ERGONOMIC PRACTICES AND THEIR IMPACT ON LOW BACK PAIN AMONG NURSES IN A TERTIARY INSTITUTION IN EKITI STATE.

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Abstract
This study examines the ergonomic practices to mitigate low back pain among nurses in Ekiti State. A cross-sectional survey was conducted among 196 nurses working in a tertiary institution in Ekiti State, Nigeria, to assess the prevalence of low back pain and the extent to which nurses employ ergonomic practices to prevent it. The survey revealed that more than half of the respondents practice key ergonomic principles, with 53.5% keeping their back straight while pushing, 47.4% calling for assistance when lifting, and 50% rolling patients instead of lifting. However, nearly half (48.5%) reported experiencing work-related low back pain, with varying durations and impacts on job performance. The study also found that incorrect postures, frequent patient lifting, and prolonged standing were the perceived causes of low back pain. In conclusion, the study highlights the importance of ergonomic practices in reducing low back pain among nurses. While a significant number of nurses adhere to ergonomic practices, there is still a notable prevalence of low back pain, impacting their health and job. The findings suggest that enhancing ergonomic education is crucial in the prevention of low back pain among nurses. We need more research to assess the long-term effects of these ergonomic principles and their cost-effectiveness in enhancing nurses' health and productivity.

Keywords: back pain, ergonomics, practices, effects, Nurses

Introduction

Low back pain (LBP) is a highly prevalent occupational-related hazard among nurses, owing to the physical demands of their job (Serra, et al., 2019). The nature of nursing work, which often involves lifting heavy loads, working in awkward postures (Liu, et al., 2023), and transferring patients, puts nurses at high risk for work-related musculoskeletal disorders, especially low back pain (Jegnie & Afework, 2021). In fact, nursing ranks among the top ten professions with a significant risk of low back pain. (Kasa, et al., 2020). The prevalence cut across different healthcare settings and regions across the globe, the highest rates has been observed in the West African region because of excess workload and high physical demands of nursing job exacerbated by scarcity of resources and infrastructures, high patient-to-nurse ratio, limited access to equipment and technology (Kasa, et al., 2020; Fatoye, et al, 2023). All these make nurses commonly engage in manual labour and heavy lifting, manual handling of patients, awkward postures, and repetitive movements, which are significant risk factors for developing LBP.

The nursing profession is significantly impacted by the prevalence of low back pain which has far-reaching consequences for patient care, healthcare systems, and nurses themselves. Pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage,

(International Association for the Study of Pain (IASP) 2021). The quality of care a nurse can provide could be highly compromised by low back pain, reducing productivity (Skela-Savic, Pesjak, & Hvalic-Touzery, 2017). LBP's consequences for nurses extend beyond physical discomfort, affecting their ability to perform daily activities and job responsibilities. A tertiary care setting study found that made it difficult for nurses to climb stairs, walk, stand up, sleep, get out of bed, and wear clothes. Low back pain can profoundly affect nurses' personal lives, causing pain, fatigue, and decreased participation in activities outside of work (Abolfotouh et al. 2015).

Furthermore, LBP is a leading cause of work-related absenteeism among nurses (Serra, et al. 2019). This not only affects the individual nurse but also places additional strain on their colleagues and the healthcare system. Also, LBP may make it difficult for sufferers to perform physically demanding tasks such as lifting or moving patients, compromising patient care. The stress and physical demands associated with LBP can lead some nurses to contemplate leaving the profession altogether, which can exacerbate the nursing shortage, especially at this crucial time when Nigeria's healthcare sector, particularly nursing, has experienced a substantial loss of skilled and experienced personnel due to emigration and affect healthcare delivery job performance, and absenteeism at work (Liu, et al., 2023). The challenge of low back pain is enormous for the nurses.

Keeping back straight while pushing objects is a fundamental ergonomic practice. By keeping the back straight, the nurses are able to align their spine properly, which reduces the strain on the back muscles and ligaments. Also, calling for assistance when lifting not only prevents back injuries but also promotes teamwork and safety culture in the workplace.

Rolling patients instead of lifting is a technique that minimizes the risk of injury to both the patient and the caregiver. Lifting heavy objects from a squatting position helps in engaging the legs and core muscles, which are stronger than the back muscles, thereby protecting the lower back. While maintaining an ideal spinal position while standing is crucial for minimizing back stress, especially during prolonged periods of standing. Also, keeping an ideal body weight, is important because excess weight, particularly around the midsection, can put additional pressure on the back and lead to pain (Heuel, Otto, & Wollesen, 2023). All these practices reflect a good understanding of ergonomics and highlight the importance of proactive measures in preventing low back pain. It is also worth noting that continuous education and training on proper body mechanics are essential for sustaining these practices and further reducing the incidence of work-related back injuries.

Statement of the Problem

Nurses in Nigeria face increasing work demands due to the mass departure of nurses seeking better opportunities abroad. The limited available nurses are burdened with excessive workloads. Despite the physically demanding nature of nursing, Nigerian nurses often perform manual tasks due to resource scarcity, high patient-to-nurse ratios, and limited access to technology. These factors contribute to their vulnerability to developing low back pain (LBP). While studies have highlighted the prevalence of LBP among nurses, there is a lack of research on preventive solutions. Understanding ergonomic principles and implementing safe patient handling programmes is crucial in addressing this issue. However, research that investigates and relates ergonomic practices to preventing low back pain is not common, making the index study pertinent. Thus, this study

examines the relationship between ergonomic practices and incidents of LBP among nurses

Research Questions

Three research questions were raised to guide the study. They are as follows:

1. To what extent do the nurses engage in back ergonomics?
2. What is the rate of low back pain among nurses in Ekiti State?
3. What are the common effects of low back pain on nurses' job?

Research Hypothesis

One hypothesis guides this study:

1. There is no significant difference in the incidence of low back pain between nurses with high and nurses with low ergonomics practice scores among Nurses in Ekiti State.

Research Methods

The study utilized a descriptive cross-sectional approach to evaluate the relationship between ergonomic principles and their impacts on the incidents of low back pain among nurses in Ekiti State. The study was conducted among 196 nurses at Ekiti State University Teaching Hospital (EKSUTH), Ado-Ekiti. A purposive sampling technique was used to select EKSUTH as the study center, being the only state teaching hospital in Ekiti State and having the largest population of nurses among other health institutions in the state. The 300 nurses working in EKSUTH represent the study population, while 196 randomly selected across five departments were the study sample. After obtaining the informed consent from the selected participants, a self-structured questionnaire was administered to them to collect data, the questionnaire consisted of three sections. The first section collected demographic information, the second section collected information on the practice of ergonomic principles at work among the nurses, and the third section collected information on nurses' experiences with low back pain. Data was collected by the researcher and one trained research assistant. Collected data were coded and analyzed using SPSS version 23.

RESULTS

Introduction

This section presents the results of the study, which aimed to investigate the relationship between practice of ergonomic principles and experience of low back pain among nurses.

Descriptive statistics

The mean age of 29.9 ± 1.0 years with majority 122 (62.2) between the ages of 19–29. More than half of them 126 (64,3%) were females and 70 (35.7%) were males, giving a male-to-female ratio of 1.59:1. Five units of the hospital were represented in the study; 55 (28.1%) nurses work in the surgical ward, 72 (36.7%) work in the medical ward, 17 (8.7%) nurses work in the emergency unit, 28 (14.3%) from the maternity while the remaining 24 (12.2%) work in the children's ward. Also, regarding the cadre, of the respondents, more than half of the nurses were in low cadre with 73 (37. 2%) Nursing Officer 11 (NO11) and 36 (18.4%) Nursing Officer 1 (NO1) while only 9 (7.2%) were either Chief Nursing Officers (CNOs) or Assistant Director of Nursing Services (ADNS). The respondents Socio-Demographic data are shown in Table 1 below.

Table 1: Socio-Demographic Profile of the Respondents

Items	F	%
Age range		
19-29	122	62.2
30-39	37	18.9
40-49	21	10.7
50-59	16	8.2
Sex		
Male	70	35.7
Female	126	64.3
Wards/ units		
Surgical	55	28.1
Medical	72	36.7
Emergency	17	8.7
Maternity	28	14.3
Children	24	12.2
Highest educational level		
Basic nursing	97	49.5
Degree	78	39.8
Post graduate	21	10.7
Cadre		
Nursing officer 11	73	37.2
Nursing officer 1	36	18.4
Senior nursing officer	48	24.5
Assistant chief nursing officer	25	12.7
Chief nursing officer	9	4.6
Assistant Director	5	2.6

Extent of Ergonomic Principles Practices among Nurses in Ekiti State

Seven multiple-choice questions with three options were asked to ascertain the practice of ergonomic principles for back pain prevention among nurses. 1 point was assigned to the correct answer and 0 points to the incorrect answer. In all, 698 points were scored out of 1372. Meaning (51%) of nurses practice ergonomic principles at work.

On practices that prevent low back pain at work, a little above half of the respondents, 115 (53.5%) indicated that they keep their back straight while pushing objects as a way of preventing low back pain. 93 (47.4%) indicated that they call for assistance when work requires lifting; 98 (50%) claimed to roll patients from side to side instead of lifting, and 90 (45.9%) lift heavy objects from a squatting position. Another 111 (56.6%) maintain correct position of the spine while standing, 83 (42.3%) do frequent changing of position during prolonged standing, and 106 (55.1%) maintain ideal weight. This is further explained in Table 2.

Table 2: Practice of Back Ergonomics

Practice of ergonomics principles by nurses	Frequency	Percentage
Keeping back straight while pushing objects	115	53.5
Call for assistance when work requires lifting	93	47.4
Roll patients from side to side instead of lifting	98	50.0
Lifting heavy objects from a squatting position	90	45.9
Maintaining the correct position of the spine while standing	111	56.6
Frequent changing of position during prolonged standing	83	42.3
Maintaining ideal weight	108	55.1
Total	698	51%

Incidents of Low Back Pain among Nurses

In this study, more than three-quarters of nurses 165 (84.2%) have experienced work-related low back pain before, with 95 (48.5%) nurses currently suffering from back pain, among which 60 (63.2%) have pain for less than six weeks, 21 (22.1%) have the pain for about 6-12 months and the remaining 14 (14.7%) have chronic pain for over 12 months. The pain was considered mild by 49 (51.6%), while 36 (37.9%) described their pains as moderate and the remaining 10 (10.5%) nurses indicated that they were having severe LBP. On perceived causes of the pain, 29 (30.5%) perceived the pain to be caused by wrong postures while working, 54 (56.8%) ascribed it to frequent lifting of patients, and 12 (12.6%) indicated prolonged standing as the cause. The results are further presented in Table 3.

Table 3: Experience with Low Back Pain among Nurses

Items	Frequency	percentage
Ever suffer from work-related low back pain?		
Yes	165	84.2
No	31	15.8
Currently suffering low back pain?		
Yes	95	48.5
No	101	51.5
Duration of the pain		
less than six months	60	63.2
six to twelve months	21	22.1
over 12 months	14	14.7
The severity of the pain		
Mild	49	51.6
Moderate	36	37.9
Severe	10	10.5
Perceived causes of low back pain		
Wrong postures while working	29	30.5
Frequent lifting of patients	54	56.8
Prolonged standing	12	12.6

Common Effects of Low Back Pain on Nurses' Job Performance

The result revealed that low back pain hinders 89 (93.7%) out of 95 nurses who currently suffer low back pains to provide adequate care for their patients, with 66 (69.5%) indicating that low back pain was responsible for a high rate of their absence from duty. Another 76 (80%) nurses claimed that they lose money on pain medication, while the other 24 (25.3%) nurses claimed that because of low back pain, they waste a lot of time in physiotherapy clinics. Also, 3 (3.2%) of the nurses have been admitted and treated with tractions at one time or the other, which was also part of time loss. The summary of this finding is shown in Table 4 below:

Table 4: Common Effects of Low Back Pain on Nurses' Job Performance

Difficulty in providing adequate care for patients	89	93.7
High rate of absence from duty	66	69.5
Losing money to pain-relieving medications	76	80.0
Waste time in the Physiotherapy clinic for exercise	24	25,3
Admitted for traction	3	3.2

The result of the t-test showed that the t-cal is 42.312, and the p-value is .000 at 0.05 level of significance which implies that there is a significant difference in the incidence of low back pain based on ergonomic practice scores which implies that nurses who practice ergonomic principles are less likely to develop low back pain. Thus, the null hypothesis is rejected. This is shown in Table 5 below:

Table 5: Difference in Incidence of Low Back Pain based on Ergonomics Practice Scores

Ergonomic practice score	Incidence of low back pain	Absence of Low back pain	SD	Df	t-cal	P value
High	23	78	.501	195	42.312	.000
Low	80	15	3.585			

*p < 0.05

Table 5 revealed that nurses who scored high at the practice of ergonomic principles are less likely to develop low back pain. The calculated t-value was 42.312 and the corresponding p-value was 0.00. Since the p-value is < 0.05 level of significance, the null hypothesis was rejected, which implies that there is a significant difference in the incidence of low back pain among nurses based on the ergonomics practice score.

Discussion of Findings

The study aimed to investigate the experience of nurses with low back pain and the practices of ergonomic principles as preventive strategies. The data of the survey showed that more than three-quarters of nurses (84.2%) have experienced work-related low back pain at one time or another, and almost half of the nurses (48.5%) experienced work-related low back pain at a chronic level. This is significant, considering that low back pain (LBP) is one of the most common musculoskeletal disorders among nurses. This finding is consistent with the findings of many researchers (Liu, et al., 2023; Jegnie & Afework, 2021; Kasa, et al., 2020), and it is an indication of the fact that low back pain is very common among nurses.

Another finding of this study revealed that most nurses were aware of the causes of their LBP; more than half (56.8%), attributed LBP to frequent lifting of patients, wrong postures at work was identified as the cause of LBP by over thirty percent, other (12.6%) nurses were identified prolonged standing as main contributors to LBP. These activities are inherent to nursing and highlight the need for ergonomic interventions and proper training in body mechanics. This finding is also supported by the finding of Liu, et al., (2023), who found that nurses are aware of the causes of low back pain but are not really doing much to prevent it. The study further revealed that the practice of ergonomic principles among nurses in Ekiti State is at a moderate level as not up to half of the study sample have a good ergonomic practice score, such as keeping back straight while pushing objects or patients, calling for assistance when work requires lifting, rolling patients from side to side instead of lifting, carrying heavy objects from a squatting position, maintaining the correct position of the spine while standing, and maintaining an ideal weight as much as possible. All these practices reflect a good understanding of ergonomics and highlight the importance of proactive measures in preventing low back pain. It is also worth noting that continuous education and training on proper body mechanics are essential for sustaining these practices and further reducing the incidence of work-related back injuries. This finding is similar to the finding of Roman-Liu, et al., (2020), who found that the nurses have very low ability

to prevent low back pain despite their good attitude towards the prevention. The findings could be due to lack of knowledge of ergonomic principles among the nurses or could be as a result of work overload, which provides no time to engage in practices that could prevent low back pain among the nurses. The findings suggest that enhancing the knowledge of ergonomics may be very necessary to reduce the prevalence of low back pain among nurses.

The study further revealed the impacts of low back pain on job performance among the nurses in Ekiti State. The fact that 93.7% of nurses who reported suffering LBP indicate that the pains hindered their job performance underscores the significant impact of this condition on healthcare delivery. LBP can lead to decreased productivity and increased absenteeism, which can strain healthcare systems, especially in areas with nursing shortages. While nearly three-quarter of nurses with low back pain (69.5%) are frequently excused from duty, to rest as indicated in this study, the work load increases for the remaining nurses on duty and this can impact the health of other nurses and the already weak health system as a whole.

In conclusion, the experiences of low back pain among nurses not only affect their personal health but also have broader implications for healthcare systems. Preventive measures, workplace ergonomics, and effective pain management protocols are essential to address this pervasive issue. Further research could explore the long-term outcomes of these interventions and their cost-effectiveness in improving nurses' health and productivity.

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