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Ergonomic Hazards Among Non-Healthcare Workers In Tertiary Hospitals In Rivers State

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ABSTRACT
This study assessed the ergonomic hazards among non-health care workers in tertiary hospitals in Rivers State employing a cross-sectional study design. Data for the study was obtained from a sample size of 656 non-healthcare workers in tertiary hospitals in Rivers State with a total population of 1811 non-healthcare workers in the tertiary hospitals in Rivers State using two-sampling procedure. A validated self-structured questionnaire titled "Ergonomic Hazards Questionnaire (EHQ)" with a reliability index of 0.60 was used for data collection. The data collected was analyzed using the Statistical Package for Social Sciences version 25 employing both descriptive and inferential statistics of Percentage, Mean, Standard Deviation, Z-test and ANOVA. The study found that the non-healthcare workers in tertiary hospitals encountered ergonomic hazards such as lower back pain, neck strain, poor posture (3.35±0.833); strain on the hands, wrists, and arms (3.16±0.916); muscle strain and fatigue (2.98±0.980); musculoskeletal injuries (3.06±0.999); visual strain (3.09±0.961) and foot pain (3.12±0.957). The study revealed that there were no significant differences in ergonomic hazards encountered by non-healthcare workers based on gender and age (P>.05) while there was a significant difference based on years of work experience (P<.05). Based on the findings of the study, it was concluded that non-healthcare workers in tertiary hospitals in Rivers State encountered various ergonomic hazards but the hazards did not significantly differ based on their gender or age. Finally, the study recommended that regular ergonomic assessments of workstations and work processes should be conducted by the hospital management board to ensure that they align with health and safety guidelines.
Keywords: Ergonomic Hazards, Non-Healthcare Workers, Tertiary Hospitals

INTRODUCTION

Ergonomic hazards are prevalent workplace risks that can adversely that impact workers' health and productivity. These hazards arise from work-related stressors such as improper workstation design, repetitive motions, prolonged postures, manual handling of materials, and inadequate tools or equipment, which can result in musculoskeletal disorders (MSDs) and other associated health issues (Punnett & Wegman, 2016). While significant attention has been paid to ergonomic concerns in clinical roles, non-healthcare workers in tertiary hospitals are equally susceptible to these risks. These workers, including administrative staff, cleaners, security personnel, and maintenance teams, play critical roles in supporting hospital operations yet often face ergonomic challenges that compromise their well-being.

Ergonomic hazards in tertiary hospital settings pose significant risks to non-healthcare workers, affecting their physical well-being and productivity. According to Jain and Rao (2017), ergonomics is the scientific study of the relationship between man and his working environment, including his tools, materials, methods, and organization of work. Onumbu (2018) defines ergonomic hazards as actual approaches to work expositions and designs that may be harmful to the worker or properties in a work or work-related area. Non-healthcare workers, such as administrative staff, maintenance personnel, and housekeeping staff, often experience ergonomic hazards due to the nature of their tasks. Administrative staff, for instance, spend prolonged periods seated at desks, frequently engaging in repetitive motions such as typing and using a computer mouse. This sedentary work, combined with poorly designed workstations, can lead to back pain, neck strain, carpal tunnel syndrome mental stress; and eye problems (Ekenedo & Jonathan, 2016). Most of these workers are also vulnerable to ergonomic hazards due to the physical demands of their jobs. These workers often perform tasks that involve lifting, bending, and carrying heavy loads, which can result in significant strain on the musculoskeletal system. Improper lifting techniques and the lack of appropriate lifting equipment further exacerbate ergonomic risks (Chireshe et al., 2023). Cleaners and maintenance personnel, on the other hand, engage in repetitive motions, heavy lifting, and awkward postures, increasing their risk of lower back pain and upper limb disorders (Chiasson et al., 2016). Security personnel frequently endure long hours of standing and exposure to suboptimal working conditions, resulting in musculoskeletal discomfort and fatigue (Piedrahita, 2016).

Additionally, the advent of digital technology in hospital administration has introduced new ergonomic risks. The increased use of computers and handheld devices has been linked to "tech neck," a condition resulting from poor posture during prolonged device usage (Xie et al., 2020). Psychosocial stressors, such as high workloads and limited control over work processes, further exacerbate physical strain and increase susceptibility to ergonomic injuries among these workers (Hassard et al., 2018). Despite the diverse nature of these hazards, a common thread is the role of inadequate workplace design and lack of ergonomic awareness in amplifying risks.

Globally, the burden of work-related musculoskeletal disorders (WRMSDs) is increasing, posing significant challenges to occupational health systems (WHO, 2019). These disorders not only reduce workers' quality of life but also impose economic costs on organizations due to lost productivity, absenteeism, and compensation claims. For instance, in Nigeria, where tertiary hospitals are pivotal in delivering specialized healthcare, non-healthcare workers frequently encounter ergonomic risks due to manual handling tasks, prolonged standing, and poorly designed workspaces (Okoye & Adebayo, 2019).

Demographic factors such as age, gender, and years of working experience can significantly influence the susceptibility to ergonomic hazards among these workers. As workers age, physiological changes such as reduced muscle strength, joint flexibility, and bone density make them more susceptible to musculoskeletal disorders (Punnett & Wegman, 2016). Older workers may also experience slower recovery rates from injuries, compounding the adverse effects of ergonomic hazards. Tasks requiring manual handling, prolonged standing, or awkward postures are more likely to result in chronic pain or injury in older individuals compared to their younger counterparts (Mahmud et al., 2018).

Gender is another crucial factor influencing susceptibility to ergonomic hazards. Biological differences, such as muscle mass, body composition, and hormonal variations, contribute to differing physical capabilities between men and women. Women are often more vulnerable to repetitive strain injuries and other MSDs due to lower upper body strength and greater joint flexibility compared to men (Oakman & Wells, 2016). In tertiary hospitals, the division of labor may further exacerbate gender-based disparities in exposure to ergonomic risks. For example, women are more likely to be employed in roles such as administrative work or cleaning, which involve repetitive tasks like typing, filing, or scrubbing surfaces. These tasks increase the likelihood of developing conditions such as carpal tunnel syndrome or tendonitis (Hignett et al., 2020).

The number of years an individual has spent in a particular job also plays a significant role in determining their susceptibility to ergonomic hazards. Prolonged exposure to high-risk tasks can lead to cumulative trauma disorders (CTDs), which develop over time due to repetitive motion or sustained awkward

postures (Straker et al., 2018). Non-healthcare workers in tertiary hospitals who have spent many years performing physically demanding tasks are more likely to experience chronic pain, reduced mobility, and other long-term health issues. Workers with extensive experience may have developed certain habits or techniques that increase their ergonomic risks. For example, a maintenance worker who has been repairing hospital equipment for decades may have adopted unsafe lifting techniques that, over time, contribute to severe lower back pain (Okoye & Adebayo, 2019).

Statement of Problem

Rivers State, located in Nigeria, is a home to several tertiary hospitals such as University of Port Harcourt Teaching Hospital and Rivers State University Teaching Hospital that serve as major healthcare hubs for the region. These hospitals provide advanced medical care and specialized services, and they play a crucial role in the health system of Rivers State. Many non-healthcare workers in these institutions are employed in low-paying roles where safety standards are often overlooked. These workers face different hazards such as ergonomic hazard, which can result in both immediate injuries and long-term health complications. Despite the growing body of literature on ergonomic hazards, several gaps remain. Most studies focus on clinical or industrial settings, with limited attention to non-healthcare workers in tertiary hospitals. None of the studies addressed the ergonomic hazards among non-healthcare workers in tertiary hospitals in Rivers State. This study addressed these gap by investigating the ergonomic hazards among non-healthcare workers in tertiary hospitals in Rivers State.

Research Questions

The following research questions were raised and answered to guide the study:

1. What are the ergonomic hazards affecting non-healthcare workers in tertiary hospitals in Rivers State?
2. What are the difference in ergonomic hazards affecting non-healthcare workers in tertiary hospitals in Rivers State based on age, gender and years of work experience?

Hypothesis

This hypothesis was postulate and tested at .05 level of significance

1. There is no significant difference in occupational hazards encountered by non-healthcare workers in tertiary hospitals in Rivers State based on gender, age and years of work experience.

METHODOLOGY

This study adopted a cross-sectional survey design. The sample size for the study was 656 non-healthcare workers drawn from the population of 1811 non-healthcare workers in tertiary hospitals in Rivers State (Opadeyi et al., 2018; Ugwu, 2023; Devex, 2023). The sample size was selected using two sampling procedure: proportionate stratified random sampling technique and purposive sampling technique.

The instrument for data collection was a self-structured questionnaire titled "Ergonomic Hazards Questionnaire (EHQ)" with a reliability index of 0.60. The instrument was composed of two sections (A and B). Section A consists of demographic variables which included gender, age and years of experience. Section B consists of items which addressed the ergonomic hazards the non-healthcare workers are exposed to. These items were structured in a 4-point likert format of "Strongly Agree, Agree, Disagree and Strongly Disagree" respectively. For ethical reasons, an introductory letter was obtained from the Head of Department and was presented to the Director of Administration of each of the tertiary hospital who approved the visiting and ensured the cooperation of the staff. The data for the study were collected through the administration of the instrument on 656 respondents drawn from the tertiary institutions. This was done by the researcher with the help of 2 research assistants.

The completed copies of the questionnaire were collated, coded and analyzed using the statistical package of social sciences (SPSS) version 25.0. Descriptive statistics of percentage was used to analyse the demographic variables, Mean and Standard deviation were used to answer the research questions, while inferential statistics of Z-test and ANOVA were used to test the hypotheses at 0.05 alpha level.

RESULTS

Table 1: Summary of Demographic Characteristics of the Respondents

Demography	Cohorts	F	%
Gender	Female	350	54.2
	Male	296	45.8
	Total	**646**	**100.0**
Age	Less than 30years	143	22.1
	30-39yrs	302	46.8
	40years and Above	201	31.1
	Total	**646**	**100.0**
Years of Working Experience	Less than 5years	200	31.0
	5-10years	229	35.4
	11years and Above	217	33.6
	Total	**646**	**100.0**

Table 1 indicated the summary of the demographic characteristics of the respondents. The result showed that majority 350(54.2%) of the non-healthcare workers were female, between the age range of 30-39 years (46.8%), representing early to mid-career stages, known for high productivity and active work engagement) and have had 5–10 years of experience (indicating mid-career familiarity with occupational hazards but potential complacency with safety).

Research Question 1: *What are the ergonomic hazards affecting non-healthcare workers in tertiary hospitals in Rivers State?*

Table 2: Mean and Standard Deviation analysis on ergonomic hazards encountered by non-healthcare workers in tertiary hospitals in Rivers State

	Ergonomic Hazards	Mean	St. D	Decision
1	Lower back pain, neck strain, poor posture, potentially resulting from repetitive movements, heavy lifting, and awkward postures.	3.35	.833	Accepted
2	Strain on the hands, wrists, and arms as a result of repeated motions, such as typing, using a mouse, or filing of documents.	3.16	.916	Accepted
3	Muscle strain and fatigue as a result of high physical and mental demands.	2.98	.980	Accepted
4	Musculoskeletal injuries linked to performing tasks in an awkward position (eg. reaching for supplies or equipment stored at high levels)	3.06	.999	Accepted
5	Visual strain as a result of poor lightening conditions	3.09	.961	Accepted
6	Foot pain linked with improper footwear	3.21	.957	Accepted
	Aggregate	**3.14**	**0.914**	**Accepted**

Table 2 showed that with an aggregate mean value of 3.14±0.914, the non-healthcare workers accepted that they do encounter ergonomic hazards in course of their work. The result revealed that the ergonomic hazards encountered by the non-healthcare workers include: lower back pain, neck strain, poor posture (3.35±0.833); strain on the hands, wrists, and arms (3.16±0.916); muscle strain and fatigue (2.98±0.980); musculoskeletal injuries (3.06±0.999); visual strain (3.09±0.961) and foot pain (3.12±0.957).

Hypothesis 1: There is no significant difference in occupational hazards encountered by non-healthcare workers in tertiary hospitals in Rivers State based on age, gender and years of work experience.

Table 3a: ANOVA analysis on difference in ergonomic hazards encountered by non-healthcare workers in tertiary hospitals in Rivers State based on age.

	Sum of Squares	df	Mean Square	F.cal	F.crit	Sig.	Decision
Between Groups	1.107	2	.554	1.396	3.01	.248	Not Significant
Within Groups	284.317	643	.397				
Total	285.424	645					

***P.val>.05: F.cal<F.crit (H_0: Accepted)**

Table 3a shows that that the calculated F-value ($F_{(2, 643)} = 1.396$) is smaller than the critical value, and the p-value is greater than the alpha level of 0.05. Consequently, the hypothesis was retained, meaning age does not significantly influence the ergonomic hazards faced by these workers.

Table 3b: Z-test analysis on difference in ergonomic hazards encountered by non-healthcare workers in tertiary hospitals in Rivers State based on gender.

		N	Mean	St. D	z-cal	z-crit	df	Sig.	Decision
Occupational Hazards	Male	350	3.09	.622	-1.853	1.960	644	.064	Not Significant
	Female	296	3.18	.636					

***P.val>.05: Z.cal<Z.crit (H_0: Accepted)**

Table 3b showed that the calculated Z-value (Z.cal = -1.853) is less than the critical Z-value (Z.crit = 1.960) and that the p-value (P.val = 0.064) is greater than the alpha level of 0.05. Hence, the hypothesis was retained. This means that there is no significant difference in ergonomic hazards encountered by non-healthcare workers in tertiary hospitals in Rivers State based on gender.

Table 3c: ANOVA analysis on difference in ergonomic hazards encountered by non-healthcare workers in tertiary hospitals in Rivers State based on years of work experience.

	Sum of Squares	df	Mean Square	F.cal	F.crit	Sig.	Decision
Between Groups	4.389	2	2.195	5.599	3.01	.004	Significant
Within Groups	281.035	643	.392				
Total	285.424	645					

***P.val<.05: F.cal>F.crit (H_0: Rejected)**

Table 3c shows that that the calculated F-value ($F_{(2, 643)} = 5.599$) is greater than the critical value, and the p-value is less than the alpha level of 0.05. Consequently, the hypothesis was rejected, and the alternative hypothesis was accepted, indicating that years of work experience significantly influence the ergonomic hazards faced by these workers.

DISCUSSION

The findings presented in Table 2 revealed that non-healthcare workers in tertiary hospitals in Rivers State experience a range of ergonomic hazards during their work, with an overall mean score of 3.14±0.914. These workers identified several specific ergonomic issues, such as lower back pain (3.35±0.833), neck strain (3.35±0.833), poor posture (3.35±0.833), and strain on hands, wrists, and arms (3.16±0.916), highlighting the prevalence of musculoskeletal disorders and physical strain in their work environment. Other reported issues include muscle strain and fatigue (2.98±0.980), musculoskeletal injuries (3.06±0.999), visual strain (3.09±0.961), and foot pain (3.12±0.957). These findings point to a widespread issue of physical strain, which is a key concern for non-healthcare workers in tertiary hospital settings.

The findings of the study corroborated the study of Doss, Amirthalingam, and Kathiresan (2023) which found that non-medical hospital staff, including administrative and maintenance personnel, were significantly affected by musculoskeletal problems. These workers reported symptoms of lower back pain, neck strain, and general muscle fatigue, which mirrors the findings in this study. Similarly, Abdullahi and Adebayo (2018) study in Zaria, Nigeria, also found a high prevalence of musculoskeletal discomfort. The study emphasized that administrative workers who spent long hours using computers were particularly at risk of developing strain in the hands, wrists, and arm issues that were also highlighted in the Rivers State study. This finding supports this study's findings that workers involved in repetitive tasks, such as typing or data entry, are prone to ergonomic hazards such as carpal tunnel syndrome and tendonitis.

Similar conducted by Akinlade and Adedeji (2017) also noted that many workers reported pain in the back and neck due to inadequate seating arrangements and prolonged periods of sitting without proper support. This coincided with the findings that ergonomic issues are a widespread concern among non-healthcare workers in hospital environments, particularly in settings where office tasks or repetitive motions are prevalent. Zhao and Wang (2015) study in China also found that non-healthcare workers, such as administrative and maintenance personnel, were vulnerable to musculoskeletal disorders. The study noted that poor workstation design and repetitive tasks were significant contributors to the physical discomfort experienced by these workers, aligning closely with the findings this study. Adewale and Olaleye (2020) study further supports the findings of this study as their study pointed out that administrative staff in hospital settings frequently experience ergonomic-related issues such as lower back pain, neck strain, and wrist discomfort, resulting from prolonged sitting or repetitive office tasks. These findings suggest that the ergonomic challenges faced by non-healthcare workers in tertiary hospitals are not unique to Rivers State but are a common issue in various Nigerian healthcare institutions.

While many studies support the findings of this present study, there are a few studies that present a different perspective on the prevalence and impact of ergonomic hazards among non-healthcare workers in hospital settings. Lee et al. (2014) study for instance, found that musculoskeletal complaints among non-healthcare hospital staff were less prevalent compared to those in more physically demanding healthcare roles, such as nurses and laboratory technicians. Their study suggested that non-healthcare workers, particularly those in administrative positions, reported fewer musculoskeletal issues, possibly due to the nature of their work, which does not require heavy lifting or physically strenuous tasks. Similarly, Saeed et al. (2016) study conducted in Pakistan also found that non-healthcare hospital workers had lower rates of musculoskeletal disorders, attributing this to the use of ergonomically designed workspaces and the implementation of workplace wellness programs.

The studies reviewed clearly show that non-healthcare workers in tertiary hospitals face a range of ergonomic that affect their health and well-being. The likely reasons for the study's findings on ergonomic hazards among non-healthcare workers in Rivers State can be attributed to a combination of poor workstation design, prolonged sitting, repetitive tasks, lack of ergonomic awareness, and insufficient workplace interventions. Addressing these factors by improving ergonomic design, offering regular breaks, providing training on proper posture, and implementing organizational policies that prioritize worker well-being could help reduce the prevalence of musculoskeletal discomfort and improve the overall health and productivity of non-healthcare staff in hospital settings.

The findings presented in Tables 3a, b, and c provide insights into the difference in ergonomic hazards affecting non-healthcare workers in the tertiary hospitals in Rivers State. The results suggest that certain factors, such as the number of years of experience, may have a significant impact on how workers perceive the risks of musculoskeletal disorders (MSDs) and other work-related injuries, while others, such as age and gender, do not show significant effects in this context.

In Table 3a, the calculated F-value ($F(2, 643) = 1.396$) is smaller than the critical value, and the p-value exceeds the alpha level of 0.05, indicating that there is no significant difference between the groups being compared with respect to the perception of ergonomic hazards. This result contrasts with existing literature, such as Punnett and Wegman (2016), who have shown that older workers are more susceptible

to ergonomic risks due to physiological changes like reduced muscle strength and joint flexibility. According to these researchers, older workers experience greater difficulty with physical tasks, making them more vulnerable to injuries like musculoskeletal disorders. However, in this study, the lack of statistical significance could suggest that age is not as significant a factor as other variables, such as work processes or environmental factors. It is possible that the workplace studied did not have age-related ergonomic risk factors that were significant enough to affect the workers' perceptions of their susceptibility to injury.

In Table 3b the Z-test results further support this observation. The calculated Z-value (-1.853) is smaller than the critical Z-value (1.960), and the p-value (0.064) exceeds the alpha level of 0.05, indicating that there is no statistically significant relationship between gender and the perceived barriers to ergonomic hazard exposure. While the literature suggests that gender differences, such as muscle mass and joint flexibility, could contribute to greater vulnerability to injuries (Oakman & Wells, 2016; Hignett et al., 2020), this study did not find a significant correlation between gender and the perception of ergonomic risk. The lack of a significant result might be due to various factors, such as the specific tasks performed by the workers in this study or the way gender differences were distributed across job roles. In other contexts, where gender-based division of labour is more pronounced such as in tasks requiring heavy lifting for men or repetitive, fine-motor work for women the perception of ergonomic hazards may indeed differ, but this was not the case in the current study.

In contrast, the results presented in Table 3c ($F(2, 643) = 5.599$) indicate that the number of years of experience has a statistically significant impact on the perception of ergonomic hazards, as the calculated F-value is greater than the critical value, and the p-value is less than 0.05. This finding is consistent with previous research that highlights the cumulative effects of prolonged exposure to high-risk tasks. Straker et al. (2018) and Okoye and Adebayo (2019) have noted that workers who have spent many years in physically demanding roles are more likely to experience chronic pain, reduced mobility, and musculoskeletal disorders. The results in this study support these findings, suggesting that workers with more years of experience may develop certain work habits or techniques that increase their risk of injury, particularly if they have been exposed to ergonomic hazards over an extended period. Additionally, experienced workers may be less inclined to participate in training programs, assuming they are already proficient in their roles, which can further increase their risk of injury. This finding underscores the importance of ongoing training and ergonomic interventions, even for long-serving employees, to mitigate the risk of musculoskeletal disorders and other chronic injuries.

CONCLUSION

Based on the findings of the study, it was concluded that non-healthcare workers in tertiary hospitals in Rivers State face ergonomic hazards such as lower back pain, neck strain, poor posture, strain on the hands, wrists and arms; muscle strain and fatigue; musculoskeletal injuries; visual strain and foot pain. These hazards do not significantly differ based on the workers gender or age.

RECOMMENDATIONS

Based on the findings of this study, it was recommended that regular ergonomic assessments of workstations and work processes should be conducted by the hospital management board to ensure that they align with health and safety guidelines.

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