ORIGINAL ARTICLE

VALIDATION OF A NEW QUESTIONNAIRE ASSESSING THE HEALTH IMPACT OF DIVORCE ON WOMEN: AN EXPLORATORY FACTOR ANALYSIS

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ABSTRACT

The aim of this study was to develop a new validated questionnaire to assess the health impact of divorce on women. A cross sectional study was undertaken in a district in Terengganu, using a newly developed self-administered Malay language questionnaire comprising of six domains and 82 items. The questionnaire was constructed based on the literature review and discussions with experts. Exploratory factor analysis was applied in construct validity and internal consistency was used for reliability analysis. A total of 51 respondents were involved in this study. All the consented divorcees were Malays. The mean (SD) age for the divorced women was 35.8 (10.00). Majority (82.4%) of them had secondary education. All the final three domains demonstrated Keiser-Meyer-Olkin (KMO) of more than 0.6, significant Bartlett's test of Sphericity and Cronbach's alpha of more than 0.80. The overall Cronbach's alpha was excellent (0.920). The final questionnaire consisted of two domains. Factor loading for all items in each subdomains were satisfactory. The final functional somatic symptoms domain consisted of 6 subdomains and 19 items with factor loading from 0.402 to 0.914. For emotional instability domain, the final items were 13 items with factor loading from 0.548 to 0.878. The questionnaire was valid and reliable to be used for functional somatic symptoms and emotional instability domains. It is useful to assess the health impact and related intervention of divorced women. A confirmatory factor analysis may further confirm the final model.

Keywords: divorce, health impact, reliability, validity, women

INTRODUCTION

Divorce is defined as dissociation, cessation of association or termination of marriage or the legal dissolution of marriage. The rate of divorce worldwide has substantially increased. For example in Belgium, while the number of marriages has declined (by almost 40% between 1900 and 2000), the number of divorces increased by over 400%.[1] In Malaysia, the number of divorce is increasing year by year. The recent statistics provided by the Department of Islamic Development (JAKIM) showed a rising trend in the number of Muslim divorce from 13,536 in 2000 to 27,116 in 2009.[2] The problem is again exposed by an extensive report by Chan and Mustaffa (2008) which showed that in 2005 there was a 15.5 per cent divorce rate for Muslim couples compared to 7.9 per cent for the non-Muslims in Malaysia.[3]

Several studies had explored various aspects of the impact of divorce on women, such as, the psychological aspect,[4-9] physical illness,[6, 10, 11] and health care utilisation among divorcees.[11-13] People who experience divorce tend to develop health problem, depression, lower level of life satisfaction and more health problem than married people.[14] In terms of economic consequences, poverty becomes a major problem in lone mothers. A majority of them were living in low incomes due to inability to work, work with low-pay or in low-status occupation.[10, 15]The children of divorced couple also follow similar pattern of economic hardships. Bianchi (1995), for instance, reported that half of the children living in mother-only families in Puerto Rico were living in poverty.[16] Children living in single parent families were one third lower in economic status compared to those living in two-parent families or stepfamilies.[17]

Many previous studies had developed and used questionnaires to explore the impact of divorce on children.[18, 19] In contrast and in spite of many questionnaire-based studies on the impact of traumatic event on women's health,[20, 21] there had been no comprehensive questionnaire developed specifically to assess the impact of divorce on women. This study hopes to develop and validate a questionnaire to rectify the situation so that a significant part of women's health issues may be addressed.

METHODOLOGY

Study Design and Location
This was a cross sectional study. The study was conducted in Besut, a coastal district in north Terengganu in Malaysia. It has a population of 136, 563 (2010 census) consisting of Malays who are the majority followed by Chinese and other

ethnics.[22]The main economic activities were agriculture and fishing.

Study Respondents

The list of divorcees in Besut district from year 2005 to 2010 was obtained from the Religious District Office. The divorcees who were recruited into this study were aged 18 years and above, divorced between 1 month to 6 years, Malay and Malaysian citizen. Those who had psychiatric illness and severe medical illness prior to divorce were excluded from this study. All consented divorcees were included in the study to meet the required sample.

Sample size was determined using two methods; factor analysis and reliability analysis. Sample size for factor analysis was determined by using subject-to-variable ratio of 1:2[23] and calculation for each domain by using Stata/SE 9 software for internal consistency based on Cronbach's alpha. The minimum sample size required was 58 respondents.

Instrument

The questionnaire was developed in Malay language. Content validity involved extensive literature review and discussions. Items in the domains were designed based on the literature search about the impact of divorce and some of the items were extracted from the Malay version of questionnaire on Women's Health and Life Events Experiences by World Health Organization.[21] Discussion with a Psychiatrist was also made to identify clinical and diagnostic representatives of each item in the psychosomatic symptoms and emotional instability symptoms domains. The questionnaire was also reviewed by two Family Health Physicians, a panel from Women's Health and Development Unit and a Malay language teacher from the Language Unit at UniversitiSains Malaysia Health Campus. The questionnaire was divided into two parts consisting of subjects' data and health impacts questionnaire. The preliminary version of the questionnaire after content validity assessment comprised of 82 items distributed over five domains which were functional somatic symptoms, emotional instability, sexual activity related, social problem and medical illness.

The functional somatic symptoms domain was developed to assess the psychological effect of divorce on divorcees. This domain contained 30 items. The first 16 items were fatigability, giddiness, headache, backache, bloatedness, abdominal discomfort, whole body ache, skin problem, fainting, difficulty in breathing, dryness of mouth, palpitation, soles pain, calves pain and frequency in urination. Another 14 items were focused on problems in walking, climbing up and downstairs, lifting weight more than five kilograms, long standing and sitting, slow jogging, seeing, hearing, reaching, waving, writing, cutting and holding.

Emotional instability domain was designed to assess any emotional impact experiences by subjects after divorce. The domain consisted of 24 items which were change in appetite, sleep pattern and disturbance, stress, worrying, crying, difficulty in making decision, loss of focus, feeling of guilt, hopelessness and worthlessness, feeling sad, easily angry, taking tranquilizer pills, having suicidal thoughts and loss of interest or pleasure in the activity they used to enjoy before divorce.

Sexual activity related domain had seven items. The domain elicited information about their sexual relationship after divorce. The sexual activity related items were homosexuality, masturbation, promiscuity and multiple sexual partners. Social problem domain was also included in the questionnaire for both the divorcees and their children. The items in the domain consisted of questions about taking drugs, searching for outside entertainment, running away from home, being sorted by family, becoming alcoholic, smoking, beating up children and being isolated by the community. Questions for the children were focused on involvement in illegal racing, drug taking, running away from home, getting irritated, being rebellious and blaming their mothers for the current situation. Finally, medical illness domain was included in the questionnaire to determine whether the subject was suffering from any illnesses as a result of divorce. The expected illnesses include diabetes, hypertension, stroke, breast cancer, cervical cancer and heart problem.

The scoring for functional somatic symptoms and emotional instability domains were positive type items using five score Likert-scale; "5", "4", "3", "2", "1", for "strongly agree", "agree", "not sure", "not agree", and "strongly disagree" respectively. The scoring for the other three domains; sexual activity, social and medical problems were also of positive type. However these domains used Likert scale scores of "3", "2", and "1" for "yes", "don't know" and "no". The questionnaire was a self- administered questionnaire.

Statistical Analysis

All data were entered and analyzed using PASW software version 18.0. Subjects' data; personal and marital information were analyzed using descriptive statistics. Exploratory Factor Analysis (EFA) was applied to explore possible construct using Principle Component Analysis (PCA) extraction method with direct Varimax rotation. The factor analysis, Keiser-Meyer-Olkin (KMO) and

Bartlett's test of Sphericity were computed for every domain to identify the items to be included in the final analysis. The KMO value of ≥ 0.5 and significant Barlett's test of Sphericity (p value < 0.05) were required for a satisfactory factor analysis.[24] The factor analysis and Pearson's Correlation matrix was repeated by including and excluding the items until the best combination or reduction was met. Lastly, the factor analysis was again computed to produce factor loading for the final version of the questionnaire. The internal consistency reliability of the questionnaire was examined by computing the inter item correlation and Cronbach's alpha for each domain and sub-domain. A Cronbach's alpha of ≥ 0.70 and corrected item total correlation of ≥ 0.30 were considered as the acceptable evidence of internal consistency for the considered scale.[24]

Ethical Considerations
This research was approved by the Research Ethics Committee (Human) of UniversitiSains Malaysia.

RESULTS

Socio-demographic and Marital Characteristics of the Respondents
All 51 respondents of divorced women were included in the analysis. The mean (SD) age among the respondents was 35.8 (10.00). All the respondents who participated in this study were Malay women. The mean (SD) duration of marriage was 10.5 (9.46) and mean (SD) age at marriage was 22.9 (5.69). The socio-demographic and marital characteristics of the respondents are presented in Table 1.

Construct Validity
Table 2 shows each item in the final questionnaire with its factor loading. The final analysis of functional somatic symptoms and emotional instability domains demonstrated KMO values of greater than 0.6 and significant Bartlett's test of Sphericity. Scree plot suggested six factors or subdomains for functional somatic symptoms domain and three factors for emotional instability domain. The domains accounted for 76.7% and 71.8% of the total variance respectively. The minimum item factor loading was 0.402.

Validity for sexual activity related, social problem and medical illness domains could not be computed because there was zero variance in the analysis making it impossible to compute correlation coefficient. KMO and Bartlett's of Sphericity were also not produced.

Reliability
The values' range of Cronbach's alpha for functional somatic symptoms subdomains were from 0.694 to 0.893 and emotional instability subdomains were from 0.839 to 0.891. The overall value of Cronbach's alpha was 0.920.

Reliability for sexual activity related and social problem domains could not be computed because the items had zero variance resulting in many items being deleted from the scale. For medical illness domain, the determinant of the covariance matrix was zero or approximately zero. Thus, they could not be computed and displayed as system missing values.

The final questionnaire consisted of two domains and 32 items. Table 3 summarizes the results of factor analysis and reliability analysis of the final questionnaire.

Table 1: Socio-demographic and marital characteristics of respondents (n=51)

Characteristics	Mean (SD)	n (%)
Socio-demographic characteristic		
Age (year)	35.8 (10.0)	
Race		
Malay		51 (100)
Non-Malay		0 (0)
Income (RM)	702.3 (768.84)	
Educational level		
Primary		3 (5.9)
Secondary		42 (82.4)
College		3 (5.9)
University		3 (5.9)
Marital characteristic		
Duration of marriage	10.5 (9.46)	
Age at marriage	22.9 (5.69)	
Number of child		
0-3		40(78.4)
4-6		9(17.6)
>6		2(0.04)
Reasons for divorce		
Infidelity		12 (23.5)
Lack of understanding		29 (56.9)
Violence		10 (19.6)

Item Level Descriptive Statistics
Item level descriptive analysis of original 82 items for functional somatic symptoms domain revealed the mean ranged from 1.84 to 3.25. The mean for emotional instability domain ranged from 2.10 to 3.06. All respondents answered "no" in sexual activity related domain. In social problem domain, 53.3% of respondents answered "no" in all questions, and in medical problem domain, 67.0% of the respondents answered "no" to five out of six questions. The mean for social domain ranged from 1.00 to 1.73 and mean for medical domain ranged from 1.02 and 1.18.

Table 2: Final questionnaire of health impact of divorce on women (32 items)

Domain and **components**	Final items in Malay version	Factor loading
Functional somatic symptoms		0.752
○ **General musculoskeletal symptoms**	1. *Sayaselaluberasaletihsepanjanghari* (B_Q1) 2. *Saya selalu berasa sakit-sakit badan* (B_Q7) 3. *Saya selalu berasa lenguh-lenguh kaki* (B_Q16) 4. *Saya selalu berasa sakit belakang* (B_Q4)	0.870 0.727 0.689
○ **Neurological symptoms**	5. *Saya selalu berasa hendak pitam* (B_Q10) 6. *Saya selalu berasa pening* (B_Q2) 7. *Saya selalu berasa sakit kepala* (B_Q3)	0.803 0.735 0.617
○ **Gastrointestinal symptoms**	8. *Saya selalu berasa sakit perut* (B_Q5) 9. *Saya selalu berasa perut tidak selesa* (B_Q6)	0.904 0.906
○ **Musculoskeletal upper limbs**	10. *Saya mempunyai masalah untuk mengangkat tangan* (C_Q9) 11. *Saya mempunyai masalah untuk memotong buah* (C_Q13) 12. *Saya mempunyai masalah untuk menulis* (C_Q11)	0.878 0.906 0.778
○ **Musculoskeletal lower limbs** ○ **Musculoskeletal power**	13. *Saya mempunyai masalah untuk berjalan* (C_Q1) 14. *Saya mempunyai masalah untuk menaiki tangga* (C_Q2) 15. *Saya mempunyai masalah untuk menuruni tangga* (C_Q3) 16. *Saya mempunyai masalah untuk berlari anak* (C_Q14) 17. *Sayamempunyaimasalahuntukmengangkatbarangmelebihi 5kg* (C_Q4) 18. *Sayamempunyaimasalahuntukberdiri lama* (C_Q5) 19. *Sayamempunyaimasalahuntuk duduk lama* (C_Q6)	0.563 0.908 0.914 0.489 0.696 0.402 0.406
Emotional instability		
○ **Feeling of frustration**	1. *Sayaselaluberasatertekan* (D_Q6) 2. *Sayaselalumenangis* (D_Q9) 3. *Saya rasa sangat kecewa* (D_Q14) 4. *Saya rasa sangat sedih* (D_Q15)	0.748 0.699 0.867 0.851
○ **Feeling of worthlessness**	5. *Saya selalu mengambil ubat untuk menenangkan fikiran* (D_Q18) 6. *Saya selalu berfikir untuk membunuh diri* (D_Q19) 7. *Saya rasa tiada lagi orang yang menyayangi diri saya* (D_Q22) 8. *Saya rasa sangat tidak berguna* (D_Q13) 9. *Saya rasa saya menyusahkan semua orang* (D_Q21)	0.760 0.832 0.787 0.707 0.548 0.878
○ **Loss of concentration**	10. *Sayasusahuntukmembuatkeputusan* (D_Q10) 11. *Pekerjaan saya selalu terganggu* (D_Q11) 12. *Saya selalu hilang tumpuan semasa bekerja* (D_Q12) 13. *Sayatidakbolehberfikirsecarawaras* (D_Q8)	0.744 0.565 0.690

Table 3: Summary of the factor analysis and reliability of final questionnaire on health impact of divorce on women (n=51)

Domain and components	Initial items	Final items	Factor loading	Total variance explained	KMO value	Overall Cronbach's alpha
Functional somatic symptoms	(30)	(19)	0.402-0.914	**76.7%**	**0.69**	**0.872**
○ General musculoskeletal symptoms		4				0.811
○ Neurological symptoms		3				0.756
○ Gastrointestinal symptoms		2				0.893
○ Musculoskeletal upper limbs		3				0.871
○ Musculoskeletal lower limbs		4				0.858
○ Musculoskeletal power		3				0.694
Emotional instability	(24)	(13)	0.548-0.878	**71.8%**	**0.80**	**0.915**
○ Feeling of frustration		4				0.891
○ Feeling of worthlessness		5				0.856
○ Loss of concentration		4				0.839
Total	**82**	**32**	-	-		**0.920**

DISCUSSION

This study provides an assessment on the validity and reliability of a newly developed questionnaire on health impact of divorce on women. This questionnaire could be used to assess the overall health condition of the divorcees from functional somatic and emotional aspect. Validation of this set of questionnaire is also important because it will act as a screening tool for related mental illness for divorcees as the prevalence for this problem is increasing.

The present set of questionnaire was developed based on extensive literature review and expert comments. According to previous studies and reports, the health impact on the women could be divided into functional somatic, emotional, sexual, social and medical domains.[21] Discussions on the items in the questionnaire were held with the experts guided by the conceptual framework of the topic. Final consensus on the domains and the items was made after few reviews. Later, modification on few statements and phrases was made based on face validity to improve the respondents' understanding, appropriateness of items and questionnaire presentation.

The final questionnaire consisted of two domains

and 32 items based on factor analysis for construct validity. The final functional somatic or psychosomatic symptoms domain was reduced to six components or subdomains with 19 items; four items referred to general musculoskeletal symptoms, three items referred to neurological symptoms and two items referred to gastrointestinal symptoms. In addition to this, four, three and another three items referred to musculoskeletal lower limb, musculoskeletal upper limb and musculoskeletal power respectively. The six sub-components of functional somatic symptoms were consistent with undifferentiated (dis)stress disorder.[25] Fink *et al*. (2005), for instance, classified psychosomatic symptoms into health advice, natural (dis)stress reaction and undifferentiated (dis)stress disorder. Undifferentiated distress disorder consists of cardiovascular, pulmonary, gastrointestinal and musculoskeletal symptoms.[25]

Final analysis of emotional instability domain resulted in 13 items which were loaded into three constructs. Four items referred to feeling of frustration, five items referred to feeling of worthlessness, and another four items referred to loss of focus. These subdomains were consistent with the Beck Depression Inventory (BDI) which is a 21-item, self-report rating inventory that

measures characteristic attitudes and symptoms of depression (Beck, et al., 1961). The BDI demonstrates high internal consistency, with alpha coefficients of .86 and .81 for psychiatric and non-psychiatric populations respectively [26, 27]. Therefore, the emotional stability domain represents the depressive symptoms present in the women after divorced or separation. Many studies [28, 29] have concluded that a higher rate of mental illness exists among the widowed than their married counterparts which in part conform to our study on divorced women. Chen *et al.*, (1999) concluded that widows had higher mean levels of traumatic grief, depressive and anxiety symptoms compared to widowers [30].

Many divorcee live by themselves. Similar to widows, they suffer the fear of being alone and loss of self-esteem as women, in addition to the many practical problems related to living alone. They feel the loss of personal contact and human association; therefore, they tend to withdraw and become unresponsive [31].

All the final two domains produced good corrected item-total correlation (r >0.40) including the functional somatic symptoms domain (ranged from 0.445 to 0.825). Even though there was lack of homogeneity of the item-total correlation in this domain, the items were retained due to their clinical significance. The overall Cronbach's alpha for this domain was good (0.872, ranged from 0.694 to 0.893). The corrected item-total correlation value for emotional instability domain ranged from 0.517 to 0.899. The Cronbach's alpha was excellent with a total value of 0.915 (ranged from 0.839 to 0.891). None of the components in this domain had a Cronbach's alpha of less than 0.80.

Validity and reliability for sexual activity related and social problem domains could not be computed statistically. This may be due to improper arrangement and inaccurate phrasing of the items. It may also suggest that corresponding sensitive and related sinful items were not occurring in the Malay Muslim divorcee. Apart from that, the sensitive questions might hinder the respondents from answering the truth. The medical illness domain was a problematic subscale. Medical problem commonly manifested more than five years post-divorce. [6] In contrast, majority of our respondents were recently divorced.

This psychometric instrument could be considered as the first tool being developed assessing a specific women's health group in Malaysia. It involves divorced women which is a challenging sample to capture and retrieve information. This was reflected during the entire process of the research. Firstly, it was very difficult to obtain required sample because the subjects were recruited through home visits. The locations of the respondents' houses were far in between and it was difficult to find the respondents based on the address obtained from the religious department. Secondly, lack of cooperation from the respondents. This was probably because the questionnaire addressed sensitive issues and personal questions. Besides that, many respondents were excluded from the study because some of them had remarried.

Based on this study, several recommendations may be offered. The EFA is conducted in this study to provide a basis for specifying an established model in subsequent study using structured equation modelling. Thus, the current questionnaire will be subjected to confirmatory factor analysis study to confirm the current functional somatic symptoms and emotional instability domains. A cross validation studies also need to be conducted to ensure its application in different population. Later, follow-up prospective study may apply this questionnaire to assess the overall health impact of divorce not only on Muslims but also on non-Muslims. Furthermore, interventional studies to improve the health of divorcees can be carried out in the future using this questionnaire. Early detection and management may support better mental health and prevent potentially threatening disorder which in turn may be beneficial to the quality of life of the women and care of their children in the crucial period.

CONCLUSION

This questionnaire is valid and reliable for two domains; functional somatic symptoms and emotional instability domains. A further confirmatory factor analysis may confirm the reduced model. It will be a useful instrument to assess the health impact of divorce on women and to conduct intervention activities to promote their health.

ACKNOWLEDGEMENTS

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