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Title: Further validation of the Perceptions of Empowerment in Midwifery Scale

Abstract

Objective: to assess the psychometric properties of the Perceptions of Empowerment in Midwifery Scale (PEMS) on a sample of New Zealand midwives.

Design: cross sectional study. Midwives completed an online survey containing the 22 item PEMS, and a number of demographic and work-related questions.

Participants: active practising members listed on the New Zealand College of Midwives database were invited to participate. A sample of midwives who were currently employed by an organization was extracted (n=600).

Findings: exploratory factor analysis on the PEMS identified four subscales (Autonomy/Empowerment, Manager Support, Professional Support, Skills and Resources). This structure differed from that reported by the original scale developers. Each subscale showed adequate internal consistency reliability and was able to distinguish midwives who had considered leaving the profession in the past 6 months ($p=.001$).

Key conclusions: the psychometric properties of the revised 19-item four-subscale structure of PEMS were supported.

Implications for practice: The PEMS-Revised provides a psychometrically sound tool for further quantitative research to supplement the growing number of qualitative investigations of midwives perceptions and experiences of their workplace.

Keywords: Empowerment, Midwifery, Exploratory factor analysis, Psychometrics

Title: Further validation of the Perceptions of Empowerment in Midwifery Scale

Introduction

The availability of an adequately trained and resourced workforce is essential for the provision of appropriate health care worldwide. According to the World Health Report (2006) however there is a global shortage of workers in health care, including doctors, nurses and midwives. Shortages in the number of midwives have important implications for the delivery of maternity services, and the care of women during pregnancy and childbirth. There is growing awareness in the scientific literature of the challenges facing midwifery worldwide and the need to better understand the factors impacting on the chronic difficulties with retention in the profession. In a recent commentary on the topic Brodie (2013) emphasized that it was essential for effective workforce planning and the development of the midwifery profession that we identify why midwives leave, and determine what is needed for them to stay. There has however been relatively little research to date that has identified factors associated with job satisfaction among midwives and reasons for leaving the profession.

A study conducted in the UK by Kirkham and colleagues (2006a, 2006b), and later replicated in Australia (Sullivan et al., 2011) investigated the factors that influenced midwives' decisions to either stay or leave the midwifery profession. Factors associated with their retention included feeling supported by managers, availability of adequate resources, the development of relationships with pregnant women, and experiencing a sense of empowerment and control in their work.

The conditions that are important to facilitating the empowerment of midwives was the focus of a study by Matthews et al., (2006) conducted in Ireland. This study identified 24 aspects of the workplace rated as important to empowerment, representing four main themes (control, support, recognition and skills). Although the initial study was conducted on a

relatively small sample this research was later expanded, resulting in the development and validation of the Perceptions of Empowerment in Midwifery Scale (PEMS: Matthews et al., 2009) in a sample of midwives practising in Ireland. It was designed to provide a tool to measure midwives' perceptions of their own levels of empowerment and to facilitate further research on the workplace factors believed to be important to the empowerment of midwives. After initial refinement of a pool of items the final 22-item scale was administered to a sample of 244 practising midwives and a variety of psychometric analyses undertaken. The results of factor analysis of the scale suggested the presence of three subscales: *Autonomous Practice, Effective Management, and Women-Centred Practice*, each containing six items. Although the results of this study provided initial support for the psychometric properties of the PEMS, the authors of the initial article recommended testing the PEMS on larger, more varied, samples to test the international generalisability of the scale (Mathews et al., 2009).

The aim of the current study therefore was to assess the psychometric properties of the PEMS on a large sample of New Zealand midwives. This provides the opportunity to explore the underlying structure of the scale in a sample of midwives from a different cultural setting, and employed in a different health system to that used in the initial validation study.

Method

Procedure and Materials

Active practising members listed on the database of the New Zealand College of Midwives were invited to participate in this study. An email invitation, which included a link to an online questionnaire, was sent to members with an up to date email addresses. The study was

approved by the ethics committee of Auckland University of Technology (13/211 on 19 Aug 2013).

Measures

As part of a larger cross cultural study on the emotional wellbeing of midwives respondents completed an online survey containing the PEMS, and a number of demographic and work related questions.

The PEMS (Matthews et al., 2009) consists of 22 items with respondents asked to indicate their level of agreement to a series of statements (eg. *"I am valued by my manager"*) using a 5 point scale (strongly disagree to strongly agree). In the original study items were scored so that the higher the score, the lower the level of perceived empowerment. We considered this reverse scoring was potentially confusing and in this study it was decided to score items so that high scores indicated high levels of empowerment.

In addition to a number of demographic questions (gender, age, years of experience as a midwife), respondents were also asked to indicate if, in the last 6 months, they had considered leaving the midwifery profession (Yes/No).

Statistical Analyses

Using SPSS Version 21 Principal Components Analysis (PCA) with oblimin rotation was undertaken to explore the underlying structure of the 22 PEMS items. The suitability of the dataset was first assessed using the Kaiser-Meyer-Olkin test of sampling adequacy (Kaiser, 1970) (values above .6), and Bartlett's Test of Sphericity ($p < .001$) (Bartlett, 1954). The number of factors to be extracted was guided by three decision rules: Eigenvalues above 1, Catell's scree test (Catell, 1966), and Parallel Analysis (Horn, 1965). Parallel Analysis involves comparing the eigenvalues from PCA with those obtained from a randomly generated datafile of the same size. Only factors with eigenvalues exceeding that obtained

from the corresponding eigenvalue of the random data set were retained. Parallel analysis was conducted using the software developed by Watkins (2000). Items were considered for removal from the scale if they failed to load above .4 on any factor, or if they showed substantial cross loadings on two or more factors. To ensure that the solution was robust across extraction techniques the final solution was checked using Principal Axis Factoring, as recommended by Pett et al., (2003).

Total scores were calculated for each of the subscales by adding each of the items loading on the respective component and dividing by the number of items in the subscale. This converts scores on each subscale to a consistent range from 1 to 5, with high scores representing high levels of the characteristic. This is the reverse of the scoring adopted in the original article where high scores represented low levels of the characteristic. The change in the direction of the scoring was undertaken to prevent confusion amongst potential uses of the scale and to aid in the interpretability of later analyses conducted using the scale. Descriptive statistics and subscale intercorrelations were generated for each of the subscales identified from the exploratory factor analysis.

The internal consistency reliability of the subscales was assessed using both the Cronbach Alpha coefficient and the mean inter-item correlation value. While values of .7 are generally considered the minimum accepted Cronbach Alpha value (Nunnally, 1978), this is influenced by the number of items in the scale, making it difficult for short scales to achieve acceptable values. Briggs and Cheek (1986) recommend that scale developers also check the inter-item correlation, with the optimal range being .2 to .4.

Using a series of independent t-tests scores on each of the PEMS subscales were compared for midwives who indicated that they had considered, versus had not considered, leaving the midwifery profession in the last 6 months.

Findings

Sample characteristics

Characteristics of the respondents are presented in Table 1. The sample consisted of 600 midwives, ranging in age from 21 to 70 ($M=46.3$, $SD=11.2$). All except one respondent was female. All of the midwives in the sample were employed by an organization, with a quarter ($n=148$, 25%) also working in a self employed capacity. Years of experience as a midwife ranged from 0 to 42 years with an average of 15 ($SD=11.2$).

Factor Analysis

Preliminary analyses were conducted to ensure the suitability of the data for factor analysis. This was supported by the KMO value of .88, and a significant Bartlett's Test of Sphericity ($p<.001$). Principal Components Analysis (PCA) identified six components with eigenvalues above 1, explaining a total of 61.6% of the variance. Inspection of the screeplot and parallel analysis however indicated that no more than four components should be retained for further investigation.

The four component rotated solution explained a total of 52.4% of the variance. Two items (15, 13) failed to load above .4 on any of the components and one item (item 10) showed substantial crossloadings on two components. These three items were removed from the scale and PCA conducted on the remaining 19 items.

The final four component solution explained a total of 56.2% of the variance with all components correlating at .40 or below, suggesting a multidimensional solution. The pattern of loadings (see Table 2) showed a clear, interpretable solution. Component 1 was labeled as *Autonomy/Empowerment*, Component 2 as *Manager Support*, Component 3 as *Professional Recognition* and Component 4 as *Skills and Resources*. All items loaded above .48 on their

respective component. The three factor structure suggested by the original scale developers (Matthews et al., 2009) was also explored however it was not easily interpretable; therefore the alternative four factor solution was retained as the most appropriate for this data. The final 19-item, 4-factor solution was also checked using Principal Axis (PAF) to ensure it was robust across different extraction techniques. The factors extracted were similar for both PCA and PAF.

Descriptive statistics of PEMS-Revised subscales

Total scores were calculated for each of the subscales by adding scores from each of the items loading on the respective component and dividing by the number of items in the subscale. Scores can range from 1 (low levels of the characteristic) to 5 (high levels of the characteristic). Descriptive statistics and intercorrelations among the subscales are presented in Table 3. All scales showed a good spread across the full range of scores, however the mean scores were all above the midpoint of scale (3) suggesting that, generally, respondents rated their workplace positively in terms of their feelings of autonomy, the support of their manager, skills and resources and professional recognition.

The Cronbach alpha coefficients for three of the four scales exceeded the recommended minimum of .70. Although the *Skills and Resources* subscale recorded a Cronbach alpha value of .55, the mean inter-item correlation .20 was within the acceptable range suggested by Briggs and Cheek (1986). Correlations among the PEMS subscales ranged from .37 to .51 (see Table 3), suggesting some degree of overlap among the concepts measured by the PEMS, but not sufficient to warrant the combination of scores to form a total.

Almost half of the sample (n=276, 48.6%) indicated that in the last six months they had considered leaving the midwifery profession. There was a significant difference (p=.001)

in all four PEMS-Revised subscale scores between the midwives that responded yes, they had considered leaving the profession compared to those that responded no (see Table 3).

Midwives who had considered leaving the profession recorded lower scores on each of the PEMS-Revised subscales.

Discussion

The results of the current study, using a large sample of New Zealand midwives, identified an alternative four subscale structure for the PEMS to that suggested by the original developers of the scale. After the removal of three items, the four factors were identified as *Supportive Manager, Professional Recognition, Autonomy/Empowerment, Skills and Resources*. All four PEMS-Revised (PEMS-R) subscales showed adequate internal consistency reliability, and were found to distinguish those midwives who had considered leaving the profession, and those that had not.

Exploratory factor analysis conducted in this study was not able to replicate the three factor structure (*Autonomous practice, Effective management, Women-centred practice*) identified by Matthews et al., (2009) in their psychometric study of the PEMS. The subscales identified in the current study however corresponded to the four factors (control, support, recognition and skills) identified by the Matthews et al., (2006) in her small precursor study describing the development of the Understanding of Empowerment Scale (UES). It was from this 24 item UES scale that the current twenty-two items of the PEMS were obtained.

Although the current study did not support the underlying structure reported in the most recent Matthews et al., (2009) study there was overlap in the content of some of the subscales. Five of the six items from the original *Effective Management* subscale were included in the *PEMS-R Supportive Manager* subscale identified in the current study. The remaining item 10 (*I am not informed about changes in my organization that will affect my*

practice) showed substantial crossloadings and was therefore not included. The final 5-item subscale in this study showed very good internal consistency. Scores on this subscale were lower for midwives who had considered leaving the profession, supporting previous research on the important role that management support plays in job satisfaction among midwives (Brodie, 2002; Curtis et al., 2006).

In the current study a separate factor representing professional recognition was identified, including items such as “*I am recognized as a professional by the medical profession*”. In the study by Matthews et al., (2009) these items were subsumed in a subscale labeled “*Autonomous Practice*”. We felt that these items warranted a separate subscale to allow researchers to investigate the importance of professional recognition in the wellbeing and retention of midwives in the profession. Lack of professional recognition of midwifery and the role of the midwife was identified as one of the key themes that emerged from a study of 563 Australian midwives addressing the barriers to midwifery (Brodie, 2002). The importance of this aspect is supported in the current study by the fact that midwives who had considered leaving the profession had significantly lower scores on this subscale.

Another factor that emerged in the current study, but was not included in the results of Matthew et al., (2009), was a set of five items labeled *Skills and Resources*. This was made up of three items that failed to load substantially on the three factor solution of Matthews et al., (2009) and were therefore dropped from the scale. Although not included in the original PEMS final structure, these items appeared to form a conceptually coherent subscale in this NZ sample, including items such as “*I have adequate access to resources for birthing women in my care*”, “*I do not have adequate access to resources for staff education and training*”. In support of its construct validity, midwives who reported that they had considered leaving the profession recorded lower scores on this subscale. This is consistent with findings of Brodie (2002) that identified problems in the midwifery profession such as shortages of

adequately trained midwives and difficulties accessing ongoing education, particularly in rural and remote areas. These issues impact on the confidence of midwives to provide good quality care for women, and consequently their job satisfaction.

The final subscale identified in the current study, *PEMS-R Autonomy/Empowerment*, contained four items, three of which were included in Matthews et al., (2009) 6-item *Women-Centred practice* factor. This subscale contained items such as “*I have autonomy in my practice*” and “*I empower birthing women through my practice*” and was therefore given the label *Autonomy/Empowerment* to reflect this content. A sense of autonomy has been identified as one of the factors linked with job satisfaction and retention in a large UK based study (Kirkham et al., 2006a; Kirkham et al., 2006b). The loss of job autonomy that is felt by many midwives has been suggested as one of the key contributors to problems with the recruitment and retention of midwives in the profession (Stafford, 2001). The results of the current study suggest a link between scores on the *Autonomy/Empowerment* scale of the PEMS-Revised and the likelihood that midwives had considered leaving the profession. More research is needed in this area to better understand the impact that models of care and organizational factors have on midwives’ feelings of autonomy and empowerment.

Although the results of this study support the psychometric properties of an alternative four subscale structure of the PEMS-Revised, further research is needed to explore their validity and utility in better understanding the factors that impact on midwife job satisfaction and retention. A single item question was used in this study asking midwives whether they had considered leaving the profession in the past 6 months. Rather than relying solely on self report indicators, future researchers should consider the use of longitudinal research designs, following groups of midwives over time to more accurately identify those factors influencing the actual decision to leave the profession. The PEMS-Revised has a potentially important role to play in this process by providing a quantitative measure of

midwives perceptions and experiences in their workplace. Further research is needed across health systems with different models of midwifery care, and among midwives who are self employed, compared with those employed by an organization.

The PEMS-Revised provides a psychometrically sound tool for further quantitative research to supplement the growing number of qualitative investigations of midwives experiences and perceptions (Brodie, 2002; Curtis et al., 2006; Sullivan et al., 2011). The four subscales identified in the current study are consistent with the themes identified in other qualitative research of factors associated with job dissatisfaction and reasons for leaving the profession.

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Highlights

Exploratory factor analysis identified four subscales for the PEMS

Each subscale showed adequate internal consistency reliability

The subscales were able to distinguish midwives who had considered leaving the profession

The PEMS is a psychometrically sound tool for further research with midwives

Table 1**Characteristics of survey respondents**

Characteristic	Details
Sex (n %)	
Female	594 (99.8%)
Male	1 (.2%)
Age	
Mean (SD)	46.3 (11.2) yrs
Range	21 to 70 yrs
Employment status (n %)	
Employed by an organization only	452 (75%)
Employed by an organization and self employed	148 (25%)
Type of organization	
Primary	135 (26%)
Secondary	202 (38%)
Tertiary	192 (36%)
Years of experience as midwife	
Mean (SD)	15.0 (11.2) yrs
Range	0 to 42 yrs

Table 2

Pattern matrix of four component solution from Principal Components Analysis with oblimin rotation of revised 19 item Perceptions of Empowerment in Midwifery Scale.

	Component			
	1	2	3	4
<i>Autonomy/Empowerment</i>				
2 I am an advocate for birthing women	.768			
18 I empower birthing women through my practice	.750			
3 I am involved in midwife-led practice	.659			
20 I have autonomy in my practice	.519		-.411	
<i>Manager Support</i>				
8 I do not have a supportive manager R		.913		
1 I am valued by the manager		-.881		
5 I have the back-up of the manager		-.840		
6 I am not recognised for my contribution to the care of birthing women by my manager R		.742		
9 I have effective communication with management		-.640		
<i>Professional Recognition</i>				
16 I am recognised as a professional by the medical profession			-.869	
22 I am recognized for my contribution to the care of birthing women by the medical profession			-.746	
21 I am not listened to by members of the multidisciplinary team R			.579	
17 I have control over my practice	.440		-.515	
12 I have support from my colleagues			-.495	-.321
<i>Skills and Resources</i>				
11 I am adequately educated to perform my role				-.688
4 I do not have the skills required to carry out my role R				.586
14 I do not know what my scope of practice is R				.504
19 I do not have adequate access to resources for staff education and training R				.492
7 I have adequate access to resources for birthing women in my care				-.485

Only loadings above .4 are displayed. Dominant loadings for each item are shown in bold.

R denotes items that are reverse scored

Table 3**PEMS-Revised subscale descriptive statistics and intercorrelations.**

	Autonomy/ Empowerment N=513	Manager Support N=515	Professional Recognition N=508	Skills and Resources N=511
<i>Descriptive statistics</i>				
Number of items	4	5	5	5
Mean (SD)	3.99 (.67)	3.48 (.97)	3.86 (.66)	4.15 (.55)
Range (min – max)	1.5 - 5	1 - 5	1.6 - 5	2.2 - 5
<i>Internal consistency reliability</i>				
Cronbach alpha	.75	.88	.76	.55
Mean inter-item correlation	.46	.59	.38	.20
<i>Correlations among subscales (r)</i>				
Autonomy/ Empowerment	-			
Manager Support	.37	-		
Professional Recognition	.51	.47	-	
Skills and Resources	.41	.40	.44	-
<i>Comparison of scale scores with midwives thoughts of leaving the profession(M,SD)</i>				
No	4.08 (.62)	3.72 (.87)	4.01 (.58)	4.26 (.53)
Yes	3.89 (.71)	3.23 (1.0)	3.70 (.69)	4.04 (.55)
t-test	t(511)=3.27 p=.001	t (493)=5.88 p<.001	t (483)=5.53 p<.001	t (509)=4.53 p<.001
Effect size	d=.29	d=.50	d=.50	d=.40

M=mean, SD=standard deviation

r=Pearson correlation coefficient. All coefficients significant at p<.01.

d=Cohen's d (small effect d=.2, medium effect d=.5, large effect d=.8)