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PHYSICAL AND ERGONOMIC OCCUPATIONAL HEALTH RISK AMONG SECONDARY SCHOOL TEACHERS IN RIVERS STATE, NIGERIA.

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Abstract

Every occupation has inherent risks that cannot be separated from the job, but can be managed to ensure the health and safety of the worker and increase productivity. The type, nature, and work environment determine the risk encountered. This study investigated physical and ergonomic occupational health risks encountered by secondary school teachers in Rivers State, Nigeria. Two research questions guided the study. A descriptive survey research design was adopted. The population comprised 7,425 senior secondary school teachers in Rivers State. A sample of 730 teachers was selected using a multistage sampling procedure. The instrument for data collection was a 15-item questionnaire titled Occupational Health Risks Questionnaire (OHRQ), with a reliability coefficient (0.81) obtained through the test-retest method and Pearson Product Moment Correlation. 730 copies of the questionnaire were distributed, but 713 copies were correctly filled, returned, and analysed. Mean and standard deviation were used to answer the research questions. Findings revealed that physical occupational health risks encountered by teachers included threats from students (Mean = 3.58), insults from parents and guardians (Mean = 2.55), overcrowded classrooms (Mean = 3.06), prolonged sitting (Mean = 3.26), and exposure to chalk dust (Mean = 3.09), and Ergonomic risks identified included poor posture (Mean = 2.71), mismatched tables and chairs (Mean = 2.95), prolonged sitting in staff rooms (Mean = 3.24), and the use of students' desks (Mean = 3.28). The findings imply that teachers operate in unhealthy work environments and conditions that may predispose them to musculoskeletal disorders, stress-related illnesses, absenteeism, and reduced productivity. The study concluded that senior secondary school teachers in Rivers State are significantly exposed to physical and ergonomic occupational health risks. It was recommended that the government should improve school infrastructure, provide ergonomic furniture, and implement occupational health programmes for teachers.

Keywords: Physical occupational risk, Ergonomic occupational risk, Teacher, Occupational health risk, Secondary school.



Introduction

Workers across all professions face risks that vary depending on their work environment, tools, and conditions. Risk is the probability that an adverse outcome will occur. It's the likelihood of experiencing harm when exposed to an unhealthy situation, particularly in the work environment. While risks can arise in various contexts, they are particularly prevalent in workplaces where employees are exposed to different types of hazards during their professional duties. Although the terms "risk" and "hazard" are sometimes used interchangeably, they are not the same. According to Isabel (2016), risk is the combination of the likelihood of a hazardous event or exposure occurring and the potential severity of the injury or ill health that may result from that event or exposure. Similarly, the Canadian Centre for Occupational Health and Safety (CCOHS, 2023) defines risk as the probability that a person will be harmed or experience adverse health effects if they are exposed to a hazard. In essence, risk can be understood as the likelihood of harm, particularly to an individual's health, resulting from exposure to various hazards. It encompasses the chances of accidents, diseases, injuries, or work-related health issues affecting workers due to unsafe working environments, conditions, or behaviour.

Recognizing and addressing risks is crucial, particularly in the workplace, as they can lead to health issues such as musculoskeletal disorders (Centers for Disease Control, CDC, 2024). A healthy work environment improves workers' occupational health and boosts productivity. Occupational health focuses on the health and safety of employees, ensuring their well-being concerning



workplace hazards. The International Labour Organization (ILO) (2021) describes occupational health as a field dedicated to promoting workers' wellness. While it is often said that "health is wealth," the reality can be different for some employers and employees, due to the prevalence of and exposure to different risks in the workplace. Occupational health risks are the likelihood of harm to a person's health arising from their occupation (Owie and Apanga 2016). This includes any activity, material, process, or situation that may lead to an accident, injury, or disease in the workplace. It can be referred to as the potential for adverse health outcomes due to exposure to an unhealthy work environment, which can negatively impact workers' health.

Various types of hazards—such as physical, biological, chemical, ergonomic, and psychological, predominant in the workplace, are prerequisite to exposure to different occupational risks, which can result in health issues, such as injuries, diseases, infections, vision impairment, body pain, and respiratory disorders, among others.

The exposure to occupational health risks can lead to both acute and chronic health effects (Danna and Griffin, 2020) and negatively affect the concentration and productivity of workers. CCOHS (2023) identifies numerous physical factors that pose occupational health risks in modern workplaces, including heat, cold, noise pollution, poor hygiene, moisture, radiation, vibration, and electric shock. Workers can be indirectly affected by these factors, leading to various negative outcomes on their health. The Australian Government's Comcare (2019) emphasizes that any environmental factor posing harm to workers is considered a physical occupational risk, which can lead to significant health issues.



Physical occupational risks can manifest in various forms, such as deviant temperature levels, inadequate indoor air quality, and excessive noise. These conditions can lead to injuries, illnesses, or even fatalities. Additionally, physical occupational health risks involve exposure to unsafe work conditions that threaten the health of workers, even without direct contact.

Furthermore, workers are exposed to ergonomic risks due to an awkward position involved in their jobs. The design of work processes to align with workers' health needs (Danna and Griffin, 2020), plays an important role in occupational health. CCOHS (2023) elaborated that ergonomics focuses on designing jobs, equipment, and workplaces to align with the capabilities of workers, thus reducing the likelihood of injuries. The Australian Government Comcare (2019) describes ergonomic risk factors as attributes of the workplace that can harm employees, particularly regarding their musculoskeletal health. For instance; repetitive movements, improper workstation designs, prolonged sitting or standing, and tasks performed at awkward angles (Safety Education, 2025). The World Health Organization (WHO) (2022) underscores continuous exposure to a hazardous work environment can lead to occupational illnesses, which align with the International Labour Organization's standards for worker protection, yet millions still experience adverse conditions in their workplace (ILO, 2021).

Moreover, workers such as teachers experience a disproportionately high rate of mental health problems due to exposure to significant risks, including stress and occupational burnout (Benevene et al., 2020). Other contributing factors include work overload, insufficient teaching materials, lack of professional recognition, inadequate salary, unsupportive parents, and non-teaching tasks. The teaching profession is often marked by constant occupational risks, including overcrowded



classrooms and increased work intensity, which affect not only teachers but also learners (Organisation for Economic Co-operation and Development (OECD), 2020). These occupational health risks can threaten the well-being of teachers due to their regular exposure in the work environment, potentially leading to numerous adverse health effects.

Teachers are particularly vulnerable, as highlighted by Johnson et al. (2020), who noted that they may suffer from ailments such as cervical spondylitis, joint pain, dermatitis, and back pain due to exposure to physical risks in their workplaces. Besides, physical violence and threats from students represent alarming risks that teachers must navigate (McMahon et al, 2022). Teachers are thus confronted with a myriad of physical threats, from verbal abuse and assault to environmental hazards like overcrowded classrooms and poor educational facilities.

In Nigeria, many workers face significant health risks, which in turn affect their well-being. Eguvbe et al. (2017) noted that employees in small and medium-sized enterprises often encounter more health hazards. It's therefore crucial for employers to ensure a healthy work environment for workers, particularly in small and medium-sized enterprises, in line with the Occupational Health and Safety Legislation, which mandates employers to maintain safe working environments.

Secondary school teachers face unique challenges in the teaching profession, for instance, overcrowded classrooms, verbal abuses, assault, inadequate work equipment and facilities (Johnson et al., 2020). Likewise, teachers experience voice disorders, further illustrating the health challenges present in the teaching profession (Cantor, Cutiva, and Burdorf 2019), and also frequently exposed to risks, which hinders their effectiveness in the job. Arop et al. (2018) asserted that effective management of risk in the school environment is crucial for teachers' performance.



In Rivers State, challenges such as large class sizes and inadequate facilities significantly impact the health and well-being of teachers, which in turn leads to absenteeism, presenteeism, and poor student performance. Therefore, this study investigated the physical and ergonomic occupational health risk among secondary school teachers in Rivers State.

Statement of the Problem

Among government establishments of high reputation, the education sector holds a unique responsibility: it teaches and trains other professionals, serving as the foundation for all other professions. Despite this critical role, the needs and well-being of teachers, especially at the secondary school level, have received insufficient attention.

Secondary school teachers face numerous risks, including noise pollution, inadequate work materials, physical assault, overcrowded classrooms, and poorly maintained facilities. In Rivers State, particularly in the context of free education, it has been observed that teachers are further burdened by excessively large class sizes, substandard educational facilities, unsatisfactory work environments, mismatched furniture, and limited space for classrooms and staff rooms. On this premise, the study explored the physical and ergonomic occupational health risks among secondary school teachers in Rivers State.

Research Questions

The following research questions were formulated to guide the study:

- 1) What are the physical occupational health risks encountered by secondary school teachers in Rivers State?
- 2) What are the ergonomic occupational health risks affecting secondary school teachers in Rivers State?



Ergonomic risks can lead to serious conditions such as carpal tunnel syndrome and lower back pain, affecting teachers who frequently engage in bending, standing, or lifting during their duties.

American Federation of Teachers (AFT, 2016) revealed that teachers are at risk for developing musculoskeletal disorders due to consistent exposure to ergonomic risks. AFT highlighted that inadequate school furniture and poor environmental conditions can exacerbate these risks, placing teachers at further risk for injuries. This is compounded by the physical demands of teaching, where long hours and awkward postures can lead to chronic discomfort and pain.

To mitigate ergonomic risks, it is essential for schools to design work processes and environments that cater to teachers' capabilities. As reiterated by various studies, such adjustments could significantly reduce the physical toll on educators, fostering a healthier work environment that supports their well-being.

In conclusion, both physical and ergonomic occupational health risks present substantial challenges for secondary school teachers. Addressing these issues through improved workplace design, awareness, and safety measures is essential to ensure that educators can perform their critical roles without compromising their health.

Methodology

This study employed a descriptive survey design, which is aimed at systematically collecting and describing the characteristics, features, and facts about a given population. Hence, it is considered appropriate for this study.

The population for this study comprised of all teachers in public secondary schools in Rivers State. According to the Planning and Statistics Department of the Rivers State Senior Secondary Schools



Board (RSSSSB, 2018), there are a total of 7,425 teachers across 268 schools, including 3,854 male teachers and 3,571 female teachers. A sample size of 730 teachers, representing 20% of the total teachers' population, was used.

The instrument for data collection was a 15-item closed-ended questionnaire, which comprised sections A and B. Section A contained respondents' personal data, while section B raised items for the variables of the study.

The face and content validity of the instrument was established by experts from the Department of Health Promotion, Environmental, and Safety Education. The reliability of the instrument was assessed using the test-retest method, and a reliability coefficient of 0.81 was established.

Seven hundred and thirty (730) copies of the questionnaire were administered, but seven hundred and thirteen (713) were properly filled out and retrieved. The retrieved copies of the questionnaire were analyzed using mean and standard deviation to answer the research questions.

RESULTS

Table 1: Frequency and Percentage Distribution of Respondents' Demographics

Variable	Frequency	Percentage
Gender		
Male	269	38
Female	444	62
Total	713	100
Years of Experience		
1-6	37	5
7-12	133	19



13-18	133	19
19-24	108	15
25-30	136	19
31-35	166	23
Age		
20-29	20	3
30-39	303	42
40-49	304	43
50 and above	86	12
Total	713	100

Table 1 showed that there were more female respondents with a frequency of 444 (62%) than male respondents with a frequency of 269 (38%).

Years of work experience showed that most respondents have between 31-35 years of experience, with a frequency of 166 (23%), while the lowest responses came from those with 1-6 years of experience, with a frequency of 37 (5%).

The age distribution showed that most of the respondents were in the age bracket 40-49 with a frequency of 304 (43%), and the lowest responses were from within the age 20-29 with a frequency of 20 (3%).

Research Question 1: What are the physical occupational health risks encountered by secondary school teachers in Rivers State?

**Table 2: Mean and Standard Deviation Analysis on Physical Occupational Health Risks Encountered by Secondary School Teachers.****Decision Rule:****Mean ≥ 2.50 = Agreed****Mean < 2.50 = Disagreed**

S/N	Items	RESPONSE				Mean($\bar{x}$)	SD	Remark
		SA	A	D	SD			
N = 713								
1.	Teachers are regularly exposed to physical threats from students in the school.	461	213	29	10	3.58	± 0.64	Agreed
2.	Teachers are insulted by parents and guardians.	122	204	331	56	2.55	± 0.86	Agreed
3.	Teachers are exposed to overcrowded classes.	200	374	124	15	3.06	± 0.73	Agreed
4.	Teachers spend more hours standing during school hours.	32	123	405	153	2.05	± 0.75	Disagreed
5.	Teachers sit for longer hours during school hours.	282	354	59	18	3.26	± 0.71	Agreed
6.	Teachers are regularly exposed to chalk dust.	157	478	66	12	3.09	± 0.61	Agreed
7.	Teachers are exposed to excessive noise in the school.	14	224	376	99	2.21	± 0.70	Disagreed
8.	Teachers sit along corridors and under trees in the school to prepare note of lesson.	28	87	379	219	1.89	± 0.76	Disagreed
Grand Mean						2.71	± 0.72	

Table 2 showed that the mean scores ranged between 1.89 and 3.58. The mean scores for items 1, 2, 3, 5 and 6 are 3.58, 2.55, 3.06, 3.26 and 3.09 respectively, which fall above the criterion mean of 2.50, which is the benchmark for positive responses. It therefore means that items 1, 2, 3, 5 and 6 are physical occupational health risks encountered by secondary school teachers in Rivers State.



Research Question 2: What are the ergonomic occupational health risks affecting secondary school teachers in Rivers State?

Table 3: Mean and Standard Deviation Analysis of Ergonomic Occupational Health Risks Encountered by Secondary School Teachers

Decision Rule:

Mean ≥ 2.50 = Agreed

Mean < 2.50 = Disagreed

S/N	Items	RESPONSE				Mean ($\bar{x}$)	$\pm$ SD	Remark
		SA	A	D	SD			
		N = 713						
9	Teachers are exposed to bad posture in the staffroom.	87	345	265	16	2.71	$\pm .71$	Agreed
10	Teachers use mismatch table and chairs in the staffroom.	109	465	129	8	2.95	$\pm .61$	Agreed
11	Teachers are exposed to prolonged sitting in the staffroom.	233	421	59	0	3.24	$\pm .59$	Agreed
12	Teachers use chalk board too high to write in the class.	59	145	398	111	2.21	$\pm .80$	Disagreed
13	Teachers use students' desks to sit in the staffroom.	266	391	49	7	3.28	$\pm .63$	Agreed
14	Teachers are exposed to prolonged standing in the classroom.	65	177	390	81	2.32	$\pm .79$	Disagreed
15	Teachers are mandated to teach subjects not related to the areas of their specialization	11	168	395	139	2.07	$\pm .70$	Disagreed
Grand Mean						2.68	$\pm .69$	

Table 3 revealed that the mean scores ranged between 2.07 and 3.28. The mean scores for items 9, 10, 11 and 13 are 2.71, 2.95, 3.24 and 3.28 respectively, and greater than the criterion mean of 2.50, which is the benchmark mean score for positive responses. Thus, items 9, 10, 11 and 13 are ergonomic occupational health risks affecting secondary school teachers in Rivers State.

Based on the responses, the findings of the study can be summarized as follows:



1. The physical occupational health risks encountered by secondary school teachers include threats from students, insults from parents and guardians, overcrowded classrooms, prolonged sitting for hours during school, and exposure to chalk dust. However, standing for longer periods during school hours, being exposed to excessive noise, and sitting in corridors to prepare lesson notes are not considered physical occupational health risks for secondary school teachers in Rivers State.
2. The ergonomic occupational health risks affecting secondary school teachers in Rivers State include poor posture in the staffroom, the use of mismatched tables and chairs, prolonged sitting in the staffroom, and the use of student desks. In contrast, using a chalkboard that is too high, standing for long periods in the classroom, and teaching subjects outside one's area of specialization are not classified as ergonomic occupational health risks for secondary school teachers in Rivers State.

Discussion of Findings

The study revealed that secondary school teachers in Rivers State are exposed to various physical occupational health risks, resulting in a significant prevalence of health issues among them. This finding corroborates the work of Johnson et al. (2020), who highlighted that teachers experience voice problems and physical symptoms such as cervical spondylitis, dryness of hands, and back and joint pains due to exposure to workplace hazards. Similarly, Nirashnee (2015) found that teachers face challenges including overcrowded classrooms, inadequate space, and a lack of teaching aids. Moreover, McMahon et al. (2020) pointed out that secondary school teachers are at risk of experiencing workplace violence from students. These findings are not surprising, as secondary school teachers in Rivers State frequently encounter overcrowded and noisy classrooms, unruly student behavior, and verbal abuse. These issues may be attributed to weak leadership and



poor management within the schools, a lack of infrastructural development, and unhealthy behaviors among the teachers.

Principals and vice principals are trained primarily in teaching and lack the necessary leadership and management skills. There is often no clear vision for improving the school; decisions are made without input from teachers and students, and there is a lack of parental and guardian participation in school activities. Leadership positions are frequently viewed as opportunities for personal gain, rather than as roles that should focus on enhancing school activities and improving overall conditions. Additionally, political interference in the appointment of principals, based on factors other than competence, may lead to a lack of teamwork and inconsistent rules for both staff and students. Consequently, teachers may become disengaged, exhibit a lack of academic interest, and witness increased social vices and indiscipline among students.

Furthermore, dilapidated infrastructure and insufficient classrooms contribute to overcrowded and noisy environments, as well as inadequate sanitary, water, electricity, and laboratory facilities, which expose teachers to unhealthy work conditions. The free education system in Rivers State has led to overpopulation and over-dependence on the government for every need of the school, with little or no contribution from the Parent-Teacher Association (PTA). Inadequate funding, mismanagement, poor maintenance culture, and a lack of accountability and partnership may further contribute to a poor work environment and reduced productivity. The sedentary behavior of teachers may also increase the likelihood of musculoskeletal disorders. The implications of these conditions may include burnout, absenteeism, and truancy among teachers, which could stem from health complaints arising from exposure to physical occupational health risks. Ultimately, this may negatively affect students' academic development and lead to poor academic



performance, thereby impacting the education sector as a whole. The finding that secondary school teachers in Rivers State are exposed to ergonomic occupational health risks is worrisome; teachers deserve a conducive environment for effective teaching and learning activities. This result aligns with Mark's (2014) study, which found that teachers and researchers experience various health problems due to inadequate furniture and instructional aids, as well as challenging physical and social environments. Additionally, the National Education Union (NEU, 2018) suggested that teachers regularly contend with awkward postures that lead to back pain, knee problems, shoulder pain, and swelling in the feet and legs. The anticipated results stem from the reality that many schools lack suitable staff room furniture, with inadequate work equipment and poor work design hindering teachers from effectively performing their duties. Teachers often struggle to adapt to the available teaching tools and work designs, particularly in overcrowded classrooms, where they may stand for hours while teaching and writing on chalkboards that are too low or too high. Prolonged sitting in a bent posture without adequate desk support also contributes to ergonomic risks. As a result, musculoskeletal pain, absenteeism, and reduced performance due to fatigue and discomfort negatively affect both the quality of teaching and student academic performance. Finally, work-related musculoskeletal disorders (WMSDs) represent a primary manifestation of physical and ergonomic risk, arising from awkward postures, poor work design and process, and other work-related stressors.

Based on these findings, it is evident that secondary school teachers in Rivers State are exposed to both physical and ergonomic risks in their profession. This situation is not unique to teaching, as no occupation is free from associated risks. However, teachers should be proactive about their well-being and take protective measures to reduce their exposure to health risks. According to



the Swiss cheese model proposed by James Reason (1990), while protective measures exist between sources of danger and potential outcomes, flaws can occur within each measure, indicating that no system is entirely devoid of risks. This model applies to teaching, where teachers face workplace risks. There are mitigations that, if practiced or properly applied, can minimize exposure to risks and adverse outcomes; however, neglecting these measures will inevitably increase the likelihood of harm.

Conclusion

Based on the findings, the study concluded that secondary school teachers in Rivers State are exposed to significant physical and ergonomic occupational health risks. These risks include exposure to student threats, overcrowded classrooms, chalk dust, poor postural conditions, and inadequate workplace furniture. These risks may adversely affect teachers' physical health, job satisfaction, productivity, and service delivery. Addressing these risks requires collaborative intervention from government agencies, school administrators, and occupational health professionals.

Recommendations

Based on the findings of this study, we recommend the following actions:

1. Establish a disciplinary policy in secondary schools to effectively address and manage the behavior of both students and their parents or guardians.
2. Improve : educational facilities in public secondary schools to foster a more conducive learning environment.
3. Offer regular training for teachers on proactive measures aimed at enhancing their health and well-being.



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