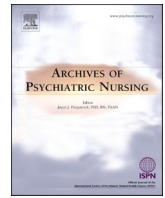




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Adaptation of the Barriers, Attitudes, Confidence, and Knowledge Scale (M-BACK-Tr) into Turkish culture to assess the metabolic health of psychiatric professionals and investigation of Its psychometric characteristics

Elcin Babaoglu^{a,*}, Aydan Akkurt Yalcinturk^a, Yalcin Kanbay^b

^a Uskudar University, Faculty of Health Sciences, Department of Nursing, Istanbul, Turkey

^b Artvin Coruh University, Health Sciences Faculty, Department of Psychiatric Nursing

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ABSTRACT

Aim: The aim was to evaluate the validity and reliability of the “Barriers, Attitudes, Confidence, and Knowledge Scale for Assessing Metabolic Health” (M-Back-Tr) to determine the barriers, attitudes, confidence, and knowledge status of psychiatry professionals in the assessing of metabolic syndrome.

Methods: This methodological study was conducted with 304 psychiatric nurses who were working in public and private healthcare institutions between March and June 2023. Translation and back-translation were made into the Turkish language during the adaptation process and it was found that there was no semantic shift between the versions. While the validity of M-Back-Tr was tested with content validity, construct validity, and convergent validity, its internal reliability and Split-Half Test Reliability were examined for reliability.

Results: The structure of M-Back-Tr, which consists of 4 dimensions (i.e., Barriers, Attitudes, Confidence, Knowledge) and 16 items, was confirmed in Turkish culture. This structure can explain 73 % of the variance in the related concept. The minimum score that can be taken from each sub-dimension is 4 and the maximum is 20. The Cronbach α value of the sub-dimensions of the scale was found to be between 0.79 and 0.91.

Conclusion: The study findings showed that the M-Back-Tr is a valid and reliable measurement tool that can be used in Turkish culture.

Introduction

According to the National Institute of Mental Health, severe mental disorder is defined as Schizophrenia Spectrum and Mood Disorders that cause functional impairment for at least two years (Lundgren et al., 2010). People who have severe mental disorders have a higher risk of physical health concerns when compared to the general population (Dickerson et al., 2006). The reason why physical health concerns are more common in this population is considered to be associated with factors such as physiological changes in hunger and satiety, metabolic changes because of drugs, and a sedentary lifestyle (Lundgren et al., 2010). It is also known that individuals who have severe mental disorders have several Metabolic Syndrome (MetS) risk factors such as abdominal obesity, dyslipidemia, hypertension, and insulin resistance more than the general population (Reininghaus et al., 2015;

Vancampfort et al., 2015). In addition to these risks, these individuals also have lower levels of physical activity when compared to the general population and have higher smoking and obesity rates (Asharani et al., 2020; Rosenbaum et al., 2020). It is already known that psychotropic drugs such as antipsychotics that are used in the treatment of mental diseases have side effects that increase susceptibility to cardiovascular diseases (e.g., hyperlipidemia, glucose dysregulation, and increased appetite) (Daumit et al., 2008; Jin et al., 2004; Meyer & Koro, 2004). The emergence of second-generation antipsychotics decreased some of the side effects of first-generation antipsychotics but increased the risk of MetS in patients (Holt & Peveler, 2009; Jin et al., 2004; Meyer & Koro, 2004). It is also known that 60.8 % of individuals who have severe mental disorders have MetS, and this is two/three-fold more common than in the general population (Morgan et al., 2014).

There is evidence that the metabolic risks of individuals who

* Corresponding author.

E-mail addresses: elcin.babaoglu@uskudar.edu.tr (E. Babaoglu), aydan.akkurtyalcinturk@uskudar.edu.tr (A.A. Yalcinturk).

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regularly use psychotropic drugs because of severe mental disorders are decreased by practices such as evaluating their lifestyles and taking precautions (Curtis et al., 2016; Hyland et al., 2003; Naslund et al., 2016). However, despite these, practices to protect and improve the metabolic health of individuals who have severe mental disorders remain limited (Bartels, 2015). Psychiatric nurses, who are responsible for the holistic care of these patients, focus more on psychosocial care, and preventable physical problems of patients remain at the secondary priority level (Gray et al., 2009).

In previous studies conducted on the subject, psychiatric nurses know that they have important roles in meeting the physical care needs of their patients, however, it is argued that nurses lack knowledge and skills in managing metabolic complications in individuals receiving care (Howard & Gamble, 2011; Nash, 2005; Robson et al., 2012; Terry & Cutter, 2013). Not only nurses but also other specialists who work in the field of psychiatry cannot proactively take part in protecting and improving the physical health of their patients. The main factors that cause these are defined as lack of knowledge and confidence in providing metabolic screening and interventions aimed at reducing risk, and lack of needed time (Happell et al., 2011). However, there is evidence showing that the training provided to mental healthcare staff about metabolic syndrome management has been effective in reducing the risks of this patient group (Rosenbaum et al., 2020).

Although the importance of metabolic health training is already known, there are limited studies that determine the metabolic health assessment and practice levels of psychiatric nurses (Hardy et al., 2011). In a previous study that was conducted in the UK, it was concluded that 75 % of psychiatric nurses did not receive adequate training in physical health services and should be supported with training for identifying and managing metabolic complications (Howard & Gamble, 2011). In another study that was conducted in the USA to determine the knowledge of psychiatric nurses about metabolic syndrome and their care practices, it was reported that the knowledge level of nurses was good, and it was emphasized that this could positively affect preventive and protective interventions in clinics. For this reason, it was stated that training programs aiming to standardize the knowledge levels of psychiatric nurses must be developed to evaluate individuals who have severe mental disorders (Bolton et al., 2016). Nurses who are working in psychiatry units must determine the metabolic risks of individuals who have severe mental disorders and plan practices to reduce these risks with training activities (Robson et al., 2012). It was reported in another study that was conducted in Turkey that nurses who were working in the psychiatry service did not regularly measure blood glucose/lipid levels, blood pressure, weight, and waist circumferences and did not provide training on this subject to individuals who have severe mental disorders (Asik et al., 2016).

Metabolic health assessment and prevention practices for individuals who have severe mental disorders are very important for the quality of life of these patients. For this reason, it is expected that mental healthcare staff know metabolic health assessment and interventions and have the knowledge, skills, and confidence to identify and manage the metabolic comorbidities of these patients. For this purpose, valid and reliable measurement tools are needed to determine the barriers, attitudes, confidence, and knowledge of these specialists for assessing metabolic health. However, there is no measurement tool in our country for the metabolic health evaluations of specialists who work in the field of mental health (psychiatric nurses, psychiatrists, and psychologists).

Psychiatric nurses should be able to identify the care needs of these patients and plan appropriate interventions while providing physical care to maintain the metabolic health of individuals with severe mental disorders. Therefore, it is important to know nurses' barriers, attitudes, confidence and knowledge levels toward metabolic health assessment that affect the quality of care by using the M-Back-Tr scale. With this scale, the needs of psychiatric nurses regarding metabolic health screening and interventions can be determined and training programs can be organized in this field. The effectiveness of these programs can

also be evaluated with the same scale. For this reason, the aim of the study was to determine the psychometric characteristics of the M-BACK measurement tool (M-Back: The Barriers, Attitudes, Confidence, and Knowledge of Mental Health Staff Regarding Metabolic Health of Mental Health Service Users) and to conduct its Turkish validity and reliability study.

Methods

This methodological study was planned to bring a measurement tool to the Turkish culture to determine the barriers, attitudes, confidence, and knowledge levels of mental healthcare staff in assessing metabolic health.

Metabolic health assessment and interventions in individuals who have chronic psychiatric diseases are very important for the quality of life of these patients. For this reason, it is expected that mental healthcare staff know metabolic health assessment and interventions and have the knowledge, skills, and confidence to identify and manage the metabolic comorbidities of the patients. For this reason, valid and reliable measurement tools are needed to determine the barriers, attitudes, confidence, and knowledge of these specialists for assessing metabolic health. However, there is no measurement tool in our country for the metabolic health assessment of specialists who work in the field of mental health (psychiatric nurses, psychiatrists, and psychologists). This study aimed to meet this need.

Determining the appropriate scale to meet the needs

When the literature was reviewed, it was found that Watkins et al. (2017) developed a measurement tool to determine the barriers, attitudes, confidence, and knowledge levels of mental healthcare staff about the metabolic health of individuals who have a psychiatric disease. The abbreviated name of this scale, which was originally “The Barriers, Attitudes, Confidence, and Knowledge of Mental Health Staff Regarding Metabolic Health of Mental Health Service Users”, is M-BACK. The name of the scale has been translated into Turkish as “Scale of Barriers, Attitudes, Confidence, and Knowledge Status for Evaluating Metabolic Health of Psychiatric Professionals (M-Back-Tr)”.

The M-BACK Scale has a 5-point Likert style and consists of 4 sub-dimensions and 16 items. The scale is scored as “I Strongly Disagree” = 1, “I Disagree” = 2, “I Am Undecided” = 3, “I Agree” = 4, and “I Strongly Agree” = 5. Scoring for each item varies between “1” and “5”, and the minimum score of each sub-dimension is “4” and the maximum is “20”. M-BACK consists of 4 sub-dimensions (Carraro et al., 2020; Golay et al., 2021).

Barriers sub-dimension

This sub-dimension aims to identify the barriers of mental healthcare staff such as workload, time constraints, and conflicts associated with metabolic health evaluation, and items in this sub-dimension are scored reversely (items 1, 2, 3, and 4).

Attitudes sub-dimension

The attitudes of mental healthcare staff regarding the importance of smoking cessation, healthy nutrition and physical activity, and monitoring metabolic health are evaluated in this sub-dimension (items 5, 6, 7, and 8).

Confidence sub-dimension

This sub-dimension determines the Confidence of mental healthcare staff regarding their follow-up practice (items 9, 10, 11 and 12).

Knowledge sub-dimension

The items of this sub-dimension are intended to find out the metabolic monitoring of mental healthcare staff and to know the metabolic side effects of psychotropic drugs (items 13, 14, 15, and 16).

Ethical principles

To adapt the “The Barriers, Attitudes, Confidence, and Knowledge of Mental Health Staff Regarding Metabolic Health of Mental Health Service Users” (M-BACK) scale into the Turkish Culture, permission was obtained from the authors who developed the measurement tool through e-mail. The Ethics Committee Approval was obtained from Üsküdar University, Non-Interventional Scientific Research Ethics Committee (Date: 30/12/2022 and Number: 61351342) to conduct the study after the author’s permission. Following the Ethics Committee Approval, institutional permission was obtained from the institutions where the study would be conducted.

Translation into the Turkish Language

The translation processes of M-BACK into Turkish were carried out by 2 expert translators in the field of English Language and Literature and 2 specialist translators specific to the field of healthcare. The scale items translated by the translators were examined and compared with each other in terms of suitability and necessary corrections were made.

Reverse translation method

It is recommended that the reverse translation be done by experts who are not involved in the first translation (Coster & Mancini, 2015). For this reason, two experts in the field of English Language and Literature, who were not included in the first translation, made the reverse translation process, and then the reverse translations were compared with the original scale. Following this process, no difference was detected between the two versions, except for very minor and insignificant differences. The form obtained after the reverse translation was sent to the researchers who developed the original form, and they were asked to examine whether there was a semantic shift in the form. After this process, it was decided that the reverse-translated form and the original form were similar in meaning and cognitive terms.

Expert opinion

The WHO recommends obtaining expert opinions after translation to identify inadequate concepts in translation and to identify inconsistencies between advanced translations and the two languages (Jesus & Valente, 2016). Content Validity Ratio (CVR) and Content Validity Index (CVI) are calculated in line with expert opinions (Yurdugül, 2019; Esin, 2014; Lawshe, 1975). The translated and linguistically validated draft form was sent to a total of 12 specialists, including a psychiatric nurse (6 academics), psychiatrists (3 academics), and psychologists (3 academics), and the draft form was evaluated. Necessary calculations were made after the feedback. The minimum CVR value to be obtained for 12 experts was determined to be 0.667 (Ayre & Scally, 2014; Veneziano & Hooper, 1997).

The data obtained from the experts were tested by determining the content validity ratios and calculating the content validity index for the content validity of the M-BACK-TR scale, which was planned to be adapted in the present study. In line with expert opinions, CVR was calculated for each statement of the draft form, and it was found that there was no item with zero or negative values. When the CVR values of the items were evaluated, it was found that all the statements in the draft form were suitable for calculating the content validity index. In this way, it was decided to calculate the Content Validity Index of 16 items in the draft form. As a result of the necessary calculation, it was calculated that

the Content Validity Index of the 16-item draft form was 0.86. For the form to be valid as a whole, the CVI value must be greater than the CVR value (CVI > CVR). As seen in Table 1, it was concluded that the values obtained from the study were CVI (0.86) > CVR (0.667) and the M-BACK-TR scale provided the content validity.

Pilot implementation

The participants of a pilot implementation depend on the variable to be measured and who the target group will be. Many characteristics (e.g., age range, education level, gender of the group) of the sample of the pilot implementation must be the same as the target group of the original scale (Erkus, 2007). A sample of 30–50 people is considered sufficient in the literature for pilot implementation studies (Seker & Gencdogan, 2006: 13). For this reason, a sample of 30 people who had similar characteristics to the study population was employed to determine whether the draft form, whose language and content validity was made, was understood correctly by the sample. After the pilot implementation, it was found that the items in the scale could be correctly evaluated by the sample and that the participants did not have barriers in responding to the statements.

Population and sample

The population of the study consisted of psychiatric nurses who were working in public and private healthcare institutions. Since the study was a scale adaptation study, factor analysis techniques were used. It is stated in the literature that a sample of 300 people is sufficient for factor analysis (Cokluk, Sekercioglu, & Buyukozturk, 2014: 206; Ho, 2006). In the present study, a sample of 304 people was reached, 80.6 % of whom were female and the mean age of the sample was 30.7 ± 6.9 . Also, 11.5 % of the sample had associate degrees, 63.2 % had undergraduate degrees, and 25.3 % had postgraduate education.

Evaluation of data

The SPSS 26 package program was used for descriptive statistics and the AMOS 23 package program was used for Model Fit Analysis in the data analysis. Numbers, averages, and percentages were preferred for descriptive statistics. Correlation analysis was used to search for relationships, and the construct validity of the scale was tested with the Confirmatory Factor Analysis (CFA). AVE (Average Variance Extracted) and CR (Component Reliability) values were calculated for Convergence Validity. The Cronbach’s Alpha Coefficient and Split-Half Test Reliability were calculated for reliability.

Results

In the present study, firstly, the data of the sample were subjected to Confirmatory Factor Analysis to evaluate the construct validity. As a result of the analysis that was made to test the suitability of the data for factor analysis, it was found that Bartlett’s Normal Distribution Test result was significant (χ^2 : 3093.83; $p < .000$), and the KMO (Kaiser-Meyer-Olkin) Value was 0.85. These findings provided clues that the dataset was suitable for factor analysis and there may be factorization in the scale.

The Model Fit of the M-Back-Tr, which consisted of 4 dimensions and 16 items, was tested with the First-Level Multifactorial DFA. Because the data had a normal distribution, the Maximum Likelihood Calculation Method was used. When the Goodness of Fit values of the structure were evaluated, it was found that the Goodness of Fit values were not at the desired level, therefore, the correction indices were examined and high covariance was detected between the error terms of the items M11-M12 and the error terms of these items were merged. When the Goodness of Fit values of the scale were evaluated, it was found that $\chi^2 = 178.607$, $\chi^2 / df = 3.7281.921$, AGFI = 0.90, CFI = 0.97, GFI = 0.93, RMSA = 0.055,

Table 1
Content validity information of the M-BACK-TR scale.

Item no	Not suitable	Must be corrected	Suitable	CVR	Item no	Not suitable	Must be corrected	Suitable	CVR
M1	12	0	0	1.0	M9	11	1	0	0.83
M2	11	1	0	0.83	M10	11	0	1	0.83
M3	12	0	0	1.0	M11	11	1	0	0.83
M4	12	0	0	1.0	M12	11	0	1	0.83
M5	11	0	1	0.83	M13	12	0	0	1.0
M6	12	0	0	1.0	M14	12	0	0	1.0
M7	10	1	1	0.67	M15	10	2	0	0.67
M8	10	1	1	0.67	M16	11	1	0	0.83

Number of Experts: 12
Content Validity Ratio (CVR): 0.667
Content Validity Index (CVI): 0.86

NFI = 0.94. In line with these results, it was understood that the compliance values were at the desired level (Unuvar, 2021: 132; Gurbuz & Sahin, 2015: 329; Meydan & Sesen, 2011: 37; Sumer, 2000: 61) (Diagram 1).

When the significance of the latent variables of the M-Back-Tr was evaluated, it was found that all variables (t:4.19–11.84) were significant at the $p < .001$ level. When the Goodness of Fit values of the structure of the scale and the significance of the items were evaluated, it was concluded that the 4-factor structure of the scale was confirmed and its structural validity was provided for this study (Table 2).

Convergent validity

The Convergent Validity of the structure obtained for M-Back-Tr was determined by calculating the AVE and CR values (Table 3). When the Convergent Validity of the 4-factor structure of the scale was evaluated, it was found that the correlations of the items were significant. When the Concurrent Validity of the structure was evaluated, since the AVE of the items in the Barriers factor (AVE: 0.50; CR: 0.89), Attitudes factor (AVE: 0.65; CR: 0.84), Confidence factor (AVE: 0.56; CR: 0.88), and Knowledge factor (AVE: 0.56; CR: 0.88): 0.72; CR: 0.85) were >0.50 , it was concluded that the AVE of the items was significant. When the Composite Reliability of the structure of the scale was evaluated, it was found that it was significant because the CR values were above 0.70. When the AVE and CR values were evaluated, it was concluded that the $AVE > 0.50$, $CR > 0.70$ and $CR > AVE$ criteria that are required for Convergence Validity were met. Therefore, the Convergence Validity of the

scale was achieved.

Reliability

The Cronbach α Reliability Coefficient and Split-Half Test Consistency were used to test the reliability of the structure obtained in the study. Although it is desired that the reliability coefficient, which can be considered sufficient on a Likert-type scale, is above 0.70, it should be as close to “1” as possible (DeVellis, 2014, p.109; Tezbasaran, 2008, p.49). The correlation between the two halves is expected to be as high and significant as possible in the Split-Half Test Consistency.

According to the findings, it was determined that there was a high, positive, and significant relationship between the two halves of the scale in all dimensions (Barriers: $r: 0.72$; $p < .001$, Attitudes: $r: 0.78$; $p < .001$; Confidence: 0.83 ; $p < .001$; Knowledge: $r: 0.87$; $p < .001$). The Cronbach α Value of the sub-dimensions of the scale ranged between 0.79 and 0.91. These reliability coefficients were interpreted as providing reliability in all sub-dimensions of the scale. When the Split-Half Test Consistency of the scale and the Cronbach α Reliability Coefficient were evaluated, the reliability of the 4-factor structure was considered to be at a sufficient level (Table 4).

Discussion

In the present study, the name of the M-BACK (M-Back: The Barriers, Attitudes, Confidence, and Knowledge of Mental Health Staff Regarding Metabolic Health of Mental Health Service Users) Scale that was

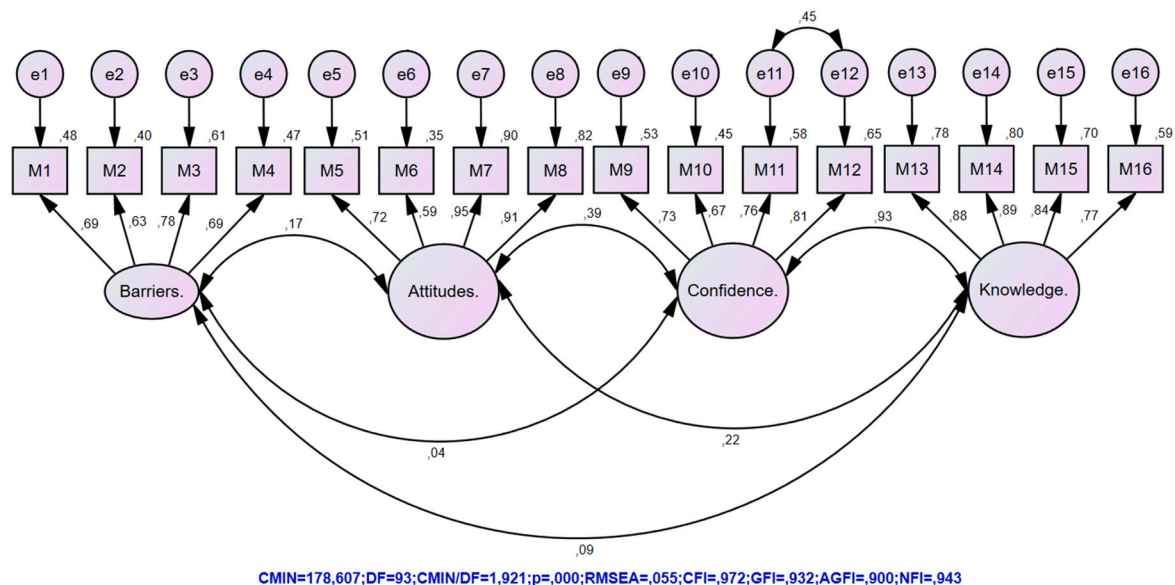


Diagram 1. The Goodness of Fit values of M-Back-Tr. Explanation Variance: 73 %.

Table 2
The results of M-Back-Tr confirmatory factor analysis.

No	\bar{x}	SD	Factor Load	t	P	No	\bar{x}	SD	Factor Load	t	P
M1	3.28	1.30	0.69	9.00	0.000	M9	3.11	1.11	0.73	10.50	0.000
M2	3.14	1.33	0.63	10.10	0.000	M10	3.23	1.24	0.67	11.00	0.000
M3	3.01	1.42	0.78	7.07	0.000	M11	3.32	1.08	0.76	9.44	0.000
M4	3.08	1.47	0.69	9.20	0.000	M12	3.26	1.09	0.81	8.89	0.000
M5	3.89	1.13	0.72	11.45	0.000	M13	3.08	1.10	0.89	8.81	0.000
M6	3.69	1.24	0.59	11.84	0.000	M14	3.01	1.16	0.89	8.64	0.000
M7	4.05	1.05	0.95	4.19	0.000	M15	3.20	1.26	0.84	9.79	0.000
M8	3.99	1.01	0.91	7.28	0.000	M16	3.19	1.10	0.77	10.96	0.000

Table 3
The results of M-Back-Tr convergent validity.

Factor		r				Convergent Validity			
		DK1	DK2	DK3	DK4	λ	λ^2	$1-\lambda^2$	AVE/CR
Barriers	M1	1				0.691	0.477	0.227988	n = 4
	M2	0.43	1			0.631	0.398	0.158532	AVE = 0.501
	M3	0.50	0.54	1		0.778	0.605	0.366369	CR = 0.888
	M4	0.53	0.36	0.54	1	0.687	0.472	0.222755	
	M5	M6	M7	M8					
Attitudes	M5	1				0.717	0.514	0.264287	n = 4
	M6	0.52	1			0.592	0.35	0.122825	AVE = 0.648
	M7	0.69	0.53	1		0.951	0.904	0.817941	CR = 0.842
	M8	0.62	0.51	0.87	1	0.908	0.824	0.679741	
	M9	M10	M11	M12					
Confidence	M9	1				0.73	0.533	0.283982	n = 4
	M10	0.67	1			0.671	0.45	0.202717	AVE = 0.555
	M11	0.58	0.59	1		0.764	0.584	0.340701	CR = 0.876
	M12	0.58	0.56	0.79	1	0.809	0.654	0.428345	
	M13	M14	M15	M16					
Knowledge	M13	1				0.885	0.783	0.613441	n = 4
	M14	0.80	1			0.892	0.796	0.633081	AVE = 0.718
	M15	0.71	0.78	1		0.838	0.702	0.493147	CR = 0.846
	M16	0.66	0.66	0.69	1	0.769	0.591	0.349708	

Table 4
M-Back-Tr split-half test consistency and Cronbach α .

Factor	Half	n	x	SD	r	r ²	p	Cronbach α
Barriers	First halves	304	6.3	2.4	0.72	0.52	0.000	0.79
	Second half		6.2	2.3				
Attitudes	First half	304	7.9	2.0	0.78	0.61	0.000	0.86
	Second half		7.7	2.0				
Confidence	First half	304	6.4	1.9	0.83	0.69	0.000	0.87
	Second half		6.5	2.1				
Knowledge	First half	304	6.3	2.2	0.87	0.76	0.000	0.91
	Second half		6.2	2.1				

developed by Watkins et al. (2017) was translated into Turkish as “The Barrier, Attitude, Confidence, and Knowledge of Psychiatric Professionals to Evaluate Metabolic Health Scale” (M-Back-Tr). The findings that were obtained as a result of this adaptation study, which was conducted with a sample of nurses who were working in the psychiatry clinic, showed that the scale had validity and reliability in determining the barriers, attitudes, confidence, and knowledge status of mental healthcare staff toward the evaluation of metabolic health.

CVR was calculated for each item of the translated and linguistically validated draft form and it was found that there were no items with zero or negative values and it was found to be suitable for CVI. As a result of the analyses, it was found that the Content Validity Index of the 16-item draft form was 0.86. For the form to be valid as a whole, the CVI value must be greater than the CVR value (CVI > CVR). It was concluded that the values obtained from the study were CVI (0.86) > CVR (0.667) and the M-BACK-TR Scale provided the Content Validity (Ayre & Scally, 2014; Lawshe, 1975).

The Confirmatory Factor Analysis was used to examine the construct validity of the M-Back-Tr Scale. As a result of the analysis that was made

to test the suitability of the data for factor analysis, it was found that Bartlett's Normal Distribution Test result was significant (χ^2 : 3093.83; $p < .000$), and the KMO (Kaiser-Mayer-Olkin) value was 0.85. These findings provided clues that the dataset was suitable for Factor Analysis and there might be factorization in the scale.

The model fit of the M-Back-Tr, which consisted of 4 dimensions and 16 items, was tested with the First-Level Multifactorial CFA. When the Goodness of Fit values of the structure were evaluated, it was found that the Goodness of Fit values were not at the desired level. For this reason, the correction indices were evaluated and high covariance was observed between the error terms of the items M11-M12 and the error terms of these items were combined. When the Goodness of Fit values of the scale were evaluated, it was found that $\chi^2 = 178.607$, $\chi^2 / df = 3.7281921$, AGFI = 0.90, CFI = 0.97, GFI = 0.93, RMSA = 0.055, NFI = 0.94. In line with these findings, it was understood that the fit values were at the desired level (Unuvar, 2021: 132; Gurbuz & Sahin, 2015: 329; Meydan & Sesen, 2011: 37; Sumer, 2000: 61). When the significance of the latent variables of the M-Back-Tr was evaluated, it was found that all variables (t :4.19–11.84) were significant at the $p < .001$ level. When the Goodness

of Fit values of the structure of the scale and the significance of the items were evaluated, it was concluded that the 4-factor structure of the scale was confirmed and its structural validity was provided for this study.

The Convergent Validity of the structure obtained for M-Back-Tr was determined by calculating the AVE and CR values. When the Convergent Validity of the 4-factor structure of the scale was evaluated, it was found that the correlations of the items were significant. To ensure the Convergent Validity of the scale, the Average Variance Extracted (AVE) of the items must be 0.50 and above (Bagozzi & Yi, 1988: 82). When the Convergent Validity of the structure was evaluated, since the AVE values were calculated for the Barriers factor (AVE: 0.50; CR: 0.89, Attitudes factor (AVE: 0.65; CR: 0.84), Confidence factor (AVE: 0.56; CR: 0.88), and Knowledge factor (AVE: 0.72; CR: 0.85) were >0.50 , it was concluded that the AVE of the factors were significant.

When the Composite Reliability of the scale was evaluated, it was found that it was significant because the CR values were above 0.70. Composite Reliability (CR) values are expected to be 0.70 and above (Hair et al., 2010). When the AVE and CR values were evaluated, it was concluded that the AVE > 0.50 , CR > 0.70 , and CR $> AVE$ criteria that are required for Convergence Validity were met, and in this way, the Convergence Validity of the scale was achieved.

The Cronbach α Reliability Coefficient and Split-Half Test Consistency were used to test the reliability of the structure obtained in the study. Although it is desired that the reliability coefficient, which can be considered sufficient on a Likert-type scale, is above 0.70, it must be as close to "1" as possible (DeVellis, 2014, p.109; Tezbasaran, 2008, p.49). The correlation between the two halves is expected to be as high and significant as possible in the Split-Half Test Consistency (Sencan, 2005). According to the findings, it was found that there was a high level, positive and significant relationship between the two halves of the scale in all its dimensions (Barriers: $r: 0.72$; $p < .001$, Attitudes: $r: 0.78$; $p < .001$; Confidence: 0.83 ; $p < .001$; Knowledge: $r: 0.87$; $p < .001$). The Cronbach α Value of the sub-dimensions ranged from 0.79 to 0.91. These reliability coefficients were interpreted as providing reliability in all sub-dimensions. When the Split-Half Test Consistency of the scale and the Cronbach α Reliability Coefficient were evaluated, the reliability of the 4-factor structure was considered to be at a sufficient level.

The Cronbach α Values ranged between 0.61 and 1 in the sub-dimensions of the original scale that was developed by Watkins et al. (2017), and this value was found to be 0.87 in the total scoring. The Cronbach's α Values of the sub-dimensions of the scale ranged from 0.86 to 0.91 in the Italian version of the scale, which was adapted in two more languages, and the total value was found to be 0.87 (Carraro et al., 2020). The French version of the scale was investigated with a sample of 225 mental healthcare staff, and the reliability coefficient of the scale was found to be PPP: 0.545. The M-Back scores were found to differ between mental healthcare staff, psychiatrists, psychologists, and nurses in this adaptation, which showed that the educational requirements associated with metabolic syndrome varied depending on the profession. Also, the mean scores of knowledge and confidence sub-dimensions were higher in mental healthcare staff with a long age and professional experience, those who were educated about the healthcare concerns of metabolic syndrome or psychiatric patients, and those who knew the side effects of antipsychotic drugs. It was suggested in the study that the adaptation study must be conducted with nurses in homogeneous groups, especially in patients because of the amount of time they spend (Golay et al., 2021). Watkins et al. (2017) also recommend conducting studies with scales in homogeneous professional groups working in different settings. In these studies, it is emphasized that it is clinically important to determine whether the metabolic syndrome evaluation changes in inpatients or outpatients and investigate the differences between psychiatrists, psychologists, and nurses in the evaluation of metabolic syndrome (Watkins et al., 2017).

Limitations and implications

The limitation of the study is that the study was carried out with a homogeneous sample consisting of only psychiatric nurses. On the other hand, the adaptation study of the questionnaire is limited to psychiatric nurses working in Turkey and it is recommended to be applied in different regions and cultures.

Since individuals with severe mental disorders need special physical care to protect and maintain their metabolic health, it is important for psychiatric nurses to be competent in metabolic health assessment and practices. In-service trainings and courses can be organized in the areas they need by evaluating the difficulties, attitudes, self-confidence and knowledge of psychiatric nurses about metabolic health assessment with M-back-Tr. The effectiveness of these trainings, which can also be organized by institutions, can be evaluated with the same scale. Since the metabolic syndrome risks of individuals receiving inpatient and outpatient mental health services may differ, it is recommended that the questionnaire be applied to psychiatric nurses working in outpatient mental health institutions as well as psychiatric nurses working in inpatient treatment institutions.

Conclusion

It can be said that the Turkish version of the M-Back-Tr is a valid and reliable scale for determining the barriers, attitudes, confidence, and knowledge levels of mental healthcare staff toward evaluating metabolic health. It can also be considered as an advantage that it is easy to use and practical and can be applied in a short time. It was seen in the original version of the scale and the other two adaptation studies that the samples consisted of psychiatrists, psychologists, and psychiatric nurses, and it was recommended that adaptation studies be conducted in homogeneous occupational groups in these studies (Carraro et al., 2020; Golay et al., 2021; Watkins et al., 2017). In line with these recommendations, the Turkish adaptation study was conducted with a homogeneous sample that consisted only of nurses, and this sample group highlighted M-Back-Tr as the first adaptation study in homogeneous groups. It is recommended to examine the psychometric characteristics of the scale with a sample of other mental healthcare staff such as psychiatrists and psychologists in future studies. It is considered that the scale can be used by institutions to determine in-service training needs and evaluate the effectiveness of training because the M-Back scale will determine the status of mental healthcare staff in the evaluation of metabolic syndrome. Since the metabolic syndrome risks of the patients who receive service may differ in inpatient and outpatient mental health units, it is recommended that the scale be applied in institutions that provide outpatient mental healthcare services as well as mental healthcare staff who work in inpatient treatment institutions.

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CRedit authorship contribution statement

Elcin Babaoglu, Aydan Akkurt Yalcinturk, Yalcin Kanbay: Conceptualization, Methodology. **Elcin Babaoglu, Aydan Akkurt Yalcinturk:** Data collection, Data curation. **Elcin Babaoglu, Aydan Akkurt Yalcinturk, Yalcin Kanbay:** Writing - Original draft preparation. **Elcin Babaoglu, Aydan Akkurt Yalcinturk, Yalcin Kanbay:** Visualization, Investigation. **Elcin Babaoglu:** Supervision. **Elcin Babaoglu, Aydan Akkurt Yalcinturk, Yalcin Kanbay:** Writing - Reviewing and Editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- Asharani, P. V., Ling Seet, V. A., Abdin, E., Siva, K. F. D., Wang, P., Roystonn, K., ... Subramaniam, M. (2020). Smoking and mental illness: Prevalence, patterns and correlates of smoking and smoking cessation among psychiatric patients. *International Journal of Environmental Research and Public Health*, 17(15), 5571. <https://doi.org/10.3390/ijerph17155571>
- Asik, E., Albayrak, S., & Erdogan, N. (2016). Nursing practices addressing metabolic syndrome risk in patients using antipsychotic drugs. *Clinical and Experimental Health Sciences*, 6(4), 161–165.
- Ayre, C., & Scally, A. J. (2014). Critical values for Lawshe's content validity ratio: revisiting the original methods of calculation. *Measurement and Evaluation in Counseling and Development*, 47(1), 79–86. <https://doi.org/10.1177/0748175613513808>
- Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing*, 16, 74–94.
- Bartels, S. J. (2015). Can behavioral health organizations change health behaviors? The STRIDE study and lifestyle interventions for obesity in serious mental illness. *The American Journal of Psychiatry*, 172(1), 9–11. <https://doi.org/10.1176/appi.ajp.2014.14101246>
- Bolton, P. S., Knight, M., & Kopeski, L. M. (2016). Psychiatric–mental health nurses' knowledge of risks and care practices. *Journal of Psychosocial Nursing and Mental Health Services*, 54, 11–15. <https://doi.org/10.3928/02793695-20161026-01>
- Carraro, A., Gobbi, E., Solmi, M., Watkins, A., Ward, P. B., & Rosenbaum, S. (2020). Test–retest reliability of the Italian version of the M-BACK questionnaire to assess the barriers, attitudes, confidence, and knowledge of mental health staff regarding metabolic health of psychiatric patients. *Brain and Behavior: A Cognitive Neuroscience Perspective*, 10(2), Article e01491. <https://doi.org/10.1002/brb3.1491>
- Cokluk, O., Sekercioglu, G., & Buyukozturk, S. (2014). *Multivariate Statistics SPSS and LISREL Applications for Social Sciences* (3rd ed.). Ankara: Pegem Academy.
- Coster, W. J., & Mancini, M. C. (2015). *Recommendations for translation and cross-cultural adaptation of instruments for occupational therapy research and practice*, 26 pp. 50–57. Rev Ter Ocup Univ Sao Paulo. <https://doi.org/10.11606/issn.2238-6149.v26i1p50-57>
- Curtis, J., Watkins, A., Rosenbaum, S., Teasdale, S., Kalucy, M., Samaras, K., & Ward, P. B. (2016). Keeping the body in mind: An individualised lifestyle and life-skills intervention to prevent antipsychotic-induced weight gain in first episode psychosis. *Early Intervention in Psychiatry*, 10(3), 267–276. <https://doi.org/10.1111/eip.12230>
- Daumit, G. L., Goff, D. C., Meyer, J. M., Davis, V. G., Nasrallah, H. A., McEvoy, J. P., ... Lieberman, J. A. (2008). Antipsychotic effects on estimated 10-year coronary heart disease risk in the CATIE schizophrenia study. *Schizophrenia Research*, 105(1–3), 175–187. <https://doi.org/10.1016/j.schres.2008.07.006>
- DeVellis, R. F. (2014). *Scale Development* (3rd). Ankara: Nobel Academic Publishing.
- Dickerson, F. B., Brown, C. H., Kreyenbuhl, J. A., Fang, L., Goldberg, R. W., Wohlheiter, K., & Dixon, L. B. (2006). Obesity among individuals with serious mental illness. *Acta Psychiatrica Scandinavica*, 113(4), 306–313. <https://doi.org/10.1111/j.1600-0447.2005.00637.x>
- Erkuş, A. (2007). Problems encountered in scale development and adaptation studies. *Turkish Psychology Bulletin*, 13(40), 17–25.
- Esin, N. (2014). Data collection methods and tools & Reliability and validity of data collection tools. In S. Erdoğan, N. Nahcivan, & M. N. Esin (Eds.), *Research in Nursing*. Nobel Medicine Bookstores (pp. 195–226). Istanbul.
- Golay, P., Calderoni, M., Eap, C. B., & Conus, P. (2021). French validation of the M-Back questionnaire: Assessing clinicians' knowledge of metabolic syndrome in psychiatry. *Swiss Arch Neurol Psychiatr Psychother*, 105(w10011), 1–6. <https://doi.org/10.4414/sanp.2021.03224>
- Gray, R., Hardy, S., & Anderson, K. H. (2009). Physical health and severe mental illness: If we don't do something about it, who will? *International Journal of Mental Health Nursing*, 18(5), 299–300. <https://doi.org/10.1111/j.1447-0349.2009.00640.x>
- Gurbuz, S., & Sahin, F. (2015). *Research Methods in Social Sciences Philosophy Method Analysis*. Ankara: Seckin.
- Hair, J. F. J., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis* (Seventh Edition). Prentice Hall.
- Happell, B., Platania-Phung, C., Gray, R., Hardy, S., Lambert, T., McAllister, M., & Davies, C. (2011). A role for mental health nursing in the physical health care of consumers with severe mental illness. *Journal of Psychiatric and Mental Health Nursing*, 18(8), 706–711. <https://doi.org/10.1111/j.1365-2850.2010.01666.x>
- Hardy, S., White, J., Deane, K., & Gray, R. (2011). Educating healthcare professionals to act on the physical health needs of people with serious mental illness: A systematic search for evidence. *Journal of Psychiatric and Mental Health Nursing*, 18(8), 721–727. <https://doi.org/10.1111/j.1365-2850.2011.01722.x>
- Ho, R. (2006). *Handbook of univariate and multivariate data analysis and interpretation with SPSS*. London & New York: Chapman & Hall / CRC Taylor and Francis Group.
- Holt, R. I., & Peveler, R. C. (2009). Obesity, serious mental illness and antipsychotic drugs. *Diabetes, Obesity & Metabolism*, 11(7), 665–679. <https://doi.org/10.1111/j.1463-1326.2009.01038.x>
- Howard, L., & Gamble, C. (2011). Supporting mental health nurses to address the physical health needs of people with serious mental illness in acute inpatient care settings. *Journal of Psychiatric and Mental Health Nursing*, 18(2), 105–112. <https://doi.org/10.1111/j.1365-2850.2010.01642.x>
- Hyland, B., Judd, F., Davidson, S., Jolley, D., & Hocking, B. (2003). Case managers' attitudes to the physical health of their patients. *The Australian and New Zealand Journal of Psychiatry*, 37(6), 710–714. <https://doi.org/10.1080/j.1440-1614.2003.01264.x>
- Jesus, L. M. T., & Valente, A. R. (2016). Cross-cultural adaptation of health assessment instruments. Retrieved from <http://sweet.ua.pt/lmtj/lmtj/JesusValente2016.pdf>.
- Jin, H., Meyer, J. M., & Jeste, D. V. (2004). Atypical antipsychotics and glucose dysregulation: A systematic review. *Schizophrenia Research*, 71(2–3), 195–212. <https://doi.org/10.1016/j.schres.2004.03.024>
- Lawshe, C. H. (1975). A Quantitative Approach to Content Validity. *Personnel Psychology*, 28, 563–575.
- Lundgren, J. D., Rempfer, M. V., Brown, C. E., Goetz, J., & Hamera, E. (2010). The prevalence of night eating syndrome and binge eating disorder among overweight and obese individuals with serious mental illness. *Psychiatry Research*, 175(3), 233–236. doi:10.1016/j.psychres.2008.10.027.
- Meydan, H., & Sesen, H. (2011). *Structural Equation Modeling AMOS Applications*. Ankara: Detay Publishing.
- Meyer, J. M., & Koro, C. E. (2004). The effects of antipsychotic therapy on serum lipids: A comprehensive review. *Schizophrenia Research*, 70(1), 1–17. <https://doi.org/10.1016/j.schres.2004.01.014>
- Morgan, V. A., McGrath, J. J., Jablensky, A., Badcock, J. C., Waterreus, A., Bush, R., et al. (2014). Psychosis prevalence and physical, metabolic and cognitive co-morbidity: Data from the second Australian national survey of psychosis. *Psychological Medicine*, 44(10), 2163–2176. <https://doi.org/10.1017/s0033291713002973>
- Nash, M. (2005). Physical care skills: A training needs analysis of inpatient and community mental health nurses. *Mental Health Practice*, 9(4), 20–23. <https://doi.org/10.7748/mhp2005.12.9.4.20.c1896>
- Naslund, J. A., Aschbrenner, K. A., Scherer, E. A., Pratt, S. I., Wolfe, R. S., & Bartels, S. J. (2016). Lifestyle intervention for people with severe obesity and serious mental illness. *American Journal of Preventive Medicine*, 50(2), 145–153. <https://doi.org/10.1016/j.amepre.2015.07.012>
- Reininghaus, U., Dutta, R., Dazzan, P., Doody, G. A., Fearon, P., Lappin, J., ... Jones, P. B. (2015). Mortality in schizophrenia and other psychoses: A 10-year follow-up of the AESOP first-episode cohort. *Schizophrenia Bulletin*, 41(3), 664–673. <https://doi.org/10.1093/schbul/sbu138>
- Robson, D., Haddad, M., Gray, R., & Gournay, K. (2012). Mental health nursing and physical health care: A cross-sectional study of nurses' attitudes, practice, and perceived training needs for the physical health care of people with severe mental illness. *International Journal of Mental Health Nursing*, 22(5), 409–417. <https://doi.org/10.1111/j.1447-0349.2012.00883.x>
- Rosenbaum, S., Morell, R., Abdel-Baki, A., Ahmadpanah, M., Anilkumar, T. V., Baie, L., et al. (2020). Assessing physical activity in people with mental illness: 23-country reliability and validity of the simple physical activity questionnaire (SIMPAQ). *BMC Psychiatry*, 20(1), 108. <https://doi.org/10.1186/s12888-020-2473-0>
- Seker, H., & Gencdogan, B. (2006). *Development of Measurement Tools in Psychology and Education* (1st ed.). Ankara: Nobel Publishing Distribution.
- Sumer, N. (2000). *Structural Equation Models: Basic concepts and example applications*. *Turkish Psychology Writings*, 3(6), 49–74.
- Terry, J., & Cutter, J. (2013). Does education improve mental health practitioners' confidence in meeting the physical health needs of mental health service users? A mixed methods pilot study. *Issues in Mental Health Nursing*, 34(4), 249–255. <https://doi.org/10.3109/01612840.2012.740768>
- Tezbasaran, A. A. (2008). *Likert type scale preparation guide* (e- 3rd Edition). Mersin.
- Unuvar, H. (2021). Happiness at Work Scale (HMS): A scale development study and the mediating role of work life balance in the effect of five factor personality traits on happiness at work (Unpublished Doctoral Thesis). In *Tokat Gaziosmanpaşa University Social Sciences Institute*.
- Vancampfort, D., Stubbs, B., Mitchell, A. J., De Hert, M., Wampers, M., Ward, P. B., ... Correll, C. U. (2015). Risk of metabolic syndrome and its components in people with schizophrenia and related psychotic disorders, bipolar disorder and major depressive disorder: A systematic review and meta-analysis. *World Psychiatry*, 14(3), 339–347. <https://doi.org/10.1002/wps.20252>
- Veneziano, L., & Hooper, J. (1997). A method for quantifying content validity of health-related questionnaires. *American Journal of Health Behavior*, 21(1), 67–70.
- Watkins, A., Rosenbaum, S., Ward, P. B., Patching, J., Denney-Wilson, E., & Stein-Parbury, J. (2017). The validity and reliability characteristics of the m-back questionnaire to assess the barriers, attitudes, confidence and knowledge of mental health staff regarding metabolic health of mental health service users. *Frontiers in Public Health*, 11(5), 321. <https://doi.org/10.3389/fpubh.2017.00321>
- Yurdugül, H. (2005). Using scope valid indices for scope conditions of scale development processes, XIV. In *National Educational Sciences Congress, Pamukkale University Faculty of Education*, 28–30 September Denizli (taken from <http://yunus.hacettepe.edu.tr/~yurdugul/3/indir/PamukkaleBildiri.pdf>). on 16.02.202023.