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EVALUATION OF NURSING BEST PRACTICE GUIDELINES: ORGANIZATIONAL CHARACTERISTICS

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Introduction

In 1999, the Registered Nurses Association of Ontario (RNAO), with funding from the Ontario Ministry of Health and Long-Term Care, launched a multi-year project aimed at developing, pilot testing, evaluating and disseminating best practice guidelines (BPGs) for nurses. Seventeen BPGs were developed and launched by the RNAO during three cycles. Each BPG includes substantive, evidence-based recommendations for nursing practice and for organizational and policy change, as well as recommendations for nursing education. Details about the RNAO Best Practice Guideline Project may be obtained on the RNAO web site: www.rnao.org

A multi-site team designed a pre-post design evaluation to examine the process and impact of pilot site implementation of the BPGs. Both generic indicators and indicators specific to the BPGs were developed. This monograph is one of a series describing the measures used during this evaluation. The monograph is intended for evaluation teams that may be interested in using or adapting the interview schedules for their own evaluation purposes. In this monograph, we describe the development and psychometric properties of scales that measure organizational characteristics and provide recommendations for the administration, scoring and interpretation of these scales. The evaluation measures on organizational characteristics included in this monograph are: 1) Perceived Characteristics of Innovating for BPG Implementation, 2) Organizational Stability, 3) Organizational Support for BPG Implementation and 4) Organizational Culture for Change. The scales are included in the appendix.

Development of the Scales

Background

Two sets of instruments are described in this monograph: a) those used to measure organizational characteristics that were expected to influence the adoption of the Best Practice Guidelines and b) an instrument to assess the innovation characteristics of Best Practice Guidelines.

In this section, instruments that were developed by the team are described. For those instruments that were adapted from the literature, the original sources for the instruments, the psychometric characteristics of the original versions of the instruments and the adaptations we made to existing instruments are summarized.

Innovation characteristics

The original Perceived Characteristics of Innovating (PCI) instrument included 43 items and 8 subscales (Moore & Benbasat, 1991), with a shortened version of 25 items. The PCI was designed to investigate how perceptions affect individual's actual use of technology based on Rogers' diffusion theory (1995). Domains of the original PCI included: 1) relative advantage (the degree to which the innovation is perceived as being better than its precursor); 2) compatibility (the degree to which the innovation is perceived as being consistent with the existing values, needs, and past experiences of the user); 3) complexity or ease of use (the degree to which the innovation is perceived as being difficult to use); 4) results demonstrability (the extent to which the uses of the innovation are apparent); 5) trialability (the degree to which the uses of the innovation may be experimented with before adoption); 6) voluntariness of use (the degree to which the use of the innovation is perceived as being voluntary); 7) image (the degree to which use of an innovation is perceived to enhance one's image or status in one's social system); and, 8) observability (the degree to which the results of an innovation are observable to others). The Cronbach's coefficient alphas for the original PCI subscales ranged from .71 (trialability) to .93 (relative advantage) (Moore & Benbasat, 1991). Construct validity of the original tool was confirmed via factor analysis and discriminant analysis of "adopters" versus non-adopters."

We selected items from the first four scales of the short version of the PCI, with a view towards selecting those that were relevant for BPG implementation. Eight of the original PCI items were adapted for use in this study. Two new items were added which asked respondents to assess the extent to which the BPG fit with standard unit policies and procedures (unit compatibility).

Organizational characteristics

Three domains of organizational characteristics were assessed: organizational stability, organizational culture for change, and organizational support for BPG implementation. The 7-item organizational stability instrument assessed significant organizational change that was expected to impact on implementation of the BPGs. For example, respondents are asked to rate on a 5-point scale to what extent staff cuts, absenteeism or hiring of new staff have occurred in their organization within the past six months.

The organizational culture for change instrument assessed aspects of the organization that can influence changes in the organization such as morale, communication and workload. The degree of perceived organizational support for BPG implementation was assessed using five items from the support/resistance subscale of the Implementation Attitude Questionnaire developed by Schultz & Slevin, (1975). This measure was originally designed to assess the extent to which the respondent perceived adequate support from the organization in the implementation of a new information innovation (Robey, 1979; Robey & Bakr, 1978; Robey & Zeller, 1978; Rodriguez, 1977). Using a sample of salespeople being introduced to a computer-based information system, Robey (1979) reported acceptable internal consistency of the support/resistance scale (Cronbach's alpha = .74). This study also found a significant relationship between organizational support/resistance and objective measures of system use ($r = .31$, $p < .01$). In a more recent study of on-line learning for public health professionals, acceptable levels of internal consistency were found for organizational support for Best Practice Guidelines (Cronbach's alpha = .74) (Lockett, Edwards, Gurd & Simpson, 2003).

Best Practice Guideline Development

The RNAO developed BPGs during three cycles (see Figure 1). A multidisciplinary panel of nurses, administrators, nursing researchers, and specialists used a systematic approach to develop the best practice guidelines. Briefly, this process involved the review of evidence from current research, theory, and expert advice as well as extensive reviews of similar clinical practice guidelines. Recommendations were selected and the level of evidence supporting each recommendation was identified. Recommendations based on studies with meta-analyses were assigned the rating for the highest level of evidence while recommendations based on expert consensus opinion, in the absence of evidence from quasi-experimental studies were assigned the rating for the lowest level of evidence. Preliminary guideline recommendations and supporting documentation were then reviewed by several stakeholders. Each published BPG presents the guideline development process in detail and the specific stakeholders

who reviewed the guidelines. Upon completion of each cycle of guidelines, the RNAO invited health care organizations in Ontario to submit proposals outlining an implementation strategy. Successful organizations were provided with financial and administrative support for implementing the BPG.

Figure 1. Development of RNAO Best Practice Guidelines

Cycle 1
- Fall Prevention
- Promoting Continence
- Preventing Constipation
- Risk Assessment of Pressure Ulcers

Cycle 2
- Enhancing Healthy Adolescence
- Client Centered Care
- Crisis Intervention
- Assessment and Management of Pain
- Establishing Therapeutic Relationships
- Prevention and Management of Pressure Ulcers
- Strengthening/ Supporting Families

Cycle 3
- Adult Asthma Control
- Breastfeeding
- Screening for Delirium, Dementia and Depression
- Reducing Foot Complications for People with Diabetes
- Smoking Cessation
- Venous Leg Ulcers

Evaluation design

Evaluation of the BPGs implementation in these organizations proceeded along the three cycles. Specific objectives of the evaluation of BPG pilot site implementation were to:

- Document the process of BPG implementation across project sites from the perspective of clinical resource nurses, staff nurses and nursing administrators;
- Determine the effectiveness of BPG implementation on changes in nursing practice, and selected clinical outcomes;
- Determine perceived utility and value of the BPG by clinical resource nurses, staff nurses and administrators; and,
- Examine factors that influence implementation of the BPG.

Both qualitative and quantitative methods were used in the evaluation. A before and after design was used for cycles 2 and 3 evaluation, and a retrospective baseline for

cycle 1. Patient chart audits, patient interviews and nurse interviews were conducted at baseline and 6 months after implementation. For those BPGs where patient interviews were conducted or chart audits completed, patient eligibility criteria were set for each of the BPGs. A more detailed description of the evaluation design is available from the authors.

Description of the Sample

The sociodemographic characteristics of the sample of staff who completed the scales is shown in Table 1. The majority of respondents were registered nurses. However, in several organizations, registered practical nurses or staff from other disciplines were also involved in BPG implementation and thus were included in the sampling frame. A total of 747 participants are included in this analysis. Absent from this summary are those who participated in the evaluation of the Venous Leg Ulcers BPG and the Diabetes Foot Care BPG. Post-implementation data for the pilot site evaluations of these BPGs were not yet available at the time of this report.

Table 1. Demographic Characteristics of the Sample

Demographic Characteristics		Cycle							
		Cycle 1		Cycle 2		Cycle 3		Group Total	
		N	%	N	%	N	%	N	%
Gender	Female	172	88.7	337	95.5	187	93.5	696	92.5
	Male	18	9.3	14	4.0	11	5.5	43	6.2
	Missing	4	2.1	2	0.6	2	1.0	8	1.2
	Group Total	194	100.0	353	100.0	200	100.0	747	100.0
Highest Education	Diploma	89	45.9	202	57.2	115	57.5	406	53.5
	Canadian Nurse's Association Certification	26	13.4	45	12.7	9	4.5	80	10.2
	Baccalaureate Degree	29	14.9	69	19.5	63	31.5	161	22.0
	Masters degree	1	0.5	0		8	4.0	9	1.5
	Doctorate	0	0.0	10	2.8	1	0.5	11	1.1
	Other	33	17.0	18	5.1	1	0.5	52	7.5
	Missing	16	8.2	9	2.5	3	1.5	28	4.1
	Group Total	194	100.0	353	100.0	200	100.0	747	100.0
Years Employed in Nursing	0-5	31	16.0	107	30.3	36	18.0	174	21.4
	6-10	32	16.5	43	12.2	25	12.5	100	13.7
	11-15	47	24.2	86	24.4	31	15.5	164	21.4
	>15	78	40.2	101	28.6	102	51.0	281	39.9
	Missing	6	3.1	16	4.5	6	3.0	28	3.5
	Group Total	194	100.0	353	100.0	200	100.0	747	100.0
Professional Licence	RN	68	35.1	55	15.6	163	81.5	286	44.0
	RPN	68	35.1	76	21.5	21	10.5	165	22.4
	Other	18	9.3	176	49.9	8	4.0	202	21.0
	Missing	40	20.6	46	13.0	8	4.0	94	12.5
	Group Total	194	100.0	353	100.0	200	100.0	747	100.0
Employment Status	Full time	117	60.3	234	66.3	155	77.5	506	68.0
	Part time	73	37.6	103	29.2	40	20.0	216	28.9
	Casual	2	1.0	14	4.0	1	0.5	17	1.8
	Missing	2	1.0	2	0.6	4	2.0	8	1.2
	Group Total	194	100.0	353	100.0	200	100.0	747	100.0
Current Position	Staff nurse	96	49.5	267	75.6	176	88.0	539	71.0
	Team leader	17	8.8	13	3.7	7	3.5	37	5.3
	Other	80	41.2	70	19.8	17	8.5	167	23.2
	Missing	1	0.5	3	0.8	0	0.0	4	0.5

Demographic Characteristics		**Cycle**							
		Cycle 1		**Cycle 2**		**Cycle 3**		**Group Total**	
		N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
	Group Total	194	100.0	353	100.0	200	100.0	747	100.0
Years on Unit	0-5	84	43.3	107	30.3	91	45.5	282	39.7
	6-10	37	19.1	43	12.2	27	13.5	107	14.9
	11-15	44	22.7	86	24.4	44	22.0	174	23.0
	> 15	17	8.8	101	28.6	25	12.5	143	16.6
	Missing	12	6.2	16	4.5	13	6.5	41	5.7
	Group Total	194	100.0	353	100.0	200	100.0	747	100.0
Average Number of Patients	Less than 5	8	4.1	55	15.6	32	16.0	95	11.9
	6-8	31	16.0	76	21.5	75	37.5	182	25.0
	9-20	33	17.0	176	49.9	27	13.5	236	26.8
	Missing	122	62.9	46	13.0	66	33.0	234	36.3
	Group Total	194	100.0	353	100.0	200	100.0	747	100.0
Typical shift worked	Days	81	41.8	133	37.7	69	34.5	283	38.0
	Evenings	37	19.1	29	8.2	7	3.5	73	10.3
	Nights	29	14.9	17	4.8	21	10.5	67	10.1
	Combination	45	23.2	168	47.6	101	50.5	314	40.4
	Missing	2	1.0	6	1.7	2	1.0	10	1.2
	Group Total	194	100.0	353	100.0	200	100.0	747	100.0
Years in agency	0-5	45	23.2	155	43.9	58	29.0	258	32.0
	6-10	38	19.6	45	12.7	21	10.5	104	14.3
	11-15	64	33.0	59	16.7	36	18.0	159	22.6
	> 15	42	21.6	64	18.1	75	37.5	181	25.8
	Missing	5	2.6	30	8.5	10	5.0	45	5.4
	Group Total	194	100.0	353	100.0	200	100.0	747	100.0
Professional Activities									
Member of quality control committee in past year		53	27.3	59	16.7	46	23.0	158	22.3
Member of research committee in past year		41	21.1	39	11.0	14	7.0	94	13.1
Assisted with policy/procedure/ guideline/standard development in past year		74	38.1	134	38.0	38	19.0	246	31.7
Presented research paper in past year		41	21.1	15	4.2	8	4.0	64	9.8

Demographic Characteristics	**Cycle**							
	Cycle 1		**Cycle 2**		**Cycle 3**		**Group Total**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
BPG								
Fall Prevention	29	14.9					29	14.9
Promoting Continence	33	17.0					33	
Risk Assessment of Pressure Ulcers	132	68.0					132	
Client-Centred Care			54	15.3			54	15.3
Establishing Therapeutic Relationships			23	6.5			23	6.5
Prevention of Pressure Ulcers			79	22.4			79	22.4
Crisis Intervention			31	8.8			31	8.8
Assessment and Management of Pain			78	22.1			78	22.1
Enhancing Healthy Adolescence			19	5.4			19	5.4
Strengthening/ Supporting Families			69	19.5			69	19.5
Adult Asthma Control					35	17.5	35	17.5
Breastfeeding					54	27.0	54	27.0
Smoking Cessation					42	21.0	42	21.0
Screening for Delirium, Dementia and Depression					69	34.5	69	34.5
Group Total	194	100	353	100	200	100	747	100
Observation Period								
Completed only pre-implementation	0	0	145	41.1	-	-	145	19.4
Completed only post-implementation	194	100	69	19.5	-	-	69	9.2
Completed pre- and post-implementation	0	0	139	39.4	200	100	533	71.4
Group Total	194*	100	353	100	200**	100	747	100

* Note that for cycle 1, baseline information was gathered retrospectively.

** For cycle 3, only those respondents with pre and post are shown here and included in this analysis.

Statistical Procedures Used in Psychometric Testing of Scale Items

Data were analyzed using SAS 8.02 software ([SAS/STAT] software, version [8] of the SAS system for Windows. copyright© 1999-2001 by SAS Institute Inc., Cary, N.C., USA). For each scale, descriptive analyses were conducted to examine response patterns, skewness and kurtosis of the data. Internal reliability was assessed using Cronbach's coefficient alpha. Principal component analysis was used to describe the main axes of variance. We then conducted a factor analysis to determine whether all items in the scale (or sub-scale) loaded on the factor.

Orthogonal rotation procedures were used to obtain the maximal amount of variance for all scales in this monograph except for the scale on Organizational Culture for Change. Varimax rotation, the most commonly used type of orthogonal rotation, provides a simple structure in factor analysis and was used in this study to facilitate interpretation of the factors. The goal of the factor analysis was to determine how many factors the items were located under as well as their significance. A more detailed description of factor analysis is included in the appendix.

For the present study, we used the following measurement criteria and cut-offs:

1. Sampling Adequacy:
Sampling adequacy predicts if the data is likely to factor. This is measured by the Kaisar-Meyer-Olkin (KMO) statistic. We used the most common cut-off, i.e. .60 for the present study. When the value was less than the cut-off, we analyzed sampling adequacy by cycles, and included data from cycles where sampling adequacy criterion was met.

2. Factor Loading:
An acceptance threshold of .40 for the loading was used in this study.

3. Eigenvalue:
The eigenvalue for a given factor measures the variance in all the variables that is accounted for by that factor. The ratio of eigenvalues is the ratio of explanatory importance of the factors with respect to the variables. Kaisar's criterion is a common rule of thumb for dropping the least important factors from the analysis. The Kaisar rule is to drop all components with eigenvalues less than 1.0 which is the default in the SAS software and hence our cut-off criterion.

4. Cronbach Coefficient Alpha:
This statistic was used to evaluate the internal consistency of each factor, and of all items in each scale. It is a measure of squared correlation between observed scores and true scores. The higher the alpha, the more reliable the factor. A Cronbach's alpha of .70 (rounded off) is generally considered adequate.

Psychometric Properties of the Scales

Descriptive Statistics

Table 2 shows the timing of administration, what cycles were included in the analysis, the total number of respondents and the number of respondents with complete data for each of the scales. For example, the PCI for BPG Implementation was administered six months after implementation (post-implementation). The data for this scale included all three cycles since the versions used in all cycles were identical. Of the 601 respondents with post-implementation data, only 473 had complete data (that is, no blanks for all ten items administered during post-implementation).

Table 3 (see the following page) presents the descriptive statistics for each item of the scales, including skewness and kurtosis.

Table 2. Sources of Data for Scales

Scale	Timing of Administration	Cycles Included in Analysis	Total Respondents N	Respondents with Complete Data N (%)
Perceived Characteristics of Innovating for BPG Implementation	Post	1, 2 and 3	601	473 (78/7%)
Organizational Stability	Post	1, 2 and 3	602	448 (74.5%)
Organizational Support for BPG Pre-Implementation	Pre	1, 2 and 3	678	591 (87.2%)
Organizational Support for BPG Post-Implementation	Post	2 and 3	408	348 (85.3%)
Organizational Culture for Change	Pre	1, 2 and 3	678	537 (79.2%)

Table 3. Descriptive Statistics

Scales with Items	*N*	*Range*	*Mean*	*Standard Deviation*	*Skewness*	*Kurtosis*
Perceived Characteristics of Innovating for BPG Implementation						
Using the RNAO best practice guideline has improved the quality of patient care I provide	514	1, 4	2.90	0.62	-0.40456	0.783836
The RNAO best practice guideline has been advantageous for my job	515	1, 4	2.95	0.61	-0.3724	0.860014
The RNAO best practice guideline is compatible with my daily practice	512	1, 4	3.06	0.58	-0.48441	1.858424
Results of using the RNAO best practice guideline are apparent to me	506	1, 4	2.80	0.65	-0.44002	0.532066
I can explain why using the RNAO best practice guideline is beneficial for nurses on our unit	511	1, 4	2.97	0.54	-0.63002	2.655428
The RNAO best practice guideline is useful to my work	512	1, 4	3.07	0.55	-0.43225	2.247882
It has been easy to implement the RNAO best practice guideline	507	1, 4	2.72	0.68	-0.38985	0.231697
Standard unit policies/procedures have fit well with the RNAO best practice guideline	501	1, 4	2.86	0.58	-0.57843	1.353204
Unit and/or agency policies/procedures have been modified to reflect the RNAO best practice guideline	495	1, 4	2.66	0.63	-0.53147	0.318465
The RNAO best practice guideline is too complicated for use by staff nurses*	513	1, 4	1.97	0.66	0.522577	0.89897
PCI (Overall)	**473**	1, 4	**2.80**	**0.68**	**-0.50877**	**0.50881**
Organizational Stability						
Financial pressures (constraints or cutbacks)	481	1, 5	2.75	1.42	0.171737	-1.20423
Staff cuts	488	1, 5	2.43	1.43	0.510414	-1.10799
High staff turnover	490	1, 5	2.95	1.39	-0.02146	-1.20319
Infusion of new money into organization	461	1, 5	1.95	1.10	0.908866	-0.08807
High staff absenteeism	489	1, 5	2.74	1.31	0.208939	-1.04104
Hiring of new staff	490	1, 5	3.09	1.23	-0.08932	-0.85255
Increasing percentage of casual nurses	486	1, 5	2.64	1.38	0.278566	-1.13599
Organizational Stability (Overall)	**448**	1, 5	**2.65**	**1.37**	**0.260789**	**-1.13411**

Scales with Items	*N*	*Range*	*Mean*	*Standard Deviation*	*Skewness*	*Kurtosis*
Organizational Support for BPG Pre-Implementation						
Top management will support staff to implement best practice guidelines	635	1, 4	3.08	0.70	-0.57404	0.578313
Nurses would readily adopt changes required to implement best practice guidelines	632	1, 4	2.89	0.63	-0.41317	0.74575
Nurses will be given sufficient time and training to learn how to use best practice guidelines	630	1, 4	2.70	0.72	-0.43024	0.11516
We have adequate numbers of qualified staff to implement the best practice guidelines	631	1, 4	2.50	0.82	-0.24675	-0.51237
We have the equipment and supplies needed to implement the best practice guidelines	613	1, 4	2.58	0.74	-0.32223	-0.15692
Organizational Support for BPG Pre-Implementation (Overall)	**591**	1, 4	**2.75**	**0.75**	**-0.42714**	**0.042561**
Organizational Support for BPG Post-Implementation						
Top management has supported staff to implement RNAO best practice guidelines	358	1, 4	2.96	0.72	-0.46277	0.281339
Nurses have readily adopted changes required to implement the RNAO best practice guidelines	361	1, 4	2.74	0.69	-0.15528	-0.07893
Nurses were given sufficient time and training to learn how to use best practice guidelines	361	1, 4	2.70	0.74	-0.58508	0.278819
We had adequate numbers of qualified staff to implement the RNAO best practice guidelines	359	1, 4	2.66	0.76	-0.43879	-0.02041
We had the equipment and supplies needed to implement the best practice guidelines	357	1, 4	2.74	0.71	-0.4583	0.265154
Organizational Support for BPG Post-Implementation (Overall)	**348**	1, 4	**2.76**	**0.73**	**-0.42031**	**0.146189**
Organizational Culture for Change						
Nurses are open to new ways of doing things on my unit/team	643	1, 4	2.74	0.64	-0.40233	0.354202
The morale of nurses on my	642	1, 4	2.29	0.87	0.103844	-0.73712

Scales with Items	*N*	*Range*	*Mean*	*Standard Deviation*	*Skewness*	*Kurtosis*
unit/team is high						
Nurses exert group pressure on non-conforming workers	611	1, 4	2.33	0.64	0.228541	0.021804
During unit meetings, there is a feeling of “let's get things done”	625	1, 4	2.56	0.69	-0.40021	-0.06959
There is good communication between nurses and administration in my hospital/agency	632	1, 4	2.35	0.80	-0.03234	-0.5436
Managers are strong advocates for nursing in my hospital/agency	625	1, 4	2.55	0.82	-0.27841	-0.44626
Nurses carry out patient care procedures utilizing professional judgement to meet individual patient needs even when this means deviating from hospital/unit procedure	595	1, 4	2.71	0.67	-0.35789	0.184815
On my unit, nurses often participate in decision-making around patient care	642	1, 4	3.12	0.57	-0.24708	1.03872
On my unit, nurses often feel that they have too many patients to care for adequately*	630	1, 4	2.96	0.79	-0.25814	-0.61564
Nurses on my unit are strong advocates for patients and families	642	1, 4	3.27	0.56	-0.14669	0.08616
Organizational Culture for Change (Overall)	**537**	1, 4	**2.69**	**0.78**	**-0.27588**	**-0.26445**

* These items were reverse coded.

Missing Data

As illustrated in the table above, non-response rates for individual items on the scales ranged from a low of 5.3% to a high of 23.2%. The item with the lowest missing data was "the morale of nurses in my unit/team is high" in the Organizational Culture for Change scale. The item with the highest non-response rate was the item "infusion of new money into organization" of the Organizational Stability scale.

Results of Factor Analysis

Results of the factor analysis for each of the scales in this monograph are presented below. Table 4 presents the final factor solutions. All factors demonstrated good internal consistency (Cronbach's alpha ranged from .69 to .89).

For the Perceived Characteristics for Innovating for BPG Implementation, 10 items were initially included in the analysis with a two-factor solution. Nine items loaded on one

factor, and only one item loaded on the second factor. This item ("the BPG is too complicated to use by staff nurses") had a loading of 0.91 on a second factor. This item was dropped since it was a single item factor and appeared to measure a different dimension.

A two-factor solution was obtained for the scale on Organizational Stability. One-factor solutions were obtained for the pre and post-test versions of the Organizational Support for BPG Implementation.

A three-factor solution was obtained for the initial 10 items of the Organizational Culture for Change. The third factor was a single-item factor and was dropped ("nurses exert group pressure on non-conforming workers": loading = .74). The three items in the second factor were dropped due to low internal consistency (Cronbach's alpha = .42). The items in this second factor were: "nurses carry out patient care procedures utilizing professional judgment" (loading = .62), "on my unit nurses often participate in decision-making" (loading = .61), and "nurses on my unit are strong advocates for patients and families" (loading = .49). The final scale has six items loading on one factor.

Table 4. Results of Factor Analysis on Organizational Characteristics

Scale	Items	loading	Factor characteristics
Perceived Characteristics of Innovating for BPG Implementation ***n=473*** ***Cronbach's alpha (10 items) = .85*** ***Sampling Adequacy (for factor) = .90***	**Factor 1** The RNAO best practice guideline has been advantageous for my job Using the RNAO best practice guideline has improved the quality of patient care I provide Results of using the RNAO best practice guideline are apparent to me I can explain why using the RNAO best practice guideline is beneficial for nurses on our unit The RNAO best practice guideline is useful to my work The RNAO best practice guideline is compatible with my daily practice Unit and/or agency policies/procedures have been modified to reflect the RNAO best practice guideline Standard unit policies/procedures have fit well with the RNAO best practice guideline It has been easy to implement the RNAO best practice guideline	 .82 .82 .82 .80 .77 .66 .60 .59 .56	***Eigenvalue = 5.03*** ***Cronbach's alpha = .89*** ***Variance explained (%) = 50.3***

Scale	Items	loading	Factor characteristics
Organizational Stability ***n=448*** ***Cronbach's alpha (all items) = .81*** ***Sampling Adequacy (for factor)= .80***	**Factor 1**		
	Hiring of new staff	.87	***Eigenvalue = 3.30***
	High staff turnover	.78	***Cronbach's alpha = .79***
	Increasing percentage of casual nurses	.69	
	High staff absenteeism	.59	***Variance explained (%) = 47.1***
	Factor 2		***Eigenvalue = 1.10***
	Staff cuts	.86	***Cronbach's alpha = .69***
	Financial pressures	.82	
	Infusion of new money into organization	.55	***Variance explained (%) = 15.7***
Organizational Support for BPG Implementation (Pre) ***n = 591*** ***Sampling Adequacy (for factor) = 0.75***	**Factor 1**		
	Nurses will be given sufficient time and training to learn how to use best practice guidelines	.73	
	Top management will support staff to implement best practice guidelines	.70	***Eigenvalue = 2.18***
	We have adequate numbers of qualified staff to implement the best practice guidelines	.68	***Cronbach's alpha = .67***
	Nurses would readily adopt changes required to implement best practice guidelines	.59	***Variance explained (%) = 43.62***
	We have the equipment and supplies needed to implement the best practice guidelines	.59	
Organizational Support for BPG Implementation (Post) ***n = 348*** ***Sampling Adequacy (for factor)= .85***	**Factor 1**		
	We had adequate numbers of qualified staff to implement the best practice guidelines	.83	
	Nurses were given sufficient time and training to learn how to use the best practice guidelines	.81	***Eigenvalue = 3.02***
	We had the equipment and supplies needed to implement the best practice guidelines	.77	***Cronbach's alpha = .84***
	Nurses have readily adopted changes required to implement the best practice guidelines	.74	***Variance explained (%) = 60.5***
	Top management has support staff to implement the best practice guidelines	.73	

Scale	Items	loading	Factor characteristics
Organizational Culture for Change ***n = 537*** ***Cronbach's alpha (10 items) = .70*** ***Sampling Adequacy (for factor)= .79***	**Factor 1** There is good communication between nurses and administration in my hospital/agency The morale of nurses on my unit/team is high Managers are strong advocates for nursing in my hospital/agency During unit meetings there is a feeling of "let's get things done" Nurses are open to new ways of doing things on my unit/team On my unit/team nurses often feel that they have too many patients/clients to care for adequately	 .76 .76 .71 .70 .67 .39	***Eigenvalue = 3.22*** ***Cronbach's alpha = .78*** ***Variance explained (%) = 32.2***

Administration, Scoring and Interpretation

Administering the Scales

The scales in this monograph are to be given to nurses directly involved in the implementation of the nursing BPG. These scales were not designed for patients or clients' significant others.

Table 5 below lists the scales, the number of items per scale (proposed based on factor analysis), the types of rating scale used, approximate time to complete them, and suggested timing of administration. Note that for the scale on Organizational Support for BPG Implementation, there is a pre-test version and a separate post-test version.

Table 5. Description of Scales on Organizational Characteristics

Scale	Number of Items	Type of Rating Scale	Approximate Time for Completion	Pre or Post Administration
Perceived Characteristics of Innovating for BPG Implementation	9 items	4 point Likert scale	3 min	Post
Organizational Stability	7 items	5 point Likert scale	2 min	Post
Organizational Support for BPG Implementation	5 items	4 point Likert scale	2 min	Pre and Post *(different versions)*
Organizational Support for Change	6 items	4 point Likert scale	2 min	Pre

The scales were designed to be self-administered. It is recommended that nurses finish the scales in one session, or at the very least one scale in one sitting. If these scales are part of a larger battery of evaluation measures, adequate time and minimizing fatigue on the part of the respondents should be considered. For the evaluation of the pilot site implementation, it was found that time available and workload were barriers adversely affecting response rates.

Respondents should be provided with a covering letter explaining the purpose of the scales, the time required for completing the scales, and the confidentiality of the information.

Scoring and Interpretation

The scoring procedure for the scales involves adding the ratings for each item and obtaining a mean total score for each scale. If there are items left blank, cases either need to be excluded or missing values imputed before calculating the mean total score across all respondents. Negatively worded items are reverse-coded so that scores are in the same direction.

In general, higher scores indicate higher levels of the indicator being measured. For the scale on Organizational Stability, higher scores indicate *lower* organizational stability.

Conclusions

Evaluation is a key step in determining whether the implementation of a nursing best practice guideline has improved patient outcomes through changes in nursing care. Evaluation findings may guide decisions about whether or not to support efforts to sustain or expand the use of specific practice guidelines in an organization.

The scales in this monograph included: 1) Perceived Characteristics of Innovating for BPG Implementation, 2) Organizational Stability, 3) Organizational Support for BPG Implementation and 4) Organizational Culture for Change. Scores from these scales can provide insights on factors that can influence the implementation of the BPGs. This monograph presents the development and psychometric properties of these scales based on our pilot site evaluation of the implementation of BPGs from cycles 1 to 3.

- Scales included in this monograph demonstrated adequate levels of internal consistency.
- Scales demonstrated adequate response variability.
- Missing response patterns suggest that respondents were least familiar with items listed in the Organizational Stability scale.
- Scales are recommended for use in similar evaluation studies.

References

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Appendices

A Primer on Factor Analysis

Resources

Perceived Characteristics of Innovation

Organizational Stability

Organizational Support for BPG Pre-Implementation

Organizational Support for BPG Post-Implementation

Organizational Culture for Change

Primer on Factor Analysis

Factor analysis is a technique used mainly to reduce the number of variables, and to detect structure in the relationship between variables. Factor analysis is commonly used in developing and refining instruments, by identifying how many factors or domains a questionnaire has, and which items go together i.e., the items have high loadings on a factor.

A typical factor analysis answers four major questions:

1. How many factors are needed to identify the pattern of relationship among given variables?
2. What is the nature of those factors?
3. How well do the inferred factors explain the variables they define?
4. How much unique variance is explained by the observed variables?

1. Sampling Adequacy:
Sampling adequacy predicts if the data is likely to factor. This is measured by the Kaisar-Meyer-Olkin (KMO) statistic. This value ranges from 0 to 1.0 and a value of at least .60 should be obtained to proceed with the factor analysis.

2. Factor Loading:
This is purely arbitrary and varies by research context. In instruments with Likert type scales, the following criteria are often used: low loading for less than .40, moderate between .40 and .60, and high for more than .60. Factor loadings range from -1 to +1. The sign reflects the direction of relationship between the item and the factor.

3. Eigenvalue:
The eigenvalue for a given factor measures the variance in all the variables that is accounted for by that factor. The ratio of eigenvalues is the ratio of explanatory importance of the factors with respect to the variables. Kaisar's criterion is a common rule of thumb for dropping the least important factors from the analysis. The Kaisar rule is to drop all components with an eigenvalue less than 1.0 which is the default in the SAS software.

4. Rotation:
Rotation is commonly used to obtain a simple and more understandable factor structure. There are generally two types of rotation: orthogonal and oblique rotation. Orthogonal rotation is commonly used since it facilitates interpretation. An orthogonal rotation provides a simpler factor structure and assumes that the factors are uncorrelated. Varimax rotation is the most widely used orthogonal rotation. Oblique rotation is used when factors are correlated—factor structure and interpretation of the factors is often more complex.

Resources

For information on the Registered Nurses Association of Ontario (RNAO) Best Practice Guidelines Project, consult the website of the RNAO. The nursing BPGs can be downloaded for free.Hard copies are available for purchase.
http://www.rnao.org

For further information on developing, implementing and evaluating nursing practice guidelines, consult the RNAO *"**Toolkit: Implementation of clinical practice guidelines.**"* The RNAO Toolkit can also be downloaded for free and hard copies are available for purchase through the RNAO website.

For more information on evaluation measures for nursing best practice guidelines, the Community Health Research Unit (CHRU) of the University of Ottawa is publishing a series of monographs that can be downloaded for free. Hard copies may also be purchased (see website address below). These monographs include measures on organizational innovation characteristics, organizational stability, organizational culture for change, organizational support for BPG implementation, education and supportive processes, and perceived worth of the BPG, and interviewing nurses and administrators.

http://www.medicine.uottawa.ca/epid/chru/chru_eng.htm
http://www.medicine.uottawa.ca/epid/chru/chru_fr.htm
Community Health Research Unit
University of Ottawa
451 Smyth Road
Ottawa, ON K1H 8M5

Perceived Characteristics of Innovating (PCI) for BPG Implementation

Post-Implementation

The following items are designed to measure how people feel about new innovations. Please indicate the extent to which you *agree or disagree* with each of the following statements, concerning your experiences with the RNAO best practice guideline on _____ implemented on your unit. *There are no right or wrong answers. We are interested in your opinions.* Please circle your response.

		Strongly Disagree	Disagree	Agree	Strongly Agree
1.	Using the RNAO best practice guideline has improved the quality of patient care I provide.	1	2	3	4
2.	The RNAO best practice guideline has been advantageous for my job.	1	2	3	4
3.	The RNAO best practice guideline is compatible with my daily practice.	1	2	3	4
4.	Results of using the RNAO best practice guideline are apparent to me.	1	2	3	4
5.	I can explain why using the RNAO best practice guideline is beneficial for nurses on our unit.	1	2	3	4
6.	The RNAO best practice guideline is useful to my work.	1	2	3	4
7.	It has been easy to implement the RNAO best practice guideline.	1	2	3	4
8.	Standard unit policies/procedures have fit well with the RNAO best practice guideline.	1	2	3	4
9.	Unit and/or agency policies/procedures have been modified to reflect the RNAO best practice guideline.	1	2	3	4

Organizational Stability

Post-Implementation

Listed below are examples of organizational changes that may influence RNAO best practice guidelines regarding _____ _____implementation. For each item, **indicate to what extent this change has taken place in your organization over the past six months.** *Please circle your response.*

		Not at all		Somewhat		To a large extent
1.	Financial pressures (constraints or cutbacks)	1	2	3	4	5
2.	Staff cuts	1	2	3	4	5
3.	High staff turnover	1	2	3	4	5
4.	Infusion of new money into organization	1	2	3	4	5
5.	High staff absenteeism	1	2	3	4	5
6.	Hiring of new staff	1	2	3	4	5
7.	Increasing percentage of casual nurses	1	2	3	4	5

Organizational Support for Best Practice Guidelines Pre-Implementation

The following items concern how supportive you feel your organization will be in facilitating the implementation of best practices guidelines (BPGs). Using the response categories provided, please indicate the extent to which you agree or disagree with each of the following statements. There are no right or wrong answers. We are interested in your opinions.

	Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**
1. Top management will support staff to implement best practice guidelines.	1	2	3	4
2. Nurses would readily adopt changes required to implement best practice guidelines.	1	2	3	4
3. Nurses will be given sufficient time and training to learn how to use best practice guidelines.	1	2	3	4
4. We have adequate numbers of qualified staff to implement the best practice guidelines.	1	2	3	4
5. We have the equipment and supplies needed to implement the best practice guidelines.	1	2	3	4

Organizational Support for Best Practice Guidelines Post-Implementation

The following items concern how supportive you feel your organization will be in facilitating the implementation of the RNAO best practice guidelines. Using the response categories provided, please indicate the extent to which you agree or disagree with each of the following statements. *There are no right or wrong answers. We are interested in your opinions. Please circle your response.*

		Strongly Disagree	**Disagree**	**Agree**	**Strongly Agree**
1.	Top management has supported staff to implement the RNAO best practice guidelines.	1	2	3	4
2.	Nurses have readily adopted changes required to implement the RNAO best practice guidelines.	1	2	3	4
3.	Nurses were given sufficient time and training to learn how to use best practice guidelines.	1	2	3	4
4.	We had adequate numbers of qualified staff to implement the RNAO best practice guideline.	1	2	3	4
5.	We have the equipment & supplies needed to implement the best practice guideline.	1	2	3	4

Organizational Culture for Change

Pre-Implementation

The following items are designed to measure aspects of your organization's culture. Using the response categories provided, please indicate the extent to which you agree or disagree with each of the following statements.

		Strongly Disagree	Disagree	Agree	Strongly Agree
1.	Nurses are open to new ways of doing things on my unit/team.	1	2	3	4
2.	The morale of nurses on my unit/team is high.	1	2	3	4
3.	During unit meetings, there is a feeling of "let's get things done."	1	2	3	4
4.	There is good communication between nurses and administration in my hospital/agency.	1	2	3	4
5.	Managers are strong advocates for nursing in my hospital/agency.	1	2	3	4
6.	On my unit/team, nurses often feel that they have too many patients/clients to care for adequately.	1	2	3	4