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RESEARCH ARTICLE

EFFECT OF BODY MECHANICS, PHYSICAL EXERCISES AND YOGA ON MANAGEMENT OF LOW BACK PAIN AMONG WOMEN WORKING IN NURSING PROFFESSION: A LITERATURE REVIEW

***[1]Nutan Makasare and [2]Dr. Seema Singh**

[1]Lecturer, College of Nursing, Govt. Medical College, Nagpur, Maharashtra, India
[2]Principal, SRMMCON, Sawangi (Meghe), Wardha, Maharashtra, India

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ABSTRACT

Nursing personnel especially female Nurses have a higher prevalence of low back pain (LBP) among all health care workers. Improper body mechanics has a direct effect on the prevalence of LBP. Working with risky posture, prolonged standing, physical workload, bending and twisting are main contributing factors for LBP among Nursing professionals. Majority of Nurses lack knowledge, and hence don't use body mechanics when turning, moving, lifting, and transferring the patients. Researches proved that physical exercises and yoga are an acceptable method for improving and maintaining physical and emotional health. Studies revealed that yoga appears to be an effective and safe intervention for low back pain. Educational training programs of body mechanics integrated with physical exercises and yoga can play a vital role in decreasing low back pain among Nurses.

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INTRODUCTION

Low back pain (LBP) pain is the pain in the lumbo-sacral area of the spine where the lordotic curve forms, that is distance from the first lumbar vertebra to the first sacral vertebra. The 4th and 5th lumbar segment is the most frequent site of low back pain. LBP may be acute, sub acute or chronic in nature. The LBP is the most common reason for medical consultation as it interferes with quality of life and work performance. Moreover, low back pain is said to be among the leading musculoskeletal disorders that predominantly affect the working population in developed as well as in developing countries.[1] The intensity of pain may be dull, constant, sudden, sharp or shooting in nature. It can begin suddenly as a result of heavy lifting or an accident, or it can develop over time as we age. Acute low back pain mostly resolves on its own within a few days with self-care management and there is no any functional disability. Few months are required in some cases for the symptoms to disappear. In chronic LBP, pain continues for 12 weeks or longer, even after an initial injury or underlying cause of acute low back pain has been treated. At one year, about 20 % of people affected by acute LBP develop chronic low back pain with persistent symptoms. Persistent pain does not always mean that there is a medically serious underlying cause or one that can be easily identified and treated.[2]

****Corresponding author: Nutan Makasare,***
Lecturer, College of Nursing, Govt. Medical College, Nagpur, Maharashtra, India

Important risk factors for lower back pain include improper body mechanics or posture when undertaking strenuous activity, obesity, lack of exercise, and increasing ge. Globally, 37% of lower back pain is attributed to occupations in which professionals are subject to vibrations or long periods of standing, such as miners, health care workers, occupational drivers etc. LBP is greatly associated with the repetitive and prolonged bending or incorrect, heavy twisting with one's trunk.[3] Health care personnel, specifically Nurses often experience musculoskeletal disorders like low back pain at an even higher rate than workers in other physically demanding fields. This is due to improper body mechanics used during lifting, transitioning and repositioning patients.

Prevalence of low back pain among nurses: In a study conducted at Uganda, the prevalence of LBP was very high i.e. 84% (n=100) among health workers. The prevalence of LBP was 54.76% among female and 45.24% among male health workers.[4] The descriptive cross-sectional study was conducted in Nepal among 110 Nurses to find out the prevalence and contributing factors of low back pain by using stratified proportionate random sampling method. It is analyzed that, 64.5% were affected from low back pain. The current working area of Nurses was strongly associated with LBP, i.e. p=0.000. Heavy workload (62.72%), prolong standing (64.54%), working in same positions (58.18%) and bending and twisting (64.54%), were perceived factors of low back pain. The factors that decreased low back pain were

taking rest (99.1%), physiotherapy (92.7%) and taking medication (82.7%). Increased work restriction (46.4) and less productivity and creativity (42.7) observed due to low back pain. Researchers stated that more than half of Nurses were affected from low back pain. Physical workload, prolonged standing, bending and twisting were main contributing factors for LBP among Nurses. Authors recommended to maintain correct body mechanics, timely screening and periodic rotation of Nurses for the prevention of LBP.[1] A cross-sectional survey was carried out to assess the prevalence of LBP among female Nurses, their risk status and association between LBP and selected demographic and clinical variables. The sample were 1284 Nurses between the age group of 20 and 60 years. Data were collected with demographic sheet and a standardized screening tool for LBP. After analysis it is revealed that, 53.4% of the Nurses had LBP and 17.1 % of them were at high risk. There was a significant association ($p<0.001$) between LBP and age, body mass index, experience, and place of work. As LBP is common among Nurses and they comprise majority of the health care professionals, adequate precautions should be taken to prevent low back pain. Periodic screening for low back pain and referring the high risk Nurses for immediate medical assistance may prevent complications related to low back pain and improve the functional ability.[5] Regular education on good body postures, physical fitness and appropriate body mechanics may help in prevention of low back pain among Nursing personnel.

Effect of body mechanics on low back pain: The term 'Body mechanics' refers to a coordinated effort of the musculoskeletal and nervous systems that maintain body alignment, balance and posture which is directly related to effective bodily functioning in daily life. The risk of damage or physical harm increases with bad or improper working posture. Body mechanics is the term which refers the method of efficient use of body while making movements, such as stretching an arm, standing, sitting, lying, bending the body, lifting a heavy object or person, while performing the tasks.[6] A study conducted in Egypt to measure LBP prevalence & the relation between body mechanics performance and Nurses' exposure of work place risk factors on LBP. It revealed that 88% of them had pain in lumber region & majority of Nurses don't use body mechanics when moving, turning, lifting, and transferring the patients. Low back pain is mainly related to the exposure to many risk factors such as obesity, lack of knowledge and practice regarding proper use of body mechanics. Educational programs regarding use of correct body mechanics while handling and lifting the patient have important role in decreasing low back pain among Nurses.[7] Nurses are often required to carry out strenuous work activities in an upright posture for many hours in a row like assisting in surgeries, providing CPR and other emergency procedures, changing patient's position, moving trolleys and other medical devices, transferring conscious or unconscious patients. These Nursing activities require proper application of the body mechanics principle to avoid musculoskeletal disorders like low back pain.[8] Researchers stated that, it is necessary to educate undergraduate Nursing students regarding use of body mechanics principle while Nursing and also to implement a systematic training program or in-service training programme for Nursing personnel at their workplace .

Effect of physical exercises on low back pain: Many researches proved that active and passive stretching improves flexibility and increases range of motion, decreases pain and improves blood circulation. 40 subjects with chronic mechanical low back pain randomized in a single blind experimental study, 20 subjects into each, study and control group. Study group received stretching of hamstring, tensor fasciae latae and lower back muscle for 7 sessions for a period of a week. After one week post intervention, no intervention was given during follow up week, while control group received placebo stretching. Authors stated that stretching of hamstring, tensor fasciae latae and lower back muscle, shown significant short term effect on improving pain, functional disability and flexibility in work related chronic mechanical low back pain among community Nurses. Implementation of stretching of these muscles in mechanical low back pain due to imbalance in thoracolumbar pelvic hip complex is recommended, that can enhances the recovery and decreases the pain, and functional disability.[9] A pre experimental study was carried out to assess the effectiveness of back strengthening exercise on pain and disability among nursing students with mechanical low back pain in Index Nursing College, Indore. 60 students who met the inclusion criteria were recruited for the back strengthening exercise intervention which was carried out for 30 minutes daily for 30 days. The Numerical pain rating scale was used to assess low back pain severity and Modified Oswestry Low Back Pain Disability Questionnaire was used to assess disability before and after the intervention. Analysis of the findings revealed that the pain and disability score was significantly less in post test than the in the pre-test. Thus back strengthening exercise was found to be effective in reducing low back pain and disability among the Nursing students.[10] Low back pain decreases the productivity due to functional disability among Nurses, increases absenteeism and the prevalence of clinic visits. Lower back muscles strengthening exercises may reduce the level of pain and degree of disability. Authors, J Fiter, R A Werdhani and S Wahyuni conducted a study to assess the effect of back-exercise on the level of pain and disability in low back pain among 20 hospital ward Nurses. Before and after the back exercise intervention, data were obtained by Visual Analog Scale and Roland Morris Disability Questionnaire. Before the back-exercise intervention, level of pain was 3.4 ± 0.8, while it was 0.5 (0–5.6, $p < 0.001$), after the back-exercise intervention. The disability score was 6.8 ± 2.1 before the back-exercise intervention, while it was 1.0 (0–6.0, $p < 0.05$) after the back-exercise intervention. Significant relationship, ($p < 0.05$) was found between the tendency of mental-emotional disorder to the change of disability score. Authors concluded that after the back-exercise intervention, there was a significant difference in the level of pain and disability in sub acute and chronic non specific low back pain among hospital ward Nurses. [11] These data support that the back-exercises can decrease the level of low back pain.

Effect of yoga on LBP: Yoga and exercises bring about an increase in neurotransmitters, immune mediator, a decrease in cortical concentration, thereby improves cognition, sleep, uplifts mood, lowers anxiety, negative symptoms, and improves concentration. For improving and maintaining physical and emotional health, exercise is considered as an acceptable method. Researches support the belief that yoga benefits physical and mental health via Sympathetic Nervous System (SNS) and the down-regulation of the Hypothalamic-Pituitary-Adrenal (HPA) axis. A study conducted by Bali Y, Ebnezar J and John R, to assess the effect of Integrated Approach of Yoga Therapy (IAYT) as an additional treatment for back disability, spinal flexibility, pain and tenderness in

patients undergoing conventional treatment for chronic LBP. 120 patients, aged 18–75 years suffering from chronic low back pain, from Ebnezar orthopedic center, Bengaluru were randomly assigned into 2 groups-a yoga group and a control group (yoga group = 41.29±15.87, control group = 41.63±13.48), to receive IAYT or therapeutic exercises after ultrasound (20 minutes/day) and intermittent lumbar traction. Both groups practiced supervised interventions for 3 weeks at the center and then for 12 weeks, at their residences after the completion of treatment. Both groups were assessed for pain, tenderness, spinal flexibility and back disability, in the pre-test (first day) and in the post-test (twenty first day).

There were significant differences within (RMANOVA, $p<0.001$) and between the groups (RMANOVA, $p<0.001$) in pain, tenderness, spinal flexibility and back disability, with greater improvement in the yoga group than in the control group. IAYT an addition to conventional physiotherapy provides significantly better improvement than therapeutic exercises alone in patients suffering from chronic low back pain.[12] Yoga popularity has grown tremendously in the past several years. National Health Interview Survey data conducted by the Centers for Disease Control and Prevention (CDC) show increased usage for complementary and alternative medicine (CAM) treatments. In 2007, yoga was the 7th most commonly used CAM therapy. CAM therapies are used mostly to treat musculoskeletal conditions, in particular back pain and to a lesser degree neck pain. Douglas G. Chang et al in their study stated that Yoga appears as effective as other non-pharmacologic treatments in reducing the functional disability of back pain. Yoga may have a positive effect on depression and other psychological co-morbidities, with maintenance of serum BDNF and serotonin levels.[13] Yoga appears to be an effective and safe intervention for chronic low back pain.

Chronic low back pain (CLBP) adversely affects quality of life among Nursing professionals. A study conducted by Nitin J Patil et al to evaluate the effects of integrated yoga and physical exercises on quality of life (QOL) in Nurses with CLBP. A total of 88 women Nurses from a tertiary care hospital of South India were randomized into yoga group (n = 44; age – 31.45 ± 3.47 years) and physical exercise group (n =44; age – 32.75 ± 3.71 years). Yoga group was intervened with integrated yoga therapy module practices, 1 h/day and 5 days a week for 6 weeks. Physical exercise group practiced a set of physical exercises for the same duration. All participants were assessed at baseline and after 6 weeks with the World Health Organization Quality of Life-brief (WHOQOL-BREF) questionnaire. Data were analyzed by paired-samples t-test and independent-samples t-test for within- and between-group comparisons, respectively, using the Statistical Package for the Social Sciences (SPSS). Within-group analysis for QOL revealed a significant improvement in physical, psychological, and social domains in both groups. Between-group analysis showed a higher percentage of improvement in yoga as compared to exercise group except environmental domain. Integrated yoga was showed improvements in physical, psychological and social health domains of QOL better than physical exercises group with CLBP.[14] There is a need to incorporate yoga as lifestyle intervention for Nursing professionals.

Conclusion

The prevalence of work related musculoskeletal disorders among Nursing personnel is higher as compare to other professions. Obesity, pregnancies, child births etc are the contributing factors among female Nursing personnel along with many other work related risk factors, which are responsible for low back pain. Improper body mechanics while performing many strenuous bedside Nursing activities lead to mechanical LBP. As per findings of many researches, no any single complementary therapy is effective in reducing low back pain. Body mechanics training programme may be effective for management of low back pain among Nursing personnel. It is necessary to construct and implement, an integrated training programme of body mechanics, physical exercises and yoga for the management of LBP among Nurses at every health care setting.

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