Measurement of psychosocial health in medical students: Validation of the Jefferson Medical College's Questionnaire in Mexico*

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Resumen

Como la literatura consigna, los estudiantes y profesionales de la Medicina en comparación con la población general y de otras carreras conforman una población que resulta vulnerable frente a los trastornos de salud psicosocial. En la investigación psicosocial de la *educación médica* un punto clave corresponde a la identificación de medidas relevantes con cualidades psicométricas. En el presente trabajo se analiza la *validez* y confiabilidad de un conjunto de *escalas psicosociales* aplicadas a 3.603 alumnos de la Facultad de Medicina de la Universidad Autónoma de

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Nuevo León (México). Las escalas administradas fueron: *Soledad*, *Ansiedad ante los exámenes*, *Ansiedad general*, *Autoestima*, *Extroversión*, *Locus de control externo*, *Neuroticismo*, *Depresión*, *Eventos estresantes en la vida*, *Percepción de relaciones tempranas con los padres y amigos* y *Percepción de estado de salud general*. Estas escalas fueron propuestas por investigadores de la Escuela de Medicina de Jefferson (Estados Unidos). Se confirmó la unidimensionalidad y la validez de constructo de las mediciones de Soledad, Ansiedad ante los exámenes, Ansiedad general, Autoestima y Extroversión. Así también, la magnitud y dirección de las correlaciones interescalas apoyaron la validez convergente y discriminante, con excepción de Locus de control externo y Neuroticismo. Los resultados confirman las propiedades psicométricas de las escalas, las cuales son útiles para proveer información a los educadores médicos y a profesionales de la salud mental en la detección temprana de problemas psicosociales quienes en conjunto pueden coadyuvar en la optimización de la salud mental de los estudiantes de escuelas de Medicina a través de programas académicos acordes a sus necesidades.

Palabras clave: Educación médica - Escalas psicosociales - Validez.

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Abstract

The greater the psychosocial health, the greater is the well-being and the capacity for adaptation and overcoming problems and common life frustrations in family, relationships, and work. Medical students and practicing physicians, in comparison with the general population and that of other professions, are exposed to academic and professional stress and therefore are vulnerable to psychosocial health problems and certain specific dysfunctions that may compromise their physical, mental, and social health. In the field of psychosocial research in *medical education*, the key issue is to find relevant and psychometrically sound measures. The Jefferson Medical College's Psychosocial Questionnaire contains abridged versions of nine personality tests, as well as questions about respondents' relationships with parents in the first five years of life and with classmates in the early schooling. The scales in the questionnaire have shown satisfactory internal consistency reliability and construct *validity* through factor analysis. To our knowledge, in Mexico, there is not a specific questionnaire that *measures psychosocial* profile in a non-clinical population such as medical students. The present study adapted and translated the questionnaire from English to Spanish in order to evaluate its validity and reliability in Mexican medical students, to further learn its predictive validity of academic performance. In this study, we compared the factor structure in Mexico to the results obtained in the United States research. Implications for predicting academic and clinical performance of medical students and physicians were discussed. Study participants consisted of 3,603 matriculates at the Escuela de Medicina de la Universidad Autónoma de Nuevo León (Mexico). Psychosocial measures included *Loneliness*, *Test anxiety*, *General anxiety*, *Self-esteem*, *Extroversion*, *External locus of control*, *Neuroticism*, *Depression*, *Stressful life events*, *Perceptions of early relationships with mother and father*, *Peer relationships* and *Perception of health*, used by researchers at Jefferson Medical College in the United States. The items were translated into Spanish and back translated from Spanish to English, following the guidelines for adaptation of instruments for psychological evaluation. The questionnaire was adminis-

tered in the third month after admission of the students to the Medicine School in the students' usual classrooms, on a schedule and day set aside for it according to the school's administration program. They were assured of the strict confidentiality of the test scores and of the individual data. Dimensionality of 40 items of the eight brief psychosocial scales was assessed with factor analysis using the principal components extraction method and orthogonal rotation; the Depression scale was not included in the factorial analysis because it was not shortened for the present study. Correlation coefficients and internal consistencies were calculated for all the scales. Unidimensionality and construct validity were confirmed for measures of Loneliness, Test anxiety, General anxiety, Self-esteem, and Extroversion. The pattern and direction of the scale correlations with external criterion measures supported the concurrent validity of some of the measures. Also, the magnitude and direction of the inter-scale correlations supported the convergent and discriminant validities with the exception of the External locus of control and Neuroticism scales. The results supported the psychometric properties of the scales useful for providing information for medical educators and mental health professionals in early detection of psychosocial problems. It is important to mention that in spite of frequent talk about the importance of health among college students, few schools of Medicine in Mexico and in Latin America actually promote empirical research and support detect problems and develop solutions once they are identified. The mental health professionals should be responsible for sharing their understanding. They are capable of helping faculty for optimizing mental health through allocation of educational and remedial resources when designing academic programs in agreement with necessities of their students.

Key words: Medical education - Psychosocial measure - Validity.

Introduction

According to the World Health Organization (1948), *health* is defined as physical, mental and social well-being of the individual. The greater the psychosocial health, the greater is the well-being and the better the capacity for adaptation and overcoming of problems and common life frustrations in family, relationships, and work. Impulse control and adherence to reality also correspond to factors that contribute to a mature and healthy personality. The healthy student develops a good capacity to learn based on introspection, self-observation, and practical judgment. At the same time he develops a capability to form meaningful interpersonal relationships, emphatic understanding, and to work in a team and in the community. Medical students and practicing physicians, in comparison with the general population and that of other professions, are exposed to academic and professional stress and therefore are vulnerable to psychosocial health problems and certain specific dysfunctions that may compromise their physical, mental, and social health (Nogueira, 1996).

For evaluating medical students' psychosocial profiles, it is necessary to make use of the psychometrically sound instruments with emphasis on the status of cognitive and psychosocial resources. The cognitive factors refer to the evaluation and selection of medical students based on academic and intellectual abilities. Recent studies suggest that not only scores or intellectual abilities, but also psychosocial attributes contribute to academic performance (Goleman, 1995; Mayer, & Salovey, 1995). The psychosocial aspects contribute significantly to predicting academic success of medical students more than cognitive or purely intellectual factors (Gonella, Hojat, Erdmann, & Veloski, 1993; Gonella, Veloski, Xu, & Hojat, 1992; Hojat, 1982a, 1982b, 1982c, 1983; Hojat, Borenstein, & Shapurian, 1990; Hojat, Erdmann, Robeson, Damjanov, & Glaser, 1992; Hojat, Glaser, Xu, Veloski, & Christian, 1999; Hojat, Robeson, Damjanov, Veloski, & Zeleznik, 1992; Peng, Khaw, & Edariah, 1995).

In the field of psychosocial research in medical education, the key issue is to find relevant and psychometrically sound measures. Jefferson Medical College, Center for Research in Medical Education and Health Care has used a set of psychosocial measures and shown that the predictive power improves when these psychosocial attributes are included in the overall prediction models (Hojat, Erdmann, Robeson, Damjanov, & Glaser, 1992; Hojat, Vogel, Zeleznik, & Borenstein, 1988; Zeleznik et al., 1988).

The relationship between psychosocial characteristics and academic success is complex and therefore a combination of a variety of psychological

measures has been suggested. The Jefferson Medical College's Psychosocial Questionnaire contains abridged versions of nine personality tests, as well as questions about respondents' relationships with parents in the first five years of life and with classmates in the early schooling (Hojat, Erdmann, Robeson, Damjanov, & Glaser, 1992). Items in the abridged scales were chosen because of their better psychometrics (e.g., item-total score correlations) and their relevance to student population. Because they have been discussed frequently in the literature as influencing academic performances, also.

The scales in the questionnaire have shown satisfactory internal consistency reliability and construct validity through factor analysis. In particular, the scales of Loneliness, Test anxiety, General anxiety, Self-esteem, Extro-oversion and Depression have shown satisfactory psychometric properties among medical students in the United States (Hojat, Erdmann, Robeson, Damjanov, & Glaser,1992; Hojat et al., 1999) and in Argentina (Rimoldi, Raimondo, Erdmann, & Hojat, 2002). To our knowledge, in Mexico, there is not a specific questionnaire that measures psychosocial profile in a non-clinical population such as medical students. We considered the Jefferson Questionnaire because it includes the most relevant aspects for evaluating personal qualities among medical students. The present study adapted and translated the questionnaire from English to Spanish in order to evaluate its validity and reliability in Mexican medical students, to further learn its predictive validity of academic performance. In this study, we compared the factor structure in Mexico to the results obtained in the United States research. Implications for predicting academic and clinical performance of medical students and physicians were discussed.

Methods

Subjects

Participants included 3,603 matriculates class of 1998 to 2002 (52.5% male with a mean age 18 years ± 1.97) of the Escuela de Medicina de la Universidad Autónoma de Nuevo León in Monterrey, NL (Mexico). Participants were administered a set of psychosocial measures.

Instruments

The instruments consisted of several psychological measures carefully selected for measuring medical students' psychological attributes of relevance

to academic performance based on the fact that students' learning can be disturbed by emotional states such as anxiety, depression, life stress events, and self-esteem[1]. These scales were identified based on their psychometric characteristics, frequent use in research, and usefulness for measuring the desired psychological attributes (Hojat, Erdmann, Robeson, Damjanov, & Glaser, 1992).

The following eight brief scales included five items from their original version:

1.- The UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980), a measure of intensity of loneliness.
2.- The Test Anxiety Scale (Sarason, 1972).
3.- General Anxiety Scale (Taylor, 1953), a measure of manifest anxiety.
4.- The Self-Esteem Scale (Rosenberg, 1965), a measure of the self-acceptance.
5.- Extroversion Scale (Eysenck, & Eysenck, 1978) from the Eysenck Personality Questionnaire.
6.- Neuroticism Scale (Eysenck, & Eysenck, 1978) from the Eysenck Personality Questionnaire.
7.- External Locus of Control Scale (Rotter, 1966) measures the extent of attributing the cause of events to external and uncontrollable sources.
8.- Stressful Life Events (Holmes, & Rahe, 1967) measure individual's own appraisal of five stressors.

In addition, the abridged version (13 items) of the Beck Depression Inventory (Beck, & Beamesderfer, 1974; Beck, & Beck, 1972) was used. Other psychosocial measures included perception of early relationships with the parents because theory on psychological development emphasizes the importance between the quality of these early relationships and better adaptation to stress, a necessary condition for mature behaviors in adulthood: To the best of the student's knowledge, when he / she was a child he / she had personal problems, he / she turned to his / her mother; to the best of the student's memory, he / she remembers that his / her mother spent enough time with him / her; according to childhood memories, the mother was understanding. Similar questions were asked about perceptions of the relationship with the father. Each item was answered alternately for the mother and father on a 4-point

1 Available by sending a written request to first author.

Lickert-type scale (1 = *never* and 4 = *always*). The average of the three answers for the mother and the average of the three answers for the father were used as the scores for perceptions of early relationships with mother or father. Also, early relationships with classmates in the preschool years were evaluated. The following seven anchor questions were used as the criterion measures for studying the criterion-related validity of the psychosocial measures:

1.- I have been under a lot of pressure in the last 12 months (global measure of academic stress).
2.- There have been a number of stressful events in my life in the last 12 months (global measure of stressful life events).
3.- Generally, I feel I am an anxious person (global measure of anxiety).
4.- I feel that people, in general, cannot control events happening to them (global measure of external locus of control).
5.- I have a realistic estimate of my academic knowledge (global measure of realism).
6.- How often do you feel lonely? (global measure of perceived loneliness), and
7.- How do you rate your health in general? (global measure of perceived health).

All these questions were answered on a 4-point Likert-type scale (1 = *strongly disagree* and 4 = *strongly agree*). Also, the chronicity of feeling loneliness was measured on a 5-point scale (1 = *never felt lonely*, 5 = *always felt lonely*).

Procedures

The items were translated into Spanish and back translated from Spanish to English, following the guidelines for adaptation of instruments for psychological evaluation (Geisinger, 1994). The questionnaire was administered in the third month after admission of the students to the Medicine School in the students' usual classrooms, on a schedule and day set aside for it according to the school's administration program. The students were informed at the admission about the requirement to complete the psychosocial questionnaire. They were also informed that the psychosocial questionnaire would not be part of their academic file and would in no way affect their admission. They were assured of the strict confidentiality of the test scores and of the individual data.

Analysis

Dimensionality of 40 items of the eight brief psychosocial scales reported in Table 1 was assessed with factor analysis using the principal components extraction method and orthogonal rotation. Depression Scale was not included in the factorial analysis because it was not shortened for the present study. Correlation coefficients and internal consistencies were calculated for all the scales.

Results

The descriptive statistics as well as the internal consistency of the nine psychosocial measures, in their Spanish version for Mexican students, are shown in Table 1.

Except for the External Locus of Control and Neuroticism scales (Cronbach alphas of .24 and .45, respectively), the rest had internal consistencies equal or greater than .60 (see Table 1).

Analysis of underlying components (Construct validity)

The exploratory factor analysis allowed identification of 11 factors with eigenvalues greater than or equal to one; three factors are not reported because only one item had loading greater than .50 on those items. The remaining eight factors explained 44% of the total variance.

All the items of the Scale of Test Anxiety loaded on Factor 1 greater than .49, while all those on the Loneliness Scale on Factor 2 with loadings greater than .60. Four of 5 items of Self-esteem and General Anxiety, loaded on Factors 3 and 4, respectively.

All the items of the Extroversion Scale loaded on Factor 5, while 4 of the 5 items of Stressful Life Events loaded on Factor 6. Two of 5 items of the External Locus of Control Scale loaded on Factor 7 (powerful people control the world and success is a matter of luck) and one loaded on Factor 2 (Control on the direction of life).

Finally, two Neuroticism questions loaded on Factor 8 (to be irritable and easily hurt, with loadings .74 and .63, respectively).

The dimensionality of the psychological measures is presented in Table 2.

Concurrent validity

The Loneliness, Test Anxiety, General Anxiety and Depression were the only scales that show concurrent validity with corresponding anchor items. The results are presented in Table 3. Depression was negatively related to the students' general assessment of their health, but positively related to loneliness experiences and Stressful Life Events. None of the scales showed strong correlations with the perceptions of early relationships with parents or with retrospective report of early relationships with classmates in the preschool years.

Inter-scale correlations

Correlations among psychosocial scales are reported in Table 4. The Loneliness Scale showed the highest positive correlation with Depression and the highest negative correlation with Self-esteem, Test Anxiety correlated with the conceptually relevant measure of General Anxiety, and Depression correlated negatively with Self-esteem and positively with Test Anxiety, and General Anxiety.

Discussion

The results of this study support unidimensionality and construct validity for Loneliness, Test anxiety, and General anxiety, Self-esteem and Extroversion. These results are consistent with those obtained in one American sample of second year medical students (Hojat, Erdmann, Robeson, Damjanov, & Glaser, 1992), and in another sample of Argentinian first year medical students (Rimoldi et al., 2002).

Early relationships with peers in the preschool years and other seven anchor questions were used as external criteria for the study of validity. Answers to the questions of relationships with peers in preschool age were not correlated with greater extroversion sociability, self-esteem and less anxiety, contrary to results of Hojat, Erdmann, Robeson, Damjanov, & Glaser (1992). On the other hand, based on the notions of convergent and discriminant validation, a greater correlation was expected between two measures conceptually more related (for example, Test Anxiety and General Anxiety) than two measures conceptually less relevant (for example, Extroversion and Stressful Life Events). Also, it was thought that a negative correlation would

be observed between a measure of a positive aspect of personality (for example, Self-esteem) and a measure of a negative aspect of personality (for example, Loneliness). Thus, Loneliness was correlated positively with Depression and negatively with Self-Esteem and Extroversion. Also, Depression was correlated positively with Test Anxiety, General Anxiety, Neuroticism, and Stressful Life Events. On the other hand, External Locus of Control was correlated negatively with Self-esteem and Extroversion, and positively with Loneliness, Test Anxiety and General Anxiety.

With respect to reliability, although a reliability coefficient of at least .70 seems reasonable for psychological tests, there is no agreed upon criteria for the magnitude of reliability, in any case cautious should be exercised in using scales with low reliability coefficient (e.g., < .70). Except for Neuroticism and External Locus of Control, the rest of the scales showed internal consistencies within a range often reported for personality tests.

The low internal consistency of the External locus of control is in agreement with the result obtained in American population by Hojat, Erdmann, Robeson, Damjanov, & Glaser (1992) who attribute it to the non-unidimensionality of the abridged scale in medical students. We thought the situation might be different for Mexican samples.

We recommended this scale to be dropped for Mexican medical students in future research. In Mexican Medicine students, Neuroticism did not show unidimensionality, either. The Scale of Stressful Events in Mexican population showed a better internal consistency in comparison to American (Hojat, Erdmann, Robeson, Damjanov, & Glaser, 1992) and Argentinian medical students (Rimoldi et al., 2002). It is important to mention that in spite of frequent talk about the importance of health among college students, few schools of Medicine in Mexico and in Latin America actually promote empirical research and support detect problems and develop solutions once they are identified.

The presented psychosocial questionnaire is a valuable resource that documents the areas in need of remedies and support in medical students during their academic life. Myers (1996, 1998, 2000) points out that health problems and especially mental health problems, are a serious stigma to avoid for physicians themselves or students in the pre and postgraduate medical education. Support programs still exclude Psychiatry even in our Center, depriving those who can benefit from it.

The authorities are often likely to offer pedagogical programs and disregard the psychosocial issues that can contribute to the worsening of the problem. The results of this study support acceptable psychometric qualities of Loneliness, Test Anxiety, General Anxiety, Self-esteem, Extroversion,

and Depression scales for measuring psychosocial profile of Mexican medical students allowing educational professionals and mental health experts to develop integrated remedial programs to improve students' chance of success. We recommend modify items of Neuroticism, External Locus of Control, and Stressful Life Events scales before continuing its use.

The study of psychosocial measures or psychosocial aspects of academic performance in Medicine schools requires the development of valid instruments in the population of interest. It is important to replicate the study in other medical schools to assure external validity of the findings before their widespread use in medical schools in Mexico. Furthermore, the study of prediction of academic success factors using longitudinal design is necessary and far-reaching. The mental health professionals should be responsible for sharing their understanding of the problems. They can offer help to faculty and students for optimizing mental health through allocation of educational and remedial resources when designing academic programs in agreement with the necessities of the community. Finally, our next step is to examine the predictive validity of these psychosocial scales in academic and professional success. We will report the findings in the due course.

Table 1
Descriptive statistics and reliability of nine psychological measures applied to Mexican medical students at the Universidad de Nuevo León and to medical students at Jefferson Medical College (Hojat, Erdmann, Robeson, Damjanov, & Glaser, 1992)

Psychological measures	Mexico				United States			
	M	*SD*	Actual Range	Alpha	*M*	*SD*	Actual Range	Alpha
Loneliness	9.50	3.47	5-25	.77	11.17	3.42	5-21	.84
Test Anxiety	12.74	3.56	5-25	.70	12.89	4.38	5-23	.81
General Anxiety	12.79	3.57	5-25	.67	13.82	3.73	5-22	.77
Self-esteem	16.70	2.64	5-20	.70	15.85	2.94	7-20	.85
Extroversion	15.26	2.50	5-20	.63	14.56	2.64	6-20	.81
External Locus of Control	10.27	2.13	5-19	.24	10.85	2.13	5-19	.51
Neuroticism	11.61	2.50	5-20	.45	11.35	2.74	5-19	.72
Stressful Life Events	8.54	4.21	0-25	.60	5.01	4.31	0-20	.43
Depression	2.60	3.07	0-37	.74	3.64	3.56	0-16	.80

Table 2
Rotated factor loadings of the items of psychological measures applied to Mexican medical students

	Factor loadings[1]		Factor loadings[1]
Loneliness		*Stressful Life Events*	
Satisfaction with relationships*	.70	Changes in health of a family member	.73
Many close relationships*	.69	Death of a family member	.69
People available to turn to*	.67	Personal injury / illness	.68
Feel lonely	.65	Financial problems	.43
Feel isolated	.60	Academic problems	-
Test Anxiety		*Self-esteem*	
Heart beat during test	.74	Feel useless*	.77
Upset feeling before a test	.64	Think not well of oneself*	.76
Pressure by time limit	.49	Satisfied with self*	.54
Hands trembling in a test	.73	Positive toward self	.43
Thought interference during a test	.53	Feel of worth	-
General Anxiety		*Extroversion*	
Take things hard	.70	Can change a dull party	.65
Worrying about something	.70	Being lively	.67
Worry about possible troubles	.68	Going out a lot	.67
Lose sleep because of problems	.61	Lack of initiation in making friends*	.44
Sweating when embarrassed	-	Cannot enjoy a lively party*	.48
External Locus of Control		*Neuroticism*	
Powerful people control de world	.65	Tense	-
Success is a result of luck	.69	Moody	-
Grades are influenced by luck	-	Easily hurt	.63
Events are results of inability*	-	Irritable	.74
Control over direction of life	-	Suffer from nerves	-

Notes

1 Loadings which were greater than .40 are reported
* Reverse scored items

Table 3
Correlations between psychological and external criterion measures applied to Mexican medical students

Psychological measures	External criterion				
	a	b	c	d	e
Loneliness (higher score, more loneliness)				.39*	
Test Anxiety (higher score, more anxiety)	.29*	.30*	.25*		
General Anxiety (higher score, more anxiety)	.28*	.37*	.30*		
Self-esteem (higher score, more self-esteem)		.25*			
Depression (higher score, more depression)		.26*		.43*	-.25*

* $p \leq .01$

Notes

External criterion measures are based on responses (using a Lickert-type scale) to the following items:
a: I have been under a lot of pressure in the last 12 months.
b: There have been a number of stressful events in my life in the last 12 months.
c: Generally, I feel I am an anxious person.
d: How often do you feel lonely?
e: How do you rate your health in general? (higher score, better health).

Table 4
Correlations coefficients among psychological measures applied to Mexican medical students

Psychological measures	1	2	3	4	5	6	7	8	9
1.- Loneliness	1.00								
2.- Test Anxiety	.23*	1.00							
3.- General Anxiety	.30*	.49*	1.00						
4.- Self-esteem	-.49*	-.29*	-.34*	1.00					
5.- Extroversion	-.47*	-.16*	-.20*	.35*	1.00				
6.- External Locus of Control	.17*	.18*	.17*	-.23*	-.17*	1.00			
7.- Neuroticism	.32*	.38*	.44*	-.38*	-.19*	.18*	1.00		
8.- Stressful Life Events	.17*	.27*	.29*	-.17*	-.02	.09*	.20*	1.00	
9.- Depression	.48*	.30*	.38	-.46*	-.27*	.22*	.36*	.27*	1.00

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