

# Psychometric Testing of a Spiritual Well-being Scale for People with Cancer

*Panchan Thapanakulsuk, Yupapin Sirapo-ngam\*, Carol Estwing Ferrans, Pisamai Orathai, Tiraporn Junda*

**Abstract :** Spiritual well-being is crucial to the health outcomes of people with cancer and is influenced by culture, religious perspectives, and the characteristics of particular societies. There was no Thai instrument that measured this important concept, consequently, the Spiritual Well-being Scale for People with Cancer was developed by researchers and its psychometric properties were tested in this study. This instrument contains 20 items and the content validity index was .88. People with cancer aged 18 years and over, who had at least two experiences of treatment, and could communicate in the Thai language were selected to be study participants. The dimensions of spiritual well-being were identified using exploratory factor analysis (n = 190) and internal consistency testing. Four factors accounting for 58.35% of the total variance were: spiritual strengthening, spiritual suffering, spiritual uncertainty, and spiritual readiness. The confirmatory factor analysis was tested (n = 203), and the results indicated that the measurement model had a good fit with the data. The Cronbach's alpha coefficient of the entire scale was .76. The correlation coefficient was tested with the other three instruments, and the results were between .58 and .75 (p < .001).

The instrument has an acceptable level of content, construct, and concurrent validity, as well as internal consistency reliability. Nurses and other healthcare profession can use this instrument to assess and evaluate intervention designs to improve the spiritual well-being of people with cancer. It is recommended that the scale be further tested with other groups of people with cancer in Thailand.

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## Introduction and Literature Review

Cancer and its treatment produces a great deal suffering for people. They may confront many changes in their lives, undergo complicated and treatment with many physical issues, and have to deal with the threat of death.<sup>1</sup> This disease can deteriorate physical, psychological, social, and spiritual well-being (SWB).<sup>2-5</sup> Thus, cancer patients' needs are specific and different

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from those of people with other chronic illnesses.<sup>5, 6</sup> Healthcare providers need to understand the individual's life experience in order to help them cope with cancer. Many studies have indicated that spirituality helps improve a person's physical health, helps people with cancer (PWC) accept their life and illness, enhances their emotional stability, increases their satisfaction with life and their inner strength, provides positive meaning of life, and also helps to decrease anxiety, symptom distress, depression, and levels of stress.<sup>7-14</sup> As spirituality is essential for PWC, SWB can be seen as a significant health outcome enhancement for the holistic health of PWC. The measurement of SWB, then, is useful for healthcare providers to assess the SWB of PWC.

Most of the instruments used for measuring SWB were developed in the west and can be divided into 2 groups: SWB as a part of the quality of life (QOL) instrument, and SWB scales. These QOL instruments were designed to use with general and specific groups of participants. Examples of the generic QOL instruments that were used to measure SWB were the QOL Index, the Missoula-VITAS Quality of Life Index (MVQOLI), the McGill Quality of Life Questionnaire (MQOL); and the specific QOL instruments such as the QOL Index cancer version III (QLI-CV III), the Quality of Life Patient/Cancer Survivor Version, and Assessment of Quality of Life at the End of Life (AQEL). Many studies of PWC have used the QOL instrument to explain the SWB of participants. These instruments have focused on many aspects of life and contained various items related to the effect of disease on life, psychological responses to illness, and perceptions about life and happiness, and some items related to spirituality, whereas, the SWB instruments were developed to support studies focusing only on SWB. The well-known examples are the Spiritual Well-being Scale (SWBS), the JAREL Spiritual Well-Being Scale (JSWBS), the Functional Assessment of

Chronic Illness Therapy-Spiritual Well-Being Scale (FACIT-Sp), and the Spiritual Health and Life-Orientation Measure (SHALOM). Based on the research related to SWB<sup>15-17</sup>, the items included in the SWB instruments focused on: 1) the importance of religious faith and religious activities; 2) the inter-connectedness of the individual with surrounding persons, the environment, and a supreme being; and 3) spirituality being influenced by the country's culture, society, and parenting. This indicated that the characteristics of spirituality are influenced by many factors, and people from different contexts have different characteristics of spirituality.<sup>16</sup> However, evidence from the literature indicates that many Thai studies focusing on SWB have applied translated versions of an original western instrument and/or have modified the content from the items originally developed to make them match the Thai context.<sup>18-20</sup>

During the past decade, there were two SWB instruments developed by Thai researchers: the Thai Spiritual Well-being Assessment Tool for Elders with Chronic Illnesses (TSWBATECI)<sup>21</sup> and the Spiritual Well-being Scale for Thai Buddhist Adults with Chronic Illness (SWS-TBACI).<sup>22</sup> The TSWBATECI was designed to measure the SWB of elderly patients with chronic illness. Evidence might not have provided deep insight into the essence of spirituality among patients with cancer, which is considered more frightening and different from other chronic diseases.<sup>5,6</sup> Furthermore, this instrument focused on the SWB of the elderly, which may be a limitation in terms of its use with other age groups. Another was the SWS-TBACI, and the item development of this instrument was from a literature review and expert interviews, not from the direct experiences of cancer participants. This means that this instrument may not be suitable to completely explain the spirituality of cancer patients. Therefore, these two instruments still have some limitations in terms of capturing the

essence of the spirituality of PWC. Thus, in this study there was interest in developing a SWB instrument for Thai cancer patients based on the concept of individualistic views, in which SWB was a subjective experience.<sup>23</sup> Twenty items of the Spiritual Well-Being Scale for Thai people with Cancer (SWS-TC) generated from in-depth interviews with PWC in a prior study phase were psychometrically tested and this process and results are presented in this article.

### Study Aim

To test the psychometric properties of the Spiritual Well-Being Scale for Thai people with Cancer (SWS-TC)

### Methods

**Design:** Prior to the psychometric testing, this instrument was developed using a qualitative approach to define the content domains and to generate 20 items from in-depth interviews with PWC. The study phase reported here consisted of four steps: step 1 was reliability testing using a pilot study; step 2, testing the theoretical validity by using exploratory factor analysis (EFA); step 3, construct validity and the reliability testing using confirmatory factors analysis (CFA); and step 4, testing the concurrent validity. The processes are illustrated in **Figure 1**.

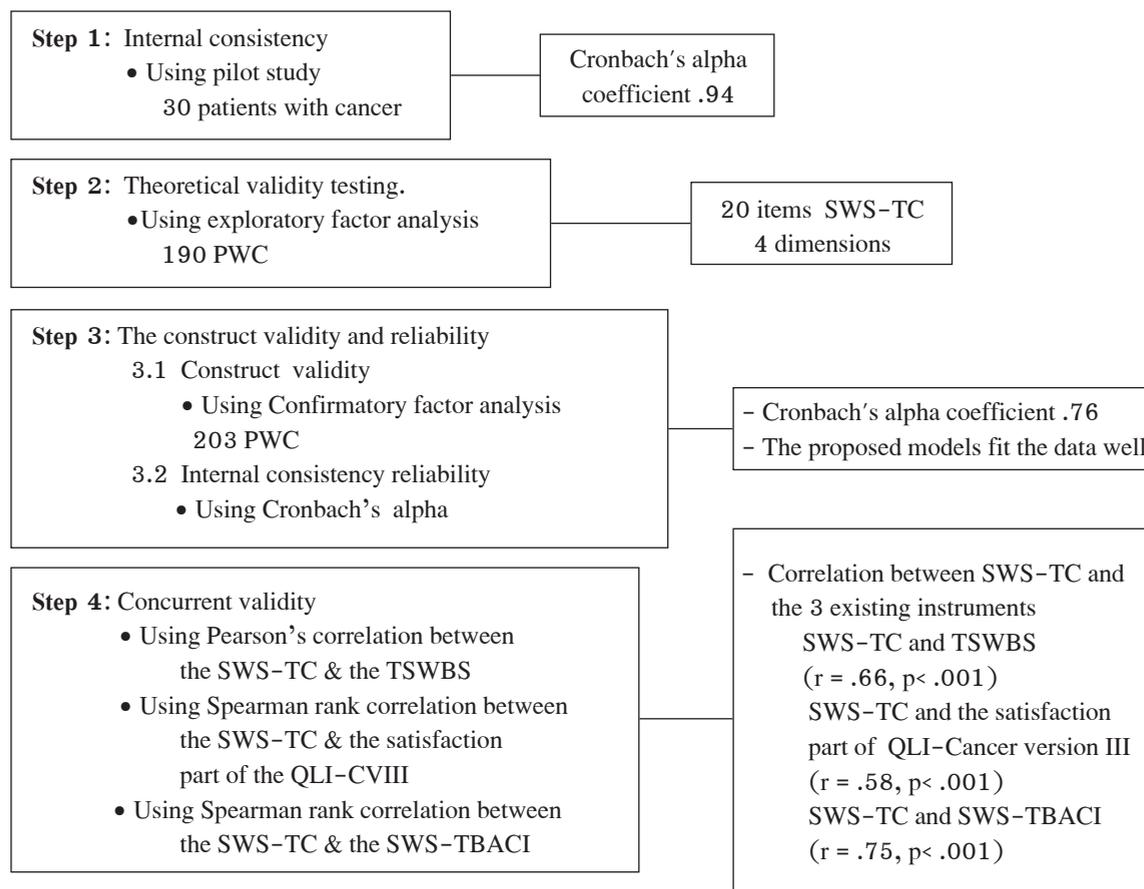


Figure 1 Steps of psychometric properties testing

## Sample and Settings

People with cancer (PWC) were the population of this study. They included survivors of cancer, both male and female, who had come to the outpatient clinic or day care clinic and those who had been admitted to the hospital. For the males, recruitment included patients with lung, prostate, and colon cancer, whilst for females they were patients with breast, cervical and colon cancer. The sample was enrolled from 4 hospitals and a cancer institute in Thailand, and were purposively selected based on the following eligibility criteria: 1) PWC at any stage whose age was 18 years and over; 2) had a combination of at least two experiences of treatments; and 3) understood and could communicate in Thai. There were three different groups of participants: 30 participants for the pilot study, 190 for the EFA, and 203 for the CFA and concurrent validity testing.

## Measurements

The SWS-TC was used as the main instrument in this study and there were three other existing instruments used for concurrent validity testing of the SWS-TC: 1) the Thai version of Spiritual Well-being Scale (TSWBS)<sup>19</sup>; 2) The Quality of Life Index-Cancer version III (QLI-CV III)<sup>31</sup>, and 3) the Spiritual Well-being Scale for Thai Buddhist Adults with Chronic Illness (SWS-TBACI).<sup>22</sup> The characteristics of each instrument are as follows:

### 1) *The SWS-TC.*

This is a new instrument developed by the researchers and consists of 20 items in 4 dimensions: spiritual strengthening (12 items); spiritual suffering (4 items); spiritual uncertainty (2 items); and spiritual readiness (2 items). Examples of items are “You get peace of mind when you engage in religious/faith activities” and “You can perceive love from the people around you”. The participants were asked, on a rating scale of five, to evaluate the extent to which

each item matched their perception. The score for the SWS-TC ranged from 20 to 60, and a high score indicated high levels of SWB. The content validity index of the SWS-TC was .88.

### 2) *The Thai Version of the Spiritual Well-being Scale (TSWBS).*

This instrument was developed in the west and was translated into Thai by Noipiang and her colleague<sup>19</sup> who also modified some of the items of the instrument so that they were in accordance with Thai culture. The TSWBS consists of 20 items with two dimensions: 1) religious well-being (10 items), and 2) existential well-being (10 items). The examples of items are “Making merit makes you feel comfortable and relieve suffering from illness” and “You can feel the well-being in your future life”. The participants were asked whether they agreed or disagreed with items on a 6-point Likert scale. The score for the SWB ranged from 20-120, and a high score indicates high levels of SWB. The reliability of this instrument in their pilot study was .81, and in main study it was .84.

### 3) *The Quality of Life Index-Cancer Version III (QLI-CV III)*

This instrument is a well-known instrument developed by Ferrans and Powers (1985). The QLI-CVIII consists of 66 items. The first 33 items measure satisfaction with various aspects of life, and the second part measures the importance of those same aspects to the individual. The instrument includes four domains of life: health and functioning (13 items); psychological/spiritual (7 items); social and economic (8 items); and family (5 items). The score ranges from 0 to 30, with a higher score indicating better QOL.<sup>31</sup> This instrument has been used with various groups of PWC and has been translated into many languages. The internal consistency (Cronbach's alpha) for the total scale was .93 and .87, .82, .90, and .77 for the subscales.<sup>32</sup> In this study, the QLI-CV III was used only for the satisfaction part of the instrument. Only 33 items then were tested. The

participants were asked about their satisfaction with many areas of life such as “The emotional support you get from your family” and “Your achievement of personal goals”. This instrument was translated into Thai by Saengsiri and Hacker, and was modified and used in their study. The reliability of the instrument in their study was .98.<sup>29</sup>

4) *The Spiritual Well-being Scale for Thai Buddhist Adults with Chronic Illness* (SWS-TBACI) was developed by Promkaewngam and colleagues for use with Thai Buddhist adults with chronic illness.<sup>22</sup> This instrument has three dimensions: having hope and a sense of connectedness (5 items); understanding self and the nature of life (4 items); and being happy (4 items). The SWS-TBACI had only 13 items with an alpha coefficient of .88 for the overall instrument, and .76-.88 for the three dimensions of the scale. In this study, the researchers adjusted one item of the SWS-TBACI to make it more general for use with all religions. The examples of items are “You can accept your physical condition” and “You feel that your life is happy”.

#### **Ethical Considerations**

The study received approval from the Committee on Human Rights to Research Involving Human Subjects, Faculty of Medicine Ramathibodi Hospital, Mahidol University, and ethics review committees of the other 4 institutions. The study’s objectives, procedures, potential risks and benefits, protection of confidentiality and rights, including the right to withdraw from the study were declared individually to all participants. They were given opportunities to ask questions before signing the consent form.

#### **Procedure of the Data Analysis and the Results of the Study**

The psychometric properties of the SWS-TC consisted of 4 steps (Figure 1).

**Step 1: Internal consistency testing.** The reliability of SWS-TC was examined by 30 participants. The results of the pilot test showed good internal consistency reliability at .94. The average time taken to complete the instrument was 10 minutes.

**Step 2: Theoretical Validity Testing.** The theoretical validity of the SWS-TC was assessed by EFA using the principal component analysis (PCA) method with varimax rotation to identify the underlying dimensions of the SWB in the instrument.<sup>33</sup> The criteria for the number of extracted factors were (a) an eigenvalue greater than 1; (b) scree plot characteristics showing the leveling-off point of the eigenvalues; and (c) a cumulative percentage of variance that was in the accepted value range between 50 and 60%.<sup>34</sup> One hundred and ninety PWCs participated in this step. Nearly 58% were inpatients and around 42.11% were from the outpatient department, and they came from all regions of Thailand. The mean age of the males was 60.78 and 52.11 for the females. A large number of the participants were at stage II and III of their cancer and their characteristics are presented in **Table 1**. The results indicated that the SWS-TC had four factors, each representing an underlying dimension of the instrument. The factors, items, statements, eigenvalues, factor loadings, and percentages of variance are shown in **Table 2**. All of the items had a factor loading greater than a cut-off point of .40. There were 2 factors that consisted of only 2 items, factor 3 and factor 4. These 4 factors accounted for 58.35% of the total variance with the communality ranging from .46 to .84.

**Factor 1** consisted of 12 items. The factor loadings were between .46 and .78. and explained 24.52% of the total variance. This factor then was named “Spiritual Strengthening.”

**Factor 2** had 4 items with factor loadings between .57 to .75, and explained 13.59% of the total variance. This factor then was named “Spiritual Suffering.”

**Factor 3** consisted of 2 items with factor loadings of .65 and .75 and explained 10.84% of the total variance. This factor was named “Spiritual Uncertainty.”

**Factor 4** consisted of 2 items with factor loadings of .75 and .84 and explained 9.40% of the total variance. This factor was named “Spiritual Readiness.”

**Step 3: The construct validity and reliability.**

The construct validity of the SWS-TC was tested using the second-order CFA to examine how these indicators explained the SWB of the Thais. The internal consistency reliability was tested using Cronbach's alpha. A new group of participants (203 participants)

The majority of participants were female, with an average of 51.66 years. Most were diagnosed with breast cancer. In the male group, the average age of the participants was 58.73 years, and the majority was diagnosed with lung and colon cancer. The characteristics of the participants at this step are presented in **Table 3**.

The results of the assumption testing revealed that this data set had a non-normal distribution. The robust maximum likelihood was then used to estimate the parameters in the model relevant to this condition.<sup>35</sup> CFA was conducted using the LISREL program.

The overall goodness of fit of the model, measured by the ratio of  $\chi^2/df$ , was .95, and showed that the proposed model fit the data well. The additional goodness of fit indices (GFI = .93, AGFI = .90, NFI = .97, NNFI = 1.00, CFI = 1.00, RFI = .96, RMSEA = .00, SRMR = .05) also confirmed that the hypothesized model exhibited a good fit with the data (**Table 4**).

**Table 1** Characteristics and clinical status of participants of EFA (n=190)

| Characteristics                                     | Number | Percent |
|---|--------|---------|
| <b>Gender</b>                                       |        |         |
| Male (Age: Min= 25, Max=80, Mean=60.78, SD=11.02)   | 77     | 40.53   |
| Female (Age: Min= 27, Max=76, Mean=52.11, SD=10.53) | 113    | 59.47   |
| <b>Hometown</b>                                     |        |         |
| Central (21 provinces)                              | 106    | 55.79   |
| Northern (5 provinces)                              | 7      | 3.69    |
| Northeastern (13 provinces)                         | 32     | 16.84   |
| Eastern (6 provinces)                               | 27     | 14.21   |
| Western (4 provinces)                               | 10     | 5.26    |
| Southern (6 provinces)                              | 8      | 4.21    |
| <b>Diagnosis</b>                                    |        |         |
| Lung cancer   | 37     | 19.47   |
| Prostate cancer                                     | 11     | 5.79    |
| Colon cancer (Male)                                 | 31     | 16.32   |
| Breast cancer                                       | 37     | 19.47   |
| Cervical cancer                                     | 37     | 19.47   |
| Colon cancer (Female)                               | 37     | 19.47   |
| <b>Staging</b>                                      |        |         |
| Stage I   | 16     | 8.42    |
| Stage II  | 48     | 25.26   |
| Stage III   | 60     | 31.58   |
| Stage IV  | 34     | 17.89   |
| Recurrent stage                                     | 11     | 5.79    |
| Unspecified   | 21     | 11.05   |

**Table 2** Factors, items, statement, eigenvalue, factor loading, and percent of variance (n = 190)

| Factors                           | items | Statement   | Factor loading | Percent of variance |
|-----------------------------------|-------|---|----------------|---------------------|
| <b>1. Spiritual Strengthening</b> |       | <b>Eigenvalue = 4.90</b>  | <b>.46-.78</b> | <b>24.52</b>        |
|                                   | 7)    | You have the courage to live.   | .78            |                     |
|                                   | 9)    | You are mentally strong enough to fight the disease.                      | .75            |                     |
|                                   | 8)    | You are happy to think in a positive way about the disease and treatment. | .75            |                     |
|                                   | 5)    | You feel that you still have hope in your life.                           | .67            |                     |
|                                   | 12)   | You can accept your illness.  | .64            |                     |
|                                   | 1)    | You believe that you can live with the disease.                           | .61            |                     |
|                                   | 13)   | You feel at ease.   | .57            |                     |
|                                   | 11)   | You can deal with what makes you feel discouraged.                        | .55            |                     |
|                                   | 18)   | You can live happily every day.   | .53            |                     |
|                                   | 6)    | You can perceive love from the people around you.                         | .52            |                     |
|                                   | 16)   | You find relief from the suffering connected with your disease.           | .50            |                     |
|                                   | 14)   | You get peace of mind when you engage in religious/ faith activities.     | .46            |                     |
| <b>2. Spiritual Suffering</b>     |       | <b>Eigenvalue = 2.72</b>  | <b>.57-.75</b> | <b>13.59</b>        |
|                                   | 4)    | You are discouraged by the illness.                                       | .75            |                     |
|                                   | 17)   | You are worried that you will not live long.                              | .72            |                     |
|                                   | 15)   | You feel that you have lost courage.                                      | .66            |                     |
|                                   | 2)    | You think that your life goals have changed.                              | .57            |                     |
| <b>3. Spiritual Uncertainty</b>   |       | <b>Eigenvalue = 2.17</b>  | <b>.65-.75</b> | <b>10.84</b>        |
|                                   | 20)   | You can accept your own death.  | .75            |                     |
|                                   | 3)    | You are ready for future uncertainty                                      | .65            |                     |
| <b>4. Spiritual Readiness</b>     |       | <b>Eigenvalue = 1.88</b>  | <b>.75-.84</b> | <b>9.40</b>         |
|                                   | 10)   | You have managed what you were worried about.                             | .84            |                     |
|                                   | 19)   | You have already planned for your future.                                 | .75            |                     |

**Table 3** Characteristics and clinical status of participants for CFA (n = 203).

| Characteristics  | Number | Percent |
|--|--------|---------|
| <b>Gender</b>  |        |         |
| Male (Age: Min = 29, Max = 83, Mean = 58.73, SD=11.03)     | 81     | 39.90   |
| Female (Age: Min = 26, Max = 79, Mean = 51.66, SD = 10.63) | 122    | 60.10   |
| <b>Diagnosis</b>   |        |         |
| Lung cancer  | 34     | 16.75   |
| Prostate cancer  | 13     | 6.40    |
| Colon cancer (Male)  | 34     | 16.75   |
| Breast cancer  | 48     | 23.65   |
| Cervical cancer  | 38     | 18.72   |
| Colon cancer (Female)                                      | 36     | 17.73   |
| <b>Staging</b>   |        |         |
| Stage I  | 20     | 9.85    |
| Stage II   | 60     | 29.57   |
| Stage III  | 68     | 33.50   |
| Stage IV   | 46     | 22.66   |
| Recurrent stage  | 4      | 1.97    |
| Unspecified  | 5      | 2.46    |

**Table 4** The results of the CFA of the SWS-TC (n=203)

| Dimension /Items   | Factor loading |      |         | t      | R <sup>2</sup> for secondary indicators | Factor Scores Regression | AVE    |
|--|----------------|------|---------|--------|---|--------------------------|--------|
|  | b              | B    | S.E.(b) |        |   |                          |        |
| <b>Spiritual Strengthening</b>   |                |      |         |        |   |                          |        |
| 1. You have courage to live. (ST1)   | 0.55           | 0.59 | -       | -      | 0.34                                    | 0.05                     | } 0.43 |
| 2. You are mentally strong enough to fight the disease. (ST2)                      | 0.51           | 0.58 | 0.06    | 8.47*  | 0.36                                    | 0.05                     |        |
| 3. You are happy thinking in a positive way about the disease and treatment. (ST3) | 0.15           | 0.23 | 0.05    | 2.99*  | 0.05                                    | 0.02                     |        |
| 4. You feel that you still have hope in your life. (ST4)                           | 0.58           | 0.75 | 0.07    | 8.93*  | 0.56                                    | 0.34                     |        |
| 5. You can accept your illness. (ST5)  | 0.52           | 0.58 | 0.07    | 7.83*  | 0.34                                    | 0.02                     |        |
| 6. You believe that you can live with the disease. (ST6)                           | 0.65           | 0.84 | 0.07    | 9.89*  | 0.71                                    | 0.28                     |        |
| 7. You feel at ease. (ST7)   | 0.64           | 0.72 | 0.07    | 8.83*  | 0.52                                    | 0.16                     |        |
| 8. You can deal with what makes you feel discouraged. (ST8)                        | 0.68           | 0.75 | 0.07    | 10.18* | 0.56                                    | 0.13                     |        |
| 9. You can live happily every day (ST9)  | 0.70           | 0.73 | 0.07    | 10.13* | 0.54                                    | 0.06                     |        |
| 10. You can perceive love from the people around you. (ST10)                       | 0.29           | 0.39 | 0.07    | 4.43*  | 0.15                                    | 0.03                     |        |
| 11. You can manage your suffering. (ST11)  | 0.66           | 0.76 | 0.07    | 9.32*  | 0.57                                    | 0.32                     |        |
| 12. You get peace of mind when you engage in religious/faith activities. (ST12)    | 0.60           | 0.71 | 0.07    | 9.20*  | 0.50                                    | 0.06                     |        |

**Table 4** The results of the CFA of the SWS-TC (n=203) (Cont.)

| Dimension /Items  | Factor loading |      |          | t     | R <sup>2</sup><br>for<br>secondary<br>indicators | Factor<br>Scores<br>Regression | AVE    |
|---|----------------|------|----------|-------|--|--------------------------------|--------|
|   | b              | B    | S.E. (b) |       |  |                                |        |
| <b>Spiritual Suffering</b>                                    |                |      |          |       |  |                                |        |
| 1. You are discouraged by the illness.<br>(SU1)               | 0.71           | 0.59 | -        | -     | 0.35   | 0.14                           | } 0.47 |
| 2. You are worried that you don't have long<br>to live. (SU2) | 0.88           | 0.74 | 0.13     | 6.99* | 0.55   | 0.27                           |        |
| 3. You feel that you have lost courage.<br>(SU3)              | 0.77           | 0.71 | 0.11     | 6.95* | 0.50   | 0.23                           |        |
| 4. You think that your life goals have<br>changed. (SU4)      | 0.79           | 0.69 | 0.12     | 6.81* | 0.48   | 0.21                           |        |
| <b>Spiritual Uncertainty</b>                                  |                |      |          |       |  |                                |        |
| 1. You can accept your own death. (UN1)                       | 0.30           | 0.30 | -        | -     | 0.09   | 0.10                           | } 0.24 |
| 2. You are ready for future uncertainty.<br>(UN2)             | 0.70           | 0.63 | 0.27     | 2.62* | 0.39   | 0.44                           |        |
| <b>Spiritual Readiness</b>                                    |                |      |          |       |  |                                |        |
| 1. You have managed what you were<br>worried about. (RE1)     | 0.72           | 0.62 | -        | -     | 0.39   | 0.16                           | } 0.56 |
| 2. You have already planned for the future.<br>(RE2)          | 0.93           | 0.86 | 0.18     | 5.13* | 0.73   | 0.72                           |        |
| <b>Spiritual Well-being</b>                                   |                |      |          |       |  |                                |        |
| 1. Spiritual Strengthening                                    | 0.96           | 0.96 | 0.13     | 7.65* | 0.92   | -                              | } 0.52 |
| 2. Spiritual Suffering  | 0.68           | 0.68 | 0.14     | 4.84* | 0.46   | -                              |        |
| 3. Spiritual Uncertainty                                      | 0.67           | 0.67 | 0.25     | 2.69* | 0.44   | -                              |        |
| 4. Spiritual Readiness  | 0.49           | 0.49 | 0.12     | 4.20* | 0.24   | -                              |        |

$\chi^2 = 141.97$ ,  $df = 149$ ,  $p = 0.65$ ,  $\chi^2/df = 0.95$ ,  $GFI = 0.93$ ,  $AGFI = 0.90$ ,  $NFI = 0.97$ ,  $NNFI = 1.00$ ,  $CFI = 1.00$ ,  $RFI = 0.96$ ,  $SRMR = 0.05$ ,  $RMSEA = 0.00$

\*p < .05, - = constraint parameters

- df = Degree of Freedom
- CFI = Comparative Fit Index
- GFI = Goodness of Fit Index
- AGFI = Adjusted Goodness of Fit Index
- NFI = Normed Fit Index
- NNFI = Non-normed Fit Index
- RFI = Relative Fit Index
- SRMR = Standardized Root Mean Square Residual
- RMSEA = Root Mean Square Error of Approximation

The parameter estimates confirmed the original four factors found in the previous exploratory factor analysis. These 4 primary indicators showed a significant factor loading value of  $p < .05$ . In addition, they displayed medium to high standardized factor-loading values (0.49–0.96,  $p < .05$ ) and could explain the variance in the SWS-TC at a moderate to high level ( $R^2 = 23.9\% - 92.3\%$ ). The average variance extracted (AVE) of these four primary indicators was .52.

“Spiritual Strengthening” was the primary indicator identified with the highest important weight of variance, explaining the SWB of Thai PWC at a high level ( $R^2 = 92\%$ ). The AVE explained among the items of this primary factor was .43. The most important indicator of spiritual strengthening was “You believe that you can live with the disease” (ST6).

“Spiritual Suffering” had a completely standardized factor loading of .68 on SWB. This primary indicator could explain the variance in SWB at a moderate level ( $R^2 = 46\%$ ). The AVE explained among the items was .47. The most important indicator was “You are worried that you don’t have long to live” (SU2).

“Spiritual Uncertainty” had a completely standardized factor loading of .67 on SWB and could explain the variance in SWB at a moderate level ( $R^2 = 44\%$ ). The AVE was .24. There were 2 secondary indicators that could explain the variance of “Spiritual Uncertainty.” The standardized factor loading of the items was .63 for “You are ready for future uncertainty” (UN 2) and .30 for “You can accept your own death” (UN1).

“Spiritual Readiness” had a completely standardized factor loading of .49 on SWB and could explain the variance in SWB at a moderate level ( $R^2 = 24\%$ ). The AVE was .56. There were 2 secondary indicators that could explain the variance of “Spiritual Readiness.” The most important indicator was “You have already planned for the future (RE2).

The corrected item-to-total correlation of SWS-TC (20 items) ranged from .32 to .76. The Cronbach’s alpha coefficient for the reliability of the SWS-TC was tested and it was found that the Cronbach’s alpha coefficient of the total scale of the SWS-TC was .76, which indicated the acceptable level of internal consistency of a newly-developed instrument.<sup>33</sup>

**Step 4 The concurrent validity testing.** The SWS-TC was tested for concurrent validity with the other three existing instruments. The results indicated that the SWS-TC and SWS-TBACI had the highest positive significant relationship ( $r = .75$ ,  $p < .001$ ). The SWS-TC and the TSWBS also showed a moderate positive significant relationship ( $r = .66$ ,  $p < .001$ ). A positive moderate relationship was also found between the SWS-TC and the QLI-CV III ( $r = .58$ ,  $p < .001$ ). Thus, these correlations provide support for the concurrent validity of the SWS-TC as a measurement of SWB.

## Discussion

The SWS-TC displayed multi-dimensions of SWB. It had good internal consistency reliability because the items were explored from the direct experience of PWC, who were able to delineate the facets of the construct of SWB and could enhance the accuracy and comprehensiveness of the construct.<sup>36</sup>

In terms of the construct validity, EFA and CFA were used with the different groups of participants in order to identify and confirm the factors. The number of participants in both EFA and CFA was revealed to be strong enough to explain the construct of the SWB of Thai PWC.<sup>37</sup> The four extracted factors with variance accounting for 58.35% of total variance was in the accepted value range between 50 and 60%.<sup>34</sup> The percentage of the total variance explained depended on the characteristics of the variables. SWB is a difficult variable to measure due to its abstractness, and the information might be

less precise when compared to the variables in natural science.<sup>37</sup> However, the total variances explained in this study were consistent with a meta-analysis of total variance explained by extracted factors in 568 empirical documents that reported a mean of 56.6% variance.<sup>38</sup> In addition, the construct validity of the SWS-TC was tested using second order CFA. The fit indices of the CFA confirmed that the model of the SWB fit the data well.

The concurrent validity between the SWS-TC and the three other existing instruments revealed a positive relationship that supported the concurrent validity of the SWS-TC as a measure of SWB. When comparing the items between the SWS-TC and the SWB instruments from the west (QLI cancer version III) and the instrument modified from the west (TSWBS), the items of the QLI cancer version III had more varied items and domains due to its aim to validate many aspects of QOL and because the SWS-TC was scoped to measure SWB. The items of the SWS-TC had specific aspects of spirituality for PWC more than the TSWBS, where half of the items focused on the religious aspect. When compared to the SWS-TBACI, even the correlation between the SWS-TC and SWS-TBACI showed a moderate relationship. However, many items of the SWS-TC reflected to a greater extent the specific characteristics of the SWB of PWC as follows.

The factor called “Spiritual Strengthening” represented the effort of PWC in dealing with cancer. The items contained concepts related to hope, happiness in life, acceptance, thinking in a positive way, peace of mind, courage to live with cancer, and care on the part of the people surrounding them. This indicated that cancer is a complex disease and people have to use their full potential and various supportive sources to fight the illness and treatment.

“Spiritual Suffering” represented items reflecting the suffering from cancer that affected the people’s life, especially the psychosocial discouragement that occurred during their sickness, the worrying, and

also reflected the change of life goals after they were diagnosed with cancer. “Spiritual Uncertainty” reflected the feeling about the patients’ unexpected future; that is, they did not know how much more time they had to live. The items were related to the acceptance of death and future uncertainty while “Spiritual Readiness” provided items related to the concerns about their assets, worries, and their life plans after they knew that they were seriously ill.

These characteristics of the factors and items did not exist in the SWS-TBACI. This might be related to the fact that the participants of the study were different. The items of the SWS-TC were generated from the direct experience of PWC, whereas the SWS-TBACI was generated from literature reviews, the experience of experts, and other non-cancer participants. The SWS-TBACI aimed to validate the SWB of people with chronic illness who were Buddhist, while the SWS-TC was developed for measuring the SWB of Thai PWC whose faith was in all religions. However, between these two instruments, similarity of issues was found. They included the concepts of hope, changes in one’s life, happiness, and strength of mind. Both instruments also presented patterns of acceptance of illness or “thumjai,” which is a coping strategy found among the Thais.<sup>39</sup>

Moreover, the SWS-TC is a specific instrument that can reflect the essential aspects of the SWB of PWC. The items represent the crucial attributes of SWB that have been discussed in the literature review, such as the importance of religious faith to life, the connectedness of the individual with his or her surrounding persons, with the environment, and with a supreme being, and also the spirituality of Thai PWC based on Thai culture. The results of this study revealed that the construct of the SWS-TC was proper for validating the SWB of Thai PWC. However, the instruments for measuring SWB should be reliable and valid in several aspects and with different groups of participants, and should be appropriate for cultural contexts.

## **Limitations**

Although this study included PWC with many types of cancer, not all types of cancer could be included. In addition, the SWS-TC is a new instrument and is at the early stage of instrument development. Further research needs to be carried out in various cancer settings and with various types of cancer in order to obtain rigorous psychometric properties and to specify specific cut-off points for scores to indicate the levels of SWB.

## **Conclusion and Implications for Nursing Practice**

The SWS-TC displayed evidence of content and constructing validity, internal consistency, reliability, and concurrent validity. Additionally, its uniqueness compared to the existing instruments is that the items reflect the essentials of SWB based on Thai culture. This uniqueness can be helpful to healthcare providers for assessing SWB among Thai PWC. This instrument can be used in nursing practice due to the small number of items and it is easy to understand and takes a short time to complete. In addition, it can be used in studies concerning prediction, outcome testing of interventions, and the correlations between SWB and the health status of PWC. In nursing education, this instrument can be used as an exemplary instrument for the evaluation of SWB. The learner would come to understand about the dimensions and characteristics of the items that are found in the SWB of Thai PWC. We encourage researchers to use this instrument with further groups of cancer survivors in Thailand.

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## การทดสอบคุณสมบัติการวัดเชิงจิตวิทยาของแบบวัดความผาสุกด้านจิตวิญญาณสำหรับคนไทยที่ป่วยเป็นมะเร็ง

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**บทคัดย่อ:** ความผาสุกทางจิตวิญญาณเป็นผลลัพธ์ทางด้านสุขภาพที่สำคัญของผู้ที่ป่วยเป็นมะเร็ง ซึ่งมีอิทธิพลมาจากวัฒนธรรม มุมมองทางศาสนา และลักษณะทางสังคมที่แตกต่างกัน ซึ่งประเทศไทย ยังไม่มีแบบวัดความผาสุกทางจิตวิญญาณเพื่อใช้ในผู้ที่ป่วยเป็นมะเร็ง คณะผู้วิจัยจึงได้สร้างเครื่องมือวัดความผาสุกทางจิตวิญญาณสำหรับผู้ที่ป่วยเป็นมะเร็งขึ้น การศึกษานี้จึงมีเป้าหมายเพื่อทดสอบคุณสมบัติการวัดเชิงจิตวิทยาของแบบวัดนี้ ข้อคำถามในแบบวัดนี้มีจำนวน 20 ข้อ ผู้ร่วมวิจัยในการวิจัยนี้เป็นผู้ที่ป่วยเป็นมะเร็งอายุ 18 ปีขึ้นไป มีประสบการณ์การรักษาอย่างน้อย 2 วิธี และสามารถสื่อสารเป็นภาษาไทย ผลการวิจัยพบว่าแบบวัดนี้มีค่าดัชนีความตรงเชิงเนื้อหา .88 ทดสอบความตรงเชิงโครงสร้างด้วยการวิเคราะห์องค์ประกอบเชิงสำรวจจากผู้ป่วยเป็นมะเร็งจำนวน 190 คน พบว่าความผาสุกด้านจิตวิญญาณ ประกอบด้วย 4 องค์ประกอบ คือ 1) ความแข็งแกร่งทางจิตวิญญาณ 2) ความทุกข์ทางจิตวิญญาณ 3) ความไม่แน่นอนทางจิตวิญญาณ และ 4) การเตรียมความพร้อมด้านจิตวิญญาณ อธิบายความแปรปรวนได้ 58.35% และนำไปวิเคราะห์องค์ประกอบเชิงยืนยัน โดยเก็บข้อมูลในผู้ร่วมวิจัยกลุ่มใหม่ จำนวน 203 คน พบว่า โครงสร้างองค์ประกอบความผาสุกด้านจิตวิญญาณมีความสอดคล้องกับข้อมูลเชิงประจักษ์อยู่ในเกณฑ์ดี และมีค่าความเชื่อมั่น .76 การทดสอบความตรงตามสภาพกับแบบวัดอื่นอีก 3 แบบวัด ได้แก่ แบบวัดความผาสุกทางจิตวิญญาณที่แปลจากภาษาต่างประเทศและปรับปรุงข้อคำถามเพื่อใช้ในคนไทย แบบวัดที่มีนักวิจัยคนไทยพัฒนามาก่อนหน้านี้ และแบบวัดคุณภาพชีวิตที่มีผู้นำมาใช้ในการวิจัยอย่างแพร่หลาย พบว่า มีค่าสัมประสิทธิ์สหสัมพันธ์อยู่ในช่วง .58 -.75 ( $p < .001$ )

การศึกษาดังนี้พบว่า เครื่องมือนี้มีค่าความเชื่อมั่น ความตรงเชิงเนื้อหา ความตรงเชิงโครงสร้าง และความตรงตามสภาพ อยู่ในเกณฑ์ดี และสามารถนำไปใช้ในการประเมินความผาสุกด้านจิตวิญญาณสำหรับคนไทยที่ป่วยเป็นมะเร็งได้

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