Challenges of Public Health Nurses in Coordinating Relationships: Scale Development

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博 士 論 文

Challenges of Public Health Nurses in Coordinating Relationships: Scale Development

（関係の調整における保健師の困難を測定するための尺度開発）

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CHALLENGES OF PUBLIC HEALTH NURSES IN COORDINATING RELATIONSHIPS: SCALE DEVELOPMENT

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We developed a scale for measuring the challenges faced by public health nurses in coordinating relationships for supporting preschool children with autism spectrum disorder, and examined the scale's construct validity using a factorial structure model. Participants were 708 Japanese public health nurses. The secondary structural model consisted of 6 factors with 25 items. Internal consistency and reliability were high and confirmatory factor analysis using structural equation modeling indicated that the fit criteria were statistically significant. Attributes of public health nurses were significantly related to scale scores. These findings validate the efficacy of our scale to identify and assess the challenges of public health nurses in relationship coordination.

Keywords: autism spectrum disorder, challenges, public health nurses, relationship coordination.

Autism spectrum disorder (ASD) is characterized by pervasive impairments in social reciprocity and/or communication, stereotypical behavior, and restricted interests. This disorder has been the focus of debate in recent years, primarily because of reports of increasing prevalence globally (Fombonne, 2009). The worldwide prevalence of ASD is estimated to range from 0.07% to 1.80% (Baird et al., 2006; Centers for Disease Control and Prevention, 2009; Williams, Higgins, & Brayne, 2006). Kawamura, Takahashi, and Ishii (2008) reported that the prevalence of ASD in Japan is 1.80%, which is higher than the rate of

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1.30% previously reported by Sugiyama and Abe in 1989. Although much of the literature on ASD fails to shed light on the cause for this increase in prevalence, Williams et al. (2006) suggested that the contributing factors are changes in study methodology, an actual increase in autism risk factors, an increase in available services (including diagnostic screening), and increased awareness of the disorder among educational and clinical professionals.

Increased detection rates resulting from screening during early childhood may be another reason for the increased prevalence of ASD (National Research Council, 2001). In Japan, children are required to have health checks at their local health center at the age of 18 months and at 3 years, in accordance with the Maternal and Child Health Law (Mothers' and Children's Health and Welfare Association, 2012). During these health checks, children also undergo screening tests by psychologists to identify possible symptoms of ASD (Inada, Koyama, Inokuchi, Kuroda, & Kamio, 2011; Kamio et al., 2014). Children identified as having symptoms of ASD are referred to a child neurologist or psychiatrist who will determine if the child has ASD.

Once the child has been diagnosed with ASD, public health nurses (PHNs) have a major role in supporting the children and their families. According to the Japanese Ministry of Health, Labor, and Welfare (2010), in 2010 there were approximately 32,000 PHNs employed in municipal or prefectural governments across Japan. An increasing number of PHNs in municipal government positions are engaged in supporting children with ASD and in assisting their families.

In several studies researchers have pointed to the important role of PHNs in assisting these children and their families. Begley et al. (2004) acknowledged that PHNs play a key role in assisting children at risk in the community. Further evidence was offered by Chakrabarti and Fombonne (2001), who found that PHNs are a major source for referral of requests for assessment for diagnosis of ASD. Halpin and Nugent (2007) further highlighted the importance of the role of PHNs, reporting that interactive activities between PHNs and families are important for providing holistic quality care.

The supportive role of PHNs is particularly vital for children with ASD and their families, as ASD is generally regarded as a lifelong disorder that places substantial functional and financial burdens on the individual and family (Howlin, Goode, Hutton, & Rutter, 2004; Järbrink & Knapp, 2001). Baird et al. (2006) reported that individuals with ASD place heavy demands on educational, social, and medical services. To meet these demands requires careful planning and intervention strategies by a range of allied health professionals (AHPs), and such interventions are mainly carried out by PHNs. Effective collaboration between PHNs and AHPs is crucial to ensure optimal care is provided.

To provide support for the family and assist in ensuring that the child's development is managed effectively and appropriately, PHNs consult with

AHPs and nursery- and/or schoolteachers to organize home visits. This support is achieved by providing the family with information about ASD, acting as the advocate for the family, and informing the family about available health and welfare services in their community.

Although procedures and guidelines are in place to assist PHNs in their role within the community (Ministry of Health, Labor, and Welfare, 2011), many PHNs continue to face challenges in their efforts to assist children with ASD and support the family. Ishii, Matsuda, and Takada (2013) found that the core challenge faced by PHNs in supporting preschool children with ASD and their families was coordinating the relationships among PHNs, children with ASD, their families, and AHPs. However, no scale has been developed to identify and evaluate how great the challenges are that PHNs face in coordinating relationships among all players involved in providing care.

Our primary aim in this study was to develop a scale for measuring the challenges faced by PHNs in coordinating relationships among PHNs, children with ASD, their families, and AHPs, and to examine the validity and reliability of this scale. A secondary aim was to investigate the relationships among the scale scores and the attributes of PHNs, including collaborating with the AHPs of relevant organizations, being an expert in family support, being an expert in child development, developing rapport with the family, reviewing clients' needs, and defining the core role of the PHN in regard to ASD support and management.

Method

Measures

We organized and prepared the specific challenge items that constituted the six lower order factors of our proposed model as follows. The process described is in line with that used by Koshida and Morita (2013). First, specific challenge items were extracted from the literature on coordinating relationships for PHNs' in the role of supporting children with ASD and from data obtained from a group interview with five PHNs with at least five years of work experience. We recruited this group as follows: A gatekeeper nominated by the Director of Public Health Nursing forwarded information about the study to all PHNs in a city in Japan seeking their participation in the study. The principal author then contacted five female PHNs who indicated an interest in participating in the study. The criterion for inclusion was to be directly involved in providing ongoing support to preschool children with ASD and their families at the time of the study.

A 102-item pool was created based on the data extraction. Next, we conducted interviews with a panel of experts who were asked "What creates challenges for PHNs when coordinating relationships among PHNs, children with ASD, their families, and AHPs?" and "Could you tell us the reason you think this is

so?" The data sourced from interviews with the group and expert panel were cross-checked, and 35 items were generated.

Content validity was checked through a comprehensive review carried out by an expert panel to determine whether or not items adequately assessed the targeted behaviors to be measured (Fitzner, 2007). This review is essential in developing a scale, and as a mechanism to link abstract concepts with tangible and measurable indicators (Wynd, Schmidt, & Schaefer, 2003). The expert panel involved in the content validity process consisted of five specialists representing public health nursing, nursing education, and pediatrics. All 35 items were checked and recommendations made by the panel members were factored into the questionnaire used in this study. We calculated the content validity ratio (CVR) and the content validity index (CVI) to quantitatively analyze content validity. To calculate the CVR, we asked members of the panel to evaluate each item on a 3-point Likert scale: 1 = *essential*, 2 = *useful*, and 3 = *not necessary*. In line with the findings of Lawshe (1975), items with a CVR ≥ .56 were selected. In determining the CVI, we asked the same expert panel members to evaluate the items in terms of relevancy on a 4-point Likert scale, ranging from 1 = *not relevant* to 4 = *highly relevant* (Davis, 1992). First, the content validity of individual items (I-CVI) was calculated. I-CVI represents the proportion of content experts who assigned a relevance rating of 3 or 4 to a given item. Next, the average of the content validity of the overall scale for all items on the scale (S-CVI/Ave) was calculated. Items with an I-CVI = 1 (Lynn, 1986) and an S-CVI/Ave ≥ .90 (Polit & Beck, 2006) were selected.

Face validity refers to the understanding and comprehension of a scale by the general population (Fitzner, 2007). In carrying out this procedure for this study we applied both quantitative and qualitative methods (Nevo, 1985). For the quantitative section, five PHNs were asked to evaluate the questionnaire and score the importance of each item using a 5-point Likert scale (1 = *irrelevant* to 5 = *extremely suitable*) to calculate the item impact score (impact score = frequency (%) × importance). An impact score ≥ 1.5 is considered satisfactory (Nevo, 1985). For the qualitative section, PHNs were asked about the relevancy, ambiguity, and difficulty of each item. Their responses indicated that several minor changes should be made to the questionnaire. Following the evaluation of the validation process, five items were removed and 30 items were retained.

Participants were asked to rate the level of challenge of each item on a 4-point Likert scale ranging from 1 = *strongly disagree* to 4 = *strongly agree* (Streiner & Norman, 2008). A higher score reflected a higher level of challenge and total scores ranged from 30 to 120.

Participants

From across Japan we recruited 1,393 Japanese PHNs who were supporting

preschool children with ASD and their families at the time of this study. For the recruitment process we used data on municipalities provided by the Japanese Ministry of Internal Affairs and Communications (2011). According to the data, there were 1,727 municipalities at that time; however, 334 were excluded because of extensive structural damage caused by the East Japan Great Earthquake in 2011.

We obtained responses to the initial questionnaires from 826 of 1,393 participants (response rate = 59.3%). Of the 826 initial questionnaire forms returned by participants, 118 were excluded because data were incomplete. Thus, 708 valid initial questionnaires were received (valid response rate = 50.8%). Of the 112 participants who chose to complete both questionnaires, 57 returned both questionnaire forms (valid response rate = 50.8%). All participants were female. The mean age of participants was 41.1 years (SD = 8.31), and the mean years of work experience as a PHN was 16.4 (SD = 8.65). Participant demographic characteristics are shown in Table 1.

Table 1. *Demographic Characteristics of Participants*

	All participants (N = 708)		Sample for ICC (n = 57)	
	n	%	n	%
Sex				
Female	708	100	57	100
Age (years)				
≤ 29	165	23.3	13	22.8
30–39	202	28.6	16	28.1
40–49	236	33.3	19	33.3
≥ 50	105	14.8	9	15.8
Work experience (years)				
≤ 5	163	23.0	13	22.8
6–10	142	20.0	11	19.3
11–20	205	28.9	16	28.1
≥ 21	198	28.0	17	29.8
Position in the workplace				
Staff member	508	71.7	40	70.2
Subsection chief	145	20.5	12	21.0
Section chief	53	7.5	5	8.8
Department head	2	0.3	0	0.0
Nursing education				
Vocational school	452	63.8	36	63.2
Junior college	77	10.9	6	10.5
University	179	25.3	15	26.3
Region of municipalities				
Hokkaido and Tohoku	138	19.5	11	19.3
Kanto	111	15.7	9	15.9
Chubu	143	20.2	11	19.3

Table 1 continued

	All participants ($N = 708$)		Sample for ICC ($n = 57$)	
	n	%	*n*	%
Kinki	98	13.8	8	14.0
Chugoku and Shikoku	91	12.9	8	14.0
Kyushu and Okinawa	127	17.9	10	17.5
Population of municipalities				
≤ 4,999	102	14.4	9	15.8
5000–9999	90	12.7	7	12.3
10,000–19,999	103	14.5	9	15.8
20,000–29,999	88	12.4	6	10.5
30,000–49,999	91	12.9	6	10.5
50,000–99,999	101	14.3	9	15.0
100,000–299,999	82	11.6	7	12.3
≥ 300,000	51	7.2	4	7.0

Procedure

The study was conducted from November 2011 to February 2012. Prior to this time we sent a letter outlining the purpose and procedure of the study, and seeking his/her cooperation, to the chief PHN of each municipality. We collated copies of the questionnaire and manuals describing the purpose, method, and ethical considerations of the study and distributed these to chief PHNs to give to interested participants.

Individuals who agreed to participate in the study were given the choice of completing only the initial questionnaire or completing the same questionnaire again two weeks later so that the reliability of the scale could be examined.

Participants who agreed to complete only the initial questionnaire were required to place their completed questionnaire into a supplied self-addressed envelope and return it to the principal author. Participants who agreed to complete the identical questionnaire on two separate occasions two weeks apart were required to place a unique mark on the initial questionnaire before returning it. An identical mark was placed on the second questionnaire when it was mailed to the participant so the first and second questionnaires could be matched for analysis once both were returned to the principal author. Those participants who agreed to complete the second questionnaire also complete a form to record their address. The completed initial questionnaire and the form on which the participant wrote their address were each placed in a separate supplied self-addressed envelope to prevent linking the questionnaire to the participant. These items were then returned to the principal author. Once the address form was received by the principal author, the second questionnaire was sent to the participant to be completed, marked with the identical unique identifying mark, and then returned in the supplied self-addressed envelope.

Data Analysis

Item analysis was conducted by examining the response distribution and normality of scores. Two criteria were used to remove items: a) average item score plus $SD \geq 4.0$ or ≤ 1.0, and b) correlation coefficients $\geq .80$ in the item correlation matrix. Construct validity was assessed using both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

For the EFA, all 708 participants completed the initial questionnaire and its factor structure was extracted using the maximum-likelihood estimation method with promax rotation. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were used to assess the appropriateness of the sample for the factor analysis. Eigenvalues > 1 and a scree plot were used for determining the number of factors. Factor loadings $\geq .35$ were deemed appropriate (Nunnally & Bernstein, 1994).

The goodness of fit of the hypothesized six-factor model to the data was examined by performing a CFA. As recommended (Kline, 2010; MacCallum, Browne, & Sugawara, 1996), various fit indices were used, including relative chi square (χ^2/df), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). Relative chi square refers to the ratio of chi square to degrees of freedom. Its recommended reference value for accepting the fitness of the model is < 3 (Munro, 2005). The values for GFI, AGFI, and CFI range from 0 to 1, and values closer to 1 are indicative of better data fit (Kline, 2010). An RMSEA ranging from .05 to .08 indicates a good fit (MacCallum et al., 1996).

Internal consistency was evaluated using Cronbach's α coefficient, with values $\geq .7$ considered satisfactory (Litwin, 1995). In addition, a subsample of participants ($n = 57$) completed the questionnaire twice within a two-week interval to examine the reliability of the scale by calculating the intraclass correlation coefficient (ICC); an ICC $\geq .4$ is considered acceptable (Baumgartner & Chung, 2001).

Next, the attributes of participants were examined using a one-way analysis of variance (ANOVA) and multiple comparison analyses were performed in order to investigate the utility of the scale for measuring how challenging the participants perceived each of the items to be. All statistical analyses except CFA were performed using SPSS version 20.0 for Windows. The CFA was performed using AMOS version 20.0 for Windows.

Ethical Considerations

Approval for this study was given by the Research Ethics Review Committee of the Kobe University Graduate School of Health Sciences. A note describing ethical considerations was sent with the questionnaire to the chief PHN and to all PHNs participating in the survey at each institution. This note indicated that the return of the completed questionnaire would be considered the participant's

informed consent. In the description of ethical considerations it was stated that participation was optional and that the anonymity of participants was guaranteed. The intended management and usage of the obtained data were also explained in the note.

Results

Construct Validity and Reliability of the Scale

As a result of observing ceiling effects in 2 of the 30 items in the analysis, these were deleted. Therefore, we adopted 28 items for the EFA. The KMO value was 0.92, and Bartlett's test of sphericity was significant (5.55, $p < .001$), indicating sampling adequacy. The initial analysis indicated a six-factor structure for the scale, with three items loading unexpectedly so that they were irrelevant to the loaded construct. These three items were removed, leaving a total of 25 items that loaded on six distinct constructs (see Table 2).

Table 2. *Six-Factor Solution of Exploratory Factor Analysis With Promax Rotation*

Item No.	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
1	**.959**	.098	-.072	.004	-.072	-.120
2	**.795**	.055	-.029	-.091	-.061	.082
3	**.761**	-.105	-.020	.038	.130	-.013
4	**.682**	-.014	.066	-.003	-.003	.068
5	**.452**	-.034	.225	-.016	.016	.134
6	.005	**.814**	-.047	.018	.028	-.047
7	.020	**.787**	.239	-.210	-.136	.031
8	-.012	**.717**	-.015	.079	-.004	.049
9	.048	**.707**	-.022	.111	.041	-.003
10	.023	**.556**	-.145	.290	.135	-.026
11	.023	-.061	**.861**	-.086	-.016	.062
12	-.045	.065	**.753**	.052	.027	-.107
13	.059	-.097	**.704**	.114	-.029	.043
14	-.123	.319	**.650**	-.116	-.009	-.003
15	.168	-.024	**.442**	.287	.009	-.169
16	-.014	.031	.006	**.852**	-.215	.001
17	-.009	-.007	.010	**.672**	.098	-.040
18	-.076	.048	.060	**.572**	-.029	.204
19	.001	.002	-.107	-.115	**.958**	-.016
20	-.031	-.007	.115	-.075	**.729**	-.037
21	.059	.153	.121	.018	**.403**	.123
22	.025	-.072	.254	.167	**.395**	.044
23	.034	-.044	-.056	.017	-.042	**.880**
24	-.059	.045	.046	.048	.001	**.742**
25	.155	.092	-.056	-.024	.040	**.535**
Eigenvalue	9.96	2.04	1.52	1.24	1.15	1.02

Note. Extraction method = maximum-likelihood estimation method; rotation method = promax rotation with KMO normalization. Factor loadings > .35 appear in **bold**. $N = 708$.

As can be seen in Table 3, the 25 items that now comprised the scale were classified into six lower order factors: collaborating with the AHPs of relevant organizations (five items), being an expert in family support (five items), being an expert in child development (five items), developing rapport with the families (three items), reviewing clients' needs (four items), and defining the core role of the PHN (three items).

Table 3. *Demographic Factors and Scale Items*

Factor	Item
Factor 1. Collaborating with the AHPs of relevant organizations	
1.	It is a challenge to cooperate with AHPs of relevant organizations.
2.	It is a challenge to have AHPs acknowledge and understand the role of the PHN.
3.	It is a challenge to share the policy about supporting the child and his/her family with AHPs of relevant organizations.
4.	It is a challenge to introduce the child and his/her family to the services provided by AHPs of relevant organizations.
5.	It is a challenge to be familiar with the existing services in the community to support the child and his/her family.
Factor 2. Being an expert in family support	
6.	It is a challenge to accurately grasp the family's living situation.
7.	It is a challenge to accurately grasp the child's living situation.
8.	It is a challenge to understand the dynamics of the family's troubles.
9.	It is a challenge to focus on the family's strengths.
10.	It is a challenge to encourage families to reach desired outcomes.
Factor 3. Being an expert in child development	
11.	It is a challenge to determine the most appropriate services to meet the child's needs.
12.	It is a challenge to provide appropriate information to the family concerning the child's situation and his/her growth/development.
13.	It is a challenge to judge the appropriate intervention time required for utilizing the services.
14.	It is a challenge to accurately grasp the child's growth/development.
15.	It is a challenge to connect the child with the services.
Factor 4. Developing rapport with the families	
16.	It is a challenge to encourage families to accept proposals and advice offered by the PHN.
17.	It is a challenge to develop rapport between families and PHNs.
18.	It is a challenge to encourage families to share their concerns with PHNs.
Factor 5. Reviewing clients' needs	
19.	It is a challenge to review the progress of support void of supervision.
20.	It is a challenge to decide when to complete the following-up of the children and their families.
21.	It is a challenge to recognize the needs of children and their families.
22.	It is a challenge to make appropriate support plans for the children and their families.
Factor 6. Defining the core role of the PHN	
23.	It is a challenge to explain the differences and similarities that exist between the role of PHNs and AHPs.
24.	It is a challenge to communicate the role of PHNs to families.
25.	It is a challenge to discuss the treatment plans and intervention strategies provided by AHPs to assist families.

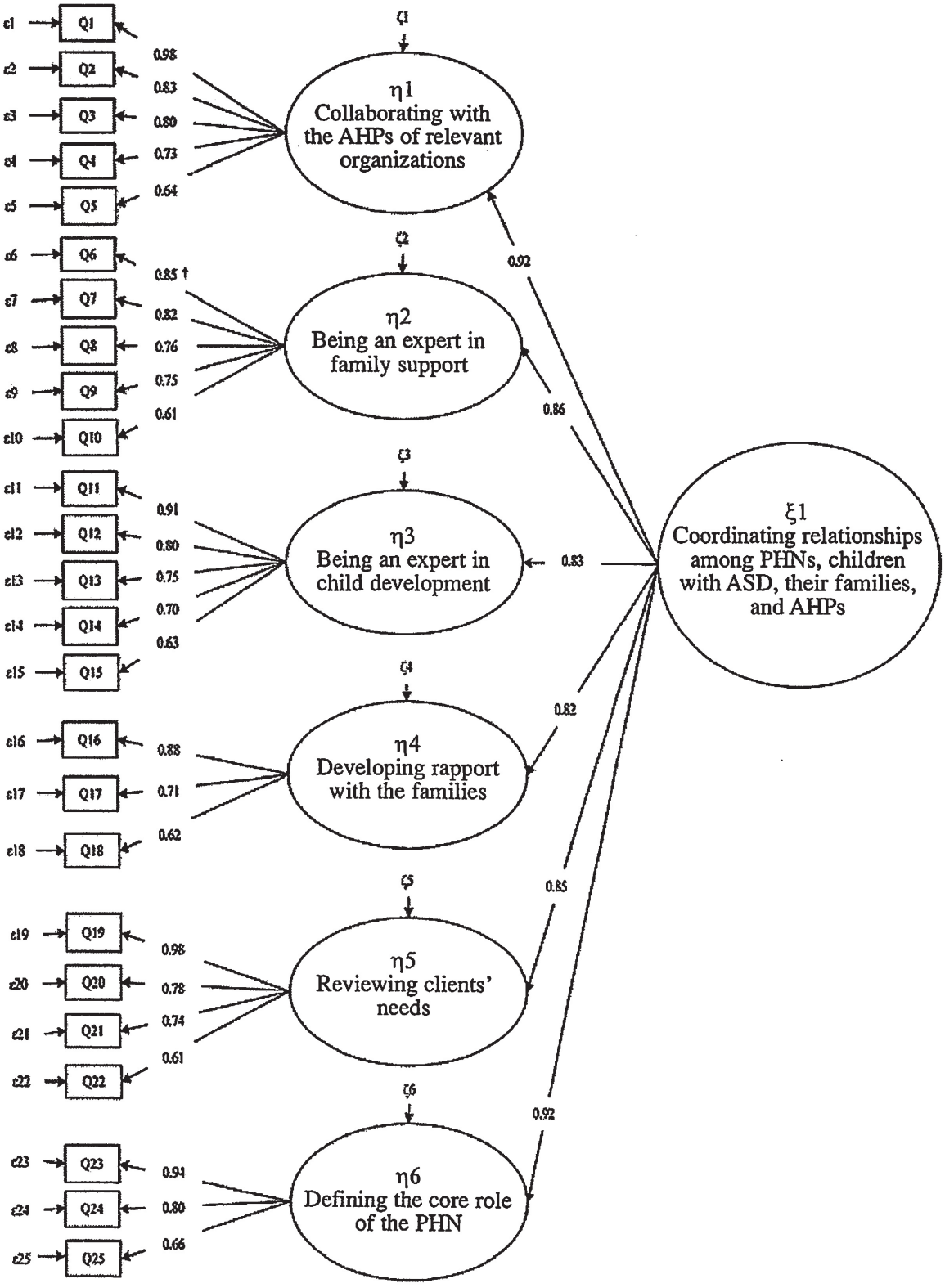

Figure 1. *Results of confirmatory factor analysis of a scale for measuring the challenges faced by PHNs in coordinating relationships among PHNs, children with ASD, their families, and AHPs.*

Note. χ^2/df = 1.51; goodness-of-fit index = .931; adjusted goodness of index = .912; comparative fit index = .956; root mean square error of approximation = .058. □, observed variables; O, latent variables (factors); η, endogenous latent variables; ξ, exogenous latent variables; ε, latent errors of observed variables; ζ, observed errors of latent variables; †, a constraint was added to identify the model. AHPs = allied health professionals. PHN = public health nurse. ASD = autism spectrum disorder.

In Figure 1 the goodness-of-fit indices are shown for the hypothesized second-order factor model, which consisted of six lower order factors. The standardized coefficients between the second-order factors and the first-order factors were positive, ranging from .82 to .92. The standardized coefficients between the first-order factors and the observed variables ranged from .61 to .98. All standardized coefficients were significant ($p < .01$).

The scale we had developed was found to have excellent internal consistency (.94). The ICC was .93, indicating that the questionnaire had an appropriate level of reliability (see Table 4).

Table 4. *Cronbach's α Coefficients and ICCs for the Scale and its Subscales*

	Number of items	*M*	*SD*	Cronbach's α	ICC ($n = 57$)
Factor 1	5	13.2	2.92	0.87	0.86
Factor 2	5	14.4	2.61	0.87	0.87
Factor 3	5	15.4	2.63	0.84	0.83
Factor 4	3	9.3	2.66	0.77	0.76
Factor 5	4	12.1	2.12	0.80	0.80
Factor 6	3	7.6	1.71	0.80	0.80
Total	25	72.3	10.56	0.94	0.93

Note. ICC = intraclass correlation coefficient; AHPs = allied health professionals. $N = 708$.

Relationships Between Scores and Attributes of Public Health Nurses

Using the entire scale and the six subscales as dependent variables, and attributes of PHNs as independent variables, we conducted a one-way ANOVA and corresponding multiple comparison analysis (Tables 5a and 5b).

Older, more experienced PHNs had significantly lower scores on the entire scale and on each of the six subscales. Department heads, section chiefs, and subsection chiefs had significantly lower scores than staff members. Those who had attended nursing courses at vocational schools and junior colleges scored significantly lower than those who had attended nursing courses at universities. However, there were no significant differences with regard to municipality, region, or population.

Discussion

In this study we have provided a new 25-item self-report scale that can be used to measure the level of challenge that PHNs perceive in the tasks of coordinating relationships among PHNs, working with children with ASD, their families, and AHPs. The psychometric properties of the scale were inclusively tested and found to be satisfactory. We believe this scale can assist PHNs in their own professional development by identifying strengths as well as levels of support

Table 5a. *Relationships Between Scores and PHNs' Attributes*

	N	Factor 1 *M* ± *SD* 1)	Factor 2 *M* ± *SD* 1)	Factor 3 *M* ± *SD* 1)	Factor 4 *M* ± *SD* 1)
Age (years)					
≤ 29	165	16.0 ± 3.09	16.5 ± 2.75	17.3 ± 2.01	10.4 ± 1.41
30–39	202	14.5 ± 2.94	15.2 ± 2.73	15.8 ± 2.13	9.5 ± 1.53
40–49	236	12.3 ± 2.84	13.4 ± 2.97	14.3 ± 2.19	8.7 ± 1.48
≥ 50	105	10.1 ± 2.79	12.5 ± 3.13	14.1 ± 2.04	8.4 ± 1.64
Work experience (years)					
≤ 5	163	16.3 ± 3.14	16.1 ± 2.70	17.2 ± 2.03	10.2 ± 1.50
6–10	142	14.2 ± 2.96	15.0 ± 2.76	16.2 ± 2.10	9.5 ± 1.47
11–20	205	12.4 ± 2.81	13.7 ± 2.81	14.4 ± 1.95	8.8 ± 1.38
≥ 21	198	9.9 ± 2.76	12.9 ± 3.03	13.9 ± 1.98	8.5 ± 1.41
Position in the workplace					
Staff member	508	16.2 ± 3.01	16.3 ± 2.85	17.0 ± 1.99	10.5 ± 1.36
Subsection chief	145	13.0 ± 3.60	14.1 ± 2.97	15.2 ± 2.11	9.1 ± 1.40
Section chief	53	11.7 ± 4.05	13.7 ± 3.01	14.9 ± 2.14	8.6 ± 1.52
Department head	2	12.0 ± 4.68	13.3 ± 3.78	14.3 ± 2.20	8.9 ± 1.64
Nursing education					
Vocational school	452	12.1 ± 4.01	13.0 ± 3.05	14.4 ± 2.18	8.6 ± 1.33
Junior college	77	12.4 ± 4.05	13.5 ± 3.01	14.8 ± 2.30	9.0 ± 1.45
University	179	15.2 ± 4.11	16.8 ± 2.84	16.9 ± 2.26	10.4 ± 1.51

Note. The Tukey and Games-Howell methods were used for multiple comparisons. * $p < .05$, ** $p < .01$.

Table 5b. *Relationships Between Scores and PHNs' Attributes*

	N	Factor 5 *M* ± *SD* 1)	Factor 6 *M* ± *SD* 1)	Entire scale *M* ± *SD* 1)
Age (years)				
≤ 29	165	13.8 ± 2.02	9.5 ± 2.03	83.7 ± 11.20
30–39	202	12.6 ± 2.21	8.1 ± 1.98	75.8 ± 11.08
40–49	236	11.5 ± 2.18	6.7 ± 1.92	66.9 ± 10.59
≥ 50	105	10.6 ± 2.24	6.2 ± 2.14	61.9 ± 10.43
Work experience (years)				
≤ 5	163	13.9 ± 2.01	9.3 ± 2.10	83.0 ± 11.03
6–10	142	12.8 ± 2.08	8.1 ± 2.13	75.8 ± 10.87
11–20	205	11.1 ± 1.95	6.6 ± 1.95	67.0 ± 10.44
≥ 21	198	10.7 ± 1.87	6.3 ± 1.92	62.2 ± 10.52
Position in the workplace				
Staff member	508	13.6 ± 1.86	8.9 ± 2.24	82.5 ± 10.28
Subsection chief	145	12.4 ± 2.04	8.0 ± 2.25	70.1 ± 10.46
Section chief	53	11.3 ± 2.11	7.0 ± 2.49	67.2 ± 10.73
Department head	2	11.0 ± 2.41	6.6 ± 2.53	66.1 ± 10.52
Nursing education				
Vocational school	452	11.0 ± 2.07	7.0 ± 2.22	66.1 ± 10.27
Junior college	77	11.4 ± 2.13	7.1 ± 2.30	68.2 ± 11.17
University	179	13.9 ± 1.87	8.8 ± 2.37	81.9 ± 10.61

Note. The Tukey and Games-Howell methods were used for multiple comparisons. * $p < .05$, ** $p < .01$.

and knowledge. We perceive that this would improve the confidence of PHNs and, thus, lead to improved communication and cooperation with AHPs. In turn, this would serve to provide improved quality of care to clients of PHNs and AHPs. The self-report scale can also be used to evaluate practical training programs for PHNs in supporting children with ASD and their families.

The development of the scale involved several steps. The process used provides strong confidence in the scale's content and construct validity. First, PHNs from across Japan participated and the average age of PHNs, average years of work experience as a PHN, position in the workplace, and level of nursing education were almost identical to those reported in 2010 (Japanese Nursing Association, 2011). Second, although the data were collected by postal surveys, the response rate was high (59.3%) in comparison with the 25% to 30% that has previously been reported as the usual response rate to postal surveys (Burns & Grove, 2005). Thus, the response rate and results of our analysis of the demographic characteristics of participants indicate that the present sample was representative of the target population.

We conducted a CFA to assess the construct validity of the factor model of the scale. The hypothesis that the challenges faced by PHNs in relationship coordination would fit the second-order factor model consisting of six lower order factors, was supported. These results also suggest that the six subscales in our scale, taken together, enabled the extent of the challenges faced by PHNs to be measured. Further, we believe that the scale could be very valuable in evaluating the support being provided for children with ASD and their families.

A reliable instrument can increase the power of a study to identify real and significant correlations and group/condition differences (Devellis, 2012). The internal consistency of the scale was .94, indicating desirable reliability, and the ICC, which we used to measure the reliability of the items over two time points, indicated appropriate test-retest reliability. Furthermore, the six factors correspond with the factors previously identified by Saeki, Izumi, Uza, and Murashima (2007), Shiomi, Okamoto, and Iwamoto (2009), and Koshida and Morita (2013) as being associated with the professional competencies of PHNs, and the fact that this correspondence in factors occurred further strengthens the validity of our scale. A characteristic of our scale, which differentiates it from many other scales, relates to the wording of items. Unlike questionnaires in which items consist of short statements, in this scale we used detailed and complete sentences to facilitate understanding among the respondents. Finally, our scale is a relatively short questionnaire that is easy to administer.

We analyzed the relationships between attributes of PHNs and scores on the scale and found that older, more experienced PHNs reported significantly lower levels of challenge than other respondents did when providing support. This is concordant with findings in a previous study in which researchers investigated

the competency of PHNs (Saeki et al., 2007), as, according to their results, experience can improve the practical competencies of PHNs and reduce the challenges they face. With regard to position, in our study department heads, section chiefs, and subsection chiefs had significantly lower scores than staff members. This might be attributed to the different roles of these people within their positions in the workplace, but age and length of experience might also have an effect (Shiomi et al., 2009). Finally, regarding education level, PHNs who had completed their nursing education at a vocational school or junior college scored significantly lower than those who had studied nursing at a university. As nursing education courses at universities in Japan began only in the past two decades, there are currently more PHNs in the workforce who have graduated from vocational schools than have a qualification from a university, and, thus, PHNs with a vocational school qualification have more nursing experience than those with a university qualification. This might explain our findings for both education level and position in the workplace. We found it noteworthy that the relationships we found between attributes of PHNs and scores on the scale were concordant with those reported in a previous study (Koshida & Morita, 2013), further demonstrating the validity of our scale.

We did not analyze concurrent validity to demonstrate the strength of this instrument's correlation with a previously validated measure. This might be considered a limitation of our study. However, the study had a number of strengths. Notably, the sample we used was representative of the target population, and the process used provides substantial confidence in the scale's content and construct validity.

Further investigation is necessary to evaluate the suitability of this scale for use outside Japan. Although the PHN work system in Japan differs from those in other countries, PHNs globally play a vital role in supporting children with ASD and their families (Koshida & Morita, 2013). Therefore, it would be beneficial to conduct a study to determine the suitability of the scale for use with PHNs in other countries. As the scale relies on participants' subjective assessments, its precision must be improved. This might be accomplished by comparing results with objective assessments from AHPs during evaluation of the effectiveness of community activities.

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Challenges faced by Japanese Public Health Nurses in Supporting Children with Autism Spectrum Disorder and their Families: A qualitative study

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Abstract

This qualitative descriptive study explored the challenges faced by Japanese Public Health Nurses in supporting pre-school-aged children with Autism Spectrum Disorder and their families. Nine Public Health Nurses volunteered to participate in the study. Data was collected through nine in-depth interviews with data collection and analysis continuing until all themes was saturated. Six main themes were identified: 1) expertise in child development; 2) reviewing clients' needs, acquiring new resources and developing existing resources; 3) collaborating with Allied Health Professionals of relevant organizations; 4) core role of the Public Health Nurse; 5) developing rapport with the family; and 6) being a partner in family support. The findings indicated the need for improved training for Public Health Nurses in supporting children with Autism Spectrum Disorder, in order to reduce the challenges they encounter. Training is also required to improve the practical skills for creating appropriate resources in the community, and to promote collaboration with Allied Health Professionals. Improving the skills of Public Health Nurses will provide them with confidence in overcoming many challenges they face when delivering appropriate support to clients.

Key Words

Autism Spectrum Disorders, Challenges, Japanese, Public Health Nurses, Qualitative

INTRODUCTION

Japanese Registered Nurses who also hold a National Public Health Nursing License can work as a Public Health Nurse (PHN) undertaking a range of activities to assisting clients in the community. Their role share similarities with those of the PHN in other countries such as in Europe and America. However, in Japan most Public Health Nurses (PHNs) are employed in municipal or prefectural governments, assisting in preventing illness and promoting citizens' health. Having the dual nursing license and being employed by municipal or prefectural governments is unique to Japan [1)].

The importance of the role of PHN in Japan is well documented in the guidelines about the health activities of PHNs in the community [2)]. The content and methods of the PHN activities in municipalities includes the responsibility of both supporting the individual/family and providing community-focused practice [3)]. The extent of the PHNs responsibilities is acknowledged by Saeki [1)] and Okamoto [4)] who reported that central to the PHNs performing their role is the requirement to possess interpersonal health support competencies in addition to administrative and management competencies.

Recently in a global context, there has been increasing concern about the increase in the prevalence of Autism Spectrum Disorders (ASD) [5)-8)]. Several studies have underlined the importance of early identification of ASD and the need to tailor individual intervention programs to improve the management and outcomes of ASD [9)-11)]. To improve the detection rate of ASD, the American Academy of Pediatrics [12)] recommends screening tests be performed regularly at 9, 18, 24, or 30 month visits. In Japan children have a health check at 18 months and 3 years of age at their local health center, in accordance with the Maternal and Child Health Law [13)]. The attendance rate at these health checks is higher than 90% [14)]. These health checks are thought to function effectively as

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a place to screen children for ASD. And the screening tests enable PHNs and other Allied Health Professionals (AHPs) to detect children with suspected ASD systematically [15, 16].

Several researches have commented on the important role PHNs play in assisting children with ASD and providing support to the family. Begley [17] asserts PHNs have a key role in assisting children at risk in the community. Her claim is supported by Chakrabarti [18] who found PHNs are a major source of referrals requesting the assessment for ASD. Equally, the research of Halpin [19] gives added weight to the importance of the role of the PHN by reporting that interactive activities between the PHN and families are important in providing holistic quality care.

Though procedures are in place for detecting cases of ASD and providing family support, various challenges exist for PHNs in undertaking these activities. To address this situation there have been discussions centered on improving the systems in place allowing PHNs to provide support for families who have a child with ASD [20, 21].

Despite the research highlights the important contribution made by PHNs in supporting children with ASD and their family, an exhaustive literature review failed to uncover studies focusing on the "challenges" PHNs face in performing their role. However, anecdotal evidence highlights some of the challenges PHNs encounter in assisting in the identification of children with ASD and providing ongoing support for the family.

To address the lack of research aimed at identifying the challenges PHNs encounter, a qualitative descriptive approach was selected for this study, to shed light on challenges facing PHNs in Japan.

This qualitative study aimed to explore the challenges faced by Japanese PHNs supporting pre-school-aged children with ASD and their families.

METHODS

Design

To best interpret the Japanese PHNs perspective concerning their challenges in supporting pre-school-aged children with ASD and their families, a qualitative descriptive approach underpinned by the naturalistic inquiry [22] was adopted for this study.

Participants

After gaining ethical approval, information about the study was forwarded to all PHNs in one city, by a gatekeeper nominated by the director of public health nursing. Nine female PHNs who indicated an interest in participating in the study contacted the principal researcher. The criterion for inclusion was to be directly involved in providing ongoing support to pre-school-aged children suspected of having ASD and their families at the time of the study.

Data collection

The chief nurse of each public health center identified potential participants (referred to as PHNs) for this study. With the permission of each PHN, the chief nurse provided their names to the principal researcher who explained the study to each of them before obtaining their written consent. In-depth interviews were conducted as the primary method of data collection. All interviews were conducted individually and in the privacy of the PHN's office. Each interview lasted approximately 110 minutes with the following questions asked from a semi-structured interview guide; "Would you tell me in as much detail as possible the support you provided for the pre-school-aged child with ASD and his/her family that has had the greatest impression on you?" and "What were the challenges you faced in your role as a PHN in providing support for the case?" The PHNs were then asked to address each question by describing the challenges they had experienced, how they managed them, and what kind of support they had received/lacked from colleagues, families and AHPs. Probing questions such as: "Can you give me more information about that?" and "How did this make you feel?" were asked in order to extract the maximum amount of detail from the PHNs' experiences.

Data analysis

Following the completion of each interview, data was processed and transcribed verbatim by the principal researcher. To enhance the researchers' understanding of the PHNs' situation from their point of view, memos and field notes of the principal researcher were read and compared with the transcripts.

A qualitative descriptive method was used to process all interview data [23]. To allow the principal researcher to become familiar with all of the text describing the experiences of each PHN, the audiotapes were listened through, and transcribed text was read and reread. As meaning units were condensed, they were labeled with a code. The differences and similarities between the codes were then compared. Codes were sorted into categories according to the similarities between them. Interactive analysis was undertaken between the whole texts, codes, and categories. An interpretation of the underlying meaning which was identified in the categories was formulated into various themes.

To ensure the trustworthiness of the data, the following tenets established by Lincoln [22] were adhered to. To affirm credibility, the principal researcher along with the co-researchers checked with the nine PHNs during debriefing sessions. To establish dependability, the identified themes, along with categories, were compared and then discussed with the co-researchers. The raw data, memos, field notes and products of the data analysis increased the trustworthiness and confirmability of the data.

Ethical considerations

Approval for this study was given by the Research Ethics Review Committee of Kobe University School of Medicine. Before signing the consent form, participants were verbally informed about the study by the principal researcher and assured all information provided would be kept confidential and anonymous.

RESULTS

Demographic characteristics

The ages of the PHNs ranged from 26 to 52 years. Two had worked as a PHN for more than 20 years, four between 15 - 20 years, one 10 - 15 years, one 5 - 10 years, and one 0 - 5 years. Seven were employed at the Maternal and Child Health division and two at the Welfare division for persons with disabilities. Seven were staff members in the work place, one was the subsection chief and one the section chief. Six graduated from vocational school, one from junior college and two from university.

Challenges faced by Public Health Nurses

Six themes and thirty categories emerged from the data analysis. Themes are discussed below with the categories shown in quotation marks.

Expertise in child development

PHNs expressed concern about the challenges they encountered as childhood development 'experts.' Concerns included the challenge of "providing appropriate information to the family concerning the child's situation and their growth/development" based on the need for the family "to accurately grasp the child's growth/development." Also, "to determine the most appropriate services suitable to meet the child's needs", "to judge the appropriate intervention time required for utilizing the services" and "to connect the child with the services:"

> There are times I find the developmental variations in children with ASD difficult to assess accurately. My knowledge of the development of such children needs to be continually updated due to changes in treatment modalities and for me to accurately determine the developmental changes. However, ongoing training is rarely available. The lack of training leaves

> me feeling confused as to whether the advice I provide to the family about the level of their child's development is appropriate, accurate or sufficient (PHN 1).

> One of the greatest challenges I am faced with in my work, is how best determine the necessary services appropriate for children and families, and when should families commence using the services. This situation results from the lack of guidelines outlining procedures to assist PHNs in determining what services are appropriate, and at what stage during contact with the client should treatment commence (PHN 2).

Reviewing clients' needs, acquiring new resources and developing existing resources

PHNs responsible for reviewing the progress and level of support provided to clients, expressed concerns about the lack of resources and poor administration systems. The PHNs saw as their greatest challenge, acquiring additional resources and developing workable systems so as to provide quality service to their community. Other challenges included "making appropriate support plans for the children and their families," "recognizing whether the needs of children and their families were adequately met," "deciding when to complete the following-up of the children and their families" and "reviewing the progress of support void of supervision." Also, "creating new social resources to provide support for the family," "constructing/reconstructing the system to foster improved collaboration with related organizations" and "developing rapport amongst AHPs involved in providing support:"

> Reviewing the progress of support is often difficult ... and we lack clear procedures and criteria of when or how to terminate services after successful intervention is completed (PHN 3).

> As a PHN, it is necessary to review the services we provide despite the challenges in doing so. Reviewing services is necessary to draw attention to the degree of lack of resources and the need to provide additional services to support the child and family. In many rural regions such as our own, few resources are available to support children and families. It is necessary that we develop new resources in collaboration with AHPs and administrators. However, due to the complex administrative nature that exists between our service and the local municipality, it is difficult to acquire and engage in developing existing services in part due to financial constraints (PHN4).

Collaborating with Allied Health Professionals of relevant organizations

PHNs expressed concerns about the lack of collaboration with AHPs and relevant organizations in the community. They spoke about the challenge of wanting to be involved in the discussions and "sharing the policy about supporting clients with other AHPs and relevant organizations" and "having AHPs acknowledge and understand the role of the PHN." The lack of "cooperation with AHPs and relevant organizations" has made it difficult for PHNs "to introduce the child and his/her family to the services provided by relevant organizations" and "to be familiar with the existing services in the community to support the child and his/her family:"

> Collaboration between PHNs and colleagues is necessary to provide appropriate quality of care and support for the client. However, achieving a workable support strategy in collaboration with AHPs always seems elusive. Despite tireless efforts, I continue to struggle with the challenges involved to have AHPs acknowledge the need for improved collaboration (PHN 5).

Core role of the Public Health Nurse

PHNs spoke about the challenges faced in attempting to explain to AHPs and families their responsibilities and role. Specifically, they expressed a degree of frustration stemming from the challenges they encountered in attempting to "communicate the role of PHNs to the families" by "explaining the differences and similarities that existed between the roles of PHNs and other AHPs" and "discussing the treatment plans and intervention strategies provided by them to assist families:"

> Many AHPs representing different professions and organizations are involved directly or indirectly with ASD cases. This leads to confusion and gaps in the treatment and support of families hence, the need for families to understand the role of the PHNs. Though I attempt to educate families about the role of PHNs', doing so is quite difficult and at times frustrating. It is important to ensure families understand the role of PHNs' and other AHPs. Equally trying to gather and organize information from the AHPs and organizations involved so as to provide continuity of services for the families is extremely challenging. I am often left feeling uncertain in how I should go about securing relevant information that is not always made readily available to me (PHN 6).

Developing rapport with the family

PHNs described many challenges faced in developing rapport with families. Some of the challenges mentioned included "developing and maintaining treatment and support between the PHN and families" by "developing rapport between families and PHNs" based on "encouraging families to share their concerns with PHNs" and "convincing families of the benefits of evaluating and or accepting proposals and advice offered by the PHN."

> In my efforts to support families, there are times I find I am confronted by a number of challenges in trying to have them consider or accept my professional advice. When I do receive a consultation phone call from a mother who had previously ignored my advice, I feel that the psychological gap between us no longer exists and I think, "Yes, I have achieved success in developing the trust of the mother!" This can only lead to improved quality of care for the child with ASD and the family (PHN 1).

Being a partner in family support

From this theme emerged how PHNs struggled with the daily challenges associated with the need to be considered as partners in providing family support and quality client centered care. They emphasized the need "to accurately grasp the child's and family's living situation," "to understand dynamics of the family's troubles" and "to encourage families to focus on their strengths in order to reach desired outcomes:"

> From my perspective and experience as a PHN, I firmly believe that having the family and child's support are absolutely necessary for providing efficient and effective quality client-centered care. Though it is often a challenge to grasp the true reality of each family's life style and difficulties, I try doing this where possible, as it is central to the overall success of any intervention. Also, supporting the family by helping them to identify, fully understand and take advantage of their strengths is an ongoing challenge. My efforts are made even more challenging because I am fully aware of the enormous benefits for the family when they focuses on their strengths, in order to succeed in reaching their desired intervention goals (PHN 7).

DISCUSSION

In this study six themes were identified, highlighting various challenges faced by PHNs in their efforts of supporting children with ASD and their families. The challenges impact on how PHNs perceive their role as health providers, and influence the way they perform their clinical and administrative responsibilities. While the six themes are able to stand alone, they also overlap each other.

Our findings indicate that PHNs in this study challenge their level of expertise. Expertise is defined as having specialized knowledge gained by acquiring and updating knowledge and skills[24]. The need for ongoing professional development to improve one's skill level is supported by Saeki [1] and Okamoto [4] who suggest that to perform as an expert, PHNs must possess competencies in skills. We contend that the lack of opportunities for PHNs to participate in professional development to improve their competencies results in a degree of confusion and affects the levels of care provided to clients.

Another important finding in this study was the challenge PHNs face in accessing appropriate resources. Sasamori [21] spoke about there being discussions centered on improving systems that are in place to assist PHNs in undertaking their activities. Despite such discussions, our research shows reviewing clients' needs, acquiring new resources and developing existing resources still remains a challenge for PHNs.

The disappointment in the level of collaboration with AHPs and relevant organizations expressed by PHNs is another key finding of this study. In addressing the lack of effective collaboration, PHNs openly spoke about the challenge they experience when referring clients to the appropriate organizations. The challenge results from poor communication exchanges, lack of feedback and from often being excluded from discussions central to treatment modalities' involving their clients. The need for effective collaboration is acknowledged by Chakrabarti [18], who found that PHNs are the major source of referrals, and by Banner [25], who asserts that the lack of information sharing creates a degree of uncertainty. Together, these findings draw attention to the reason collaboration is central to having an effective community health care system. Failure to engage in appropriate collaboration impacts negatively on the level of care, and often leads to duplication, fragmentation and un-coordinated services.

PHNs in this study also expressed concern about how they perceive and perform their role within their community. The lack of information sharing and feedback makes it a difficult challenge for PHNs to adequately perform their role. Results from the interviews demonstrate that the PHNs often feel professionally isolated from other AHPs, and perceive their role to be undervalued. This prevents the sharing of vital information about the client and creates confusion about the role of the PHN in supporting families. Begley [17] reported that PHNs play a key role in providing for children at risk in the community. Despite this finding, PHNs in this study believe that the absence of acknowledgement of the importance of their role in the community remains a challenge for them to overcome. This lack of acknowledgement leads to gaps in developing intervention strategies and to securing and organizing relevant client information. It also creates challenges for PHNs in trying to explain their role to clients. By being aware of the challenges expressed by PHNs in this study, interested stake-holders have the opportunity to address the findings. To do so will go a long way to promoting the role of the PHN among AHPs and the families they support.

PHNs spoke about the challenges they face in establishing rapport and encouraging families to accept the role of the PHN as a necessary partner in family support. The importance of this was addressed by Dawson [9], Eikeseth [10] and Magiati [11] who found that it was necessary to tailor individual intervention programs to produce the best outcomes relating to ASD. For this to occur, rapport between the PHN and the family is central in allowing the PHN to closely engage with the family to more effectively identify their needs. This would also allow the PHN to evaluate the family's social environment more closely and assist them in providing holistic client centered intervention programs. This is supported by Halpin [19] who reported a close relationship between client and health provider is important in providing holistic quality care. Additional research is required to fully identify the complex nature of the causes that create challenges for PHN in establishing rapport and building interactive partnerships.

Limitations of the study

The findings of this study may not represent the experiences of all health providers or have identified all the challenges that exist in the public health system. However, this does not lessen the need to further research the challenges raised by the PHNs in this study. The small number of PHNs from the same city who participated may not be an accurate representation of other health organizations in Japan. Therefore, the findings must be interpreted cautiously while at the same time acknowledging the contributions made by the PHNs in this study.

Implications for health providers and administrators

The findings highlighted in the six themes of this study have far reaching clinical and administrative implications for health providers and administrators. First, health care providers can use the information from this study to promote and provide a collaborative team approach to holistic health care and to assist in breaking down barriers that impede collaboration between health providers and organizations. Second, being made aware of the challenges provides administrative health personnel with knowledge of the need to provide ongoing professional development training, and update appropriate health systems. In doing so, the focus must be on developing systems that are designed to improve health outcomes. Finally, additional research is warranted to examine the impact the challenges outlined in the six themes have on assessment procedures, treatment interventions, and support for clients.

CONCLUSION

This study highlights the challenges faced by Japanese PHNs in supporting children with ASD and their families. The challenges identified provide information that can be used to improve the management of public health care. It provides the opportunity for PHNs and administrators to use the information gained to put forward programs and interventions specific to the clients' needs. Participation in developing programs should be based on first-hand clinical experience, and understanding of what is required to effect changes to the public health system. Significantly, the findings of this study can contribute to the efforts of promoting improved inter agency collaboration in addition to professional development opportunities. Also, in developing systems that promote the role of the PHN, and to support the interactive interventions by PHNs to allow them to provide the best possible outcome for children with ASD and their families.

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