

# Validation of the Persian version of the Daily Spiritual Experiences Scale (DSES) in Pregnant Women: A Proper Tool to Assess Spirituality Related to Mental Health

Mohsen Saffari<sup>1,2</sup> · Hossein Amini<sup>3</sup> · Zarindokht Sheykh-oliya<sup>2</sup> · Amir H. Pakpour<sup>4,8</sup> · Harold G. Koenig<sup>5,6,7</sup>

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**Abstract** Assessing spirituality in healthy pregnant women may lead to supportive interventions that will improve their care. A psychometrically valid measure such as the Daily Spiritual Experiences Scale (DSES) may be helpful in this regard. The current study sought to adapt a Persian version of DSES for use in pregnancy. A total of 377 pregnant women were recruited from three general hospitals located in Tehran, Iran. Administered scales were the DSES, Duke University Religion Index, Santa Clara Strength of Religious

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✉ Mohsen Saffari  
m.saffari@bmsu.ac.ir; Saffari.CHESS@gmail.com

Hossein Amini  
hamini2005@gmail.com

Zarindokht Sheykh-oliya  
z-olia@bmsu.ac.ir

Amir H. Pakpour  
pakpour\_amir@yahoo.com

Harold G. Koenig  
Harold.Koenig@duke.edu

<sup>1</sup> Health Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran

<sup>2</sup> Health Education Department, School of Health, Baqiyatallah University of Medical Sciences, Tehran, Iran

<sup>3</sup> Department of Epidemiology, School of Public Health, Iran University of Medical Sciences, Tehran, Iran

<sup>4</sup> Social Determinants of Health Research Center, Qazvin University of Medical Sciences, Qazvin, Iran

<sup>5</sup> Professor of Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, NC, USA

<sup>6</sup> King Abdulaziz University, Jeddah, Saudi Arabia

<sup>7</sup> Ningxia Medical University, Yinchuan, China

<sup>8</sup> Department of Nursing, School of Health and Welfare, Jönköping University, Jönköping, Sweden

Faith scale, and Depression Anxiety Stress Scale, as well as demographic measures. Reliability of the DSES was tested using Cronbach's alpha for internal consistency and the intraclass correlation coefficient (ICC) for test–retest stability. Scale validity was assessed by criterion-related tests, known-groups comparison, and exploratory factor analysis. Participant's mean age was 27.7 (4.1), and most were nulliparous (70%). The correlation coefficient between individual items on the scale and the total score was greater than 0.30 in most cases. Cronbach's alpha for the scale was 0.90. The ICC for 2-week test–retest reliability was high (0.86). Relationships between similar and dissimilar scales indicated acceptable convergent and divergent validity. The factor structure of the scale indicated a single factor that explained 59% of the variance. The DSES was found to be a reliable and valid measure of spirituality in pregnant Iranian women. This scale may be used to examine the relationship between spirituality and health outcomes, research that may lead to supportive interventions in this population.

**Keywords** Spiritual health · Religion · Pregnancy · Validity

## Introduction

Spirituality/religiosity (SR) has been associated with better mental health, health-related behaviors, and increased quality of life (Chester et al. 2006; Moon and Kim 2013; Weber and Pargament 2014). During recent decades, researchers have focused on the role of SR on health in specific populations, including those with general medical illness, cancer, end-stage renal disease, and a variety of health conditions. These studies indicate that SR may have a considerable impact on health status and well-being (Lucchetti et al. 2013; Selman et al. 2011). Improvement in cognitive function, reduction in stress level, decrease in anxiety and depression, as these studies have found, are important outcomes related to SR that may lead to the maintenance of physical functioning, improved self-efficacy, and increased self-esteem (and buffering of the negative effects of a variety of health conditions) (Pargament 2013).

Lack of instruments to measure SR and failure to differentiate between the spirituality and religiosity have been recognized as limitations to understanding how these constructs are related to health outcomes (Lucchetti et al. 2013). Many studies measure SR together as a single construct, while others distinguish spirituality from religion and assess them separately. For example, religiosity has sometimes been defined as a specific set of behavioral, social, and institutional indicators reflecting group-related activities (Hill and Pargament 2003), whereas spirituality is defined as the meaning and purpose behind life (Moreira-Almeida and Koenig 2006). However, these concepts are closely linked together and have justified their being assessed together.

As noted above, people with specific health conditions that may challenge their ability to cope may derive particular benefit from SR resources. As a more vulnerable population, women tend to be involved in the S/R more so than males (Flannelly and Galek 2006). A number of studies of women with chronic medical disorders have found better coping and mental health among those with spiritual beliefs (Boscaglia et al. 2005; Fallot and Heckman 2005). In pregnancy, which may be considered a chronic condition, women experience a wide range of physical and psychological events that predispose them to mental health problems such as anxiety and depression (Staneva et al. 2015). For example,

pregnant women are exposed to a new physiologic state with special requirements regarding nutrition, exercise, and overall lifestyle, as well as having to deal with fears related to delivery and child birth. Therefore, spirituality may help these women to overcome life challenges by providing them with a source of support. Several studies have now investigated the role of SR in the health of pregnant women and reported positive outcomes (Breen et al. 2006; Jesse et al. 2007). Pregnancy may be an opportunity to expand thinking or renew feelings about their spiritual beliefs, which might ultimately protect them from negative health outcomes.

A considerable body of literature, largely from Western countries, exists on the relationship between spiritual involvement and health outcomes. Therefore, most of the information has been collected from Christians or Jews. Examining these relationships in other religions or cultures has now become a high priority (Koenig 2011). There has only been limited research on these relationships in Muslim countries, a group that makes up nearly one-quarter of the world's population (Pew Research Center 2016). One reason for this may be a lack of reliable, valid measures of SR. The Daily Spiritual Experiences Scale (DSES) has been widely recognized as a reliable and valid measure of religious and spiritual experiences in daily life. The primary purpose for developing the measure was to examine the relationship between spirituality and well-being (Loustalot et al. 2011; Underwood and Teresi 2002). Although the feasibility and usefulness of the full 16-item version and 6-item version of this instrument in non-English-speaking populations have been documented (Bailly and Roussiau 2010; Kimura et al. 2012; Ng et al. 2009), and have found the DSES to be a unidimensional scale with demonstrated validity and reliability, the function of the measure when administered in Persian-speaking countries has received little attention. Thus, we decided in the current study to develop a culturally adapted Persian version of the 16-item DSES and test its psychometric properties in a group of healthy pregnant women. The full version of the DSES was chosen above the 6-item version because it may provide a more comprehensive assessment of daily spiritual experiences.

## Materials and Methods

### Sample and Setting

A convenience sample of pregnant women was recruited from three general hospitals across Tehran city between February and March 2015. The sample size was calculated to obtain a sufficient number of participants for factor analysis, according to Comrey and Lee (Comrey and Lee 1992). They classified the sample adequacy for factor analysis into five classes: poor = 100, fair = 200, good = 300, very good = 500, and excellent  $\geq$  1000. Pregnant Muslim women aged 18 or older with a gestational age of 6–36 weeks who spoke Persian were included in the sample. Illiterate women or those with a severe chronic physical, mental, or cognitive disorder or had a history of abortion or stillbirth were excluded. Participants were approached by a trained midwife and asked to complete the questionnaire at the time of their visit to the hospital for prenatal care. The objectives of the study were fully explained to participants before data collection, and confidentiality was guaranteed by researchers. All respondents provided consent to participate in the study before proceeding. The study was approved by institutional review board of Baqiyatallah University of Medical Sciences.

## DSES and Cultural Adaptation

The DSES was originally developed by Underwood as part of a workgroup convened by the Fetzer Institute (Fetzer Institute: National Institute on Aging Working Group 1999). Psychometric characteristics of the DSES were presented later in a paper by Underwood and Teresi (2002). The DSES assesses every day experiences related to closeness to God or perceptions of the transcendent across a range of religious traditions and beliefs (Underwood and Teresi 2002). Most questions in this 16-item measure (15 of 16) have response options ranging from “many times a day” (1) to “never” (6) on a Likert-type scale, and one item has responses ranging from “as close as possible” (1) to “not at all” (4). With reverse coding of the items, higher scores indicate a higher frequency of daily spiritual experiences. Psychometric testing of the measure in previous studies has established its reliability and validity in a variety of populations (Loustalot et al. 2006; Wyatt et al. 2009). The English version of the DSES was translated into Persian using the methodology described by Beaton et al. (2000). First, two independent translators, experts in health education and SR research, translated the English version into Persian. Translators were native Persian speakers but were fluent in the English language. Second, an expert panel was convened to arrive at a consensus for the Persian translation. Disagreement between the two translations was discussed with translators and members of the research team. Third, two additional translators who were bilingual and not familiar with the questionnaire performed translation of the Persian version back into English. Both were English teachers and blinded to the original version of the questionnaire. This ensured that the content of the Persian version was similar to the original English version. Fourth, a second panel of experts including three health professionals, two specialists in SR research, and one epidemiologist discussed the cross-cultural comparability of the questionnaire. Discrepancies between the original version and the Persian version were resolved. In addition, ambiguities or uncertainties in the content were discussed with the original developer of the DSES and these were resolved to come up with a semi-final Persian version. Finally, the resulting DSES was administered to 15 pregnant women with a mean age of 26.7 (SD = 2.4) who were not included in the main study. A trained midwife asked participants to complete the questionnaire and provide feedback regarding difficulty in understanding or wording. After minor changes in the items to improve clarity and distinctness, the final Persian version was arrived at and submitted to the original developer for approval.

## Other Measures

### *Socio-Demographics*

Data on age, duration of marriage, trimester of pregnancy, accommodation, employment, education level, parity status, contraceptive use before pregnancy, willingness for pregnancy, subjective perception regarding economic situation of the family, and life satisfaction were collected using a demographic questionnaire.

### **Duke University Religion Index (DUREL)**

The DUREL is a 5-item measure that assesses organizational religiosity (ORA) (i.e., participation in group religious activities), non-organizational religiosity (NORA) (i.e., performance of private religious activities), and intrinsic religiosity (IR) (i.e., relationship

with God as primary motivation in life). ORA and NORA are assessed by single items with a 6-point Likert response options. IR is assessed with 3 items each with a 5-point response option ranging from definitely not true (1) to definitely true (5). Koenig, the original developer of the scale, suggested computing the scores of each dimension separately; however, the dimensions may also be combined to arrive at a total score ranging from 5 to 27. Higher scores indicate higher religiosity. The psychometric properties of the Persian version of the DUREL have been established in prior studies and have been found to be a reliable and valid measure of religiosity (Saffari et al. 2013).

### **Santa Clara Strength of Religion Faith (SCSORF)**

The 10-item SCSORF was originally developed by Plante and Boccaccini in 1997 to broadly measure both religiosity and spirituality, including the role that a higher being (God) plays in a person's life. The items are rated on a 4-point Likert scale ranging from strongly disagree (1) to strongly agree (4). When items are summed, higher scores indicate greater religious faith. The SCSORF has acceptable internal consistency and validity when used in Persian-speaking people (Pakpour et al. 2014).

### **Depression Anxiety Stress Scale (DASS)**

The DASS is a 42-item scale designed to evaluate depression, anxiety, and overall psychological stress. Each of the three dimensions is assessed using 14 items with 4-point response options, with the frequency and severity of symptoms measured during the past week. Items are summed to compute score for each domain. There are also cut-points for each domain that categorizes scores into normal, mild, moderate, severe, and extremely severe. The English version of the DASS has been translated several times into Persian and its psychometric properties established. The version used in the present study was that of Sahebi, which has particularly strong psychometric properties (Sahebi 2004).

### **Psychometric Properties of the DSES**

The validity of the DSES was assessed using criterion-related and known-groups methods. Since the DUREL and SCSORF measure SR, we hypothesized that there should be a significant correlation between the DSES and these scales, demonstrating convergent validity. The DASS was selected to examine the associations between DSES and related psychological constructs (depression, anxiety, and stress) in order to establish divergent validity. The ability of the scale to differentiate between subgroups of the sample in terms of age, morbidity, pregnancy willingness, life satisfaction, and other psychological states, to demonstrate known-groups validity. Construct validity was further assessed by determining the factor structure of the scale. The internal consistency of the scale was examined using Cronbach's alpha and item-to-total score correlations (ITC). Finally, the stability of the scale over time was determined by the intraclass correlation coefficient (ICC) in 25 healthy pregnant women across a 2-week interval.

### **Statistical Analysis**

Descriptive analysis was used to summarize categorical (number and frequency counts) and continuous variables (mean and standard deviation) across the sample. To identify the

relationship between individual items of the DSES and the total score, the Pearson correlation coefficient was used to determine the ITC. An ITC of 0.30 or greater is considered acceptable. The Cronbach's alpha was used to determine the internal consistency of the scale, and values of 0.70 or higher are considered acceptable. For test–retest reliability, an ICC value of 0.85 or higher considered acceptable stability. Associations between other scales and the DSES were calculated using the Spearman correlation coefficient. Comparisons between subgroups were made using the Student's *t* test and one-way analysis of variance (ANOVA). Floor and ceiling effects were assessed for skewness of responses. If a floor or ceiling effect is greater than 15%, the distribution of responses may be skewed and require transformation to meet the normality assumptions (Hays et al. 1998). Exploratory factor analysis (EFA) with principal components and varimax rotation was applied to assess dimensionality. To conduct the EFA, sample adequacy was determined using the Kaiser–Meyer–Olkin (KMO) index. KMO indices of 0.60 are considered sufficient for factor analysis. In addition, Bartlett's test of sphericity was used to assess the correlation matrix for factorability of the data. The Kaiser–Guttman rule along with scree plot was applied to extract the factors from the scale. Data were analyzed by SPSS software, version 20, for Windows (IBM Statistics). Significance level was set at *p* less than 0.05.

## Results

The majority of respondents (71.6%) were of age 25 years or older, and their mean age was 27.7 (SD = 4.1) (Table 1). Participants were married for an average of 4.8 (SD = 4.4) years, nearly half were in the first trimester of their pregnancy, and 70% were in their first pregnancy. Only 15% of the participants reported having a job; most were homemakers. Approximately two-thirds of the sample had a university education, although only one-fifth (20%) of respondents described their family income as good. Despite this, a majority of women (68%) indicated that they were satisfied with their lives.

Descriptive analysis of the DSES items is presented in Table 2. The item with lowest mean compared to other items with six response options was item 14 (“I accept others even when they do things I think are wrong”). All items had ITC's of 0.30 or greater except for #15 (0.27) and #16 (0.28). The mean score of the overall scale was 76.4 (SD = 11.1). Cronbach's alpha for full scale was 0.90, and when individual items were deleted, the scale alpha ranged from 0.88 to 0.90. The ICC was 0.86 in the 25 participants who completed the DSES 2 weeks apart. Floor and ceiling effects for the total scale were 0 and 0.8%, respectively.

The results for the assessment of criterion validity are presented in Table 3. Significant positive associations were found with similar scales (DUREL and SCSORF), whereas relatively weak negative correlations were found with depression, anxiety, and stress, indicating convergent and divergent validity. Among SR measures, the strongest correlation with the DSES was found for the SCSORF ( $r = 0.422$ ) and weakest correlation with the organizational religiosity item from the DUREL ( $r = 0.12$ ).

The DSES differentiated between several subgroups of the sample (Table 4). Pregnant women who were older, lived in cities, had chronic disorders, desired to become pregnant, were satisfied of their lives, and had lower scores on depression, anxiety, and stress scored higher on the DSES. According to the DASS, 24.7, 44.4, and 25.7% of respondents had some degrees of depression, anxiety, and stress symptoms, respectively.

**Table 1** Characteristics of the sample ( $n = 377$ )

Variables	<i>n</i>	%
<i>Age (years)</i>		
<25	107	28.4
≥25	270	71.6
<i>Marital duration (years)</i>		
<5	274	72.7
≥5	103	27.3
<i>Pregnancy trimester</i>		
First	196	52.0
Second	144	38.2
Third	37	9.8
<i>Employment</i>		
Employed	58	15.4
Housekeeper	319	84.6
<i>Residence</i>		
City	297	78.8
Village	80	21.2
<i>Education</i>		
University	237	62.9
Secondary	89	23.6
Primary	51	13.5
<i>Parity</i>		
Nulliparous	262	69.5
Multiparous	115	30.5
<i>Contraception history</i>		
None	39	10.3
Natural	255	67.7
Others (condom, IUD, etc.)	83	22.0
<i>Pregnancy</i>		
Wanted	332	88.1
Unwanted	45	11.9
<i>Economic status</i>		
Good	75	19.9
Mediocre	259	68.7
Weak	43	11.4
<i>Chronic disorder</i>		
Yes	25	6.6
No	352	93.4
<i>Life satisfaction</i>		
Satisfied	257	68.2
Relatively satisfied	114	30.2
Unsatisfied	6	1.6

**Table 2** Descriptive statistics and internal consistency of the DSES

Item	Mean	SD <sup>a</sup>	ITC <sup>b</sup>	Alpha <sup>c</sup>
1. I feel God's presence	5.58	0.81	0.51	0.890
2. I experience a connection to all life	4.96	1.13	0.59	0.887
3. During worship, or at other times when connecting with God, I feel joy, which lifts me out of my daily concerns	4.89	1.30	0.68	0.883
4. I find strength in my religion or spirituality	5.14	1.04	0.67	0.885
5. I find comfort in my religion or spirituality	5.24	0.95	0.73	0.883
6. I feel deep inner peace or harmony	4.66	1.33	0.66	0.884
7. I ask for God's help in the midst of daily activities	5.49	0.86	0.64	0.887
8. I feel guided by God in the midst of daily activities	4.82	1.17	0.70	0.883
9. I feel God's love for me, directly	5.31	1.02	0.61	0.887
10. I feel God's love for me, through others	4.57	1.34	0.60	0.887
11. I am spiritually touched by the beauty of creation	4.94	1.18	0.67	0.884
12. I feel thankful for my blessings	4.74	1.26	0.47	0.892
13. I feel a selfless caring for others	4.61	1.26	0.54	0.889
14. I accept others even when they do things I think are wrong	3.36	1.29	0.33	0.898
15. I desire to be closer to God or in union with Him	5.51	0.85	0.27	0.897
16. In general, how close do you feel to God?	2.57	0.73	0.28	0.896

<sup>a</sup> Standard deviation

<sup>b</sup> Item–total correlation

<sup>c</sup> Cronbach's alpha if item deleted

The KMO was 0.89, indicating sample adequacy. Also, the identity of correlation matrix was rejected regarding the result of Bartlett's test ( $\chi^2 = 2807.2$ ,  $P < 0.001$ ) provided evidence of factorability of the scale. Findings of the EFA revealed a single factor that explained 59% of the total scale variance (Table 5).

## Discussion

The purpose of this study was to assess the psychometric properties of a measure of daily spiritual experiences in a sample of healthy pregnant women. To our knowledge, this is the first time that the psychometric properties of DSES have been examined in pregnant women living in Iran. The findings indicate that the DSES is a valid and reliable measure of daily spiritual experiences in this population. The DSES also distinguished women in various states of mental health, supporting its use in examining the relationship between spirituality and mental health. The unidimensionality of the questionnaire was also established, confirming the theory on which the measure was based and its factor structure, accounting for nearly 60% of the total scale variance.

First, with regard to the issue of cultural adaptation, we were surprised to learn that few changes were necessary in the original items (developed in a Christian population) in order to fit the cultural context of Iranian women. Some minor adjustments, however, were necessary. In the instructions of the questionnaire, it was noted that if a respondent felt the word "God" was not comfortable for them, they were allowed to substitute another holy name in its place (such as Allah). In addition, Item 11, "I am spiritually touched by the



**Table 3** Correlations between the DSES and other measures

Scales <sup>a</sup>	1	2	3	4	5	6	7	8	9
<b>1. DSES</b>	–								
<b>2. DASS</b>	–0.186**	–							
3. Depression	–0.169**	0.882**	–						
4. Anxiety	–0.145**	0.908**	0.710**	–					
5. Stress	–0.182**	0.948**	0.797**	0.788**	–				
<b>6. DUREL</b>	0.166**	–0.211**	–0.240**	–0.138**	–0.198**	–			
7. OR	0.124*	–0.093	–0.087	–0.064	–0.117*	0.640**	–		
8. NOR	0.170**	–0.167**	–0.148**	–0.196**	–0.110*	0.391**	0.180**	–	
9. IR	0.153**	–0.177**	–0.223**	–0.088	–0.167**	0.785**	0.162**	0.041	–
<b>10. SCSORF</b>	0.422**	–0.139**	–0.067	–0.157**	–0.123*	0.318**	0.341**	0.247**	0.140**

OR organizational religiosity; NOR non-organizational religiosity; IR intrinsic religiosity

\*p < 0.05, \*\*p < 0.01

<sup>a</sup> Scales in bold font demonstrate full scales and those in normal font are subscales

**Table 4** Known-groups validity of the DSES differentiating subgroups of the sample

Subgroups	Mean (SD)	<i>P</i> value
<i>Age (years)</i>		
<25	74.20 (11.87)	0.016
≥25	77.24 (10.69)	
<i>Residence</i>		
City	77.45 (10.61)	0.001
Village	72.34 (12.13)	
<i>Chronic disorder</i>		
No	76.79 (11.07)	0.040
Yes	72.09 (11.02)	
<i>Pregnancy</i>		
Wanted	76.98 (11.00)	0.004
Unwanted	71.91 (11.00)	
<i>Life satisfaction</i>		
Satisfied	77.82 (10.73)	<0.001 (satisfied > relatively s. > unsatisfied)
Relatively satisfied	73.65 (11.12)	
Unsatisfied	66.50 (14.03)	
<i>Depression status</i>		
Normal	78.01 (10.24)	<0.001
Depressed (to some degree)	71.40 (12.19)	
<i>Anxiety status</i>		
Normal	77.39 (10.84)	0.046
Anxious (to some degree)	75.09 (11.36)	
<i>Stress status</i>		
Normal	77.71 (10.89)	<0.001
Stressed (to some degree)	72.55 (10.91)	

beauty of creation” was a bit ambiguous for women in our sample, so we revised it to say “I am spiritually affected by the magnificence and beauty of creation.”

Although our sample was one of convenience, the average age of participants was similar to the age when women usually become pregnant in Iran (i.e., 25–30 years old) (Iran Statistical Center 2016). Furthermore, nearly 70% of the women were in their first pregnancy. According to the international reports, the average age of marriage in Iran was 19 years in 1956, which has now increased to 24 years old (World Bank 2010). In addition, more than 70% of our participants experienced pregnancy within the first 5 years of marriage, which is similar to the usual delay of 4 years for pregnancy after marriage in Iran (Torabi et al. 2013). These data suggest that the pattern of pregnancy has changed over time in Iran. If this trend continues in Iran, the birth rate may not be able to keep up with the death rate and there could be a negative population growth; the same trends are occurring in other developing countries such as Turkey and Malaysia (World Bank 2015).

The reliability of the DSES was established by high correlations between nearly all individual items on the scale and the total score, by the high Cronbach’ alpha, and by the high test–retest ICC. The two items with an ITC < 0.30 were those examining closeness to

**Table 5** Factor structure of the DSES (principal component analysis with varimax rotation)

Item #	Factor 1
Q1	0.710
Q2	0.774
Q3	0.881
Q4	0.883
Q5	0.906
Q6	0.851
Q7	0.839
Q8	0.883
Q9	0.798
Q10	0.768
Q11	0.835
Q12	0.627
Q13	0.694
Q14	0.577
Q15	0.558
Q16	0.531
Eigenvalue	9.412
Variance explained (%)	0.588

God. The nature of these items may be different than the other items that tend to assess behaviors or feelings regarding spirituality more generally. However, in the original study on developing the scale the ITC for these items ranged from 0.72 to 0.80 among different groups of population (Underwood and Teresi 2002). It seems that this difference may be related to cultural variability between samples in terms of spiritual concepts. Less stringent criteria for item–total correlations have been advocated by some researchers who have argued for accepting ITC as low as 0.20 (Field 2009). Similarly, the Cronbach's alpha for the DSES scale after deletion of each of these items indicated that removing them did not substantially increase the alpha for the scale. Based on floor and ceiling effects calculated, the DSES total score did not demonstrate considerable skewness; however, all items had a mean value higher than recorded in previous studies (Kalkstein and Tower 2009; Ng et al. 2009; Underwood and Teresi 2002), likely reflecting the strong SR of the sample.

The DSES was moderately correlated with other scales (DUREL and SCSORF) that measure SR, which indicates acceptable convergent validity. Of note, however, was the stronger correlation between the DSES and SCSORF than with the DUREL. The authors of the SCSORF have emphasized that this scale was designed to assess SR more broadly (as does the DSES) (Plante and Boccaccini 1997). The DUREL, in contrast, is more specifically a measure of religiosity. The lower correlation between the DSES and the latter, then, is not surprising. The organizational religiosity subscale of the DUREL, in particular, had a low correlation with the DSES. This finding is also understandable given that the DSES contains no items measuring group activity such as religious attendance.

Divergent validity of the scale was demonstrated by small and negative correlations with depression, anxiety, and stress. Negative associations between psychological disorders and the SR have been reported in many studies (Moon and Kim 2013; Weber and Pargament 2014). For example, Bennett and Shepherd in a cross-sectional study on Australian women found a significant correlation between spirituality and depression

(Bennett and Shepherd 2013). In another study, one conducted specifically in pregnant women, SR was strongly and inversely related to stress and anxiety (Breen et al. 2006). Finally, Lamis and colleagues found that parenting stress was lower among the women who scored high on spiritual well-being (Lamis et al. 2014).

The DSES was also able to distinguish various subgroups of women in this study (known-groups comparison). For example, women who were older scored higher on the DSES than younger women. Older age has long been known to correlate with greater SR (Hill and Pargament 2003). As Pokorski and Warzecha have suggested, increasing age may increase vulnerability to psychological distress due to problems with physical health and increasing disability, challenging one's coping abilities (Pokorski and Warzecha 2011). One way that women, particularly those in Iran, may cope with these age-related challenges is by engagement in SR beliefs and activities that increase their daily spiritual experiences. In our sample, higher age may be a risk factor for preterm birth or complications during delivery, which may increase anxiety/stress among these women. Similarly, pregnant women who lived in larger cities may experience a greater number of stressors than those living in rural areas, increasing their likelihood of turning to SR for comfort in coping. Interestingly, however, women with chronic medical disorders in our sample scored lower on the DSES than those without chronic disorders. This finding may be due to the impact a close relationship with God and daily spiritual experiences has on physical health, given the large and growing research base indicating an effect of SR involvement on physical health (Chester et al. 2006; Moon and Kim 2013). Alternatively, those women who are healthier may be more thankful to God for their health and may experience more daily spiritual experiences as a result (whereas chronic illness may interfere with such experiences). This may also help to explain the positive relationship between DSES scores and life satisfaction. Those who feel more blessed by God may be more satisfied with their lives, or alternatively, those who are more satisfied with their lives may find it easier to have daily spiritual experiences. Therefore, the effect in terms of causal direction may go either way in these relationships.

Our findings indicated that the factor structure of the DSES was primarily explained by a single component. This supports the unity and integrity of the measure in primarily assessing one dimension. Some researchers have proposed a two-factor solution indicating two dimensions that have been called the “God” or “theistic” and the “non-theistic” or “self-transcendence” domains (Ellison and Fan 2008; Kalkstein and Tower 2009). However, these studies used different groups from US general population, a community Internet sample and an elderly sample. Therefore, besides cultural differences between these samples and our sample, other differences in the composition of these samples from the present sample may lead to different findings. Nevertheless, the original developer of the DSES has reported that a single-factor solution is more common and that dividing the scale into separate dimensions is not necessary (Underwood and Teresi 2002).

While the DSES is not a diagnostic tool for mental health, it may be used to supplement the assessment of psychological well-being particularly that related to spirituality. Since spiritual health has been recognized as an important component of overall health, addressing this particular component of health with interventions directed at increasing daily spiritual experiences may have a positive impact on depressive, anxiety, and other stress-related symptoms. Unfortunately, addressing SR issues in clinical practice is uncommon, despite growing research indicating that spiritually integrated interventions reduce depressive symptoms, for example, to a similar or greater degree than do conventional treatments (especially in those who are more religious) (Koenig et al. 2015).

The study also has several limitations that impact the interpretation and generalizability of the findings. First, this study has demonstrated the psychometric properties of the DSES only in pregnant women. Therefore, further research is needed to determine whether the DSES is a reliable and valid measure of SR in males and in non-pregnant females in Persian-speaking populations. Second, our sample was one of convenience affecting our ability to apply these findings to all pregnant women in Iran. However, the relatively large sample size in this study helps to counteract this limitation. Finally, the cross-sectional design limits the ability to make definitive statements regarding the direction of causation in the relationships identified here.

## Conclusion

The Persian version of the DSES examined here is a valid and reliable instrument for assessing SR among healthy pregnant women in Iran. Our factor analysis indicated a single factor confirming the unidimensional nature of DSES in this sample, consistent with prior research in largely Christian and English-speaking populations. Further research is needed to determine whether the DSES is a useful measure of SR in different cultural and religious environments. In addition, given the significant correlation between the DSES and mental health outcomes identified in this study, it may be a useful measure in studies that examine interventions for mental disorders in pregnant women in Iran. Investigation of the associations between the DSES and other SR measures may help to further establish its validity. Finally, much of the research on the DSES has been conducted in medical samples, and examining its application in healthy populations will help to identify differences in spiritual experiences between these two groups and their relationship to health.

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## Compliance with Ethical Standards

**Conflict of interest** There was no conflict of interest to declare.

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