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| RESEARCH ARTICLE

Meta-analysis of the Effectiveness of Acupuncture Treatment in Chronic Low Back Pain

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| ABSTRACT

This research aimed to evaluate the effectiveness of acupuncture treatment in chronic low back pain using meta-analysis. Of the 743 acupuncture research studies assessed on academic databases, 11 studies with 12 samples were selected. Research participants' ages, female-to-male ratios, and initial and final Visual Analog Scale (VAS) pain scores were documented. In total, 388 patients, including 208 (53.61%) female and 180 (46.39%) male patients, were subjected to acupuncture due to low back pain. Mean age was 43.45 with 30.8-57.6 range. The initial VAS score mean was 5.79, and the final VAS score mean was 3.17. VAS difference mean was -2.62 with 0.47-5.26 range. Comparison with exercise and electrical acupuncture were insignificant ($p>0.05$), whereas differences between control and acupuncture groups were significant ($p<0.05$). Spearman's rho correlation analysis results showed that VAS difference was only significantly correlated with VAS initial ($r=-0.874$; $p<0.01$). Female frequency, male frequency and age were not significantly correlated with VAS difference ($p>0.05$). Generalized Linear model (Logit) analysis results showed that age (OR=-0.055; $p<0.05$) and VAS initial (OR=-0.767; $p<0.01$) had a significant effect on VAS difference in patients having low back pain and had acupuncture treatment. Acupuncture is much more effective in the treatment of nonspecific chronic low back pain for both women and men, individuals of all age groups, but especially young people. The high level of initial pain is also one of the important factors affecting the success of low back pain treatment with acupuncture.

| KEYWORDS

Low back pain, acupuncture, age, gender

| ARTICLE INFORMATION

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1. Introduction

Low back pain is a significant health problem that limits the physical activities of individuals in their daily lives and, therefore, reduces their quality of life due to pain (1-3). While low back pain is experienced due to many diseases, unbalanced or irregular physical activity, heavy lifting, and adverse movements, the cause of these is unknown in some cases (4-8). In low back pain, characterized by pain in the muscular system, if the cause of the pain is known, the treatment process is managed by eliminating that cause. However, in nonspecific low back pain, where the cause is unknown, instead of modern treatment methods, studies are carried out to reduce the pain rather than remission of the disease. However, this ends with long-term drug use and restriction of individuals' movements (6-8).

Acupuncture is basically a treatment method that aims to activate or stimulate the muscle and nervous system in areas of the body where there are physical problems with needles (9-11). Although there were some discussions about it in the past, today, acupuncture treatments are included in educational institutions, especially in academic studies, institutional hospitals, and

universities, and now acupuncture is emerging as a medical treatment method. It has important use especially in physical therapy and rehabilitation, neurology, addiction, muscle, nervous system and other areas (9-11).

Although there are studies in the literature on low back pain, which is considered important among muscle diseases, studies on acupuncture treatment methods are quite limited (12-22). In general, there were not enough studies examining these studies in terms of demographic variables such as gender and age in larger samples. Therefore, the aim of this study was to examine acupuncture methods in nonspecific chronic low back pain with meta-analysis in terms of gender and age.

2. Methods

2.1. Model of the Research

Methods of meta-analysis and descriptive scanning were studied. In this regard, research on acupuncture for low back pain was initially reported, and then additional meta-analysis techniques were applied.

2.2. Data Set

Research data was gathered from secondary data sources. Relevant keywords were looked up for this purpose in scholarly databases like Web of Science, Scopus, and Pubmed. All acupuncture treatment studies pertaining to low back pain were assessed because of the variety of acupuncture applications.

Of the 743 acupuncture research studies that were assessed on academic databases, 11 studies with 12 samples were selected in the study (12–22). Research participants' ages, female to male ratios, and initial and final Visual Analog Scale (VAS) pain scores were documented.

2.3. Statistical Analysis

Means and frequencies were used to describe the research data. The association between VAS differences and gender-age parameters was examined using Spearman's rho correlation analysis. Due to linearization errors (23-25), Generalized Linear Model (Logit) was utilized for the impacts of gender and age on VAS pain score differences. Analysis was conducted using SPSS 25.0 for Windows at a significance level of 0.05 and a 95% CI.

3. Results

In total, 388 patients, including 208 (53.61%) female and 180 (46.39%) male patients, were subjected to acupuncture due to low back pain. Mean age was 43.45 with 30.8-57.6 range. Initial VAS score mean was 5.79, and the final VAS score mean was 3.17. VAS difference mean was -2.62 with 0.47-5.26 range. Comparison with exercise and electrical acupuncture were insignificant ($p>0.05$), whereas differences between control and acupuncture groups were significant ($p<0.05$) (Table 1).

Table 1. Baseline characteristics of low back pain patients and VAS scores with research outcomes

Articles	Females	Males	Age	VAS initial	VAS final	VAS difference	Comparison	Results
12	8	7	44.4	8.26	3	-5.26	Exercise	0
13	16	14	36.6	3	2.1	-0.9	Exercise	0
14	12	38	36	7	4.24	-2.76	EA	0
15	23	10	49	7.9	3.7	-4.2	EA	0
16	41	40	39.8	6.2	1.8	-4.4	Control	1
17	16	8	39	5	4.53	-0.47	Control	1
18	25	8	45.3	4.4	3.4	-1	Control	1
19	19	29	38.7	7.2	3.68	-3.52	Control	1
20	18	9	49.85	5.33	2.7	-2.63	Control	1

21a	9	6	57.6	5.51	2.65	-2.86	Control	1
21b	9	6	54.4	4.96	2.53	-2.43	Control	1
22	12	5	30.8	4.68	3.66	-1.02	Control	1
Total	208	180	Mean: 43.45	Mean: 5.79	Mean: 3.17	Mean: -2.62		

EA: Electrical Acupuncture, VAS: Visual Analog Scale.

Spearman's rho correlation analysis showed that VAS difference was only significantly correlated with VAS initial (r=-0.874; p<0.01). Female frequency, male frequency and age were not significantly correlated with VAS difference (p>0.05) (Table 2).

Table 2. Spearman's rho correlation between VAS differences and gender with ages

	r	**p**
Females	-0.004	0.991
Males	-0.270	0.396
Age	-0.231	0.471
VAS initial	-0.874**	0.000

**p<0.01, VAS: Visual Analog Scale.

Generalized Linear model (Logit) analysis results showed that age (OR=-0.055; p<0.05) and VAS initial (OR=-0.767; p<0.01) had a significant effect on VAS difference on patients having low back pain and had acupuncture treatment (Table 3).

Table 3. Generalized Linear model (Logit) for effects of gender, age and VAS initial on VAS difference

Parameter	**OR**	**Std. Error**	**95% Wald Confidence Interval**		**Hypothesis Test**		
			Lower	**Upper**	**Wald X^2**	**df**	**p**
(Intercept)	4.874	1.346	2.237	7.511	13.120	1	0.000
Females	-0.022	0.025	-0.071	0.027	0.781	1	0.377
Males	-0.018	0.021	-0.059	0.023	0.720	1	0.396
Age	-0.055	0.027	-0.109	-0.002	4.102	1	0.043
VAS initial	-0.767	0.137	-1.036	-0.497	31.149	1	0.000
(Scale)	0.402	0.164	0.181	0.896			

VAS: Visual Analog Scale.

Age had a negative effect on VAS difference, showing that high VAS differences were found in higher ages (Figure 1).

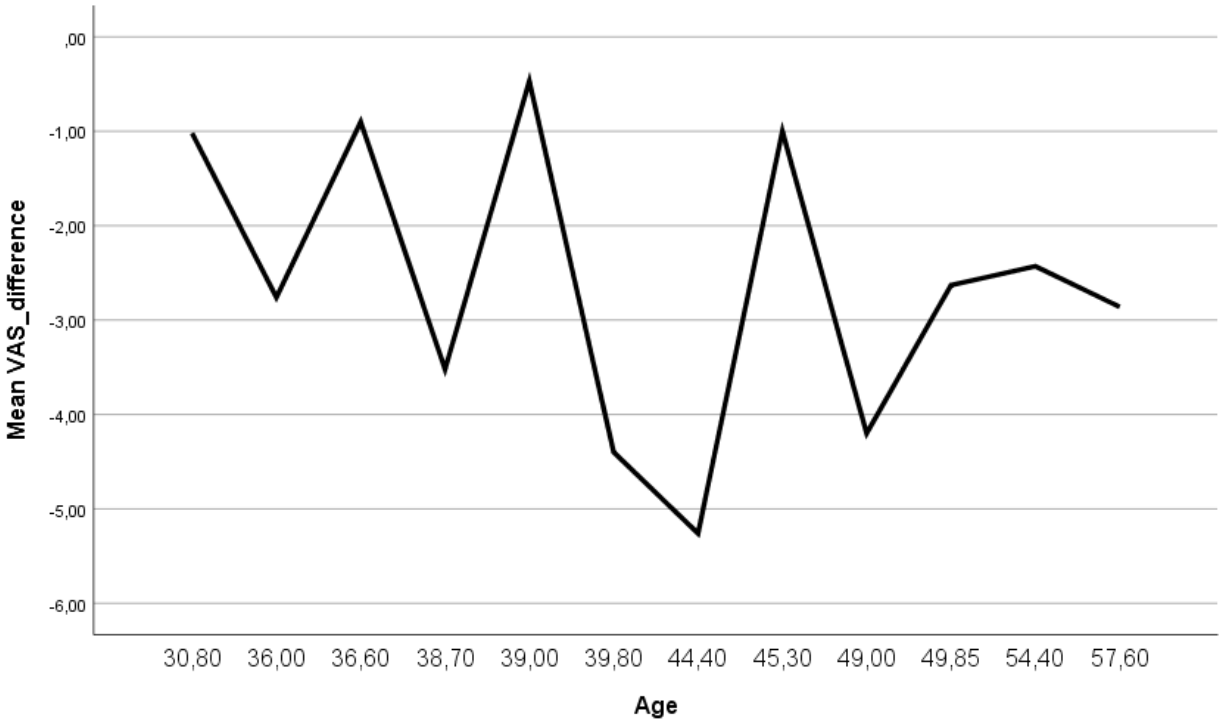

Figure 1. VAS difference and age relationship on low back pain patients

4. Discussion

This study aimed to examine the effectiveness of the acupuncture method in chronic low back pain by conducting a meta-analysis of literature studies in terms of gender and age. In this context, 12 samples were analyzed in 11 clinical studies in the literature. The results obtained revealed that the acupuncture method was effective for both genders in patients with chronic low back pain, but it was more effective in younger individuals.

The use of acupuncture for chronic lower back pain is actually one of the most frequently encountered issues from the past to the present. In general, acupuncture treatment has been used for muscle pain for many years for various reasons such as relieving muscle pain by needle insertion and directing the pain to another direction. However, in general, there are no studies that focus sufficiently on demographic variables such as gender and age in practice. Although there are many reasons for this, the main reasons seen in the literature review are that the majority of the studies conducted are conceptual studies and that clinical research and cohort studies are limited.

The results we obtained in this study show that there are significant decreases in pain levels for all demographic groups, and acupuncture is more effective, especially in individuals with high pain levels or in young people. Although the regression analysis results also show that the acupuncture treatment process is significantly affected only by the age variable according to the multivariate analysis results, this situation also shows that acupuncture has a significant effect on low back pain in older ages. In other words, acupuncture is actually effective in older ages and in younger people, but it is much more effective in younger people. In this respect, many factors such as medication use, comorbidity, muscle strength level, and physical activity may have an effect on the results in older ages.

Limitations of the study

The study's primary limitation is that there aren't many studies to compare because most acupuncture research focuses on conceptual studies or literature reviews. Actually, this circumstance adds to the study's notoriety as well.

There is a lot of variation in acupuncture-related practices therefore it is impossible to draw conclusions about which kind of acupuncture has which effects. This is another significant drawback of the study. Furthermore, demographic information was restricted to age and gender because each clinical practice had a different approach to gathering clinical and demographic data.

Contribution to literature and clinical applications

The study's most significant contribution to the literature is that it shows how demographic factors affect a big sample, which is not the case with studies on low back pain. The study's findings show that acupuncture works well for both sexes and all age groups.

The study's contribution to clinical practice is that acupuncture treatment is not as effective in older patients as it is in younger ones, and it would be helpful to offer extra support sessions or supplements.

5. Conclusion

According to the results obtained in the study, acupuncture is much more effective in the treatment of nonspecific chronic low back pain for both women and men, individuals of all age groups, but especially young people. The high level of initial pain is also one of the important factors affecting the success of low back pain treatment with acupuncture.

Examining the effects of many reasons such as differences in pain thresholds of individuals, known causes of low back pain, comorbidity in advanced ages, drug use, and decreased physical activity on the treatment process of chronic low back pain, can make a positive contribution to field applications. In addition, it may be possible to develop the possibilities for the treatment of chronic low back pain with acupuncture by conducting multi-center cross-comparative studies.

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