CHAPTER 3

The psychometric qualities of the MOS-20 Short Form Health Survey in a Romanian setting

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Abstract:

Objectives: There is a need in countries in transition for instruments that assess people's functional health and wellbeing. The assessment of functional health is especially relevant in these countries since the health status is deteriorating and policymakers are considering changes in the health care delivery system. This paper deals with the question, Is the Medical Outcomes Study Short Form Health Survey (MOS-20) a valid and reliable instrument to assess the health status of the population in a Romanian setting?

Methods: The MOS-20 questionnaire was administered to a representative sample of 619 Romanian adults from the Dolj district. This study replicates the methods used in the United States (on validity and reliability) and new methods of validation (confirmatory principal component analysis) and comparison with the findings in Western European countries with pre-established validity (i.e. the Netherlands).

Results: The MOS-20 is a valid and reliable instrument for assessing the health status of the Romanian population.

Conclusions: This study proves the utility of the MOS-20 for a Romanian setting. For proving the cross-cultural stability of this instrument for the other countries in transition, and also for developing a more suitable mental health subscale for these countries, further studies are required.

Key words: *health status, MOS-20, validity, reliability, countries in transition, Romania*

3.1 Introduction

To describe the health status of a population or to monitor the effects of health policy, the need for a measure to complement traditional indicators such as age-adjusted morbidity and mortality rates has been widely recognized [1]. As a health status questionnaire, Medical Outcomes Study 20 Items (MOS-20) responds to this need. It also measures the impact of medical care on patient function and wellbeing from the patients point of view. The MOS-20 may be considered as a valued and up-to-date instrument for other reasons. Firstly, the MOS-20 is a useful instrument in studies evaluating health care facilities. Secondly, completing the picture of the populations health status with other instruments, it may help policy makers to decide on priorities in health care reforms and health policy. Thirdly, the point of the patients perspective is gaining importance in decision-making procedures [2] and health care research; the MOS-20 responds to the decision-makers requirement to know how patients perceive their own health.

At the same time, there is the particular situation of countries in transition, in South East and Central Europe. The decline of average life expectancy at birth [3], a deterioration of age-specific mortality rates for the middle-aged and in health status (experienced over the last three decades)[4,5] are some reasons justifying the need for a more detailed description of health status, useful for both policymakers and health care providers. In Romania, a country in transition in South East Europe, many changes have occurred in the last decade including significant health care reforms [3]. Therefore, the assessment of the health status from the users point of view may help policymakers in their attempt to evaluate the changes.

The purpose of this study is to analyze the psychometric properties of the Romanian version of the Medical Outcomes Study Short Form-20 (MOS-20) in a general population. The MOS-20 was developed and tested for an American patient population [6]. It has been used in Western countries to assess health-related quality of life for specific chronic conditions (e.g. [7-12]) as well as for general patient populations (e.g.[13-15]). Despite this original purpose, the tendency to change the MOS-20 into a generic instrument (i.e., intended for use both in general population surveys and in studies of patients with diverse health conditions [16]) is growing. In the last decade, the MOS-20 was validated for general populations in Finland [17], Dutch elderly [18] and Canadian elderly [19].

Although also used in Central and East European countries (Poland, Croatia, Slovakia), this instrument is seldom tested in such a setting. It is known that one of its initial purposes was related to the differences in health care systems [20]. From this theoretical point of view, MOS-20 may be useful

in countries in transition as well. But MOS-20 should first be shown to be a valid and reliable instrument for countries in transition in order for the concepts and assumptions underlying the 20 questions and the summarizing scores to be the same as in the original study.

Less frequently used than its competitor SF-36, MOS-20 has an important feature, namely its length. For this reason, it may be better to use the MOS-20 for surveys comprising many other topics. This kind of health research is very suitable for countries in transition due to the fact that, in these countries, not many surveys were carried out before 1990 and many changes are occurring nowadays [3,21]. Above all, it is suitable for countries where registration of health care utilization and morbidity are in development.

According to Zimmermann [22], in modern democratic societies, survey research has played a major role since War World II. For example, in Switzerland in recent years there have been panel studies every five years on self-perceived state of health and other related topics [22]. In Germany, health surveys were carried out in 1994 and 1998 using SF-36 [23]. It is worth noting that these surveys were financed by the Ministry of Health. In Australia, there is a series of five-yearly population studies which use SF-36, namely the Australian National Health Survey, and SF-12 is employed within other surveys [24]. For the Romanian setting, this survey is the first one on health status as perceived by the population in the last 13 years.

It is of wide interest and importance that the state of the populations health is described in detail in Romania and other countries in transition. As mentioned before, an important prerequisite to the use of this instrument in a country in transition is the reproduction of the conceptual model underlying its scoring and interpretation. Therefore, this study answers the research question, is the MOS-20 a valid and reliable instrument to assess health-related quality of life in a Romanian setting? The major hypothesis of this study is that the concepts underlying the 20 questions of the MOS assess wellbeing and functional health in a Romanian setting.

3.2 Materials and methods

a. Measures

The MOS-20 is a short form health survey with three dimensions both for functioning (physical, social and role) and for wellbeing (mental health, health perceptions and pain).

Physical functioning is assessed by limitations due to health in a variety of physical activities, ranging from strenuous to basic. Role and social functioning are defined by limitations due to health problems. Mental health is assessed in terms of psychological distress and wellbeing. The measure of

health perceptions records patients own ratings of their current health in general. Pain captures differences in physical discomfort [6]. The items are scored on a Likert scale.

The construction of the health measures is described by Stewart et al. [6]. Briefly, each of the six scales obtains a score by summing the responses. The scores are reversed so that a high value indicates better health and are transformed linearly to range from 0 to 100. The exception is the single-item measure for pain which is scored so that a high score indicates more pain.

Sociodemographic variables include age, gender, educational level and income. Education is modelled as a variable with seven categories, namely less than primary school, primary school, vocational school low, high school, vocational high school, university and other. Income variable is described with 13 categories.

b. Sample and data collection

In order to assess the changes in the Romanian health care system from the peoples point of view, a research project was carried out in 2000.

Since the available reliable population registries through municipalities and regional authorities are from 1996 (the last elections), the sampling is based on the population of randomly selected GP practices in the Dolj district. Since 1999, GPs have had to create their own lists of the patients they care for. In as far as people are registered with a GP, the lists present a reliable record of the population. Dolj Health Insurance Fund keeps the lists of GP and patient names, and its manager agreed to cooperate (as did also the Chairman of the Dolj College of Physicians). The GPs were stratified according to urban or rural area (60% urban, 40% rural) and randomly selected from both types. For each of the 10 GPs, a random list of 100 patients was made. Thus a sample of 1,000 randomly selected addresses was used in order to obtain a net result of at least 600 completed questionnaires. The data were gathered through face-to-face interviews by trained interviewers. The instrument was designed for self-administration but, in order to address all the study population (i.e., to include ill people, the disabled and illiterates), the face-to-face interview was preferred. The number of questionnaires returned was 680; the response rate was 68%. After verifying the questionnaires, the data of 619 respondents was used. Descriptive statistics of the sample are presented in Table 1.

Table 1. Socio-demographic and MOS 20 descriptives of study sample

Characteristics of the respondents	Mean/Frequency*	Standard deviation	Minimum	Maximum
Age	46	17.5	18	91
Gender*	44.4%			
Education*	31%			
	23.4%			
	35.5%			
	9.9%			
Area of living*	61.2%			
Marital status*	71.6%			
Physical functioning	72.1	38.0	0	100
Role functioning	61.7	47.7	0	100
Social functioning	73.5	28.3	0	100
Mental health	61.0	18.1	0	100
Health perception	58.1	21.0	10	95
Pain	36.4	37.2	0	100

The 20 questions in the Medical Outcome Study were placed at the beginning of the questionnaire, which contained about 350 items, to focus on peoples opinions and satisfaction with the reformed health care system and the health status of the population.

c. Statistical Analysis

The assessment of cross-cultural validation of the MOS-20 Short Form Health Survey was conducted using the MOS authors methods, i.e., preliminary tests of validity and reliability [6].

Preliminary tests of validity consisted of (a) correlations among the health measures (all correlations among the health measures should be statistically significant and substantial in magnitude), and (b) correlations with sociodemographic characteristics (people with higher education and/or income should report better health. Older people should report poorer health than younger people, except for mental health). In addition, these results should be similar to results derived from other countries. Furthermore, we tested convergent and discriminant aspects of validity.

With respect to convergent validity, we hypothesized that each item in a hypothesized group should be substantially related (r<=0.40) to the total score

* *Variables such gender, living area, marital status and education level are categorical, so the percentage of the men, urban, married people and the percentage of grouped educational categories (i.e., primary school or less, vocational school low, high school, university or vocational school high) are presented here for these variables.*

computed from other items in that group, i.e., item-rest correlation. With respect to discriminant validity, we hypothesized that each item should correlate more closely with its hypothesized scale than with other MOS-20 scales [25]. In addition, a scaling success was counted whenever the correlation between an item and its hypothesized scale equaled or exceeded 0.40. For item divergent validity tests, a success was counted whenever an item had a higher correlation with its hypothesized scale than with other MOS-20 scales [26,27].

The internal reliability (Cronbachs alpha) was estimated by conforming with the original version of Stewart et al. [6] for the four multi-item scales.

Moreover, the existence of the six health domains within this instrument is proved by performing confirmatory Principal Component Analysis for the items of each hypothesized scale. Some correlation matrices showing the patterns of Dutch data and Romanian data were also compared (Dutch MOS-20 has pre-established reliability and validity, according to Kempen [18]).

Almost all respondents answered all the questions of the Romanian MOS-20, with three exceptions. There were two missing scores identified for one question in the mental health scale and there was one missing score identified for one question within the role functioning scale. These missing scores were replaced by the mean score of the specific item for all other subjects and used in all analysis except for the reliability analysis.

Analyses were performed using the Statistical Package for the Social Sciences (SPSS) software program, version 11. [28].

3.3 Results

With respect to the preliminary test of validity, the bivariate parametric correlation analysis performed for health measures shows (Table 2) that all the coefficients are statistically significant and most of them (11 of 15) are substantial in magnitude, i.e., higher than 0.50.

Table 2. Pearson correlations among MOS-20 health measures

Health Measures	Physical functioning	Role functioning	Social functioning	Mental health	Health perception
Role functioning	.768**				
Social functioning	.673**	.590**			
Mental health	.457**	.429**	.401**		
Health perception	.678**	.623**	.555**	.512**	
Pain	-.564**	-.586**	-.514**	-.491**	-.708**

** Correlation is significant at the 0.01 level.

The associations between the sociodemographic variables and the MOS-20 health measures are presented in Table 3. In line with US results, better health is reported by younger people, educated respondents and those with higher incomes. In the case of reported mental health, the results are quite different from those found by Stewart et al. [6].

Table 3. Spearman correlations among socio- demographic variables and MOS-20 health measures

MOS-20 Health measures	**Socio- demographic variables**			
	Age	**Gender**	**Education**	**Income**
Physical functioning	-.482**	.113**	.342**	.243**
Role functioning	-.370**	.107**	.243**	.244**
Social functioning	-.286**	.168**	.223**	.174**
Mental health	-.262**	.188**	.219**	.183**
Health perception	-.440**	.174**	.244**	.211**
Pain	.395**	-.176**	-.266**	-.224**

With respect to convergent validity, we identified strong associations between the items and the sum of the scores of the remaining items in the MOS-20 subscales (item-rest correlations). The rule of thumb of correlation coefficients higher than 0.40 is exceeded; most correlation coefficients (17 of 18) are higher than 0.60.

Regarding the discriminant validity, all the items have a higher correlation with their hypothesized scale than with the competing scale. Therefore, the scaling success rate on discriminant validity is 100% for all scales.

Table 4 compares the Cronbachs alpha coefficients of internal reliability of the four scales on health status applied in the Romanian setting with Dutch and US data. All the coefficients are above the standard of 0.70. Moreover, for the Romanian data, the criterion of an internal consistency coefficient higher than 0.90, which is recommended as a minimum in order to interpret scores at the individual level, is exceeded in three out of four cases. It is notable that the exception in the Romanian case is the mental health scale.

Table 4. Internal consistency (by Cronbachs alpha) of four multi-items MOS-20 scales for Romanian, Dutch and American data

MOS-20 health measures	**Romanian**	**Dutch**	**American (patients)**
Physical functioning score	.94	.84	.86
Role functioning score	.97	.86	.81
Mental health score	.81	.89	.88
Health perception score	.92	.89	.87

** *Correlation is significant at the 0.01 level.*

The results of the unrotated principal component for the four multi-item scales are shown in Table 5. The items of each hypothesized scale are loaded in one component. Therefore, each of the scales on health status, i.e. physical functioning, role functioning, mental health and health perceptions, measures one concept.

Table 5. Component loadings, Eigenvalues and Total Variance Explained of Romanian MOS-20 for multi-items scales

Scales on	Component	Initial Eigenvalues	% of Variance
Physical functioning	1	4.716	78.6
	2	.549	9.2
	3	.308	5.1
	4	.169	2.8
	5	.144	2.4
	6	.115	1.9
Role functioning	1	1.942	97.1
	2	5.803E-02	2.9
Mental health	1	2.881	57.6
	2	.714	14.3
	3	.659	13.2
	4	.384	7.7
	5	.362	7.2
Health perceptions	1	3.760	75.2
	2	.470	9.4
	3	.345	6.9
	4	.246	4.9
	5	.179	3.6

Following the explained variance by component, not surprisingly the mental health scale again has the component that "fits" less well than the same one in the Dutch data (Table 6). On the other hand, the physical functioning score is much higher for the Romanian data than for the Dutch data.

Table 6 The comparison between the Explained Variance of Romanian MOS-20 and Dutch MOS- 20

Scale	% of Variance explained by the component solution of Romanian data	% of Variance explained by the component solution of Dutch data
Physical functioning score	78.5	56.7
Role functioning score	97.1	87.9
Mental health score	57.6	68.7
Health perception score	75.2	70.7

3.4 Conclusion and Discussion

The findings of the Romanian MOS-20, with respect to validity and reliability and also confirmatory factorial analyses, are sufficient and generally in line with US original data and Dutch data. Therefore, our conclusion is that the MOS-20 is a valid and reliable instrument; thus the MOS-20 scales can be scored using the standard scoring algorithms for measuring the functional status and wellbeing of the Romanian general population.

Proving the validity of an instrument measuring the health status of the population in a country in transition is challenging, especially following Stewarts methods. Stewarts study on the health status of the American population [6] was carried out in a country with economic prosperity and with a stable situation. The validation of the MOS-20 in a country in transition was performed during a period with negative consequences especially for mental health, defined as "general mood or affect, including depressing anxiety, and psychological wellbeing" [6]. "A prolonged economic downturn sharply reduced social security, widening income and wealth differences (…) have all contributed to frustration and disillusion" [5]. This state of affairs is reflected by the validation in a Romanian setting of the mental health scale that has the lowest score of all the other scales on reliability and also on percentage of explained variance. It seems that the complex reality of the mental health of a population during the very stressful period of transition is not completely described by the five items of the MOS-20 mental health scale. This Romanian situation may also be the reason for the worse mental health reported by the elderly, contrary to Stewarts findings, since they are in the most deprived circumstances as described in some studies [3, 21]. In general, however, this contextual difference does not seem to affect the validity of the MOS-20; therefore, it seems "context stable". The statistical analysis also supports the validation of the mental health scale, but not at such a high level as the other three scales of the MOS-20 (two scales are one-item scales, thus Cronbach s alpha cannot be calculated).

There is a need for an instrument to measure health status in a country in transition like Romania (see Introduction). The choice of the MOS-20 to address this task may be a point of discussion. This instrument was originally designed to assess the wellbeing and the functional health of patient populations. But, as mentioned earlier, during recent years it has also been widely applied to general populations. Our assumption was that the concepts underlying the 20 questions assess wellbeing and functional health, and consequently, the scores used to summarize items for each scale are the same both for patients and for general populations. This study confirms this

hypothesis.

In this study, the utility of the MOS-20 is proved for studying the health status of the Romanian population, following Stewarts method, confirmatory principal component analysis and a comparison with the findings in a West European country where the instrument has already been validated. The Romanian version of the MOS-20 was found to be equivalent in concepts to the original US-English MOS-20. In addition, the comparison between the Romanian and Dutch findings of the MOS-20 supports the idea of adequate validity for the Romanian version.

The MOS-20 was designed to measure the different outcomes of different health care systems [20]. The findings of this study prove that, despite the cultural differences between the US, The Netherlands and Romania, and despite the transition period of an East European country characterized more or less as a crisis, the MOS 20 has cross-cultural applicability. However, future health status measurements for healthy populations should have greater capacity to differentiate with regard to the mental health scale for populations of countries in transition.

Since many countries in Europe are in a process of transition which may have consequences for the health status of the population, the findings in this paper call for further proof of the cross-cultural stability of the MOS-20 in countries in transition because of the need for a valid instrument to assess the functional health and wellbeing of the population.

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