Chronic Diseases Journal

DOI: 10.22122/cdj.v4i2.220 Published by Vesnu Publications

The effectiveness of hypnotherapy with physiotherapy: Pain intensity, functional disability, and psychological distress among patients with non-specific low back pain

Nader Abazari[1], Isaac Rahimianboogar[2], Siavash Talepasand[2], Atefeh Aminianfar[3]

1 MSc Student, Department of Clinical Psychology, School of Psychology and Educational Sciences, Semnan University, Semnan, Iran
2 Associate Professor, Department of Clinical Psychology, School of Psychology and Educational Sciences, Semnan University, Semnan, Iran
3 Assistant Professor, Neuromuscular Rehabilitation Research Center, Semnan University of Medical Sciences, Semnan, Iran

Original Article

Abstract

BACKGROUND: It has been demonstrated in previous investigations that non-specific low back pain is caused by multiple factors. Evidently, integrative therapies should be used in order to improve this disorder. Documents exhibit that integrative therapies are capable of improving different aspects of low back pain and preventing the recurrence of clinical symptoms. The aim of the present study was to determine the effectiveness of hypnotherapy with physiotherapy on low back pain.

METHODS: The statistical sample included 28 women who were randomly divided into two groups. One group received hypnotherapy with physiotherapy and the other received pure physiotherapy. The Depression Anxiety and Stress Scales (DASS-21), the Numerical Rating Scale (NRS), the Roland Morris Disability Questionnaire (RDQ) were used to measure the trend of changes (pretest, mid-test, and posttest) of psychological distress, pain intensity, and functional disability. The Hypnotic Induction Profile (HIP) was used to measure suggestibility. In order to analyze data, repeated measures analysis of variance (ANOVA) was used in SPSS software.

RESULTS: The results revealed that hypnotherapy with physiotherapy affects pain intensity in the same way as pure physiotherapy ($P < 0.050$). Furthermore, it was found that hypnotherapy with physiotherapy is more effective than pure physiotherapy on functional disability ($P < 0.050$). It was also discovered that only hypnotherapy with physiotherapy can improve psychological distress ($P < 0.050$).

CONCLUSION: It can be concluded that hypnotherapy with physiotherapy can improve pain intensity, functional disability, and psychological distress, and the total effectiveness of hypnotherapy with physiotherapy is more than the total effectiveness of pure physiotherapy.

KEYWORDS: Hypnotherapy, Physiotherapy (Techniques), Low Back Pain, Psychological Stresses

Date of submission: 13 Jan. 2016, ***Date of acceptance:*** 06 Mar. 2016

Citation: Abazari N, Rahimianboogar I, Talepasand S, Aminianfar A. **The effectiveness of hypnotherapy with physiotherapy: Pain intensity, functional disability, and psychological distress among patients with non-specific low back pain.** Chron Dis J 2016; 4(2): 61-9.

Introduction

Pain is a protective mechanism in coping with physical illness. When an organ is injured, this causes the person to omit the reasons of pain.[1] Based on the International Classification of Diseases 10th Revision (ICD-10), non-specific low back pain (NSLBP) is one of the disorders the main feature of which is pain.[2] NSLBP is a disabling disorder which the individual suffers from his/her whole lifetime.[3] According to the

Corresponding Author:
Isaac Rahimianboogar
Email: i_rahimian@semnan.ac.ir

available literature, NSLBP can be triggered by both medical and psychological causes. Pain catastrophizing, pain avoidance, psychological distress, and passive coping styles can be more effective than physical factors in the appearance of symptoms.[4] NSLBP is a multifactorial disorder that has directed etiological theories toward a bio-psychosocial perspective.[4] There have been different therapeutic modalities for NSLBP, almost all of which have ignored the psychosocial factors.[5] One of the prominent features of therapeutic modalities in NSLBP is that each method focuses on one especial aspect of NSLBP.[6]

NSLBP is a common disorder; the prevalence of NSLBP has been estimated through numerous investigations to be approximately 49 to 80%. Moreover, it has been illustrated that NSLBP can transform into a chronic disorder in 7% of patients. In England, it has been estimated that the cost of NSLBP therapeutic care is about 10668€ per year.[7] Since NSLBP is one of the most prevalent reasons for referral to general hospitals and clinics, inattention to resolving this problem can result in its chronicity and numerous economic and social harms.[8]

Investigations indicate that hypnosis can decrease stress and block pain receptors in the central nervous system (CNS), and as a result, decrease pain intensity and psychological distress in patients experiencing chronic pain. Hypnosis is a safe and effective pain management method that affects both the sensation and affection of pain.[9] The other common physical method of pain alleviation is physiotherapy. However, there are not enough evidence-based documents about its being the most effective method to manage chronic pain.[10]

In order to treat this sophisticated illness, we require an integrative therapy to focus on the main aspects of disorders. In fact, both hypnotherapy and physiotherapy have been shown to improve symptoms of NSLBP. Thus, the effectiveness of hypnotherapy with physiotherapy on predominant aspects of NSLBP was investigated in the present study. Therefore, the biggest problem is measuring the effectiveness of hypnotherapy with physiotherapy on pain intensity, psychological distress, and functional disability among patients with NSLBP. It is expected that the integrative treatment including hypnotherapy and physiotherapy be more effective than other individual therapeutic modalities and it be more economic than other long and expensive treatment methods for low back pain. Given the importance of integrated interventions in the treatment of NSLBP, the role of hypnotherapy with physiotherapy was investigated in the treatment of NSLBP.

Materials and Methods

The present research was a randomized controlled trial. In order to control excessive variables, the participants were selected accidently and randomly divided into two groups. The statistical population encompassed 20 to 45-year-old patients who had referred to Tabatabayi rehabilitation clinic at Semnan University of Medical Sciences, Iran. In total, 36 patients with NSLBP were accidentally selected and randomly divided into two groups from winter 2015 to spring 2016. In this study, one group received hypnotherapy with physiotherapy and the other group only received pure physiotherapy. Subsequently, 4 patients from the pure physiotherapy group and 4 patients from the hypnotherapy with physiotherapy group were excluded from the study due to incomplete questionnaires, and not conforming to the research criteria. The final sample of the study included 28 patients (14 patients in each groups). In order to control the obtrusive variables, we matched the groups in terms of demographic variables. The inclusion criteria were age ranging between 20 and 45 years, NLBP diagnosis, literacy of higher than grade 5 of elementary school, and more than 3 suggestibility ranks. The exclusion criteria were

psychotic disorder diagnosis and a lack of cooperation in the therapeutic process. The present study was reviewed and approved by the Institutional Review Board (IRB) of Semnan University of Medical Sciences under the code of IR.SEMuMS.REC.1394.128 and was registered by the Iranian Randomized Controlled Trials Site under the code of IRCT2016011926111N1.

Pain intensity: The Numerical Rating Scale (NRS) was used in the present study to measure pain intensity. The NRS was made by McCaffery in 1999. The NRS is a unidimensional instrument of pain intensity and includes its total score ranges between 1 and 10, where 1 means no pain and 10 mean the most severe pain. This instrument has been supported by the National Institute of Pain in the USA for the measurement of pain intensity.[10] This instrument is user-friendly and the patients do not require powerful visible ability or high literacy to use it. According to literature, this tool has suitable validity and reliability.[11] Different investigations have estimated its reliability to be about 0.84, 0.89, and 0.92.[12] NRS scores strongly correlated to visual analogue scale (VAS) scores at all time periods (r = 0.94, 95% CI = 0.93 to 0.95). The slope of the regression line was 1.01 (95% CI = 0.97 to 1.06) and the y-intercept was -0.34 (95% CI = -0.67 to -0.01). The minimum clinically significant difference in pain was 1.3 (95% CI = 1.0 to 1.5) and 1.4 (95% CI = 1.1 to 1.7) on the NRS and VAS, respectively.[13]

Psychological distress: The Depression Anxiety and Stress Scales (DASS-21) has 3 elements, including depression, anxiety, and stress, and contains 21 questions. This tool was made by Lovibond in 1995 in order to measure the common signs of stress, anxiety, and depression. This tool measures the mental situation in the previous two weeks.[12] Each element contains 7 questions, and the degree of each element is determined by computing the sum of the scores of these questions. The reliability of this instrument in Iran has been estimated about 0.95, 0.92, and 0.97.[14] In another investigation, it has been reported that the DASS-21 had very good Cronbach's alpha with amounts of 0.84, 0.74, and 0.79 for depression, anxiety, and stress, respectively. In addition, it had good factor loading values for most items (0.39 to 0.73).[15] Correlations among scales were between 0.54 and 0.68. This tool can measure psychological distress in the continuum of normal, mild, severe, and extremely severe.[16]

Functional disability: The Roland Morris Disability Questionnaire (RDQ) was made by Roland and Morris in 1983 in order to measure the level of functional disability among patients with NSLBP. It is a paper-and-pencil questionnaire that contains 24 questions.[17] This instrument is one of the most sensitive tools for the measurement of functional disability. The reliability of this tool has been estimated as about 0.94.[18] It has been reported that this tool has appropriate reliability based on the test-retest method and internal consistency. Sufficient reliability was demonstrated with a Cronbach's coefficient of 0.85. This sensibility is the result of different aspects which the RDQ can measure.[19]

The Hypnotic Induction Profile (HIP): The Hypnotic Induction Profile (HIP) is a clinical instrument for the measurement of biological readiness in suggestibility. This method was designed by Spiegel and Bridger in the 1970s. It measures the suggestibility level by computing the ranks of deviation and rotation of eyes. The highest level of suggestibility is 7 and the lowest level equals 1. The usefulness of the HIP in relation to psychodiagnosis has been demonstrated elsewhere and is not the subject of this paper. Evidence has been presented of the satisfactory reliability of the profile and induction scores. Some information on validity is provided through satisfactory correlation with existing standardized scales; the HIP and Stanford Hypnotic Susceptibility Scale correlate.[20] This tool is a suitable instrument to measure the readiness of people

to be hypnotized.[21]

The process of therapy: In this process, we selected the patients accidentally with respect to the inclusion criteria. The participants underwent 6 sessions of hypnotherapy. Each hypnotherapy session lasted about 60 minutes, and the hypnotherapy was performed immediately before the physiotherapy procedure. Each hypnotherapy session was done before every session of physiotherapy.

The protocol of hypnotherapy contained 6 sessions of hypnotherapy. This protocol was in accordance with the manual outlined by Hammond (1990). The hypnotherapy protocol was implemented individually. The first session was allocated to introduction and pretest in order to determine the baselines. Each session lasted 45 minutes. Session 1 included familiarization, socialization, and preparation of the patient for a deep and flowing trance. Then, the trance is induced through progressive muscle relaxation (PMR); the patient enters a trance state and eventually returns to a normal state. In session 2, induction of the main suggestions are suggested including changing sense of pain to itching, and conditioning this change to hand touch of low back. Then, participants gradually return to the normal state. In session 3, after induction of a trance and suggesting a change in the sense of pain, suggestions are made on tolerating bad sensations (all negative sensations not only pain). Finally, the patient returns to a normal state. In session 4, after changing the sense pain and increasing the tolerance of pain, suggestions on ego strength are presented for the patient to promote beliefs on living normally like others. Session 5 included the induction of all of the previous suggestions, fixation of conditioning, prepare the patient for termination of therapeutic sessions in the next session, and gradual return to normal state. Fixation of conditioning is also the main task of session 6; in addition, the patients receive feedbacks on their sensations. After the end of the trance, recommendations are presented to fix the post-hypnotic suggestions. The protocol of hypnotherapy was implemented by MA students of clinical psychology who were educated in hypnotherapy in the Iranian Association of Hypnotism.

The protocol of physiotherapy consisted of 10 sessions each lasting 30 minutes and included the increasing of blood flow around the lower back via a hot pack for 15 minutes. Transcutaneous electrical nerve stimulation (TENS or TNS) is the therapeutic use of electric current for nerve stimulation. The term TENS refers to the whole range of transcutaneous currents applied for nerve stimulation. However, TENS is mostly used to describe the use of pulses produced by portable stimulators in the treatment of pain. Another procedure is pain alleviation using the TENS instrument with the frequency of 5 to 10 units for 15 minutes. Subsequently, the ultra sound procedure is performed for 5 minutes.[22] The therapeutic ultrasound procedure is commonly used in the treatment of lower back pain. In this procedure, a hand-held vibrating device is rubbed against the skin on the lower back with the goal of providing body parts with heat and energy in order to reduce pain and speed up the recovery process.[23] There were also sport experiments which were performed at home. The protocol of physiotherapy was implemented by an associate professor of physiotherapy from the Department of Physiotherapy at Semnan University of Medical Sciences.

The patients provided written informed consent forms for cooperation in the study. In addition, the questionnaires were completed in the order of the HIP, NRS, DASS-21, and RDQ. This investigation was performed from winter of 2015 until spring of 2016.

In order to analyze data, repeated measures analysis of variance (ANOVA) was applied in SPSS software (version 19, SPSS Inc., Chicago, IL, USA). In addition, repeated measurements were taken during the therapy. To determine the

baseline, a pretest was conducted on the first session, mid-test at the termination of both protocols, and a posttest 2 months later. The level of significance in this investigation was 0.05.

Results

The sample consisted of 28 patients who were randomly divided into two groups. Their age range was 24 to 45 years and their mean (standard deviation) age was 37.82 (6.22). The mean (standard deviation) of suggestibility was 5.714 (0.658). The lowest level of literacy was grade 5 of primary school, and the highest level was diploma; 3 patients had primary education, 8 had a middle school degree, and 17 had a diploma. The majority of participants were married; only 3 of them were single and 25 of them were married. The lowest and highest level of suggestibility was 5 and 7, respectively. The result of Mauchly's test of sphericity for pain intensity was 0.923 (P = 0.366), for DASS-21 was 0.603 (P = 0.716), and for RDQ was 0.847 (P = 0.126).

The mean of pain intensity in the pretest of the hypnotherapy with physiotherapy group was 8.142; in the mid-test and the posttest, it was 3 and 2.285, respectively. Thus, in this group, the pretest of psychological distress was 1.207, and the mid-test and the posttest were 0.673 and 0.323, respectively. The functional disability of this group in the pretest was 1.400, and increased to 1.710 and 1.830 in the mid-test and posttest, respectively. Moreover, in the pure physiotherapy group, the mean of pain intensity changed from 7.857 in the pretest to 4.285 and 3.285 in the mid-test and posttest, respectively. Therefore, the psychological distress in the pure physiotherapy group started from 1.023 in the pretest and changed to 0.84 and 0.721 in the mid-test and posttest, respectively. In addition, in this group, functional disability started from 1.452 and changed to 1.631 and 1.705 in the mid-test and posttest, respectively (Table 1).

Table 1. Mean and standard deviation of dependent variables (n = 28)

Dependent variables	Measure	Group	Mean (Standard deviation)
Pain intensity	Pretest	Hypnotherapy/physiotherapy	8.142 (0.949)
		Physiotherapy	7.857 (1.099)
		Total	8.000 (1.018)
	Mid-test	Hypnotherapy/physiotherapy	3.000 (2.112)
		Physiotherapy	4.285 (1.069)
		Total	3.642 (1.768)
	Posttest	Hypnotherapy/physiotherapy	2.285 (2.016)
		Physiotherapy	3.285 (1.637)
		Total	2.785 (1.872)
Psychological distress	Pretest	Hypnotherapy/physiotherapy	1.207 (0.413)
		Physiotherapy	1.023 (0.588)
		Total	1.115 (0.508)
	Mid-test	Hypnotherapy/physiotherapy	0.673 (0.289)
		Physiotherapy	0.840 (0.323)
		Total	0.756 (0.313)
	Posttest	Hypnotherapy/physiotherapy	0.323 (0.128)
		Physiotherapy	0.721 (0.332)
		Total	0.522 (0.339)
Functional disability	Pretest	Hypnotherapy/physiotherapy	1.400(0.215)
		Physiotherapy	1.452 (0.176)
		Total	1.430 (0.194)
	Mid-test	Hypnotherapy/physiotherapy	1.711 (0.130)
		Physiotherapy	1.631 (0.104)
		Total	1.671 (0.122)
	Posttest	Hypnotherapy/physiotherapy	1.830 (0.082)
		Physiotherapy	1.705 (0.166)
		Total	1.767 (0.143)

Table 2. Multivariate tests on the within-subject and between-subject effects

Effects			Value	F	df	Error df	P	Partial Eta Squared
Between group	Intercept	Wilks' Lambda	0.003	3003.815	3	24	0.001	0.994
	Group	Wilks' Lambda	0.906	0.835	3	24	0.488	0.094
Within group	Factor	Wilks' Lambda	0.039	85.497	6	21	0.001	0.961
	Factor*group	Wilks' Lambda	0.387	5.555	6	21	0.001	0.613

dF: Degree of freedom

The results of this analysis regarding F value, then the significance level of F value showed that the model in between-subjects and within subjects is significant (Table 2).

There are significant differences between interventions of the two groups. The efficacy of the procedure of hypnotherapy with physiotherapy in the ralated group was more than that in the hypnotherapy with pure physiotherapy group (Table 3).

Discussion

In the present study, it was found that the group which underwent hypnotherapy with physiotherapy showed a higher decrease in pain intensity than the group which underwent pure physiotherapy. The data also showed that only the patients who underwent hypnotherapy with physiotherapy experienced a decrease in psychological distress. A decrease was observed in both groups in the aspect of functional disability; however, it should be noted that the effectiveness of hypnotherapy with physiotherapy was higher than pure physiotherapy in decreasing functional disability. The present study indicates that hypnotherapy with physiotherapy affected all three variables meaningfully, while pure physiotherapy only affected pain intensity and functional disability. It is worth mentioning that hypnotherapy with physiotherapy was more effective than pure physiotherapy on functional disability.

In agreement with this result, a systematic review reported that hypnotherapy decreased the use of sedative drugs and psychiatric drugs among patients with pain by decreasing their pain intensity.[24] Additionally, hypnotherapy can decrease the use of anti-inflammatory drugs among patients with chronic pain. In another study, it was found that physiotherapy cannot influence patients' viewpoints on pain, locus of control, and psychological indications, but affects pain intensity meaningfully.[25] Another systematic review disclosed that pure physiotherapy can only affect pain intensity, and that investigations have utilized psychological treatments in order to change the psychological indications of pain.[26]

Table 3. Paired comparison of the interactive effect of time and group

Item	Test	Group (I)	Group (J)	Mean difference[#]	Standard error	P
Pain intensity	Pretest	Physiotherapy	Hypnotherapy/physiotherapy	4.357*	0.304	0.001
	Mid-test	Physiotherapy	Hypnotherapy/physiotherapy	4.357*	0.304	0.001
	Posttest	Physiotherapy	Hypnotherapy/physiotherapy	-5.214*	0.338	0.001
Psychological distress	Pretest	Physiotherapy	Hypnotherapy/physiotherapy	0.539*	0.096	0.003
	Mid-test	Physiotherapy	Hypnotherapy/physiotherapy	-0.539*	0.096	0.003
	Posttest	Physiotherapy	Hypnotherapy/physiotherapy	-0.594*	0.075	0.001
Functional disability	Pretest	Physiotherapy	Hypnotherapy/physiotherapy	-0.241*	0.029	0.001
	Mid-test	Physiotherapy	Hypnotherapy/physiotherapy	0.241*	0.029	0.001
	Posttest	Physiotherapy	Hypnotherapy/physiotherapy	0.338*	0.040	0.001

[#] Significance of mean difference with regard to paired comparison
* P = 0.050 (For column values)

Concerning the effectiveness of pure physiotherapy on pain intensity, there are no differences between physiotherapy techniques. It has been shown that pure physiotherapy can influence the biomechanical aspects of NSLBP.[27] An investigation revealed that physiotherapy in combination with psychotherapy can affect pain intensity more than pure physiotherapy; this result is more enduring than pure treatments.[28] In an Iranian investigation, it was reported that disability is affected by psychological aspects more than pain intensity.[29] In a systematic review, 10 randomized controlled trials (RCTs) were reviewed which indicated that hypnotherapy, by affecting psychosocial aspects, was more effective on functional disability than the control group and other treatments.[30] Another study also showed that hypnotherapy decreased psychological distress, and this decrease predicted the reduction in pain intensity in the near future.[31] However, some scientific investigations defy the effectiveness of hypnotherapy on psychological distress, especially stress.[32]

The present analysis demonstrated that hypnotherapy with physiotherapy can influence both the psychological and physical aspects of NSLBP, while pure physiotherapy only affects pain intensity as a physical aspect of NSLBP.

In an investigation, it was pointed out that this result can be due to the focus of hypnotherapy on psychosocial aspects; however, physiotherapy focuses on the physiological aspects of NSLBP.[33] The philosophy of physical therapies, such as physiotherapy, ignores patients' different fears of pain, psychological distress, and affection of disorder. Accordingly, these items can cause the recurrence of the signs of NSLBP in the future after the end of treatment.[34] Consistent with this fact, NSLBP is a multifactorial disorder; thus, physiotherapy only improves its physical aspects and ignores other different causes of NSLBP.[35] This result is in agreement with that of an investigation which reported that hypnotherapy with morphine can affect the signs of NSLBP more than pure morphine therapy.[36]

Conclusion

The present study findings revealed that hypnotherapy with physiotherapy and pure physiotherapy both affected pain intensity. It should be noted that hypnotherapy with physiotherapy was more effective than pure physiotherapy on pain intensity. This was also true regarding functional disability. Furthermore, it was found that psychological distress decreased only by hypnotherapy with physiotherapy. Thus, it can be concluded that hypnotherapy accompanied with physiotherapy is an applicable and effective treatment for NSLBP.

Limitations: One of the important limitations of the present study was not using a combination of qualitative and quantitative methods. The other limitation was solely using self-report instruments to measure the variables such as pain intensity in place of using clinical observations or biological indicators like MRI. With regard to the situation of the university clinics, it was not possible to investigate the effect of pure hypnotherapy on NSLBP and this was another limitation of this study.

Suggestions: It is recommended that a group in which patients only undergo pure hypnotherapy be studied. Another suggestion is that in order to measure the variables, biological instruments like MRI be used to measure biological indicators. With regard to the multifactorial etiology of NSLBP, the use of a combined method in future investigations is recommended.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

We appreciate all who contributed to this investigation especially patients who underwent the therapeutic methods. This study was confirmed and conducted for a Master's thesis in clinical psychology in Semnan University of Medical Sciences. Therefore, we acknowledge the assistance of the staff of Semnan University of Medical Sciences.

References

1. Jensen MP, Ehde DM, Gertz KJ, Stoelb BL, Dillworth TM, Hirsh AT, et al. Effects of self-hypnosis training and cognitive restructuring on daily pain intensity and catastrophizing in individuals with multiple sclerosis and chronic pain. Int J Clin Exp Hypn 2011; 59(1): 45-63.
2. Cifuentes M, Webster B, Genevay S, Pransky G. The course of opioid prescribing for a new episode of disabling low back pain: Opioid features and dose escalation. Pain 2010; 151(1): 22-9.
3. Lin CW, Haas M, Maher CG, Machado LA, van Tulder MW. Cost-effectiveness of guideline-endorsed treatments for low back pain: A systematic review. Eur Spine J 2011; 20(7): 1024-38.
4. Choi HK, Gwon HJ, Kim SR, Park CS, Cho BJ. Effects of active rehabilitation therapy on muscular back strength and subjective pain degree in chronic lower back pain patients. J Phys Ther Sci 2016; 28(10): 2700-2.
5. Martin BC, Fan MY, Edlund MJ, Devries A, Braden JB, Sullivan MD. Long-term chronic opioid therapy discontinuation rates from the TROUP study. J Gen Intern Med 2011; 26(12): 1450-7.
6. Hegmann KT, Weiss MS, Bowden K, Branco F, DuBrueler K, Els C, et al. ACOEM practice guidelines: Opioids for treatment of acute, subacute, chronic, and postoperative pain. J Occup Environ Med 2014; 56(12): e143-e159.
7. Deyo RA, Dworkin SF, Amtmann D, Andersson G, Borenstein D, Carragee E, et al. Report of the NIH Task Force on research standards for chronic low back pain. Pain Med 2014; 15(8): 1249-67.
8. Degenhardt L, Bruno R, Lintzeris N, Hall W, Nielsen S, Larance B, et al. Agreement between definitions of pharmaceutical opioid use disorders and dependence in people taking opioids for chronic non-cancer pain (POINT): A cohort study. Lancet Psychiatry 2015; 2(4): 314-22.
9. Johnson AJ, Marcus J, Hickman K, Barton D, Elkins G. Anxiety reduction among breast-cancer survivors receiving hypnotic relaxation therapy for hot flashes. Int J Clin Exp Hypn 2016; 64(4): 377-90.
10. Henschke N, Kuijpers T, Rubinstein SM, van Middelkoop M, Ostelo R, Verhagen A, et al. Trends over time in the size and quality of randomised controlled trials of interventions for chronic low-back pain. Eur Spine J 2012; 21(3): 375-81.
11. Farrar JT, Young JP Jr, LaMoreaux L, Werth JL, Poole RM. Clinical importance of changes in chronic pain intensity measured on an 11-point numerical pain rating scale. Pain 2001; 94(2): 149-58.
12. Tonsing KN. Psychometric properties and validation of Nepali version of the Depression Anxiety Stress Scales (DASS-21). Asian J Psychiatr 2014; 8: 63-6.
13. Bijur PE, Latimer CT, Gallagher EJ. Validation of a verbally administered numerical rating scale of acute pain for use in the emergency department. Acad Emerg Med 2003; 10(4): 390-2.
14. Osman ZJ, Mukhtar F, Hashim HA, Abdul LL, Mohd Sidik S, Awang H, et al. Testing comparison models of DASS-12 and its reliability among adolescents in Malaysia. Compr Psychiatry 2014; 55(7): 1720-5.
15. Wilkowska A, Landowski LJ. P.2.a.009 Stress reaction during myocardial infarction and depression: Predictive value of Depression Anxiety Stress Scale (DASS) 21. Eur Neuropsychopharmacol 2011; 21(Supplement 3): S359.
16. Pirbaglou M, Katz J, de Souza RJ, Stearns JC, Motamed M, Ritvo P. Probiotic supplementation can positively affect anxiety and depressive symptoms: A systematic review of randomized controlled trials. Nutr Res 2016; 36(9): 889-98.
17. Lin JD, Su SF, Lin LP, Hsu SW, Wu JL, Chu CM. The RolandMorris disability scale for the assessment of non-specific low back pain outcomes among disability sector workers. Res Autism Spectr Disord 2014; 8(12): 1635-40.
18. Schiphorst Preuper HR, Reneman MF, Boonstra AM, Dijkstra PU, Versteegen GJ, Geertzen JH. The relationship between psychosocial distress and disability assessed by the Symptom Checklist-90-Revised and Roland Morris Disability Questionnaire in patients with chronic low back pain. Spine J 2007; 7(5): 525-30.
19. Stevens ML, Lin CC, Maher CG. The roland morris disability questionnaire. J Physiother 2016; 62(2): 116.
20. Spiegel H, Aronson M, Fleiss JL, Haber J. Psychometric analysis of the Hypnotic Induction Profile. Int J Clin Exp Hypn 1976; 24(3): 300-15.
21. Terhune DB, Cardena E. Differential patterns of spontaneous experiential response to a hypnotic induction: a latent profile analysis. Conscious Cogn 2010; 19(4): 1140-50.
22. Konidena A, Sharma D, Puri G, Dixit A, Jatti D,

Gupta R. Effect of TENS on stimulation of saliva in postmenopausal women with or without oral dryness-An interventional study. J Oral Biol Craniofac Res 2016; 6(Suppl 1): S44-S50.
23. Jones AY, Hutchinson RC. A comparison of the analgesic effect of transcutaneous electrical nerve stimulation and entonox. Physiotherapy 1991; 77(8): 526-30.
24. Katz JN. Lumbar disc disorders and low-back pain: Socioeconomic factors and consequences. J Bone Joint Surg Am 2006; 88(Suppl 2): 21-4.
25. Abrahamsen R, Dietz M, Lodahl S, Roepstorff A, Zachariae R, Ostergaard L, et al. Effect of hypnotic pain modulation on brain activity in patients with temporomandibular disorder pain. Pain 2010; 151(3): 825-33.
26. Finger ME, Selb M, De Bie R, Escorpizo R. Using the international classification of functioning, disability and health in physiotherapy in multidisciplinary vocational rehabilitation: A case study of low back pain. Physiother Res Int 2015; 20(4): 231-41.
27. Richardson J, Smith JE, McCall G, Pilkington K. Hypnosis for procedure-related pain and distress in pediatric cancer patients: A systematic review of effectiveness and methodology related to hypnosis interventions. J Pain Symptom Manage 2006; 31(1): 70-84.
28. van Middelkoop M, Rubinstein SM, Kuijpers T, Verhagen AP, Ostelo R, Koes BW, et al. A systematic review on the effectiveness of physical and rehabilitation interventions for chronic non-specific low back pain. Eur Spine J 2011; 20(1): 19-39.
29. Kizhakkeveettil A, Rose K, Kadar GE. Integrative therapies for low back pain that include complementary and alternative medicine care: A systematic review. Glob Adv Health Med 2014; 3(5): 49-64.
30. Smallwood RF, Laird AR, Ramage AE, Parkinson AL, Lewis J, Clauw DJ, et al. Structural brain anomalies and chronic pain: A quantitative meta-analysis of gray matter volume. J Pain 2013; 14(7): 663-75.
31. Taxter AJ, Chauvin NA, Weiss PF. Diagnosis and treatment of low back pain in the pediatric population. Phys Sportsmed 2014; 42(1): 94-104.
32. Elkins G, Jensen MP, Patterson DR. Hypnotherapy for the management of chronic pain. Int J Clin Exp Hypn 2007; 55(3): 275-87.
33. Jensen MP, Patterson DR. Hypnotic approaches for chronic pain management: Clinical implications of recent research findings. Am Psychol 2014; 69(2): 167-77.
34. Pan CX, Morrison RS, Ness J, Fugh-Berman A, Leipzig RM. Complementary and alternative medicine in the management of pain, dyspnea, and nausea and vomiting near the end of life. A systematic review. J Pain Symptom Manage 2000; 20(5): 374-87.
35. Berger MM, Davadant M, Marin C, Wasserfallen JB, Pinget C, Maravic P, et al. Impact of a pain protocol including hypnosis in major burns. Burns 2010; 36(5): 639-46.
36. Crawford HJ, Gur RC, Skolnick B, Gur RE, Benson DM. Effects of hypnosis on regional cerebral blood flow during ischemic pain with and without suggested hypnotic analgesia. Int J Psychophysiol 1993; 15(3): 181-95.