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Development of an integrated Yoga module for Low Back Pain (LBP) in adults through research reviews

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Abstract

Low Back Pain (LBP) is one of the most common disorders in today's time at least every person experiences it at any one point in his lifetime. A number of causes (multi-factorial) are responsible for LBP like wrong body postures, stress, overuse or injury to low back muscles or ligaments or spine. LBP is the leading cause of activity limitation and is very expensive to treat. Exercises, surgery, non-pharmacologic treatments are not that much effective as they do not provide multi-focus approach. Yoga provides a holistic approach as it offers a combination of physical exercises with mental focus and patients are taught good postures, self-awareness and self-care along with relaxation. It is affordable, reduces stress, and improves postural problems, increases flexibility and healing capacity of the body. A research review has been planned to find out the effect of yoga on LBP and to develop a research-based yoga module which includes various *prānāyāmas* and meditative practices to help patients get rid of LBP. Inclusion and exclusion criteria were applied for the search strategy from the year 2002 to 2020, population aged between 18 to 40 years and yoga as primary intervention. Precautions like lifestyle changes, proper relaxation, diet and keeping correct posture while working and resting along with the module may help to decrease the LBP. Hence it can be concluded that yoga a cost-effective therapy has a potential to treat LBP. Further well-designed clinical trial will be highly encouraged to verify this.

Keywords: Yoga, low back pain, spinal disorders, sciatica, well-being, relaxation

Introduction

Yoga is a primitive austerity which balances and makes the physical, mental, emotional, and spiritual dimensions of an individual healthy [34]. According to *Patanjali*, yoga consists eight steps or limbs, which are all equally important [38] among which the physical exercises (*āsana*) can improve patient's bodily pliability, unification and vigourity [9] and *prānāyāma* (breathing practices) and meditation can tranquil and concentrate the mind [9].

Lower back pain (LBP) is one of the most common problems encountered in medical applications [8]. It is the leading cause of activity limitation and absenteeism from work and results in a huge medical burden and economic cost [41]. LBP is a general anarchy concerning the muscles, nerves and bones of the back [1]. Posadzki and Ernst defined LBP as pain localized between 12th rib and the inferior gluteal folds, with or without leg pain [26]. LBP may be classified by duration as acute pain (pain lasting less than 6 weeks), sub-chronic (6 to 12 weeks), or chronic (more than 12 weeks) [17]. The diagnostic process is mainly focused on the triage of patients with specific or non-specific LBP. Specific LBP is the pain in which the symptoms are due to the physio-pathological process like infection, arthritis, fracture and hernia nuclei pulposi and non-specific LBP is defined as the pain without any clear cause or unspecified reason like muscle or bone strain [16].

LBP is not a specific disease but rather a complaint that may be caused by a large number of underlying problems of varying levels of seriousness [8]. Some of the causes of LBP are incorrect posture while working, sitting, standing or sleeping [5], inadequate flexibility of muscles and tendons, injury or overuse of muscles, ligaments, hip joints and spine [36], wrong food combination [5] anxiety and depression [30], stress and low quality of lifestyle [5], pressure on nerve roots in the spinal canal due to herniated disc, osteoarthritis, spondylolisthesis, spinal tumours, compression fractures due to osteoporosis [36], heavy lifting [13], changes in the posture and centre of gravity in some pregnant women causing muscle and ligament strain [22].

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Yoga for Low Back Pain

A therapy encompassing the entire functionality of the disorder is necessary. As yoga increases flexibility and provides relaxation, therefore it may act as a potential treatment for LBP [26]. Yoga has a lot to offer in stress related disorders such as hypertension, diabetes, back pain, and other functional disorders [6]. The benefits of yoga may be greater than exercise alone because yoga offers a combination of physical exercise with mental focus [39], breathing techniques [36], meditations [36] and patients are taught good postures, self-awareness, and self-care along with relaxation [39].

Yogāsanas, prānāyāma, good lifestyle, diet [5], meditation [20] altogether can help in curing LBP. Yoga practices such as *āsana* and *prānāyāma* correct the vertebral curvature with respective angles and strengthen thoracic and abdominal cavities as well as respiratory muscles, which help in keeping appropriate posture [5]. The regular practice of meditation strengthen the nervous system and slacken stress more effectively by reducing the steroid hormones, free fatty acids, uric acid, and cholesterol [24].

The regular practice of meditation by any of the various techniques develops the inherent defense mechanism to fight with external physical, mental, emotional and environmental factors for the causation of diseases. Meditation provides physical and mental relaxation renews and reinvigorate the bodily organs for their normal functioning [35]. Meditation, *āsana* and *prānāyāma* provide relaxation which plays a very effective role in reducing stress that reduces the defense mechanism of the body [24]. Meditation practices have been widely used to combat

the day-today stress and exertion of modern life [35]. Meditation reduces the level of cortisol [35], a stress hormone [15] which in turn bestows relaxation and reduces the adverse effect of stress [35, 24]. Therefore, meditation can be used for

the prevention of psychological and psychosomatic disorders like depression, anxiety, hypertension and arthritis [35].

Healthy digestion is needed for muscle and bone recovery [40]. Yoga also teaches us about the approach to food, the types of food as well as the importance of timing and moderation in diet [6]. Yogic diet, *āsanas*, *prānāyāmas*, *mudrās*, *kriyās* and relaxation are the important aspect of lifestyle modification [6, 32].

Modern generation being totally indulged in the world, is not paying heed to their health (physical and mental), lifestyle which includes eating habits, physical activities, wake and sleep cycle and rest due to which they are suffering from number of diseases and disorders. The need of this study was to cure and treat the patients suffering from one of the most common disorder, LBP through Yoga.

Research Methodology

It is a survey method where, the keywords “Yoga, Low Back Pain, spinal disorders, sciatica, well-being, relaxation”, has been searched for the formulation of yoga module, the research has been conducted using the search engine (Google Scholar) and databases (Medline, PubMed) between the time limit 2002 to 2020.

Inclusion Criteria

LBP Patient (Male and female) aged between 18-40 years; yoga as primary intervention; papers from 2002 to 2020 has been included.

Exclusion Criteria

Healthy Individual; patient below 18 years and above 40 years; yoga not as primary intervention has been excluded from the search strategy.

Table 1: Showing the research based Yoga module for the prevention of Low Back Pain

Yoga Module	Timing (In minutes)	Application/ Benefits
Opening Phase (Prayer & Conditioning)		
<i>Om</i> Chanting [3]	5	Increases concentration
<i>Gāyatri Mantra</i> [27]		Increases consciousness
Breath Awareness		Increases awareness
Practice Phase (Asanas, Prānāyāma and Meditation)		
<i>Yogic Sukshma Vyāyāma</i>	6	Loosens Joints
(A) <i>Grivā Shakti Vikāsaka-1</i> (a, b), 2 (neck) [7]		Strengthens the neck
(B) <i>Purna Bhujā Shakti Vikāsaka</i> (arms) [7]		Tones up the nerves
(C) <i>Mani Bandha Shakti Vikāsaka</i> (wrists) [7]		Develops the wrists
(D) <i>Vaksha Sthala Shakti Vikāsaka</i> [7]		Gives vitality & strength to the back Keeps back straight
(E) <i>Kati Shakti Vikāsaka-1 & 2</i> (spine), 4(waist) [7]		Strengthens back
(F) <i>Kati Shakti Vikāsaka-5</i> [7]		Make back supple & symmetrical Removes all minor back deformities, Body symmetrical & strong strengthens back
(I) Standing āsanās		
(1) <i>Tādāsana</i> (Palm Tree Pose) [31]	3	Stretches & loosens the entire spine
(2) <i>Katichakra</i> (Waist rotating Pose) [31]		Tones back & hips Corrects back stiffness Improves postural problems, Decreases physical and mental tension
(II) Sitting āsanās		
(1) <i>MeruVakrāsana</i> [31]	7	Stretches spine, Loosens vertebrae, Tones the nerves Alleviates lumbago & sciatica
(2) <i>Vakrāsana</i> [2]		Relieves lumbago
(3) <i>Gomukhāsana</i> [29]		Stretches spine, Decreases lumbago by relaxing the muscles causing LBP
(4) <i>Ardha Matsyendrāsana</i> [31, 4]		Decreases LBP Tones spinal nerves Supple back muscles, Decreases muscular spasms
6) <i>Marjariāsana</i> [31, 33]		Increases flexibility of spine, Exercises core muscles that supports spine hence decreases LBP
(6) <i>Shasankāsana</i> [29]		Relieves LBP
(III) Prone āsanās		

(1) <i>Saral Bhujangāsana</i> ^[31]	7	Relieves stiff back
(2) <i>Bhujangāsana-1</i> ^[2]		Panacea for LBP
(3) <i>Ardha Shalabhāsana</i> ^[31, 2]		Good for back, decreases LBP, Relieves sciatica and stiff back, Tones back muscles Stimulate lower back nerves
(4) <i>Shalabhāsana-2</i> ^[2]		Decreases LBP
(5) <i>Sarpāsana</i> ^[31]		Correct posture
(6) <i>Advāsana</i> ^[31]		Slip disc Improves posture
(7) <i>Makarāsana-1, 2</i> ^[31, 2]		Slip disc & sciatica Decreases certain types of LBP Release spinal nervecompression Realign vertebral column
(IV) Supine āsanas		
(1) <i>Kandhrāsana</i> ^[31]	7	Realign spine, relieve backache
(2) <i>Supta Pawanmuktāsana</i> ^[2]		Slip disc, sciatica, decreases LBP
(3) <i>Ardha-halāsana</i> ^[2]		Decreases LBP
(4) <i>Markatāsana</i> ^[2]		Decreases LBP, Slip disc and sciatica
(5) <i>Shavāsana</i> ^[2, 31]		Releases body's stress & tiredness, decreases mental stress
(V) Meditative āsanas		
(1) <i>Siddhāsana</i> ^[31]	4	Redirects blood circulation to lower spine, tone lumbar region
(2) <i>Vajrāsana</i> ^[31]		Alters blood flow & nerve impulses in pelvic region, strengthens pelvicregion, good for sciatica
Prānāyāmas		
(1) <i>Bhastrikā (nimana 2:1)</i> ^[10]	10	Increases exchange of O ₂ & CO ₂ in the bloodstream, balances andstrengthens the nervous system
(2) <i>Kapālbhāti</i> ^[2]		Decreases depression & negative thinking
(3) <i>Anilom-Vilom</i> ^[2]		Cleanses nadis Relief from psychological stress
(4) <i>Bhrāmari</i> ^[2]		Anxiety neurosis panic disorders
(5) <i>Udgeet</i> ^[2]		Removes tiredness, decreases stress
Closing Phase (Yoga-Nidrā & Chanting)		
(1) <i>Yog Nidrā</i> ^[18, 23]	10	Relaxes physical as well as mental stress
(2) 'OM' Mantra Chanting and Shānti Path ^[42]	1	Deep relaxation (body & mind) Increases energy level in the body

Results

On the basis of number of studies done on LBP, a 60 minute *yogā* module has been created for the patients of LBP which includes 6 Joint movements, various *asanas* according to different positions like 2 standing *asanas*, 6 sitting *āsanas*, 7 prone lying *asanas*, 5 supine lying *āsanas* and 2 meditative *asanas*, 5 *prānāyāmas* and *Yog Nidrā*. All these together helps to loosen up the joints, increases flexibility, improves body alignment, strengthens back and relaxes the whole body from the day-today stress and strain, hence helpful in curing Low Back Pain.

Discussion

The purpose of this review was to find out how Low Back Pain (LBP) can be treated through yoga and some specific care. Some researchers estimate that 25% of the US population experiences LBP at any one time ^[32]. A number of causes are responsible such as maintaining wrong bodily postures, improper diet ^[5], overuse of muscles ^[36] and the lack of physical exercises ^[20]. Females are most likely to get LBP due to excessive household work, lack of rest, wrong body postures especially while working. Nowadays, students and corporate also suffer a lot from LBP because of long sitting hours with incorrect position ^[5].

The financial burden for treating LBP is enormous ^[21]. Many of the current treatments for LBP have not been proven successful ^[12]. Exercise is somewhat efficacious but its effect is neither curative nor consistent. Surgery is often expensive and can lead to reappearance of LBP or failure altogether ^[36]. None of the non-pharmacologic treatments [includes physical treatments (i.e., heat, ice, ultrasound, massage therapy), spinal manipulation and forms of injection therapy] stand out as clearly superior as it is very pricey and addictive ^[12], therefore the treatment is limited to people who could afford.

Yoga can be considered as its treatment with low cost, its

holistic approach can offer health benefits to those with LBP ^[14]. Yoga implies integrating all aspects of the individual body with mind and mind with soul to achieve a happy, balanced, and useful life. One hour yoga module has been prepared for those suffering from these disorders. This module consists of various *āsanas*, *prānāyāmas*, and meditations to help patients get rid of their pain. In which the *Sukshma Vyāyāma* practices given help opening the stiff body joints, warms up the body, shows improvement in all the pain measures ^[19] and prepare the body for the further yoga practices. The various *yogāsanas* given are classified into four sections on the basis of their position. These *asanas* strengthen, increase flexibility, relax, and improve postural problems of the spine ^[31, 2, 29]. The pranayama practices prescribed help reducing the day-today psychological or stress-related disorders, hypertension ^[25], tiredness, anxiety ^[2] which are also the cause of LBP ^[32] and hence help in relaxing the body. *Prānāyāma* increases the absorption of O₂ in the blood ^[37] and its flow to the cells supplying enough O₂ to each part of the body ^[28]. The meditative *āsanas* redirects the flow to the lumbar spine, strengthen the back ^[31] and reduces the stress level by modulating the hypothalamic-pituitary-adrenal axis ^[28]. The *Yog Nidrā* is given just before ending the session which helps in relaxing the whole body from both physical and mental stress and increases healing capacity of the body ^[18, 23].

Conclusion

At the end of this review, the following points can be concluded on the basis of the various researches done on LBP. There are several causes of LBP therefore a treatment with multi-focus approach is required to cure it and LBP is very expensive to treat as well. Since *yogā* is a holistic method equipped with multi target approaches ^[5] and is affordable (low cost treatment), therefore it has been chosen

as a way to treat LBP. Precautions like maintaining correct body postures, proper diet and relaxation and little physical activities can also help reduce LBP. According to several research studies, a valid integrated Yoga module is designed with good quality content. However, its potentiality, efficacy and benefits must be determined by further studies.

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