Original Article

Validation of the Minnesota Multiphasic Personality Inventory (MMPI 2) in psychiatric patients and non-patient individuals in Mashhad city, Iran

*Zohre Valianpour[1]; Morteza Modarres Gharavi[2]; Behrouz Mahram[3]

[1]MS. in Psychology, Branch of Torbat-e-Jam, Islamic Azad University, Torbat-e-Jam, Iran
[2]Associate Professor of Clinical Psychology, Psychiatry and Behavioral Sciences Research Center, Mashhad University of Medical Sciences, Mashhad, Iran.
[3]Associate Professor, Department of Educational Curriculum Studies, Faculty of Psychology and Educational Sciences, Ferdowsi University of Mashhad, Mashhad, Iran.

Abstract

Introduction: The second edition of the Minnesota Multidimensional Personality Inventory (MMPI 2) is the most widely used objective test for personality assessment and psychological pathology. The main purpose of this study was to validate and prepare for the MMPI-2 test.

Materials and Methods: In this study, 210 healthy adults in Mashhad and 160 psychiatric patients aged 19 to 50 years with a medical record in Ibn-e-Sina Psychiatric Hospital in Mashhad were selected from 2007 to 2010. Data were analyzed using descriptive indices, Pearson correlation coefficient, percentile norms, Student T and Cronbach's alpha.

Results: Pearson correlation coefficient was reported in all scales except Hysteria (Hy) scale in retest between 0.73 and 0.93. The results show the validity of all scales based on differentiation based on discriminant validity except L scale (lie detector) at the level of 0.01. Also, the validity in each of the scales, except for the Hy (hysteria) scale, is moderate to high. Cronbach's alpha internal consistency coefficient in non-sick and sick individuals showed good reliability for all scales except the scales of lie (L), hysteria (Hy), masculinity (Mf m), and femininity (Mf f).

Conclusion: The Minnesota Multidimensional Personality Inventory (MMPI 2) has an acceptable validity for use in the Iranian adult community. The researchers and specialists can use this inventory in counseling centers in addition to history and clinical interviews to assess the psychiatric patients.

Keywords: Mental disorders, Minnesota Multiphasic Personality Inventory (MMPI-2),Validation

Introduction

Psychological assessment is still one of the main tasks of clinical psychologists. Personality assessment tools with high reliability and validity are helpful for clinical psychologists. Therefore, the long history of using personality measurement tools cannot justify the current use (1). Minnesota Multiphasic Personality Inventory-2 (MMPI-2) is

*Corresponding Author:
Branch of Torbat-e-Jam, Islamic Azad University, Torbat-e-Jam, Iran.
zvalianpour@yahoo.com
Received: Jan. 11, 2020
Accepted: Aug. 11, 2020

the highest usage personality test in the psychology profession. Although this tool was initially created in the United States during the middle of the last century, its application has spread throughout the world (2). "Minnesota Multiphasic Personality Inventory 2" has been translated into 125 different languages so far. MMPI/MMPI-2 is one of the personality assessment tools emphasized in the teaching of doctoral programs in psychology (Ph.D. and Psy.D.) (3). There are psychological tools that have a principal place in psychological therapy (4). Numerous studies have pointed to the widespread use of this tool. For example, this questionnaire was used by Kashani et al. (5) on the prevalence of personality disorders among emergency nurses. Rezaei Doogheh (6) used it in addicted people. Malek Raisi (7) applied this tool in smokers. In addition, MMPI used to assess psychological characteristics of combat veterans, individuals who refer due to dental beauty processes, and addicted and non-addicted people (8-11).

Also, the diagnostic validity of MMPI-2-RF was examined by Dawai et al. (12) in line with the obsessive-compulsive disorder, Kamkari et al. (13) in imprisoned men and Darmi and Shokrzadeh (14) in bipolar disorder. Other uses of the test in legal settings to identify the denial of psychiatric disorders in criminal offenders (15) and the diagnosis of malingering (16), the history of sexual abuse in women (17), and the history of physical abuse in childhood (18), as well as for PTSD detection in combat veterans (19).

In addition, Selburn et al. (20) examined the development and validation of MMPI-2-RF scales for indexing triarchic psychopathy constructs. In another study, MMPI-2-RF is used in a psychiatric sample. Finally, Farina et al. (22) also conducted a meta-analytic review to assess the validity of MMPI to detect defensiveness in custody evaluations.

The research findings were obtained from a sample of subjects depending on the tools used to gather information. Therefore, one of the essential tasks of researchers is to evaluate the validity, reliability, objectivity, and appropriateness of information collection tools. These assessments should be described and defended in written research reports (23). This test is important instrument and used widely but some of its materials do not fit the culture of our

tool in Iran for evaluating mental patients in the field of research? The sub-questions are: 1- Does the MMPI-2 questionnaire have sufficient reliability to evaluate mental patients in Iran? 2- Does the MMPI-2 questionnaire have sufficient validity to evaluate mental patients in Iran?

The first standardization was conducted by Motabi and Shahrami (1995) in order to psychologically assess patients with axis I on 439 subjects, including (207 women, 232 men) and 128 mental patients in Tehran (24). The results showed that this inventory has good psychometric properties in the Iranian adult population (25). In Iran, MMPI-2-RF has been translated and adapted by Kamkaree and Shokrzadeh (2009) (26). The study population included various populations such as national team athletes, employees of various organizations, students, teachers, citizens living in Tehran and other cities of the country, people with clinical problems such as schizophrenia, obsessive-compulsive disorder, depression, anxiety, etc.

The present study, considering the limited geographical community of previous researchers (24) and not considering the patient sample in another study (25), intends to be tested again the efficiency of the MMPI-2 questionnaire in a larger sample, including healthy and patient people with various subcultural characteristics that exist in the pilgrimage city of Mashhad city, Iran.

Materials and Methods

The present study is part of developmental research in terms of purpose. The research method is descriptive (non-experimental) and is a kind of test construction and standardization. The statistical population of the patients in this study was 700 people, including the whole of people 19 to 50 years old who were referred to Ibn-e-Sina Hospital during 2007-2010. The statistical population of the non-patient population, including adults in Mashhad, who did not have a history of outpatient or hospitalized admission, brain damage, and drug use, had at least eight grades of education. According to similar validations, the statistical sample of the patient using the available sampling method included the profiles of 140 male and 20 female patients in the archive files of Ibn-e-Sina Hospital, and the

normal statistical sample (non-patient) in proportion to survey studies using age (18-60), gender (male and female) and education criteria (cycle and lower than cycle, diploma, Postgraduate, bachelor's, master's and doctoral degrees) and using the non-probabilistic sampling method type of quotation, 210 people, including 65 men and 145 women. For the non-patient sample, the first known families in different parts of Mashhad were considered. In each family with one member and, if possible, with the whole family, a face-to-face interview was conducted on the questionnaire and the conditions for answering it. If the family were agreed, the number of eligible people in the family would be given the questionnaire. However, in the interview, people were told that if a person had enough time and was willing to take the re-examination after a week, it was necessary to write the date on the first answer sheet if they agreed. After receiving telephone inquiries from the questionnaires, they were handed over, and some of the subjects who wished to cooperate were told that if they had a qualified friend or relative in other parts of the city where samples were not yet available, introduce them and give them a questionnaire if they wish. A number of these tests were distributed at Ibn-e-Sina Hospital among medical students and their families and hospital staff and guards. Several questionnaires were also distributed between families of Mashhad seminary students. In this way, everyone filled in the same conditions (at home) and received the same information about the questionnaire. In addition, during the implementation of the questionnaire, all subjects had access to the test takers for their possible questions.

In order to consider ethical considerations at the request of the subjects for interpretation, despite having a time limit (determining a specific time to defend the dissertation), a paper containing a test interpretation was given to them after scoring.

Responses that did not have specifications were separated from the rest as invalid. The next step evaluated the responses using four credit scales L, (F), K, and I do not know (?). Responses to more than 15 unanswered questions were also considered invalid. Then, to calculate the validity of the answers on the other three scales, they were

hand-scored using three key answers, T-scores for valid answers in Graham's book, and profiles normalized by Baraheni and Motabi (27). At this stage, valid answers were separated from invalid ones, and finally, 210 valid questionnaires were obtained from 300 questionnaires.

The re-test sample consisted of 30 non-patient samples re-tested voluntarily one week after the first test. Of these, seven people were excluded from the study due to the invalidity of one of the two answers or both. Therefore, 12 questionnaires were given to 12 language center students considering the decline. Some of them were university students. After re-testing on these individuals, 30 re-tests were finally obtained. Because patients are being treated and the treatment effects may affect their responses to re-testing, they were not used for re-testing.

For the patient cases, the supervisor provided the examiner with about 200 answers and profiles from patients at Ibn-e-Sina Hospital, which clinical psychologists had previously taken. The tester evaluated these answers in terms of 4 scales, and those that did not meet the validity criteria were discarded. Due to the confidentiality of patients' documents, this was done by the examiner herself. Then, using the codes written in the available answers, the examiner found the files of these patients from the medical records section of Ibn-e-Sina Hospital and recorded the psychiatrist's diagnosis for each patient in front of each code (adaptation to the file and criterion validity). At this stage, some patients who did not have a diagnosis or did not have a file, their answers were taken away, and only 156 answers that had a final diagnosis (hospitalized patients) and four answers with an initial diagnosis (outpatients), their data were entered into SPSS by the examiner.

Research instrument
A) Minnesota Multiphasic Personality Inventory MMPI-2: This questionnaire has 567 questions answered correctly / incorrectly by the subject. The four-credit indicators that are used to evaluate the test response attitude that was developed for the original MMPI and is retained in MMPI-2 are: I do not know the scales (?), The lie detector (L), the infrequency (F), and Correction (K). New credit scales that have become part of MMPI-2 in the standard include

variable response inconsistency scales, correct response inconsistency (FB), Psychopathology inconsistency (FP), and Excellent Descriptive Self (S) (27). This test also has ten clinical scales, including hypochondriasis (Hs), depression (D), hysteria (Hy), psychosocial deviate (Pd), masculinity-femininity (Mf), paranoia (Pa), and psychasthenia (Pt), schizophrenia (Sc), hypomania (Ma) and social introversion (Si). In addition, some other scales are used to refine the meaning of clinical scales and provide additional information that includes content-based scales (content scales), sub-scales for clinical and personality scales based on clusters of content-dependent materials (Harris and Lingoes scales), assessment of materials and clusters of materials related to specific dimensions (critical materials) and new scales obtained experimentally (complementary scales) (28). To get meaningful results from MMPI-2, subjects should have sufficient ability to read and understand questions and answer them appropriately. The ability to read up to six literacy classes is required. The use of MMPI-2 is specific to subjects 18 years of age or older (27). In this study, only 370 questions at the beginning of the MMPI-2 questionnaire were performed on a non-patient sample, and the responses and profiles performed on psychiatric patients were 370 questions. These 370 questions include four validity scales and ten clinical scales.

Results

To calculate the validity of each of the MMPI-2 questionnaire scales, criterion validity was used by matching the results with the patients' files. For this purpose, after separating the responses of patients placed by the psychiatrist in one of the different diagnostic groups according to the file, the average score of 13 MMPI-2 questionnaire scales in the patient group with the non-patient group using the t-test was compared for independent groups. The mean scales of F, Hs, D, Hy, Pd, Mf m, Pa, Pt, Sc, Ma, and Si in the patient group were significantly higher than the mean of these scales in the healthy group. Also, the mean of the L scale in the patient group was higher than the average in the healthy group, but this difference was not very noticeable. In addition, the mean scales of K (defense) and Mf f in the healthy group are higher than the mean of these two scales in the patient group.

Table 1. Comparison of scores of healthy and patient groups in 13 scales using t-test

Scales	F value (equivalence of variances)	Significance of variance differences	Value t	Meaning t
L	0.698	0.404	-1.28	0.199
F	15.568	0.000	-13.31	0.000
K	6.349	0.012	4.38	0.000
Hs	0.166	0.684	-5.45	0.000
D	4.933	0.027	-3.79	0.000
Hy	8.100	0.005	-2.68	0.008
Pd	2.09	0.149	-9.29	0.000
Mf m	0.032	0.858	-3.64	0.000
Mf f	1.258	0.264	2.90	0.004
Pa	0.475	0.491	-11.83	0.000
Pt	0.223	0.637	-8.47	0.000
Sc	0.465	0.496	-11.57	0.000
Ma	0.232	0.630	-8.68	0.000
Si	1.493	0.223	-6.66	0.000

According to the table above, the mean scales of F, Hs, D, Hy, Pd, Mf m, Pa, Pa, Pt, Sc, Ma, and Si in the patient group are significantly higher than the mean of these scales in the healthy group. Also, the mean L scale in the patient group is higher than the average of this scale in the healthy

group, but this difference is not significant. In addition, the mean scales of K (defense) and Mf f in the healthy group are significantly higher than the mean of these two scales in the patient group.

Reliability by test-retest method

Table 2. The reliability of the 13 scales by re-testing after one week

Scale name	Number	Reliability value (Pearson correlation)
L	30	0.830
F	30	0.752
K	30	0.813
Hs	30	0.763
D	30	0.827
Hy	30	0.474
Pd	30	0.882
Mf	30	0.775
Pa	30	0.738
Pt	30	0.935
Sc	30	0.921
Ma	30	0.820
Si	30	0.917

As shown in the table above, all scales except the Hy scale have relatively good reliability above 0.70. Pearson correlation coefficient has been used because scales scores are interval. It should be noted that because medication or psychotherapy may affect patients' responses in two stages of the test, the test-retest was

performed only on non-patients. Reliability calculation using Cronbach's alpha. The following results were obtained for calculating the internal similarity coefficients using Cronbach's alpha for the whole sample (patient and non-patient):

Table 3. The reliability value and statistical characteristics in 13 scales

Scales	Mean	Standard deviation	Variance	Number of questions	Reliability value
L	3.91	1.96	3.86	11	0.508
F	14.18	9.49	90.12	58	0.899
K	13.35	4.80	23.05	29	0.734
Hs	10.83	5.68	32.32	31	0.818
D	17.38	6.65	44.27	42	0.804
Hy	18.41	5.94	35.35	47	0.719
Pd	16.31	6.30	39.76	38	0.799
Mf m	17.17	4.11	16.92	37	0.503
Mf f	19.92	5.01	25.19	36	0.688
Pa	12.81	5.92	35.05	33	0.820
Pt	20.74	9.35	90.88	46	0.902
Sc	29.03	13.34	177.98	77	0.918
Ma	17.57	5.84	34.15	39	0.762
Si	24.63	8.04	64.64	57	0.814

For the scores of each scale, Cronbach's alpha was calculated twice, and the second time, after removing the phrases that had a negative correlation value with the score of the whole scale, the following results were obtained: Cranbach's Alpha was calculated for Scale L, 0.508, F, 0.899, K, 0.734, Hs, 0.818, D, 0.804, Hy, 0.719, Pd, 0.799, Mf m, 0.503, Mf f, 0.688, Pa, 0.820, Pt, 0.902, Sc, 0.9188, Ma, 0.762, and for Si scale, 0.814.

Norm: Percentile norms of the MMPI-2 questionnaire are presented in Table 4 for non-patient sample men and women in each of the thirteen scales.

Table 4. Percentile norms for the healthy group with gender separation

Scales	L		F		K		Hs		D		Hy	
Centile	f	m	f	m	f	m	f	m	f	m	f	m
10	3	3	3	3	19	18	19	18	19	18	18	17
20	4	4	4	4	21	19	21	19	21	19	20	18
30	4	4	5	5	23	21	23	21	23	21	22	21
40	4		5	7	5	24	22	24	22	24	22	23	22
50	4		6	7	7	25	23	25	23	25	23	24	23
60	5		7	9	9	27	24	27	24	27	24	25	24
70	6	7	11	11	29	26	29	26	29	26	26	26
80	7	8	14	12	31	27	31	27	31	27	28	26
90	8	9	18	17	35	29	35	29	35	29	30	27

Scales	Pd		Mf		Pa		Pt		Sc		Ma		Si	
Centile	f	m	f	m	f	m	f	m	f	m	f	m	f	m
10	13	14	25	20	7	7	8	7	9	8	12	13	20	20
20	15	14	28	22	9	8	11	8	12	10	15	14	22	22
30	16	15	29	23	10	9	14	9	14	12	16	16	25	24
40	17	17	30	23	11	10	16	10	18	16	17	17	27	25
50	19	18	31	24	12	11	19	11	20	18	18	18	29	28
60	20	20	32	25	14	12	23	12	23	19	20	18	31	30
70	23	21	33	27	15	13	25	13	28	23	21	21	34	32
80	24	23	34	28	17	15	27	15	34	3	23	22	36	35
90	27	25	35	30	19	18	30	18	39	37	25	25	41	38

Discussion

Due to the importance and widespread use of MMPI-2 in various centers, this study was conducted to adapt the test and ensure the results for clinical applications and counseling services.

The first run performed the re-test reliability on 30 subjects in one week. The results showed a minimum reliability coefficient of 0.47 for the hysterical scale and for the other scales, reliability between 0.73 for paranoia and 0.93 for psychasthenia, which is relatively desirable.

Butcher et al. (29) reported in the Guide to Performing and Scoring Minnesota Multiphasic Personality Inventory 2, on 82 men and 111 women, with an average interval of 8.6 days. In this report, the correlation coefficient for clinical scales was relatively high, so that these coefficients in men from 0.67 (paranoia) to 0.92 (social introversion) and women from 0.58 (paranoia) to 0.91 (social introversion) has fluctuated. In a study, Dehghani et al. (25) examined the MMPI-2 scale re-test coefficients

in a period of one month on a sample of 30 healthy subjects. According to this study, the minimum and maximum re-testing coefficients were 0.42 (psychopathy) and 0.76 (schizophrenia), and the re-testing coefficient was not significant in the paranoid subscale (0.21), while in the present study, the minimum and maximum retraining coefficients are 0.47 (hysterical) and 0.93 (psychasthenia).

In Motabi and Shahrami's (24) study of 67 subjects with a time interval of one week, the reliability coefficients were between 0.36 (scale 5) to 0.92 (scale 8) in women and 0.57 (scale F), and 0.87 (Scale 9) was variable in men, indicating relatively high reliability.

Kamkari and Shokrzadeh (26) calculated validity coefficients for clinical scales (fifty subscales) MMPI-2-RF above 0.80. That was done by Cronbach's alpha method, halving and stabilization coefficient emphasizing test-retest and indicating the desired validity coefficients.

Dehghani et al. (25) used Kuder- Richardson statistics to examine the reliability of its subscales because of being two values of the response spectrum in this inventory. The results showed that the reliability of subscales was variable between 0.43 for masculinity-femininity and 0.89 for schizophrenia.

In this study, the second method for calculating reliability was Cronbach's alpha internal consistency coefficient, which Motabi used only for the (healthy) normative group, and the results confirmed the re-test coefficients. While in the present study, Cronbach's alpha was performed on the whole sample (patient and non-patient), and the results were calculated for scale L, 0.47, Hy, 0.57, Pd, 0.63, Mf m, 0.27, Mf f, 0.21, and for the rest of the scales between 0.66 (D) and 0.91 (Sc). Therefore, the Cronbach's alpha internal consistency coefficient results are consistent with Motabi's findings (21) except for L, D, Hy, Pd, Mf m, and Mf f scales and indicates the average to high levels of internal consistency of some scales. Also, the results of alpha coefficients for most scales are in lint with the results of Butcher, Graham, Benporat, Telegen, Dalstrom, and Kaimer (30). Furthermore, this indicates that some scales have internal consistency coefficients relatively low. The internal consistency coefficient for L, D, Hy, Pd, Mf m, and Mf f scales is lower than expected, which this problem for clinical scales is due to the questionnaire structure and heterogeneous content of the materials of these scales. To assess the validity of the questionnaire, the mean scores of 160 patients (140 men and 20 women) were compared with 210 non-patients (65 men and 145 women) on 13 scales. The results showed the validity of all scales except L, K, and Mf f at the level of 0.001 and 0.01 errors, which on the L scale, the mean score of the patient group was slightly higher than the healthy group, but this difference was not significant. Of course, it is not expected that there will be a difference in scores of L scale between the two healthy groups and the patient, and on the K and Mf f scales, the mean of the healthy group was significantly higher than the patient group. The present study results are consistent with Ragibi's (31) research in terms of the high rate of K validity in normal non-patients compared to the average of Hathaway and McKinley.

In the study of Motabi and Shahrami (21), 128 psychiatric patients from different diagnostic classes were selected to calculate the validity of each scale, according to the diagnosis of the psychiatrist and the interview of the researchers and using the checklist. For a non-patient sample, 439 subjects similar to the present study were selected using the quota sampling method, and according to three variables of age, sex, and education and the average scores of healthy people were compared with the average scores of patient people that results of the study showed the validity of all scales at the level of 0.01 error.

In the test of student's t for independent groups, the scales mean of F, Hs, D, Hy, Pd, Mf m, Pa, Pa, Pt, Sc, Ma, and Si in the patient group were significantly higher than the non-patient group which is in line with the findings of Motabi (21) and indicates the validity of these scales at the desired level. The results show that the Hy scale, in addition to not having the desired stability, has a low internal consistency. Based on the present study's findings on the reliability and validity of the MMPI-2 questionnaire, the need to re-examine the materials and phrases used in some scales is revealed. Furthermore, due to some cultural and social changes in society, the reliability and validity of the few scales may have been reduced. In recent validations, including research conducted by Selbourne et al. in 2016 (20) using the convenient sampling two participants samples from the archive included 209 women from the correctional facility and 327 university students who had previously filled out the questionnaire, the validity of MMPI-2-RF scales was examined to index triarchic psychopathy constructs. However, in the present study, the archived sample was used only for the patient sample and included men. Selburn et al. also tested internal variability and multivariate correlation between scales. Furthermore, in the next step, using Levinson's self-reporting psychopathy scale and the psychopathy personality inventory, they calculated the criterion validity, including regression and confirmatory factor analysis.

In another study, Selburn et al. (21) used a 343 sample of psychiatric patients evaluated construct and the criterion validity for MMPI-2-RF personality disorder spectra scales, and contrary to current research, no healthy sample has been

used. Overall, except for the Narcissistic and the Obsessive-Compulsive PD Spectra scales, the criterion and construct validity findings were quite supportive of rest scales. In the present study, despite the positive points, there were some limitations that the researchers faced. Lack of systematic sampling for healthy individuals due to lack of a list of healthy individuals in the community and the need for an interview before the test, the length of the questionnaire, and the non-cooperation of some subjects. There is less cooperation of males in the non-patient sample and fewer men in the non-patient group, discarding the profiles and responses of patient women and thus the small number of women in the patient group. It was better to use the factor analysis method to calculate the validity, but this study did not use this statistical method due to the low sample size. It is recommended that more research on the internal consistency coefficient of the L scale and other scales be conducted. If possible, this research should be repeated in other cities of Iran, and the results should be compared and examined. Also, examining and reviewing the materials of some scales that obtained little reliability and validity in this study and re-compiling some materials in accordance with the cultural changes of the society by expert, are recommendations.

Conclusion

Based on the findings, the MMPI-2 questionnaire is a valuable tool in diagnosis and research, along with the history and clinical interview. In particular, scales such as F, Sc, Pt, Hs, and K can be used more confidently than other scales.

Acknowledgments

References

1.Phares E, Trull T. [Clinical psychology: Concepts, methods, and profession]. Firoozbakht M. (translator). 4th ed. Tehran: Roshd; 2008: 295.

2. Butcher J, Williams C. Personality assessment with the MMPI-2: Historical roots, international adaptations, and current challenges. J Appl Psychol 2009; 1(1): 105-35.

3. Piorowski C, Zalewksi C. Training in psychodiagnostic testing in APA-approved PsyD and PhD clinical psychology programs. J Pers Assess 1993; 61(2): 394-405.

4. Piotrowski C, Belter RW. Internship training in psychological assessment: Has managed care had an impact? Assessment 1999; 6(4): 381-92.

5. Kashani P, Mirbaha S, Forouzanfar M, Meschi F, Baratloo A. The prevalence of personality disorders among emergency nurses based on MMPI-2 questionnaire; a cross-sectional study. Arch Acad Emerg Med 2017; 5(1): 1-9.

6. Rezaei DE. [Psychic profile study of addict people with use of the Minnesota multiphases personality inventory-2]. MA. Dissertation. Tehran: University of Social Welfare and Rehabilitation Sciences, 2001. (Persian)

7. Malek-Raisi Mogaddam A. [Compare research of MMPI test scores in medicine students of Zahedan Medical Sciences University in 2003-2004 academic year]. PhD. Dissertation. Zahedan: Medical Sciences University, College of Psychology, 2004. (Persian)

8. Kimiayee A, Azadi Z, Abbasi BS. [The relationship of scale 5 (masculinity- femininity) on the MMPI-2 test with antisocial behaviors and hypochondria]. Quarterly modern psychological research 2016; 40(10):1-12. (Persian)

9. Samadi-Tilenoee A. [Comparative study of mental characteristic of combat veterans with non-veterans using MMPI test in Mazandaran province]. M.A Dissertation of psychology. Tehran: Literature University, 1995. (Persian)

10. Ahmadi-Abhari M. [Research on dental beauty with use Minnesota multiphasic personality inventory in patients that referred to dentistry college diagnosis part of Tehran medical science university]. PhD. Dissertation. Tehran: Dentistry College, 2001. (Persian)

11. Razavi M. [Comparative research of MMPI test indexes in addict and in addict persons that referred to Zahedan psychiatry hospital]. Ph.D. Dissertation. Zahedan Medical Sciences University, 2001. (Persian)

12. Davaee M, Pasha Sharifi H. Zolfagaree S. [Review the diagnostic validity of the Minnesota multiphasic personality inventory-2 restructured MMPI-2-RF in line with the obsessive-compulsive disorder]. MA. Dissertation. Tehran. Islamic Azad University, 2012: 1-10. (Persian)

13. Kamkaree K, shokrzadeh S, Sadeghi M. [The diagnostic validity of the Minnesota Multiphasic Personality Inventory-2 Restructured MMPI-2-RF in prisoner men]. Journal of psychometry 2018; 26(7): 123-43. (Persian)

14. Daromi S, Shokrzade S. [The diagnostic validity of the Minnesota multiphasic personality inventory-2 restructured form (MMPI-2RF) bipolar disorder]. Journal of psychometry 2019; 28(7): 43-71. (Persian)

15. Kucharski L, Tang P, Rosenfeld B. Detecting denial of severe psychiatric disorder: An MMPI-2 investigation of criminal defendants. Int J Forensic Ment Health 2007; 2(6): 145-52.

16. Toomey J, Kucharski L, Duncan S. The utility of the MMPI-2 malingering discriminant function index in the detection of malingering, A study of criminal defendants]. J Assess 2010; 16(12): 115-21.

17. Parks ED. Selected MMPI-2 scales for identifying women with a history of sexual abuse. J Nerv Ment Dis 1995; 1(1830): 53.

18. Korbanka J. Mckay M. An MMPI-2 Scale to Identify History of Physical abuse. J Interpers Viol 2001; 15(11): 1131-9.

19. Kairz J, Drescher K, Klein J, Gusman F, Schwartz M. MMPI-2 assessment of differential post-traumatic stress disorder patterns in combat veterans and sexual assault victims. J Interpers Viol 2010; 16(7): 619-39.

20. Sellbom M, Drislane L, Johnson A, Goodwin B, Phillips T, Patrick C. Development and validation of MMPI-2-RF scales for indexing triarchic psychopathy constructs. Assessment 2016; 23(5): 527–543.

21. Sellbom M, Brown T, Bagby R. Validation of MMPI-2–RF personality disorder spectra scales in a psychiatric sample. J Psychol Assess 2020; 32 (3): 314-320.

22. Farina F, Redondo L, Seijo D, Novo M, Arce R. A meta-analytic review of the MMPI validity scales and indexes to detect defensiveness in custody evaluations. Int J Clin Health Psychol 2017; 17(2): 128-38.

23. Baldbi D, Dalen V. [Fundamentals of research in educational sciences]. Taghavinezhad G. (translator). 1st ed. Tehran: Ghomes; 1995.

24. Motabi F, Shahrami A. [Preparation and standardization of MMPI-2 inventory in Tehran]. MA. Dissertation. Tehran: Psychiatry Institute University, 1995. (Persian)

25. Dehghani M, Ashori A, Habibi Askarabad M, Khatibi M. Standardization and psychometric properties of minesota multiphasic personality inventory-2. J Psychol 2010; 3(14): 299-302. (Persian)

26. Kamkaree K, Shokrzadeh S. [Assessment of personality traits (emphasis on Minnesota Multiphasic Personality Inventory-2 Restructured Form)]. 1st ed. Tehran: Islamic Azad University, Science and Research Branch; 2016: 121-48. (Persian)

27. Graham J. [MMPI-2 assessing personality and psychopathology]. Kafi Masooleh M, Yaghoubi H. (translators). 1st ed. Tehran. Nasle Farda; 2010: 12, 30-44.

28. Groth-Marnat G. [Handbook of psychological assessment]. 3rd ed. Sharifi P. (translator). Tehran: Sokhan; 2008: 420.

29. Butcher J, Dahlstrom W, Graham J, Tellegen A, Kaemmer B. Manual for administration and scoring: MMPI-2. Minneapolis: University of Minnesota; 1989.

30. Butcher J, Graham J, Ben-Porath Y, Tellegen A, Dahlstrom W, Kaemmer B. MMPI-2: manual for administration, scoring, and interpretation, revised edition. Minneapolis: University of Minnesota; 2001.

31. Ragibi M. [Research about applied of the Minnesota multiphasic personality inventory-2 in know of personality trait of non- patient normal individuals]. M.A Dissertation. Shiraz University, 2002. (Persian)