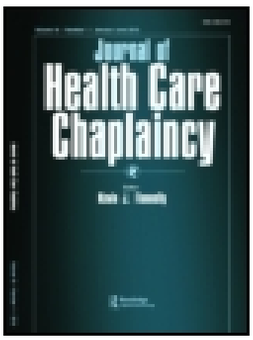


Routledge
Taylor & Francis Group

Journal of Health Care Chaplaincy

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/whcc20

Statistical fit is like beauty: A rasch and factor analysis of the Scottish PROM

Austyn Snowden, Leila Karimi & Heather Tan

To cite this article: Austyn Snowden, Leila Karimi & Heather Tan (2021): Statistical fit is like beauty: A rasch and factor analysis of the Scottish PROM, Journal of Health Care Chaplaincy, DOI: 10.1080/08854726.2021.1916336

To link to this article: https://doi.org/10.1080/08854726.2021.1916336

Published online: 26 May 2021.

JOURNAL OF HEALTH CARE CHAPLAINCY
https://doi.org/10.1080/08854726.2021.1916336

Statistical fit is like beauty: A rasch and factor analysis of the Scottish PROM

Austyn Snowden[a,b], Leila Karimi[c], and Heather Tan[b]

[a]School of Health and Social Care, Edinburgh Napier University, Scotland; [b]European Research Institute for Chaplains in Healthcare, KU Leuven University, Belgium; [c]School of Psychology and Public Health, La Trobe University, Australia

ABSTRACT

Chaplains help people face some of the most complex, intractable and traumatic issues in their lives. Spiritual care works. Unfortunately, spiritual needs are rarely met in health and social care because a) spiritual distress is not recognised as such, and b) chaplain interventions are undervalued and misunderstood. The Scottish Patient Reported Outcome Measure (PROM) © was created to help provide evidence for the impact of chaplain interventions. The aim of this study was to establish whether the PROM could also be used to identify patients in *need* of chaplain interventions. To test this psychometrically, Rasch and Confirmatory Factor Analysis was conducted on an international dataset of post intervention PROMS from UK, Europe and Australia completed between 2018–2020 ($n = 1117$). The data fit the Rasch model, and the PROM demonstrated unidimensionality, construct validity and reliability, meaning PROM scores represent a coherent concept. Higher scores represented lower levels of spiritual distress, and the mean score was 12 out of 20. PROM score of 9 was one standard deviation below the norm, a metric routinely used to identify 'clinically important difference' in psychometric scales. A Scottish PROM© score of 9 and under could therefore identify people for whom chaplaincy may be beneficial. The clinical implications of this are considerable.

KEYWORDS

Chaplain; confirmatory factor analysis; psychometrics; Rasch analysis; screening; spirituality

Introduction

Chaplains around the world help people recover from spiritual distress, whether a function of bereavement, loss, or any other personal or family trauma (Cramer, Tenzek, & Allen, 2015). They provide a wide range of support for patients and families, beyond religious concerns (Carey, 2012). Chaplain interventions have been shown to be more effective than antidepressants in the long term, and they can help people overcome and live with chronic, long term conditions in genuinely life affirming ways (Macdonald, 2017). They have also been shown to mitigate burnout and improve well-being in

CONTACT Austyn Snowden a.snowden@napier.ac.uk School of Health and Social Care, Edinburgh Napier University, Scotland

Supplemental data for this article can be accessed on the publisher's website

multidisciplinary teams because of their ability to help with some of the most complex, intractable and 'difficult to treat' problems faced by health services (Snowden, Gibbon, & Grant, 2018).

It is increasingly acknowledged that people present to health services with spiritual needs as well as health needs (Zumstein-Shaha, Ferrell, & Economou, 2020). Spiritual needs include the need to find meaning, purpose, and value in life, and whilst these issues continue to be associated with religion for many, for many others they are not (Ripamonti, Giuntoli, Gonella, & Miccinesi, 2018). Further, chaplains have historically been predominantly faith based too, so health practitioners may not automatically think of the chaplain when faced with non religious spiritual issues. The outcomes of this are twofold. First, spiritual distress is not always recognised as something that should be identified and supported through specialist intervention (Baldacchino, 2015). Second, after failing to recognise spiritual need, health colleagues tend to pathologise it instead, raising the risk of inappropriate treatment and potential iatrogenic harm (Bronn & McIlwain, 2015).

Despite some notable exceptions (e.g., Carey, Swift, & Burton, 2020) patients' spiritual needs are rarely identified in healthcare (Winiger, 2020) and chaplains are not having the impact they should because their role is misunderstood (Vandenhoeck, 2013). This position is maintained by an absence of empirical evidence to support the impact of chaplain interventions (Timmins & Pujol, 2018). This vicious cycle is further complicated by chaplains themselves feeling uneasy with any attempt to reduce their specialised interventions down to generalisable metrics (Snowden & Telfer, 2020).

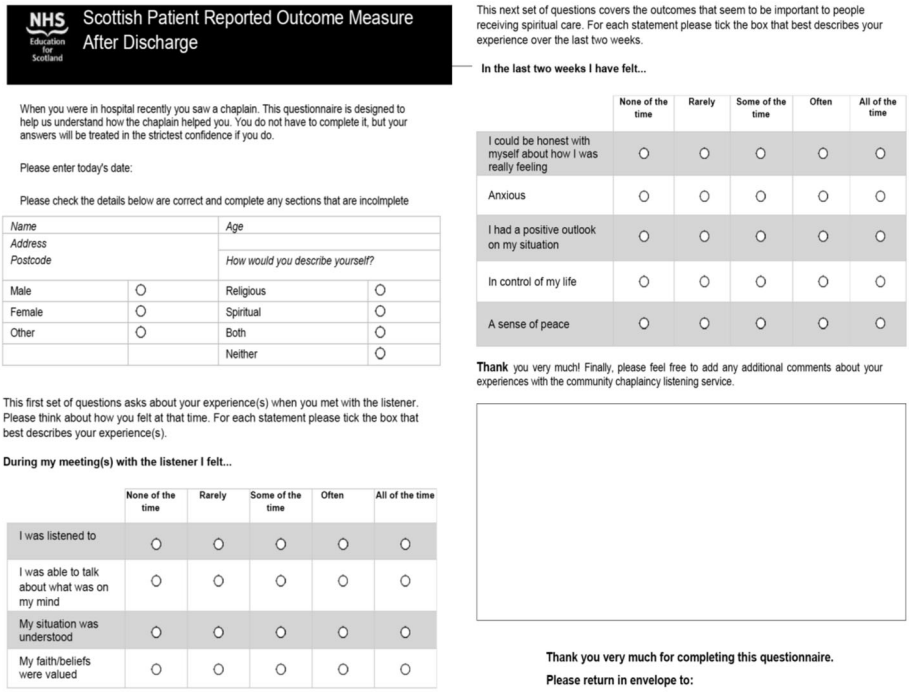
Background

The Scottish PROM©: A measure of the impact of chaplain interventions

Against this backdrop the Scottish Patient Reported Outcome Measure (PROM)© was developed; the first and so far only validated measure of the impact of chaplain interventions (Snowden & Telfer, 2017). The Scottish PROM© is a short, five-item measure that asks the patient to reflect on how they have felt in the last two weeks in relation to: peace, outlook, anxiety, honesty and control (Figure 1). Each item has five response options ranging from none of the time to all of the time, scored zero to four, with the anxiety item reverse scored. The range of total scores for PROM is zero to 20.

The scale is usually completed alongside four items designed to ascertain the patient's experience of the encounter with the chaplain. These four items ask about whether the chaplain 1. Listened to the person, 2. Valued their faith and beliefs, 3. Helped them talk about what was on their mind, and 4. understood their situation. Previous studies have shown that '*being able to talk about what is on your mind*' is the strongest indicator of successful outcome of chaplain interventions (Snowden, Gibbon, et al., 2018; Snowden, Telfer, Kelly, Bunniss, & Mowat, 2013a). These items have also proved useful as feedback for chaplains on how patients perceive their encounters. These items were therefore retained to further help the individual chaplain reflect, and to establish further empirical links between the patient experience of the chaplain encounter and the subsequent outcome.

Finally, there is a free text box for the patient to add any detail they wish to. Again, this descriptive element has proved useful in reflection. Further, an examination of



NHS Education for Scotland

Scottish Patient Reported Outcome Measure
After Discharge

When you were in hospital recently you saw a chaplain. This questionnaire is designed to help us understand how the chaplain helped you. You do not have to complete it, but your answers will be treated in the strictest confidence if you do.

Please enter today's date:

Please check the details below are correct and complete any sections that are incolmplete

Name		*Age*	
Address			
Postcode		*How would you describe yourself?*	
Male	○	Religious	○
Female	○	Spiritual	○
Other	○	Both	○
		Neither	○

This first set of questions asks about your experience(s) when you met with the listener. Please think about how you felt at that time. For each statement please tick the box that best describes your experience(s).

During my meeting(s) with the listener I felt...

	None of the time	Rarely	Some of the time	Often	All of the time
I was listened to	○	○	○	○	○
I was able to talk about what was on my mind	○	○	○	○	○
My situation was understood	○	○	○	○	○
My faith/beliefs were valued	○	○	○	○	○

This next set of questions covers the outcomes that seem to be important to people receiving spiritual care. For each statement please tick the box that best describes your experience over the last two weeks.

In the last two weeks I have felt...

	None of the time	Rarely	Some of the time	Often	All of the time
I could be honest with myself about how I was really feeling	○	○	○	○	○
Anxious	○	○	○	○	○
I had a positive outlook on my situation	○	○	○	○	○
In control of my life	○	○	○	○	○
A sense of peace	○	○	○	○	○

Thank you very much! Finally, please feel free to add any additional comments about your experiences with the community chaplaincy listening service.

Thank you very much for completing this questionnaire.

Please return in envelope to:

Figure 1. The Scottish PROM and associated questions.

responses to the pilot version of the PROM found that chaplains tended to use the same language as their patients to describe their problems and the conversations that were helpful to the patient. It is likely chaplains are unique among health professionals in this regard (Snowden et al., 2013a).

The Scottish PROM has already been used in a range of studies, and many are still under way. For example, a study of a primary care chaplain intervention called Community Chaplaincy Listening (CCL) has just completed data collection.[1] Preliminary analysis showed that patients ($n = 103$) referred to see a chaplain in primary care reported significantly higher mean scores on the Scottish PROM© after chaplain intervention as compared to baseline. This rise in PROM scores was correlated with a clinically significant gain in health related quality of life scores. These results demonstrated that (a) The Scottish PROM© appears capable of detecting clinically meaningful differences, (b) chaplain interventions are associated with measurable improvement in quality of life, and that (c) primary care is a very effective place for chaplains to be.

Many of the patients in this study had been very regular attenders at Family Doctors' surgeries prior to the study, suffering from what Macdonald (2017) described as 'modern maladies' such as obesity, addiction, depression and general loss of wellbeing prior to visiting the chaplain. The philosophy behind Community Chapaincy Listening is that such presentations can reflect at least in part an underlying inner or spiritual distress that is a product of materialism, individualism, consumerism and the inequalities they generate (please see Hanlon, Carlisle, Hannah, Reilly, & Lyon, 2011). As well as improving PROM scores and general wellbeing, after seeing the chaplain these patients

also subsequently reduced their regular attendances at the family doctor. These are very promising findings, especially as they replicate those in similar settings earlier (Gibbon & Baldie, 2019; Snowden, Gibbon, et al., 2018).

Focusing on the role of the PROM it was interesting to reflect that the GPs were very good at recognising and referring those patients for whom seeing a chaplain was beneficial. This is relevant because it means this referral process could be analysed, replicated and potentially systematised. At present healthcare colleagues in UK do not routinely attempt to assess people for spiritual need. Many hospital admission documents in the UK simply record whether the patient is religious or not. Anecdotally even this question is often asked in a negative way – *You're not religious, are you? You don't want to see the chaplain, do you?* – Obviously this is a wholly inadequate method of ascertaining spiritual need, and whilst admission may not the best time to assess for spiritual need because of the association of chaplains and palliative care (Choi, Curlin, & Cox, 2015), the absence of meaningful assessment means that even in palliative care patients in the greatest spiritual distress might never be seen by the health professional best placed to help them (Fitchett et al., 2020).

One potential solution to this problem would be to replace or supplement the '*what is your religion*' question with a better question, such as '*do you follow a particular faith or philosophy*'? There may also be a place for the five-item Scottish PROM. It only takes a minute to complete, and the scoring is easy. If a patient scored under a particular value, that could trigger referral or at least a discussion with the patient. Clearly there are training implications, but the findings above strongly suggest that the Scottish PROM© could be used to systematically identify people who may benefit from seeing a chaplain.

To take this idea further, the PROM needed to be psychometrically tested in a new way. This is because it was created as a measure of impact of chaplain interventions and not necessarily as an identifier of people in spiritual need. It logically follows that if people score higher on the PROM after seeing a chaplain, then their previous lower score is likely to represent a degree of spiritual distress. However, to test this psychometrically, the scores on the Scottish PROM© need to be analysed for a range of assumptions so that users can be sure that the scores are clinically meaningful, and the best way to do that is through a form of statistical 'triangulation'(Walton, Mehta, Seo, & MacDermid, 2020), essentially applying different techniques to analyse the same dataset, using each to either support or negate the findings of the other. This analysis used a combination of Rasch and Confirmatory Factor Analysis (Allison, Baron-Cohen, Stone, & Muncer, 2015).

To date, the Scottish PROM© has been iteratively tested for face validity, content validity, (Snowden, Telfer, Kelly, Bunniss, & Mowat, 2013b) reliability, dimensionality, construct validity, and convergent validity with mental wellbeing (Snowden & Telfer, 2017; Tan et al., 2020). A recent confirmatory factor analysis by Karimi and Tan (2020) found it demonstrated model-based reliability and predictive validity. This means the Scottish PROM© has consistently proved itself valid and reliable in a wide range of settings. However, it was initially created to measure the impact of interventions delivered to Scottish patients by Scottish chaplains. If, as suggested above, it could prove a useful

discriminator for purposes of referral to chaplaincy services more widely, then a closer examination of the performance of the scale in a large dataset was needed.

Aim

To further examine the psychometric properties of the Scottish PROM© by re-examining its construct validity.

Objectives

Use a large secondary dataset of international responses to the Scottish PROM© to answer three interrelated questions:

1. Does the data fit the Rasch model?
   a. Test item and person fit to Rasch model
2. Does a single factor model best explain the data? Use Confirmatory Factor Analysis to test:
   a. Structural validity
   b. Convergent validity and reliability
   c. Criterion (predictive) validity

If the answers to 1 and 2 are yes, then:

3. What score should trigger referral to specialist spiritual care?

Method

Design

Secondary analysis of international responses to Scottish PROM© using concurrent application of Rasch analysis and Confirmatory Factor Analysis.

Rasch analysis

Rasch analysis is a member of the Item Response Theory (IRT) family, increasingly used to assess construct validity in psychometrics (e.g., Boone, 2016; Boone & Staver, 2020). It assumes the questionnaire under study is measuring a unidimensional construct and tests any data obtained from responses to the questionnaire against that assumption. It is an iterative process grounded in probability: it identifies the probability of a person responding in a particular way (e.g., None of the time/Rarely … All of the time) to a particular questionnaire item as a probability function of both that person's ability and the item's difficulty (Bond & Fox, 2007).

This is probably easiest to understand in relation to mathematics. When creating a mathematics test the assumption is that all the items on the test would be measuring a unidimensional construct, or latent trait. In this example, the construct is mathematics, so the test assumes it is measuring individual ability in math(s). A good test would

contain some relatively easy questions (e.g., $1+1 = ?$) for the cohort taking the test, and also some harder ones (e.g., what is the square root of minus one?) that only a few might get correct. A good test would be able to differentiate individuals' mathematics ability within the group based on their responses to the test. Calculations are more complex where polytomous responses such as Likert scales are involved but the principle remains the same (Linacre, 2006). Some items should be more difficult to positively endorse than others.

As well as examining the ability of people taking the test and the difficulty of items within the test, rasch analysis also examines the degree to which individual items fit with the underlying construct being measured. 'Item fit' is a mathematical expression of how closely a particular item represents the underlying putative trait being measured (Bond & Fox, 2007). For example a question about geography would be unlikely to fit with our test on mathematics. It would be measuring something else and Rasch analysis would identify this because responses to this question would be inconsistent with responses to the maths questions. In measuring 'fit', Rasch analysis tests the assumption that the items within a scale measure something of the same underlying trait.

In summary, there are three key parameters in Rasch analysis: item difficulty, person ability, and item fit (Linacre, 2011). These parameters are all calculated simultaneously to estimate:

a. The likely response to a particular item according to the ability of responding person;
b. The likely ability of a person according to their item responses;
c. The likelihood of a particular item fitting with the putative underlying trait.

Item and person misfit, item Infit/Outfit statistics were calculated in Winsteps version 4.5.5.

Confirmatory factor analysis

Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) using AMOS and SPSS (version 26) was used to assess unidimensionality, reliability and predictive validity of the PROM. The chi-square, relative chi square (CMIN/DF), fit indices (such as RMSEA, and CFI) were used for model fit evaluation using confirmatory factor analysis (CFA).

Data

Data were obtained from seven recently completed studies where the Scottish PROM had been used as an outcome measure, either post intervention or post discharge from various health facilities around the world. The full dataset ($n = 1767$) consisted of PROM responses from two studies in Scotland/UK, two studies in Belgium/Holland and three in Australia, conducted between 2017 and 2020. In every case, the responses included in this analysis had been completed by patients *after* discharge or *after* their episode of care had finished. In summary, our sample entailed responses from people who were 'spiritually normal', who no longer specifically needed to see a chaplain, with

the aim of obtaining as homogeneous and large a sample as possible, so as to define key norms.

First, all data were cleaned (see Supplementary file for process). All 1767 responses were examined for errors, missing data or logical inconsistency. A total of 1117 responses remained where all PROM data was complete, logical and checked. As discussed, PROM scores are calculated by adding up the total of the responses to the five individual items. All the items except 'anxious' are positive items. That is, they refer to positive, desirable attributes. Each positive item is scored zero, one, two, three, four, with zero meaning 'not at all' and four 'all the time'. The negative item about anxiety is reverse scored, such that feeling anxious all the time scores zero, and not at all, four. Scores therefore range from zero to twenty, with zero representing the worst possible score and 20 the best. For Rasch analysis the Scottish PROM was scored as described, converted into txt. file and imported into Winsteps version 4.5.5. For CFA, excel file was coded and imported into AMOS.

Results

Demographics

Table 1 presents the demographic characteristics of the sample. Total sample consisted of Australian participants (74%), Holland/Belgium participants (8%) and UK participants (18%). The average age of the participants was 62.7 years old ($SD = 17.02$). 41% of the participants were male ($n = 461$) versus 58% female ($n = 649$), and 0.3% other/unknown ($n = 2$). The majority was religious (18%), spiritual (15%) or both (26%), with 36.3% reporting no faith or belief.

1. Do the data fit the Rasch model?

The Root Mean Square Error (RMSE) was 0.04, same as standard error. Item separation was 13.45, infit statistic 1 and outfit 1.03 for the whole dataset. Item reliability was 0.99.

Table 1. Demographic characteristics of the sample ($n = 1117$*).

Country of participants:	Frequency	Percent
Australia	823	73.7
Holland & Belgium	89	8.0
Scotland & UK	205	18.3
Gender:		
Male	461	41.4
Female	649	58.3
Other	2	0.3
Religious belief:		
Neither	261	36.3
Religious	131	18.2
Spiritual	111	15.4
Both	190	26.4
	Mean	SD
Age:		
Years	62.68	17.02

*N varies due to some missing variables.

Table 2. Fit indices for the five items of the Scottish PROM.

	Score	Count	Measure	SE	Infit MNSQ	ZSTD	Outfit MNSQ	ZSTD
Anxious	2345	1117	0.56	0.04	1.28	6.13	1.40	8.08
Honest	3437	1117	−1.01	0.04	1.31	6.02	1.26	4.97
Peace	2539	1117	0.31	0.04	0.86	−3.54	0.91	−2.11
Outlook	2741	1117	0.05	0.04	0.81	−4.62	0.79	−5.11
Control	2719	1117	0.08	0.04	0.75	−6.34	0.79	−5.24

RMSE is a measure of how well the data fit the Rasch model. Zero indicates perfect fit, but there is always some variation, and RMSE = 0.04 suggests an excellent fit (Linacre, 2011). Separation index values indicate the scale's ability to identify meaningful differences between people, and higher values indicate better separation (Boone & Noltemeyer, 2017). Values of 3 or greater are desirable, so 13.45 shows the sample is large enough to reveal a consistent hierarchy and spacing of items. Infit and outfit statistics represent the ratio of the observed variance to what would be expected expect from the Rasch model. Infit is adjusted to account for outliers, whereas Outfit is unweighted (leaves all the outliers in). Ideally all items would display an infit mean square of one; the model value of the underlying trait.

However, response strings nearly always show variation and this is desirable in a multi item test (Saltzberger, 2012). The outfit statistic of 1.03 is well within acceptable limits for the whole scale.

Table 2 shows the degree to which all the individual items measure the same underpinning trait. Values over 1.5 indicate poor fit (Linacre, 1994) and none of the items meet that criterion, although the items about anxiety and honesty show relatively high levels of variation. Nevertheless, taken as a whole, together with a reliability coefficient of 0.99 these results show the Scottish PROM© is reliable, sensitive and capable of differentiating between respondents (Allison et al., 2015; Seamon, Kautz, & Velozo, 2019). The data fit the Rasch model.

2. Does a single factor model best explain the data?

Structural validity of PROM

Data were first tested for normality assumptions since maximum likelihood (ML) was used to assess confirmatory factor analysis (CFA) of PROM. The Mardia's coefficient for multivariate normality was high (Mardia's ccoefficient = 12.57), thus, Bollen-Stine bootstrapping were used to assess the PROM model using CFA.

As presented in Table 3, the chi-square for 5-item scale of PROM compared to independent model is not significant and the relative chi square is less than 3 (CMIN/DF = 1.6) which shows the PROM 5-item model fits very well. Bollen-Stine bootstrap also rejected the null hypothesis ($p = .27$). The fit indices, also presented in Table 3 supports the findings with smaller AIC for the PROM model an excellent fit indices (RMSEA < 0.06 and CFI > 0.95), suggest uni-dimensionality of PROM with its 5 items and one factor. RMSEA is again very small as it was in the Rasch analysis. This is noteworthy because Rasch and CFA use different procedures and calculations yet both suggest good fit.

Table 3. Model Fit evaluation and fit indices.

Model	NPAR	CMIN	DF	*p*	CMIN/DF	AIC	CFI	RMSEA
PROM 5-item model	15	8.30	5	.14	1.66	38.30	0.99	0.02
Independence model	10	1488.73	10	.001	148.87	1508.73	0.001	0.36

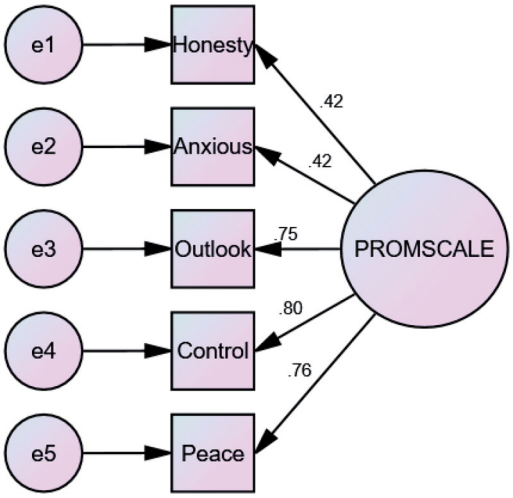


Figure 2. The standardised regression coefficients of five items of PROM.

Convergent validity. Convergent validity was evaluated by examining standardised regression coefficients which are indicated in Figure 2. All the loadings were significant, and the factor loadings were above the recommended level (0.40) (Hairr, Salisbury, Johannsson, & Redfern-Vance, 2014). The average variance extracted was slightly lower than the recommended threshold of 0.50 (Av = 0.43), however given the reliability was acceptable ($\alpha = 0.77$) the convergent validity of the scale is justifiable (Fornell & Larcker, 1981).

Criterion (predictive) validity of PROM

The criterion or predictive validity of PROM (Figure 3) was assessed using its correlation with the quality of spiritual care scale. The results indicated significant correlation between PROM and the quality of spiritual care ($r = 0.52$) supporting criterion validity of PROM.

3. What score should trigger referral to specialist spiritual care?

Because the data fit the Rasch model, and both CFA and Rasch analysis supported assumptions of uni-dimensionality and item fit, the normative properties of the Scottish PROM were examined. Means, medians, SDs and percentiles are presented in Table 4 across gender, different regions and different age groups separately. Figure 4 shows the relationship between PROM scores and percentiles in the whole sample.

A Kolmogorov-Smirnov test confirmed the distribution of PROM scores. The average score for the total population was 12.14 (SD = 3.39). The PROM scale at 50% percentile

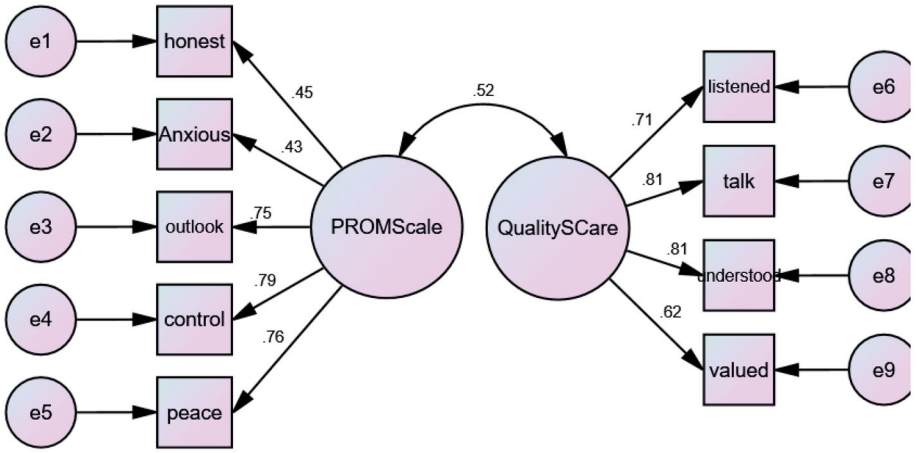


Figure 3. Criterion (predictive) validity of PROM.

Table 4. Summary statistics for the PROM for the total sample, gender, region and age separately.

Category	N	Mean	SD	Percentile 25%	50%	75%
Total	1117	12.14	3.39	10	13	14
Gender:						
Male	461	11.97	3.50	10	12	14
Female	649	12.22	3.30	10	13	14
Region:						
Australia	823	11.72	3.34	10	12	14
Europe	294	13.31	3.26	11	14	15
Age:						
18–40	53	12.32	3.51	10	12	15
41–70	272	12.78	3.04	11	13	15
70+	181	13.59	3.45	11	14	16

was in the range of 12–13 regardless of gender, and in the range 12–14 in relation to age and region, with older adults and Europeans showing higher mean scores (Table 4).

For the whole sample, Figure 4 shows that a score of 10 or under on the PROM was scored by the lowest 25th percentile of this sample. At 8 and under, the proportion roughly halves to 13th percentile, meaning a score of 8 and under is only scored by the lowest 13% population. Recall the population mean (12.14) minus the standard deviation (3.39) is 8.75. The standard deviation is an important metric, as it defines the 'minimally important clinical difference' (Johnsen et al., 2013) in a psychometric scale. Eight, and possibly nine therefore appear to be important scores. The next section discusses what this means in practice.

Discussion

The purpose of this study was to examine the psychometric properties of the Scottish PROM©. If specific assumptions were met then total scores on the PROM could be interpreted with increased confidence. The findings showed that the data fit the assumptions underpinning the Rasch model and confirmatory factor analysis showed the data were best explained by a single factor. This meant that the Scottish PROM© is a valid measure and the scores meaningfully differentiate between individual experiences.

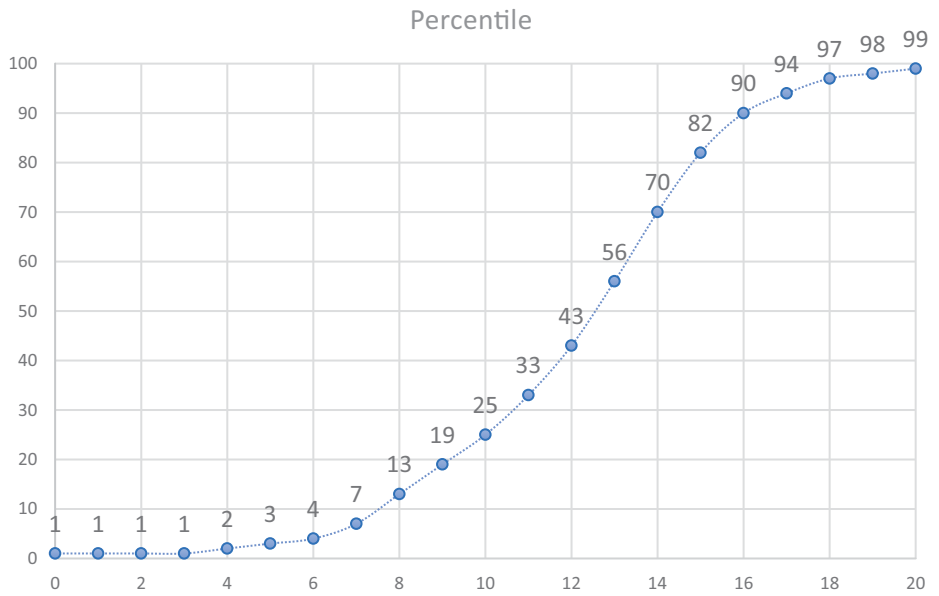


Figure 4. Scottish PROM total scores converted to percentile ($n = 1117$).

As in previous validation studies, the five individual PROM items made sense to participants (Karimi & Tan, 2020; Snowden et al., 2013b). They were not too difficult, but neither were they too easy (Boone, 2016). Bar 14 outliers, they covered the whole range of experience of this population, and there was no floor or ceiling effect. The Scottish PROM© is unidimensional, valid, reliable and fit for purpose, so the total scores it generates can be interpreted with more confidence.

One of the most important uses of short measures in clinical practice is to identify those in need of specialist services. To be clinically useful, a scale needs to tell the clinician when and how to act. For example, if Mr. Smith scores a total of x on the Scottish PROM©, please refer to chaplain for further assessment. Identifying the value of x in psychometric terms involves first identifying the '*minimally important clinically significant difference*'. The minimally important clinically significant difference is the score on a scale that equates to a meaningful change in whatever construct the scale is measuring. It could be related to a personally meaningful change in experience of back pain (Johnsen et al., 2013) for example. This '*minimally important clinical difference*' is usually taken to be the standard deviation of the test (Schatz et al., 2009).

In this full dataset the norm (mean) was 12.14 and the standard deviation 3.39. This would put the first clinically significant deterioration from 'normal' at a score of 8.75 on average. Given there is no way to score anything other than a whole number, it would be prudent to start with '9 or under' as an initial benchmark to consider someone 'at risk', or in probable need of referral.

What does a Scottish PROM score of 9 mean?

Table 5 shows the five PROM items in rows, and the Likert categories in columns. The cells represent the numerical score associated with the relevant item and category. It

Table 5. Scoring of the Scottish PROM. Scoring 9 or under requires at least one of the items to be scored as 'rarely'.

	All the time	Often	Some of the time	Rarely	None of the time
Anxious (reversed)	4	3	2	1	0
Outlook	4	3	2	1	0
Peace	4	3	2	1	0
Control	4	3	2	1	0
Honesty	4	3	2	1	0
Total	20	15	10	5	0

shows, for example that checking 'all the time' to all the items would result in a maximum score of 20, and likewise checking 'often' to them all would score fifteen. Scoring 'some of the time' to anxiety, peace and honesty and 'often' to outlook and control would score $(3 \times 2) + (2 \times 3) = 12$. There are numerous ways to score 9 and lower, but all of them would require at least one response in the 'rarely' category. Scoring 8 would need at least two responses in the 'rarely' category. Scoring any of the items as 'rarely' equates to the person saying they hardly ever feel at peace, or in control, or honest with themselves, and so on. It makes sense that this would be a valid indicator of spiritual distress.

Clinical testing is the next step, but it is very interesting to note that the average baseline Scottish PROM© score of participants referred to chaplains from Scottish GPs was 8.68[1] Following chaplain intervention, the scores rose to just over 12, a clinically significant improvement. A PROM total score of nine and under would therefore seem to be a very useful starting point for identifying people in need of spiritual support. Nine and under represents both an indicator of someone in substantial spiritual distress and most importantly somebody who can most likely be helped by a chaplain or specialist in spiritual care. Introducing the PROM into admission protocols would help deploy chaplains in a systematic manner and give spiritual support to those who need it.

Limitations

The main methodological limitation is that this paper described a secondary analysis. We did not have the opportunity to select a wider sample. Despite the Rasch analysis being data independent, it is unclear whether all the outcomes described here would hold in different countries or in a different sample of patients. From an analytic perspective, space prevented detailed analysis of the Rasch results. For example, we have not been able to report analysis of differential item functioning, or the probability curves demonstrating the independence of the Likert categories.

Nevertheless, one of the strengths of using CFA and RA together is that they take opposite conceptual starting points, so when they both come to similar conclusions it is likely the conclusion reached is sound because the answer has been arrived at by independent journeys; a form of methodological triangulation (Risjord, Moloney, & Dunbar, 2001). Doing both RA and CFA and arriving at the same conclusions raises the credibility of those conclusions.

The final major limitation is that assessment tools already exist for spiritual care (e.g., see (Piotrowski, 2013; Riklikienė et al., 2019; Steinhauser, King, Parker, & Kirshner, 2020). The Scottish PROM wasn't even devised as a screening tool in the first place, so

why 'reinvent the wheel'? The answer is that none of the existing screening tools are routinely used as part of holistic patient assessment. The other limitation with other spiritual assessments is that they are embedded in a certain worldview that not everyone may share. The Scottish PROM by contrast was developed by chaplains, for chaplains, as a method of demonstrating their impact. It was also designed to be as *inclusive as possible*, hence the absence of any religious questions. Consequently there is a chance that a new, relevant, quick and straightforward measure may succeed in general where others have failed. This is the only such tool in the world and maybe the time is just right to help patients around the world have their spiritual needs assessed and met.

Conclusion

The Scottish PROM© is a unidimensional, valid and reliable measure of spiritual distress. The PROM functioned as a clinically meaningful measure of personal spiritual improvement following chaplain interventions in Europe and Australia as well as Scotland. This study showed that it could also be used identify clinically meaningful referrals to chaplains/spiritual care services. The majority of the population (65%) scored between 10 and 16 on the PROM post chaplain intervention, and the mean score overall was 12. People scoring under 9 (13%) were more than one standard deviation away from the mean. This is important because, as long as other assumptions are met, one standard deviation represents the 'rule of thumb' cut off for identifying people who are clinically different from the norm. This study showed all necessary assumptions had been met.

This translates to the clinical environment by giving non specialists a tool to improve quality of holistic care. Anyone scoring nine or under on the Scotish PROM© should be considered for referral to specialist spiritual care services. This systematic approach would be a substantial improvement on most current methods of spiritual care referral that are still largely embedded in ad hoc approaches grounded in religious models of spirituality. Whilst there are training issues along with further questions on the best time and place to assess whether someone may benefit from seeing a chaplain, systematic use of the Scottish PROM© would result in chaplains geting more timely and appropriate referrals, fellow clinicians would better understand the significance of spiritual care, and patients would finally have their spirituality acknowledged as a matter of routine. The Scottish PROM© is freely available from NHS Education Scotland.

ORCID

Austyn Snowden http://orcid.org/0000-0001-9321-622X

Data availability statement

Anonymised dataset will be provided following clarification of storage arrangements with copyright holders NHS Education Scotland.

Note

1. Patients referred to chaplains by GPs ($n = 102$) scored mean 8.68 on baseline, and 12 on discharge. This study is being written up. Data is available for editorial/peer review.

References

Allison, C., Baron-Cohen, S., Stone, M. H., & Muncer, S. J., (2015). Rasch modeling and confirmatory factor analysis of the systemizing quotient-revised (SQ-R) scale. *The Spanish Journal of Psychology*, *18*:E16. doi:10.1017/sjp.2015.19

Baldacchino, D. (2015). Spiritual care education of health care professionals. *Religions*, *6*(2), 594–613. doi:10.3390/rel6020594

Bond, T. G., & Fox, C. M. (2007). *Applying the rasch model. Fundamental measurement in the human sciences* (2nd ed.). New York, NY: Routledge.

Boone, W. J. (2016). Rasch analysis for instrument development: Why, when, and how? *CBE Life Sciences Education*, *15*(4):rm4. doi:10.1187/cbe.16-04-0148

Boone, W. J., & Noltemeyer, A. (2017). Rasch analysis: A primer for school psychology researchers and practitioners. *Cogent Education*, *4*(1), 1416898. doi:10.1080/2331186X.2017.1416898

Boone, W. J., & Staver, J. R. (2020). *Advances in Rasch analyses in the human sciences* (Springer, Ed.) (1st ed.). Gewerbestrasse 11, 6330 Cham, Switzerland: Springer.

Bronn, G., & McIlwain, D. (2015). Assessing spiritual crises: Peeling off another layer of a seemingly endless onion. *Journal of Humanistic Psychology*, *55*(3), 346–382. doi:10.1177/0022167814528045

Carey, L.B. (2012). The utility and commissioning of spiritual carers. In B. Cobb, M. Puchalski & C. Rumbold (Eds.), *The Oxford textbook of spirituality in healthcare* (pp. 397–405). Oxford: OUP.

Carey, L. B., Swift, C., & Burton, M. (2020). Editorial: COVID-19: Multinational perspectives of providing chaplaincy, pastoral, and spiritual care. *Health and Social Care Chaplaincy*, *8*(2), 133–142. doi:10.1558/hscc.41973

Choi, P. J., Curlin, F. A., & Cox, C. E. (2015). "The patient is dying, please call the Chaplain": The activities of Chaplains in one medical center's intensive care units. *Journal of Pain and Symptom Management*, *50*(4), 501–506. doi:10.1016/j.jpainsymman.2015.05.003

Cramer, E. M., Tenzek, K. E., & Allen, M. (2015). Recognizing success in the Chaplain profession: Connecting perceptions with practice. *Journal of Health Care Chaplaincy*, *21*(4), 131–150. doi:10.1080/08854726.2015.1071543

Fitchett, G., Hisey Pierson, A. L., Hoffmeyer, C., Labuschagne, D., Lee, A., Levine, S., … Waite, N. (2020). Development of the PC-7, a quantifiable assessment of spiritual concerns of patients receiving palliative care near the end of life. *Journal of Palliative Medicine*, *23*(2), 248–253. doi:10.1089/jpm.2019.0188

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39–50. doi:10.2307/3151312

Gibbon, A., & Baldie, D. (2019). Community chaplaincy listening in a community mental health group. *Health and Social Care Chaplaincy*, *7*(1), 57–74. doi:10.1558/hscc.35116

Hairr, D. C., Salisbury, H., Johannsson, M., & Redfern-Vance, N. (2014). Nurse staffing and the relationship to job satisfaction and retention. *Nursing Economics*, *32*(3), 142–148. PMID: 25137811

Hanlon, P., Carlisle, S., Hannah, M., Reilly, D., & Lyon, A. (2011). Making the case for a "fifth wave" in public Health. *Public Health*, *125*(1), 30–36. doi:10.1016/j.puhe.2010.09.004

Johnsen, L. G., Hellum, C., Nygaard, Ø. P., Storheim, K., Brox, J. I., Rossvoll, I., … Grotle, M. (2013). Comparison of the SF6D, the EQ5D, and the oswestry disability index in patients with chronic low back pain and degenerative disc disease. *BMC Musculoskeletal Disorders*, *14*(1), 148. doi:10.1186/1471-2474-14-148

Karimi, L., & Tan, H. (2020). Validation of the patient reported outcome measure of spiritual care (PROM) in an Australian setting. *Health and Social Care Chaplaincy*, *8*(1), 71–85. doi:10.155/hscc.40705

Linacre, J. M. (2006). WINSTEPS Rasch measurement computer program. Chicago: Winsteps.com.

Linacre, M. (1994). Reasonable mean-square fit values. Retrieved August 10, 2020, from https://www.rasch.org/rmt/rmt83b.htm

Linacre, J. M. (2011). *A users guide to WINSTEPS*. Chicago. Retrieved from http://ifile.hkedcity.net/1/001/950/public/Secondary/EI0020070012/winsteps.pdf.

Macdonald, G. (2017). The efficacy of primary care chaplaincy compared with antidepressants: A retrospective study comparing chaplaincy with antidepressants. *Primary Health Care Research & Development*, *18*(04), 354–312. doi:10.1017/S1463423617000159

Piotrowski, L. F. (2013). Advocating and educating for spiritual screening assessment and referrals to chaplains. *Omega*, *67*(1–2), 185–192. doi:10.2190/OM.67.1-2.v

Riklikienė, O., Spirgienė, L., Kaselienė, S., Luneckaitė, Ž., Tomkevičiūtė, J., & Büssing, A. (2019). Translation, cultural, and clinical validation of the lithuanian version of the spiritual needs questionnaire among hospitalized cancer patients. *Medicina*, *55*(11), 738. doi:10.3390/medicina55110738

Ripamonti, C. I., Giuntoli, F., Gonella, S., & Miccinesi, G. (2018). Spiritual care in cancer patients: A need or an option? *Current Opinion in Oncology*, *30*(4), 212–218. doi:10.1097/CCO.0000000000000454

Risjord, M., Moloney, M., & Dunbar, S. (2001). Methodological triangulation in nursing research. *Philosophy of the Social Sciences*, *31*(1), 40–59. doi:10.1177/004839310103100103

Saltzberger, T. (2012). The Rasch model and factor analysis: Complementary or mutually exclusive? *Rasch Measurement Transactions*, *26*(3), 1376–1378. http://www.rasch.org/rmt/rmt263a.htm.

Schatz, M., Kosinski, M., Yarlas, A. S., Hanlon, J., Watson, M. E., & Jhingran, P. (2009). The minimally important difference of the Asthma Control Test. *Journal of Allergy and Clinical Immunology*, *124*(4), 719–723. doi:10.1016/j.jaci.2009.06.053

Seamon, B. A., Kautz, S. A., & Velozo, C. A. (2019). Rasch analysis of the activities specific balance confidence scale in individuals poststroke. *Archives of Rehabilitation Research and Clinical Translation*, *1*(3–4), 100028. doi:10.1016/j.arrct.2019.100028

Snowden, A., Gibbon, A., & Grant, R. (2018). What is the impact of Chaplaincy in Primary Care? The GP perspective. *Health and Social Care Chaplaincy*, *6*(2), 200–214. doi:10.1558/hscc.34709HSCC

Snowden, A., Lobb, E. A., Schmidt, S., Swing, A. M., Logan, P., & Macfarlane, C. (2018). What's on your mind? The only necessary question in spiritual care. *Journal for the Study of Spirituality*, *8*(1), 19–33. doi:10.1080/20440243.2018.1431031

Snowden, A., & Telfer, I. J. M. (2017). A patient reported outcome measure of spiritual care as delivered by Chaplains. *Journal of Health Care Chaplaincy*, *23*(4), 131–125. doi:10.1080/08854726.2017.1279935

Snowden, A., Telfer, I. J., Kelly, E. K., Bunniss, S., & Mowat, H. (2013a). Spiritual care as person centred care: A thematic analysis of chaplain interventions. *The Scottish Journal of Healthcare Chaplaincy*, *16*, 25–35.

Snowden, A., Telfer, I. J., Kelly, E. K., Bunniss, S., & Mowat, H. (2013b). The construction of the Lothian PROM. *The Scottish Journal of Healthcare Chaplaincy*, *16*, 3–13.

Snowden, A., & Telfer, I. (2020). The Story of the Scottish PROM. In E. Kelly & J. Swinton (Eds.), *Chaplaincy and the Soul of Health and Social Care: Fostering Spiritual Wellbeing in Emerging Paradigms of Care* (pp. 67–89). London: Jessica Kingsley.

Steinhauser, K., King, H., Parker, R., & Kirshner, M. (2020). Developing a spiritual assessment tool for palliative care (GP791). *Journal of Pain and Symptom Management*, *60*(1), 299. doi:10.1016/j.jpainsymman.2020.04.218

Tan, H., Rumbold, B., Gardner, F., Snowden, A., Forest, A., Bossie, C., … Wyles, L. (2020). Understanding the outcomes of spiritual care as experienced by patients. *Journal of Health Care Chaplaincy*, *7* (26), 1–15. doi:10.1080/08854726.2020.1793095

Timmins, F., & Pujol, N. (2018). The role of healthcare Chaplains in resuscitation: A rapid literature review. *Journal of Religion and Health*, *57*(3), 1183–1195. doi:10.1007/s10943-018-0604-4

Vandenhoeck, A. (2013). Chaplains as specialists in spiritual care for patients in Europe. *Polskie Archiwum Medycyny Wewnetrznej*, *123*(10):552–557.

Walton, D. M., Mehta, S., Seo, W., & MacDermid, J. C. (2020). Creation and validation of the 4-item BriefPCS-chronic through methodological triangulation. *Health and Quality of Life Outcomes*, *18*(1), 1–9. doi:10.1186/s12955-020-01346-8

Winiger, F. (2020). "More than an intensive care phenomenon": Religious communities and the WHO Guidelines for Ebola and Covid-19. *Spiritual Care*, *9*(3), 245–255. doi:10.1515/spircare-2020-0066

Zumstein-Shaha, M., Ferrell, B., & Economou, D. (2020). Nurses' response to spiritual needs of cancer patients. *European Journal of Oncology Nursing*, *48*, 101792. doi:10.1016/j.ejon.2020.101792