

Prevalence of Low Back Pain and associated Risk Factors among Nurses – Review

^{1,*}Aishah Omar ALMaghrabi, ²Dr. Fatmah Hazza ALSharif,
³Dr. Hayfa Hamed ALMutary

¹ Faculty of Nursing, King Abdulaziz University, Jeddah, Saudi Arabia

²Assistant Professor, Medical-surgical Department, Faculty of Nursing, King Abdulaziz University, Jeddah, Saudi Arabia

³Assistant Professor, Medical-surgical Department, Faculty of Nursing, King Abdulaziz University, Jeddah, Saudi Arabia

*Corresponding Author's E-mail: Ayoo.11@hotmail.com

Abstract: Purpose: This review paper aimed to determine the prevalence of low back pain (LBP) among nurses. Methodology: a comprehensive search using electronic databases, including the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, and PubMed through the Saudi Digital Library (SDL) databases. Further, a supplementary search was carried out for any relevant studies using Google Scholar. Studies published between January 2015 and April 2020 were met the inclusion criteria by using the PRISMA guideline. Findings: A total of 17 studies were met the inclusion criteria. Different methods of studies were applied to measure and evaluate LBP among nurses and factors associated with lower back pain. The lowest and the highest prevalence among the studies are found to be 53.4 % and 85.9%. Age, body mass index, and female gender were the most commonly reported individual risk factors. Occupational risk factors mainly included work-related activities requiring lifting and pulling objects, manual patient-handling, total years of work. Unique contribution to practice and policy: This review found that a number of nurses in hospitals across countries are suffering from lower back pain with a variety of risk factors contributed to increasing LBP prevalence. Proper protective measures need to be developed. Enough staff needs to be recruited to reduce working hours and thus decrease the workload. This, in turn, would improve the quality of patient care.

Keywords: Low back pain, nurse, Prevalence, risk factors.

1. INTRODUCTION

Low back pain (LBP) is one of the most prevalent complaints necessitating health care. It is the most common type of musculoskeletal disorder (MSD). More than 50% of the general population would seek care for LBP at some point in their lives (Parreira et al., 2018). Globally, the prevalence of LBP among the general population varies from 15% to 45%. In Saudi Arabia (SA), LBP prevalence is stated to be 18.8% among the general population (Alnaami et al., 2019).

According to the Global Burden of Disease Study (GBD; Vos et al., 2012) as cited in (Jradi et al., 2020), LBP is one of the top ten conditions that lead to illness and disability, higher than the human immunodeficiency virus, road traffic accidents, tuberculosis, lung cancer, chronic obstructive pulmonary disease, and preterm birth complications.

In health-care settings, work-related illnesses and injuries have a higher prevalence compared to the general population. The reported prevalence of LBP among nurses is 85.7% in England (Punnett & Wegman, 2004), 62% in Italy (Lorusso et al., 2007), and 80.9% in Hong Kong (French et al., 1997). In Africa, a study recorded 70% prevalence of LBP among nurses (Sikiru & Shmaila, 2009). In SA, previous cross-sectional studies have examined the prevalence and risk factors of

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LBP in SA, finding that they ranged from 48.41% in Taif province to 61% in the Sudayr region to 75% in Riyadh city (Jradi et al., 2020).

According to researchers, four major health issues are currently affecting health-care staff: musculoskeletal injuries; LBP due to occupational violence, shift work, and needlestick injuries; and increased workload and stress (Qareeballa et al., 2018).

The experience of LBP in relation to the inherent nature of the nursing job is typically determined by a variety of influencing factors (Mekonnen, 2019). According to recent studies, for example, work-related LBP is often affected by sociodemographic characteristics, such as sex, age, marital status, body mass index (BMI), and experience. Additionally, lifestyle factors, such as smoking, obesity, and lack of physical exercise, and psychological issues, such as stress and job satisfaction, have a substantial effect on the incidences of LBP. Studies also show that conditions at the workplace, such as overtime work, long working hours, working posture, and work shifts are significant predictors of LBP.

Nurses also have six times greater back injury incidences relative to other health-care professions (Ibrahim et al., 2019). LBP is an occupational hazard that affects nurses' productivity. Recruitment and retention of nurses are a challenge, and the shortage of nursing staff has been worsened by the burden of occupational injuries such as LBP and associated disabilities. It is estimated that 12% of nursing workers in the United Kingdom will consider a job transfer each year to minimize their LBP, and another 12% to 18% will leave the nursing profession because of persistent back pain (Dlungwane et al., 2018).

Understanding the prevalence of LBP and its associated risk factors among nurses is crucial. Information about this will help nursing and hospital administrators prepare effective strategies to reduce occurrences of LBP. So, this review aims to expand knowledge about the prevalence of LBP and its associated risk factors among nursing personnel.

2. MATERIALS AND METHODS

2.1 Search Strategy

A comprehensive search has been utilized to determine the published studies relevant to the topic using electronic databases, including the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, and PubMed through the Saudi Digital Library (SDL) databases. Furthermore, a supplementary search was carried out for any relevant studies using Google Scholar. Studies published between January 2015 and April 2020 were met the inclusion criteria by using the PRISMA guideline.

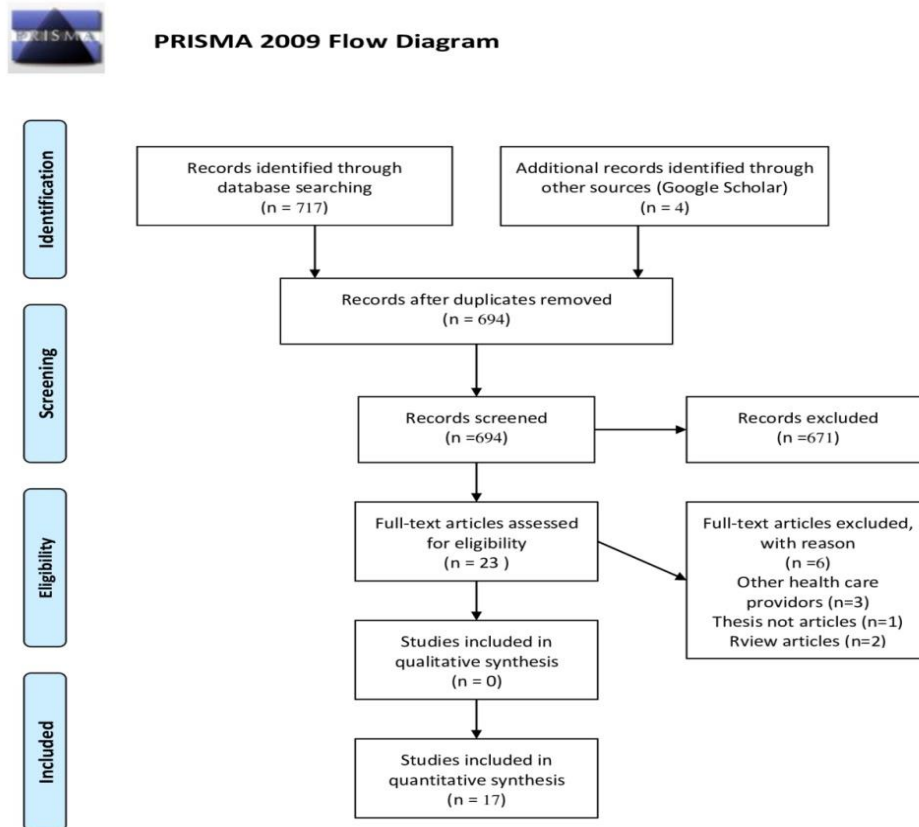
2.2 Key Search Terms

Full-text articles were obtained using the following search terms: "prevalence or incidence" and "low back pain or lower back pain" and "risk factors or predisposing factors," and "nurses or nursing." Combination searches used Boolean operators "AND" and "OR" to retrieve relevant studies. Certain inclusion criteria were considered according to the research aim. The articles that met the following criteria: written in the English language, published studies conducted between 2015 and 2020, literature on nurses, and quantitative research. Meanwhile, exclusion criteria included all published articles in different languages and other health-care providers.

2.3 Articles Retrieved and Screening Process

A large number of studies resulted from searching in databases. By using the search strategy mentioned before, a total of 717 articles were found through search databases, plus four studies identified through another source. Duplicate studies were removed after studies were filtered; the remaining studies titles and abstracts were checked and excluded according to the inclusion criteria. The 694 articles were screened for eligibility; 671 articles were excluded after title review. Then six articles were excluded after full-text screening. The main exclusion reasons: content irrelevance, duplicates, other health care providers, thesis, and review articles. Finally, the reviewers end up with 17 articles that most meet the inclusion criteria for the final review (6 studies from Medline, 4 studies from PubMed, 3 studies from CINAHL, and 4 studies from Google Scholar). This selection process is indicated below using Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) that contain a four phase flow diagram explained in **FIGURE 1**.

Data extraction matrix form was designed that included the following variables: author/s, year, location, sample, study design, tool, the prevalence of LBP, risk factors of LBP, as a method for facilitating the writing and summarizing the most related studies and identifying the main themes of the literature review.



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Figure 1: The PRISMA flow diagram of the study

3. RESULT

3.1 Low back pain

There are many definitions of LBP across the literature. Jradi et al. (2020) defined LBP as an episode of LBP characterized by the presence of pain or discomfort within the spinal area between the costal edges of the twelfth rib and the gluteal folds, leading to different problems such as disability, loss of productivity, absenteeism, or work changes. Suliman (2018) defined LBP as an MSD that affects bones, muscles, and the neural system of the back for at least 1 day; it might radiate to one or both lower limbs in the area between the lower margins of the twelfth rib and the lower gluteal folds.

In another study, LBP was defined as pains in the lower part of the back during the last 12 months preceding the research (Boughattas et al., 2017). Abolfotouh et al. (2015) defined LBP as low back pain (basically pain, numbness, tingling, aching, stiffness, or burning) occurring during the past 12 months. In another recent study, LBP was used to refer to pain

that respondents had at the time the study was conducted and that lasted for three months or more in an area between the twelfth rib and gluteal fold (Dlungwane et al., 2018).

3.2 Prevalence of LBP Among Nurses

Low back pain is a major public health problem. Among 70% to 85% of adults are affected by back pain or at least one episode of LBP in their lifetimes (Al-Arfaj et al., 2003). The prevalence of back injuries was found to be six times higher among nurses compared to other health caregivers (Ibrahim et al., 2019). Work-related LBP is common among nurses, with an incidence rate of 40–90% globally (Nair, 2020).

The reported prevalence of LBP among nurses varies across countries. In Europe, a cross-sectional study of 1744 nursing personnel with different qualifications, including practical nurses, registered nurses, and nurses with a bachelor's degree and those with a master's degree was conducted in 15 Slovenian hospitals. A total of 85.9% of nurses experienced LBP, and its one-week prevalence was 37.6% (Skela-Savič et al., 2017).

Several studies were conducted in Southeast Asia that displayed a higher prevalence rate of LBP. A cross-sectional study was conducted on 989 nurses between the ages of 25 and 60, who had been working for at least three months at six public hospitals in Penang. The findings revealed that 76.5% of respondents suffered from LBP and that the annual prevalence of LBP was 74.8% (Ibrahim et al., 2019). Another study was conducted at a general hospital in Sarawak of 141 nurses. A total of 63.1% of them had suffered from LBP during the previous one year (Thon et al., 2016).

Many studies have been conducted in South Asia as well. In a study conducted to comprehend LBP incidences among 84 nurses working in a tertiary care teaching hospital in South India, approximately three-quarters (73.8%) of the respondents complained of LBP; nonetheless, 83.3% of cases had minimum disability (Nair, 2020). Furthermore, a cross-sectional survey carried out among 250 nurses working in operation rooms (OR) in India showed that 84% of nurses during the previous year had at least one episode of mild, moderate, or severe LBP (Jeyakumar & Segaran, 2018). In another study conducted among 1284 female nurses aged between 20 and 60 years, 53.4% of nurses had LBP, and 17.1% were at higher risk of developing it (Emmanuel et al., 2015). In Bangladesh, a study conducted to examine the incidence rates of LBP among 229 Bangladeshi female nurses from two tertiary hospitals in Bangladesh showed the following annual LBP rates: lasting at least one day (72.9%), chronic LBP (31.8%), and intense pain (24.4%) (Sanjoy et al., 2017).

In Africa, in a study that took place in Ethiopia on the prevalence of LBP between 418 nurses, the findings revealed that the one-year prevalence of LBP was 63.6% and the one week-prevalence was 53.4% (Mekonnen, 2019). A similar result was obtained at a regional hospital in South Africa. Among 242 nurses, the prevalence of LBP in nurses was 59% (Dlungwane et al., 2018). In Tunisia, a cross-sectional study conducted among 203 nursing staff revealed that the prevalence of LBP over the last twelve months was 58.1% (Boughattas et al., 2017).

Low back pain prevalence has been reported in Middle Eastern countries such as, Iran, Jordan, Bahrain, Qatar, and SA. Patient handling is one of the main tasks of nursing personnel. A study was carried out on 243 Iranian nurses working in 5 hospitals (58 wards) who played a role in handling patients. The results displayed that the prevalence of LBP within the preceding 12 months was 69.5% (Samaei et al., 2017). Another study conducted in Jordan revealed that among 384 nurses from 7 public hospitals and 1 university hospital, many nurses complained of LBP, with the current, last-year, and cumulative prevalence of LBP being 69.0%, 78.9%, and 83.6%, respectively (Suliman, 2018). In another study carried out in the Kingdom of Bahrain at Salmaniya Medical Complex (SMC), among 215 female nurses, an annual prevalence of LBP was found for almost three-quarters (73.5%) of the sample (Qareeballa et al., 2018). In 2015, a study conducted in neighboring Qatar among 254 nurses from different departments/wards revealed that more than half (54.3%) of the respondents had LBP (Abolfotouh et al., 2015).

In SA, as in many other countries, LBP is a significant issue among health-care staff, most notably nurses. The prevalence and risk factors of LBP in SA have been previously investigated and found comparable to the levels recorded in the literature. In a cross-sectional study carried out in 16 hospitals across Riyadh city, a total sample of 410 nurses was surveyed, and the annual prevalence of reported LBP was found to be 80% (Jradi et al., 2020). Another study was conducted in Jeddah city among 60 nurses who were randomly selected from four different hospitals with an incidence rate of 61.7% (Gaowgzeh, 2019).

3.3 Contributing Factors for the Occurrence of LBP among Nurses

The risk factors associated with LBP have been presented in several studies, including demographic, behavioral, and workplace/employment factors. The demographic and behavioral factors linked with LBP include age, smoking status, and physical activity. Further risk factors include years of experience, professional classification, the number of patients receiving direct care, work posture, carrying of heavy items or patients, self-reported knowledge of LBP, job satisfaction, and occupational stress (Jradi et al., 2020).

Many studies found that LBP was significantly associated with age (Emmanuel et al., 2015; Samaei et al., 2017; Suliman, 2018). According to Suliman (2018), older age is linked to LBP, and incidences of it are higher in older nurses than in younger ones. The author explained that nurses are 0.8 more likely to experience LBP for each additional year of age. By advanced age, the spine will be degenerative, leading to increased stress over the spinal cord. Another study revealed that the risk of developing LBP will increase with aging (Skela-Savič et al., 2017). Moreover, the prevalence of LBP is statistically significant among nurses aged 30–39 years (Dlungwane et al., 2018).

One study found that age was positively associated with chronic LBP; with each passing year, the risk of chronic back pain will increase by 8% (Sanjoy et al., 2017).

The aging process is generally associated with decreased muscle strength and physical capability, which can cause pain as an outcome of MSD. With advanced age, the individual will suffer from muscle tension and muscle atrophy, accompanied by muscle weakness that eventually contributes to pain in old age (Samaei et al., 2017).

Younger age was found to be a significant predictor of LBP among nurse professionals. One study demonstrated a meaningful relation between nurses who are younger than thirty years old and the prevalence rate of LBP (Qareeballa et al., 2018). Another study showed that younger nurses aged between 20 and 30 years had the highest LBP, whereas older nurses aged between 51 and 60 years had the lowest LBP (Gim, 2017). Additionally, 75% of nurses in the age distribution of 21–25 years suffered from LBP (Nair, 2020). Age was shown to have no influence and was not significantly associated with the prevalence of LBP among nurses in at least one study (Abolfotouh et al., 2015).

Many studies have indicated that gender and incidences of LBP are related. In a study published in 2017, significant correlations between gender and LBP were found, and mostly women were affected (87.7%). The relationship among gender and frequency of LBP may be attributed to physiological, anatomical, and structural variations between both genders. These differences may explain the higher prevalence of LBP among women compared to men (Samaei et al., 2017).

Another study confirmed the above, finding that the female gender is associated with a high prevalence of LBP. Female nurses showed significantly higher incidences of LBP relative to male nurses, and they faced more than twice the risk of LBP compared to male nurses. Because of the effect of female hormones, degenerative changes occur rapidly (Suliman, 2018). Additionally, the study showed that the prevalence of LBP among women was statistically significant (Dlungwane et al., 2018). However, Abolfotouh et al. (2015) found that sex was not a significant predictor of LBP prevalence.

Nationality has been found to be highly associated with the prevalence of LBP. Qareeballa et al. (2018) found nationality to be a factor that helped increase the risk of developing LBP, with a majority of Bahraini nurses suffering from LBP compared to other nationalities. No other studies were found that addressed nationality as a factor.

Marital status was not associated with LBP in several studies (Abolfotouh et al., 2015; Boughattas et al., 2017; Samaei et al., 2017). Samaei et al. (2017) found no significant relation between prevalence of LBP and education level as a demographic variable.

The number of pregnancies and that of dependent children were reported as risk factors that significantly contributed to LBP. Frequent pregnancies are a risk factor for the flare-up of LBP and may be due to either pregnancy itself or the number of dependent children (Boughattas et al., 2017). Parity was shown to be positively correlated with chronic LBP, suggesting that nurses with children are 4.07 times more likely to experience intense back pain in their lifetimes compared to the nurses who do not have children (Sanjoy et al., 2017). Another study reported that nurses with 1–3 children have LBP (Gim, 2017).

The literature contains conflicting results regarding the association between BMI and LBP. Several studies found that high BMI was a factor significantly associated with LBP incidences (Boughattas et al., 2017; Samaei et al., 2017;

Suliman, 2018). Excess abdominal weight puts pressure on the backbone, resulting in chronic spasms in the lower back area (Samaei et al., 2017). In contrast, one study reported no links between obesity and LBP (Abolfotouh et al., 2015).

Positive medical history, like musculoskeletal or rheumatological disorders, are a significant factor causing LBP among nurses (Qareeballa et al., 2018). Additionally, incidences of LBP among nurses who have arthritis are substantially higher than among those who do not, with nurses who have arthritis 3.4 times more likely to suffer from LBP (Abolfotouh et al., 2015). The history of spinal arthritis is closely related to the genesis of LBP in female nurses (Boughattas et al., 2017). Suliman (2018) revealed that chronic conditions, such as diabetes or hypertension, are not significantly associated with LBP prevalence.

Smoking has been cited in the literature as having negative consequences for the circulatory system. Cigarette nicotine causes vasoconstriction, which decreases blood flow to the muscles and intervertebral discs. This predisposes smokers to low back injuries. Increased coughing by smokers is linked with increased risk in this category of low back injuries (Gim, 2017). However, several studies found no relationship between smoking and LBP (Abolfotouh et al., 2015; Boughattas et al., 2017; Gim, 2017; Suliman, 2018).

The unique nature of the job is perhaps the major cause for a higher incidence of LBP among nurses. It has been argued that the type of ward in which nurses work can lead to high LBP prevalence rates. Therefore, nurses must be rotated in their workplace to provide a balanced level of physical (Emmanuel et al., 2015).

Nurses working in intensive care units (ICUs), medicine, and orthopedics have more LBP in comparison with nurses in other wards because the nurses in these wards care for people who are normally bedridden and helpless and thus need more support with handling and transfers (Nair, 2020).

Another study found that nurses who worked in obstetrics and gynecology (O&G) reported a higher prevalence of LBP compared with nurses who worked in medical wards, orthopedics and surgery, and ICUs. Further, the association between LBP and working in O&G, orthopedics, and surgery was found to be statistically significant (Dlungwane et al., 2018). A similar study found the highest prevalence of LBP among nurses from O&G departments, including delivery room nurses. This may be due to the fact that in O&G departments, incidences are high among women and only female nurses (midwives) work there. It may also be related to the amount of work pressure in these departments (Gaowgzeh, 2019).

Nurses working in surgical wards were found to have higher annual LBP prevalence in comparison to those working in medical wards, which may be because there are more dependent patients in surgical units who require a higher physical workload. With increased manual patient transfer tasks, the risk of LBP can rise to 75% (Thon et al., 2016).

Working in the operating room (OR) presents its own risk of developing LBP due to additional risk factors, including prolonged standing and awkward postures during operations. In a study aiming to determine the risk factors for LBP specific to OR nurses, the data analysis revealed a significant association between LBP and incorrect body mechanics, surgical unit work, stressful working environments, assistance in the positioning of patients for surgery, assistance in the transfer of patients, the strenuous nature of work, and fatigue (Jeyakumar & Segaran, 2018).

Operating room nurses typically carry out certain activities that are associated significantly with increasing the risk of developing LBP. These may involve carrying heavy items above the waist, shifting patients to a trolley or table, repositioning patients, pulling a patient up the bed, and turning the body while bearing some weight. According to the Association for Advancement of Medical Instrumentation (AAMI) standards, an instrument set must not weigh more than 5.4 kg. Action should be taken to debulk sets. Trays that carry instruments can be replaced by lighter material. Besides, proper transport equipment must be provided to prevent lifting of heavy objects above waist level (Jeyakumar & Segaran, 2018).

In a study conducted among nurses working at ICUs, the results showed that working experience at the current ward and overall years of nursing experience were associated with LBP. Findings from this study indicated that nurses working in the ICU and the high dependency unit (HDU) were more likely to experience back pain than other units. Most patients in both ICUs and HDUs are typically dependent and weak and require more support from nurses for their everyday activities and transition compared to those in other units. Furthermore, nurses in ICUs with 2–4 years of working experience face the highest risk of back pain and require treatment. Although most hospitals allow patients' families to remain in the ward to help and take care of the patients, not all of them do (Gim, 2017).

Heavy physical activity by nurses such as manual lifting of patients makes nurses more vulnerable to LBP, increasing their absence from work and leading to early retirement because of ill health (Gaowgzeh, 2019). The American Nurses Association (ANA) stated that the carrying of patients is linked to LBP (Nair, 2020).

The frequent lifting of objects and patients has been found to be significantly associated with LBP. The majority of nurses reportedly lift patients and objects; around half of nurses lift patients five or more times during one shift. High workload and poor working environments may require nurses to carry out such tasks, thus putting them at risk for LBP development (Jradi et al., 2020). Moreover, a study conducted in Malaysia found that LBP was significantly associated with manual handling of patients in wards. The author noted that, in Malaysia, many nurses are still required to manually lift patients from one place or take them from one position to another by using small aids such as sliding sheets. Such repetitive work exposes them to injuries, particularly in the lumbar region. Such injuries are caused by kinetic imbalance, and more pressure applied to this region through repeated load lifting can lead to cumulative fatigue and a reduction in nurses' stress-bearing capacity (Ibrahim et al., 2019). One study found that nurses who do manual lifting in their daily jobs consider it an occupational factor associated with LBP (Sanjoy et al., 2017).

Nursing experience or length of employment is considered an important predictor of LBP among nurse professionals. One study revealed that LBP risk is positively correlated with total years in the current position and respondent's length of employment (Skela-Savič et al., 2017). Another study showed a significant correlation between the prevalence of LBP and the subject's work experience. Nurses with LBP also had more work experience (Samaei et al., 2017). Years of working experience was significantly associated with the risk of developing LBP (Thon et al., 2016).

Another study showed that nursing experience was the only professional factor associated with LBP. The results indicated that LBP prevalence was more common in nurses with more work experience than those with less experience. This relationship can be explained by the fact that nurses are exposed to more events involving inappropriate use of the back mechanism and accumulated back stress with more years of practice. Nurses must be trained on how to make effective use of their body mechanisms and how to maintain an optimal workload (Suliman, 2018).

A study found that LBP experience was higher among nurses who had been in the profession for 21 to 30 years, suggesting that increased occupational exposure contributes to the development of LBP in nurses (Dlungwane et al., 2018). A similar study revealed that nursing experience was positively associated with LBP, and that nurses with more than 20 years of experience reported the highest LBP, whereas nurses with less than one year of experience reported the lowest LBP (Gim, 2017).

In contrast, another study observed that length of employment of less than five years makes back pain conditions more likely than length of employment of five years or more. Workers with a comparatively lower period of service may typically lack awareness and skills about safety procedures and hazard control mechanisms, making them prone to injuries and accidents at the workplace (Mekonnen, 2019).

Working long hours, handling extreme workloads, taking inadequate breaks, standing up for long periods, working in the wrong posture, disturbing sleeping and eating habits because of shifts are among the work-related risk factors that can lead to LBP among nurses. One study revealed that bending and twisting, lifting patients, and standing for long periods is statistically significant (Nair, 2020).

LBP was reported to increase in parallel with the increase in working hours, and this result was linked with the decrease in rest time (Gaowgzeh, 2019). Nurses who work more than seven hours per day have been significantly associated with LBP. Because of repeated exposure to excessive work, such as lifting of heavy objects, injuries are caused to the lower back area. Besides, sometimes, nurses are required to work extra hours to cover their colleagues who are on emergency leave or when there is less manpower (Ibrahim et al., 2019). A similar study indicated that nurses with 12-hour shifts had a significantly higher prevalence rate of LBP than those with a shift time of just 8 hours (Abolfotouh et al., 2015).

Lack of supporting staff had a meaningful relation with LBP. Nurses in a department with a shortage of supporting staff are 2.74 times more likely to have chronic back pain compared to nurses with adequate supporting staff. In a hospital, a shortage of staff can increase the occurrence of manual handling per nurse as well as overtime work, resulting in an increased risk of LBP. Therefore, it is crucial to increase nursing staff by taking the nurse-to-patient ratio into account (Sanjoy et al., 2017).

4. CONCLUSION

This review found that a number of nurses in hospitals around the world are suffering from lower back pain with a variety of risk factors contributed to increasing LBP prevalence. Proper protective measures need to be developed. Enough staff needs to be recruited to reduce working hours and thus decrease the workload. Moreover, Work organizations need to consider adopting prophylactic strategies, including adequately implementing lifting devices, and appropriate education and training of staff about correct patient handling techniques, and safe ergonomics. This, in turn, would improve the quality of patient care by keeping health staff active and productive during their career.

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