

Title	Development and validation of the Spirituality Instrument-27© (Spl-27©) in individuals with chronic illness
Authors	Weathers, Elizabeth;Coffey, Alice;McSherry, Wilfred;McCarthy, Geraldine
Publication date	2020-07-13
Original Citation	Weathers, E., Coffey, A., McSherry, W. and McCarthy, G. (2020) 'Development and validation of the Spirituality Instrument-27© (Spl-27©) in individuals with chronic illness', Applied Nursing Research. doi: 10.1016/j.apnr.2020.151331
Type of publication	Article (peer-reviewed)
Link to publisher's version	10.1016/j.apnr.2020.151331
Rights	© 2020, Elsevier Inc. All rights reserved. This manuscript version is made available under the CC BY-NC-ND 4.0 license. - https://creativecommons.org/licenses/by-nc-nd/4.0/
Download date	2023-03-30 15:40:52
Item downloaded from	http://hdl.handle.net/10468/10583

Abstract

Aim: To develop and validate the Spirituality Instrument 27 (SpI-27©) in individuals with chronic illness (n=249).

Background: A need for a rigorously developed spirituality instrument that can be used with people who are religious and non-religious was identified.

Methods: The initial 46-item instrument was developed from a concept analysis, a review of theoretical and empirical literature, and an appraisal of instruments measuring spirituality. Content validity was established with user focus groups and an expert panel review. A pilot study evaluated the online mode of administration and a descriptive correlational design assessed the reliability and validity of the instrument.

Results: Results of exploratory factor analysis concluded a five-factor solution with 27 items: Connectedness with Others, Self-Transcendence, Self-Cognisance, Conservationism, and Connectedness with a Higher Power. Cronbach's alpha coefficients ranged from 0.823 to 0.911 for the five factors, and 0.904 for the overall scale. Paired t-tests, intra-class correlations, and weighted kappa values supported the temporal stability of the instrument. A significant and positive correlation was found between the SpI-27© and the Spirituality Index of Well-Being ($p < 0.01$), supporting convergent validity.

Conclusions: Findings support the validity and reliability of the SpI-27©, which was developed with patient input and is underpinned by theoretical and empirical literature. The SpI-27© should be validated for use with other samples. The conceptual framework that guided the study can be used to enhance healthcare professionals' understanding of spirituality and its core dimensions.

Keywords: spirituality, instrument, chronic illness, theoretical, mixed methods.

1. Introduction

Spirituality pervades all aspects of a person's life and is particularly prominent during key life events such as birth (Crowther and Hall, 2015), living with chronic illness (White, 2013; Francoeur et al., 2016), and for those who have been bereaved (Li et al., 2015). The importance of spirituality in nursing practice is being increasingly recognised in professional standards across the globe (e.g. Nursing and Midwifery Board of Ireland, 2009; Joint Commission International, 2001; Nursing and Midwifery Council, 2018). Spiritual care is important in the acute care setting (Lee and Kim, 2020) and for people with life limiting conditions and their carers (Selman et al., 2018). Addressing spiritual needs can result in alleviation of suffering, a sense of wellbeing, enhanced ability to adapt and cope with adversity, and a sense of peace and inner strength (Weathers et al., 2016). Yet, spirituality can often be overlooked in busy clinical practice settings (Austin et al., 2017). Better preparation of nurses is required to enable them to feel more prepared and confident in the delivery of spiritual care (Ross et al., 2018). However, it is difficult to develop and implement education programs without a common conceptual definition and assessment of spirituality.

Over several decades many definitions of spirituality (Murray and Zentner, 1989; Reed, 1992; Tanyi, 2002; McSherry et al., 2020) have been published and up until recently there was no real consensus reached. A turning point in this endeavour was the publication of Puchalski (2009, p887) definition of spirituality: *“an aspect of humanity that refers to the way individuals seek and express meaning and purpose and the way they experience their connectedness to the moment, to self, to others, to nature, and to the significant or sacred”*. This definition was developed as part of a rigorous process involving an international consensus panel. The definition has relevance to the whole of healthcare and especially for individuals experiencing a wide range of acute and chronic conditions. Chronic conditions are defined as *“the medical condition or health problem with symptoms or limitations that require long-term management”* (Freitas & Mendes, 2007, p. 592). Such individuals may be struggling to find meaning and purpose in their lives as their illness or disease endures over an extended timeframe. Therefore, this definition of spirituality is important because it captures many of the key attributes of spirituality, transcendence, relationships, meaning, purpose, fulfilment, and connection (McSherry, 2016). The fact that this definition has been adopted within a European context (European Association for Palliative Care, 2011) and nursing and midwifery education (McSherry et al., 2020) says something fundamental about its universality and generalisability.

Other concept analyses have concluded that spirituality is related to connection and meaning (Steinhauser et al., 2017) These themes are also reflected in a recent concept analysis conducted by Murgia et al., (2020) who suggest: *“Our society, complex and globalised, is made up of many facets of humanity and requires non-linear answers for non-linear, fuzzy needs that cannot be provided without having an overview of religious pluralism”* (p13). This quotation highlights the complexity of spirituality and the centrality of religious belief for some individuals. This finding also affirms the need to adopt an eclectic approach both to the study and assessment of spirituality. This is crucial if definitions of spirituality and the provision of spiritual care are to be inclusive embracing the diversity that exists within society.

In terms of instruments, spirituality is recognized as a multi-faceted concept that requires many instruments measuring different facets of spirituality (Büssing, 2017). Prior reviews have concluded that much of the research on spirituality has used measures of religiosity and there is a need for clinically-validated instruments that can be used with people who are both religious and non-religious (Austin et al., 2018; Büssing, 2017; de Jager Meezenbroek et al., 2012; Sessanna et al., 2011; Monod et al., 2011). Instruments currently available are considered too cumbersome for acute clinical settings and need to be flexible, adaptable, non-intrusive and not time-consuming (McSherry and Ross, 2002; Timmins and Neil, 2013).

In response to these concerns this study describes the development and validation of a new instrument, the Spirituality Instrument-27© (SpI-27©) that can capture some of the ‘fuzzy needs’ and can be used with religious or non-religious individuals. The SpI-27© is a theoretically sound instrument that was rigorously developed, guided by a conceptual framework of spirituality and with input from patients.

2. Methods

2.1 Design

This study was conducted in two phases (see Figure 1). Phase one focused on the first five steps of DeVellis’ approach (2016) and the second phase focused on step six, seven and eight.

INSERT FIGURE 1 HERE

2.1.1 Phase one: Item Generation and Content Validity

Step one defined the measurement constructs. A conceptual framework was developed from findings of a concept analysis of spirituality [Ref Withheld] and an appraisal of theories of spirituality (Howden, 1992; Frankl, 1988; Frankl, 2011; Reed, 1991; Miner-Williams, 2006) (see Figure 2), as recommended in instrument development literature (Netemeyer et al. 2003; Waltz et al., 2010; Streiner and Kottner, 2014). Spirituality was defined as a “*a way of being in the world in which a person feels a sense of connectedness to self, others, and/or a higher power or nature; a sense of meaning in life; and transcendence beyond self, everyday living, and suffering*” [Ref Withheld]. The framework guided the development of the instrument, which operationalised spirituality as connectedness, transcendence and meaning in life. Connectedness was conceptually defined as a relational manifestation of spirituality that incorporates a sense of connectedness with self (intrapersonal), other (interpersonal), and a Higher Power/the environment (transpersonal). It was operationally defined as the extent to which a person feels related to themselves, others, and a Higher Power or the environment. Transcendence was conceptually defined as a heightened sense of awareness that leads one to adopt new perspectives on everyday life. It was operationally defined as the extent to which a person can see the bigger picture and adopt a new perspective on life events. Meaning in life was conceptually defined as a process of searching for, or participating in events or relationships, that enhance a sense of personal significance, hope, and motivation for living. It was operationally defined as the extent to which a person perceives their life as meaningful.

INSERT FIGURE 2 HERE

An item pool was generated in the **second step**. Forty-six items were generated from two sources: (i) an appraisal of existing spirituality instruments and; (ii) a comprehensive review of theoretical and empirical

literature on spirituality. The appraisal also served to confirm that no single instrument existed that measured spirituality as defined by the conceptual framework. Table 1 provides an overview of the source of items and modifications or amalgamations. In total, 21 items measured connectedness, 13 items measured transcendence and 12 items measured meaning in life.

INSERT TABLE 1 HERE

The **third step** was to establish the measurement formation. A Likert scaling technique was used with a 5-point response format ranging from 1 (strongly disagree) to 5 (strongly agree) (DeVellis, 2016; Oppenheim, 1992). High scores on the scale represent higher levels of connectedness, transcendence and meaning in life and scores can be averaged to yield an individual score per participant (Oppenheim, 1992; Nunnally, 1967; Waltz et al., 2010). The instrument was structured in a manner that enhanced readability and ease of completion (Waltz et al., 2010; Cohen et al., 2011; Rattray and Jones, 2007; Spector, 2013) and the survey was administered online. Four items were negatively worded to minimise acquiescent response bias (Rattray and Jones, 2007).

In **step four**, the 46-item survey was evaluated by nine experts to establish content validity, internal consistency and clarity of items. Lynn's method of content validity was used (Lynn, 1986; DeVon et al., 2007; Polit and Beck, 2006). All the items had a Content Validity Index (CVI) of greater than 0.78 meeting the criteria for content validity beyond the 0.05 level of significance (Lynn, 1986). For the Connectedness and Meaning in Life subscales, apparent internal consistency was described by 100% of experts. For the Transcendence subscale, apparent internal consistency was described by 89% of experts. Twenty-one items were considered unclear and suggestions were made on how to improve the clarity of each item.

Following expert panel review, the 46-item instrument was evaluated by a subset of the development sample i.e. individuals with chronic illness. Three focus groups were conducted with three people in each group. Inclusion criteria was the same as criteria for the larger development sample. Four hours of focus group data were collected, transcribed and analysed. Findings were combined with recommendations from the expert panel review. As a result, 18 items were modified, 2 items were removed. The revised 44-item survey was subsequently administered to individuals with chronic illness (n=11) in a pilot study.

The **fifth step** was to establish convergent validity of the instrument, in which an item or scale is required to have an empirical association with some criterion or 'gold standard' (DeVellis, 2016). There is no gold standard measure of spirituality. However, the Spirituality Index of Well-Being (SIWB) (Daaleman and Frey, 2004) was most positively evaluated in several published reviews of spirituality instruments (De Jager Meezenbroek et al., 2012; Monod et al., 2011; Sessanna et al., 2011). The SIWB is a 12-item instrument that was designed to measure a person's perceptions of their spiritual quality of life. It is divided into two subscales: self-efficacy subscale and life-scheme subscale. The SIWB was administered to the development sample to establish convergent validity.

2.1.2 Phase two: Pilot Testing and Psychometric Evaluation

Step six was a pilot test to evaluate the mode of administration and to identify any further issues in terms of item clarity, survey content, layout, timing, ease of completion and presentation. The 44-item survey was administered online to a sample of people with chronic illness (n=11). All participants reported that it

was easy to complete, and items were easy to understand. Most participants (n=8) completed the survey in 10-15 minutes while two participants completed it in less than 10 minutes. The online mode of administration was positively evaluated by all participants. No further modifications to items were made based on the pilot data.

For the final **steps seven and eight**, the 44-item instrument was administered to a larger development sample and psychometrically evaluated. The statistical methods used are described in the statistical analysis section.

2.2 Sample

Based on the number of items (n=44) and sample size prerequisites for factor analysis, a sample of greater than 230 participants was deemed acceptable (Bryman and Cramer, 1999; O'Brien, 2007; Worthington and Whittaker, 2006). The population of interest for this study were individuals with a diagnosis of any type of chronic or long-term disease. Chronic diseases are a major challenge to global health and account for nearly two-thirds of deaths worldwide (Bauer et al., 2014; WHO, 2011). Convenience sampling was used to recruit individuals who met the following inclusion criteria:

- Aged 18 years or over;
- Have a diagnosis of, and be receiving treatment for, a non-malignant chronic disease e.g. hypertension, diabetes, chronic pain etc.

2.3 Data Collection

A web-based survey was used to reach a large sample of people with chronic illness with varying levels of spirituality. Data were collected, stored and collated using SurveyMonkey©. A link to the survey was distributed via online forums for people with various chronic diseases. These forums were chosen as representative of the most prevalent chronic illnesses. To ensure the maximum response rate, the survey link was re-posted once during data collection (Cohen et al., 2011). A sample of 249 people completed the online survey. Almost 78% (n=193) of respondents completed all items and 89.1% (n=222) of respondents completed at least 80% of items. Twenty-seven participants (>20% missing data) were excluded from data analysis, leaving a sample of 222 valid responses for item and factor analysis.

2.4 Statistical Analysis

2.4.1 Construct Validity (Item Analysis)

Each item was assessed using descriptive statistics, to determine whether it should be retained in the final version of the scale (scale refinement)¹. Following refinement of the items, the construct validity, convergent validity, test-retest reliability and internal consistency were evaluated (DeVon et al., 2007; Streiner, 2003, Waltz et al., 2010).

2.4.2 Construct Validity (Exploratory Factor Analysis)

Construct validity was determined using Williams et al. (2012) five-step method of exploratory factor analysis (EFA). The suitability of the data was assessed by examining the correlation matrix²; calculating

¹ Items were removed if they met any of the following criteria: > 80% missing data; Mean < 1.5 and > 4.5; Standard deviation < 1.0; Ceiling/floor effects > 80%; Skew/kurtosis coefficient > +/- 2.0; Inter-item correlation < 0.3 and > 0.8; Negative correlations with other subscale items; Corrected item-scale correlation < 0.2 and > 0.8; Increased Cronbach's alpha coefficient if item deleted (Byrne and Campbell 1999, DeVellis 2016, Dhurup et al. 2005, Netemeyer et al. 2003, Nunnally 1967, Polit and Beck 2012).

² Correlation coefficients between 0.30 and 0.80 were considered satisfactory (O'Brien 2007).

the Kaiser-Meyer Olkin (KMO) Measure of Sampling Adequacy³ (Kaiser, 1974); and examining Bartlett's Test of Sphericity⁴ (O'Brien, 2007; Williams et al., 2012). Principle Components Analysis (PCA) was used to extract factors (Pett et al., 2003; Worthington and Whittaker, 2006). To determine the number of factors to be extracted, Kaiser's criterion (retain factors with eigenvalues greater than 1; Kaiser, 1960); the Cattell Scree test (Osborne and Costello, 2004; O'Brien, 2007); and parallel analysis (Courtney, 2013; Garrido et al., 2013; Horn, 1965; Ruscio and Roche, 2012) were examined. An oblique method of rotation was used, namely Promax rotation with Kaiser normalisation (Osborne and Costello, 2005; Pett et al., 2003; Gaskin and Happell, 2014; Worthington and Whittaker, 2006).

2.4.3 Convergent Validity, Internal Consistency and Temporal Stability

Pearson's correlation was used to assess the relationship between the newly developed instrument and the 12-item SIWB (Daaleman and Frey, 2004). Cronbach's alpha coefficient was used to assess internal consistency and because the scale had more than 15 items, the mean inter-item correlations were also assessed (Streiner and Kottner, 2014). Temporal stability was assessed using test-retest reliability (DeVellis, 2016; Streiner and Kottner, 2014). The scale was administered to the development sample (n=249) and again 2 weeks later to a sub-sample of the development sample (n=70). Means and degree of agreement in ratings of individual participants on each of the items between Time 1 and Time 2 were examined using paired-sample t-tests, agreement percentage and a kappa coefficient (Cohen, 1960; Sim and Wright, 2005). Reference values provided by Altman (1991) were used (i.e. <0.20 = poor agreement, 0.21-0.40 = fair agreement, 0.41-0.60 = moderate agreement, 0.61-0.80 = good agreement, and 0.81-1.00 = very good agreement) to interpret coefficients. Intra-class correlation coefficients (ICCs) were also calculated for each subscale and for the total scale. ICC values were interpreted according to guidelines from Fleiss et al. (2003) (i.e. below 0.40 = poor, 0.40 to 0.59 = fair, 0.69 to 0.74 = good, and 0.75 to 1.00 = excellent).

2.5 Ethical Considerations

Ethical approval was granted by the Clinical Research Ethics Committee of the Cork Teaching Hospitals. For the focus groups in Phase 1, participants were given an information leaflet before participating. Those who wished to take part were asked to read and sign a consent form. For Phase 2, a gatekeeper was identified in each online forum who posted survey information for potential participants. A comprehensive information leaflet was integrated into the welcome screen of the web-based survey and it included the researcher's contact details. The requirement for consent was outlined in the welcome screen and participants were informed that by clicking 'NEXT' on the screen, they were consenting to participate in the study. All responses were stored in SurveyMonkey© and only the researcher had the username and password to access the data.

3. Results

3.1 Participants

Demographic, clinical and religious data on study participants are shown in Table 2 and Table 3. The sample was predominantly female (n=186, 86.5%) and over 80% (n=176) were aged between 26 and 55

³ Index ranges from 0 to 1; values greater than 0.50 were considered suitable for factor analysis (Hair et al. 1995; Tabachnick and Fidell 2007).

⁴ Test should be significant ($p < 0.05$) for data to be deemed suitable for factor analysis (Hair et al. 1995; Tabachnick and Fidell 2007).

years old. With regards to highest educational level achieved, almost 30% (n=64) had a university certificate or diploma while almost half 46.5%, (n=105) had a university degree or a postgraduate qualification. Most respondents (n=90, 43.1%) were employed on a part-time or full-time basis. However, a significant number of respondents (n=74, 35.4%) were unable to work due to permanent sickness. Almost half (n=92, 44.7%) earned less than €25,000, and more than half (n=112, 52.3%) were married. Most respondents described themselves as Roman Catholic (61.0%, n=133). Meanwhile, 15.2% (n=32) reported an agnostic belief system and 12.4% (n=26) reported an atheist belief system. Almost half of the sample (n=100, 47.6%) indicated that they did not engage in religious practices. Most respondents had a primary diagnosis of either chronic pain (n=75, 36.4%) or arthritis (n=71, 34.5%). Over 40% (n=95) rated their own health as good or very good while a further 32.4% (n=72) rated their health as fair.

INSERT TABLE 2 AND 3 HERE

3.2 Construct Validity

3.2.1 Item Analysis

Item analyses was undertaken to determine which items should be retained for factor analysis (n=222 with <20% missing data). Item means ranged from 3.11 to 4.35 on the 20-item connectedness scale; from 2.00 to 4.37 on the 12-item transcendence scale; and from 3.30 to 4.29 on the 12-item meaning in life scale. Nine items were removed from the initial 44-item instrument (see Table 4).

INSERT TABLE 4 HERE

3.2.2 Exploratory Factor Analysis

EFA was carried out for the 35 items selected by item analysis. The data was deemed suitable for EFA – 89% (n=222) of respondents had less than 20% missing data on items and less than 13% of data was missing per item, which is below the recommended 25% (O’ Brien, 2007). Hence, missing data were imputed using the Estimation Maximisation (EM) algorithm prior to conducting factor analysis.

Examination of the correlation matrix for factorability and multicollinearity showed that no correlations were greater than 0.80 and most correlations were greater than 0.3. The KMO index was high (0.884) and Bartlett’s Test of Sphericity was statistically significant ($p < 0.001$) indicating that the data was suitable for EFA.

3.2.2.1 Initial Factor Solution

Cattell’s Scree plot showed break points after 3, 4, and 5 factors (Figure 3) and results of parallel analysis showed raw data eigenvalues greater than the mean and percentile of actual data up until root number 5. Hence, 5 factors were extracted accounting for 56.3% of the variance. Principal components analysis was used for factor extraction, and most items loaded onto the first factor in the first unrotated principal component, indicating that there was a single underlying construct being measured.

INSERT FIGURE 3 HERE

3.2.2.2 Final Solution

An EFA was performed on the 35 eligible items, with 5 factors extracted and using an oblique promax rotation. Two items (‘I like sharing my experiences with others’ and ‘I have goals and aims for my life’) did not load onto any of the five factors (>0.4). The loadings and communalities of these two items were

examined and the item ‘I like sharing my experiences with others’ was removed, reducing the total number of items to 34 for the next repetition of EFA. These steps were repeated, and unsuitable items were removed (see Table 5). This continued until all items loaded sufficiently onto at least one factor, resulting in the removal of 8 items. There were 27 items in the final five-factor solution, accounting for 60.6% of the variance (Table 6). In the final solution almost all correlations between the factors were >0.15 , supporting the use of oblique rotation. More than half of the items in the final solution had communalities >0.6 .

INSERT TABLE 5 AND 6 HERE

3.2.2.3 Naming of Final Solution

The 27 items, arranged into the five factors, were distributed to an expert panel ($n=6$) to seek agreement on factor titles. The panel members were researchers within a nursing university, and each had either prior experience of undertaking factor analysis or had conceptual expertise in terms of spirituality. Factor 1 was labelled “Connectedness with Others”; factor 2 was labelled “Self-Transcendence”; factor 3 was labelled “Self-Cognisance”; factor 4 was labelled “Conservationism” and factor 5 was labelled “Connectedness with a Higher Power”.

3.3 Convergent Validity

Correlations between the developed scale and the SIWB scale (Cronbach’s $\alpha =0.932$) for participants with complete data on both scales ($n=187$), revealed a strong positive, statistically significant correlation ($r=0.674$, $p<0.01$). This indicated that both scales were measuring a similar construct.

3.4 Reliability

Internal consistency analysis was performed for participants with no missing data ($n=203$) on the final 27 items and missing data was not imputed. Alpha coefficients for each of the subscales ranged from 0.823 and 0.911, and the alpha coefficient for the overall scale was 0.904, indicating high internal consistency. Regarding test-retest reliability for the final 27 items, results of paired-sample t-tests showed excellent agreement overall ($ICC=0.83$) and no significant difference between means at Time 1 and Time 2 ($p>0.05$) on all subscales and the total scale (see Table 7).

INSERT TABLE 7 HERE

Discussion

This study meets a call in the literature for an instrument that is theoretically grounded, developed with future users, and can be used with both religious and non-religious people (Austin et al., 2018; Büssing, 2017; Mollica & Nemeth, 2013). The first phase involved the development of the SpI-27© instrument content and structure and included defining the constructs to be measured, generating an item pool, and establishing the measurement formation. The second phase of the study included pilot testing and psychometric evaluation of the instrument. Two hundred and forty-nine people with chronic illness completed the online survey. Almost 90% of the sample were aged between 18 and 55 years. This is not typical of the chronically ill population as the prevalence of chronic illness is said to increase with age (National Council on Aging, 2018). However, this can be attributed to the use of online chronic illness forums to collect data, which younger adults are more likely to use (Fox & Duggan 2013). Most participants identified as Roman Catholic with the next highest category being no religion. This is not surprising

considering the sample were predominantly Irish, and almost 80% of the Irish population are Roman Catholic (Central Statistics Office 2016). The sample included a mix of people who identified as believers (64.3%), agnostic (15.2%) and atheist (12.4%). More than half of respondents participated in religious practices. This study was the first to use an online mode of administration to examine spirituality in individuals with chronic illness. Advantages of internet research include rapid access to large and diverse populations not restricted by geographical location; respondent openness and full participation; reduced research costs; time-saving benefits; and reduction of human error in entering and processing data (Cohen et al. 2011; Fowler 2014).

Factor analysis showed that most items loaded onto one factor indicating that there is a single underlying construct being measured. A final 5-factor solution was extracted that was considerably different from the initial tri-dimensional conceptualisation of spirituality. Figure 4 provides an overview of the evolution of the Conceptual Framework of Spirituality.

INSERT FIGURE 4 HERE

The first factor “Connectedness with Others” was defined as the sense of belonging a person feels with others and with a larger society. The nine items within this factor pertained to time spent with friends and family, feelings of support from friends and family, ability to relate to others, and feeling part of a community. The second factor was labelled “Self-Transcendence” and defined as a person’s ability to use their own inner resources to reach a level of acceptance and adjustment during a difficult life event. The nine items within this factor related to the ability to deal with a difficult life event and to focus on the positive, the ability to accept life, beliefs about freedom to change one’s life, and the ability to accept death as a part of life. Factor three was labelled “Self-Cognisance” and defined as the extent to which a person feels connected to oneself. The four items in this factor pertain to time spent reflecting on life, and awareness of personal thoughts, feelings, and actions. Factor four was labelled “Conservationism” and defined as the extent to which a person feels connected to nature and the earth. The three items in this factor focus on concerns for the earth and a sense of responsibility to preserving the planet. The final factor was labelled “Connectedness with a Higher Power” and defined as the extent to which a person is aware of and feels related to a Higher Power. The two items in this factor pertained to an awareness of a Higher Power and praying to a Higher Power.

In the original conceptualisation, meaning in life and transcendence were identified as two distinct dimensions of spirituality. Yet, results of factor analysis suggested that the items developed to measure meaning in life measure connectedness with others, and transcendence. One potential explanation for this may be the difficulty in differentiating the dimension of meaning in life from the dimension of transcendence. Even Frankl (1985, 1988, 2011) does not explicitly differentiate the two, but says that transcendence of oneself can be achieved by finding meaning in life. It was evident from the literature that some people find meaning in life through connectedness with others and through transcendence of self and suffering (Baldacchino 2011; Glaw et al., 2017; Hedberg et al. 2009; Lancaster and Palframan 2009; Stavrova et al., 2016). Likewise, in Frankl’s Logotherapy (1985, 1988, 2011) it is postulated that people can find meaning in life, and achieve self-transcendence through experiential (what we experience in life e.g. connection with

others), creative (what we give back to the world e.g. our hobbies or work), and attitudinal (our attitude towards life events, and especially suffering) values. Hence, it could be argued that meaning in life is a consequence of spirituality rather than a core attribute. Further research is needed to establish the relationship between meaning in life, connectedness, and self-transcendence. Clarification of the relationship between self-transcendence and meaning in life would help to establish the contribution of the meaning in life variable in the measurement of spirituality.

Results revealed internal consistency values that are comparable with other spirituality instruments (Hvidt et al., 2016; Johnstone et al. 2016; Mthembu et al., 2016; Westbrook et al., 2018) and excellent test-retest reliability for the SpI-27©. The SpI-27© was developed from a new conceptual framework. This makes it difficult to compare the factor structure with prior instruments that measure other facets of spirituality such as spiritual care (Mthembu et al., 2016), closeness to the sacred (Westbrook et al., 2018); spiritual distress (Monod et al., 2010) etc. However, the final five factor structure explained more than 60% of the variance, which is comparable with other published spirituality instruments (Daaleman and Frey, 2004; Fisher 2016; Johnstone et al., 2016; Mthembu et al., 2016; Westbrook et al., 2018).

Limitations of this study included the homogeneity of the sample in terms of religion and culture. Future research should seek to validate the instrument in a more diverse group of people from different cultures and world religions. Additionally, further validation of the SpI-27© with patients in different clinical settings would accumulate evidence to identify clinically meaningful, scale cut-off points. The use of EFA is also a limitation of this study, given that EFA is considered a tentative rather than a definitive outcome, compared with confirmatory factor analysis (Fornaciari et al. 2005). Nonetheless, EFA is recommended for instruments that are still in the early stages of development (Fornaciari et al., 2005; Worthington and Whittaker, 2006). Confirmatory factor analysis should be conducted with larger and more diverse samples to test the factor structure of the SpI-27©.

Conclusion

The progress of spirituality research has been challenged by a lack of consensus on definitions and instruments. This research developed a new robust instrument to measure spirituality, guided by theoretical and empirical research on spirituality, and following a best practice mixed methodological design. The SpI-27© can be used with religious and non-religious populations to explore the relationship between spirituality and health-related variables such as quality of life, coping, stress, satisfaction with care etc. Initial psychometric analysis shows the SpI-27© to be valid and reliable in a sample of individuals with chronic illness. The conceptual framework that guided the study can be used to enhance healthcare professionals' understanding of spirituality and its core dimensions. Future research should strive to confirm the factor structure of the SpI-27© and its reliability amongst diverse populations.

References

Altman D.G. (1991) *Practical statistics for Medical Research*. Chapman & Hall Padstow, Cornwall.

Austin, P., Macleod, R., Siddall, P., McSherry, W., & Egan, R. (2017). Spiritual care training is needed for clinical and non-clinical staff to manage patients' spiritual needs. *Journal for the Study of Spirituality*, 7(1), 50-63.

Austin, P., Macdonald, J., & MacLeod, R. (2018). Measuring spirituality and religiosity in clinical settings: A scoping review of available instruments. *Religions*, 9(3), 70.

Baldacchino D. (2011) Myocardial infarction: A turning point in meaning in life over time. *British Journal of Nursing* 20(2), 107-114.

Bauer, U. E., Briss, P. A., Goodman, R. A., & Bowman, B. A. (2014). Prevention of chronic disease in the 21st century: elimination of the leading preventable causes of premature death and disability in the USA. *The Lancet*, 384(9937), 45-52.

Bryman A. & Cramer D. (1999) *Quantitative Data Analysis with SPSS Release 8 for Windows: A Guide for Social Scientists*. Taylor & Francis Group, London and New York.

Büssing, A. (2017) Measures of spirituality/religiosity—description of concepts and validation of instruments. *Religions*, 8(11), Doi: 10.3390/rel8010011.

Byrne B.M. & Campbell T.L. (1999) A look beneath the surface cross-cultural comparisons and the presumption of equivalent measurement and theoretical structure. *Journal of Cross-Cultural Psychology* 30(5), 555-574.

Central Statistics Office (2016) Census of Population 2016 – Profile 8 Irish Travellers, Ethnicity and Religion. Available from: <https://www.cso.ie/en/releasesandpublications/ep/p-cp8iter/p8iter/> (accessed 24th October 2019).

Cohen J. (1960) A coefficient of agreement for nominal scales. *Educational and Psychological Measurement* 20(1), 37–46.

Cohen L., Manion L. & Morrison K. (2011) *Research Methods in Education* 7th Edition. Routledge New York.

Courtney M.G.R. (2013) Determining the number of factors to retain in EFA: using the SPSS R-Menu v2 0 to make more judicious estimations. *Practical Assessment Research & Evaluation* 18(8), 1-14.

Crowther, S. & Hall, J. (2015) Spirituality and spiritual care in and around childbirth. *Women and Birth* 28 173 -178.

Daaleman T.P. & Frey B.B. (2004) The Spirituality Index of Well-Being: a new instrument for health-related quality-of-life research. *Annals of Family Medicine* 2(5), 499-503.

De Jager Meezenbroek, E., Garssen, B., van den Berg, M., Van Dierendonck, D., Visser, A., & Schaufeli, W. B. (2012). Measuring spirituality as a universal human experience: A review of spirituality questionnaires. *Journal of religion and health*, 51(2), 336-354.

DeVellis, R. F. (2016). *Scale development: Theory and applications* (Vol. 26). Sage publications.

DeVon H.A., Block M.E., Moyle-Wright P., Ernst D.M., Hayden S.J., Lazzara D.J. & Kostas-Polston E. (2007) A psychometric toolbox for testing validity and reliability. *Journal of Nursing Scholarship* 39(2), 155-164.

- Dhurup M., Venter P.F. & Oosthuizen A. (2005) A factor analytical service quality measurement scale for supermarkets in South Africa. *Journal of Economic and Management Sciences* 8(2), 140.
- European Association for Palliative Care. (2011). "Spiritual Care." Available from: <https://www.eapcnet.eu/eapc-groups/reference/spiritual-care> (accessed 18 November 2019).
- Fisher, J. (2016). Selecting the best version of SHALOM to assess spiritual well-being. *Religions*, 7(5), 45.
- Fleiss J.L., Levin, B. & Paik M.C. (2003) *Statistical Methods for Rates and Proportions* 3rd ed. John Wiley, Hoboken, NJ.
- Fornaciari C.J., Sherlock J.J., Ritchie W.J. & Dean K.L. (2005) Scale development practices in the measurement of spirituality. *International Journal of Organizational Analysis* 13(1), 28-49.
- Fowler F.J. (2014) *Survey Research Methods*. Sage Publications, California.
- Fox S. & Duggan M. (2013) *Health Online Pew Research Center's American Life Project*. Available from: <http://bibliobasesermaispt:8008/BiblioNET/Upload/PDF5/003820pdf> (accessed 24th October 2019).
- Francoeur, R. B., Burke, N. & Wilson, A. M. (2016) The role of social workers in spiritual care to facilitate coping with chronic illness and self-determination in advance care planning. *Social Work in Public Health* 31, (5), 453–466.
- Frankl V.E. (1985) *Man's Search for Meaning*. Simon and Schuster, New York.
- Frankl V.E. (1988) *The Will to Meaning: Foundations and Applications of Logotherapy*. New American Library, New York.
- Frankl V.E. (2011) *Man's Search for Ultimate Meaning*. Random House Group Limited, Chatham.
- Freitas, M. C., & Mendes, M. M. R. (2007). Chronic health conditions in adults: Concept analysis. *Rev Latinoam Enfermagem*, 15(4), 590-597.
- Garrido L.E., Abad F.J. & Ponsoda V. (2013) A new look at Horn's parallel analysis with ordinal variables. *Psychological Methods* 18(4), 454.
- Gaskin C.J. & Happell B. (2014) On exploratory factor analysis: a review of recent evidence an assessment of current practice and recommendations for future use. *International Journal of Nursing Studies* 51(3), 511-521.
- Glaw, X., Kable, A., Hazelton, M., & Inder, K. (2017). Meaning in life and meaning of life in mental health care: An integrative literature review. *Issues in Mental Health Nursing*, 38(3), 243-252.
- Hair J., Anderson R., Tatham R. & Black W. (1995) *Multivariate Data Analysis* (4th ed). Prentice Hall, Upper Saddle River, NJ.
- Hedberg P., Brulin C. & Aléx L. (2009) Experiences of purpose in life when becoming and being a very old woman. *Journal of Women & Aging* 21(2), 125-137.
- Horn J.L. (1965) A rationale and test for the number of factors in factor analysis. *Psychometrika* 30, 179-185.
- Howden J. (1992) *Development and psychometric characteristics of the Spirituality Assessment Scale*. Unpublished doctoral dissertation, Texas Women's University, Denton Texas USA.

Hvidt, N.C., Kappel Kørup, A., Curlin, F.A., Baumann, K., Frick, E., Søndergaard, J., ... & Ramakrishnan, P. (2016). The NERSH international collaboration on values, spirituality and religion in medicine: development of questionnaire, description of data pool, and overview of pool publications. *Religions*, 7(8), 107.

Johnstone, B., Bhushan, B., Hanks, R., Yoon, D. P., & Cohen, D. (2016). Factor structure of the brief multidimensional measure of religiousness/spirituality in US and Indian samples with traumatic brain injury. *Journal of Religion and Health*, 55(2), 572-586.

Joint Commission International (2001) *Spiritual assessment. In Standards Frequently Asked Questions*. Available from: http://www.jointcommission.org/standards_information/jcfaqdetails.aspx?StandardsFaqId=290&ProgramId=47 (accessed 24th October 2019).

Kaiser H.F. (1974) An index of factorial simplicity. *Psychometrika* 39(1), 31-36.

Lancaster B.L. & Palframan J.T. (2009) Coping with major life events: the role of spirituality and self-transformation. *Mental Health Religion and Culture* 12(3), 257-276.

Lee G.E. & Kim, K.M. (2020) Analysis of spiritual care experiences of acute-care hospital nurses. *Korean Journal Hospital Palliative Care* 23(2), 44-54.

Li, J., Chan, J.S.M., Chow, A.Y.M., Yuen, L.P. & Chan, C.L.W. (2015) From body to mind and spirit: qigong exercise for bereaved persons with chronic fatigue syndrome-like illness. *Evidence-Based Complementary and Alternative Medicine*, Volume 2015, Doi: <http://dx.doi.org/10.1155/2015/631410>.

Lynn M.R. (1986) Determination and quantification of content validity. *Nursing Research* 35(6), 382-386.

McSherry, W. (2016). Reintegrating Spirituality and Dignity in Nursing and Health Care: A Relational Model of Practice. In *Stories of Dignity Within Healthcare: Research, Narratives and Theories*, Edited by O. Tranvåg, O., Synnes, O. & McSherry, W., p75–96. Keswick: M&K Publishing.

McSherry W. & Ross L. (2002) Dilemmas of spiritual assessment: considerations for nursing practice. *Journal of Advanced Nursing* 38(5), 479-488.

McSherry, W., Ross, L., Attard, J., van Leeuwen, R., Giske, T., Kleiven, T., Boughey, A and the EPICC Network (2020) Preparing undergraduate nurses and midwives for spiritual care: Some developments in European education over the last decade. *Journal for the Study of Spirituality* 10(1), 55-71.

Miner-Williams D. (2006) Putting a puzzle together: making spirituality meaningful for nursing using an evolving theoretical framework. *Journal of Clinical Nursing* 15(7), 811-821.

Mollica M. & Nemeth L. (2013) Spirituality measurement in African American cancer survivors: a critical literature review. *Journal of Holistic Nursing* 31(3), 214-225.

Monod, S. M., Rochat, E., Büla, C. J., Jobin, G., Martin, E., & Spencer, B. (2010). The spiritual distress assessment tool: an instrument to assess spiritual distress in hospitalised elderly persons. *BMC Geriatrics*, 10(1), 88.

Monod, S., Brennan, M., Rochat, E., Martin, E., Rochat, S., & Büla, C. J. (2011). Instruments measuring spirituality in clinical research: a systematic review. *Journal of general internal medicine*, 26(11), 1345.

Mthembu, T. G., Roman, N. V., & Wegner, L. (2016). An exploratory factor analysis into the applicability of the Spirituality Care-Giving Scale, the Spirituality Care Rating Scale and the Spirituality in Occupational Therapy Scale to the South African context. *South African Journal of Occupational Therapy*, 46(1), 74-82.

Murgia, C., Notarnicola, I., Rocco G., & Stievano, A (2020). Spirituality in nursing: A concept analysis. *Nursing Ethics*, 1 – 17 Doi: <https://doi.org/10.1177%2F0969733020909534>.

Murray, R.B. & Zentner, J.B. (1989) *Nursing Concepts for Health Promotion*. Prentice Hall: London.

National Council on Aging (2018) Healthy Aging, Fact Sheet. Available from: <https://www.ncoa.org/resources/fact-sheet-healthy-aging/> (Accessed 23rd June 2020).

Netemeyer R.G., Bearden W.O. & Sharma S. eds. (2003) *Scaling procedures: Issues and Applications*. Sage.

Nunnally J.C., Bernstein I.H. & Berge J.M.T. (1967) *Psychometric Theory* (Vol 226). McGraw-Hill, New York.

Nursing and Midwifery Board of Ireland (2009) *Professional Guidance for Nurses Working with Older People*. Available from: <https://www.nmbi.ie/NMBI/media/NMBI/working-with-older-people.pdf?ext=.pdf> (accessed 24th October 2019).

Nursing and Midwifery Council (2018) Standards for pre-registration nursing education. Available from: <https://www.nmc.org.uk/standards/standards-for-nurses/standards-for-pre-registration-nursing-programmes/> (accessed 23rd June 2020).

O' Brien R.M. (2007) A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity* 41(5), 673-690.

Oppenheim A.N. (1992) *Questionnaire Design and Attitude Measurement*. Bloomsbury Publishing.

Osborne J.W. & Costello A.B. (2004) Sample size and subject to item ratio in principal components analysis. *Practical Assessment Research & Evaluation* 9(11).

Pett M.A., Lackey N.R. & Sullivan J.J. (2003) *Making Sense of Factor Analysis: The Use of Factor Analysis for Instrument Development in Health Care Research*. Sage.

Polit D.F. & Beck C.T. (2006) The content validity index: are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health* 29(5), 489-497.

Polit D.F. & Beck C.T. (2012) *Nursing Research: Generating and Assessing Evidence for Nursing Practice*. Lippincott Williams & Wilkins, Philadelphia.

Puchalski, C. M. (2009). Physicians and Patients' Spirituality: Ethical Concerns and Boundaries in Spirituality and Health. *AMA Journal of Ethics*, 11(10), 804-815.

Rattray J. & Jones M.C. (2007) Essential elements of questionnaire design and development, *Journal of Clinical Nursing* 16(2), 234-243.

Reed P.G. (1991) Toward a nursing theory of self-transcendence: Deductive reformulation using developmental theories. *Advances in Nursing Science* 13(4), 64-77.

Reed, P. (1992) An emerging paradigm for the investigation of spirituality in nursing. *Research in Nursing and Health*, 15 349 – 357.

Ross, L., McSherry, W., Giske, T., van Leeuwen, R., Annemiek Schep-Akkerman, A., Koslander, T., Jenny Hall, J., Østergaard Steinfeldt, V., & Paul J.P. (2018). Nursing and midwifery students' perceptions of spirituality, spiritual care, and spiritual care competency: A prospective, longitudinal, correlational European Study. *Nurse Education Today* 67: 64–71.

Ruscio J. & Roche B. (2012) Determining the number of factors to retain in an exploratory factor analysis using comparison data of known factorial structure. *Psychological Assessment* 24(2), 282.

Selman, L.E., Brighton, L.J., Sinclair, S., Karvinen, I., Egan, R., Speck, P., Powell, R.A. et al. (2018). Patients' and caregivers' needs, experiences, preferences and research priorities in spiritual care: A focus group study across nine countries. *Palliative Medicine*, 32(1), 216–230.

Sessanna, L., Finnell, D. S., Underhill, M., Chang, Y. P., & Peng, H. L. (2011). Measures assessing spirituality as more than religiosity: A methodological review of nursing and health-related literature. *Journal of Advanced Nursing*, 67(8), 1677-1694.

Sim J. and Wright C.C. (2005) The Kappa Statistic in reliability studies: use interpretation and sample size requirements. *Physical Therapy* 85(3), 257– 268.

Spector, P.E. (2013) *Research Designs (Quantitative Applications in the Social Sciences)*. Sage Publications: London.

Stavrova, O., & Luhmann, M. (2016). Social connectedness as a source and consequence of meaning in life. *The Journal of Positive Psychology*, 11(5), 470-479.

Steinhauser K.E., Fitchett G., Handzo G.F, Johnson K.S., Koenig H.G., Pargament K.I., Puchalski C.M., Sinclair S., Taylor E.J., and Balboni T.A. (2017) State of the science of spirituality and palliative care research part I: definitions, measurement, and outcomes. *Journal of Pain and Symptom Management*. 54(3): 428-440.

Streiner D.L. (2003) Starting at the beginning: an introduction to coefficient alpha and internal consistency *Journal of Personality Assessment* 80(1), 99-103.

Streiner D.L. & Kottner J. (2014) Recommendations for reporting the results of studies of instrument and scale development and testing. *Journal of Advanced Nursing* 70(9), 1970-1979.

Tabachnick B. & Fidell (2007) *Using Multivariate Statistics* 5th Edition Pearson Education, CA.

Tanyi, R, A. (2002) Towards clarification of the meaning of spirituality. *Journal of Advanced Nursing*, 39 (5), 500 – 509.

Timmins F. & Neill F. (2013) Teaching nursing students about spiritual care—A review of the literature *Nurse education in practice* 13(6), 499-505.

Waltz C., Strickland O.L. & Lenz E. (2010) *Measurement in Nursing and Health Research: Fourth Edition* Springer Publishing Company, NY.

Weathers, E., McCarthy, G., & Coffey, A. (2016). Concept analysis of spirituality: An evolutionary approach. *Nursing Forum* (Vol. 51, No. 2, pp. 79-96).

Westbrook, C. J., Davis, D. E., McElroy, S. E., Brubaker, K., Choe, E., Karaga, S., ... & Hook, J. (2018). Trait sources of spirituality scale: Assessing trait spirituality more inclusively. *Measurement and Evaluation in Counseling and Development*, 51(2), 125-138.

White M, L. (2013) Spirituality self-care effects on quality of life for patients diagnosed with chronic illness self-care. *Dependent-Care & Nursing* 20 (10) 23 – 32.

Williams B., Brown T. & Onsmann A. (2012) Exploratory factor analysis: A five-step guide for novices. *Australasian Journal of Paramedicine* 8(3), 1.

Worthington R.L. & Whittaker T.A. (2006) Scale development research a content analysis and recommendations for best practices. *The Counseling Psychologist* 34(6), 806-838.