

Development of a scale to measure the degree of support from public health nurses to promote health promotion volunteers' autonomy in Japan

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Abstract

Government-trained health promotion volunteers are a type of community-based health organization in Japan. This study aimed to develop a scale to measure the degree of support from public health nurses to promote health promotion volunteer autonomy (support scale). A cross-sectional study was conducted. Among public health nurses working in 19 municipalities with health promotion volunteers in Niigata Prefecture, a total of 200 supporting health promotion volunteers at the time of the study were studied. The measurements of this study were as follows: Public health nurse attributes; details of their support to promote health promotion volunteer autonomy; their attitudes toward health promotion volunteer training; and levels of health promotion volunteer autonomy with such support. The number (rate) of valid responses was 140(70.0%). As a result of factor analysis, a support scale consisting of the following 4 factors and 31 items was developed: "support to promote health promotion volunteers' communication with the government and community"; "support to enhance the significance and joyfulness of health promotion volunteer activities"; "Support to increase awareness, knowledge and skills of self-directed activities";

and "the provision of a basis for health promotion volunteer activities and agreement with superiors and colleagues". Its validity and reliability were confirmed in each factor overall. The validity and reliability of the support scale developed in the study were generally favorable; therefore, it is likely to be sufficiently applicable.

Introduction

Japan has one of the world's top longevities. The mean lifespan for males and females in 2010 was 79.64 and 86.39 years, respectively [1]. With a prolonged lifespan, the population aged 65 and older is continuously increasing. In such a rapidly aging society, the increased incidence of lifestyle-related diseases and number of people requiring assistance are serious social problems. Although the maintenance and promotion of health is basically a personal issue, the WHO emphasizes that promoting community-based activities is key to the provision of social support necessary for it [2].

Health promotion volunteers (HPVs) are a type of community-based health organization in Japan. HPVs and their autonomy have been defined as follows:

Definition of HPV: A government-trained volunteer [3]. Most HPVs are recommended by

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the leaders of their districts or wards and appointed from the chiefs of superior municipalities. They receive no remuneration, and, although being appointed with a fixed term, they tend to be reappointed; consequently, their years of experience vary. A system has been developed to distribute HPVs throughout the community. With the slogan, "Promoting your own health", HPVs act to maintain and promote their own and families' health, while promoting such a movement in the communities and guiding residents to a healthier life as community leaders. Their activities may be classified into 3 categories: self-care to promote their own and families' health; the promotion of medical check-ups among community residents and provision of health-related information at the government's request; and performance of community-based activities on HPVs' own initiative, such as organizing classes and cafés for health promotion and guidance. Such activities are mainly supported by PHNs as government-employed specialists. PHNs working in municipalities provide HPVs with advice regarding their activities and professional knowledge of health, while also attending their regular meetings. PHNs aim to promote HPV autonomy to perform self-directed health-promoting activities in the community, in addition to self-care and the government-led activities.

Definition of HPV autonomy: HPVs' self-directed activities with increased interest in their own and families' health, as well as community health issues, and their initiative to perform such activities [4].

The reciprocal model defined by Schwartz [5] is one of the theories to promote group work in the community, proposed in previous studies regarding support for groups. According to this model, the primary function of the "worker" supporting a group is to lead both the group and its members to the problem-solving process through mutual aid, while mediating between the

group and a larger system. Further, it has been reported that it is necessary to provide the following 3 types of support throughout the process of promoting group work in the community: establishing a group-community relationship [6-11]; providing information [6,8,10]; and providing substantial support [12].

Up to the present, there have been several studies regarding PHNs' support for community-based organizations and groups, such as HPVs [13-17]. The details of PHNs' support leading residents' activities to community building have also been reported [18]; however, it is difficult to standardize the findings of these studies, in which quantitative analysis was not performed, and, consequently, scales to measure the degree of support from PHNs to promote HPV autonomy (support scale) have not yet been developed. Considering such a situation, this study aimed to develop a support scale and examine its association with levels of HPV autonomy and PHN attributes.

An appropriate support scale is needed in the following 2 respects: To facilitate PHNs' self-evaluation of their support and understanding of important points to promote HPV autonomy; and to facilitate their superiors' and colleagues' evaluation of such support.

Methods

1. Preliminary study

Based on the findings of the previous studies regarding PHNs' support for community-based organizations, such as HPVs [13-18] and indices of HPV autonomy [4], scale items were considered. The scale items of indices of PHNs' support for HPV autonomy have been examined as the indices of consciousness of PHNs. The scale items of indices of HPV autonomy have been examined to judge their degree of autonomy by PHNs in these previous studies. So, these scale items were used in this study. Subsequently, the content validity of each item was verified by 2

PHNs with abundant experience in supporting community-based activities and 1 specialist well versed in such activities.

A pre-test was conducted involving 5 PHNs working in the study communities to examine these items in March 2011, and, based on the results, they were corrected, worded, and used in the main study.

2. Main study

1) Subjects

Among PHNs working in 19 of 30 municipalities with HPVs in Niigata Prefecture, a total of 200 supporting HPVs at the time of the study were studied (excluding 30 on administrative leave).

2) Methods

An anonymous self-description questionnaire survey was conducted from July to August 2011 by requesting the chief PHNs working in the study communities to distribute the questionnaire sheet by mail. Respondents were asked to return their completed questionnaire sheets to the distributors by mail.

3) Questionnaire items

(1) PHN attributes

The questionnaire consisted of the following questions: the age; years of experience as a PHN; position; job content; years of support for HPVs; number of supported HPVs; attitude toward HPV training; number of seminars attended during 2010; content of attended seminars; and presence/absence of external support for HPV training.

(2) Details of support from PHNs to promote HPV autonomy

Based on the findings of the previous studies, the details of support from PHNs to promote HPV autonomy were classified into 52 items, including: facilitating HPVs' communication with community and social resources; providing necessary information; working with HPVs; and developing a cooperative system in the workplace. Respondents answered on a 5-point Likert scale (1 = Strongly disagree, 2 = disagree,

3 = neutral, 4 = agree, 5 = Strongly agree) for each item.

(3) HPV autonomy with support from PHNs

Among 39 items consisting of 5 factors of the indices of HPV autonomy defined by Fujinami et al. [4], the following 12 accounting for the upper 30% of factor scores were used to evaluate the level of HPV autonomy with support from PHNs: 1. Using the knowledge and skills obtained through training and activities to maintain and promote their own and family's health; 2. performing HPV activities for community residents with a wide range of ages; 3. being aware of the characteristics and health issues of the community; 4. feeling close to other HPVs; 5. resolving anxiety and enhancing motivation by talking with other HPVs; 6. coming up with new ideas and focusing on new challenging issues in HPV activities; 7. actively expressing opinions in regular HPV meetings; 8. defining their own tasks and acting self-directedly to implement them; 9. working with other members while fully understanding the position of each; 10. creating an open-hearted atmosphere with other members; 11. cooperating with the government staff, such as public health center and city employees; and 12. collaborating with other organizations, such as clubs for the elderly. The previously mentioned a 5-point Likert scale was used.

The total scores for all the 12 items were considered as scores representing the level of HPV autonomy (HPV autonomy scores).

These indices of HPV autonomy were used by health professionals to evaluate the HPVs's levels of autonomy according to structural framework [4].

(4) PHNs' attitude toward HPV training

Based on the findings of the previous studies, the following 3 items were determined as questions regarding PHNs' attitude toward HPV training: 1. Do you recognize the significance of HPV training? ; 2. Are you willing to actively participate in HPV training? ; and 3. Do you

consider HPV training enjoyable and worthwhile?. The previously mentioned a 5-point Likert scale was used.

4) Questionnaire response rates

A total of 143 subjects from 18 of 19 municipalities responded (71.5%). The number (rate) of valid responses was 140 (70.0%), excluding those with incomplete answers to the questions regarding the details of support or the same answers for all items.

5) Ethical considerations

Subjects who received the questionnaire sheet by mail were provided with a written explanation of ethical considerations, including completely voluntary participation and withdrawal, privacy protection, appropriate control and usage of data, and informed consent by sending a response. This study was conducted with the approval of the Ethics Committee at Niigata University of Health and Welfare (Approved on June 7, 2011; approval number: 17243).

3. Analysis

Analysis of the collected data was performed, as mentioned in below. Statistical procedures were performed using SPSS 17.0J for Windows.

1) Scale items

The 5-point answers were scored from 1 to 5, and their appropriateness was examined using a P-P plot. Subsequently, for the selection, scale items were analyzed by calculating the item-total (I-T) correlation, Cronbach's alpha without each item, and correlation coefficients between items, in addition to performing good and poor (G-P) analysis.

2) Validity

To verify the construct validity of the support scale, factor analysis was performed. In the absence of an external criterion, the criterion-related validity was not examined.

3) Reliability

To examine the reliability of the support scale, Cronbach's alpha coefficients were calculated in each factor and overall. Further, the I-T

correlation coefficient was calculated by item.

4) Association between the support scale and levels of HPV autonomy

The association between the support scale and levels of HPV autonomy was examined by performing a t-test with the significance level set at $p < 0.05$.

5) Applicability of the support scale

To examine the applicability of the support scale, its association with PHN attributes was examined by performing a t-test or ANOVA and Tukey's test for multiple comparisons with the significance level set at $p < 0.05$.

Results

1. Respondent attributes

Respondent attributes are shown in Table 1.

The mean age (standard deviation) was 40.9 (± 8.9). The mean number of years of experience as a PHN was 17.9 (± 9.3). Their positions included: section chief, assistant section chief, or equivalent positions: (10 respondents; 7.1%); sub-section chief or equivalent positions: (24; 17.1%); chief or equivalent positions (71; 50.7%); and engineer or PHN (35; 25.0%).

2. Basic statistics of the support scale

The frequency distribution, mean, standard deviation, and response rate for each item of the support scale were calculated (these values are not shown in the table). The mean for each item was 2.62 to 4.18, and standard deviation was 0.53 to 1.06. The mean for each item after adding or deducting the standard deviation value was within a range of 1 to 5 points without showing ceiling and floor effects. The obtained data were considered to be appropriate in terms of the frequency distribution and P-P plot. The response rate was 97.9% or higher in all items.

3. Results of item analysis

The I-T correlation, Cronbach's alpha without each item, and correlation coefficients between items were calculated by performing item analysis, in addition to G-P analysis. As a result,

Table 1. Basic respondent data

Items	n=140	
	Number of persons n	(%)
Age of PHN		
Under 30	12	(8.7)
30 to 39	51	(36.4)
40 to 49	46	(32.9)
50 to 59	31	(22.1)
Mean±sd	40.9±8.9	
Years of experience as a PHN		
Less than 10	13	(9.3)
10 to 19	51	(36.4)
20 to 29	45	(32.1)
More than 30	31	(22.1)
Mean±sd	17.9±9.3	
Position		
Section chief, assistant section chief, or an equivalent position	10	(7.1)
Sub-section chief or an equivalent position	24	(17.1)
Chief or an equivalent position	71	(50.7)
Engineer or PHN	35	(25.0)
Job content		
Managing affairs (as a manager for the section, subsection, and PHNs)	26	(18.6)
Staff affairs (as a person in charge of the district-related and operational procedures)	114	(81.4)

PHN: Public Health Nurse sd: Standard deviation

the I-T correlation coefficient was within a range of 0.30 to 0.62. On comparison between Cronbach's alpha coefficients before and after excluding each item, the latter was not greater than the former in any item. Internal consistency was obtained with all items. On G-P analysis, respondents were divided into 2 groups by the median (183) of the total score for 52 items: those with higher scores (≥ 184 : 69 respondents); and those with lower scores (≤ 183 : 71). The results of a t-test performed to examine score differences between groups showed a significant difference at significance levels lower than 1% in all items; those with higher scores exhibited significantly higher scores than those with lower scores. Further, a significant correlation was observed between items with a correlation coefficient of 0.7

or greater in 9 of 11 items. Based on these results, the content of the initially considered 52 items was re-examined, 6 items apparently having a similar content were excluded, and the remaining 46 items were finally studied.

4. Results of validity examination

The results of factor analysis of scale items are shown in Table 2.

To examine the construct validity, factor analysis of the 46 items was performed.

Adopting the main factor method and eigenvalue 1, 7 factors were obtained; as the scree plot dropped sharply between 4 and 5 factors, the analysis was finally performed adopting 4 factors. Following a promax rotation, an eigenvalue of 1.72 and cumulative contribution rate of 50.4% were obtained with 4 factors. Further, the number

Table 2. Results of factor analysis on the factors involved in PHNs' support for HPV autonomy

Scale Items	Factor 1	Factor 2	Factor 3	Factor 4
Factor 1: Support to promote HPV's communication with the government and community				
48: Enhancing the understanding of HPV activities and their outcomes in the government staff	.648	.116	-.086	-.034
21: Promoting cooperation and collaboration between community-based organizations	.624	-.073	.200	-.147
39: Discussing common issues with related organizations	.622	-.091	-.088	.383
42: Establishing a partnership with other departments and proposing a cooperative system to them	.611	.169	-.058	-.166
47: Coordinating governmental environments necessary for HPV activities	.608	.161	-.053	-.049
38: Collecting necessary information from related community-based organizations and experts	.607	-.129	-.017	.293
40: Ensuring that advice from a sufficient number of partners is available when needed	.567	.120	-.156	.121
35: Promoting HPV's communication with other advanced communities	.550	-.116	.175	-.222
33: Guiding HPV's in establishing a relationship with community staff to facilitate their collection of necessary information	.521	.224	-.045	.043
17: Guiding HPV's to the self-evaluation of their activities	.478	-.217	.360	.015
34: Enhancing understanding of the importance of HPV activities in the leaders of districts and neighborhood associations to obtain their cooperation	.448	-.090	.093	.127
18: Sharing the significance and outcomes of activities with HPV's (to enhance their motivation)	.447	-.010	.386	-.126
16: Obtaining community residents' understanding of HPV activities	.428	.080	-.053	.191
Factor 2: Support to enhance the significance and joyfulness of HPV activities				
28: Working and learning with HPV's	.001	.667	.151	.059
30: Focusing on HPV's satisfaction and enjoyment	-.041	.657	.056	.055
31: Respecting an individual HPV's pace and self-directedness	.107	.654	-.268	-.013
32: Dealing with HPV's flexibly according to their conditions	-.004	.637	-.178	.109
27: Appreciating HPV's abilities and activities	-.085	.610	.178	.061
24: Sufficiently communicating with HPV's to establish a relationship of mutual trust with them	.222	.533	.088	-.088
13: Respecting an individual HPV's statements	.000	.485	.185	.001
26: Sharing challenging and joyful times of activities with HPV's	.088	.484	.381	-.172
Factor 3: Support to increase awareness, knowledge and skills of self-directed activities				
6: Enhancing HPV's awareness of the importance of self-directed activities	-.111	.011	.709	.089
10: Providing HPV's with the knowledge and skills necessary for their activities	-.030	-.043	.665	.155
9: Guiding HPV's in planning feasible activity projects	.066	-.018	.663	-.049
4: Promoting discussion among HPV's (for the performance of activities with common consent)	-.011	.054	.532	.190
11: Ensuring appropriate locations and opportunities for HPV activities within the community.	.217	-.031	.532	-.021
Factor 4: The provision of a basis for HPV activities and agreement with superiors and colleagues				
2: Providing necessary information to HPV's to enhance their awareness of their own and families' health issues	-.120	-.007	.087	.715
3: Providing necessary information to HPV's to lead them to solve their own and families' health problems.	.062	.077	-.066	.634
49: Sharing a view on HPV activities with other PHNs	-.216	.138	.268	.498
50: Obtaining superiors' and colleagues' understanding of community residents' activities on their own initiative.	.070	.141	.219	.494
37: Providing relevant materials that show evidence to HPV's	.339	-.122	-.011	.444
Eigenvalues	8.82	3.02	2.07	1.72
Cumulative contribution rates	28.44	38.19	44.85	50.39
Factor 1	1.000	.323	.478	.413
Factor 2	.323	1.000	.563	.216
Factor 3	.478	.563	1.000	.268
Factor 4	.413	.216	.268	1.000
Correlation between factors				

The table shows the 31 finally adopted items out of the 52 for the support scale. Factor loadings above 0.4 are shown in bold type.
PHN: Public health nurse HPV: Health promotion volunteer

of factor loadings was 0.4 or greater in all items, showing that an optimal solution was obtained without contradiction in the content of the items involved in each factor. The 4 factors included: 1: “support to promote HPVs’ communication with the government and community”; 2: “support to enhance the significance and joyfulness of HPV activities”; 3: “Support to increase awareness, knowledge and skills of self-directed activities” ; and 4: “the provision of a basis for HPV activities and agreement with superiors and colleagues”.

5. Results of reliability examination

Cronbach’s alpha coefficients for each factor and the entire scale were as follows: Factor 1: 0.87; 2: 0.85; 3: 0.79; 4: 0.74; and entire scale: 0.91; a high level of reliability was observed in each factor and overall. On comparison of Cronbach’s alpha coefficients for these factors and the entire scale between before and after excluding each of 31 items obtained through the factor analysis, the latter was not greater than the former in any item. Further, the I-T correlation coefficients for each item and the entire scale were within a range of 0.29 to 0.58, demonstrating internal consistency.

6. Association between the support scale and levels of HPV autonomy

The association between the support scale and levels of HPV autonomy is shown in Table 3.

To examine the association between them, the association of each factor and the entire scale with HPV autonomy scores was initially

examined.

The lowest HPV autonomy score was 25, the highest was 57, and the median was 44. By dividing HPV autonomy scores into 2 groups (≥ 45 and ≤ 44) by the median, scores for the former were significantly higher than those for the latter in all factors and the entire scale ($p \leq 0.018$).

7. Association between the support scale and PHN attributes

The association between the support scale and PHN attributes is shown in Table 4.

To examine the association between them, the association of each factor and the entire scale with the respondents’ age, years of experience as a PHN, position, job content, years of support for HPVs, number of supported HPVs, attitude toward HPV training, number of seminars attended during 2010, content of attended seminars, and presence/absence of external support for HPV training was initially examined.

The youngest age was 23, the oldest was 59, and the median was 41. By dividing these ages into 2 groups (≥ 42 and ≤ 41) by the median, scores for the former were significantly higher than those for the latter in Factor 3 ($p = 0.033$).

Job content was examined on dividing into managing and staff affairs, and scores for the former were significantly higher than those for the latter in Factor 1 ($p = 0.040$).

Similarly, the attendance at seminars regarding community building was examined by dividing

Table 3. Association between the support scale and levels of HPV autonomy

HPV autonomy scores	Factor 1		Factor 2		Factor 3		Factor 4		Entire scale		
	n	Mean±sd	p-value	Mean±sd	p-value	Mean±sd	p-value	Mean±sd	p-value	Mean±sd	p-value
44 and below	73	39.9±6.2	<0.001	29.7±2.8	<0.001	17.0±2.7	<0.001	18.3±2.4	0.018	104.8±10.5	<0.001
45 and above	67	44.2±6.8		33.5±3.4		19.8±2.5		19.3±2.7		116.8±11.7	

HPV: Health Promotion Volunteer sd: standard deviation
An unpaired t-test was performed.

Table 4. Association between the support scale and PHN attributes

Items	Factor 1		Factor 2		Factor 3		Factor 4		Entire scale		
	n	Mean±sd	p-value	Mean±sd	p-value	Mean±sd	p-value	Mean±sd	p-value	Mean±sd	p-value
Age of PHN											
Under 42	75	41.2±6.3	.157	31.4±3.6	.724	17.8±2.9	.033	18.6±2.4	.578	108.9±11.3	.133
42 and above	64	42.8±7.4		31.6±3.6		18.8±2.9		18.8±2.8		112.1±13.6	
Years of experience as a PHN											
Less than 18	72	41.8±6.3	.826	31.5±3.7	.907	17.8±2.9	.051	18.7±2.5	.745	109.8±11.9	.499
More than 18	68	42.1±7.4		31.6±3.6		18.8±2.9		18.8±2.7		111.3±13.3	
Position											
Section chief, assistant section chief, or an equivalent position	10	43.4±5.3	.245	31.0±4.9	.368	19.1±1.8	.163	19.1±2.0	.511	112.6±9.8	.324
Sub-section chief or an equivalent position	24	44.3±9.2		32.2±4.0		18.6±3.7		19.4±3.1		114.5±17.1	
Chief or an equivalent position	71	41.3±6.0		31.1±3.4		18.5±2.6		18.6±2.3		109.5±10.7	
Engineer or PHN	35	41.3±6.9		32.1±3.6		17.3±3.3		18.4±2.9		109.3±13.0	
Job content											
Managing affairs	26	44.5±7.8	.040	32.7±3.6	.072	18.9±3.6	.293	18.9±2.5	.745	114.9±14.8	.050
Staff affairs	114	41.4±6.5		31.3±3.6		18.2±2.8		18.7±2.6		109.5±11.9	
Years of support for HPVs											
12 or less	73	42.0±6.7	.739	31.3±3.6	.313	18.3±2.9	.907	18.5±2.7	.246	110.2±12.1	.707
More than 13	66	41.8±7.1		31.9±3.7		18.3±3.1		19.0±2.4		111.0±13.2	
Number of supported HPVs											
29 or less	70	41.9±5.9	.932	31.5±3.2	.826	18.1±2.9	.385	18.6±2.2	.580	110.1±10.4	.683
30 or more	60	42.1±8.2		31.6±4.2		18.5±3.1		18.9±2.9		111.0±13.2	
Attitude toward HPV training ¹⁾											
12 and below	98	41.0±6.9	.013	30.5±3.2	<.001	17.6±2.8	<.001	18.3±2.5	.004	107.4±11.7	<.001
13 and above	42	44.2±6.5		33.9±3.6		20.0±2.7		19.7±2.6		117.7±11.6	
Number of seminars attended within one year											
4 or less	74	41.5±7.4	.418	31.5±3.6	.985	18.2±2.8	.705	18.6±2.6	.536	109.9±12.9	.515
5 or more	66	42.5±6.3		31.5±3.8		18.4±3.1		18.9±2.5		111.3±12.3	
Attendance at seminars regarding healthy community building											
Not attended	80	40.6±7.5	.007	31.1±4.0	.141	18.1±2.9	.346	18.4±2.9	.038	108.2±13.8	.012
Attended	60	43.8±5.4		32.1±3.1		18.6±3.0		19.2±2.1		113.6±10.0	
Support for HPV training from outside											
Not attended	98	41.9±6.8	.805	31.1±3.4	.043	17.8±3.0	.003	19.1±2.3	.014	109.9±12.3	.357
Attended	42	42.2±46.9		32.3±4.2		19.4±2.5		17.8±2.9		112.0±13.2	

PHN: Public health nurse HPV: Health Promotion Volunteer sd: standard deviation
 An ANOVA and Tukey's test were performed for multiple comparisons of positions, while the remaining items were analyzed by performing an unpaired t-test

the respondents into attending and non-attending groups; scores for the former were significantly higher than those for the latter in Factors 1 and 4 and the entire scale ($p \leq 0.038$).

Scores for those with external support for HPV training were significantly higher than those without in Factors 2, 3, and 4 ($p \leq 0.043$).

Scores regarding years of support for HPVs, number of supported HPVs, attitude toward HPV training, number of seminars attended during 2010, and number of seminars attended during 2010 were divided into 2 groups by each median and compared, while those regarding positions were divided into 4 groups. As a result, no significant differences were observed in any factor or the entire scale.

Discussion

A limitation of the previous studies which tried to identify the factors which affect HPVs' autonomy was lack of quantitative study. This study was the first quantitative study to summarize the factors and develop a scale to measure the degree of support from PHNs to promote health promotion volunteers' autonomy.

1. Validity and reliability of the support scale

The overall reliability of the support scale was generally favorable with a high Cronbach's alpha coefficient, and its internal consistency was also confirmed with Cronbach's alpha coefficient for each factor.

Regarding its validity, the results of the factor analysis may be regarded as favorable; the construct validity was demonstrated with sufficient eigenvalues, cumulative contribution rates, and factor loadings.

2. Characteristics and theoretical consistency of the support scale

The support scale developed in this study was characterized by its framework, consisting of 4 factors and 31 items. In this section, the content of each factor was discussed by comparing to the findings in the existing literature.

Factor 1 "support to promote HPVs' communication with the government and community", consisting of 13 items, indicated that HPV autonomy may be promoted through PHNs' support facilitating HPVs' communication with the government and community. Such support included: enhancing the understanding of HPV activities in the government and community organization staff, as well as community residents; promoting cooperation and collaboration between community-based organizations; and establishing a HPV-community relationship to facilitate the provision of information needed by HPVs. Such results are consistent with the findings of the previous studies [6-11].

Factor 2 "support to enhance the significance and joyfulness of HPV activities", consisting of 8 items, indicated that HPV autonomy may be promoted through PHNs' support for HPV activities, respecting individuals and focusing on their enjoyment and satisfaction. Such results are consistent with the findings of the previous study [18].

Factor 3 "Support to increase awareness, knowledge and skills of self-directed activities", consisting of 5 items, HPV autonomy may be promoted through PHNs' appropriate substantial support in HPVs' developmental process, such as enhancing HPVs' awareness of the importance of self-directed activities, proposing feasible plans, and supporting their activities based on them. Such results are consistent with the findings of the previous studies [8,12,16].

Factor 4 "the provision of a basis for HPV activities and agreement with superiors and colleagues", consisting of 5 items, indicated that HPV autonomy may be promoted through PHNs' provision of necessary information, sharing a view on HPV activities with other PHNs, and agreement with their superiors and colleagues regarding community residents' activities on their initiative. Such results are consistent with the findings of the previous studies focusing on the

provision of information [6,8,10] and agreement with superiors and colleagues [18].

Based on these findings, the support scale developed in the study may be considered to consist of important items for HPV autonomy, although they may not represent all the details of PHNs' support for it.

3. The association between the support scale and levels of HPV autonomy

The association between the support scale and levels of HPV autonomy was discussed as follows: HPV autonomy scores were significantly higher for those with scores of 45 or higher than for those with 44 or less in all factors and the entire scale, suggesting that HPV autonomy may be promoted through PHNs' support for it.

4. The association between the support scale and PHN attributes

The association between the support scale and PHN attributes was discussed as follows:

On comparison of the 2 age-based groups (≥ 42 and ≤ 41), scores for the former were significantly higher than those for the latter in Factor 3; this result suggests that older PHNs may be more capable of promoting HPV autonomy, and is consistent with the findings of a previous study [14].

On comparison of the 2 groups (≥ 13 and ≤ 12) divided based on attitude toward HPV training, scores for the former were significantly higher than the latter in all factors and scale; this result suggests that PHNs with an affirmative attitude toward HPV training may provide support for HPV autonomy more actively, and is consistent with the findings of a previous study [16].

On comparison of the 2 groups divided based on the attendance at seminars regarding community building, scores for the attending group were significantly higher than those for the non-attending group in Factors 1 and 4 and the entire scale; this result suggests that the attendance at these seminars may have influenced Factors 1 and 4 and the entire scale.

On comparison of the 2 groups divided based on the presence/absence of external support for HPV training, scores for those with support were significantly higher than those without in Factors 2, 3, and 4; this result suggests that external support may have influenced these factors.

Further studies may be necessary to examine the relationship between the age and years of experience as a PHN, and position and job content. The remaining PHN attributes, such as years of support for HPVs, and numbers of supported HPVs and seminars attended during 2010, were considered not to influence the support scale.

5. Applicability and limitations

The validity and reliability of the support scale were confirmed in the study. As previously mentioned, scales to measure the degree of support from PHNs to promote the autonomy of community-based organizations, such as HPVs, have not been developed, except for this. It may be applicable as a basis for PHNs to provide appropriate support for HPV autonomy and conduct self-evaluations of their support.

In addition, this support scale may also be useful for PHNs' superiors and colleagues to evaluate the effect of such support. On the other hand, in order to enhance its accuracy, it may be necessary to accumulate further data through its application by PHNs in municipalities.

As limitations of the study, a limited number of PHNs working in municipalities in a single prefecture were studied. It is necessary to study on the subjects in other prefectures, to confirm and generalize the results of this study.

Further, HPVs' activities and support for their autonomy were evaluated subjectively by individual PHNs, and the results of such an evaluation were not compared to those of an objective evaluation by a third person and by a HPV; therefore, it may be necessary to conduct comparative studies in order to use this scale for both purposes.

Conclusions

The following findings were obtained by reviewing previous studies, developing a support scale to measure the degree of support from PHNs to promote HPV autonomy, and verifying its validity and reliability:

1. The developed support scale consisted of the following 4 factors and 31 items: “support to promote HPVs’ communication with the government and community”; “support to enhance the significance and joyfulness of HPV activities”; “Support to increase awareness, knowledge and skills of self-directed activities”; and “the provision of a basis for HPV activities and agreement with superiors and colleagues”.
2. The support scale was shown to be valid and reliable in each factor and overall. This scale can be used to measure the degree of support from PHNs to promote HPV autonomy as a total score of 31 items among 4 factors. And we can identify the factor with low score and we can strengthen the factor to increase the total score.
3. An association of scores for the support scale with HPV autonomy scores and PHNs’ attitude toward HPV training was observed.

Based on these findings, it may be concluded that this support scale is applicable as a basis for PHNs to provide support for the autonomy of community-based organization and conduct evaluations of such support.

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