ARTICLE

Adaptation and validation of the Beliefs about Medicines Questionnaire (BMQ) in primary care patients in Greece

Ioannis D.Komninos[a], Katerina Micheli MPH[b], Theano Roumeliotaki MPH[c] and Rob Horne BSc MSc PhD FRPharmS[d]

a General Practitioner & Research Coordinatior, SHARE Greece Research Laboratory, Department of Social Medicine, Medical School, University of Crete, Iraklion, Crete, Greece
b Social Worker & Researcher, Department of Social Medicine, Medical School, University of Crete, Iraklion, Crete, Greece
c Statistician, Department of Social Medicine, Medical School, University of Crete, Iraklion, Crete, Greece
d Head of the Department of Practice and Policy; Director ,Center for Behavioral Medicine and Professor of Behavioural Medicine, Department of Practice and Policy, UCL School of Pharmacy, London,UK

Abstract

Objective: Cultural adaptation and validation of the Beliefs about Medicines Questionnaire in Primary Health Care patients in Greece.

Methods: For the assessment of the psychometric properties of the Greek version of the Beliefs about Medicines Questionnaire, 150 chronic patients visiting primary healthcare settings throughout the island of Crete, Greece, were recruited. They all completed both BMQ-general and BMQ-specific scales of the BMQ version which was previously culturally adapted and translated into the Greek language.

Results: The subscales of the Beliefs about Medicines Questionnaire demonstrated adequate internal consistency with Cronbach's alphas of 0.852 for Specific Necessity, 0.763 for Specific Concern, 0.784 for General Harm and 0.676 for General Overuse. On both parts of the BMQ, the inter-item correlations were found to be sufficient. Factor analysis revealed identical patterns for all questions between the Greek and the original scales.

Conclusion: The Greek Version of the Beliefs about Medicines Questionnaire is a valid and reliable instrument for evaluating patients' beliefs about medicines in primary healthcare in Greece. Further research is needed in order to study the relationship between beliefs about medication and non-adherence to medications.

Keywords

Attitudes, medication adherence, medication beliefs, person-centered medicine, primary care, validation

Correspondence address

Dr. Ioannis Komninos, Department of Social Medicine, Medical School, University of Crete, Iraklion PO 71003, Crete, Greece. E-mail: ykomninos@med.uoc.gr

Accepted for publication: 2 October 2012

Introduction

Although adherence to prescribed medication plays a crucial role in the management of most chronic diseases [1], several studies have shown that the percentage of non-adherence is considerable and represents a research challenge for all levels of healthcare [1-5]. On the basis of a theoretical approach to this challenge, several cognition models have been developed to explain the determinants of adherence to treatment. Among these, Social Cognition models and the Self-Regulatory Theory, share the common assumption that individuals develop beliefs than influence the interpretation of information and experiences and which guide behavior [1].

According to some reviews, it has been shown that non-adherence is not necessarily related to the type or severity of disease or sociodemographic factors [1,3,4,6]. Furthermore, the causes of non-adherence can be intentional (patients' preferences, motivations and beliefs) or unintentional (patients' skills and capacity) [4]. The importance of the former factor is highlighted by a number of studies on a range of illnesses and countries. According to their findings, it seems that patients' empirical decision-making in terms of adherence to their prescribed medication is often determined by the way in which they evaluate the necessity of the medication in relation to their concerns about potential adverse effects [1,8-9].

In an effort to evaluate and score in "common terms" the nature of patients' beliefs about medicines, Horne *et al*. developed the Beliefs about Medicines Questionnaire (BMQ) [7]. This questionnaire consists of two parts: a) the Specific part, which incorporates 2 subscales, the Specific-Necessity and the Specific-Concern and assesses patients' personal beliefs and concerns regarding their medication and b) the General part, which also incorporates 2 subscales, the General-Harm and General-Overuse and

addresses patients' beliefs and perceptions about medicines in general. According to the developers of this tool, individuals' beliefs about Necessity of medication are positively correlated with adherence, while their Concerns about adverse outcomes from its use are correlated negatively. Furthermore, personal beliefs about medicines seem to be a stronger predictor of adherence than any other socio-demographic factor [1,6].

The BMQ has been translated and validated in many European languages [10-14] and has proved suitable to measure patients' beliefs in medicines in a German primary care setting [15]. In addition, it has been shown that BMQ-specific scores represent strong predictors of adherence to the treatment of a range of diseases such as asthma, mental disorders, rheumatoid arthritis, heart, renal diseases, depression, diabetes, AIDS, hypertension and haemophilia [1,10,11,16-24].

The aim of this study was the cultural adaptation of the Beliefs about Medicines Questionnaire into the Greek language and its validation for use in primary healthcare patients in Greece.

Methods

Procedure and Sample

Our study consisted of 2 phases, cultural adaptation and validation of the Beliefs about Medicines Questionnaire.

In the first phase of the study, the Beliefs about Medicines Questionnaire was translated from English into the Greek language by a professional bilingual translator and then translated back into English by a native English speaker in order to check whether or not the Greek translation conveyed the original meaning intended by the developers. Cognitive debriefing was conducted in a group of 7 individuals by 2 independent interviewers in order to test alternative wording and to check the understandability, interpretation and cultural relevance of the translation. All items, both in the special and the general part of the BMQ, performed extremely well, indicating that there was no need for altering any questionnaire item (Table 1). In addition, both raters scored most questions of the BMQ with the codebook's highest possible score, that is, mean score 5 "high understanding" (standard deviation = 0.0). Hence, the inter-rater Correlation Coefficient (ICC) cannot be computed, since 0 variance in scores was observed.

In the second phase of the study, 150 patients visiting 14 primary healthcare settings throughout the island of Crete, Greece, were recruited for a period of 4 months. Inclusion criteria for participants were: being primary care patients and receiving long-term medication for one or more chronic diseases. Exclusion criteria were: patients with cognitive decline (MMSE≤24), patients without understanding of the spoken Greek language and patients not on any medication. Patients who provided incomplete information at the completion of the questionnaire were also excluded from the study.

The group of health services users included a variety of different health conditions along with a wide spectrum of diverse treatment characteristics. All participants completed the Beliefs about Medicines Questionnaire, while additional information was tabulated from each patient's medical record, in terms of demographic characteristics (age, gender, residence, occupational status, educational status) and specific medical information (number of comorbid chronic diseases and number of medicines taken daily). For the assessment of cognitive status, all participants underwent MMSE with 24 as a cut-off score, as used in numerous studies.

Each questionnaire was anonymous and all participants, after they had been informed of the aims of the study, provided written informed consent. Ethical approval for this study was provided by the scientific board of the Hospital Health Center of Neapolis, Lasithi, Crete, Greece.

Measures

The Beliefs about Medicines Questionnaire (BMQ)

The Beliefs about Medicines Questionnaire [7] is a self-administered questionnaire, which assesses cognitive representations of medication. It comprises 2 scales: the BMQ-Specific which assesses representations of medication prescribed for personal use and the BMQ-General which assesses beliefs about medicines in General. This questionnaire consists of 2 parts:

a) the BMQ-specific, an 11-item questionnaire incorporates 2 subscales, the Specific-Necessity subscale assessing patients' beliefs about the necessity of prescribed medication (e.g., "My health, at present, depends on my medicines", "my medicines protect me from becoming worse") and the Specific-Concern subscale which addresses their concerns regarding potential adverse outcomes from its use (e.g., "I sometimes worry about the long-term effects of my medicines", "These medicines give me unpleasant side effects")

b) the BMQ-general, an 8-item questionnaire, which also comprises 2 subscales, the General-Harm subscale, assessing patients' general beliefs and concerns about potential harm of medicines and the degree to which they are perceived by the individual as being harmful (e.g., "Medicines do more harm than good", "All medicines are poisonous") and the General- Overuse subscale which addresses patients' considerations regarding certain aspects of medication overuse, such as healthcare providers' over-investment of trust in medicines or over-administration of medicines due to lack of time (e.g., "Doctors use too many medicines", "Doctors place too much trust on medicines").

Respondents indicate their degree of agreement with each individual statement about medicines on a 5-point Likert scale, (1=strongly disagree to 5=strongly agree). Scores obtained for the individual items within each scale are summed to give a scale score with higher scores

Table 1 Mean scores for each questionnaire items after the application of the codebook, assessing how participants interpreted, elaborated on and answered items

		Codebook					
		Item Interpretation		Coherent Elaboration		Concrete Answer Choice	
	N	m	(SD)	m	(SD)	m	(SD)
Specific Part							
S1	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
S2	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
S3	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
S4	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
S5	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
S6	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
S7	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
S8	7	4.9	(0.4)	4.9	(0.2)	5.0	(0.0)
S9	7	4.9	(0.2)	5.0	(0.0)	5.0	(0.0)
S10	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
S11	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
General Part							
G1	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
G2	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
G3	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
G4	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
G5	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
G6	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
G7	7	5.0	(0.0)	5.0	(0.0)	5.0	(0.0)
G8	7	4.9	(0.2)	5.0	(0.0)	5.0	(0.0)

In a scale from 1 (poor understanding) to 5 (good understanding).

indicating stronger beliefs in the concepts represented by the scale.

Statistical analysis

Statistical analyses were conducted using the statistical computer software SPSS v.18 (SPSS Inc. Chicago, IL, USA).

Confirmatory factor analysis was carried out. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of Sphericity were initially employed to determine the appropriateness of the dataset for factor analysis [25-26]. High values (>0.5) in KMO indicate that factor analysis is appropriate. Factor analysis using the correlation matrix was conducted to extract underlying subscales. To identify the number of factors the eigen value of >1.0 was used as primary criterion. The varimax rotation method was applied to help in the simplification of factors interpretation. Items with factor-loadings >0.30 were considered important contributors to a factor and played the key role for the interpretation and labeling of the construct they loaded on [27]. Solutions deriving factors with less than 3 items with loading >0.30 were disregarded.

Descriptive statistics, such as frequencies and means and standard deviation, were used to examine the demographic characteristics of the participants and the completion of the questionnaire. Univariate associations between demographic characteristics and the BMQ scales were examined by t-tests or analysis of variance (ANOVA) for categorical variables and Pearson's r correlation coefficient for continuous ones.

Internal consistency of the questionnaire subscales was assessed using Cronbach's alpha. The criterion for testing the scales' reliability was statistic α to be as close as, or higher of 0.7 [28].

Results

Demographic characteristics

A total of 150 patients, 57 males and 93 females, participated in this study. The average age of the participants was 62.5 years (SD: 13.5). The majority of the respondents were retired, of lower education and residents of agricultural rural areas (Table 2).

Table 2 Descriptive characteristics of validation study sample

	Descriptive characteristics	
	N	**%**
Sex		
Men	57	38.0
Women	93	62.0
Occupational status		
Retired	80	53.3
Farmer/Breeder	20	13.3
Public servant	12	8.0
Private servant	15	10.0
Household	17	11.3
Unemployed	6	4.0
Education		
University/polytechnic	9	6.0
Further Commercial/Technical	19	12.7
Secondary	42	28.0
Elementary school	63	42.0
Analphabetic	17	11.3
Residence		
Urban area	16	10.7
Semi-urban area	49	32.7
Rural area	85	56.7
	Mean	**SD**
Age		
Years	62,5	13,5
Chronic diseases		
Number of diseases	3,2	1,6
Medication taken		
Number of medicines taken daily	4,8	3,0

Table 3 Factor loadings from confirmatory factor analysis applied in both specific and general parts of the BMQ

	Specific Questions	
	Factor 1	**Factor 2**
	Necessity	**Concerns**
Without my medicines I would be very ill	0.899	
My life would be impossible without my medicines	0.854	
My health, at present, depends on my medicines	0.828	
My health in the future will depend on my medicines.	0.667	
My medicines protect me from becoming worse	0.639	
I sometimes worry about becoming too dependent on my medicines		0.768
My medicines disrupt my life		0.762
My medicines are a mystery to me		0.694
Having to take medicines worries me		0.688
I sometimes worry about long-term effects of my medicines		0.640
These medicines give me unpleasant side effects		0.416
	General Questions	
	Factor 1	**Factor 2**
	Harm	**Overuse**
Medicines do more harm than good	0.809	
All medicines are poisons	0.808	
Most medicines are addictive	0.728	
People who take medicines should stop their treatment for a while every now and again	0.720	
Natural remedies are safer than medicines	0.490	
Doctors use too many medicines		0.836
If doctors had more time with patients they would prescribe fewer medicines		0.801
Doctors place too much trust on medicines		0.623

Table 4 Internal validity of the BMQ subscales and Pearson's correlation coefficient between scales

	Specific		General	
	Necessity	**Concerns**	**Overuse**	**Harm**
Scale statistics				
Mean (SD)	18.3 (4.5)	17.5 (4.6)	10.1 (2.4)	13.6 (3.8)
Internal validity				
Cronbach's α	0.852	0.763	0.676	0.784
Concerns				
Pearson's r	0.280*			
Overuse				
Pearson's r	-0.237*	0.178 *		
Harm				
Pearson's r	-0.052	0.441*	0.364*	

** p-value<0.05*

Table 5 Univariate associations of demographic characteristics of the validation study sample and the BMQ subscales

		Specific				General			
		Necessity		Conserns		Overuse		Harm	
	N	**Mean**	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**	**Mean**	**(SD)**
Sex									
Men	57	18.0	(4.4)	17.7	(4.5)	10.5	(2.4)	13.4	(3.9)
Women	93	18.4	(4.6)	17.5	(4.7)	9.8	(2.3)	13.8	(3.8)
Occupational status									
Retired	80	19.5 *	(3.9)	17.7	(4.8)	9.9	(1.9)	14.0	(4.2)
Farmer/Breeder	20	18.7	(3.9)	17.4	(4.4)	9.5	(3.3)	14.0	(3.0)
Public servant	12	16.2	(2.5)	17.4	(3.7)	10.8	(2.2)	11.8	(3.7)
Private servant	15	14.4	(3.8)	16.3	(5.5)	10.6	(2.7)	12.0	(3.8)
Household	17	18.6	(5.6)	18.1	(3.3)	10.2	(2.9)	13.9	(3.1)
Unemployed	6	13.8	(7.3)	17.5	(7.0)	11.7	(2.0)	14.5	(2.6)
Education									
University/polytechnic	9	13.0 *	(5.6)	17.0	(7.1)	11.8	(1.8)	12.7	(4.7)
Further Commercial/Technical	19	17.2	(2.3)	16.8	(4.3)	10.3	(2.1)	12.2	(3.5)
Secondary	42	17.5	(4.2)	17.2	(4.2)	10.4	(2.4)	13.2	(4.0)
Elementary school	63	19.5	(4.5)	18.3	(4.5)	9.5	(2.4)	14.2	(3.8)
Analphabetic	17	19.6	(4.0)	16.6	(5.0)	10.5	(2.5)	14.6	(3.0)
Residence									
Urban area	16	17.6	(4.9)	16.5	(3.9)	10.9	(2.6)	12.2 *	(3.8)
Semi-urban area	49	17.5	(4.1)	16.6	(4.7)	10.4	(2.1)	12.5	(4.1)
Rural area	85	18.9	(4.6)	18.3	(4.6)	9.8	(2.4)	14.5	(3.5)
		Pearson's r		**Pearson's r**		**Pearson's r**		**Pearson's r**	
Age		0.449	*	0.232	*	-0.047		0.227	*
Disease		0.475	*	0.234	*	-0.103		0.016	
Number of medicines		0.520	*	0.279	*	-0.121		-0.010	

* p-value<0.050

Item analysis and data adequacy for factor analysis

The overall KMO measure for the 11-items of the Specific part of the BMQ was 0.811, much higher than the cut-off of 0.5. The computed KMO measure for the General part of the questionnaire was 0.788, also sufficiently high. At the same time, the Bartlett's test of Sphericity verified that the inter-item correlations were sufficient for both parts of the BMQ (X^2 = 602.1; df=55, p<0.001 and X^2 = 311.5; df=28, p<0.001).

Factor solution

In order to obtain independent factors measuring different dimensions, principal components extraction method with varimax rotation was performed separately in the Specific and the General parts. Two factors were found to have eigen values >1 for each of the 2 parts, explaining 55% and 57% of the total variability, respectively, verifying the original structure of the BMQ. Factor loadings are presented in Table 3. Generally, factor analysis revealed identical patterns for all questions between the Greek and the original scales.

Individuals' characteristics related to social capital

Table 5 demonstrates the partial associations of each of the 4 BMQ subscales with a series of socio-demographic variables. Statistically significant differences were found for the Necessity subscale in correlation with education ($F=6.07$, $df=149$, $p<0.001$) and occupation ($F=5.99$, $df=149$, $p<0.001$). Another association was identified between area of residence and the potential Harm of medication ($F=5.58$, $df=149$, $p=0.005$), where participants from rural areas scored higher to this scale compared to those from urban or semi-urban areas. However, more important associations were found through correlation coefficients for age, number of diseases and daily medication with both Specific subscales. The scoring of Necessity and Concern was found to increase significantly with those 3 variables ($p<0.05$). Age was additionally found to correlate positively with the Harm General subscale (Table 5).

Discussion

The main aim of this study was to deliver the Greek primary healthcare professionals a culturally adapted, valid questionnaire in the Greek language that assesses the psychometric properties involved in patients' decision-making about adherence to their prescribed medication. According to the findings of our study, the Greek version of the Beliefs about Medicines Questionnaire can be used as a reliable instrument for this purpose in primary healthcare in Greece. Furthermore, to our knowledge, this is the first time in Greece that there is evidence about the degree to which socio-demographic factors such as age, education and previous occupational status, along with medical parameters such as the number of chronic diseases and number of daily medications taken, influence individuals' personal beliefs and perceptions in general about medicines.

In this study, the Greek version of the BMQ was applied in primary healthcare patients. Primary healthcare patients of the island of Crete, given its large geographical and socio-demographical diversity, are considered to represent multiple Greek cultural and social dispositions, providing an adequate sample according to the aims and needs of this study. Our results suggest high internal consistency for both BMQ parts, BMQ-Specific and BMQ-General, comparable with the results of the original BMQ UK validation [7], increasing the level of reliability for the Greek version of the BMQ. In addition, both parts present high adequacy with strong inter-item correlation.

In our sample, an important association between both BMQ-Specific subscales with age, number of diseases and number of medicines taken daily has been recorded. It seems that aging, as well as accumulation of diseases and/or medicines, has a positive impact on both Necessity and Concern, increasing their scores significantly. The level of interaction between these factors and the underlying psycho-social mechanisms through which patient's personal beliefs about his medicines are formed, may be key elements in the conceptualization of patients' adherence in primary healthcare.

Respondents of a lower educational level tend to estimate more the necessity of prescribed medication, as well as retired persons, farmers and housewives. In addition, according to the results of this study, increased age and residence in rural areas are positively correlated with patients' skepticism about the potentially harmful effects of medicines. A possible explanation could be lack of adequate education and/or lack of information to assist a greater understanding of medicines and their effects. However, these primary care patients may form a group that future interventions and strategies regarding adherence should focus on.

This study has some limitations. Our sample consisted mainly of patients of an older age with chronic illnesses who represented a typical example of primary care patients. But given the fact that all were previously informed by a letter with written consent about the subject of our study, it is possible that our results are biased by patients who were more motivated to participate in a study partially oriented towards interpretation of their relationship with medication. Another limitation may be the cross-sectional nature of the study, along with the absence of data concerning the test of the predictive validity of the measure.

Conclusion

In conclusion, the Greek version of the Beliefs about Medicines Questionnaire presented satisfactory psychometric/measurement properties indicating its reliability for use in primary healthcare patients. The BMQ is therefore advanced as a useful tool that will provide important information to primary healthcare professionals regarding patient's perceptions and about their prescribed medication either about medicines in general. With reference to clinical management, this knowledge may play a key role in many ways, from decisions about adequate therapeutical approaches, up to the configuration of the appropriate intervention in the family or the individual in primary healthcare.

Acknowledgements

The authors wish to thank the following for their contribution and positive spirit of collaboration for the completion of this study: Dr Aligizakis Kyriakos GP, Vamos Health Center, Dr Kapiki Soultana GP, Hospital – Health Center Neapolis, Dr Helen Makri, Internal Pathologist, Hospital – Health Center Neapolis, Dr E. Georgoulaki, Arkalohori Health Center, Dr Emm Margetakis GP, Myrtos GP practice, Dr E. Otabasidou, Elounda GP practice, Dr N. Syvaropoylos GP, Spili Health Center.

References

[1] Horne, R. & Weinman, J. (1999). Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness. *Journal of Psychosomatic Research* 47, 555–567.
[2] Haynes, R., McDonald, H. & Gatg, A.X. (2002). Helping patients to follow prescribed treatment. Clinical applications for medications. *Journal of the American Medical Association* 288, 2880-2883.
[3] Vermiere, E., Hearnshaw, H., Van Royen, P. & Denekens, J. (2001). Patient adherence to treatment: three decades of research. A comprehensive review. *Journal of Clinical Pharmacy and Therapeutics* 26, 331–342.
[4] Horne, R. (2007). Adherence to treatment. In: Cambridge Handbook of Psychology, Health & Medicine 2nd Edition. (Ayers, S., Baum, A., McManus, C., Newman, S., Wallston, K. Weinman, J. et al., eds.), pp. 417-421. Cambridge: Cambridge University press.
[5] World Health Organization. (2003). Adherence to long-term therapies: evidence for action, Geneva: *whqlibdoc.who.int/publications/2003/9241545992.pdf.*
[6] DiMatteo, M.R. (2004). Variations in Patients' Adherence to Medical Recommendations A Quantitative Review of 50 Years of Research. *Medical Care* 42, 200-209.
[7] Horne, R., Weinman, J. & Hankins, M. (1999). The beliefs about medicine questionnaire: the development and evaluation of a new method for assessing the cognitive representation of medication. *Psychology and Health* 14, 1–24.
[8] Kumar, K., Gordon, C., Toescu, V., Buckley, C.D., Horne, R., Nightingale, P.G. & Raza, K. (2008). Beliefs about medicines in patients with rheumatoid arthritis and systemic lupus erythematosus: a comparison between patients of South Asian and White British origin. *Rheumatology* 47, 690–697.
[9] Treharne, G.J., Lyons, A.C. & Kitas, G.D. (2004). Medication adherence in rheumatoid arthritis: effects of psychological factors. *Psychology, Health and Medicine* 9, 337-349.
[10] Tibaldi, G., Clatworth, J., Torchio, E., Argentero, P., Munizza, C. & Horne, R. (2009). The utility of the Necessity-Concerns Framework in explaining treatment non adherence in four chronic illness groups in Italy. *Chronic Illness* 5,129-133.
[11] Jónsdóttir, H., Friis, S., Horne, R., Pettersen, K.I., Reikvam A. & Andreassen, O.A. (2009). Beliefs about medications: measurement and relationship to adherence in patients with severe mental disorders. *Acta Psychiatrica Scandinavica* 119, 78–84.
[12] Perpiñá Tordera, M., Martínez Moragon, E., Belloch Fuster, A., Lloris Bayo, A. & Pellicer Císcar, C. (2009). Spanish asthma patients' beliefs about health and medicines: validation of two questionnaires. *Archivos de Bronconeumologia* 45, 218-223.
[13] Beléndez, M., Hernández, A., Horne, R. & Weinman, J. (2007). Evaluación de las creencias sobre el tratamiento: validez y fiabilidad de la versión Españoladel Beliefs about Medicines Questionnaire. *International Journal of Clinical and Health Psychology* 7, 767-779.
[14] Optiz, U., Glattacker, M. & Jäckel, W.H. (2008). Der 'Beliefs about Medicines Questionnaire' (BMQ© R Horne) – Übersetzung und erstemethodischePrüfunganPatientenmitFibromyalgie. Deutsche Rentenversicherung Bund (Hrsg), editor. http://forschung. deutsche-rentenversicherung.de/ForschPortalWeb/ressorce?key= tagungsband_17_reha_kolloqu.pdf, 99–100.
[15] Mahler, C., Hermann, K., Horne, R., Jank, S., Haefeli, W.E. & Szecsenyi, J. (2012). Patients' Beliefs about Medicines in a primary care setting in Germany. *Journal of Evaluation in Clinical Practice* 18 (2) 409-413.
[16] Menckeberg, T.T., Bouvy, M.L., Bracke, M., Kaptein, A.A., Leufkens, H.G., Raaijmakers, J.A.M. & Horne, R. (2008). Beliefs about medicines predict refill adherence to inhaled corticosteroids. *Journal of Psychosomatic Research* 64, 47-54.
[17] Clatworthy, J., Bowski, I. R., Parham, R., Rank, T., Scott, J. & Horne, R. (2009). Understanding medication non adherence in bipolar disorders using a Necessity-Concerns framework. *Journal of Affective Disorders* 116, 51-55.
[18] Horne, R. & Weinman, J. (2002). Self Regulation and self management in asthma: exploring the role of illness perceptions and treatment beliefs in explaining non adherence to prevent medication. *Psychology and Health* 17, 17-32.
[19] Neame, R. & Hammond, A. (2005). Beliefs about medications: a questionnaire survey of people with rheumatoid arthritis. *Rheumatology* 44, 762-767.
[20] Horne, R., Cooper, V., Gellaitry, G., Leake, H., Date, H.L. & Fischer, M. (2007). Patients' perceptions of highly active antiretroviral therapy in relation to treatment uptake and adherence: the utility of the necessity-concerns framework. *Journal of Acquired Immune Deficiency Syndromes* 45, 334-341.
[21] Horne, R., Buick, D., Fisher, M., Leake, H., Cooper, V. & Weinman, J. (2004). Doubts about necessity and Concerns about adverse effects: identifying the types of beliefs that are associated with non-adherence to HAART. *International Journal of STD & AIDS* 15, 38-44.
[22] Aikens, J.E., Nease, D.E., Nau, D.P., Klinkman, M.S. & Schwenk, T.L. (2005). Adherence to maintenance-phrase antidepressant medication as a function of patient beliefs about medication. *Annals of Family Medicine* 3, 23-30.
[23] Ross, S., Walker, A. & MacLeod, M.J. (2004). Patient compliance in hypertension: role of illness perceptions and treatment beliefs. *Journal of Human Hypertension* 18, 607-613.
[24] Llewellyn, C., Miners, A., Lee, C., Harrington, C. & Weinman, J. (2003). The illness perceptions and treatment beliefs of individuals with severe haemophilia and their role in adherence to home treatment. *Psychology and Health* 18, 185-200.
[25] Malhotra, N.K. (Ed.). (1996). Marketing Research: An Applied Orientation. White Plains, NJ: Prentice-Hall.
[26] Kline, P. (1993). An Easy Guide to Factor Analysis. London: Routledge.

[27] Hair, J.F., Anderson, R.E., Tatham, R.L. & Black, W.C. (1998). Multivariate Data Analysis (5th Ed.). White Plains, NJ: Prentice-Hall.
[28] Nunnally, J.C. & Bernstein, I.R. (1994). Psychometric Theory. New York: McGraw-Hill.