



BELIEFS ABOUT MEDICINES QUESTIONNAIRE (BMQ) IN PATIENTS WITH CHRONIC PAIN

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SUMMARY – The aim of this study was to identify demographic and disease characteristics associated with different medication beliefs of patients with chronic non-malignant pain and to investigate beliefs about medicines and their association with medicine adherence. Data were collected from 202 patients using the Beliefs about Medicines Questionnaire (BMQ) and the Numeric Rating Scale (NRS). According to four different attitudinal constructs, the results indicate that the majority of patients were Indifferent, followed by Distrustful and Mixed-feelings, whereas the lowest proportion of patients were In-favour. The highest patient age was found in the In-favour and Indifferent constructs. Primary education level was the most represented in the In-favour construct. The most patients in the In-favour, Indifferent and Distrustful constructs used a combination of non-steroidal anti-inflammatory drugs (NSAID) and opioids. In the Mixed-feelings construct, patients mostly used a combination of paracetamol and NSAIDs. Most patients in the In-favour and Mixed-feelings construct reported severe pain. In the Indifferent and Distrustful constructs, most patients reported moderate pain. The study results indicate an association between some demographic characteristics and medications beliefs and that constructs could be predictors of adherence. The BMQ can be used to identify patients who are at risk of non-adherence and can be used in multidisciplinary pain programs.

Key words: chronic pain; beliefs about medicines questionnaire; adherence; pain measurement

Introduction

Chronic pain (CP) is defined as pain¹ that lasts or recurs for longer than 3 months². The World Health

Organisation (WHO) have recently reclassified – through the International Classification of Diseases (ICD) – chronic pain as a disease in the hope that governments would take a new interest in how chronic pain is identified, assessed and managed³, considering that CP is a global problem and has a significant impact on patients, their families, employers, health services and the wider economy⁴. At the pan-European level, around 40% of all respondents reported back/neck pain, 22% reported hand/arm pain and 21% reported foot/leg pain⁵. Despite the fact that pharmacotherapy

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is an important component of pain therapy⁶ and despite the effectiveness of pain medicines, recent data point to about 40% of the prescription medicines not being taken as prescribed⁷. Furthermore, non-adherence to medication is conceptualized in this taxonomy as “the process by which patients do not take their medications as prescribed”⁸. There are many possible factors related to pharmacotherapy that may influence non-adherence, such as the complexity of the therapeutic regimen, lack of efficacy, side effects, duration of treatment, concomitant treatment regimens, various changes in prescriptions during treatment, immediate availability of the health-care professionals and the associated economic costs⁹. Horne and Weinman found that medication beliefs may be a more powerful predictor of medication adherence than gender, education experience, number of medications and sociodemographic factors¹⁰. Thus, Horne identified two categories of reasons for non-adherence: intentional (the patient’s preferences, motivations and beliefs) or unintentional (the patient’s capabilities and capacity)¹¹. To further evaluate and score the intentional factor, Horne *et al.*¹² introduced Beliefs about Medicines Questionnaire (BMQ). Due to the conclusion that adherence behavior is more strongly associated with specific beliefs than with general beliefs¹³, the scales (scores) from the specific BMQ theme have been considered to be more powerful indicators of adherence than those from the general theme. The specific theme is divided into two subscales: Necessity and Concern. The Necessity subscale assesses patient beliefs about the necessity of preventative medications for maintaining their current and future health, while the Concern subscale assesses their worries about the existing and potentially adverse consequences of medication use¹⁰. A patient’s intention to adhere to their treatment can be predicted based on this necessity and concern framework¹⁴. Studies have identified patient beliefs about medicines as an important determinant of non-adherence. A meta-analysis of 96 peer-reviewed studies involving over 24000 patients across 24 long-term conditions and 18 countries showed that non-adherence was related to patients beliefs about medicines, measured by the Beliefs about Medicines Questionnaire (BMQ)¹⁵. To our knowledge, there have not been any studies on the association between patients’ beliefs and medication adherence among the Croatian population with chronic non-malignant pain, or

about changes in beliefs and adherence due to interventions. The aims of this study were as follows: 1) to identify demographic and disease characteristics associated with different medication beliefs of patients with chronic non-malignant pain and to 2) to investigate beliefs about medicines and their association with medicine adherence.

Methods

Participants and Data Collection Procedures

The sample was composed of 202 outpatients included in the study during the examination at the Department of Pain Management, University Hospital Centre Osijek, in the period from February to August 2022. The criterion according to which patients were chosen was: older than 18 years, duration of pain ≥ 3 month, understanding of Croatian language and writing, absence of diagnosis of cognitive or mental illness and voluntary consent to participate. Out of a total of 236 patients, 202 of them met the inclusion criteria and voluntarily agreed to participate after being informed about the aim and purpose of the study.

Instruments

Beliefs about Medicines Questionnaire, BMQ

The Beliefs about Medicines Questionnaire (BMQ) has been validated for appraisal of chronic physical illness¹⁰. The BMQ comprises two sections: the BMQ-Specific and the BMQ-General; the two sections of the BMQ can be used in combination or separately. The first (specific) part examines the cognitive representation of medicines prescribed for personal use and consists of a total of 10 items. This study sought to determine beliefs about medications prescribed for chronic pain as regulated by the guidelines (“Attitudes about medications prescribed for your chronic pain”). The second part of the questionnaire (general) examines beliefs about medications in general and contains 8 items. Patients answer each item using a five-point Likert scale: 5=strongly agree, 4=agree, 3=uncertain, 2=disagree and 1=strongly disagree. During the construction of the original questionnaire, two factors were singled out in each part of the questionnaire. The first factor in the specific part of the questionnaire measures beliefs about the necessity of prescribed medications (consisting of five items), and the second factor concerns their harmful consequences (also consisting of five items). The possible range of scores on each factor ranges from 5-25.

Higher scores indicate a higher degree of belief in the necessity of prescribed medications, or a higher degree of concern about the possible harmful consequences of prescribed medications. The first factor in the general part of the questionnaire measures beliefs about the harmfulness of medications in general (consisting of four items), and the second factor measures beliefs about excessive prescription of medications by clinicians (also consisting of four items). The possible range of scores on each factor ranges from 4-20. Higher scores indicate a higher degree of belief about the harmfulness of medications, i.e., a higher degree of belief about the excessive tendency of clinicians to prescribe medications¹⁰. The Necessity-Concern Differential (NCD) score is determined by subtracting the patient's Concern score from their Necessity score. It ranges from -20 to 20 and is useful for analyzing the relative balance of the patient's beliefs. Patients with a NCD above 0 are more likely to be adherent because their medication beliefs about their necessity outweigh their concerns. The higher their NCD scores, the stronger this relationship will be. The necessity and concern framework was then further analysed using the subscale mid-point of 15 to differentiate between high- and low-scoring respondents. This generated four different attitudinal constructs according to the combination of high or low Concern and Necessity scores: low Concern and high Necessity (In-favour) construct; high Concern and low Necessity (Distrustful) construct; low Concern and low Necessity (Indifferent) construct; and high Concern and high Necessity (Mixed-feelings) construct. It is believed that an effective modification of the underlying beliefs underlying these attitudes is more likely to produce positive results from adherence-improving interventions¹⁶. The internal consistency reliability of the BMQ indicated a highest Cronbach's alpha coefficient of 0.75 for Concern and the lowest, 0.54, for Overuse¹⁷. Regarding the sample of participants in this study, the reliability of the internal consistency indicated the highest value for Necessity ($\alpha=0.82$) and the lowest value for Harm ($\alpha=0.63$). For the purposes of this research, the BMQ was translated through the process of translation from English to Croatian and back-translation into English by two independent translators.

Numeric rating scale (NRS)

The Numeric Rating Scale (NRS) is one of the most effective single-item techniques for determin-

ing the degree of pain^{18,19}. The NRS rates pain severity on a scale of 0 to 10, with 0 indicating "no pain" and 10 indicating "unbearable pain". Clinicians, including psychologists, frequently use the classifications of mild, moderate and severe to streamline communication among patients and medical professionals. Establishing clear cut points for mild, moderate and severe pain on the NRS is important in research and clinical practice because they can be used as a guide in the selection and initiation of pain treatment and to quantify changes in a patient's functional status and quality of life²⁰. The intensity of the pain is assessed in such a way that the patients choose a numerical expression that indicates the intensity of the pain.

Ethics

This study was approved by the Ethics Committee of the author's institution, following the principles of the 1983 revised Helsinki Declaration guiding research on human subjects. All patients were informed about the study's purpose and aim, and they provided informed consent to participate in the research on a voluntary basis. The anonymity of the participants was guaranteed.

Statistics

Standard statistical methods were used for statistical analysis. All collected categorical data are presented with absolute and relative frequencies. The normality of the distributions was tested by the Kolmogorov-Smirnov test (K-S). Numerical data were presented with median and interquartile ranges and mean and standard deviation, according to the Gaussian distribution normality. Statistical analysis was performed with the SPSS statistical program (IBM Corp., SPSS Statistics for Windows, IBM Corp, Armonk, NY, USA), with statistical significance defined as $\alpha < 0.05$.

Results

This study involved 202 patients (156 women and 46 men) that were identified as eligible for the analysis. The mean age of the patients was 55.59 ± 10.71 in a range from 29 to 81 years. Regarding education, most patients ($n=145$; 71.8%) had the high-school level of education. The majority of patients ($n=106$; 52.5%) had a combination of NSAID and opioid medications in their pain therapy. The patients evaluated their pain on the NRS scale as 6.27 ± 1.617 . There was an almost

equal share of patients in the categories of moderate (49.5%) and severe (45.5%) pain (Table 1).

Observing participants according to four different attitudinal constructs in regard to the combination of high and low Concern and Necessity, the majority of patients (52.97%) were Indifferent, followed by Distrustful (21.29%) and Mixed-feelings (11.88%). The lowest proportion of participants were in the In-favour construct (4.45%) (Figure 1).

Among the four constructs, the mean age of In-favour and Indifferent constructs was both approximately 56 years, followed by the Distrustful construct. The construct with the youngest participants was the Mixed-feelings construct (50.88±10.695). From highest to lowest, the rates of having primary education levels were in the following order: In-favour (22.9%), Indifferent (16.8%), Distrustful (9.3%) and Mixed-feel-

ings (4.2%). According to the prescribed medications, and in relation to the four constructs, most patients in the In-favour (44.4%), Indifferent (53.3%) and Distrustful constructs (62.8%) used a combination of NSAID and opioids. In the Mixed-feelings construct, patients mostly used a combination of paracetamol and NSAIDs (62.5%). According to the assessed pain intensity using NRS categories, and in relation to the four constructs, the most patients in the In-favour (66.7%) and Mixed-feelings (54.2%) construct reported severe pain. In the Indifferent (55.1%) and Distrustful constructs (53.5%), most patients reported moderate pain (Table 1).

Regarding the patients' BMQ subscale scores, NCD scores were in a range of -17 to -3, with a mean of -2.15±4.917. Cronbach's α indicated that all scale measures were internally consistent in the study sam-

Table 1. Sociodemographic characteristics of patients

Characteristics	Total n=202	In-favour n=9 (%)	Mixed-feelings n=24 (%)	Indifferent n=107 (%)	Distrustful n=43 (%)
Male	46 (22.77)	3 (33.3)	7 (29.2)	28 (26.2)	3 (7)
Female	156 (77.23)	6 (66.7)	17 (70.8)	79 (73.8)	40 (93)
Mean age ± SD	55.59±10.741	56.89±9.075	50.88±10.695	56.48±10.480	55.23±11.077
Education level					
Primary school	28 (13.9)	2 (22.2)	1 (4.2)	18 (16.8)	4 (9.3)
High school	145 (71.8)	5 (55.6)	19 (79.2)	75 (70.1)	31 (72.1)
College	23 (11.4)	1 (11.1)	2 (8.3)	13 (12.1)	6 (14)
High education	6 (3)	1 (11.1)	2 (8.3)	1 (0.9)	2 (4.7)
Medications					
Paracetamol + NSAID	66 (32.7)	3 (33.3)	15 (62.5)	32 (29.9)	11 (25.6)
NSAID + adjuvant	7 (3.4)	0 (0)	0 (0)	5 (4.7)	1 (2.3)
NSAID+ opioid	106 (52.5)	4 (44.4)	9 (37.5)	57 (53.3)	27 (62.8)
Opioid + adjuvant	23 (11.4)	2 (22.2)	0 (0)	13 (12.1)	4 (9.3)
NRS (Mean ± SD)	6.27±1.617	6.11±2.147	6.25±10.695	6.28±1.871	6.28±1.403
NRS categories					
Mild (NRS 1-3)	10 (5)	2 (22.2)	2 (8.3)	4 (3.7)	1 (2.3)
Moderate (NRS 4-6)	100 (49.5)	1 (11.1)	9 (37.5)	59 (55.1)	23 (53.5)
Severe (NRS 7-10)	92 (45.5)	6 (66.7)	13 (54.2)	44 (41.1)	19 (44.2)

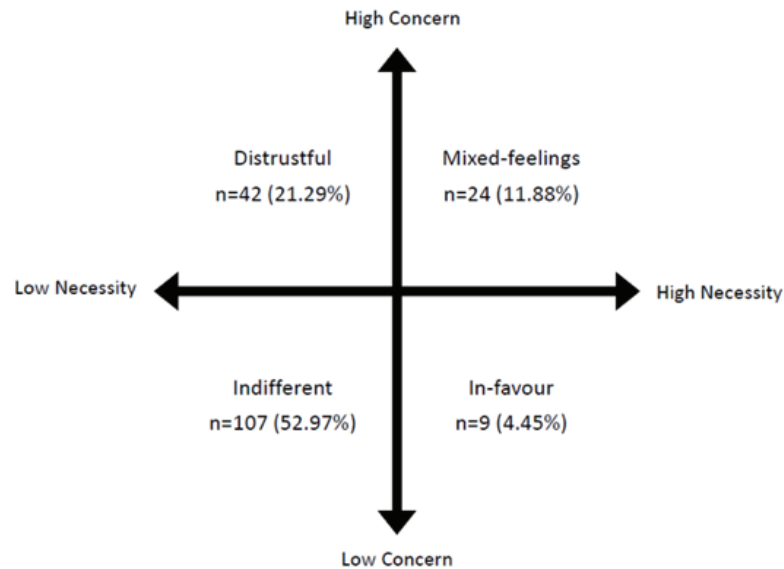


Figure 1. Four attitudinal constructs according to the combination of Concern and Necessity BMQ scores

ple, with the highest value for Necessity ($\alpha=0.82$) and the lowest value for Harm ($\alpha=0.63$) (Table 2).

Mean NCD scores of the two hesitant constructs, Mixed-feelings (-1.13 ± 2.271) and Indifferent (-0.94 ± 2.292), were found to be between the two

strongest, but opposing belief constructs: In-favour (6.89 ± 3.551) and the Distrustful (-8.53 ± 3.391). Similarly, the values of perceived Harm and Overuse of the two hesitant constructs were also situated in between the In-favour and the Distrustful constructs (Table 3).

Table 2. BMQ subscale scores

BMQ subscales	Score range	Mean \pm SD n=202	Cronbach CRO (n=202)	Cronbach HK (n=698)	Cronbach Swedish (n=595)
Necessity	5 to 23	11.83 \pm 3.951	0.819	0.788	0.823
Concern	5 to 25	13.99 \pm 4.208	0.813	0.728	0.818
NCD	-17 to -3	-2.15 \pm 4.917	NA	NA	NA
Harm	4 to 20	13.31 \pm 2.646	0.633	0.568	0.647
Overuse	4 to 20	11.82 \pm 2.665	0.728	0.612	0.684

Table 3. Mean scores in different attitudinal constructs

BMQ subscales	In-favour Mean \pm SD n=9	Mixed-feelings Mean \pm SD n=24	Indifferent Mean \pm SD n=107	Distrustful Mean \pm SD n=43
Necessity	17.89 \pm 2.619	18.58 \pm 1.976	10.35 \pm 2.628	9.98 \pm 2.395
Concern	11.00 \pm 1.323	19.71 \pm 2.579	11.28 \pm 2.073	18.51 \pm 2.261
NCD	6.89 \pm 3.551	-1.13 \pm 2.271	-0.94 \pm 2.924	-8.53 \pm 3.391
Harm	10.89 \pm 2.571	14.62 \pm 2.856	12.48 \pm 2.208	15.42 \pm 1.855
Overuse	10.00 \pm 1.414	12.96 \pm 2.726	11.08 \pm 2.245	13.60 \pm 2.787

Discussion

The aim of this study was to identify demographic and disease characteristics associated with different medication beliefs of patients with chronic non-malignant pain and to identify important criteria for finding a path towards developing more effective interventions in order to improve patient beliefs about medications and consequently their adherence as well.

The largest share of patients in this study had completed high school, which corresponded to the distribution of the adult population in the Republic of Croatia²¹. Our sample was dominated by women, which is in accordance with other studies indicating that CP is more common among women than men²². Most patients evaluated their pain on the NRS scale almost equally in the categories of moderate and severe pain, which is similar to findings in a previous study²³. The majority of all patients in our study were classified in the Indifferent attitudinal construct, followed by Distrustful and Mixed-feelings constructs. The lowest proportion of participants were in the In-favour construct. We found some similarities but also differences with the results of previous studies with regard to the representation of certain attitudinal constructs involving chronic diseases such as stroke, cardiovascular, respiratory and gastrointestinal diseases, diabetes mellitus and rheumatoid arthritis. Wan *et al.*¹⁶ reported that the highest proportion of their sample was in the In-favour construct, which is in contrast to our findings. Our results were similar to the aforementioned study in that the Mixed feelings construct was equally ranked with regard to representation. Wei *et al.*²⁴ examined patients with similar chronic diseases as the previously mentioned authors and found a different representation ranking of attitudinal constructs. Furthermore, the majority of all patients in our study were in the Indifferent attitudinal construct, which is in stark contrast to the findings of Wei *et al.*²⁴. Furthermore, lowest proportion of patients in our study were in the In-favour construct, whereas this construct ranked in first place in terms of representation in the study by Wan *et al.*¹⁶. In order to try explaining the differences between the results of these studies, we can hypothesize that although chronic pain is a chronic disease, there are specificities with regard to each chronic disease. Additionally, we have to take differences such as ethnicity, educational level, age and gender into account when comparing at the results of these studies.

Studies show that patient attitudes towards administering medications is a good indicator of their intention to adhere to treatment^{25,26}. Patients in the In-favour construct were assumed to have the most positive attitude about medications, whereas patients in the Distrustful construct appeared to have the most negative attitude about medications. According to BMQ scores, it was therefore possible to predict that patient attitude in these two opposed constructions would be more resistant to intervention than those of patients in the two hesitant constructs, Mixed-feelings and Indifferent^{13,26}. Although the smallest proportion of patients was in the In-favour construct in our study, which characterizes a positive attitude towards medications, we emphasize that the majority of the sample was in the Indifferent and Mixed feelings constructs. Therefore, although the results indicate a negative attitude of the patients and thus identify possible non-adherence, these findings could also provide an opportunity for professionals to use interventions to influence medication attitudes toward adherence.

Patients with a NCD above 0 are more likely to be adherent because their medication beliefs about the necessity outweigh their concerns¹⁶. Our results indicate there were negative NCD score regarding the BMQ subscale which indicates a tendency to non-adherence, which is not in accordance with the study by Wan *et al.*¹⁶, which could be explained the fact that the In-favour construct ranked highest with regard to representation in their study. Additionally, the mean NCD scores of the hesitant constructs from the patients were nearly in the middle of the two extreme constructs, In-favour and Distrustful (**Table 4**). This shows that these hesitant patients with more malleable attitudes toward medications are more prone to external influences, and thus more receptive to behavioral adjustment^{12,27}. The likelihood of putting a successful and effective intervention in place may be increased with positive changes in these attitudes²⁸.

The study results indicate an association between some demographic characteristics and medications beliefs, and that constructs could be predictors of adherence. The BMQ can be used to identify patients who are at risk of non-adherence and can be used in multidisciplinary pain programs. Despite the efficacy of medications, managing chronic pain becomes difficult and challenging without good adherence on the part of the patients. In order to facilitate treatment success, patients should also have a positive attitude

about medications as well as a strong understanding of their diseases in order to encourage better adherence.

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Sažetak

UPITNIK UVJERENJA O LIJEKOVIMA (BMQ) KOD PACIJENATA S KRONIČNIM BOLOM

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Cilj ovog istraživanja bio je identificirati demografske karakteristike i karakteristike bolesti povezane s različitim stavovima pacijenata s kroničnom nemalignom boli o lijekovima, te istražiti uvjerenja o lijekovima i njihovu povezanost s pridržavanjem uzimanja lijekova. Podaci su prikupljeni od 202 pacijenta pomoću Upitnika stavova o lijekovima (BMQ) i Numeričke skale boli (NRS). Prema četiri različita konstrukta stava, rezultati pokazuju da je većina pacijenata Ravnodušna, zatim Nepovjerljiva i Ambivalentna, a najmanji udio pacijenata je pripada u Prihvatljivi konstrukt. S obzirom na prosječnu dob, najstariji pacijenti bili su u konstruktima Prihvaćajući i Ravnodušni. Razina osnovnog obrazovanja bila je najzastupljenija u konstruktima Prihvaćajućih. Većina pacijenata u konstruktima Prihvaćajući, Ravnodušni i Nepovjerljivi koristila je kombinaciju nesteroidnih protuupalnih lijekova i opioida. U konstruktima Ambivalentni pacijenti su uglavnom koristili kombinaciju paracetamola i nesteroidnih protuupalnih lijekova. Većina pacijenata u konstruktima Prihvaćajući i Ambivalentni izvještavalo je o jakoj boli, dok je u konstruktima Ravnodušni i Nepovjerljivi većina pacijenata procijenila bol umjerenom. Rezultati istraživanja ukazuju na povezanost pojedinih demografskih obilježja sa stavovima o lijekovima te da bi konstrukti mogli biti prediktori adherencije. BMQ se može koristiti za identificiranje pacijenata kod kojih postoji rizik od nepridržavanja te se može koristiti u multidisciplinarnom programu za liječenje boli.

Ključne riječi: *kronična bol, Upitnika stavova o lijekovima (BMQ), adherencija, mjerenje intenziteta boli*