of Public Health Nurse Educational Institutions, 2019). PHNs in municipalities provide preventive services to people of all ages living in the community. PHNs in prefectures work to provide support for intractable diseases, tuberculosis, and mentally handicapped persons, and widely work with municipalities to solve health issues. PHNs in special ward, designated cities, core cities, and cities with a population of more than 200,000 have functions in both municipalities and prefectures. The distribution PHNs working for each affiliation is 15% in prefectures; 26% in special wards; designated cities, core cities, and cities; and 59% in municipalities. Considering these percentages, sample areas were randomly extracted from the Tanaka (2015), which lists administrative organs across the country, namely, 8 prefectures; 25 special wards, designated cities, core cities, and cities; and 357 municipalities. Furthermore, the sampled agencies ( $n = 390$ ) were found to be distributed across the country on a map of Japan by researchers.

Next, researchers sent a questionnaire to the supervising PHN who worked in the identified institution. The questionnaire described the purpose and method of the research, a sample of the questions in the questionnaire, and a reply postcard that would indicate participation in the survey. A positive response (PHNs' reply postcard) was obtained from 107 institutions, and the survey questionnaire was sent to 1,512 PHNs working in these 107 institutions. Response surveys were individually mailed by respondents to keep their answers confidential from their superiors and colleagues in the workplace. This national postal survey was conducted from January to March 2017.

### 2.2 | Measures

The contents of the questionnaire were the characteristics and items of professional confidence. Items on demographic characteristics were sex, age, experience as a PHN, educational background, affiliation, and position.

Items on professional confidence were created based on 20 Japanese articles and 13 English articles that described the phenomenon of self-confidence in PHNs' public health practice. In the articles, contents describing the phenomenon refer to sentences that describe how PHNs gain self-confidence in practice. For example, the accumulation of continuous support led to self-confidence (Abe, Iimura, Mayumi, Yoshino, & Muneyuki, 2008) or self-confidence was

acquired by solving practical issues (Shiomi & Ushio, 2012). Contents of the phenomenon of the extracted self-confidence were qualitatively and descriptively analyzed, and the 34 items of professional confidence were completed. Each professional confidence item asked the existence of experience. Furthermore, PHNs who answered that they had an experience in each item were asked the degree of their self-confidence. Questions were as follows: "Do you have experience with each of the following items?" "If you had experience, how high or low is your self-confidence as a public health nurse now?" The grade of acquiring self-confidence was classified into six categories (no confidence, approximately 20%, 40%, 60%, 80%, and 100%).

Before conducting the national survey, we conducted a pretest on 10 PHNs with different years of experience. In the pretest, we obtained opinions regarding the time required to answer, the expression of questions, and the appropriate quantity of questions to improve the measurement strategy for the national survey.

### 2.3 | Analytical strategy

Age was classified into the following four stages: 20s, 30s, 40s, and above 50 years. PHNs' experience was classified into the following four categories: Less than 10, 11–20, 21–30, and over 31 years. In recent years, a variety of educational courses can be taken in Japan until a PHN is licensed, and the experience of nurses until becoming a PHN varies. The career ladder of PHNs is being discussed in the development of division based on competence (Ministry of Health, Labor, & Welfare, 2016). In this study, Matsuo (2006) divided 10 years of experience based on the analysis of the experience learning process of professionals from various Japanese interpersonal service companies such as real estate and automotive sales.

Professional confidence was assigned to 1–6 points, and professionally confident respondents received higher scores. Factors associated with professional confidence were identified by explanatory factor and confirmatory factor analyses associated with professional confidence. The exploratory factor analysis can identify potential factors associated with professional confidence, and factors contributing to the rate from the exploratory factor analysis reveal factors that predominantly affect professional confidence. The confirmatory factor analysis was used to verify the configuration, concept, and validity of the question on confidence obtained from the exploratory factor analysis (Nakayama, 2018).

Before factor analysis, we performed an item analysis of professional confidence. The 34 items of each professional confidence were computed according to the average value and standard deviation, and the ceiling and floor effects were evaluated. Next, the Spearman's correlation coefficient was used for the correlation analysis between items. The items with a correlation coefficient of  $r \geq .7$  were examined among the researchers for whether the questions were similar or not. If the correlation coefficient is too high between items, then factors are formed between these items; therefore, its originality as a new concept is lost (Nakayama, 2018). We carefully considered

whether the questions were similar and only used items that were considered to reflect the uniqueness of professional confidence.

After the item analysis, explanatory factor analysis (maximum likelihood method, Promax rotation) was performed on the remaining items, items exhibiting factor loads of  $\geq 0.4$  in one of the factors were collected together as common factors, and factors associated with professional confidence were identified. There are no rules for naming factors, except to give names that best represent the variables within the factors (Gie Yong & Pearce, 2013). The factor name was chosen by the researchers to best reflect the variable and adopted once all researchers were in agreement. Based on the factors identified in the explanatory factor analysis, the factor structure of professional confidence was considered by a confirmatory factor analysis. The factor structure was verified through the construct validity in the fitness index model, such as the goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA) from the confirmatory factor analysis, and the factor structure of professional confidence in PHNs was clarified. SPSS Statistics and SPSS Amos Version 20.0 for Microsoft Windows were used for analysis.

## 2.4 | Ethical consideration

The study was approved by the ethics committee of epidemiology research at Hiroshima University (November 30, 2016). The request document for investigation, a questionnaire, and a reply envelope were placed in a clear bag to ease the burden of the supervising PHNs who distributed the questionnaire. A researcher indicated the contents on the request to each candidate. The questionnaire was distributed by the supervising PHN who was the superior, but the people who answered the questionnaire were arbitrary. Because the survey was not signed, the respondents were not specified. Recovered surveys were mailed by individual respondents so that the answers would not be leaked to their superiors and colleagues at the workplace. Agreement to participate in this study was confirmed by answering and returning the questionnaire. Thus, formal consent for participation was not obtained. The results of this study were announced at the related academic meeting.

## 3 | RESULTS

Responses from 883 participants (58.4%) were received. Responses missing an answer to a question and those with multiple answers were excluded from the analysis ( $N = 97$ ). Furthermore, to clarify the confidence level of PHN respondents, those ( $N = 319$ ) who indicated inexperience in one of the 34 items of professional confidence were excluded. By excluding PHNs with no practical experience, we attempted to extract true confidence based on actual practice that was unaffected by individuality. Lastly, 467 respondents (30.9%) were included in the analysis.

## 3.1 | Characteristics of the respondents included in the analysis

Characteristics of the respondents included in the analysis are indicated in Table 1. Respondents comprised 460 women (98.5%) and 7 men (1.5%), with an average age of  $45.83 \pm 8.89$  years. Regarding the educational background, 79.2% of the respondents completed vocational college and junior college, followed by those who completed university and masters course (20.8%). Approximately 62.5% of the respondents was affiliated in municipalities, and 21.4% of the respondents was affiliated in special district, designated city, core city, and city. Approximately 42.6% of the respondents had chief positions, and subsequently followed by the managerial position (21.0%).

## 3.2 | Factors associated with professional confidence

Not all scores in the items on professional confidence showed the ceiling effect and floor effects. The Spearman's correlation coefficient

**TABLE 1** Characteristics of respondents included in the analysis ( $N = 467$ )

Characteristics	N	%
Sex		
Female	460	98.5
Male	7	1.5
Age		
20–29	24	5.1
30–39	94	20.1
40–49	164	35.1
50+	185	39.6
Experience as a public health nurse (years)		
$\leq 10$	75	16.1
11–20	151	32.3
21–30	159	34.0
31+	82	17.6
Educational background		
Vocational college & Junior college	370	79.2
University & masters courses	97	20.8
Affiliation		
Prefecture	75	16.1
Special district, Designated city, Core city & City	100	21.4
Municipality	292	62.5
Position		
Manager	98	21.0
Chief clerk	85	18.2
Chief	199	42.6
Staff	85	18.2

showed a range of  $r = .298$  to  $r = .890$  in the 34 items. Most items showed a comparatively strong positive correlation, with  $\geq 0.4$  correlation coefficients. The similarity of semantic contents was considered by 27 pairs, with a correlation coefficient of  $\geq 0.7$ , and 13 items that were identified to be similar were eliminated. For example, the items "I support the difficult cases" and "I continue to support the case" have a correlation coefficient of .811. Both items relate to providing individual support within public health nursing skills; therefore, one item was removed. Similarly, the items "I have seniors and colleagues who understand me" and "I have seniors and superiors who can give me advice" have a correlation coefficient of .792. Both items provide data on support from seniors; therefore, one item was removed.

The remaining 21 items were included in the explanatory factor analysis, and the item that showed factor loadings to no factor

was excluded; hence, factor analysis was conducted again. Lastly, 17 items of four factors were extracted (Table 2). Factors contributing to the rate before Promax rotation comprised 53.35% of the first factor, 4.12% of the second, 3.71% of the third, and 3.53% of the fourth, and 64.71% of the cumulative contribution rate. The Cronbach's  $\alpha$  coefficient of 17 items was 0.934, with the first factor as 0.879, the second factor as 0.887, the third factor as 0.883, and the fourth factor as 0.847.

The first factor comprised technical items specific to public health nursing; such items included the analysis of the realities of the residents' lives or support for difficult individual cases. Therefore, the first factor was termed "technical practice." The second factor comprised items of learning based on a PHN's autonomy, such as continuing of self-study or attending graduate

**TABLE 2** Explanatory factor analysis of the professional confidence

		Factor 1	Factor 2	Factor 3	Factor 4	Cronbach's alpha index
Factor 1: Technical practice						
No.6	I try to communicate with the people involved	0.850	-0.156	0.093	0.074	0.879
No.4	I analyzed the realities of the residents' lives	0.723	0.254	-0.035	-0.153	
No.2	I support the difficult cases	0.703	0.143	-0.056	-0.056	
No.8	I associate an individual health problem with community health problem	0.688	0.122	-0.036	0.000	
No.7	I coordinate the opinions of my colleagues	0.557	-0.085	0.140	0.250	
Factor 2: Effortful learning						
No.24	I continue self-studying	-0.043	0.896	0.102	-0.061	0.887
No.23	I attend graduate education programs	0.097	0.685	-0.056	0.114	
No.25	I plan a study meeting	0.180	0.552	0.003	0.073	
No.20	I participate in workshops and study meetings voluntarily	-0.040	0.532	0.238	0.082	
No.21	I discuss in case study	0.291	0.476	0.013	0.107	
Factor 3: Exploring the evidence						
No.32	I practice using manuals	-0.128	0.129	0.773	-0.029	0.883
No.31	I practice using theories	0.021	0.167	0.747	-0.071	
No.27	I pursue the responsibility of my duties	0.032	-0.014	0.732	0.105	
No.30	I pursue the role of related agencies	0.255	-0.092	0.713	0.013	
Factor 4: Educators in workplace						
No.13	I have a role model	-0.059	0.070	-0.077	0.856	0.847
No.14	I have seniors and colleagues who understand me	0.043	-0.051	0.069	0.790	
No.17	I have colleagues who check my growth	-0.020	0.132	0.030	0.702	
The maximum likelihood method (Promax rotation)						
	Factor correlation	Factor 1	Factor 2	Factor 3	Factor 4	
	Factor 1	1.00	0.695	0.739	0.704	
	Factor 2		1.00	0.682	0.632	
	Factor 3			1.00	0.704	
	Factor 4				1.00	

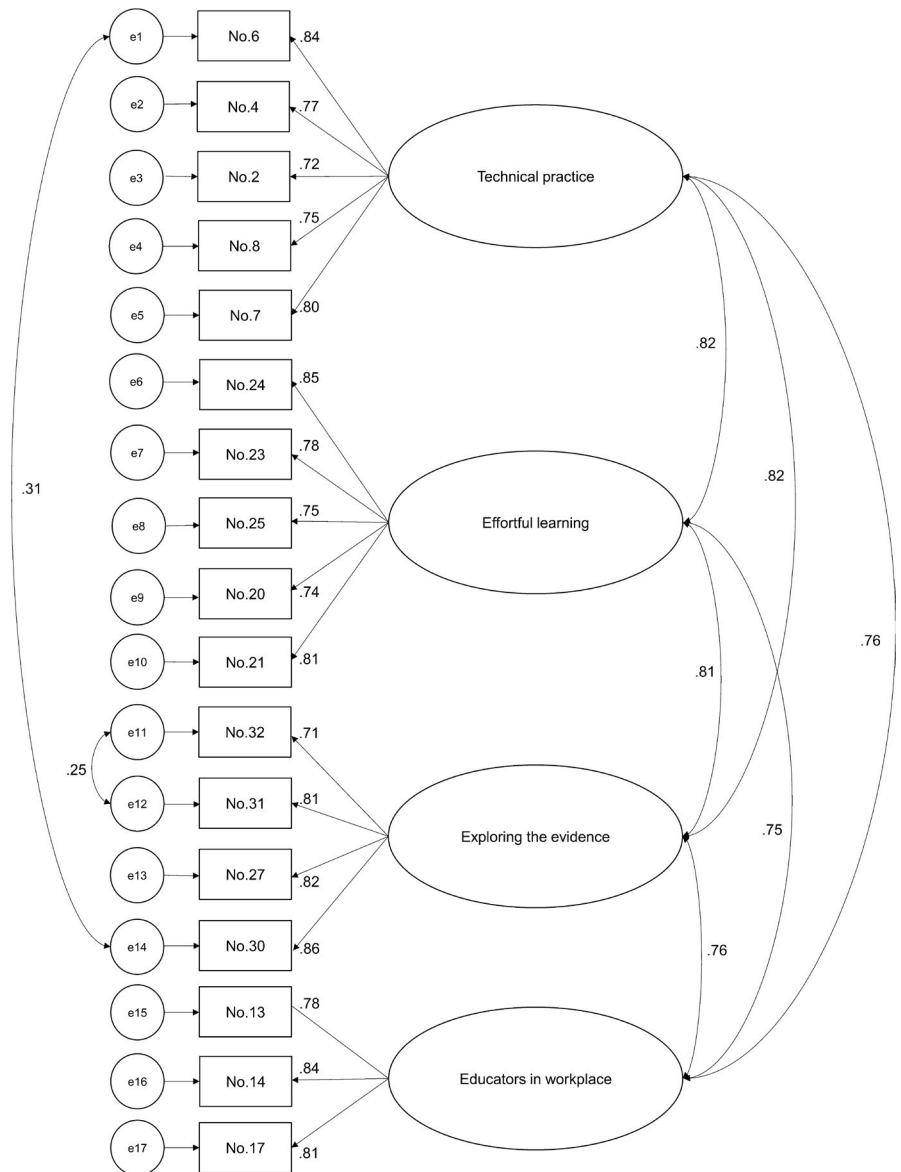
educational programs. Therefore, the second factor was named "effortful learning." The third factor comprised items that pursue the basis of PHNs' activities, such as practice in accordance with the theory or pursue responsibility for duties. Therefore, the third factor was named "exploring the evidence." The fourth factor consisted of items that show existence of superiors and colleagues in the workplace, such as existing role model or checking your growth with colleagues. Therefore, the fourth factor was named "educators in workplace."

Confirmatory factor analysis was performed based on the four factors extracted from the explanatory factor analysis as latent variables that constitute the professional confidence. The results of confirmatory factor analysis are as follows: Chi-square of 390.481 and statistical degrees of freedom of 113. GFI was 0.906, AGFI was 0.873, CFI was 0.949, and RMSEA was 0.073. AGFI was slightly low and RMSEA was slightly high. Therefore, the estimates of the text were output,

and an item with a high value of the correction exponent and model improvement were considered. The item with error correlation due to the similarity of question expression is considered to draw the line of correlation with a model, and confirmatory factor analysis was performed again. The results of the repeated confirmatory factor analysis were Chi-square of 340.028 and statistical degrees of freedom of 111. GFI was 0.918, AGFI was 0.888, CFI was 0.958, and RMSEA was 0.067. Since the corrected model met the general goodness of fit, factors associated with professional confidence in PHNs were clarified (Figure 1).

### 4 | DISCUSSION

First, based on the factors extracted in the factor analysis, the researchers considered how PHNs can increase their professional confidence.



**FIGURE 1** Confirmatory factor analysis of the professional confidence. AGFI, adjusted goodness-of-fit index; CFI, comparative fit index; GFI, goodness-of-fit index; RMSEA, root mean square error of approximation

Numeric values were standardized estimates  
 Goodness-of-fit : GFI=.918, AGFI=.888, CFI=.958, RMSEA=.067

Considering that the “technical practice” of the first factor showed a contribution ratio of more than 50%, professional confidence regarded as a belief based on technical practice is not an overstatement. However, professional confidence was also extracted from “effortful learning,” “exploring the evidence,” and “educators in workplace.” These three factors have a low factor contribution rate, but they are important factors that characterize professional confidence. In the factor analysis that discovers a new concept, not only the contributing factor but also the number of factors existed is a serious discovery (Nakayama, 2018). Extraction of the factors of “effortful learning” and “exploring the evidence” showed that PHNs can gain professional confidence by experiential learning, thereby reflecting the practice positively and providing nursing care based on the residents’ evidence. Furthermore, the extraction of “educators in workplace” confirmed that professional confidence could not be acquired by one person but was nurtured by the relationship between educators, such as superiors and colleagues. Active learning required rich environment that encourages the growth of student responsibility, initiative, decision making, and intentional learning (Grabinger & Dunlap, 1995). Educators are indeed the people who encourage PHNs to learn. Supportive leadership and high collective efficacy were associated with evidence-based practice (Bostrom, Ehrenberg, Gustavsson, & Wallin, 2013). “Educators in workplace” promote supportive leadership and enhance collective efficacy. “Educators in workplace” show nurses the necessity for learning and bear the role of promoting an evidence-based practice. Hence, we defined professional confidence as follows: “Professional confidence can be acquired through experience-based learning, which PHNs aggressively reflect on the practice with educators such as their superiors or colleagues.”

Next, we examined the relationship between factors associated with professional confidence and competency. Public health nursing skills in professional confidence were generally concentrated in the first factor of “technical practice.” “Technical practice” consists of support for difficult cases and analysis of the realities of the residents’ lives and associates an individual health problem with a community health problem. These skills were used for individual and community assessments to achieve care and support. We think that professional confidence was associated with “assessment and analytic skills” of eight skills that constituted professional competency in PHNs. Health assessment skills are the utmost important skills (Weber & Kelley, 2003) that a nurse should possess. The more precise the assessment, the better the results would be obtained; the quality of patient care would also be improved (Mohsen & Azade, 2013). Assessment skills of PHNs are important skills that promote the health of the community. Professional confidence plays a role in supporting the assessment skills, forming the basis of health promotion.

Furthermore, professional confidence supports the generalist level competency of PHNs. The generalist levels routinely use public health nursing skills such as basic data collection, fieldwork, home visit, and population-based services, and generalist competency needs to reflect these practices (Quad Council Coalition, 2018). “Technical practices” of professional confidence was also composed of the skills that PHNs used on a daily basis. Moreover, professional

confidence is a belief acquired by reflecting the practice, and the importance of reflection is common to the professional competency at the generalist level. Hence, we were convinced that the professional confidence of PHNs was a concept that underpinned the professional competency.

In the future, the relationship between professional confidence and professional competency could be further clarified by scaling the factors associated with professional confidence. By scaling professional confidence, we can demonstrate the relationship between professional confidence and professional competency through quantitative research. If the relationship between confidence and competency is demonstrated, human resource development is achieved in which it enhances the competency from the acquisition of confidence. If the on-the-job training, which was originally devised in the workplace, enhances professional confidence, the educational content and methods that increase professional confidence can be used in continuing education to enhance professional competency. In addition, the analysis of the relationship between the professional confidence score by scaling and years of experience as a PHN can help to identify those who require continuing education to increase their professional confidence. Factors associated with professional confidence discovered in this research were generally confirmed by construct validity through confirmatory factor analysis. However, an error correlation existed in the similarity of expressions between questions. To be utilized as a scale, we need to modify the expressions of the question to increase the reliability and validity of the scale.

## 5 | CONCLUSION

Factors associated with professional confidence comprised the following four factors: technical practice, effortful learning, exploring the evidence, and educators in workplace. Professional confidence can be acquired through experience-based learning, which PHNs aggressively reflect on the practice with their superiors or colleagues.

Professional confidence is the important concept that influences the most important assessment skills for health promotion and underpins the professional competency in PHNs as generalists.

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## CONFLICT OF INTEREST

No potential conflicts of interest to disclose.

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