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MUSCULOSKELETAL PAIN EVALUATION: MCGILL PAIN QUESTIONNAIRE VERSUS MULTIDIMENSIONAL PAIN EVALUATION SCALE

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Abstract: *The first and most important step in pain management is to correctly assess it. Short-form McGill Pain Questionnaire-2(SF-MPQ-2) and Multidimensional Pain Evaluation Scale (MPES) are valid and reliable tools used in clinical practice and research. Our aim was to evaluate the efficacy of pharmacological and non-pharmacological treatments applied for pain relief. 27 patients were included in the study, of which 12 were outpatients and 15 were inpatients. Statistical and clinical significant differences were obtained only for the inpatient group on the MPES (p=0.00, difference between means=3.07) and for 3 out of 4 domains of the SF-MPQ-2 (p=0.01, 0.01 and 0.00 and the difference between means=2.60, 2.00 and 2.20 for continuous pain, neuropathic pain and affective descriptors, respectively). Outcomes of pain management are better for inpatients due to a combination of analgesic drugs with physical medicine and rehabilitation procedures and a strict monitoring during their hospitalization.*

INTRODUCTION

Musculoskeletal pain in the context of rheumatic disease is a type of chronic pain that affects the muscles, joints, bones and the soft tissues surrounding these structures.(1) In daily practice in can be categorised in five types: inflammatory joint pain, mechanical joint pain, bone pain, referred pain and neuropathic pain.(2) Musculoskeletal pain is the main cause that determines patients to seek a rheumatologist and is one of the greatest global burden of disease. People under 65 years are most affected by musculoskeletal disorders, being exceeded by cardiovascular disease in those over 65 years.(3)

The main cause of musculoskeletal pain is represented by low back pain, although it is not considered as an actual disease but a symptom. Up to 80% of the adult population experiences at least one episode during their life, being in the last three decades the leading cause of years lived with disability.(3)

A major challenge in pain management is that 40% of the patients being treated for chronic pain are not satisfied with the effects.(4) The profound impact produced by chronic musculoskeletal pain on physical and mental wellbeing and also on the socio-economic aspect of life highlights the importance of pain management. Therefore the first and most important step in pain management is a correct assessment of pain.

Because pain is a subjective experience it's very hard to quantify it in a clinical and paraclinical manner, hence self-report is the best method of evaluation. Pain assessment tools are the gold standard in both daily practice and research. They can evaluate the intensity, localization, characteristics of pain and also various behaviours. Usually they are divided into two groups: unidimensional pain measures like the Visual Analogue Scale (VAS) and the Numeric Rating Scale (NRS), and multidimensional pain evaluation tools like the McGill Pain Questionnaire (MPQ), Brief Pain Inventory (BPI), Pain Disability Index (PDI) and Pain Quality Assessment Scale (PQAS).(5)

MPQ was developed in 1975 and later adapted to its short form in 1978, which was revised in 2009. It represents the gold standard of acute and chronic pain evaluation in both clinical practice and research. It has been translated in 44 languages and used in more than 500 studies. Clinimetric testing has proven excellent validity and reliability. Also it can be used as an outcome measure and it has a good ability to detect change and distinguish between different types of pain (neuropathic vs. non-neuropathic pain).(6)

Musculoskeletal pain management can be achieved by pharmacological means using painkillers, such as opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), steroids or gabapentinoids, among others. Or via physical medicine and rehabilitation procedures, such as electrotherapy, hydrotherapy, thermotherapy, kinesiotherapy and medical massage, which are considered non-pharmacological treatments.

AIM

Taking into consideration the global burden of musculoskeletal pain the aim of this study was to evaluate the efficacy of pharmacological and non-pharmacological treatments applied for pain management.

MATERIALS AND METHODS

The study was designed as a cross-sectional study and screened for musculoskeletal pain in all patients admitted in the Rheumatology Department in a given day, regarding whether they were in- or outpatients. Inclusion criteria were: the presence of pain at the time of admittance and in the last seven days.

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Table no. 1. Descriptive and inferential statistics for the study group

	All patients		Outpatients		Inpatients	
	Base-line	**Reassessment**	**Base-line**	**Reassessment**	**Base-line**	**Reassessment**
SF-MPQ-2						
Continuous pain						
Mean	3.48	2.19	2.17	2.50	4.53	1.93
Difference between means	1.30		-0.33		2.60	
Median	3	1	2	2	4	1
p	0.01		0.69		0.00	
Intermittent pain						
Mean	1.93	1.15	1.42	0.92	1.93	1.15
Difference between means	0.78		0.50		0.78	
Median	1	0	1	1	1	0
p	0.01		0.11		0.01	
Neuropathic pain						
Mean	3.33	1.4	to little data (4 patients)		3.46	1.46
Difference between means	1.93				2.00	
Median	4	1			4	1
p	0.00				0.01	
Affective descriptors						
Mean	2.78	1.70	1.92	2.17	3.53	1.33
Difference between means	1.07		-0.25		2.20	
Median	2	1	1	2	2	1
p	0.02		0.64		0.00	
All domains						
Mean	2.67	1.48	1.83	1.50	3.33	1.47
Difference between means	1.19		0.33		1.87	
Median	2	1	1.5	1.5	3	1
p	0.00		0.47		0.00	
NRS (MPES)						
Mean	6.89	4.70	5.58	4.50	7.93	4.87
Difference between means	2.19		1.08		3.07	
Median	8	3	7	3	8	4
p	0.00		0.16		0.00	

Table no. 2. Correlation between SF-MPQ-2 domains and NRS (MPES)

SF-MPQ-2/NRS	**Base-line**			**Reassessment**		
	All patients	**Outpatients**	**Inpatients**	**All patients**	**Outpatients**	**Inpatients**
Continuous pain						
r	0.67	0.87	0.52	0.28	0.66	-0.41
p	0.00	0.00	0.05	0.15	0.02	0.13
Intermittent pain						
r	0.72	0.83	0.62	0.41	0.82	-0.06
p	0.00	0.00	0.01	0.03	0.00	0.83
Neuropathic pain						
r	0.52	to little data (4 patients)	0.26	0.15	to little data (4 patients)	-0.56
p	0.49		0.45	0.61		0.08
Affective descriptors						
r	0.54	0.59	0.15	0.15	0.54	-0.27
p	0.00	0.05	0.59	0.45	0.08	0.33
All domains						
r	0.67	0.08	0.40	0.33	0.75	-0.41
p	0.00	0.00	0.14	0.09	0.01	0.13

Two questionnaires were used for pain assessment: Short-form McGill Pain Questionnaire-2 (SF-MPQ-2) and Multidimensional Pain Evaluation Scale (MPES). Pain intensity in both questionnaires was measured using the Numeric Rating Scale (NRS). Time of admission in the department was the base-line for the two questionnaires application, both for outpatients and for inpatients. Reassessment (second application of the questionnaires) for inpatients was done the day prior to discharge, after completion of the evening analgesic treatments. Outpatients were reassessed after one month. These patients were contacted by telephone in order to complete the questionnaires. The data were collected in May-June 2019.

SF-MPQ-2 is comprised of 22 items which are grouped in 4 dimensions of pain evaluation: continuous pain, intermittent pain, neuropathic pain and affective descriptors. Each item is scaled using NRS.(7)

MPES assesses the sensitive, cognitive and affective dimensions of pain. It is made up of 3 parts in which the first one quantifies pain intensity by means of the NRS. The second part is comprised of two 10 item lists that characterize acute and chronic pain. And the third part is represented by a diagram in which the intensity, descriptors and pain localization areas are marked according to their time of appearance and ratting on NRS.(8)

The 11-point pain intensity NRS has an excellent capacity to detect chance, therefore a reduction of two points or 30% in the scale is noted as a clinically important difference.(9) As there are no studies to assess the ability to detect change for SF-MPQ-2, we have decided to extrapolate the data valid for NRS.

The data collected via the two questionnaires were analyzed using GraphPad InStat Demo. *T*-test for dependent

samples and Wilcoxon test were chosen as statistical hypothesis tests. To assess differences between in-and outpatients regarding pain intensity Mann-Whitney *U* test and unpaired *t*-test were performed. Spearman and Pearson correlation coefficients were used in order to analyze whether there was an association between the values obtained with the two questionnaires.

RESULTS

After screening 35 patients, 27 were included in the study, of which 18 were women and 9 were men, aged 26-82 years. 12 were outpatients and 15 were inpatients.

It was observed that low back pain was the most common cause of pain of musculoskeletal origin (40.7%, 11 patients). Rheumatoid arthritis being the leading cause for inflammatory joint pain (18.5%, 5 patients).

NSAIDs were the most commonly used class of painkillers at home, before the first application of the questionnaires (51.8%, 14 patients). All inpatients received NSAIDs during their hospitalization.

Only the inpatients underwent physical medicine and rehabilitation procedures during their hospitalization, of which medical massage was the main procedure used in the department (all 15 patients), followed closely by electrotherapy (93.3%, 14 patients).

The statistical analysis using *T*-test for dependent samples and Wilcoxon test showed a significant difference between the medians of the analyzed data (base-line and reassessment) for the whole study group and for the inpatient group. These data were obtained using the SF-MPQ-2 and the NRS within MPES. However only the difference between the means evaluated by NRS (MPES) for the whole study group and the inpatient group was clinically relevant (difference between means at least 2 points). Domain analysis of the SF-MPQ-2 showed a statistically significant difference on all four domains for the whole study group and for the inpatient group. But a clinically significant difference was evident only in the inpatient group for 3 out of 4 domains assessed: continuous pain, neuropathic pain and affective descriptors (Table no. 1).

The results obtained by performing Mann-Whitney *U* test and unpaired *t*-test in order to assess differences between in- and outpatients regarding pain intensity at base-line, demonstrated a statistical and clinical difference regarding continuous pain domain evaluation (difference between means=2.37, $p=0.01$). In the case of pain assessment using the NRS (MPES) a clinically significant difference was obtained (difference between means=2.35), but this was not statistically significant ($p=0.06$). Both in- and outpatients received only painkillers 7 days prior to the first pain assessment via the questionnaires. Also no statistical or clinical difference was observed when evaluating pain intensity at reassessment between inpatients (underwent both pharmacological and non-pharmacological treatments during their hospitalization) and outpatients (took only analgesic medication at home).

Very heterogeneous results were obtained for the statistical analysis of the correlation between SF-MPQ-2 and NRS (MPES). A consistency of the obtained data was observed only for outpatients, both at base-line and at reassessment. In this case a positive, strong and very strong correlation that was statistically significant was obtained. This type of association was between the evaluation of pain qualitatively with the aid of continuous and intermittent pain domains of the SF-MPQ-2 and the evaluation of pain quantitatively with the aid of NRS (MPES) (Table no. 2).

The data obtained from the MPES diagram showed that the highest pain intensity at base-line was at 7 AM (40.7%, 11 patients) and on reassessment was at 6 AM (44.4%, 12 patients) (Figure no. 1). The most utilised pain descriptor at base-line and reassessment was "uncomfortable pain" (92.6%, 25 patients). Also the most affected areas at base-line were those corresponding to nos. 30 and 31. At reassessment the areas corresponding to no. 17, 23 and 29 were the most affected (Figure no. 2).

DISCUSSIONS

The results of this study reflect the fact that low back pain is a major health related problem worldwide due to its high prevalence and also because it is the leading cause of disability.(3,10)

The use of NSAIDs by the study population is in accordance with the scientific literature that shows that this class of drugs is the most prescribed for musculoskeletal pain. They are the first therapeutic step for pain management in osteoarthritis and low back pain. The use of these drugs represents a logical choice given that inflammation plays an important role in pain mechanisms of rheumatic disease.(11)

Both conventional drug therapy and medical massage have proven effective in relieving low back pain. Although the differences between the two therapeutic modalities were not very large, the pharmacological therapy proved its superiority. However, the incorporation of medical massage into the therapeutic management of pain offers an effective alternative for patients who do not want or want to reduce the use of analgesics.(12)

The lack of a clinically significant difference in the outpatient group can be explained by the small number of cases (12 patients), by the predominance of autoimmune disease as etiology of the inflammatory pain and especially by pain worsening at the time of reassessment in some cases (e.g., a patient was in the Emergency Department at the time of revaluation due to the aggravation of her chronic pain). Pain improvement obtained by the inpatient group advocates for the logical therapeutic attitude of this type of hospitalization. In general, outpatient type of hospitalization is motivated by the need for reassessment, the inpatient type being related to the need for intensive rheumatological treatment.

NRS has proven its validity and reliability as a pain assessment tool for musculoskeletal disease, but because it is a unidimensional measure it fails to quantify the complexity of the pain experience in patients with low back pain, hip and knee osteoarthritis.(13)

The heterogeneity of the results obtained when correlating SF-MPQ-2 with NRS (MPES) is due to the small number of subjects included in the study and the diversity of musculoskeletal disorders. In the study by Dworkin et al. weak, statistically significant positive correlations were obtained between SF-MPQ-2 and NRS. Although these measurements assess different aspects of the pain experience, the homogeneity of the data obtained shows that the intensity of the pain is assessed similarly.(7)

The pain curve has the appearance of a "two-humped camel" or "twin peaks", the pain intensity being higher in the morning than in the evening (figure no. 1). This aspect suggests the need to modify the analgesic treatments in order to attenuate or suppress the peaks by adding a medication that acts on the mood. This correlates well with the fact that pain intensity is highest in patients with rheumatoid arthritis at 8AM, and for those with osteoarthritis the pain intensity peaks at 5 AM and 4 PM.(14)

The fact that "uncomfortable pain" is the most utilized descriptor in both the initial and second assessment highlights the subjective nature and affective characteristic of pain.

Despite the heterogeneity of painful areas on the MPES diagram the most affected areas are nos. 30 and 31, corresponding to the anatomical area of the lower back (figure

no. 2). As we stated earlier low back pain is the most common cause of musculoskeletal pain globally.(10)

Figure no. 1. Hourly distribution of pain intensity evaluated by MPES

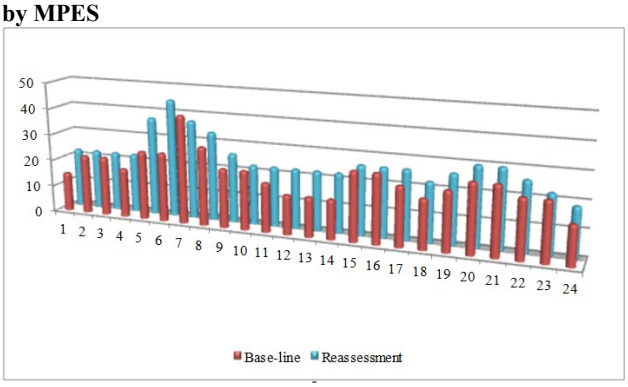
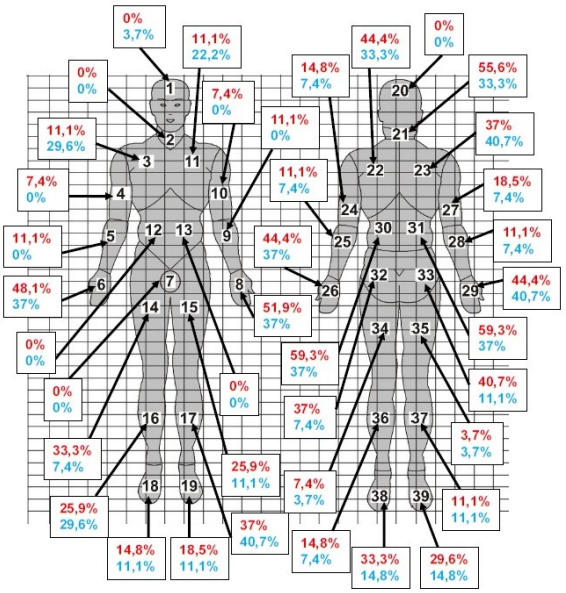


Figure no. 2. Anatomical distribution of pain (red-frequency at base-line, blue-frequency at reassessment)



CONCLUSIONS

The results of this study are a reflection of well known facts regarding musculoskeletal pain: low back pain is the main cause of this type of pain, NSAIDs are the most common painkillers prescribed and inpatients have a better pain management outcome due to the combination of pharmacological and non-pharmacological treatments received, alongside a strict supervision by healthcare workers.

Pain treatment efficacy was demonstrated for the inpatient group only. This can be explained by the design of the study, the small number of cases and the heterogeneity of the studied population in terms of pain etiology and the diversity of the pharmacological and non-pharmacological therapies used. In order for this study to exceed the informative value of a cross-sectional study, encumbered by its definition, it is necessary to continue it and to expand the group of subjects.

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