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Reliability and Validatidity of Hospital Anxiety and Depression Scale (HADS) on Breast Cancer Survivors: Malaysia Case Study

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ABSTRACT

Objective: Cancer survivors may experience psychiatric or psychological disturbances during or after medical treatment, but most of it was under-reported or unrecognized by the health care professionals. Hospital Anxiety and Depression Scale (HADS) is a common and widely used tool for determining psychological distress among cancer population. This study determined the reliability and validity of both Malay and Chinese translated English version of HADS.

Method: Malay and Chinese versions of HADS were administered to 150 breast cancer survivors Cronbach's alpha coefficient and convergent validity was assessed to determine the internal consistency and the validity of the questionnaire.

Result: The prevalence of anxiety was 7.3% whereas the prevalence of depression was 4.7%. The internal consistency for the full scale on Malay version was 0.87, for the anxiety subscale was 0.81 and for depression subscale was 0.73. For the scales on Chinese version, the Cronbach's alpha (α) was 0.81, for the anxiety subscale was 0.67 and for the depression subscale was 0.70. The internal consistency of this study was found to be satisfactory with the α coefficient values of above 0.70, as the recommended values. The correlation coefficient ranged from 0.40 to 0.78 for the anxiety and depression subscale for both Malay and Chinese version of HADS, which showed that the correlations between the items of each subscale with its subscale were moderate.

Conclusion: The Malay and Chinese version of HADS were reliable and valid instrument in assessing anxiety and depression among breast cancer survivors.

Keywords: *Hospital Anxiety and Depression Scale (HADS), psychological distress, reliability and validity, breast cancer survivors*

1. Introduction

Psychological distress is a common outcome of cancer diagnosis and treatment. Anxiety and depression was the most predominant psychological distress experienced by breast cancer survivors. The rates of anxiety among breast cancer survivors ranged from 10-50% (Hall, A'Hern, & Fallowfield, 1999; Grassi, Rossi, Sabato, Cruciani, & Zambelli, 2004; Söllner, Maislinger, König, Devries, & Lukas, 2004) while the rates of depression among breast cancer survivors ranged from 1.5-4.6% (Massie, 2004). From a Danish study, it showed that breast cancer survivors had a standardized incidence ratio of 1:25 for anxiety when compared to healthy population (Hjerl, Andersen, Keiding, Mortensen, & Jørgensen, 2002). The most common anxiety symptoms that are frequently experienced by breast cancer survivors were fear of recurrence, fear of the spread of cancer nervousness, restlessness and tension (Meyers, 2002).

An excess risk of developing depression may increase gradually with the diagnosis of breast cancer, while the intermittent and long term depression was the most frequently experienced by nearly all survivors during or after the cancer diagnosis and treatment (Taylor, 1999). Depression was a common disorder that coexists with anxiety (Massie, 2004). However, most of the time, it was underreported or unrecognized by health care professionals. Today, there are many screening tools that have been developed to determine the levels of psychological distress of cancer patients. Among them, hospital anxiety and depression scale (HADS) was a common and widely used tool among a wide variety of medically-ill as well as general populations (Johnston, Pollard, & Hennessey, 2000; Lewin et al., 2002).

2. Materials and Methods

The English version of HADS was translated into both Malay and Chinese language by using the forward translation procedures, with the assistance of Malay and Chinese translators. Respondents' written consents were obtained before their participation in this research. All data were collected from face-to-face interviews by trained interviewers. The data collection was conducted between July 2010 and December 2010. Over the 6 months' period, all the respondents from the breast cancer hospital outpatients and the support groups members were selected in accordance to the inclusive criteria which stated that the subjects were with the age range of 18 to 58 years old, only females were included, had invasive breast cancer characterized by Stage I or II and did not receive any medical treatment during the period of the study. The final Malay and Chinese versions of HADS were administered to 150 breast cancer survivors who fulfilled the inclusive criteria.

HADS is a 14-item self-reported scale developed by Zigmond and Snaith (1983) which had been translated extensively and is available in different languages. HADS is a reliable and valid self-assessment questionnaire developed to identify the anxiety and depression among hospital outpatients. The goal of this study was to provide a screening tool for depression and anxiety, which can be used in any clinical settings, since it is not confounded by any psychical symptoms of illness or diseases (Martin, 2005). HADS is also a popular and simple screening tool which had been validated among breast cancer survivors (Bjelland, Dahl, Haug, & Neckelmann, 2002; Loh, Tan, & Xavier, 2009). Reviews showed that HADS was valid, reliable and sensitive in the screening of the caseness of anxiety and depression among cancer patients (Ballenger et al., 2001; Montazeri, Vahdaninia, Ebrahimi, & Jarvandi, 2003; Olssøn, Mykletun, & Dahl, 2005).

HADS can be divided into two subscales: 7 items represent each of the anxiety and depression subscales. Somatic symptoms associated with physical disorders were excluded in this measurement. Each of the items were scored on a four-point Likert scale of 0-3, giving both the anxiety and depression subscales a maximum score of 21 respectively, with a total maximum scores of 42. For scores lower than the cut-off points (<8), is considered as 'probable absence' of the disorders or normal. Scores exceeded the cut-off points (≥8) showed 'probable presence of the disorders' or caseness while subjects with scores of ≥11 on the subscale are considered as having the disorders (Cohen et al., 2002; Shim, Shin, Jeon, & Hahm, 2008; Terluin, Brouwers, van Marwijk, Verhaak, & van der Horst, 2009).

2.1. Statistical analysis

All data analysis was carried out using the Statistical Package for Social Sciences (SPSS) version 20.0 software. Cronbach's alpha coefficient was used to determine the internal consistency of the items in measuring the same construct. The recommended Cronbach's alpha coefficient for self-reported measurement should be at least 0.70 in order to be reliable (Nunnally & Bernstein, 1994). Convergent validity was conducted to assess the degree of the items for which the subscales are measuring and what theoretically it should measure. Pearson's Correlation coefficient was used to determine the convergent validity of the subscales and also the inter-correlation between the subscales and a value of 0.40 and above was considered as satisfactory.

3. Results

The mean age of a total of 150 survivors was 49.11 years [standard deviation (SD) = 7.10] and the duration of employment was 19.34 years (SD = 10.32). Most subjects were Malay (50.7%), married (60.0%), with education until secondary school (52.0%). A total of 35 (23.3%) were having anxiety, 29 (19.3%) depressed while, 33 (22.0%) were distressed. From the HADS assessed with the cutoff scores ≥ 8, 35 (23.3%) of survivors were anxious, 29 (19.3%) were depressed and with the cutoff scores ≥15, 33 (22.0%) were distressed (Table 1).

3.1. Reliability of HADS

The internal consistency showed that the Cronbach's alpha for the Malay version was 0.87 for the full scale, 0.81 for anxiety subscale and 0.73 for depression subscale. For Chinese version, the Cronbach's alpha for the full scale was 0.81, for anxiety subscale was 0.67 while for depression subscale was 0.70. All values were above 0.70

except for the anxiety subscale of the Chinese version (Table 2-3).

Table 1: The socio-demographic and cancer history of the study subjects and their scores on HADS (N = 150)

Variables	Mean (SD)	No. of subjects (%)
Age	49.11 (7.10)	
Duration of employment	19.34 (10.32)	
Ethnicity		
Malay		76 (50.7)
Chinese		67 (44.7)
Indian		7 (4.6)
Marital status		
Married		114 (76.0)
Single		17 (11.3)
Widowed		13 (8.7)
Divorced		6 (4.0)
Education level		
No formal education		6 (4.0)
Primary education		29 (19.3)
Secondary education		78 (52.0)
Tertiary education		37 (24.7)
Employment		
Private		90 (60.0)
Government		37 (24.7)
Self-employed		23 (15.3)
Stage of cancer		
Stage I		64 (42.7)
Stage II		86 (57.3)
Family history of breast cancer		
Yes		65 (43.3)
No		85 (56.7)
Anxiety score	5.5 (3.4)	
Normal (0-7)		115 (76.7)
Borderline (8-10)		24 (16.0)
Caseness (11-21)		11 (7.3)
Depression score	5.0 (3.1)	
Normal (0-7)		121 (80.6)
Borderline (8-10)		22 (14.7)
Caseness (11-21)		7 (4.7)

Table 2: Items characteristics and reliability of the Malay version of HADS (N = 94) (α = 0.87)

Variables	Mean (SD)	Corrected item- total	Cronbach's alpha if item deleted
Anxiety subscale (α = 0.81)			
Item 1	0.73 (0.85)	0.59	0.66
Item 3	0.70 (0.76)	0.42	0.70
Item 5	0.71 (0.62)	0.39	0.71
Item 7	0.93 (0.63)	0.32	0.72
Item 9	0.61 (0.74)	0.47	0.69
Item 11	0.72 (0.72)	0.40	0.71
Item 13	0.52 (0.71)	0.49	0.68
Depression subscale (α = 0.73)			
Item 2	0.99 (0.78)	0.61	0.77
Item 4	0.89 (0.78)	0.59	0.78
Item 6	0.81 (0.82)	0.66	0.76
Item 8	0.63 (0.80)	0.54	0.78
Item 10	0.76 (0.62)	0.66	0.77
Item 12	0.62 (0.71)	0.55	0.78
Item 14	0.83 (0.80)	0.25	0.83

Table 3: Items characteristics and reliability of the Chinese version of HADS (N = 56) (α = 0.81)

Variables	Mean (SD)	Corrected item-total	Cronbach's alpha if item deleted
Anxiety subscale (α = 0.67)			
Item 1	0.89 (0.71)	0.56	0.58
Item 3	0.91 (0.72)	0.54	0.59
Item 5	0.82 (0.62)	0.54	0.59
Item 7	0.70 (0.66)	0.18	0.69
Item 9	0.71 (0.65)	0.37	0.64
Item 11	0.70 (0.69)	0.35	0.64
Item 13	0.68 (0.72)	0.17	0.69
Depression subscale (α = 0.70)			
Item 2	0.98 (0.77)	0.37	0.68
Item 4	0.68 (0.64)	0.60	0.61
Item 6	0.64 (0.67)	0.52	0.63
Item 8	0.96 (0.63)	0.23	0.71
Item 10	0.80 (0.72)	0.45	0.65
Item 12	0.71 (0.65)	0.33	0.68
Item 14	0.54 (0.57)	0.37	0.67

3.2. Validity of HADS

The validity of the instrument was assessed using convergent analysis. Convergent validity was analyzed by measuring the correlations of the subscale with each of its related item. From the translated Malay version of HADS, the anxiety subscale and its related items, the correlation coefficient ranged from 0.45 to 0.78 whereas for the depression subscale and its related items, the correlation coefficient varied from 0.46 to 0.75. All items were significantly correlated with the subscales ($p<0.001$) (Table 4). For the Chinese version of HADS, the correlation coefficient for anxiety subscale varied from 0.41 to 0.72 while for the depression subscale, varied from 0.40 to 0.72. All items were significantly correlated with the subscales except for Item 13 (I get sudden feelings of panic) (Table 5).

Table 4: Correlation of Malay version of HADS items with anxiety, depression subscale and the full scales

Items	Anxiety subscale	Depression subscale	Full scale (HADS)
Anxiety			
Item 1	0.74**	0.58**	0.71**
Item 3	0.72**	0.51**	0.66**
Item 5	0.78**	0.60**	0.73**
Item 7	0.69**	0.56**	0.67**
Item 9	0.75**	0.62**	0.73**
Item 11	0.68**	0.60**	0.68**
Item 13	0.45**	0.31**	0.41**
Depression			
Item 2	0.62**	0.75**	0.72**
Item 4	0.43**	0.61**	0.55**
Item 6	0.44**	0.56**	0.53**
Item 8	0.48**	0.46**	0.50**
Item 10	0.46**	0.64**	0.57**
Item 12	0.41**	0.59**	0.52**
Item 14	0.50**	0.66**	0.61**

Statistical analysis – Pearson's correlation
** significant at $p<0.001$

4. Discussion

The prevalence of anxious among respondents was 7.3% whereas depression s was 4.7%. The prevalence of anxiousness was lower than the prevalence (10-50%) found in most of the previous studies (Hall et al., 1999; Grassi et al., 2004; Söllner et al., 2004; Lueboonthavatchai, 2007). However, the prevalence of depression was similar and within the ranged of prevalence of depression (1.5-46%) found in previous studies (Massie, 2004).When compared to a local study (prevalence of anxiety was 24% and 21% for depression), these results were also relatively low (Saniah & Zainal, 2010). The differences in prevalence between this study and the local study might be due to the different study group. This study aimed at the prevalence of anxiety and depression of breast cancer cases after all medical treatment have been completed whereas, Saniah and Zainal (2010) studied patients undergoing chemotherapy. Obviously, patients who underwent chemotherapy were more depressed and anxious than those who already completed their treatment.

Table 5: Correlation of Chinese version of HADS items with anxiety, depression subscale and the full scales

Items	Anxiety subscale	Depression subscale	Full scale (HADS)
Anxiety			
Item 1	0.72**	0.51**	0.67**
Item 3	0.71**	0.45*	0.64**
Item 5	0.70**	0.62**	0.72**
Item 7	0.42*	0.32*	0.41*
Item 9	0.56**	0.38*	0.52**
Item 11	0.55**	0.38*	0.51**
Item 13	0.41*	0.03	0.24
Depression			
Item 2	0.48**	0.60**	0.59**
Item 4	0.57**	0.72**	0.71**
Item 6	0.46**	0.67**	0.62**
Item 8	0.28*	0.40*	0.38*
Item 10	0.37*	0.66**	0.56**
Item 12	0.19	0.53**	0.40*
Item 14	0.38*	0.56**	0.51**

Statistical analysis – Pearson's correlation
* significant at $p<0.01$
** significant at $p<0.001$

The internal consistency of this study was found to be satisfactory with a Cronbach's alpha coefficient values of above 0.70 as the recommended values. Both full scales on Malay and Chinese version had values above 0.80 with 0.87 and 0.81 respectively. These values were similar and within the range of Cronbach's alpha values found in Bjelland et al. (2002), where, the Cronbach's alpha values for HADS full scales ranged from 0.78 to 0.93. When comparing between the anxiety and depression subscales of the 2 versions of HADS, the Cronbach's alpha coefficient for the Malay version subscales were better ($\alpha = 0.81$ for anxiety and $\alpha = 0.73$ for depression) as compared to the Chinese version ($\alpha = 0.67$ for anxiety and $\alpha = 0.70$ for depression). These values were similar to that by Bjelland et al. (2002), who showed values for the anxiety subscale ranged from 0.68 to 0.93 while for the depression subscale ranged from 0.67 to 0.90.

Convergent validity which measured by item-subscales correlations, overall showed higher and significant correlations were found for all items with its factors than its opposite factors, except items 12 and 13 on Chinese version. The Pearson's correlation coefficient varied from 0.45 to 0.78 and 0.41 to 0.72 for anxiety subscale for both Malay and Chinese version of HADS while varied from 0.46 to 0.75 and 0.40 to 0.72 for depression subscale. This showed that the correlation between the items of each subscale and its subscale was moderate, similar to Sartorius, Ustün, Lecrubier, and Wittchen (1996). A review found many studies had proved that most of the self-reported measures were highly correlated with coefficients in the range of 0.45 to 0.75 (Bjelland et al., 2002). The real coincidences of anxiety and depression symptoms measured in HADS were the reasons for strong inter-correlation between the 2 subscales. On both translated HADS, the items of HADS had significant correlations with the full scales. This is similar to Marcolino et al. (2007) which found the similar findings.

There are limitations in this study, social desirability bias, a frequent problem of face to face interviews might be resulted especially in those sensitive questions when assessing psychological issues. The original HADS is a self-rating questionnaire, however, in this study; face to face interviews were conducted in the consideration of illiterate respondents. Problems in translation which lead the items not reached the original meaning in the questionnaires can be also be limitation of the study. These were possibly reasons for weak correlations for items and its factors (Montazeri et al., 2003).

5. Conclusion

The findings showed that the Malay and Chinese version of HADS was a reliable and valid instrument in assessing anxiety and depression of the breast cancer patients. Results indicated this version of HADS can be used as a screening tool for anxiety and depression among the breast cancer survivors.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ETHICAL ISSUES

This study obtained approval from the Medical and Ethics Research Committee of Faculty of Medicine and Health Sciences, Universiti Putra Malaysia. Permissions to carry out the study were obtained from the Hospital Kuala Lumpur, Hospital Seberang Jaya Administrative Division as well as the President of the Ipoh, Bangi, Segamat and Johor Bahru Breast Cancer Support groups.

APPENDIX

References for items:

Item 1: I feel tense or 'wild up'
Item 2: I still enjoy the things i used to enjoy
Item 3: I get a sort of frightened feeling as if something awful is about to happen
Item 4: I can laugh and see the funny side of things
Item 5: Worrying thoughts go through my mind
Item 6: I feel cheerful
Item 7: I can sit at ease and feel relaxed
Item 8: I feel as if I am slowed down
Item 9: I get a sort of frightened feeling like 'butterflies' in the stomach
Item 10: I have lost interest in my appearance
Item 11: I feel restless as if I have to be on the move
Item 12: I look forward with enjoyment to things
Item 13: I get sudden feelings of panic
Item 14: I can enjoy a good book or radio or television program

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