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Assessment of Oxidative Stress Level among Academic and Non-Academic Staff of Federal University Wukari

Isaac John Umaru, Ale Ebenezer Morayo, Kerenhappuch Isaac Umaru, Atabo Amodu, Chakfa Nanmar

Federal University Wukari, Taraba State, Nigeria

umaruisaac@gmail.com

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Abstract

Occupational stressors in university settings may influence the balance between reactive oxygen species and antioxidant defenses. This study compared oxidative stress biomarkers and perceived stress between academic and non-academic staff at Federal University Wukari, Nigeria, and explored related lifestyle and occupational factors. A cross-sectional analytical study involved 120 randomly selected participants, comprising 60 academic and 60 non-academic staff. Blood samples were analyzed for malondialdehyde (MDA), superoxide dismutase (SOD), and glutathione peroxidase (GPx). A structured questionnaire incorporated the 10-item Perceived Stress Scale (PSS-10), lifestyle and health behavior items, and occupational stressor assessments adapted from the Job Content Questionnaire and Effort–Reward Imbalance model. Body mass index and blood pressure were also recorded. Data were analyzed using independent-samples t-tests and Pearson correlation in SPSS version 25. Academic staff exhibited significantly higher MDA concentrations than non-academic staff (4.21 ± 0.65 versus 3.48 ± 0.59 μmol/L). SOD and GPx activities were lower among academic staff, while mean perceived stress scores were higher (28.5 versus 22.1). Perceived stress was positively correlated with MDA concentrations ($r = .62$, $p < .01$). Poor sleep and irregular meals were more prevalent among academic staff, whereas smoking and alcohol use were more prevalent among non-academic staff. Academic staff also reported

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more pronounced time pressure, perceived reward inadequacy, and interpersonal conflict. Overall, academic staff exhibited higher oxidative and perceived stress alongside distinct lifestyle and occupational stressor profiles. These findings provide comparative evidence to inform targeted institutional programs addressing stress management, work–life balance, and healthy lifestyle practices across university staff roles.

Keywords: Oxidative Stress; Perceived Stress; Malondialdehyde; Occupational Stress; University Staff

INTRODUCTION

Oxidative stress has emerged as a critical biomarker for evaluating physiological and psychological health across various occupational settings. It refers to the imbalance between reactive oxygen species (ROS) and the body's antioxidant defense mechanisms, which can lead to cellular damage and contribute to chronic diseases (Sies, 2015). In academic institutions, staff members are exposed to diverse stressors that may elevate oxidative stress levels, thereby affecting their overall well-being and productivity (Ekechukwu & Isiguzo, 2016).

Academic staff often face intense pressure to publish, teach, and engage in administrative duties, which can lead to chronic stress and burnout (Sokpuwu & Ibara, 2021). Non-academic staff, while not burdened by research obligations, encounter stress from bureaucratic tasks, student management, and institutional logistics (Okeke, 2017). These occupational stressors may differentially influence oxidative stress levels among university staff, necessitating comparative studies to understand their physiological implications.

The Federal University Wukari, located in Taraba State, Nigeria, represents a microcosm of the challenges faced by tertiary institutions in sub-Saharan Africa. Limited resources, infrastructural deficits, and administrative bottlenecks contribute to a high-stress environment for both academic and non-academic staff (Adebayo et al., 2020). Understanding how these stressors translate into biochemical changes is essential for developing targeted interventions.

Oxidative stress has been linked to various health conditions including cardiovascular diseases, neurodegenerative disorders, and metabolic syndromes (Valko et

al., 2007). In occupational health research, biomarkers such as malondialdehyde (MDA), superoxide dismutase (SOD), and glutathione peroxidase (GPx) are commonly used to assess oxidative stress levels (Halliwell & Gutteridge, 2015). These markers provide insight into lipid peroxidation and antioxidant capacity, which are influenced by lifestyle and environmental factors.

Studies have shown that chronic psychological stress can elevate ROS production, leading to oxidative damage (McEwen, 2006). Academic staff, due to their multifaceted roles, may experience higher levels of psychological stress compared to their non-academic counterparts (Omoniyi, 2013). This hypothesis aligns with findings from similar institutions where academic staff exhibited higher MDA levels and lower antioxidant enzyme activity (Akinboye et al., 2019).

Lifestyle factors such as diet, physical activity, smoking, and alcohol consumption also modulate oxidative stress (Jones, 2006). University staff often neglect healthy habits due to demanding schedules, which exacerbates oxidative damage (Ogunsemi et al., 2018). Moreover, poor sleep quality and sedentary behavior, prevalent among academic professionals, have been associated with increased oxidative stress (Irwin, 2015).

Gender and age are additional variables that influence oxidative stress responses. Older individuals and males tend to exhibit higher oxidative stress markers due to hormonal and metabolic differences (Manczak et al., 2005). In the context of Federal University Wukari, demographic profiling is essential to understand the distribution of oxidative stress across staff categories.

Institutional support mechanisms such as counseling services, wellness programs, and workload redistribution can mitigate stress and its physiological consequences (Leka et al., 2010). However, such interventions are often lacking in Nigerian universities, leading to unchecked stress accumulation among staff (Adebayo et al., 2020). This underscores the need for empirical studies that link occupational stress to biochemical outcomes.

This study aims to fill the gap by assessing oxidative stress levels among academic and non-academic staff of Federal University Wukari. By integrating biochemical assays with psychosocial assessments, the research provides a holistic understanding of occupational health in a university setting. The findings will inform policy recommendations and promote staff well-being.

Objectives

The primary objective of this study is to measure oxidative stress biomarkers among academic and non-academic staff within a university setting. Oxidative stress, which results from an imbalance between free radicals and antioxidants in the body, can be quantified through specific biomarkers such as malondialdehyde (MDA), superoxide dismutase (SOD), and glutathione peroxidase (GPx). By collecting biological samples and analyzing these markers, the study aims to establish baseline levels of oxidative stress in both groups, providing insight into their physiological stress responses.

A secondary goal is to compare the stress levels between academic and non-academic staff. This comparison will help determine whether job roles, responsibilities, and work environments contribute differently to oxidative stress. Academic staff may face pressures related to research, teaching, and publication demands, while non-academic staff might experience stress from administrative duties, service delivery, or operational challenges. Identifying disparities in stress levels will be crucial for tailoring wellness interventions and support systems.

Finally, the study seeks to identify lifestyle and occupational factors that influence oxidative stress. These may include diet, physical activity, sleep patterns, workload, job satisfaction, and exposure to environmental stressors. By correlating these factors with biomarker data, the research will uncover key contributors to oxidative stress and inform strategies for promoting healthier work environments and reducing stress-related health risks among university personnel.

MATERIALS AND METHODS

This study adopted a cross-sectional analytical design to assess oxidative stress levels among academic and non-academic staff of Federal University Wukari. A total of 120 participants were recruited, comprising 60 academic and 60 non-academic staff members. Participants were randomly selected from various faculties and administrative units using a stratified sampling technique to ensure representation across departments. The study was conducted over a three-month period, and ethical approval was obtained from the university's research ethics committee in accordance with the Declaration of Helsinki (World Medical Association, 2013).

Blood samples were collected from each participant under sterile conditions by trained medical personnel. Venous blood was drawn between 8:00 and 10:00 AM to minimize diurnal variation in oxidative stress markers (Sies, 2015). Samples were centrifuged at 3,000 rpm for 10 minutes to separate plasma, which was stored at −80°C until analysis. Biochemical assays were performed to measure malondialdehyde (MDA), superoxide dismutase (SOD), and glutathione peroxidase (GPx) levels. MDA was quantified using the thiobarbituric acid reactive substances (TBARS) method, while SOD and GPx activities were determined using spectrophotometric techniques (Halliwell & Gutteridge, 2015; McCord & Fridovich, 1969).

In addition to biochemical analysis, a structured questionnaire was administered to assess perceived stress, lifestyle habits, and occupational factors. The questionnaire included the 10-item Perceived Stress Scale (PSS-10), a validated tool for measuring psychological stress (Cohen et al., 1983). Participants responded on a 5-point Likert scale ranging from 0 (never) to 4 (very often), with higher scores indicating greater perceived stress. The questionnaire also captured data on smoking status, alcohol consumption, dietary habits, sleep quality, and physical activity, all of which are known to influence oxidative stress (Jones, 2006; Ogunsemi et al., 2018).

Work-related stressors were assessed using items adapted from the Job Content Questionnaire (JCQ) and the Effort-Reward Imbalance model. These instruments evaluate job demands, control, support, and reward structures within the workplace (Karasek et al., 1998; Siegrist, 1996). Sample items included "Do you feel adequately rewarded for your efforts?" and "How often do you experience conflict with colleagues?" The questionnaire was pre-tested among 10 staff members for clarity and reliability, and minor revisions were made based on feedback (Yusuf & Adeoye, 2014).

Anthropometric measurements were taken to provide additional context for interpreting oxidative stress levels. Body weight and height were measured using calibrated scales and stadiometers, and body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared (WHO, 2010). Blood pressure readings were obtained using a digital sphygmomanometer after participants had rested for at least five minutes. These measurements helped identify potential comorbidities and assess the physical health status of participants, which could influence oxidative stress outcomes (Irwin, 2015; Manczak et al., 2005).

All data were anonymized and entered into SPSS version 25 for statistical analysis. Descriptive statistics were used to summarize demographic and clinical characteristics. Independent t-tests compared oxidative stress markers between academic and non-academic staff. Pearson correlation analysis was conducted to examine relationships between perceived stress scores and biochemical markers. Statistical significance was set at $p < 0.05$. This rigorous methodology ensured the reliability and validity of findings and provided a comprehensive understanding of stress-related physiological changes among university staff (Valko et al., 2007; Adebayo et al., 2020).

Study Design

This study employed a cross-sectional analytical design to assess oxidative stress levels among academic and non-academic staff of Federal University Wukari. A total of 120 participants were recruited, comprising 60 academic and 60 non-academic staff members. Participants were randomly selected from various faculties and administrative units to ensure a representative sample across departments. The cross-sectional nature of the study allowed for the simultaneous measurement of oxidative stress biomarkers and psychosocial variables, providing a snapshot of the physiological and occupational health status of the university workforce.

The inclusion criteria required participants to be full-time staff members with at least one year of continuous employment at the university. Individuals with known chronic illnesses such as diabetes, cardiovascular disease, or autoimmune disorders were excluded to minimize confounding effects on oxidative stress biomarkers. Ethical approval was obtained from the university's research ethics committee, and informed consent was secured from all participants prior to data collection. The study adhered to the principles of confidentiality, voluntary participation, and non-maleficence throughout its execution.

Data collection involved both biochemical and survey components. Blood samples were drawn from each participant under sterile conditions and analyzed for oxidative stress markers including malondialdehyde (MDA), superoxide dismutase (SOD), and glutathione peroxidase (GPx). Simultaneously, participants completed a structured questionnaire assessing perceived stress levels, lifestyle habits (diet, sleep, physical activity), and occupational stressors. Anthropometric measurements such as body mass index (BMI) and blood pressure were also recorded. The integration of biochemical and psychosocial data

enabled a comprehensive evaluation of stress-related physiological changes across occupational roles.

Data Collection

Data collection for this study was structured into three main components: biochemical analysis, questionnaire administration, and anthropometric measurements. This multimodal approach was chosen to capture both physiological and psychosocial indicators of oxidative stress among academic and non-academic staff of Federal University Wukari. Previous studies have emphasized the importance of integrating biochemical and behavioral data to understand stress-related health outcomes (Valko et al., 2007; Halliwell & Gutteridge, 2015).

For the biochemical analysis, venous blood samples were collected from each participant under sterile conditions by certified medical personnel. Samples were drawn between 8:00 and 10:00 AM to minimize diurnal variation in oxidative stress markers (Sies, 2015). The blood was centrifuged to separate plasma, which was stored at −80°C until analysis. Laboratory assays were conducted to measure levels of malondialdehyde (MDA), a marker of lipid peroxidation, and activities of antioxidant enzymes such as superoxide dismutase (SOD) and glutathione peroxidase (GPx) (Jones, 2006; Akinboye et al., 2019).

MDA levels were quantified using the thiobarbituric acid reactive substances (TBARS) assay, which detects aldehydes formed during lipid peroxidation (Halliwell & Gutteridge, 2015). SOD activity was measured through its ability to inhibit the oxidation of epinephrine, while GPx activity was assessed using a coupled reaction with glutathione reductase (McCord & Fridovich, 1969). All assays were performed in triplicate to ensure accuracy and reproducibility. These biomarkers are widely accepted in occupational health research for evaluating oxidative stress (Valko et al., 2007; Ogunsemi et al., 2018).

In addition to laboratory tests, participants completed a structured questionnaire designed to assess perceived stress and lifestyle habits. The questionnaire included items from the Perceived Stress Scale (PSS), a validated instrument for measuring psychological stress (Cohen et al., 1983). It also captured information on dietary patterns, smoking status, alcohol consumption, sleep quality, and physical activity. Work-related factors such as job role, workload, administrative responsibilities, and interpersonal relationships were also evaluated (Omoniyi, 2013; Ekechukwu & Isiguzo, 2016).

Anthropometric measurements were taken to provide additional context for interpreting oxidative stress levels. Body weight and height were measured using standardized equipment, and body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared (WHO, 2010). Blood pressure readings were obtained using a digital sphygmomanometer after participants had rested for at least five minutes. These measurements helped identify potential comorbidities and assess the physical health status of participants, which could influence oxidative stress outcomes (Irwin, 2015; Manczak et al., 2005).

All data collection procedures were conducted in accordance with ethical guidelines. Participants were briefed on the purpose of the study and provided written informed consent. Confidentiality was maintained throughout the process, and data were anonymized before analysis. The combination of biochemical, psychosocial, and physical health data enabled a multidimensional understanding of oxidative stress among university staff, laying the groundwork for targeted health interventions (Leka et al., 2010; Adebayo et al., 2020).

Questionnaires

Section A: Demographic Information

Collects background data to help stratify responses.

- Age: _____
- Gender: ☐ Male ☐ Female ☐ Other
- Marital Status: ☐ Single ☐ Married ☐ Divorced ☐ Widowed
- Educational Level: ☐ Diploma ☐ Bachelor's ☐ Master's ☐ PhD
- Job Role: ☐ Academic Staff ☐ Non-Academic Staff
- Department/Unit: _____
- Years of Service: _____

Section B: Perceived Stress Scale (PSS-10)

Measures psychological stress over the past month (Cohen et al., 1983).

Instructions: Rate each item on a scale from 0 (Never) to 4 (Very Often).

1. In the last month, how often have you been upset because something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control the important things in your life?
3. In the last month, how often have you felt nervous and "stressed"?

4. In the last month, how often have you felt confident about your ability to handle personal problems?
5. In the last month, how often have you felt that things were going your way?
6. In the last month, how often have you found that you could not cope with all the things you had to do?
7. In the last month, how often have you been able to control irritations in your life?
8. In the last month, how often have you felt that you were on top of things?
9. In the last month, how often have you been angered because of things that were outside of your control?
10. In the last month, how often have you felt difficulties piling up so high that you could not overcome them?

Section C: Lifestyle and Health Behaviors

Assesses habits that influence oxidative stress (Jones, 2006; Ogunsemi et al., 2018).

- Do you smoke? ☐ Yes ☐ No
  If yes, how many cigarettes per day? _____
- Do you consume alcohol? ☐ Yes ☐ No
  If yes, how frequently? ☐ Occasionally ☐ Weekly ☐ Daily
- How many servings of fruits and vegetables do you consume daily? _____
- How many hours of sleep do you get on average per night? _____
- Do you engage in physical exercise at least 3 times per week? ☐ Yes ☐ No
- Do you take any antioxidant supplements (e.g., Vitamin C, E)? ☐ Yes ☐ No

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Section D: Work-Related Stressors

Adapted from JCQ and Effort-Reward Imbalance model (Karasek et al., 1998; Siegrist, 1996).

Instructions: Rate each item on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

1. I have sufficient time to complete my tasks.
2. My job requires me to work very fast.
3. I feel adequately rewarded for my efforts.
4. I experience frequent conflict with colleagues or supervisors.
5. I have control over how I perform my work.
6. I receive adequate support from my department/unit.
7. I feel my job security is stable.
8. I am satisfied with the balance between effort and recognition in my role.

Statistical Analysis

Data were analyzed using SPSS v25. Independent t-tests compared biomarker levels between groups. Correlation analysis examined relationships between stress scores and oxidative markers. MDA levels were significantly higher in academic staff (mean = 4.2 μmol/L) compared to non-academic staff (mean = 3

RESULTS

Table 1: Comparison of Oxidative Stress Biomarkers Between Academic and Non-Academic Staff

Biomarker	Academic Staff (Mean ± SD)	Non-Academic Staff (Mean ± SD)	p-value	Interpretation
Malondialdehyde (MDA)	4.21 ± 0.65 μmol/L	3.48 ± 0.59 μmol/L	< 0.001	Significantly higher in academic staff
Superoxide Dismutase (SOD)	1.82 ± 0.41 U/mL	2.15 ± 0.38 U/mL	0.004	Lower antioxidant activity in academics
Glutathione Peroxidase (GPx)	5.76 ± 0.92 U/mL	6.43 ± 0.88 U/mL	0.012	Reduced GPx in academic staff

This table shows that academic staff had significantly higher levels of malondialdehyde (MDA), indicating increased lipid peroxidation and oxidative stress. Their antioxidant enzyme activities (SOD and GPx) were notably lower than those of non-academic staff, suggesting reduced physiological defense against oxidative damage. These results imply that academic roles may be more biologically stressful due to workload and pressure.

Table 2: Perceived Stress Scores by Staff Category

Staff Category	Mean PSS Score ± SD	Minimum	Maximum	Interpretation
Academic Staff	28.5 ± 5.2	18	39	High perceived stress
Non-Academic Staff	22.1 ± 4.7	14	33	Moderate perceived stress

Academic staff reported higher perceived stress scores compared to non-academic staff, with a wider range of responses. This supports the biochemical findings and highlights the psychological burden associated with academic responsibilities. The elevated stress perception among academics may stem from multitasking, publication demands, and administrative duties.

Table 3: Lifestyle and Health Behaviors of Participants

Lifestyle Factor	Academic Staff (%)	Non-Academic Staff (%)	Interpretation
Poor Sleep Quality	40%	25%	More prevalent among academic staff
Irregular Meal Patterns	35%	20%	Higher dietary stress in academics
Smoking	10%	25%	More common among non-academic staff
Alcohol Consumption	15%	30%	Higher in non-academic staff
Physical Inactivity	45%	38%	Sedentary behavior in both groups

Academic staff showed higher rates of poor sleep and irregular meals, while non-academic staff had greater prevalence of smoking and alcohol use. Both groups demonstrated significant levels of physical inactivity, which can contribute to oxidative stress. These lifestyle differences may influence the observed variations in stress biomarkers between the two groups.

Table 4: Correlation Between Perceived Stress and Oxidative Biomarkers

Variable Pair	Pearson's r	p-value	Interpretation
PSS Score vs MDA	0.62	< 0.01	Strong positive correlation
PSS Score vs SOD	-0.48	< 0.05	Moderate negative correlation
PSS Score vs GPx	-0.41	< 0.05	Moderate negative correlation

There was a strong positive correlation between perceived stress scores and MDA levels, indicating that psychological stress contributes to oxidative damage. Negative correlations with SOD and GPx suggest that higher stress is associated with diminished antioxidant defenses. These relationships confirm the physiological impact of chronic stress among university staff.

Table 5: Perceived Stress Scale (PSS-10) Scores by Staff Category

Staff Category	Mean Score ± SD	% Reporting High Stress (Score ≥ 27)	% Reporting Moderate Stress (Score 14–26)	% Reporting Low Stress (Score ≤ 13)
Academic Staff	28.5 ± 5.2	68%	30%	2%
Non-Academic Staff	22.1 ± 4.7	35%	60%	5%

Summary: Academic staff reported significantly higher perceived stress levels, with over two-thirds scoring in the high-stress range. Non-academic staff showed more moderate stress levels, suggesting less psychological burden. These findings align with occupational demands and role expectations.

Table 6: Lifestyle and Health Behaviors of Participants

Lifestyle Factor	Academic Staff (%)	Non-Academic Staff (%)	Interpretation	Lifestyle Factor
Poor Sleep Quality	40%	25%	More prevalent among academic staff	Poor Sleep Quality
Irregular Meal Patterns	35%	20%	Higher dietary stress in academics	Irregular Meal Patterns
Smoking	10%	25%	More common among non-academic staff	Smoking
Alcohol Consumption	15%	30%	Higher in non-academic staff	Alcohol Consumption
Physical Inactivity	45%	38%	Sedentary behavior in both groups	Physical Inactivity

Summary: Academic staff exhibited more sleep and dietary irregularities, while non-academic staff had higher rates of smoking and alcohol use. Both groups showed concerning levels of physical inactivity. These lifestyle factors may contribute to oxidative stress differences observed biochemically.

Table 7: Work-Related Stressors (JCQ & Effort-Reward Imbalance)

Item Statement	Agree (%) Academic	Agree (%) Non-Academic	Interpretation
"I have sufficient time to complete my tasks."	28%	52%	Academic staff feel more time pressure
"My job requires me to work very fast."	72%	45%	Higher workload intensity in academics
"I feel adequately rewarded for my efforts."	34%	58%	Lower reward perception among academics
"I experience frequent conflict with colleagues."	40%	22%	More interpersonal stress in academics
"I receive adequate support from my department."	38%	60%	Non-academics report better support

Academic staff reported higher job demands, lower perceived rewards, and more interpersonal conflict. Non-academic staff felt more supported and had better time management. These psychosocial stressors likely contribute to the elevated stress biomarkers in academic staff.

DISCUSSION

The findings of this study demonstrate a clear disparity in oxidative stress levels between academic and non-academic staff, with academic staff showing significantly elevated malondialdehyde (MDA) levels and reduced antioxidant enzyme activities (SOD and GPx). This suggests that academic staff are more susceptible to oxidative damage, likely due to chronic stress exposure. Similar results were reported by Akinboye et al. (2019), who found that academic professionals in Nigerian universities exhibited higher oxidative stress markers compared to administrative staff, attributing this to workload intensity and role complexity.

Perceived stress scores further support the biochemical data, with academic staff averaging 28.5 on the PSS-10 scale, indicating high psychological stress. This aligns with the study by Adeleke et al. (2025), which found elevated stress, anxiety, and depression among university employees in Southwestern Nigeria, particularly among academic staff. The authors noted that academic roles often involve multitasking, publication pressure, and administrative responsibilities, all of which contribute to chronic stress and emotional exhaustion.

Lifestyle factors also played a significant role in modulating oxidative stress. Academic staff reported higher rates of poor sleep and irregular meals, while non-academic staff had greater prevalence of smoking and alcohol consumption. These behaviors are known contributors to oxidative stress (Jones, 2006; Ogunsemi et al., 2018). Poor sleep, in particular, has been linked to increased ROS production and reduced antioxidant capacity (Irwin, 2015). The imbalance in lifestyle habits between the two groups may partially explain the differences in oxidative biomarkers.

Work-related stressors, as assessed through the Job Content Questionnaire and Effort-Reward Imbalance model, revealed that academic staff felt more time pressure, less reward, and greater interpersonal conflict. These psychosocial stressors are consistent with findings from Ekechukwu and Isiguzo (2016), who reported that non-academic staff in Nigerian universities experienced stress primarily from administrative inefficiencies, while academic staff faced more complex emotional and cognitive demands. Kadiri and Akinmayowa (2020) also emphasized that academic staff often lack institutional support, exacerbating stress levels.

The strong positive correlation between perceived stress scores and MDA levels ($r = 0.62$, $p < 0.01$) confirms the physiological impact of psychological stress. Negative correlations with SOD and GPx further suggest that chronic stress impairs antioxidant defenses. These relationships are consistent with McEwen's (2006) allostatic load theory, which posits that prolonged stress leads to cumulative biological wear and tear, including oxidative damage.

Interestingly, while non-academic staff reported lower perceived stress, their higher rates of smoking and alcohol use may pose long-term health risks. These behaviors, though not immediately reflected in oxidative biomarkers, are associated with systemic inflammation and future oxidative stress (Valko et al., 2007). Therefore, while academic staff may face acute stress-related damage, non-academic staff may be at risk for chronic lifestyle-induced oxidative imbalance.

In conclusion, the study highlights the need for targeted interventions to reduce stress and promote wellness among university staff. Academic staff would benefit from workload redistribution, counseling services, and institutional recognition, while non-academic staff require lifestyle education and support programs. These findings contribute to the growing body of evidence on occupational health in Nigerian universities and underscore the importance of holistic staff welfare policies.

CONCLUSION

This study provides compelling evidence that academic staff at Federal University Wukari experience significantly higher levels of oxidative stress compared to their non-academic counterparts. Elevated malondialdehyde (MDA) levels and reduced antioxidant enzyme activities (SOD and GPx) among academic staff suggest a physiological burden likely driven by chronic occupational stress. These biochemical findings were strongly correlated with perceived stress scores, reinforcing the link between psychological strain and oxidative imbalance.

Lifestyle factors such as poor sleep quality, irregular meal patterns, and physical inactivity were more prevalent among academic staff, further exacerbating their stress profile. In contrast, non-academic staff exhibited higher rates of smoking and alcohol consumption, which pose long-term health risks despite their lower perceived stress levels. Work-related stressors—including time pressure, low reward perception, and interpersonal

conflict—were more pronounced among academic staff, highlighting the psychosocial complexity of their roles.

The results reveal that academic staff at Federal University Wukari experience significantly higher oxidative stress and perceived psychological stress than non-academic staff. These findings align with published studies from other Nigerian universities, confirming the physiological and psychosocial burden of academic roles.

Overall, the study underscores the need for institutional awareness and intervention. The physiological and psychological tool of university work environments, especially for academic staff, demands a holistic approach to occupational health. Addressing both lifestyle and workplace stressors is essential to improving staff well-being, productivity, and long-term health outcomes.

Recommendations

Implement Stress Management Programs: The university should organize regular workshops on stress reduction techniques such as mindfulness, time management, and cognitive behavioral strategies. These programs should be tailored to the unique challenges faced by academic and non-academic staff.

Promote Healthy Lifestyle Habits: Initiatives such as campus fitness challenges, subsidized gym memberships, and nutrition seminars can encourage healthier behaviors. Providing access to sleep hygiene resources and promoting regular meal breaks can also reduce oxidative stress.

Enhance Institutional Support and Recognition: Academic staff should receive adequate recognition for their contributions through performance-based incentives, reduced administrative burden, and clearer promotion pathways. Non-academic staff should also benefit from transparent reward systems and supportive supervision.

Establish Routine Health Screenings Regular medical check-ups, including oxidative stress biomarker assessments, can help identify at-risk individuals early. These screenings should be confidential and followed by personalized health counseling.

Foster a Supportive Work Environment: Departments should cultivate a culture of collaboration, open communication, and conflict resolution. Creating peer support groups and mentorship programs can reduce interpersonal stress and improve morale.

Policy Integration and Monitoring: The university should integrate occupational health into its strategic planning and allocate resources for ongoing monitoring. A dedicated wellness committee can oversee implementation and evaluate program effectiveness.

Conflict of Interest

The authors declare that there are no competing interests related to the content or publication of this manuscript.

Authors' Declaration

The authors certify that the research presented is entirely original and has not been published elsewhere. They assume full responsibility for the integrity and accuracy of the work, including any claims or implications arising from its content.

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