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Initial psychometric testing and validation of the Patient Participation in Pressure Injury Prevention scale

Running Head: Patient Participation in Pressure Injury Prevention Scale

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Conflicts of Interest

No conflict of interest has been declared by the authors.

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Abstract

Aims: The aim of this study was to develop the Patient Participation in Pressure Injury Prevention (PPPIP) scale and undertake initial testing of some of its psychometric properties.

Background: Clinical practice guidelines recommend patient involvement in pressure injury prevention. There is some evidence that patients are willing to participate in this activity but there are currently no instruments to measure this participation.

Design: This methodological study used data collected as part of a cluster randomised trial to modify and test the PPPIP scale.

Methods: A sample of 688 of patients with complete PPPIP scale data was used. A stratified random subsample, (Subsample A) was created and the remainder became Subsample B.

Item analysis, exploratory factor analysis and Cronbach's alpha reliability were undertaken in Subsample A. Confirmatory factor analysis and Cronbach's alpha reliability were undertaken in Subsample B. Data collection occurred between June 2014 - May 2015.

Results: In Subsample A (n = 320), inter-item correlations, item total correlations met the acceptance criteria and an exploratory factor analysis identified a one factor solution. In subsample B (n = 368) the confirmatory factor analysis supported this one factor. In both subsamples the Cronbach's alpha was 0.86.

Conclusion: This study provides preliminary evidence of acceptable reliability and validity of the PPPIP scale in two subsamples of hospitalized patients who have limited mobility. It may be used in research and quality improvement activities. As a better conceptual understanding of patient participation emerges, the PPPIP scale may require refinement.

Keywords

Pressure ulcers, Pressure injury prevention, Pressure ulcer prevention, Nurses, Nursing sensitive patient indicators, Patient participation, Psychometric testing, Instrument development, Patient perspectives, Patient outcomes.

Summary Statement

Why is this research needed?

- International clinical practice guidelines recommend active patient participation in pressure injury prevention.
- Currently there are no validated instruments to measure a patient's participation in pressure injury prevention in clinical settings.

- A patient participation in pressure injury prevention scale could be used to measure the impact of strategies to increase patient participation in pressure injury prevention.

What are the key findings?

- The Reading Ease score indicated the seven items in the Patient Participation in Pressure Injury Prevention scale would be understood by participants who have completed 8 - 9 years of formal education.
- Item analysis of the Patient Participation in Pressure Injury Prevention scale showed all seven items met acceptability criteria.
- The results of the exploratory factor analysis were supported in the confirmatory factor analysis, supporting the construct validity of the scale.
- The Cronbach's alpha for both subsamples was acceptable at 0.86, supporting the internal consistency of the scale.

How should the findings be used to influence policy/ practice/ research/ education?

- This study provides evidence of acceptable reliability and validity in two subsamples of hospitalized patients who had limited mobility.
- The Patient Participation in Pressure Injury Prevention scale is a short, condition-specific measure that may be used by organisations to identify the extent to which patients are involved in pressure injury care in their settings.
- This short scale may be used as part of pressure injury prevention quality improvement and research activities such as use as an outcome measure in testing patient centred interventions aimed to increase participation in pressure injury prevention.

INTRODUCTION

Background

Pressure injuries (PI), also known as pressure ulcers or decubitus ulcers, occur in about 10-15% of hospitalised patients (Briggs *et al*. 2013, Gunningberg *et al*. 2013, Vanderwee *et al*. 2011, Mulligan *et al*. 2011, World Health Oragnisation 2008). They are considered preventable adverse events and seen as an indicator of the quality of care and specifically the quality of nursing care. For example, PIs are one indicator tracked in England's National Health Service Safety Thermometer (Power *et al*. 2012) and are the focus of one of the ten Australian Health Service standards (Australian Commission on Safety and Quality in Health Care 2011). In the United States, Medicare ceased reimbursements for the costs of PI (Rosenthal 2007); and in Queensland, Australia, Public hospitals are financially penalised for severe PI that are hospital acquired (Queensland Government and Queensland Health 2012). Thus, PI prevention (PIP) has become a priority both nationally and internationally.

PI Clinical Practice Guidelines (National Pressure Ulcer Advisory Panel *et al*. 2014) recommend several prevention strategies, providing guidance to clinicians who are working at the bedside with patients. Key strategies include risk assessment of all patients, the use of pressure relieving measures such as regular repositioning, appropriate support surfaces and protective gear, good skin care, adequate nutrition and patient education. However, there is some evidence that these strategies are not being used consistently. For instance, one Belgian study demonstrated that of 20,000 patients evaluated, less than 10% of at-risk patients received PIP strategies (Vanderwee *et al*. 2011). In an Australian observational study of 241 at-risk patients in two hospitals, only 30% had a fully completed risk assessment on admission and 11% had received PIP education (Latimer *et al*. 2015). In another smaller Australian study (n = 26) only 17% received PIP education (McInnes *et al*. 2013). To note,

the clinical practice guidelines (National Pressure Ulcer Advisory Panel *et al*. 2014) provide recommendations for patients and their carers including participating in PIP planning and care.

There is some emerging evidence that patients have a desire to be involved in PIP. For example, in a small Australian survey of 51 patients, 80% said they understood what a PI was and 85% agreed they had a role in PIP (McInnes *et al*. 2014). In another Australian study, most of the 20 patients interviewed thought they could participate in PIP both in relation to repositioning/mobilising (Latimer *et al*. 2014). They also reported willingness to participate in their own nutritional care/support (Roberts *et al*. 2014).

The concept patient participation has been referred to as involvement, engagement and enablement. Emergent literature suggests participation is one aspect of engagement, reflecting 'behaviours through which patients participate in self-management and shared decision-making' and notes it is closely aligned to the term patient involvement (Fumagalli *et al*. 2015). A recent review of 214 papers of the antecedents (n = 198 papers), consequences (n = 42 papers) and types of patient involvement (n = 153 papers) identified three forms of patient involvement including involvement in decision making (n = 46 articles), in the delivery of one's own care (n = 91 articles) and in the development of and research into healthcare (n = 16 articles) (Snyder *et al*. 2016). Thus, the body of literature suggests terms such as engagement, involvement and participation share some common features. Future clarification to distinguish amongst these terms may be beneficial. While it appears that patient participation has been studied empirically for some time, theoretical understanding is also emerging. For example, one group has suggested patient participation in nursing has four defining attributes; an established relationship, surrendering of some power by nurses, sharing of information and active mutual agreement for patients' involvement in intellectual and/or physical activities (Sahlsten *et al*. 2008). More recently, a measure of patient

participation in nursing captured four domains; having dialogue with healthcare staff, sharing knowledge, partaking in planning and managing self-care (Eldh *et al*. 2015). Additionally, a conceptual model used in a 2016 review of instruments measuring patient participation in healthcare identified three core requirements; patients having critical self-knowledge, shared decision making and self-care/autonomy (Phillips *et al*. 2016). Thus, it appears there is consistency in the various conceptualisations of patient participation; reflecting the need for a relationship to be established, a shared understanding of the patients' condition and sharing in decision making and care activities.

To date there has been no validated instrument to measure patients' participation in PIP. Thus, there is limited understanding of the extent to which patients are actively engaged in PIP. This lack of understanding also restricts evaluation of interventions to promote this participation. Yet, patients, who have a vested interest in preventing PI, may be an untapped resource in the drive to minimise the occurrence of PIs. Consequently, the development of a patient focused scale that reflects patient values, preferences and needs as part of evidence-informed practice may advance current literature that examines person-centred participation in healthcare, in the specified PIP context. For example, Thórarinsdóttir and Kristjánsson's (2014) framework analysis for person-centred participation in healthcare identified three intertwined phases; human-connection; information processing; and action. A scale that measures patients' perspectives on their participation in pressure injury prevention can provide evidence based data on the second phase of information processing, which in turn may lead to improving the third phase of action. Given that the current international guidelines recommend at-risk patient both have an understanding of PIs and collaborate with health professionals to develop individualised prevention and management plan (National Pressure Ulcer Advisory Panel *et al*. 2014), it seems sensible to consider patients' role in PIP.

As part of a larger study investigating the delivery of a PIP care bundle, we developed the Patient Participation in Pressure Injury Prevention (PPPIP) scale. This work was informed by a generic patient participation index (Weingart *et al*. 2011), developed in the United States (US) for use with hospitalised patients. Our brief PPPIP measure is intended to expand the current literature on patient participation by providing the novel context of examining participation in PIP to be used by fellow researchers in the field and/or by health professionals wanting to examine patients' perceptions of participating in PIP care.

THE STUDY

Aim

The aim of this study was to develop the Patient Participation in Pressure Injury Prevention (PPPIP) scale and undertake initial testing of some of its psychometric properties. Nurses involved in quality improvement projects and research may find a valid and reliable tool useful as a process and/or outcome measure in designing interventions to better engage patients in their PIP. Measuring patient participation may also provide clinical nurses with insight into the extent to which their practice promotes patient participation.

Methodology

This methodological study involved two phases; first development of the scale, informed by a generic patient participation index (Weingart *et al*. 2011) and then its psychometric testing. The second phase used a subset of data collected during a cluster randomised trial (c-RT) of a multi-component patient-centred PIP care bundle conducted in eight hospitals in three Australian states. The c-RT findings, including the relationship between the care bundle and PPPIP scores, are reported elsewhere (citation masked for blinded peer review).

Phase 1: Scale Development

The PPPIP instrument was informed by a 7-item tool developed in the US to measure the extent to which hospitalised patients participated in activities that might promote patient safety (Weingart *et al*. 2011). This original tool, which had different response options for each item except one (i.e. six unique response options for seven questions), was developed from a review of the literature and from focus groups and captured patients' ability to interact with caregivers, seek or obtain information, be involved in decision making and ensuring patients' wishes are followed. Both the stems and response options of the generic tool were revised to: 1) reflect patients' level of agreement with the statements (i.e. stems); and 2) have one Likert response format (Preston *et al*. 2000) for all items. Our stems reflected patients' knowledge about PI, their ability to talk with nurses and receive information about PI and their ability to participate in PI decisions. Response options for the PPPIP scale were on a four-point scale from 1 (strongly disagree) to 4 (strongly agree), with higher scores indicating higher agreement in their participation in pressure injury prevention. A total score is obtained from summing the seven items. To address content validity, items were reviewed by seven researchers; experts in PI to ensure items reflected the focus original items and where appropriate, specified PI care, prevention or treatment. This was an iterative process, with several versions of the items considered. The original generic index items and the PPPIP scale items are displayed in Table 1. The PPPIP items had a Flesch–Kincaid Reading Ease score (Flesch 1948, Thomas *et al*. 1975) of 61 (scores closer to 100 indicate easier reading) and Flesch–Kincaid Grade Level of 8.8. This grade or ease of reading indicates that items would be understood by participants who have completed 8th or 9th grade school studies (i.e. 8-9 years of formal education; in Western education system this generally reflects 13-15 year olds) and was appropriate for target sample.

Phase 2 Psychometric Testing

Sample

As we significantly changed the stems and response options from the generic scale, two samples were sought to assess the psychometric properties of the PPPIP scale using item analysis, exploratory factor analysis (EFA) and confirmatory factor analysis (Thompson 2004). Patients were eligible to participate in the c-RT and complete the PPPIP scale if they were: aged 18 years or older; had an expected hospital length of stay of more than 48 hours; at risk of PI as measured by limited mobility (i.e. requiring physical or mechanical assistance to reposition or ambulate); and able to read English and provide informed consent. Patients were excluded if they were: admitted to the hospital for more than 36 hours prior to recruitment; admitted to maternity, paediatrics, mental health, dialysis, day surgery, intensive care, or the emergency department; previous trial participants; or receiving end of life care. Written consent was obtained from all participants. In total 1598 patients were eligible to participate with 1,332 (83.4%) patients responding to the PPPIP scale. There were various reasons for lack of responses such as; patients discharged early or unexpectedly transferred to another hospital and therefore not offered an opportunity to complete the scale, patients whose condition deteriorated, were ventilated and transferred to ICU, patient death or patients who later withdrew consent. Following exclusions for missing data, the total sample used for this analysis was reduced to 688 completed measures (i.e. 51.7% of respondents or 44.2% of the total trial participants). From this, a stratified random subsample of 320 participants was drawn from the trial database to make up Subsample A. This stratification involved randomly sampling 40 patients (20 females and 20 males) from each of the eight hospital sites. The remaining 368 participants with complete PPPIP scale data became Subsample B. Subsample A was used to describe and assess the psychometric properties of the scale. Subsample B was used to retest its construct validity and confirm the factor structure of the scale. Sample sizes

of 300 are adequate for psychometric tests such as factor analysis and Cronbach's alpha (Hair *et al*. 1998, Tabachnick *et al*. 2007).

Data collection

The PPPIP scale was administered by a research assistant when patients neared the trial endpoint (i.e. when the patient developed a PI, was discharged from hospital or reached 28 days in the study, whichever came first), with their responses entered directly into the trial database. Data collection occurred between June 2014 - May 2015.

Ethical considerations

All patients who participated in the study were given both verbal and written explanations about the study and signed a consent form. All hospitals involved and university's human research ethics committees approved of this study. This trial was registered with the Australian New Zealand Clinical Trials Registry (registration number ACTRN12613001343796).

Item Analysis, Validity and Reliability

Descriptive statistics were used to summarise the characteristics of the two subsamples and scale scores. Item performance of Subsample A was evaluated for their contribution to the construct through assessments of item skew and kurtosis, inter-item correlations (criteria r <0.8), item-total correlations (criteria r ≤0.7) and corrected item-total correlations (criteria r ≥0.3, with redundancy indicated if $r \geq 0.8$). Internal consistency for reliability was evaluated by Cronbach's alpha with the acceptable criteria of alpha of >0.7 (Nunnally & Bernstein 1994). Items that did not meet minimum cut-offs were considered for deletion. Age and gender bias at the item level was assessed using chi-square and Spearman's correlations to

test the null hypotheses for gender and age respectively. Items with significant results ($p \leq 0.05$) were highlighted for removal.

Construct validity was then tested using factor analyses. For the EFA (using Subsample A), a principal component analysis was undertaken (Tabachnick & Fidell, 2007). A significant Bartlett's test of Sphericity and a Kaiser-Myer-Olkin (KMO) measure of sampling adequacy of >0.7 was set for sample suitability. A single factor solution was predicted for the 7 items, therefore no rotation selected. Item performance was examined by applying a >0.4 factor loading (Tabachnick & Fidell, 2007). For the confirmatory factor analysis (using Subsample B), model fit evaluation used Hu and Bentler's (1999) and Byrne's (2001) recommended indices cut-off values. The model was assessed using the following fit statistics: the normed chi-square (χ^2/df; ratio of 3:1 or less, suggesting a good fit), the comparative fit index (CFI >0.9), the goodness-of-fit index (GFI >0.9), the standardised root mean square residual (SRMR of <0.1) and the root mean square error of approximation (RMSEA <0.07). IBM SPSS v21and IBM Amos v22 were used to analyse the data.

RESULTS

Descriptive characteristics of Subsamples A and B and the total sample are provided in Table 2. Subsample A (n = 320) represented 47% of the 688 patients with complete PPPIP scale scores. About one in ten participants had a PI on admission to the study and on average participants stayed in hospital for a little more than a week.

In Subsample A (n = 320), no skew or kurtosis was found when the distributions of the seven PPPIP items were examined. Inter-item correlations did not demonstrate redundancy (r = 0.33 – r = 0.65) and there were no low item-total correlations (range item 7 r = 0.68 – item 5 r = 0.84) therefore all items contributed to the construct being measured. Consequently, no

items were deleted or identified as problematic for not meeting the predetermined cut offs. No gender or age bias was found at the item level.

In Subsample A, the Kaiser-Meyer-Olkin measure of sampling adequacy (0.88) and Bartlett's test of sphericity (p <0.001) indicated that the 7 items were suitable for an EFA. The analysis provided a one factor solution with a single Eigenvalue representing 55.5% of the variance accounted for in the data. Table 3 provides the means, standard deviations and item-total correlations for the items as well as their factor loading. The seven items obtained a Cronbach's alpha of 0.86 indicating a good level of internal consistency. The Cronbach's alpha did not improve if an item was deleted. After scoring, the seven items had a scale mean of 18.3 (SD = 3.9).

Using Subsample B (n = 368), a CFA was used to validate the factor structure of the 7-item PPPIP; that is, its construct validity. In this model, we allowed each observed variable to load freely on one latent variable. This model yielded acceptable fit statistics: χ^2 (14) = 45.8, p <0.001, χ^2/df = 3.3, CFI = 0.97, GFI = 0.96, SRMR = 0.04. However, the RMSEA = 0.08 (CI 90% 0.054-0.105), was above cut-off. All factor loadings were significant (p <0.001) and ranged from 0.52 to 0.85, contributing above the expected 0.40. The Cronbach's alpha for the scale using Subsample B was also 0.86. Model fit, correlations between factors and standardised regression weights between items are shown in Figure 1. Subsample B had a scale mean of 21.1 (SD 3.6).

The EFA and CFA suggest that these 7 items reflect a uni-dimensional PPPIP measure that focuses on PIP, with high scores reflecting high patient participation in PIP and low scores reflecting low patient participation in PIP. Table 4 provides a summary of the psychometric test results for the scale.

DISCUSSION

The PPPIP scale is a brief 7-item instrument and the first tool we are aware of that measures patients' participation in their PIP care. In this initial testing, we found evidence of acceptable validity and reliability in two subsamples. That is, the internal consistency ($\alpha = 0.86$) in both subsamples supports the initial reliability of the instrument and the EFA (Subsample A) and CFA (Subsample B) reflects a single factor, which we have labelled patient participation.

Overall, the fit indices indicated that the data did primarily fit the specified model. Although, the chi-squared was significant, the normed chi-squared (χ^2/df) could be considered a little high and the RMSEA was above our predetermined cut-off. But, because the chi-squared is effected by large sample sizes, such as ours, as the minimum function is multiplied by $N-1$, a significant *p* value was expected (Byrne 2001; Hu & Bentler 1999; Tabachnick & Fidell, 2007), hence model interpretation using variety of fit indices is required. Using a normed chi-squared rule of thumb ratio of 2 to 1 or 3 to 1 are considered acceptable fit between the hypothetical model and the sample data. However, some researchers have reported using ratios as high as 5 to indicate a reasonable fit (Marsh & Hocevar 1985). Conversely having a normed chi-squared that is too low indicates that the model may be over fitted and that there may be concerns in sampling and model complexity (Preacher 2006). Furthermore, in the literature RMSEA values of .06 or less indicate a good fitting model comparative to the model degrees of freedom, while RMSEA values larger than .10 show poor fitting models (Hu & Bentler 1999). Given our RMSEA was still below .10, it indicates the model has reasonable error of approximation and may be considered an acceptable fit in the sample used in this study. Applying these recommendations to the fit indices that the model already met the cut offs for, provides further support for the proposed scale.

Participation is conceptualised as one aspect of patient centred care and encompasses involvement in care and healthcare decisions, putting the patient at the centre of care (Souliotis 2016). For this to legitimately occur, patients require an understanding of their heath conditions and treatment options (Eldh *et al*. 2010, Sahlsten *et al*. 2008, Snyder & Engström 2016). The items in the PPPIP scale reflect these requirements in terms of patients' understanding of PIs and need for information as well as their contribution to decision making and care planning. The items are consistent with a recently published conceptual model of patient participation, identifying the core requirements for patient participation that includes shared decision making, acknowledgment that patients have critical knowledge of their own health and healthcare needs and promotion of self-care and autonomy (Phillips *et al*. 2016). The items are also consistent with recommendations for patients, consumers and caregivers in international clinical practice guidelines (National Pressure Ulcer Advisory Panel *et al*. 2014), despite the scale being developed prior to the guidelines' 2014 release. Finally, the use of a Likert response scale of 4 points with no midpoint is supported in the literature (Garland 1991, Leung 2011, Preston & Colman 2000), as it eliminates the option of participants to fence sit or be undecided, allows for ease of scoring in a time limited environment and provides the option for researchers to adapt the scoring to their needs (e.g. dichotomous format).

Internationally, there have been calls for more active patient participation in health care. For example, in Australia, the National Safety and Quality Health Service Standards (2011) reflect the requirement to partner with consumers and engage patients in care. In the US, the National Patient Safety Foundation's Lucian Leape Institute has recently released their transforming Health Care compendium. In it, they recommend clinicians and staff provide information and tools to support effective engagement of patient and families in their own care and to engage them as partners in safety improvement (National Patient Safety

Foundation 2016). While there are some generic patient participation scales, authors of a recent review highlight the need to develop more valid and reliable measures (Phillips *et al*. 2016). The PPPIP scale was psychometrically sound in our sample and met the minimum expected number of items that are internally consistent, is short to assist in preventing patient fatigue and boredom and is parsimonious for a unidimensional construct (Hinkin *et al*. 1997). It is a condition-specific measure that may be used by organisations to identify the extent to which patient participation is occurring in relation to PIP in their settings. Once the level of patient participation in PIP is established, clinicians may be able to determine if strategies are needed to better engage and support patients' involvement. For example, patients' responses may help nurses determine the extent to which patients require PIP education. This short scale could also be used as part of planning quality improvement and research activities around PIP. For instance, the scale may be used as an outcome measure in testing patient centred interventions aimed to increase participation in PIP or in testing of interventions targeted towards nurses' engaging with patients in PIP.

Limitations

While this research has several strengths such as a large sample obtained from eight hospitals around Australia, allowing it to be split randomly for psychometric testing and using independent research assistants to collect all outcome data including the PPPIP scale, it also has several limitations. First, only 1,332 (83.4%) of the trial participants completed the PPPIP and of those, only 688 (51.7%) completed every item in the scale. We do not know exactly why some patients declined to participate in this part of the study or why some participants did not complete the whole scale. However, using a force-choice response format may have contributed to participants not choosing to respond and the option of using a not applicable or 5-point response scale (Preston & Colman 2000) is an option for future research using the scale. Second, because the research used an electronic case record form, the PPPIP was

administered by the research assistant, so it is not known if the scale could be used in a self-report form, something to be considered in future research. However, its readability level suggests the language is not difficult to comprehend. Third, the sample reflected patients with limited mobility who could read English and give informed consent. We had several exclusion criteria for the trial and therefore for patients who completed the PPPIP scale and the extent to which the findings reflect other patient groups is unknown and limits the generalisability of the current scale. Fourth, due to the nature of the study not all psychometric testing for scale development (e.g. test-retest reliability, discriminant validity) were undertaken, thus our work represents the initial testing of some psychometric properties. As psychometric testing and validation is an ongoing process for scales, there are clear opportunities to extend testing of the PPPIP scale in future research. Finally, although the PPPIP scale was based on a previous generic measure of patient participation, distinctions between concepts such as participation, engagement and involvement are not yet clear; once these distinctions are better understood, the PPPIP scale may benefit from refinement.

CONCLUSION

This study has generated evidence of acceptable levels of initial reliability and validity in an Australian sample of acute care patients. The PPPIP scale is short, with only seven items, making it a feasible scale to use to measure patient participation in PIP in clinical practice, quality improvement and research. However, as theoretical understanding of patient participation develops, revisions may be required. Future use and evaluation will help to determine its utility in a variety of other clinical settings.

Author Contributions:

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE*):

1) substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data;

2) drafting the article or revising it critically for important intellectual content.

* http://www.icmje.org/recommendations/

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Table 1: Generic Patient Participation Scale and Patient Participation in Pressure Injury Prevention Scale items

Generic Patient Participation Items (Weingart et al. 2011)	Patient Participation in Pressure Injury Prevention Scale Items
1. During the hospital stay, how much did you *know about the medical problem* for which you were admitted?	1. I know a lot about pressure injury risk.
2. During the hospital stay, how often did you *feel well enough to be able to talk with your doctors and nurses?*	2. I always felt well enough to be able to talk with my nurses.
3. When you wanted information about your care and treatment, *how easy or difficult was it to find a doctor or nurse to tell you what you wanted to know?*	3. When I wanted information about my pressure injury care and treatment, it was easy to find a nurse to tell me what I wanted to know.
4. During the hospital stay, when decisions had to be made, how often did your doctors and nurses *describe the good and bad things about your treatment options?*	4. During my hospital stay, when decisions had to be made about pressure injury prevention, nurses described the good and bad things about my options.
5. Did you *participate in the decisions* your doctors made about your care…?	5. I participated in the decisions made about my pressure injury prevention care, to the extent I wanted to.
6. During that hospital stay, did you have a *family member or a friend visit you?* If yes, *did that person help you make sure your health care wishes were being followed* by the hospital staff?	6. Family members or friends helped me make sure my health care wishes were being followed by the nurses.
7. During that hospital stay, *when you were given medicines, did you ever check to make sure that they were the correct ones?* If yes, *how often did you check the medicines* given to you by the hosptial staff?	7. The pressure injury prevention care I received was right for me.

Table 2: Descriptive statistics of Subsamples A, B and Total Sample

Sample Characteristics	Subsample A Frequency n = 320 (%)	Subsample B Frequency n = 368 (%)	Total Sample Frequency n = 688 (%)
Female	160 (50.0)	202 (54.9)	362 (52.6)
Nursing home resident	20 (6.3)	24 (6.5)	44 (6.4)
Admission type			
Surgical	193 (60.3)	237 (64.4)	430 (62.5)
Medical	123 (38.4)	123 (33.4)	246 (35.8)
Cancer	4 (1.3)	8 (2.2)	12 (1.7)
At least 1 co-morbidity	103 (32.2)	108 (29.3)	211 (30.7)
2 co-morbidities	78 (24.4)	79 (21.5)	157 (22.8)
3 or more co-morbidities	76 (23.7)	79 (21.5)	155 (22.5)
Pressure injury present on baseline	35 (10.9)	34 (9.2)	69 (10.0)
	Mean (SD)	Mean (SD)	Mean (SD)
Age	70.8 (14.9)	69.3 (16.2)	70 (15.6)
Hospital length of stay (days)	7.8 (6.4)	8.4 (8.8)	8.1 (7.8)
Number of co-morbidities	1.7 (1.3)	1.5 (1.3)	1.6 (1.3)

SD = Standard Deviation

Table 3: Item performance of the PPPIP Scale (Subsample A, n=320)

Item	Mean	SD	Corrected item-total correlation	Cronbach's alpha if item deleted	Factor Loading
1. I know a lot about pressure injury risk.	2.5	0.88	0.55	0.86	0.85
2. I always felt well enough to be able to talk with my nurses.	2.9	0.77	0.68	0.84	0.79
3. When I wanted information about my pressure injury care and treatment, it was easy to find a nurse to tell me what I wanted to know.	2.7	0.82	0.69	0.84	0.78
4. During my hospital stay, when decisions had to be made about pressure injury prevention, nurses described the good and bad things about my options.	2.4	0.85	0.63	0.84	0.75
5. I participated in the decisions made about my pressure injury prevention care, to the extent I wanted to.	2.7	0.81	0.77	0.82	0.68
6. Family members or friends helped me make sure my health care wishes were being followed by the nurses.	2.9	0.84	0.56	0.85	0.68
7. The pressure injury prevention care I received was right for me.	2.3	0.73	0.56	0.85	0.62

SD = Standard Deviation

Table 4: Summary of Psychometric Testing

Domain	Criteria	Summary of Results		Comment
		Subsample A n=320	Subsample B n=368	
Content validity	Underlining theoretical construct Expert review	Not applicable	Not applicable	Content validity supported
Item analysis	• Inter-item correlations r<0.8 • Item-total correlations r≤0.7 • Corrected item - total correlations r≥0.3 to ≤0.8 • Age bias- Spearman's rho; significant *p* value • Gender bias- χ^2; significant *p* value	• *r* = 0.33 – *r* = 0.65 • Range: *r* = 0.68 (item 7) to *r* = 0.73 (item 5) • Range: *r* = 0.55 (item 1) to *r* = 0.77 (item 5) • No significance found • No significance found	Not applicable	Items supported
Construct validity	EFA • Significant Bartlett's test of Sphericity • KMO <0.7 • >0.4 factor loading	• Bartlett's test *p* <0.001 • KMO = 0.87 • Factor loading Range: 0.62 (Item 7) to 0.85 (Item 1)	Not applicable	Construct validity supported
	CFA • Normed χ^2/df; ratio of 3:1 or less • CFI >0.9 • GFI >0.9 • SRMR of <0.1 • RMSEA of <0.07	Not applicable	• χ^2/df = 3.3 • CFI = 0.97 • GFI = 0.96 • SRMR = 0.04 • RMSEA =0.08	Construct validity supported
Internal consistency reliability	• Cronbach's alpha (α) ≥0.70	α = 0.86	α = 0.86	Internal consistency and initial reliability supported

Note. EFA Exploratory factor analysis, KMO Kaiser-Myer-Olkin, CFA Confirmatory factor analysis, χ^2 Chi-square, df degrees of freedom, CFI Comparative fit index, GFI Goodness-of-fit index, SRMR Standardised root mean square residual, RMSEA Root mean square error of approximation

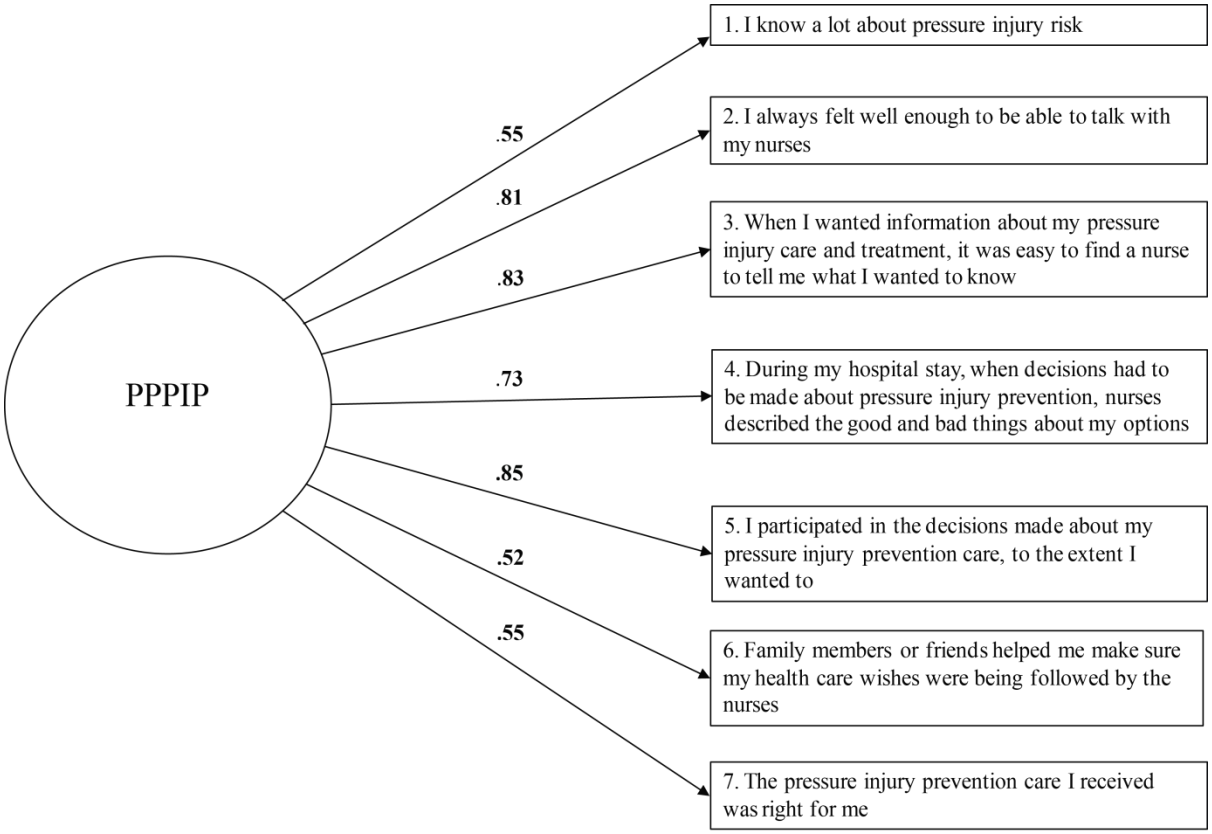

Figure 1. Confirmatory factory analysis of the PPPIP using subsample B