

ORIGINAL ARTICLE

FACTOR STRUCTURE OF TYPE D SCALE IN MALAYSIAN PATIENTS WITH CORONARY ARTERY DISEASE

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Abstract

Objective: Type D personality, tendency trait to experience increased NA (Negative Affect) and SI (Social Inhibition) has been associated with negative psychological conditions linked to heart disease. This study aimed to examine the psychometric properties of the Malay version of Type D personality scale (DS14) among Malaysian patients with coronary artery disease (CAD). **Methods:** In this cross-sectional study 195 patients diagnosed with CAD were selected from National Heart Institute, Kuala Lumpur. They completed the questionnaire including demographic information and the Malay version of DS14 and Hospital Anxiety and Depression Scale (HADS). **Results:** The structural validity, as demonstrated by exploratory factor analysis of the DS14 was acceptable. The Cronbach's α coefficient for the NA and SI subscales were 0.876 and 0.732, respectively. With the standardized cut-off of $NA \geq 10$ and $SI \geq 10$, 28.2% of the patients with CAD were defined as having a Type D personality. Anxiety was significantly higher among patients with Type D personality. **Conclusion:** The results indicate that the Type D personality (DS14) questionnaire is a valid and reliable tool in the Malaysian population. The prevalence of Type D personality in Malaysia falls close to what has been found in Western countries, at least for CAD patients. This study indicates also that it is possible to use the DS14 among the Malaysian population in future cross-cultural studies. *ASEAN Journal of Psychiatry, Vol. 15 (2): July – December 2014: 186-195.*

Keywords: Type D personality, Coronary Artery Disease (CAD), Validity, Factor Analysis

Introduction

Psychological distress has been tied to an increased risk of coronary artery disease (CAD) [1]. However, the role of individual differences in risk has to a great extent been overlooked, in particular since the controversy surrounding Type A Behavior Pattern emerged [2-3]. Personality traits may in fact be able to explain individual differences in distress, morbidity, and mortality in cardiac patients.

With the introduction of “the distressed personality” (Type D) and the development of the Type D Personality Scale (DS14) to measure this construct, focus is again being directed at the role of individual differences in CAD [4].

Type D is defined as the interaction of negative affectivity (NA) and social inhibition (SI) [5]. NA refers to a tendency to experience negative emotions across time or situations [6-

7]. High-NA individuals experience more feelings of dysphoria, anxiety, and irritability; have a negative view of self and the world (7). SI refers to a tendency to inhibit the expression of emotions or behavior in social interactions to avoid disapproval by others [8]. High-SI individuals tend to feel inhibited, tense, and insecure when with others [9-10]. Individuals who are high in both NA and SI have a distressed or Type D personality, given their vulnerability to such chronic distress [11-12]. Type D personality has been associated with a wide range of adverse health outcomes including increased morbidity and mortality in patients with established heart disease, impaired quality of life following implantation of a cardioverter defibrillator, fatigue and vital exhaustion in patients with ischemic heart disease, depressive symptoms in patients with chronic heart failure and peripheral arterial disease, and chronic anxiety in patients with coronary artery disease even after controlling for the effects of disease related factor [5, 13-19].

Type D construct has been studied extensively in Western countries, such as Belgium, Germany, Denmark, Hungary, the USA and Canada [4, 20-24]. In a cross cultural analysis of the measurement equivalence of Type D construct across Western countries; the factor-item configuration, factor loadings, and error structure were not found to be different across countries (fit: CFI=0.91; NFI=0.88; RMSEA=0.018), as well as across gender and diagnostic subgroups [25]. There have been few studies on the DS16, the DS14, or Type D personality in non-Western countries among which the construct was supported in the Chinese culture and Korean population but more replication studies are warranted [26-28]. The aim of the present study is to examine the reliability and validity of the Malay version of the DS14 in patients with CAD in Malaysia.

Methods

This was a cross-sectional study in which the participants with CAD were selected from the outpatients' clinic at the National Heart Institute, Kuala Lumpur, Malaysia. A total of 200 CAD patients consisting of male and female Malaysian nationals, aged 18 years and above were selected. The participants were as follows: The sample included 195 patients

diagnosed with CAD (out of 200, Response rate- 97.5%). Exclusion criteria were: age below 18 years or a foreign national. Ethical approval from the Research and Ethics Committee of National Heart Institute was obtained and after complete description of the study all participants provided written informed consent. All participants were interviewed on demographic variables, Type D personality scale and Hospital Anxiety and Depression Scale by the researcher and trained ancillary staff with minimal assistance.

Clinical Variables

Information on diagnosis including Myocardial Infarction (MI), Unstable Angina (UA), Stable Angina (SA) or No Angina; current invasive treatment including percutaneous coronary intervention (PCI) and/or coronary artery bypass grafting (CABG), hypertension, dyslipidemia and diabetes were obtained from the medical records of these patients.

Psychological Variables

Type 'D' Personality- This study measures Type D personality using the Type 'D' Scale (DS14) developed by Denollet (2005) to measure Type D personality. The respondents rate their personality on a 5-point Likert scale ranging from 0 = false to 4 = true. The DS14 measures negative affectivity (NA) and social inhibition (SI) scales and a cut off of 10 on both scales are used to classify respondents as Type D (i.e., NA \geq 10 and SI \geq 10). The original NA and SI subscales in Dutch are found to be internally consistent ($\alpha = 0.88/0.86$; N = 3678), stable over a 3-month period (test-retest $r = 0.72/0.82$) and not dependent on mood and health status [29]. The original DS14 has also been validated in a few non-Western nationalities and has demonstrated satisfactory psychometric properties [26, 28, 30]. To the author's knowledge the DS14 has not been used in the Malaysian context.

The DS14 was in English language in its original version. A bilingual health care professional translated the original version (English language) of DS14 into Malay language using the 'back translation' method to cater to the multi-cultural population that can speak, read and understand Malay language. The translated Malay version was

checked and drafted. Another bilingual health care professional translated the first draft of the Malay language version of instruments back to English. The first draft of the translated versions (English and Malay) were reviewed by a panel of experts including professionals from medical, cardiology, psychiatry and clinical psychology backgrounds with 10 to 21 years of working experience in their respective fields. These experts checked the equivalence and accuracy of the Malay DS14. Non-equivalent words and phrases, poorly translated sentences with vague or lost meanings, culturally inappropriate or insensitive wordings were corrected. The second draft of the questionnaire was pilot tested with 15 respondents for face validation. The participants were asked if the translated version of DS14 was easy to read and understand. None of the participants indicated any major problem with the translated version of the instrument. The Malay DS14 was well received by the participants as it was easy to understand and answer.

Anxiety and Depression-The Hospital Anxiety and Depression Scale (HADS) was used to measure symptoms of anxiety and depression [31]. The scale consists of 14 items that are answered on a four-point Likert scale (0–3). The score range for both the anxiety and depression subscales is 0 to 21. The HADS score is interpreted as follows: 0-7 (normal), 8-10 (Mild), 11 to 14 (Moderate) and 15 to 21 (Severe). The HADS has been validated in the general population, somatic, psychiatric, and cardiac patients, and has been shown to be a valid and reliable instrument with Cronbach's alpha ranging from 0.67 to 0.93 for the two subscales [32]. A recent review reconfirms the performance of HADS in assessing symptom severity and caseness in somatic, psychiatric, primary care patients and general population [33]. The validity and reliability of the Malay HADS has been found to be satisfactory in studies on a variety of patient subgroups and amongst the general population in Malaysia [34-36].

Reliability analysis included measurement of internal consistency for the items and Cronbach's α for the subscale scores. A principal component analysis with varimax rotation was used to examine the factor

structure of the DS14 in the sample. It was expected that the Kaiser–Meyer–Olkin measure of sample adequacy should be 0.60 or higher and that the Bartlett's test of sphericity should be significant. The scree plot and eigenvalue criteria greater than one were used to indicate the number of factors to extract. An absolute factor loading of ≥ 0.40 was considered salient.

Results

One hundred ninety five patients provided complete information on demographic factors and Type D personality scale. The majority of the participants were males ($n = 143$; 73.8% vs $n = 51$; 26.2% females). Mean age was 56.79 years ($SD = 10.60$). The ethnic distribution of the sample was as follows: 128 Malays (65.6%), 35 Indians (17.9%), 28 Chinese (14.4%) and a small percentage ($n = 4$; 2.1%) were patients from other ethnic backgrounds. These patients came to the clinic for follow-up with current diagnosis of no angina ($n = 191$, 97.9%) or stable angina ($n = 4$, 2%). Fifty three (27.2%) of these patients had been diagnosed with myocardial infarct (MI) and/or unstable angina (UA) ($n = 91$, 46.7%) previously (before 12 months). A large group of patients with CAD were treated with PCI ($n = 93$, 47.7%) and/or CABG ($n = 21$, 10.8%). The mean CAD duration for the sample was 2.8 ± 1.1 years. The other baseline investigations revealed that 142 patients with CAD (72.8%) were hypertensive, almost half of the patients had diabetes ($n = 90$, 46.2%) and dyslipidemia ($n = 75$; 38.5%). Following the original two factor structure criteria for DS14 (i.e., NA ≥ 10 and SI ≥ 10) 39.5% ($n = 77$) of the sample identified with NA, 45.1% ($n = 88$) with SI and 28.2% ($n = 55$) with Type D personality. Anxiety and depression were assessed based on the cutoff scores of ≥ 8 that identified 22.6% ($n = 44$) of the participants with anxiety and 13.3% ($n = 26$) with depression.

Psychometric Properties of the DS14 in Malaysian Patients with CAD

Table 1 summarizes the mean, standard deviation and internal consistency scores of the items and the subscales. Based on the mean value, the SI score (8.92 ± 5.07) was

relatively higher than the NA (8.30 ± 6.66). All NA items showed good internal consistency with corrected item-total correlation values ranging from 0.546 to 0.746. The SI items obtained internal consistency scores ranging from 0.335 to 0.672 except for item 3 ('I often talk to

strangers') that showed poor internal consistency with corrected item-total correlation value of 0.155. However, both NA and SI subscales demonstrated good internal consistency with Cronbach's α value of 0.876 and 0.732 respectively.

Table 1. The mean, standard deviation and internal consistency values for DS14 items and subscales

Item	Mean	SD	Internal Consistency
(2) I often make a fuss about unimportant things	1.47	1.42	0.546
(4) I often feel unhappy	1.22	1.24	0.637
(5) I am often irritated	1.24	1.21	0.746
(7) I take a gloomy view of things	1.11	1.24	0.687
(9) I am often in a bad mood	1.03	1.28	0.646
(12) I often find myself worrying about somethings	1.36	1.28	0.683
(13) I am often down in the dumps	0.88	1.12	0.678
Scale NA	8.30	6.66	0.876
(1) I make contact easily when I meet people [†]	0.92	1.01	0.335
(3) I often talk to strangers [†]	1.96	1.39	0.155
(6) I often feel inhibited in social interactions	1.16	1.16	0.371
(8) I find it hard to start a conversation	1.17	1.13	0.672
(10) I am a closed kind of person	1.44	1.20	0.510
(11) I would rather keep other person at a distance	1.18	1.14	0.579
(14) When socialising, I don't find the right things to talk about	1.09	1.13	0.585
Scale SI	8.92	5.07	0.732

Note: [†]Reverse keyed. Number in **bold** is the corrected item-total correlation value that is below the required criteria of 0.30.

Both the Kaiser–Meyer–Olkin measure of sampling adequacy (0.879) and Bartlett's test of sphericity ($p < 0.001$) verified the appropriateness of using factor analysis in the current data set. The Exploratory Factor Analysis (EFA) with varimax rotation and Kaiser normalization was conducted, as in the

original analysis of the DS14 in Dutch (Denollet, 2005). The rotated eigen values of the first two factors of DS14 were: 5.09 and 2.55. The factor loadings, percentage of variance and eigen values of two factors of Malay version of DS14 are described in Table 2.

Table 2. Factor Loadings of DS14 and its Subscales

DS14 Items (N = 195)	Factor 1 Negative Affectivity	Factor 2 Social Inhibition
<i>Negative Affectivity</i>		
2	0.679	-0.083
4	0.770	0.060
5	0.835	-0.019
7	0.718	0.281
9	0.727	0.145
12	0.672	0.337
13	0.693	0.354
<i>Social Inhibition</i>		
1 [†]	-0.076	0.619
3 [†]	-0.260	0.629
6	0.766	0.125
8	0.424	0.653
10	0.307	0.568
11	0.445	0.579
14	0.484	0.566
Eigenvalue	5.09	2.55
% of Variance	36.4	18.2

Note: [†]Reverse keyed. The **bold and italicized** numbers indicate items with cross loadings above 0.40.

The 7 NA items (item 2, 4, 5, 7, 9, 12 and 13) strongly loaded on Factor 1 with factor loadings ranging from -0.083 to 0.354. Among the 7 SI items (item 1, 3, 6, 8, 10, 11 and 14) all but one item 6 strongly loaded on factor 2. On scrutinizing the results of EFA, four ‘Social Inhibition’ items: item 6 (‘I often feel inhibited in social interactions’), item 8 (‘I find it hard to start a conversation’), item 11 (‘I would rather keep other person at a distance’) and item 14 (‘When socialising, I don't find the right things to talk about’) cross

loaded on ‘Negative Affectivity’ factor (factor loadings of 0.766, 0.424, 0.445 and 0.484 respectively). The three SI items 8, 11 and 14 had higher factor loadings on their original SI factor (0.653, 0.601 and 0.640 respectively) and were also conceptually linked to social interactions than negative affect. However, the factor loading of item 6 on its original ‘Social Inhibition’ factor was lower than the set criteria (≥ 0.40).

Table 3. Characteristics of Patients with CAD stratified by Type D Personality

Variables	Total Sample N = 195	Type D n = 55	Non-Type D n = 140	t/ χ^2
Age (years); Mean (SD)	56.79 (10.60)	56.25 (9.11)	57.01 (11.15)	0.445
<i>Gender; n (%)</i>				0.251
Male	144 (73.8)	42 (76.4)	102 (72.9)	
Female	51 (26.2)	13 (23.6)	38 (27.1)	
<i>Ethnicity; n (%)</i>				9.270*
Malay	128 (65.6)	87 (74.5)	41 (62.1)	
Chinese	28 (14.4)	26 (3.6)	2 (18.6)	
Indians	35 (17.9)	23 (21.8)	12 (16.4)	
Others	4 (2.1)	0 (0)	4 (2.9)	
<i>Clinical Variables; n (%)</i>				
Percutaneous Coronary Intervention	93 (47.7)	33 (60)	60 (42.9)	4.652*
Coronary Artery Bypass Grafting	21 (10.8)	4 (7.3)	17 (12.1)	0.975
Hypertension	142 (72.8)	43 (78.2)	99 (70.7)	1.113
Diabetes Mellitus	90 (46.2)	32 (58.2)	58 (41.4)	4.460*
Dyslipidemia	75 (38.5)	23 (41.8)	52 (37.1)	0.365
<i>Psychosocial Variables; n (%)</i>				
Anxiety	44 (22.6)	28 (50.9)	16 (11.4)	35.226***
Depression	26 (13.3)	9 (16.4)	17 (12.1)	0.609

Note: *P < 0.05, ***P < 0.001

Demographic, Psychosocial and Clinical Correlates of Type D Personality

The association between demographic, psychosocial and clinical factors and Type D personality was analyzed using independent t-test for continuous and Chi-square (χ^2) statistic for categorical variables. With the use of the standardized cut-off of ≥ 10 on both subscales of the DS14, 28.2% ($n = 55$) of the CAD patients were identified with Type D and 71.8% ($n = 140$) were Non-Type D patients. The demographic, psychosocial and clinical characteristics of patients stratified by Type D personality are presented in detail in Table 3. There was no significant difference in age and gender of Type D and Non-Type D patients with CAD. The ethnic background of patients with CAD was significantly different ($\chi^2 (3) = 9.270, p = .026$) with more Malays ($n = 87, 74.5%$) followed by Indians ($n = 23, 21.8%$) to be identified with Type D personality characteristics. There was significant difference observed in the clinical characteristics of Type D and Non-Type D

patients with CAD. Diabetes ($p = 0.035$) and percutaneous coronary intervention (PCI) ($p = 0.031$) was recorded significantly higher among Type D patients.

Among the psychosocial variables anxiety ($\chi^2 (1) = 35.226, p < 0.001$) was significantly prevalent among Type D patients with CAD. There was positive significant relationship between NA and SI ($r = 0.427, p < 0.001$), NA and Anxiety ($r = 0.442, p < 0.001$). SI was also significantly related to anxiety ($r = 0.225, p = 0.002$). Type D personality was significantly related to anxiety as well ($r = 0.425, p < 0.001$) but not to depression ($r = 0.056, p = 0.438$).

Discussion

This is the first study of its kind to validate the Type D measure in a Malaysian sample. The results indicated that the Malay version of the DS14 demonstrated good internal consistency for both subscales that are comparable to those of the original version. The NA-SI solution of

the Type D construct in Malaysian CAD patients replicated the concept as proposed by Denollet (2005). This study gives further evidence to the notion that the NA and SI subscales are two global traits that can capture the anticipated theoretical structure. However, the cross-cultural aspect has to be considered before applying the Type D personality construct in context of Malaysian patients with CAD, especially for the SI subscale.

The SI scores were similar to those found in clinical studies in a Western and Asian cultural context [25-26, 28]. However, the NA scores were lower in comparison to SI. It has been well documented that the tendency for people to experience negative emotions more intensely is lower in collectivistic countries like China and Taiwan [37]. Malaysia shares the collectivistic culture of these South-East Asian countries where it can be said that the intensity of negative emotions are lower in comparison to more individualistic countries that further explains the low NA scores. Alternatively, there are also substantial cultural variations reported across some European countries with Northern European countries displaying lower NA scores as well [25].

The psychometric property of the Malay version of the DS14 however comes with certain reservations. The item analysis demonstrated that one SI item (item 3) demonstrated poor internal consistency with other SI items; some SI items (item 6) had weaker factor loadings; and some other SI items showed cross loadings (items 8, 11 and 14). The current research findings thus indicate that there is a distinct possibility of overlap between the two constructs, NA and SI in the Malaysian context. Malaysian culture is different from Western culture in obvious forms and is unique among other Asian countries due to its multi-cultural inhabitance. It can be pointed out that the experience and expression of distress specifically social inhibition among Malaysians are influenced by the specific cultures that co-inhabit this country, which includes the Malays, Chinese and Indians, amongst others. There is thus a need to incorporate culture into our understanding of Type D personality, at least from a Malaysia sub-context.

The results of this study have several implications. Firstly, the Malaysian Type D screening instrument may help to identify high-risk patients, as Type D individuals are at an increased risk of emotional distress which is linked to adverse cardiac events. Secondly, clinical research in the Malaysian population is needed to examine the impact of Type D personality on the quality of life, health outcomes, and prognosis of cardiac patients. Such a study on the predictive effect of Type D personality on the physical and mental health of the CAD patients and general population has been conducted and the results are being awaited. Thirdly, Malaysian patients with Type D personality reported significantly more symptoms of anxiety than their non-Type D counterparts. Hence, the association between psychological risk factors and Type D in Western culture seems also to apply to patients in a Malaysian population. Fourthly, more work needs to be done on how the assessment of Type D personality would affect potential methods of prevention and achievable interventional goals, an issue that has seldom been addressed in previous Western research and is non-existent in non-Western cultures.

The present study has several strengths mainly in that it provides new data for the Type D concept in a South-East Asian culture. It shows evidence of good psychometric properties of the Type D construct in a Malaysian context. The findings of the present study should be interpreted with some caution. The sample size is moderate and the clinical sample is limited to the CAD patients. In future studies, a larger sample size with more patient groups (e.g., hypertension, etc.) in multiple centers is recommended.

In summary, the findings of this study suggest that the Type D construct is reliable in Malaysian populations. It can be construed that the type D construct is not limited to the Western cultural context in which this concept was formulated. In addition, with the glaring differences between the different ethnic backgrounds in terms of Type D personality, it would be relevant to conduct further studies on the cross-cultural comparison of Type D personality. With growing evidence indicating the detrimental impact of Type D personality on the health outcomes in CAD patients in

Western cultures, it may be timely to initiate research on the role of personality in the pathogenesis of CAD in Malaysia. Given the rather high prevalence estimation of Type D personality in this study, more research on Type D personality in the Malaysian context is particularly recommended.

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