

# The Validity and Reliability Study of MBPI (Multidimensional Blood/Injury Phobia Inventory)



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## SUMMARY

**Objective:** This study aims to translate the 40-item MBPI (Multidimensional Blood/Injury Phobia Inventory) into Turkish and examination the reliability and validity figures of this scale.

**Method:** Trained interviewers assessed 477 factory workers using a battery of self-report measures including demographic information and MBPI that had been translated into Turkish by the study team. 61 of the 477 were also interviewed face-to-face by the investigator using the anxiety disorders/phobias sections of the CIDI (Composite International Diagnostic Interview).

**Results:** MBPI had high internal consistency value (Cronbach alpha= 0.94). Validity studies showed scales successfully discriminated patient groups from healthy controls. Factor analysis of MBPI resulted in five factors; the factor contents were very similar to the original scale.

**Conclusion:** Our study has demonstrated the validity and reliability of the Turkish version of MBPI.

**Key Words:** MBPI, validity, reliability, blood/injury phobia

## INTRODUCTION

Blood and injury phobia is classified as a specific phobia. Feeling discomfort when exposed to blood is a common feature seen in many people (Marks 1988). Many of these individuals have responses such as near-fainting, change in heart rate, and nausea when they give blood, see fragmented human bodies or accident scenes, get injections, have their ears pierced, have a tooth pulled, and after other medical procedures (Kilic 2006). Fainting is also common in these circumstances. When exposed to the phobic condition, a temporary increase and then sudden and significant decrease in blood pressure, called diphasic response, occurs; fainting following this is called vasovagal syncope. This physiologic response leading to fainting is seen only in blood-injury phobia (Connolly and Wisselberg 1976; Ost et al. 1984; Thyer et al.1985; American Psychiatric Association, 1994).

Blood-injury phobia may affect an individual's life significantly. Some phobic people even avoid life-saving interventions: diabetics don't make injections; cancer patients reject operations; some people avoid pregnancy due to a fear of giving a birth (Kilic 2006). Women with blood-injection phobia, a subcategory of blood-injury phobias, have been reported to reject medical help (McAllister et al. 2012). Many phobics don't go to hospitals, can't look at injured people, and can't watch TV programs about medical topics. Because of this fear, they may avoid careers such as medicine and nursing. Some people may faint when they hear the word 'blood' or an ambulance siren, and some may faint when they listen to someone talking about an operation. In DSM IV (American Psychiatric Association 1994), irrational and extreme fears against blood, injury, injection and related medical procedures (including dentist phobia) are all categorized under the heading of 'blood-injury phobias'. A scale to evaluate

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blood-injury phobia is not available in Turkish, although the Modified Dental Anxiety Scale (MDAS; Humphris et al. 1995), which was developed to evaluate dentist phobia (a subcategory of blood/injury phobia), was translated to 11 languages, including Turkish. The validity and reliability of the Turkish version of this scale was evaluated by Tunc et al. (2005). Another scale commonly used to measure the severity of blood-injury phobia is Multidimensional Blood/Injury Phobia Inventory (MBPI). MBPI, which was developed by Wenzel and Holt in 2003, includes four types of stimuli (injection, hospital, blood, injury) and five types of phobic responses (fear, avoidance, apprehension, disgust, fainting). It includes 40 items developed by crossing questions for one's self and others. MBPI is the only scale that measures both anxiety and disgust against blood phobia stimulus (van Overveld et al 2011). However, this scale does not include a question about dentist phobia.

The aim of the present study was to measure psychometric properties and validity and reliability values of the 40-item MBPI in a Turkish population.

## METHOD

### Sample

This study included 477 subjects (35 females, 442 males) between the ages 22 and 56 years, who were employed as workers and public servants in a chopper maintenance plant in Ankara.

### Tools for Measurement

CIDI 2.1 (Composite International Diagnostic Interview): This interview is a fullystructured clinical interview scale developed by World Health Organization (WHO). It is commonly used worldwide as a diagnostic tool using both ICD and DSM IV criteria. It was translated into Turkish by Kilic and Gogus in 1997. Because it allows very little interviewer judgment, it can be applied by nonclinician interviewers. It is the most commonly applied scale for psychiatric epidemiological studies in the world. Although the duration of the interview varies according to the symptoms of the patient, it generally takes one hour.

CIDI can be applied as a whole or specific modules may be used according to study purposes. In this study, the Anxiety Disorders and Phobias section of CIDI was performed by the researcher who was trained for application of CIDI . After study subjects gave consent, the first two interviews were recorded and were checked by CIDI trainer.

Demographic Information Questionnaire: This questionnaire was prepared by researchers and included questions about education level, profession, address, medical status,

household monthly income, fear of the dentist in the family and relatives, history of dental treatment, previous psychiatric illness, psychiatric illness in relatives, medical illnesses, source of general information about medical and psychiatric health, psychiatric drug use, cigarette smoking and alcohol use. Study subjects completed this questionnaire under supervision of the researchers.

Modified Dental Anxiety Scale-MDAS: This questionnaire was developed by Humphris et al. in 1995 and was translated into 11 languages. This is a self-rated scale that includes five items. The first four items were developed based on the Dental Anxiety Scale (DAS) (Corah 1969) and the fifth item questions fear from intraoral injection. Each question has five answers ranging from 'not anxious' to 'extremely anxious'. Answers are scored from one to five points, respectively. A study evaluating the validity and reliability of the Turkish version was performed by Tunc et al. in 2005. This study included 557 subjects: 442 volunteers from the general population, 94 patients attending a dental clinic, and 22 patients diagnosed with dentist phobia by two separate clinicians. MDAS was applied to the whole sample and the Cronbach alpha coefficient of internal consistency was calculated as 0.91. The authors determined 15 points and above as the cut-off for dentist phobia.

Multidimensional Blood/Injury Phobia Inventory, MBPI: This inventory was developed by Wenzel and Holt (2003). Four types of stimuli (injection, hospital, blood, and injury) are crossed with five types of phobic responses (fear, avoidance, worry, fainting, and disgust) to yield 40 questions. Choices range from Very Slightly or Not at all (0 point) and Extremely (4 points). In a validity study of this scale, Fear Questionnaire- Blood/Injury (FQ-B/I Marks and Matthews, 1979), Structured Clinical Interview for DSM-IV-Non-Patient Version (SCID-NP, First et al., 1997), and State-Trait Anxiety Inventory (STAI; Spielberger et al., 1970) were applied to 558 psychology students. Blood-injury phobia was predicted to be present in 49 study subjects. Eighteen of 49 subjects approved a DSM-IV based structured interview and blood-injury phobia was detected in 9 of these 18 subjects. After this study six independent factors were defined with MBPI: fear of injection, fainting, hospital, one's own blood, injury, and other individual's blood-injury. Percentage of the variance explained by sum of these factors was not stated. Cronbach alpha value for MBPI was calculated as 0.91. Approval from author of MBPI scale (Amy Wenzel) was obtained to do a validity and reliability study of the Turkish version of MBPI. MBPI was translated to Turkish by a staff member who has very strong English proficiency as "Çok Boyutlu Kan-yaralanma Fobisi Envanteri, ÇBKFE". The translated text was compared to the original text by another researcher. Items which did not match the exact meanings in the original scale were revised.

## Procedure

Demographic Information Questionnaire, MDAS, and MBPI were given to 477 subjects working in a factory in Ankara. Interviews were made in the workplace between July 2009 and August 2009. A researcher who worked as a dentist in that workplace checked all questionnaires. Subjects with missing data were reached and asked to complete forms. To study discriminant validity, subjects estimated to have blood-injury phobia according to MDAS and MBPI were selected and diagnostic interviews were planned with these subjects. Therefore, 94 subjects who had 15 or more points using MDAS (the only scale available in Turkish), were selected to be interviewed using CIDI (anxiety disorders and phobias section). Face-to-face clinical interviews could be done in 61 of these 94 subjects who gave consent to trained researchers. Some of these interviews were done in the health center inside the workplace, while the remainder were performed in the Psychiatry Department of Hacettepe University Medical School. The study was approved by the ethical committee of Hacettepe University.

## FINDINGS

This study included 477 subjects (35 females and 442 males) who were employed in a factory as workers or public servants and whose ages were between 22 and 56 years. Mean age was 39.2 (SD: 7.1). Male subjects were older (39.6, SD: 7.0) than females (34.5, SD: 6.3). Mean age of the group showed normal distribution but MDAS and MBPI total scores did not show normal distribution. Therefore, nonparametric tests were used to analyse variables related with total scores. Several sociodemographic features of the study group are shown in Table 1.

### Reliability Measurements

Item analysis: Item-total score correlation method was used for item analysis. Correlation between an item and the total score is generally expected to be above 0.20 and not be a negative value. In our study item-total score correlations were above 0.20 for all items. The item that had the lowest correlation with the total score was the sixth item of MBPI (I avoid situations in which I might get injured, 0.23). Item-total score correlations for other items varied between 0.33-0.69 (Table 2). Correlations of items related with injury were generally lower than other items.

Inner Consistency (Cronbach alpha): Inner consistency of MBPI was calculated using Cronbach alpha reliability analysis. Data from 477 subjects yielded a Cronbach alpha value of 0.94 for MBPI. When separate inner consistency analyses were performed according to types of stimuli (each group (blood, injection, hospital and injury) consisted of 10

questions), Cronbach alpha values varied between 0.81-0.94. The lowest value was observed in the injury subgroup.

### Validity Measurements

Construct Validity: Construct validity is calculated to evaluate whether a measurement tool works in the manner it is developed for. To detect construct validity of MBPI, we used exploratory factor analysis. To measure sample size we used Kaiser-Meyer-Olkin (KMO) analysis. In our study, the KMO value for MBPI in the whole sample was 0.92. KMO value should be above 0.5 to say the sample size is adequate; a KMO value between 0.8-0.9 is defined as 'good' and 0.9-1 is defined as 'perfect' (Kaiser 1970; Cerny and Kaiser 1977). To determine MBPI factor structures, principal component analysis was applied according to Kaiser normalisation and varimax transformation.

Initial analyses yielded eight factors which explained 67.1% of the variance. The sixth and seventh factors included similar items and the eighth factor included only two items. Because scree plot evaluation showed that factors other than first five explained very little of the total variance, we decided to limit the factor number to five.

The contents of the resulting five factors were similar to those in the original study. The difference was mainly in the order of the factors. In the original study, the sequence was injection phobia, hospital phobia, fainting phobia, self-blood phobia, injury phobia and others' blood-injury phobia, while in our study the sequence was others' blood-injury phobia, self-blood phobia, injection phobia, hospital phobia, and injury phobia. The factors were named according to items they contain (Table 3). Appearance of clinically meaningful subdimensions prove construct validity of this inventory.

Concurrent Validity: MDAS is the only scale available in Turkish that measures a similar concept (because dentist phobia is classified under blood-injury phobia in classification systems) so it was used for concurrent validity. Therefore, we investigated association of MDAS with both MBPI total score and MBPI factor scores. Correlation of MDAS total score with MBPI total score was 0.41. Correlations of MDAS with MBPI factors were 0.03 (injury), 0.12 (self), 0.15 (others), 0.24 (hospital), and 0.35 (injection).

Discriminant validity: The ability of the scale to discriminate between subjects who received a diagnosis and those who did not was investigated in a subgroup (n=61) of the original sample. Mann-Whitney U test was used to analyse whether a difference was present between subjects who received and who did not receive a diagnosis of blood-injury phobia in CIDI according to MBPI total score. Mean total MBPI score was 29.1 (SD=21.9) in nonphobic subjects and 49.6 (SD=33.6) in phobic subjects; this difference was statistically significant

( $Z = 2.842$ ,  $p = 0.015$ ). These results show that MBPI can discriminate nonphobic and phobic subjects.

In addition, we calculated the possible rate of diagnosis when different cut-off points were applied and, by comparing these data with CIDI results, we found sensitivity, specificity, and rate of true positive diagnosis with each cut-off point. Accordingly, when a cut-off point of 47 was used, sensitivity was 55%, specificity was 60% and rate of true diagnosis was 72%.

## DISCUSSION

### Reliability Analyses

The aim of this study was to assess the validity and reliability of the Turkish version of MBPI that detects, examines dimensions of, and rates severity of blood-injury fear-phobia. Our results show that MBPI can reliably be used in Turkish. Calculation of inner consistency coefficient is among the most commonly used methods to assess the reliability of scales. The logic behind this method is the high correlation between individual items of the scale. As such, it can be concluded that items measure similar (unique) concepts. Therefore, scales that contain questions that assess many unrelated concepts may have low internal consistencies. Although this scale consists of multiple subscales (factors), the high Cronbach alpha value suggests that all factors measure a similar concept. To calculate inner consistency, correlation coefficients were found between each item score and the total score. The sixth item of this scale had a lower correlation with the total score than the other items. When we excluded the sixth item, the Cronbach alpha value increased (although very little). In addition, most of the items related to injury also had low item-total score correlation. Different segregation of these items may be due to how our subjects understood the term 'injury'.

### Construct Validity

Adequate sample size is important in factor analysis for the reliability of the correlation between different variables. Our sample size seems to be convenient for factor analysis ( $KMO = 0.92$ ). Although the sequence of the five factors we found in our study was different from the original study, their contents mostly overlapped. Fainting did not appear as a factor in our study. Almost all items segregated under 'fainting' factor in the original study were seen in factors related with phobic stimuli that induce phobic response. Items segregated in 'hospital' factor were same with the original study. In factor which was defined as fear from own blood, three items related with fainting and item "I feel disgusted when I get injured" were segregated different from the original study; other items of this factor overlapped with the original study. Four items which were segregated in our study to the factor 'injury phobia' were the same as the original study; but differing from

our study, items related with others' injury also segregated to this factor in the original study. In our study all other items related with others were segregated under the factor others' blood-injury. The main difference with the original scale was in the sequence of the factors. Other than this, the main difference with the original scale was in items related with injury. Considering the lower inner consistency of questions related with injury than other questions, these questions might not be understood by study subjects. Injury might be understood as more severe damage, like stab or bullet wounds, by some subjects.

### Concurrent Validity

Positive correlation with a scale which is thought to measure a similar concept is believed to reflect concurrent validity of a scale. MDAS is available in Turkish to be used to measure dentist phobia and its total score is correlated both with MBPI total score and four of its five factors. It is interesting that the factor score with the highest correlation with MDAS was injury factor. This suggests that patients visiting a dentist have more fear of intraoral and intrabuccal injections than from dental procedures.

### Discriminant Validity

One of the most common methods used to assess validity of a clinical scale is discriminant validity. A valid scale is expected to differentiate between patients and healthy people. In our study, MBPI could significantly discriminate patients diagnosed as blood-injury phobic according to DSM-IV. Although the specificity of the scale was adequate, it had moderate sensitivity. We think this result was due to low number of diagnosed patients.

### Limitations of the Study

Data collection was cross-sectional in our study. Change over time of the severity of blood-injury phobias could not be evaluated. Our study included workers and public servants working in a factory in Ankara; additionally, most of the subjects were male. Therefore our results, especially prevalence rates, cannot be extended to the general population.

## RESULT

Results from our study showed that MBPI is a valid and reliable tool to evaluate blood-injury phobia and its subdimensions. We believe that MBPI, which was translated to Turkish in this study, will be helpful to better understand patients with blood-injury phobia, to evaluate blood-injury phobia dimensionally, and to plan treatments for blood-injury phobia. Items related with injury had both taken lowest scores in item-total score correlations and this factor's inner consistency

was lower than the other (injection, hospital, blood etc) factors. It was also the factor contributing the least to variance in factor analysis. Finally, although all other factors showed positive correlation with MDAS, which was used for concurrent validity, the correlation of injury factor was near zero. These findings suggest that statements related to injury were either not understood adequately by the subjects or were not appropriately translated to maintain the same concept of injury as the original scale. We recommend replication of MBPI validity and reliability studies which exclude items related to injury in the future.

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## REFERENCES

- American Psychiatric Association (1994) DSM-IV - Diagnostic and Statistical Manual of Mental Disorders – 4th Ed. American Psychiatric Association, Washington DC, K ro lu E (Translation), Ankara: Hekimler Yayın Birli i.
- Cerny CA, Kaiser HF (1977) A study of a measure of sampling adequacy for factor-analytic correlation matrices. *Multivariate Behavioral Research* 12: 43-7.
- Connolly J, Wieselberg M (1976) Treatment of blood/injury/illness phobia. *Br Med J* 2:587-8.
- Corah NL (1969) Development of a dental anxiety scale. *J Dent Res* 48:596.
- First MB, Spitzer RL, Gibbon M et al (1997) Structured Clinical Interview for DSMIV Axis I Disorders, Research Version, Non-patient Edition. (SCID-I/NP). New York: Biometrics Research, New York State Psychiatric Institute.
- Humphris GM, Morrison T, Lindsay SJ (1995) Modified Dental Anxiety Scale: validation and United Kingdom norms. *Community Dent Health* 12: 143-50.
- Kaiser HF (1970) A second generation Little Jiffy. *Psychometrika* 35: 401-15.
- Kılı  C (2006), Anxiety Disorders: Specific Phobias. *T rk Psikiyatri Derne i Yayınları Bilimsel  alı ma Birimleri Dizisi*; 4: 147-82.
- Marks IM (1988) Blood-injury phobia: a review. *Am J Psychiatry* 145: 1207-13.
- Marks IM, Matthews AM (1979) Brief standard self rating for phobic patients. *Behaviour Research and Therapy* 17: 263–7.
- McAllister N, Elshtewi M, Badr L et al (2012) Pregnancy outcomes in women with severe needle phobia. *Eur J Obstet Gynecol Reprod Biol* 162:149-52.
-  st LG, Sterner U, Lindahl IL (1984) Physiological responses in blood phobics. *Behav Res Ther* 22: 109-17.
- Spielberger CD, Gorsuch, R L, Lushene, RE (1970) Manual for the State-Trait Anxiety Inventory. Palo Alto, CA: Consulting Psychologists Press.
- Thyer BA, Himle J, Curtis GC (1985) Blood-injury-illness phobia: a review. *J Clin Psychol* 41: 451-9.
- Tun  EP, Fırat D, Onur OD et al (2005) Reliability and validity of the Modified Dental Anxiety Scale (MDAS) in a Turkish population. *Community Dent Oral Epidemiol* 33:357-62.
- van Overveld M, de Jong PJ, Peters ML (2011) The Multi-Dimensional Blood/Injury Phobia Inventory: its psychometric properties and relationship with disgust propensity and disgust sensitivity. *J Anxiety Disord* 25: 319-25.
- Wenzel A, CS Holt (2003) Validation of the Multidimensional Blood/Injury Phobia Inventory: Evidence for a Unitary Construct. *J Psychopathol Behav Assessment* 25: 203-11.
- World Health Organization (WHO) (1997) Composite International Diagnostic Interview. 2.1 Translation. Kılı  C, G     A. Hacettepe University Medical Faculty Psychiatry Dep. and World Health Organisation Collaboration Center Ankara.