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Research Article

Impact of Acupuncture Intervention on the Pain Intensity of Patients Treated at a Tertiary Hospital in Brazil

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ABSTRACT

Background: Nowadays, in western societies, acupuncture is widely used over the control of pain and this analgesic approach is still the most studied aspect of acupuncture. Several studies have shown that most patients go through a significant pain decrease soon after the first sessions of acupuncture.
Objectives: This research has as a goal the evaluation on the effect of acupuncture treatment regarding the relief of pain intensity of different etiologies, through the visual analog scale.
Methods: This research constitutes a retrospective, descriptive study, carried out with 449 patients attended in *the Institute Hospital de Base of the Federal District*, in Brasilia city– Brazil. Every data was gathered from our own form, with detailed clinical history which included age, marital status, work activity, reason for referral to acupuncture, main and secondary complaints, pain intensity evaluated by the Visual Analog Scale (VAS), number of sessions completed and drug therapy. All data was organized in the Microsoft Excel and processed in the Statistical Package for the Social Sciences (SPSS), version 20.0.
Results: Regarding the main complaint, the mean pain decreased from 7.3 (initial VAS) to 3.2 (final VAS), a reduction that meant more than 50% relief in pain intensity. This 50% reduction in initial pain was also observed in secondary complaints (initial VAS = 6.5 and final VAS = 3.1).
Conclusions: The results of this research suggest that acupuncture treatment was effective in relieving pain intensity, providing a 50% reduction on the visual analogue scale, in relation to painful complaints of different etiologies.

1. Introduction

The word “acupuncture” comes from Latin “acus” (needle) and “punctura” (to stick needles). Acupuncture originated in China around 2000 years ago and it's one of the most ancient medical procedures in the world [1]. Nowadays, in western societies, acupuncture is widely used over the control of pain and this analgesic approach is still the most studied aspect of acupuncture. Such regard allows us to evaluate in a more accurate manner the results of this kind of treatment in what concerns the control of pain, when compared to other symptoms [2].

The incidence of chronic pain goes around 7% to 40% in the world's population. About 50% to 60% of those who suffer from chronic pain become partially or totally incapable, either permanently or in a transitional way, compromising significantly the quality of life. The neurobiological effects of acupuncture, which acts over the neurotransmitters related to pain, qualify the method as useful for the treatment of pain manifestation [3].

In Brazil there were over 180 thousand care appointments on acupuncture in 2015, number increased in 2016 to almost 711 thousand, according to partial data from January to August 2016 [4]. In the United States, approximately two million adults had acupuncture care in 2002 and this number was raised to three million in 2007, with chronic pain being the most common reason people sought treatment with acupuncture [2].

Several studies have shown that most patients go through a significant pain decrease soon after the first sessions of acupuncture. However, there's a need for a longer periods of treatment for better results [3]. This research has as a goal the evaluation on the

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effect of acupuncture treatment regarding the relief of pain intensity of different etiologies, through the visual analog scale.

2. Material and methods

2.1. Setting

This research constitutes a retrospective, descriptive study, practiced at the IHBDF (*Institute Hospital de Base of the Federal District*), in Brasília city.

2.2. Study participants and sample size

There were include in the present study adult patients who were directed from the primary, secondary and tertiary units of public health, or IHBDF employees who were spontaneously looking for the Emergency Care Unit. All patients were taken care at the Unit between January and December 2016.

Patients who were hospitalized or were under 15 years old were excluded from this research.

2.3. Variables studied

Every data was gathered from our own form, with detailed clinical history which included age, marital status, work activity, reason for the acupuncture following, main and secondary complaints, pain intensity evaluated by the Visual Analog Scale (VAS), number of sessions completed and drug therapy.

2.4. Pain intensity measurement

The VAS is a one-dimensional scale, internationally used and accepted in the evaluation of pain intensity in many and diverse conditions. The score vary among 0 ("no pain") and 10 ("worst pain imaginable"). It's a scale where the interviewed must report their current intensity of pain.

2.5. Data analysis

All data was organized in the Microsoft Excel and processed in the Statistical Package for the Social Sciences (SPSS), version 20.0, where the statistical measures were calculated. The level of significance adopted in the analysis was of 5%, parallel to a 95% trust interval.

2.6. Ethical concerns

The study was approved by the Ethics Committee of Federal District Strategic health management Institute, number 36271920.5.0000.8153.

3. Results

The research sample is formed of 449 patients who were attended in the period of January/2016 and December/2016. The age average of the patients in the study was of 51.2 (±12.3) years old and the female patients were majority, 82% of all patients attended (Table 1).

The most frequent reasons for referral for acupuncture treatment, were low back pain (17.6%), fibromyalgia (11.4%), post-mastectomy dysesthesia (8.5%) and neck pain (6.2%). Other indications of pain corresponded each to less than 5% of the total number of cases. 27.8% of patients were not following up any previous treatment.

When compared the reason for following and the genre, a great difference was observed in the following of women presented with fibromyalgia ($p = 0.007$) and post-mastectomy dysesthesia ($p = 0.005$) (chi-squared test and the fisher's test). It was also observed a statistical difference in the following of men with neuropathic pain ($p = 0.007$) (Table 2).

The main complaint of patients of the studied sample, was low back pain with 26.7% ($n = 120$), followed by neck pain (14.5%), shoulder pain (8.9%), Paresthesias (6.7%), myo-articular post-QT (5.3%). It was observed that 85% of all patients' complaints were pain related (Table 3).

Evaluating the relation between the reason for medical referral and the main complaint, in 46.5% ($n = 209$) of the patients there were no relation, reveling that in only 24.1% ($n = 108$) the main complaint of the patient was the same for which they had been referred. The chi-squared test showed a significant difference in these values ($p < 0.001$). 1.6% of the charts analyzed did not present the main complaint (Fig. 1).

There were observed from 0 to 4 secondary grievances to be treated in each individual, beside the main complaint. Overall, there were 370 secondary complaints in 230 patients (51.2%), the most common being neck pain (14.1%), followed by low back pain (10.8%), knee pain (10.5%), paresthesia (8.65%), pain in lower members (8.65%), shoulder pain (8.3%) and dysesthesia (7.3%). Other grievances corresponded to less than 5% each.

The pain intensity evaluation was done through the Visual Analog Scale (VAS), which varies from 0 (minimum) to 10 (maximum). We gathered data related to the main complaint from 314 medical charts. They showed an average at the initial VAS (iVAS) of 7.3 (±2.2) and an average at the final VAS (fVAS) of 3.2 (±3), considering the loss of the information regarding 7 of the 314 charts which presented iVAS. Regarding the secondary grievances 325 complaints were evaluated, which consisted iVAS, with average of 6.5 (±2.4); the average of fVAS was 3.1 (±-3.0). There was loss of fVAS in 4 charts. It was observed a significant difference in the decrease of the initial VAS related to the final VAS, just as what concerns the main complaint as concerning the secondary grievances (Mann-Whitney U Test) (Table 4).

With regard to the measurements for the treatment of current pain, 15.6% referred to the use of antidepressants, 14.7% the use of muscle relaxants, 12% anticonvulsants, 10.7% common painkillers, 10.2% non-steroidal anti-inflammatory drugs (NSAIDs) and only 7.6% the use of opioid painkillers. 1.3% of the sample have denied the use of any kind of medication for pain. 61.2% of the charts carried no information regarding this data (Fig. 2).

The total amount of sessions for treatment of each complaint varied among 1 and 27, with average of 8 (±4.3) sessions overall. There was a similar average number of sessions for the treatment of main complaints and secondary grievances (7.8 ± 3.5 and 7.9 ± 3 respectively) (Table 5).

Regarding the number of cycles completed by the patients in the sample, 61.5% completed 01 cycle of treatment. 16% of the charts analyzed had abandoned the treatment before being discharged,

Table 1
Frequency distribution according to socio-demographic data.

Variable	Mean ± SD	n	%
Age[†]	51.2 ± 12.3		
Female		368	82.0
Male		76	16.9
Not informed		5	1.1

[†] Referring to 393 patients, 56 without age information.
Source: 2016 Field Survey. SD - Standard deviation;

Table 2
Reason for referral, according to sex.

Reason for referral	Female (n = 278)		Male (n = 45)		*p*-value
	F (278)	%	M (45)	%	
Low Back Pain	63	22.7	16	35.6	0.062
Fibromyalgia	50	18.0	1	2.2	0.007†
Dysesthesia	38	13.7	0	0.0	0.005†
Neck Pain	24	8.6	4	8.9	0.955
Myofascial Pain	18	6.5	2	4.4	0.600
Shoulder Pain	20	7.2	0	0.0	0.089
Urogynecological Pain	15	5.4	3	6.7	0.730
Knee Pain	10	3.6	1	2.2	0.637
Back/lumbar thoraco Pain	8	2.9	2	4.4	0.573
Facial Paralysis	9	3.2	1	2.2	0.715
Headache	7	2.5	2	4.4	0.466
Neuropathic Pain	5	1.8	4	8.9	0.007†
Arthrosis	5	1.8	2	4.4	0.258
Myoarticular Pain after QT	5	1.8	0	0.0	0.999

† Significant at 5%.
Source: 2016 Field Survey. Pearson's chi-square test and Fisher's exact test.

Table 3
Distribution of major complaints (N = 449).

Main complaint	Yes		No		Not informed	
	N	%	N	%	n	%
Low back pain	120	26.7	322	71.7	7	1.6
Cervical pain	65	14.5	377	84.0	7	1.6
Shoulder pain	40	8.9	402	89.5	7	1.6
Paresthesias	30	6.7	412	91.8	7	1.6
Myoarticular pain post qt	24	5.3	418	93.1	7	1.6
Myofascial pain	22	4.9	420	93,5	7	1.6
Anxiety	18	4.0	424	94.4	7	1.6
Back/lumbar thoraco Pain	16	3.6	426	94.9	7	1.6
Headache	14	3.1	428	95.3	7	1.6
Pain in inferior members	12	2.7	430	95.8	7	1.6
Foot pain	12	2.7	430	95.8	7	1.6
Knee pain	12	2.7	430	95.8	7	1.6
Pelvic pain	12	2.7	430	95.8	7	1.6
Facial paralysis	11	2.4	431	96.0	7	1.6
Others	83	18.5	359	79.9	7	1.6

Source: 2016 Field Survey.

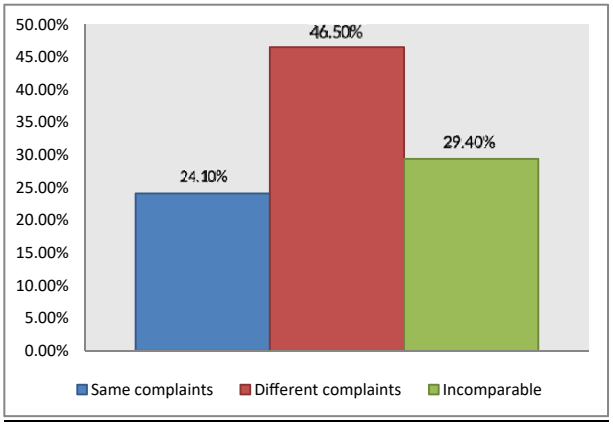

Figure 1. Comparison of the referral motives with the main complaints. In only 24.1% the main complaint of the patient was the same for which they had been referred to treatment with acupuncture ($p < 0.001$).
Source: 2016 Field Survey.

for unidentified reasons. 6 patients (1.3%) went through the appointment but did not go to any session.

4. Discussion

Acupuncture represents a high percentage in non-pharmacological interventions for pain [5,6]. In our study, we have observed, that patients seek for acupuncture especially for complaints related to pain, with low back pain being the most frequently mentioned. The chronic pain is the most common reason in the United States for patients who seek for acupuncture treatment [2], with low back pain being one of the biggest reasons patients look for medical treatment [7]. Controlled randomized studies show that acupuncture presents better results in the treatment of low back pain, when compared to control interventions [8,9].

With regard to the intensity of the pain, there was a decrease of over 50% of relief, according to the visual analog scale, for main complaints and for secondary grievances after the application of the Mann-Whitney U Test, taking into consideration an average of 8 sessions of acupuncture done in the analyzed sample. Considering the many complaints related to pain, acupuncture has presented itself as a very effective form of therapy in the reduction of pain intensity towards different etiologies.

Many different physiological models were suggested to explain the effects of acupuncture. Several models involve the use of cytokines, hormones, biomechanical and electromagnetic effects [10]. Much of the present research shows that in addition to local effects on connective and muscular tissue, acupuncture produces many of its effects in treating pain, by stimulating nerve fibers in skin and muscle, producing effects on the peripheral and central nervous systems [11,12].

So many of the different points of acupuncture coincide with the dermatomes where pain is located, being in richly innervated regions. It is assumed that the acupuncture needle produces action potentials that travel up the nerve straight to a specific segment in the spinal cord, reducing its response to painful stimuli. Action potentials also travel from the dorsal horn up to the brainstem. Here, they stimulate the endogenous pain-suppression mechanisms. After reaching the midbrain, the action potentials proceed to influence various other structures in the brain [13]. This mechanism of action justifies, in addition to the effects of analgesia, the effect related to relaxation and improved well-being provided by acupuncture treatment, surpassing conditions of sadness, melancholy, depression, fear, and discouragement to follow the treatment and improving the quality of life [14].

In addition to that, around 71% to 80% of the acupuncture points correspond to trigger points, or to motor points of skeletal muscles [15]. The therapeutic action over the points of acupuncture, such as feeling of heat, cold, electric stimulation, local anesthetics or physiological solution, or even the simple stimulation of the point with the needle, has proven that these points are, in many cases, the key for controlling the pain [16,17].

In our sample, it was observed that most patients who were referred for treatment with acupuncture were female, most of them had fibromyalgia and post-mastectomy dysesthesia. We assume that this result is associated with two following factors: First, that fibromyalgia affects more women than men in an average of 80% of cases, with a higher incidence in individuals aged between 45 and 64 years old [18-23]; Studies reporting the effectiveness of acupuncture for fibromyalgia treatment have shown positive results [23]. Also, there is a well-established relationship between the Sector of Acupuncture and that of Physiatry in the treatment of patients with breast cancer who have undergone a mastectomy or breast reconstruction, due to researches developed in the sector in

Table 4
Variation of VAS[i-f] after treatment with acupuncture.

Variable	N	Mean	SD	Median	Minimum	Maximum	*p*-value[U]
Main complaint							
Initial VAS [(NI=135)]	314	7.3	2.2	8.0	0.0	10.0	<0.001
Final VAS [(NI=142)]	307	3.2	3.0	2.0	0.0	10.0	
Secondary complaints							
Initial VAS [(NI=250)]	325	6.5	2.4	7.0	0.0	10.0	<0.001
Final VAS [(NI=254)]	321	3.1	3.0	3.0	0.0	10.0	

Source: 2016 Field Survey; SD - Standard deviation; NI - Not informed; VAS - Visual Analogue Scale; [U] - Mann-Whitney U test.

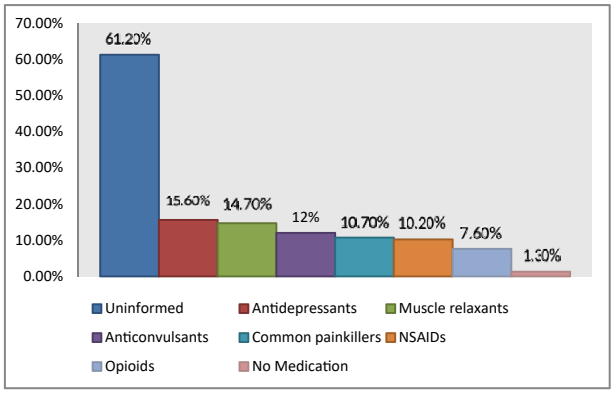

Figure 2. Classes of medications used to treat ongoing pain. Figure showing the medications used by patients when starting treatment with acupuncture. The most used medication class was that of antidepressants with 15.60%.
Source: 2016 Field Survey

Table 5
Number of sessions according to the complaint.

Variable	Sessions					
	N	Mean	SD	Median	Minimum	Maximum
Major complaints [(NI=115)]	334	7.8	3.5	8.0	1.0	27.0
Secondary complaints [(NI=249)]	200	7.9	3.0	8.0	1.0	16.0
Total number of sessions [(NI=24)]	425	8.0	4.3	8.0	1.0	27.0

Source: 2016 Field Survey; SD - Standard deviation.

question, which showed improvement in the rehabilitation of patients with pain, dysesthesia and movement limitation after mastectomy, in addiction of less pain and anxiety and a lower incidence of depression [24-26].

Due to the fact that 61.2% of the charts do not present information regarding the use of medication, only 7.6% of the analyzed sample were making use of opioids. Considering the average initial VAS of 7,3, therefore, moderate to intense pain, we question that maybe the patients are not well medicated previous to their direction to treatment with acupuncture. However we must consider that, many patients who seek for treatment with acupuncture are already those who lower use of pain killers, for personal decision or because of a specific counter medical indication. Such fact leads us to evaluate the huge impact on how the treatment approach in non-oncological patients is done, while treating them effectively and avoiding excessive use of drugs, due to the use of painkillers with opioids [27].

It was also outstanding, a profile of patients with multiple complaints, having up to 4 secondary grievances beside the main complaint, especially grievances related to pain. Such observation may compromise the answer and the objective measurement of the treatment, considering, especially by the large number of variables supposed to be approached, once the attempt to solve the entirety of the patient's complaint may cause the loss of focus out of the reason for the treatment.

The disagreement between the reason for the medical referral and the main complaint, appears to be of invaluable relevance, since, in a situation like this, the result is set in evidence introducing the possibility for dichotomous interpretation: for the patient, the treatment was effective, for it has resulted the decrease of the pain; however for the doctor who directed the patient into the treatment, in case the main reason for the following hasn't presented favorable answer, the treatment with acupuncture might seem not as effective.

It was also possible to observe a 16% treatment abandonment rate. The reasons for abandonment were not specified in the charts, however we could observe that the reasons were mostly related to family or personal illnesses, significant improvement and dissatisfaction concerning the method of treatment, as an example, fear of needles.

5. Conclusion

In conclusion, the results of this research suggest that acupuncture treatment was effective in relieving pain intensity, providing a 50% reduction on the visual analogue scale, in relation to painful complaints of different etiologies.

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The authors declare that they have no financial interests related to the material of this manuscript.

Author declaration template

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institutions concerning intellectual property.

We further confirm that any aspect of the work covered in this manuscript that has involved human patients has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript.

We understand that the Corresponding Author is the sole contact for the Editorial process (including Editorial Manager and direct communications with the office). She is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs. We confirm that we have provided a current, correct email address which is accessible by the Corresponding Author and which has been configured to accept email from (nataliafvalente@gmail.com).

Declaration of competing interest

The authors declare that they have no conflicts of interest related to the material of this manuscript.

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