

# A Psychometric Assessment of Structural Empowerment Scale for Public Health Nurses (SES PHN)

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## ABSTRACT

**Aim:** To develop a structural empowerment assessment scale for public health nurses and examined its psychometric properties and utility in predicting organizational commitment and job satisfaction.

**Methods:** Deductive scale development was employed. A total of 206 public health nurses from Central Luzon, Philippines who met the eligibility criteria were recruited as respondents. Content validity index (CVI) and exploratory factor analysis(EFA)were used in the analysis of data.

**Results:** Only 18 out of 20 items received relevance rating of 3 and 4 by all experts and has excellent CVI result. Sixteen out of the 18 items received CVI=1 and the 2 remaining items received a rating of CVI=.83. Two out of 20 items received poor interpretation of CVI with 0.5 and 0.33 CVI results. Moreover, EFA revealed that 14 items in factor 1 has larger loading than the factor 2. There will be 14 items to factor 1 and factor 2 will consist of 3 items. Factor 1 received a Cronbach's alpha result of .957 and .826 for factor 2, indicating that both factors are acceptably reliable.

**Conclusion:** The developed Structural Empowerment Scale for public health nurses (SES PHN) was valid and reliable. However, each factor could probably be strengthened through revision of items with lower primary loadings and possibly adding new items.

**Keywords:** Behavior mechanism; motivation; reliability; testing; validity

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## INTRODUCTION

Power in nursing is "the ability to get things done, to mobilize resources, to get and use whatever it is that a person needs for the goals he or she is attempting to meet"<sup>1</sup>. Power is also define as having control, influence, or domination over something or someone. It includes caring practices by nurses which are used to empower patients. It may also be viewed as a positive, infinite force that helps to establish the possibility that people can free themselves from oppression. Nursing is an expert power that is defined as "the ability to influence others through the possession of knowledge or skills that are useful to others"<sup>2</sup>.

According to Kanter, an empowered employee should have access to resources needed for one's work, access to information needed to get one's job done as well as knowledge and understanding of the organization, access to support for one's responsibilities and job performance and access to opportunity for professional growth and development<sup>3</sup>. These are the four empowerment structures that can be an advantage and a disadvantage in employee's ability to accomplish their work in meaningful ways and for them to feel empowered. If these empowerment structures are present, the power is 'on' while if these empowerment structures are unavailable, power is 'off' and effective work is impossible<sup>3</sup>.

Public health nursing promotes wellness and prevents illness through education and health teachings. It provides comfort and care through its delicate nursing care interventions and emphasizes curative and rehabilitative interventions through individualized efficient approaches. But its peculiarity involves not only caring a single client but by extending thru the whole family and the community.

Empowered nurses are best equipped to protect patients' rights. Nurses should be empowered to influence

clients, individual or group, physicians and other health care provider. And it is considered that lack of power in nursing can lead to poor patient outcomes making it important for public health nurses(PHN) to promote empowerment.

There were only limited studies about structural empowerment; most of these studies were conducted in clinical hospital settings<sup>4-9</sup>. And none of these have quantitatively assessed the structural empowerment in a public health setting. Prior to this study, there is no specific tool yet to assess structural empowerment among PHNs. This study aimed to develop and validate a structural empowerment scale for PHNs that will help measure nurse's empowerment in the community setting. Nursing empowerment results to having a healthy work environment that will increase better patient outcomes and improve quality of care. It may also decrease the number of nurses considering leaving their job, profession or are out of the nursing workforce. Structural empowerment in public health nursing may decrease job burn out and increase job satisfaction.

The study aimed to develop a structural empowerment assessment scale for PHNs and to examine its psychometric properties and utility in predicting organizational commitment and job satisfaction.

## METHODS

**Research design:** On this study, the researcher employed deductive scale development which utilizes a classification diagram or typology prior to data collection. The researcher investigated thoroughly the literature to develop the theoretical definition of the theory under examination. The definition of the theory is then used as a guide for the development of items. This approach will be used in the study by two primary ways. First, researcher derived items designed to tap a previously defined theoretical universe

and the second method is for the researcher again to develop conceptual definitions grounded in theory, but then utilize a sample of respondents who are experts in the subject matter to provide critical events that can be used to develop items.

The researcher also developed scales inductively by asking a sample of respondents to provide descriptions of their feelings about their organizations or to describe some aspects of behavior. Responses are then being categorized into a number of sets by content analysis based on key words or themes. Both deductive and inductively generated items will be subjected to a sorting process that will serve as a pretest, permitting the deletion of items that are believed to be conceptually inconsistent.

**Sample of the Study:** A total of 206 PHNs from Central Luzon, Philippines were recruited as respondents of this study. Only those who met the selection criteria were included such as those currently employed as school nurse, community nurse and company nurse; able to comprehend English language, and willing to give informed consent.

**Construction and Validation of Instrument:** The researcher prepared a 4-part questionnaire with 5 items each. Each item is based on Moore's Structural Empowerment Model<sup>[10]</sup> which is composed of 4 components: enable, engage, enhance and empower.

**Statistical Treatment of Data:** The data collected were tabulated and processed. Content Validity Index (CVI) and Exploratory Factor Analysis (EFA) were used in the analysis and interpretation of the data. Content validity measures knowledge of the content domain of which it is designed to measure knowledge. Content validity concerns the adequacy with which the test items adequately and representatively sample the content area to be measured.

EFA is a statistical technique that is used to reduce data to a smaller set of summary variables and to explore the underlining theoretical structure of the phenomena. It is used to identify the structure of the relationship between the variable and the respondent.

## RESULTS

Table 1 shows the CVI of the scale being developed for structural empowerment of PHNs. As shown, the relevance ratings of six experts for a 20-item scale. All six experts rated 17 out of the 20 as highly relevant with a mean of 2.83 to 4. All six experts rated item 18 as quite relevant with mean of 3.33; item 11 and 20 rated somewhat relevant with a mean of 2.50 and 2.17. The total scale-level CVI is 0.98 or excellent. Only 18 out of 20 items (all items except item 11, and 20) received relevance rating of 3 and 4 by all experts and has excellent CVI result. However, only 16 out of the 18 received CVI=1 and the 2 remaining items received a rating of CVI=.83. 2 out of the 20 item (items 11 and 20) received poor interpretation of CVI with 0.5 and 0.33 CVI result.

According to Laws he, if more than half the panelists indicate that an item is essential, that item has at least some content validity<sup>[11]</sup>. Greater levels of content validity exist as larger numbers of panelists agree that a particular item is essential<sup>[12]</sup>.

The result simply implies that items with poor result is not valid to be part of the scale to be developed and items with excellent rating is valid to be a content of the scale. Resulting for item 11 and 20 to be deleted as items of scale.

Construct validity is "the degree to which a test measures what it claims, or purports, to be measuring. Construct validity examines the question: Does the measure behave like the theory says a measure of that construct should behave? Construct validity is essential to the perceived the overall validity of the test<sup>[13]</sup>.

Table 2 shows the Kaiser-Meyer-Olkin (KMO), Bartlett's Test of Sphericity, and Communality Statistics to measure the appropriateness of factor analysis. As shown, out of 18 items, 16 items received a value closest to 1.0 with item-level KMO ranging from 0.93-0.98. The 2 remaining items received an item-level KMO of 0.89 and 0.73. All items received an item-level KMO closer to 1 with over all KMO measure of 0.96 or marvelous for factor analysis. It also shows that 17 items received a score greater than .4 communalities where communalities less than 0.4 cannot be included in the subsequent factor analysis resulting for item 8 to be excluded on the succeeding factor.

Kaiser-Meyer-Olkin (KMO) Test is a measure of how suited your data is for Factor Analysis. The test measures sampling adequacy for each variable in the model and for the complete model. The KMO criterion used in the study is greater than 0.5. Item-level KMO values vary between 0 to 1.0 and better if it's closer to 1.0. For reference, Kaiser put the following values on the results: 0.00 to 0.49 unacceptable; 0.50 to 0.59 miserable; 0.60 to 0.69 mediocre; 0.70 to 0.79 middling; 0.80 to 0.89 meritorious; and 0.90 to 1.00 marvelous.

This implies that EFA can be conducted subsequently since the Bartlett's Test of Sphericity is statistically significant because p value is .000 and the overall KMO is 0.96 or marvelous for factor analysis.

Table 3 shows the Eigenvalues and percentage of variance extracted to determine the number of factors. As shown, there are two factor solution for the 17 items. Two items have a result greater than 1.0 with a result of 10.25 and 1.25. Factor 1 has a 60.28 percent of variance and Factor 2 has 7.35 percent of variance resulting to 76.64 overall percent of variance.

Eigenvalues are the variances of the factors. The factor analysis was conducted based on the correlation matrix, the variables are standardized, which means that each variable has a variance of 1, and the total variance is equal to the number of variables used in the analysis. Percent of Variance column contains the percent of total variance accounted for by each factor. And the Cumulative percentage column contains the cumulative percentage of variance accounted for by the current and all preceding factors.

This simply implies that the 17 items is divided in 2 factors. The table above (Eigenvalues and percentage of variance extracted) and scree plot (Figure 1) are data that used to determine the number of factors. The elbow in the scree plot occurs at Factor Number 2, indicating that there are two factor solutions for the 17 items.

Table 4 shows the factor loadings on the principal axis factoring with promax rotation for the 17 items for validity and factor label. As shown, the factor loading on the principal axis factoring. 14 out of 17 items received larger factor loading in factor 1 than the 3 other items. Items 1-3 got larger loading in factor 2 with a score of .839, .771, .762 consequently. Items 4-19 (except items 8 and 11) is arrange from larger result to smaller in factor 1. Loadings can range from -1 to 1. In factor 1, item 7 received the larger loading result and closest to 1 indicating the factor strongly affects the variable and item 9 getting the smallest loading result closest to 0 indicating weakest effect on the variable. In factor 2, item 1 received the larger loading result and item 3 received the smallest loading factor. Item 1 in factor 2 is the one that strongly affects the variable and item 3 has the weakest effect on the variable.

The Factor Analysis is an explorative analysis. Factor analysis groups similar variables into dimensions. This process is also called identifying latent variables. Since factor analysis is an explorative analysis it does not distinguish between independent and dependent variables. Factor Analysis reduces the information in a model by reducing the dimensions of the observations to simplify the data, for example reducing the number of variables in predictive regression models. Factor analysis is also used in theory testing to verify scale construction and operationalization.

This simply implies that 14 items in factor 1 has larger loading than the factor 2. Resulting that in the 2 factors that was constructed, there will be 14 items to factor 1 and factor 2 will consist of 3 items.

Table 5 shows overall reliability of the SES PHN, .957. Alpha coefficient ranges in value from 0 to 1 and may be used to describe the reliability of factors extracted from multi-point formatted questionnaires or scales (rating scale: 1 = strongly agree, 5 = strongly disagree). The higher the score, the more reliable the generated scale is. Nunnally<sup>14</sup> has indicated 0.7 to be an acceptable reliability coefficient but may vary. Both factor 1 and 2 received an overall Cronbach's alpha result of .957, indicating that both factors are acceptably reliable.

Table 6 shows the discriminant validity statistics of the scale being developed and validated for measuring structural empowerment of PHNs. As shown, factor 1 average variance extracted (AVE) is larger than the factor 2 with an average of 0.805 and greater than the correlation between factors ( $r=.679$ ). The AVE of factor 2 is 0.862 and larger than the factor 1 AVE. The AVE of factor 2 is also larger than the correlation factor ( $r=.679$ ).

Discriminant validity is a measure of the quality of a measurement instrument; the instrument itself is typically a set of question-statements. A measurement instrument has good discriminant validity if the question-statements (or other measures) associated with each latent variable are not confused by the respondents, in terms of their meaning, with the question-statements associated with other latent variables<sup>[15]</sup>. The AVE of each construct should be higher than the construct's highest squared correlation with any other latent construct: Fornell-Larcker Criterion <sup>[16]</sup>. Or, the

square root of AVE of each latent variable should be higher than the correlations with all other latent variables.

The result simply implies that the instrument has good discriminant validity respondents are not confused with meaning of each items with other variables because both factor 1 and factor 2 has larger AVE received than the other constructs.

After content and construct validity, the developed scale is composed of 17 items with 5-point Likert scale used to measure respondent's perception on a particular topic. The 17 items questionnaire is measured using the following Likert Scale: 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree and 5 = strongly disagree. Interpretation of results for each respondent can be interpreted as follows:

0-34	Extremely Empowered	In this level, the nurses feel extremely empowered because access to information, resources, support and opportunity is present in the workplace. The presence of these 4 structural empowerment structure at workplace enable nurses to accomplish work in meaningful ways <sup>[10]</sup> .
35-51	Empowered	In this level, the nurse feels empowered but not as much as the first level because of possible absence of some structural empowerment structure in the workplace. Kanter posits that with tools, information, and support, people's skill base will improve, they will increasingly make informed decisions and overall accomplish more, thereby benefiting the organization as a whole.
52-68	Slightly Empowered	In this level, the nurse is experiencing lesser power and most of the empowerment structures are missing. Kanter's theory has proven to have measurable impact on both employee empowerment and job satisfaction as well as organizational morale and success, especially in healthcare settings <sup>[17]</sup> . It has also been noted that retention rates of healthcare professionals improve when empowerment principles such as decreased work pressure, greater peer cohesion, support from supervisors, and staff autonomy are put in place <sup>18</sup> .
69-85	Not Empowered	Workers who feel powerless may experience a sense of failure in their work which in turn leads to negative attitudes and behaviors (absenteeism, turnover, and disengagement) that results in increases in worker stress and burnout. In conclusion, poor staffing levels, inadequate resources, and poor nurse/physician/client relationships can directly cause job dissatisfaction and contributes to nurse frustration <sup>[18]</sup>

Psychometric Assessment of Structural Empowerment Scale

Table 1: Content Validity Index

Item	Responses							Content Validity		
	Expert1	Expert2	Expert3	Expert4	Expert5	Expert6	Mean	Descriptive Equivalent	CVI	Interpretation
I have access and control over resources.	3	3	4	4	4	3	3.50	Highly relevant	1.00	Excellent
I work in a conducive environment.	3	4	4	4	4	3	3.67	Highly relevant	1.00	Excellent
I accomplish work with enough time.	3	4	4	4	4	3	3.67	Highly relevant	1.00	Excellent
I work effectively with others	3	4	4	4	4	3	3.67	Highly relevant	1.00	Excellent
I gain new knowledge and skills from job.	2	3	3	4	4	4	3.33	Highly relevant	0.83	Excellent
I have access to information about tasks to be done and allowed to ask questions.	4	4	4	4	4	4	4.00	Highly relevant	1.00	Excellent
I participate in attaining the goals of management.	4	3	4	4	4	4	3.83	Highly relevant	1.00	Excellent
I am unsatisfied with client-nurse ratio.	3	3	3	4	1	3	2.83	Highly relevant	0.83	Excellent
I engage myself in researches to improve health care system.	4	3	4	4	4	3	3.67	Highly relevant	1.00	Excellent
Managers enhance my responsibilities and job performance by giving hints and problem solving advice.	3	3	3	4	4	3	3.33	Highly relevant	1.00	Excellent
Managers reprimand me if I commit mistakes.	3	2	2	3	2	3	2.50	Somewhat relevant	0.50	Poor
My work is being valued by others.	4	4	4	4	4	4	4.00	Highly relevant	1.00	Excellent
I work in accordance to the mission, vision and values of the institution.	4	4	4	4	4	4	4.00	Highly relevant	1.00	Excellent
I am given opportunities to enhance my job performance by attending seminars/training for professional growth and development.	4	4	4	4	4	4	4.00	Highly relevant	1.00	Excellent
I use my own skills and knowledge in performing tasks.	4	3	4	4	4	4	3.83	Highly relevant	1.00	Excellent
I am able to influence others.	4	4	4	3	4	3	3.67	Highly relevant	1.00	Excellent
I promote and encourage change.	4	3	4	3	4	4	3.67	Highly relevant	1.00	Excellent
I have the autonomy to make decisions in performing tasks.	3	3	4	3	4	3	3.33	Quite relevant	1.00	Excellent
I have creatively responded to challenges of work.	3	4	4	4	4	3	3.67	Highly relevant	1.00	Excellent
I feel like my job is not challenging anymore.	4	2	2	3	1	1	2.17	Somewhat relevant	0.33	Poor
<b>Scale-level CVI</b>									<b>0.98</b>	<b>Excellent</b>

Notes: According to Polit and Beck (2006), for 6-10 experts: Excellent item-level CVI= .78 or higher and Excellent Scale-level CVI=.90 or higher. Items with poor item-level CVI were not included in the computation of the scale-level CVI.

Table 2: Kaiser-Meyer-Olkin (KMO), Bartlette's Test of Sphericity, and Communalities Statistics

	Communalities	Item KMO
1. I have access and control over resources.	.71	0.89
2. I work in a conducive environment.	.60	0.94
3. I accomplish work with enough time.	.62	0.93
4. I work effectively with others.	.65	0.95
5. I gain new knowledge and skills from job.	.68	0.95
6. I have access to information about tasks to be done and allowed to ask questions.	.76	0.96
7. I participate in attaining the goals of management.	.78	0.96
8. I am unsatisfied with client-nurse ratio.	.05	0.74
9. I engage myself in researches to improve health care system.	.45	0.98
10. Managers enhance my responsibilities and job performance by giving hints and problem solving advice.	.58	0.97
11. My work is being valued by others.	.67	0.97
12. I work in accordance to the mission, vision and values of the institution.	.75	0.95
13. I am given opportunities to enhance my job performance by attending seminars/training for professional growth & development.	.62	0.97
14. I use my own skills and knowledge in performing tasks.	.53	0.98
15. I am able to influence others.	.72	0.97
16. I promote and encourage change.	.81	0.96
17. I have the autonomy to make decisions in performing tasks.	.66	0.96
18. I have creatively responded to challenges of work.	.68	0.96

Notes:

- Overall KMO measure of sampling adequacy: .96
- Values of item-level KMO and multiple-item KMO vary between 0 and 1.0, where values closer to 1.0 the better. This study utilized a KMO criterion of greater than 0.5 (Field, 2000).
- Bartlett's Test of Sphericity: Chisquare= 2733.21, df=153, p = .000. Factor analysis can be conducted subsequently since the Bartlett's Test of Sphericity is statistically significant (p<.05).
- Items with communalities of less than .4 cannot be included in the subsequent factor Analysis

Table 3: Eigenvalues and Percentage of Variance Extracted

Factor	Eigenvalue	% of Variance	Cumulative %
1	10.25	60.28	60.28
2	1.25	7.35	67.64
3	0.75	4.42	72.06
4	0.62	3.65	75.70
5	0.52	3.08	78.79
6	0.46	2.70	81.48
7	0.44	2.59	84.07
8	0.41	2.42	86.49
9	0.37	2.19	88.69
10	0.33	1.97	90.65
11	0.30	1.78	92.44
12	0.25	1.47	93.91
13	0.25	1.47	95.38
14	0.23	1.34	96.71
15	0.21	1.26	97.98
16	0.17	1.02	99.00
17	0.17	1.00	100.00

Notes:

- Two eigenvalues that are greater than 1.0, indicating that there are two factor solutions for the 17 items.
- The proportion of variance accounted for Factor1 is 60.28% while for Factor2 is 7.35%, thus, the proportion of variance accounted for the two factors is 67.64%.
- Principal axis factoring method using the promax rotation was utilized

Table 4: Factor Loadings on the Principal Axis Factoring with Promax Rotation for the 17 Items

	Factor 1	Factor 2
I participate in attaining the goals of management.	.869	.580
I work in accordance to the mission, vision and values of the institution.	.843	.518
I have access to information about tasks to be done and allowed to ask questions.	.842	.688
I am able to influence others.	.822	.601
My work is being valued by others.	.820	.615
I have creatively responded to challenges of work.	.819	.597
I promote and encourage change.	.804	.564
I am given opportunities to enhance my job performance by attending seminars/training for professional growth and development.	.791	.524
I gain new knowledge and skills from job.	.785	.492
I work effectively with others.	.774	.626
I use my own skills and knowledge in performing tasks.	.729	.474
I have the autonomy to make decisions in performing tasks.	.728	.650
Managers enhance my responsibilities and job performance by giving hints and problem solving advice.	.724	.663
I engage myself in researches to improve health care system.	.632	.590
I have access and control over resources.	.448	.839
I work in a conducive environment.	.597	.771
I accomplish work with enough time.	.635	.762

Extraction Method: Principal Axis Factoring; Rotation Method: Promax

Table 5: Reliability of the Resulting Factors

Factor 1	Cronbach's Alpha if item deleted	Overall Cronbach's Alpha
		.957
I participate in attaining the goals of management.	.952	
I work in accordance to the mission, vision and values of the institution.	.953	
I have access to information about tasks to be done and allowed to ask questions.	.953	
I am able to influence others.	.953	
My work is being valued by others.	.953	
I have creatively responded to challenges of work.	.953	
I promote and encourage change.	.954	
I am given opportunities to enhance my job performance by attending seminars/training for professional growth and development.	.954	
I gain new knowledge and skills from job.	.954	
I work effectively with others.	.954	
I use my own skills and knowledge in performing tasks.	.955	
I have the autonomy to make decisions in performing tasks.	.955	
Managers enhance my responsibilities and job performance by giving hints and problem solving advice.	.955	

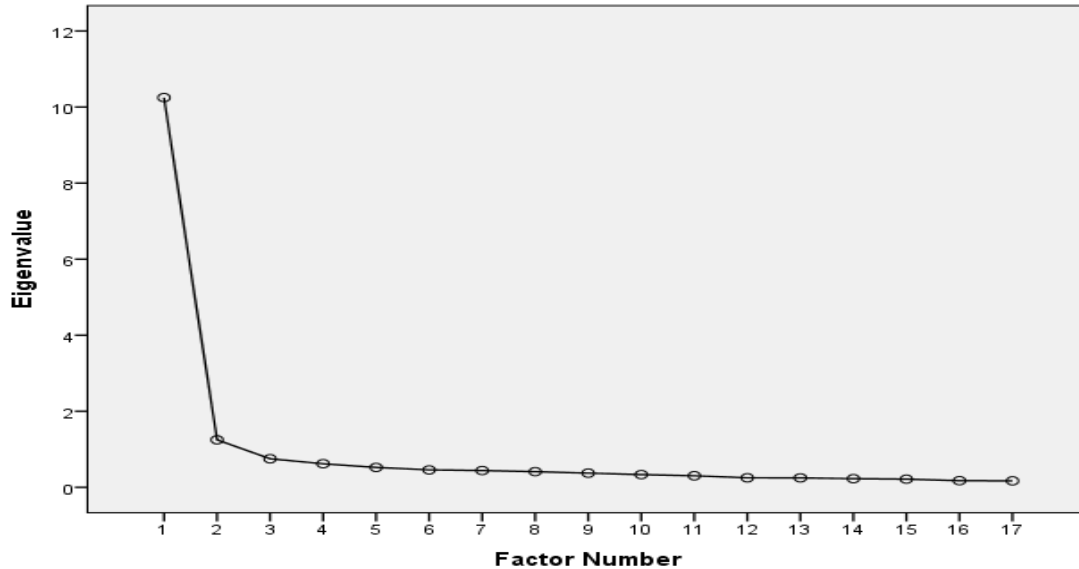
	I engage myself in researches to improve health care system.	.954	
<b>Factor 2</b>			<b>.826</b>
	I have access and control over resources.	.715	
	I work in a conducive environment.	.778	
	I accomplish work with enough time.	.785	
<b>Overall:</b>	<b>Structural Empowerment Scale</b>		<b>.957</b>

Table 6: Discriminant Validity Statistics

	Factor 1	Factor 2
<b>Factor 1</b>	(0.805)	0.682
<b>Factor 2</b>	0.682	(0.862)

Note: Values enclosed in parentheses are the square root of average variance extracted(AVE) between factors. For discriminant validity, the square root of AVE should be larger than the correlation between factors ( $r=.679$ ).

Figure 1. Scree plot for the resulting factor analysis



**DISCUSSION**

The development and validation of SES PHN will help in measuring the level of empowerment of PHNs which may have an effect on the job satisfaction of nurses in their job<sup>19</sup>. Effective working condition can increase job satisfaction, organizational commitment, and leadership practice; and can lessen job stress and burnout<sup>9,19</sup>. Higher perceived access to empowerment structures predicted to lower levels of job tension and increase work effectiveness. It can also help in determining the PHNs’ leadership practices. Leader-empowering behaviors affect employee’s perception of formal and informal power and access to empowerment structures: information, resources, support and opportunity.

Public health nursing promotes wellness and prevents illness through education and health teachings. Empowered PHNs are more likely to empower their clients if they are structurally empowered which will result to better patient and system outcomes<sup>19</sup>. There is a need for professional development of PHNs in order to support them to be more critically engaged in their work<sup>9, 19, 20</sup>. This needs to be done within organizational structures that support PHNs to critically analyze the role of advocacy and empowerment in their practice. Empowerment is a process and an outcome in which the ability, self-efficacy and autonomy of the PHNs is enabled and strengthened by the

community – where clients and healthcare professionals have open channels to all the resources they need to support them in achieving their personally defined potentials<sup>21</sup>.

The developed SES PHN was valid and reliable. However, each factor could probably be strengthened through revision of items with lower primary loadings and possibly adding new items. Factors can be improved by conducting a Confirmatory Factor Analysis (CFA) will specify the number of factors required in the data and which measured variable is related to which latent variable. CFA is a tool that is used to confirm or reject the measurement theory.

**Conflict of Interest:** None

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