

3 REVIEW OF SCIENTIFIC LITERATURE

3.1 Definition of Pain and LBP

High prevalence of low back pain is one of the most common problems among nurses. Integrative care is recommended to deal with CLBP. We all experience pain, but scientifically it is an unpleasant sensation that originates in traumatized tissues and warns of injury and stress. Ancient philosophers mostly considered pain an emotion. International Association for the Study of Pain's defines "Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage (Bonica, 1979). Aristotle, called it a passion of the soul. A contemporary writer described pain qualities as including extreme averseness or an ability to annihilate complex thoughts and other feelings, an ability to destroy language, and a strong resistance to objectification (Scarry et al., 1985). Pain can be defined in multidimensional ways. Pain has been considered as part of a defensive strategy whose specific role is to signal an immediate active danger to the organism. This definition fits well for acute pain. It does not work well, however, for chronic pain that is maintained even in absence of an ongoing, active threat. Currently, acute and chronic pain is considered to be separate conditions.

Low back pain is pain, muscle tension, or stiffness localized below the costal margin and above the inferior gluteal folds, with or without sciatica. Nonspecific low back pain is pain not attributed to a recognizable pathology viz, infection, tumor, osteoporosis, rheumatoid arthritis, fracture, inflammation (Chou, 2010). Low back pain or lumbago is a common musculoskeletal disorder affecting 80% of people at some point in their lives. Lower back pain may be classified by the duration of symptoms as acute (less

than 4 weeks), sub-acute (4–12 weeks), chronic (more than 12 weeks) (Leboeuf-Yde et al., 2013).

3.2 Epidemiology of Low Back Pain

Global Burden of Disease 2010 Study revealed that, LBP top the list in terms of disability and sixth in terms of Disability-adjusted life-years (Hoy et al., 2014). A study in US found that 80% of nurses suffer from back pain in the US (De Castro et al., 2009). LBP is a major cause of sickness absence, majority of workers who take sick leave due to back pain return to work quickly, but many continue to experience pain and between 18% and 44% usually have a further episode of absence within a year (Wynne-Jones et al., 2014).

A recent study done on Iranian nurses showed the higher prevalence of low back injury among female nurses. The effect LBP can be reduced by proper ergonomics in the workplace, regular physical examinations, exercises and other preventive measures (Azizpouret al., 2017). Reported lifetime prevalence is between 50 and 70% (Andersson, 1999). Another report reveals the lifetime prevalence of back pain was 82.03%, and the point prevalence of back pain was 43.78%. Functional prognosis is poor: the proportion of patients returning to work has been estimated at only 50% after 6 months of absenteeism and almost null after 2 years (Poulain et al., 2010). Within three months patients stop consulting for LBP, 60% to 80% of people still report pain or disability a year later (Sikiru et al., 2010).

3.3 Burden of LBP

Global: Low back pain is a significant public health problem that has reached epidemic proportions. It places a substantial burden on the workforce and the health care system. Back pain is one of the UK's costliest and least understood health problems, whose prevalence is continuously increasing (Hoy et al., 2014). In the pan-European study, the

most common location of chronic pain was the back, in 47% of sufferers (5% upper back, 18% lower back, 24% unspecified) (Goldberg et al., 2011). Chronic pain is not only a major healthcare problem which seriously impairs the quality of sufferers' working but also social lives. It has proven very difficult to treat, and it is one of the most commonly reported reasons for the use of complementary and alternative medicine (Eisenberg et al., 1993, 1998, 2001). In the United States, healthcare costs among people with back pain increased by 65% from 1997 to 2005, more rapidly than healthcare costs among people without back pain and the overall healthcare costs (Martin et al., 2008; Moradi-Lakeh et al., 2013).

In INDIA: Very few studies are found in India, those suggest occurrence of low back pain is alarming; nearly 60 per cent of the people in India have significant back pain at some time or the other in lives (Ganesan et al., 2017). A survey on 814 subjects (Madan et al., 2008) reported that manual workers (MW) in India had the least prevalence (15%) of back pain. It was 33% in MWs of Indian origin in the UK, 37% of UK white MWs, 25%, 24%, and 28% in three similar groups of Office Workers (OW) respectively. A 23% prevalence of CLBP has been reported from an outpatient orthopedic unit in north India (Sharma et al., 2003). Joshi TK et al 2001 reported a prevalence of 59.4% musculoskeletal disorders in industrial workers in Delhi.

3.4 Causes of Low Back Pain

Causes, symptoms, pathology, and radiologic appearances are poorly correlated. Pain is nonspecific in about 85 percent of persons. About 4% of persons with low back pain in primary care have compression fractures, and about 1% have a tumor. The prevalence of prolapsed intervertebral disk among persons with low back pain in primary care is about 1 to 3 %. Ankylosing spondylitis and spinal infections are less common. This covers only chronic low back pain for which a definitive diagnosis cannot be made

(Chou, 2010). Risk factors include heavy physical work; frequent bending, twisting, and lifting; and prolonged static postures. The role of psychological distress, including somatization (the expression of distress due to physical symptoms or their persistence) as a presumed source of LBP, has been shown in previous reports, (Dunn et al., 2004; Feyer et al., 2000). Numerous studies have reported that the prevalence of low back pain increases in middle aged women (Wáng et al., 2016; Shemshaki et al., 2013).

3.5 Stress and Low Back Pain

Psychological Stress & LBP: Low back pain is caused by multiple factors, generally categorized into physical, psychosocial and lifestyle factors (Habibi et al., 2012). Psychosocial factors at work have been shown to play important roles in the development of low back pain (Mosrafa et al., 2008). They are perceived characteristics of the work environment that have an emotional connotation for workers and managers, and that can result in stress and strain (Houtman et al., 1994; Huang et al., 2002). Factors such as work demands, job control, job content, and social support have been reported as psychosocial factors at work. Lack of job control is seen as a critical psychosocial work factor. It has been associated with an increased rate of musculoskeletal sickness absence and an increased risk of hospitalization due to musculoskeletal disorders (Aghilinejad et al., 2015; Yip et al., 2004). The most frequently reported psychological disturbances amongst patients with CLBP are depression, anxiety (Linton, 2000), fear and anger (Kim et al., 2006). Fanian et al., found a positive correlation between scores on anxiety and depression and pain and functional disability in patients with lumbar disc herniation. Sixty nine elderly and fifty nine nonelderly patients with CLBP reported more antidepressant use, greater pain intensity, greater interference due to pain and less control over life than the non-depressed patients (Herr et al., 1993). In the approach towards understanding CLBP

psychological factors are firmly placed at the realm of pain research and practice. It is known that psychosocial variables generally have more impact than biomedical or biomechanical factors on CLBP and disability related to it (Linton, 2000). Psychological disturbances may either cause or result from CLBP, it is most likely that pain and psychological disturbances interact to worsen each other (Linton, 2000). Attempts to adapt to pain and its consequences result in a wide range of affective disturbances. Functional disability, sleep disturbances, fatigue and medication abuse (Williams et al., 1993) are seen in people suffering from CLBP.

Psychosocial Stress &LBP:

There is growing consensus that psychosocial factors play a role in the development of CLBP. Many potential risks that include lifestyle, physical, psychosocial (both work-related and non-work-related) factors have been studied. These factors have been linked to low back pain, starting from psychological and psychosocial factors at work and private life. A major issue in pain rehabilitation programs for CLBP is the suggested relation between psychological factors and disability. This relationship is stressed in dominant models such as the bio-psychosocial model and the fear avoidance model (Vlaeyen et al., 1995). According to the bio-psychosocial model, a patient's functioning is influenced by biological, psychological and social factors. Psychological factors such as distress (depression, anxiety, and fear), self-efficacy, fear-avoidance beliefs, coping styles and cognitive factors generally are presumed to have more impact on back pain disability than biomedical or biomechanical factors (Schiphorst et al., 2008; Linton, 2000; Innes et al., 2005).

3.6 Depression and Anxiety in LBP

The most important psychological disturbance in CLBP is emotional distress, measured on questionnaires as increased bodily awareness and depression (Waddell et al., 1984).

Clinical studies suggest that an excessively negative orientation towards pain (pain catastrophizing) and fear of movement due to re-injury (kinesiophobia) are important in the etiology of chronic low back pain and associated disability (Fritz et al., 2001). Patients with CLBP reported increased psychological distress that led to higher level of pain (Verbunt et al., 2005). Depression is a condition that worsens the prognosis of low back pain (Tsuji et al., 2016). High job insecurity, feeling stressed at work, and feeling depressed increase the relative risk for developing low back pain (Clays et al., 2007). Hence LBP results in significant levels of disability, producing significant restrictions on usual activity and participation, such as inability to work.

A study analyzed the impact of anxiety, anger and depression in predicting self-report of clinical pain as indicated by McGill Pain Questionnaire (MPQ) in a sample of 60 chronic pain patients. A study examined whether anxiety sensitivity (AS) influences pain related anxiety and associated cognitive and affective reactions in patients with physically unexplained CLBP. Results indicated that patients high on AS were more negatively affected by pain (Asmudson et al., 1995).

3.7 Occupation and CLBP

Low back pain (LBP) is one of the most common occupational health problems and accounts for a large number of compensation days and disability for workers in modern industrialized societies. Extensive research into the role of occupational risk factors in the development of LBP has been carried out (Punnett et al., 2005). It is believed that LBP is caused by multiple factors, generally categorized into physical, psychosocial and lifestyle factors (Chou, 2010). Various physical factors have been found to be associated with pain in different regions. Heavy physical work, heavy or frequent manual operations, repeated rotation of the trunk, whole-body vibration and prolonged sitting were positively associated with LBP (Burdorf et al., 1997). Psychosocial factors

at work have also been shown to play important roles in the development of LBP. Factors such as work demands, decision latitude, symptoms of stress and social support have been reported as important psychosocial factors at work (Houtman et al., 1994). The impact of LBP for nurses includes time off work, increased risk of chronicity, as well as associated personal and economic costs. The nurses are also having 80% prevalence of low back pain in their life time (Mitchell et al., 2008).

3.8 Quality of Life and CLBP

In recent years, Quality of life (QoL) has become a key concept in the medical community where health care places dual emphasis on treatment and quality of care. WHO defines QOL as an 'individual's perception of his/her position in life in the context of culture and value system in which they live and in relation to their goals, expectations, standards and concerns' (WHO; 1996 ; Hyland et al., 2003).

Recognizing patients' psychological problems and understanding their social needs constitute important tasks for medical personnel, because these issues substantially contribute to overall outcome of treatment. The analysis disclosed negative correlations between the perception of the disease in the light of self-realization constraints and the feeling of satisfaction with one's life (Marcel et al., 2014).

QOL depends on a patient's physical, psychological and social responses to a disease and its treatment (Hyland et al., 2003). 18.5% of 1,470 children reported health problems and 15.3% life events with a perceived impact on QoL. Prevalence was higher in LBP + WBP (whole body pain) with >30% of this group identifying life events and/or health problems vs. 10-12% in PFree or IsoLBP groups ($p < 0.001$). IsoLBP affected QoL marginally (mean = 2.4 ± 2.2) compared to LBP + WBP (mean = 4.9 ± 2.4) ($p < 0.001$). LBP affected QoL marginally. These results stress the

distinction between disease and common life experience. They also indicate the potential value of global QoL assessments in clinical settings (Balagué et al., 2012). The prevalence of depression in a Cross-sectional study in which 193 patients with chronic low back pain was (32.1%). Those with depression presented greater pain intensity, a greater fear of movement and of performing physical activities and depression was associated with worse quality of life (Antunes et al., 2013). Chronic low back pain (CLBP) in women seems to be associated with the lowest quality of life amongst many types of non- malignant chronic pains as was observed in a survey carried out in a multidisciplinary pain clinic in Netherlands (Lame et al., 2005).

Finding of a study with 412 patients, was that “moderate and vigorous workplace PA” showed a negative association with HRQOL while those achieving WHO recommendations in leisure time showed a significantly higher HRQOL compared to those reporting “no leisure time PA”. Hence, solely the variables “current work ability” and “intensity of pain” contributed significantly to explain variance in HRQOL (Schaller et al., 2015).

3.9 Complementary and Alternative Therapies / Medicines in LBP

Treating pain requires a multifactorial approach, because pain is very complex (Salzberg et al., 2012). Eisenberg DM, et al., showed through a pilot study that multidisciplinary approach is promising trend for benefit of treating patients with persistent LBP with this integrated care mode. So treatment approaches for back related pain can be multidimensional and include conventional care, complementary and alternative medicines (CAM) or both. According to the National Center for Complementary and Alternative Medicine (NCCAM), CAM is a group of diverse medical and healthcare systems, practices and products that are not generally

considered part of conventional medicine (NCCAM, NIH 2011). The use of CAM has increased significantly among the general populations of most developed countries (Zollman et al., 1993; Harris et al., 2000; Kristofer et al., 2012). For some back pain sufferers conventional treatments have limited therapeutic affect (Chenot et al., 2007) leading often to the use of various ‘alternatives’. One of the most common areas of CAM use is that of musculoskeletal care and in the context of back pain in particular, studies have illustrated that people use a wide range of therapies within and outside the conventional medical domain (Sherman et al., 2004; Xue et al., 2008). A range of CAM treatments are used by back pain patients by Consultation with CAM practitioners or self-prescribed (Santaguida et al., 2009). Back pain is the number one condition for which Americans seek CAM care. In most cases of back pain modern medical system alone cannot carry the burden of rapidly increasing conditions of stress related diseases. This has led to the need of research in other non-pharmacological therapies including yoga. Following are the six most commonly used Complementary and Alternative Therapies / Medicine (CAM) in LBP (Kanodia et al., 2010).

- Chiropractic
- Massage
- Herbal Medicines
- Relaxation Techniques
- Yoga / Tai Chi / Qui Gong
- Acupuncture

3.10 Yoga as a therapy

Yoga is a 5,000-year-old tradition whose classical aim is liberation from suffering in this life. Ancient texts make it clear that mental and physical illness or lack of health is impediments to this goal. Yoga was used in antiquity to overcome these impediments in

preparation for attaining the goal of self-realization and liberation from suffering. Although the ancient seers recognized the health and healing effects of Yoga, they were not the primary goal of practice as is the case in western world. Yoga is now regarded in the West as a holistic approach to health and recently has been classified by the National Institutes of Health as a form of Complementary and Alternative Medicine (CAM). In India, however Yoga is not an alternative healing system but a part of mainstream medicine. In either case, this therapeutic application of Yoga requires the classical postures to be adapted to address the specific problems associated with each medical condition. Yoga techniques include *Asāna* (postures), *Prānāyāma* (voluntary regulated nostril breathing), relaxation techniques, meditation and counseling to promote physical wellbeing and mental calmness. Several studies have reported efficacy of yoga in various ailments. These include Asthma (Nagarathna et al., 1985), Epilepsy (Ramaratnam et al., 2000), PCOS (Nidhi et al., 2012), Menstrual diseases (Rani et al., 2011), Pregnancy (Rakhshani et al., 2012), hypertension (Okonta et al., 2012), obesity (Seo et al., 2012), migraine (Büssing et al., 2012), neck pain (Michalsen et al., 2012) and Low back pain (Holtzman S 2013; Sherman et al., 2013; Chang et al 2016). Osteoarthritis of the knee has also been treated by yoga (Ebnezar et al., 2011). Various autoimmune conditions like multiple sclerosis (Patil et al., 2012; Rogers, 2015) and Rheumatoid arthritis (Telles et al., 2011) have been improved by yoga. Mental health (Gangadhar et al., 2015), psychological conditions like job stress (Cowen et al., 2010; Maddux et al., 2018), anxiety (Khalsa et al., 2009), depression (Louie et al., 2014) have been successfully addressed by yoga. It has been helpful in breast cancer (Cramer et al., 2012).

3.11 Yoga therapy and CLBP

In a systematic review of RCT on yoga for LBP, seven studies for found among them five RCTs suggested that yoga leads to a significantly greater reduction in low back pain than usual care, education or conventional therapeutic exercises. Two RCTs showed no between-group differences. It is concluded that yoga has the potential to alleviate low back pain (Posadzki et al., 2011).

Sherman et al. used 12 weekly yoga classes, showed that Yoga was more effective than a self-care book for improving function and reducing symptoms chronic low back pain, and the benefits persisted for at least several months (Sherman et al., 2011). He concludes that the beneficial effects of yoga are solely or largely due to physical exercise, and that the awareness component has no materially important effect on back pain. However, it is possible that completely different pathways mediate these beneficial effects, and we will be able to determine this through the mediator analysis (Sherman et al., 2010). Williams et al. used Iyengar Yoga as intervention for 3 months, showed improvement in pain intensity (64%), functional disability (77%), reduction pain medication usage (88%) and depression in adults with CLBP. There was also a clinically important trend for the yoga group to reduce their pain medication usage compared to the control group (Williams et al., 2009).

Tekur P et al., conducted three studies using seven days intensive residential yoga program on CLBP showed that yoga reduces pain, pain-related disability, anxiety, depression, improves spinal mobility, spinal flexibility and increases quality of life and in patients with CLBP more effectively than physiotherapy exercises (Tekur et al., 2008, 2010, 2012). Chuang et al. revealed 12 weekly group classes of specialized yoga are likely to be a cost-effective intervention for treating patients with chronic or recurrent low back pain (Chuang et al., 2012). Hartfiel et al., revealed that workplace

yoga intervention can reduce perceived stress and back pain and improve psychological well-being and suggests larger RCTs are needed to determine the broader efficacy of yoga for improving workplace productivity and reducing sickness absence (Hartfiel et al., 2012). These preliminary data indicates that majority of self-referred persons with low back pain will comply to and report improvement on medical and functional pain related outcomes from Iyengar yoga therapy (Kimberly et al., 2005). Different yoga practices have been used to reduce stress, anxiety and depression. Yoga-based mindfulness meditation showed beneficial effects on perceived stress and anxiety disorders (Carmody et al., 2008). Yoga has also proved effective in increasing quality of life and spinal flexibility better than physical therapy exercises in CLBP (Tekur et al., 2008).