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Effect of Aerobic Exercises on Job Performance, Mental Health and Sleep Quality among Interns in Nigerian Tertiary Health Institution

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Abstract

***Background*:** Healthcare workers face high levels of stress, long hours and demanding workloads, which can impair sleep, mental health and job performance. Aerobic exercise has been shown to improve these outcomes by enhancing mood, reducing stress and promoting better sleep. Exploring the effects of aerobic exercise on sleep quality, mental health, and job performance among healthcare professionals is necessary. ***Aim of the Study*:** To determine the effects of aerobic exercises on job performance, mental health and sleep quality among interns in Federal Medical Centre, Owo. ***Material and Methods*:** This pretest-protest study design involved 40 physically fit healthcare interns at Federal Medical Centre, Owo selected through consecutive sampling. Participants engaged in supervised aerobic exercise sessions; three times weekly for six week, each lasting 40 minutes. Pre and post intervention data were collected using the Werwick-Edinbugh Mental well-being Scale (WEMWBS), Pittsburgh sleep quality index (PSQI), and the Minnesota Job Satisfaction Questionnaire (MJSQ). Data were analyzed using Statistical Package for Social Sciences (SPSS) version 26 with Wilcoxon signed-rank test applied to assess pre-and post- intervention differences at a 0.05 significance level. ***Results*:** A total of 37 interns (mean age= 25.54 ± 2.40 years) completed this study. Pre and post intervention comparison of results showed no significant difference in mental well-being (p=0.219) and job satisfaction (p=0.158). However, a significant difference was observed in sleep quality of participants (p=0.001), indicating better sleep quality. ***Conclusion*:** Aerobic exercise significantly improved sleep quality, with positive trends (though not significant) in mental well-being and job satisfaction.

Keywords: Aerobic Exercise, Job Performance, Mental Health, Sleep Quality.

INTRODUCTION

The health and well-being of health care professionals is essential for effective delivery of healthcare services. It is known that excessive stress, prolonged working hours and substantial workloads are peculiar challenges faced by health workers, which can have adverse effects on sleep quality, job performance and mental health of workers (Jeon and Kim, 2020, Vilela *et al*., 2015). As a way to alleviate and ease these challenges affecting health workers, aerobic exercises have been identified as a potent tool to mitigate them (Afonso *et al*., 2017).

Aerobics exercise is any sustained physical activity that raises the heart rate and promote oxygen consumption (Rebar *et al*., 2015). Such activities include running, walking, cycling, swimming, etc. Recent studies on regular aerobic exercises have demonstrated over the years to provide several health benefits ranging from improvement of physical fitness to minimizing stress, to enhancement of sleep quality thereby contributing to effective job performance and psychological well-being of health-workers (Okechukwu *et al*., 2022). Research has also shown that aerobic exercises are beneficial to health workers who are faced with emotionally demanding and draining circumstances which leads to anxiety, depression and stress (Rebar *et al*., 2015).

A previous study found that individuals who work in high demanding environments, exhibited significantly improved mood and cognition as a result of regular involvement in aerobic activities (Basso *et al*., 2022). Moreover, the correlation between aerobic exercises and sleep quality is well documented (Ezati *et*

al., 2020). Aerobic exercises have been shown to be capable of boosting sleep quality through inducement of relaxation and alleviation of symptoms of insomnia (Rubio and Ramos 2025). Due to the demanding job nature of health workers, they often experience sleep challenges which affects their productivity. Therefore, regular aerobic exercises may improve their sleep quality which would further improve their mental tenacity, resilience and overall performance (Wang *et al*., 2024).

Health workers are faced with rigorous challenges which could metamorphose into exhaustion and reduced job satisfaction. A previous randomized controlled trial conducted among nurses found that aerobic exercise reduced stress levels, which subsequently led to improved job performance (Mohebbi *et al*., 2019). The findings also suggested that through aerobic exercises, health workers can develop a coping mechanism which will enable them handle the physical and emotional demands of their profession. Furthermore, increased levels of aerobic exercises can trigger increased energy level and stamina that will enable them carry out their tasks more effectively and efficiently (Martland *et al*., 2024; Prieke *et al*., 2019).

Summarily, the intersection of aerobic exercises, mental health, job performances and sleep quality present a compelling area of study. As health-workers continue to struggle with the realities of exhaustion, mental stress and poor sleep, understanding the effect of aerobics exercises as a preventive measure has become increasingly important.

This research aims to explore the effects of aerobics exercises on these variables among health workers which would provide a valuable insight that might enhance their well-being, job performance and productivity in health care settings.

MATERIALS AND METHODS

This experimental study was conducted among health interns undergoing training at the Federal Medical Centre, (FMC) Owo. Participants were selected using a consecutive sampling technique. Inclusion criteria included, being a current intern at FMC Owo, being physically fit, providing informed consent, and not being involved in similar physical activities. Interns with underlying medical conditions such as heart problems or those who did not consent were excluded.

The study took place at the Physiotherapy Department of FMC Owo. Instruments used for data collection included the Warwick-Edinburgh Mental Well-being Scale (WEMWBS), Pittsburgh Sleep Quality Index (PSQI), and the Minnesota Job Satisfaction Questionnaire (MJSQ). WEMWBS measured positive aspects of mental health with high internal consistency (Cronbach's α = 0.89–0.91) and good test-retest reliability (ICC $\approx$ 0.83) (Smith *et al*., 2017). PSQI assessed sleep quality over one month across seven components, with strong internal consistency (Cronbach's α = 0.89) and test-retest reliability of 0.85 (Fabbi *et al*., 2021). MJSQ assessed job satisfaction using a 5-point Likert scale and demonstrated internal consistency (Cronbach's α = 0.85–0.91) and stability over time (r = 0.70–0.80), covering intrinsic and extrinsic satisfaction dimensions (Walkowisk and Staszwski, 2019).

A total of 40 participants were initially enrolled. The aerobic exercise program lasted for six weeks with sessions held three times a week for 40 minutes. Each session included a 3–5-minute warm-up, 30 minutes of main exercise (10 minutes each of aerobic dance, rope skipping, and stair climbing), and a 3–5-minute cool-down. Participants exercised at their comfortable pace with rest periods between activities and were instructed not to alter their daily routines or engage in other forms of physical activity. All sessions were supervised, and adverse events were monitored.

Data collection was carried out before the intervention (baseline) and immediately after the six-week program using the three instruments. Data were analysed using SPSS version 26. Descriptive statistics (frequency and percentage) were used for socio-demographic and anthropometric variables. The Wilcoxon signed-rank test was used to assess pre- and post-intervention differences, with the alpha level set at 0.05.

RESULTS

The study recruited 40 interns from Federal Medical Centre, Owo, however, 37 comprising 18 males (48.6%) and 19 females (51.4%) completed the study. Participants had a mean age of 25.54 years (SD = 2.40). The majority were Christians (89.2%), and from the Physiotherapy department (62.2%). (See Table 1)

Table 1: Sociodemographic Characteristics of Participants (N = 37)

Variable	Category	Frequency	Percentage (%)
Sex	Male	18	48.6
	Female	19	51.4
Religion	Christianity	33	89.2
	Islam	1	2.7
	Other	3	8.1
Department	Physiotherapy	23	62.2
	Radiography	4	10.8

	MLS	4	10.8
	Medicine/Dentistry	3	8.1
	Nursing	3	8.1
Age	Mean ± SD	25.54 ± 2.40	Range: 22-34

Presented in table 2 is the result of Wilcoxon signed-rank test of significant difference in pre and post exercise variables of participants. The result showed no significant difference between pre and post exercise variables of Mental health (p=0.219) and Job satisfaction (p=0.158). However, the result revealed a significant difference between pre and post exercise variables of sleep quality (p<0.05) indicating a significant improvement in sleep quality.

Table 2: The Wilcoxon Signed-rank Test of Significant difference in Pre and Post Exercise Variables

Variable	Pre-Mean (SD)	Post-Mean (SD)	Mean Difference	Z	p-value
Mental Health (WEMWBS)	46.76 (12.80)	49.11 (10.34)	+2.35	-1.23	0.219
Job Satisfaction (MJSQ)	66.97 (10.71)	69.86 (8.00)	+2.89	-1.41	0.158
Sleep Quality (PSQI)	8.81 (2.66)	5.84 (2.46)	-2.97	-4.22	<0.001

Shown in table 3 is the changes in categorical analysis of Mental well-being and Job performance of participants. Although not statistically significant, categorical analysis showed a shift towards higher mental well-being levels: participants with high mental well-being increased from 45.9% to 56.8% post-intervention. Similarly, the proportion of interns reporting excellent job satisfaction increased from 5.4% to 18.9%.

Table 3: Change in Mental Well-being and Job Performance Categories (Pre vs Post)

	Category	Pre (n, %)	Post (n, %)
Mental Well-being	Low Mental Well-being	5 (13.5)	3 (8.1)
	Moderate Mental Well-being	15 (40.5)	13 (35.1)
	High Mental Well-being	17 (45.9)	21 (56.8)
Job Performance	Poor Performance	2 (5.4)	0 (0.0)
	Average Performance	4 (10.8)	1 (2.7)
	Good Performance	29 (78.4)	29 (78.4)
	Excellent Performance	2 (5.4)	7 (18.9)

The result of the Man Whitney-U for gender comparison showed no statistically significant difference between males and females in mental health (P value = 0.258), Job performance (P value=0.159), and sleep quality (P value=0.070). (Table 4)

Table 4: Comparison of Change in Outcomes between Male and Female Participants.

Outcome		Mean Rank	Mann–Whitney U p-value
Mental Well-being Change	Male Female	16.92 20.97	.258
Job Satisfaction Change	Male Female	16.61 21.26	.159
Sleep Quality Change	Male Female	15.69 22.13	.070

DISCUSSION

This study aimed at determining the effects of aerobic exercise on job performance, mental health and sleep quality among interns at Federal Medical Centre, Owo Aerobic exercise has been linked to improved cardiovascular health, enhanced lung function, and better weight management. It also boosts mental health and improves sleep quality. When mental health and sleep are at optimal levels, they contribute to better job performance. By assessing the effects of aerobic exercise on job performance, mental health, and sleep quality among interns at FMC Owo, this study may promote the development of a healthier, more efficient workforce, thereby reducing burnout and medical errors.

The outcome of this study showed that there was a slight difference in the job performance outcomes post intervention but it was not significant (P=0.158). This finding however contradicts the findings by Koc *et al*., (2024) in a similar experimental group that, supervised moderate-paced walking activities improves physical activity levels, quality of life, and work performance. The contradiction from the present study may stem from differences in intervention duration,

exercise frequency, supervision, sample size, participant occupation, type of aerobic activity, and evaluation methods. While the studies of Koc *et al*., (2024) focused on 100 office workers, the present study recruited 37 health care professionals that volunteered to participate in the study. However, this study recorded a slight but statistically non-significant improvement in job performance after the intervention (P = 0.158), indicating that the intervention had limited impact on work productivity. This partially aligns with the findings of Fang *et al*., (2019), who observed only modest gains in job performance following a workplace aerobic exercise program, noting that while physical fitness improved, the direct effects on work productivity were minimal.

Observation from the present study regarding mental health revealed no difference in mental health both before and after the exercise program (P= 0.219). This result is in contrast to a study carried out by Gilani and Feizabad (2019) on the impact of aerobic exercise on mental health and self-esteem in type 2 diabetes patients. Sixty participants aged 40–55 underwent 12 weeks of exercise, three times a week. The results showed that aerobic exercise significantly improved both mental health and self-esteem. Similarly, the outcome observed in this study is not in line with the findings of a randomized controlled study by Gerodimos *et al*., (2022) involving 50 health professionals working in a hospital environment that reported an improvement in the employee's mental health. Furthermore, a study by Maung *et al*., (2022) concluded that performing aerobic and strengthening exercises for a minimum of 12 weeks may help to improve mental health among the elderly, and may also improve the quality of life for those residing in old age homes. Although previous studies have reported significant improvement in mental health after 12 weeks of supervised exercise, for instance, Rao *et al.,* (2020) reported significant reductions in depressive symptoms among adults participating in aerobic exercise, suggesting that exercise can be as effective as antidepressant medication in some populations. Furthermore, Singh *et al.,* (2023) concluded that regular physical activity contributes to reduced symptoms of anxiety and depression across diverse populations, however, some studies echo the current findings. Ramos-Sanchez *et al*., (2021) noted that the mental health benefits of exercise are not universal and may depend on factors such as exercise intensity, duration, and individual baseline mental health status. Additionally, Hecksteden *et al*., (2015) emphasized that the psychological response to exercise may vary by individual, and in cases where participants already exhibit good mental health, measurable improvements may be minimal. Therefore, the null significant results observed in the present study could be attributed to shorter duration of 6 weeks duration which may be too short to elicit a psychological benefit as against the 12 weeks adopted in the reported studies.

With respect to sleep quality, there was a statistically significant difference following the intervention (p=0.001). The results of this study are in line with the findings of Ezati *et al*., (2020), which showed that intensified aerobic exercise over 8 weeks positively influenced all components of sleep quality, furthermore, a study by Carlson *et al*., (2019) reported a significantly improvement in sleep quality following a moderate-intensity aerobic exercise program among sedentary adult men. No statistically significant difference was however observed between males and females in mental health, job performance and sleep quality indicating that gender has no effect on the tested variables. These observations could probably be attributed to the fact that participants in the study are within the same age range and are subject almost to the same job description in addition to the same exercises adopted for intervention.

CONCLUSION

This study assessed the impact of aerobic exercise on sleep quality, mental health, and job performance among interns at the Federal Medical Center, Owo. Aerobic exercise significantly improved sleep quality, highlighting its value as a non-pharmacological intervention. Though mental health and job performance showed no significant changes, positive trends were observed. These findings suggest a potential, though limited, benefit of aerobic exercise on mental health and performance.

Recommendation

Further research involving larger participant groups is recommended. Institutions are encouraged to integrate regular aerobic exercise into intern wellness programs to enhance work efficiency and reduce burnout.

Conflict of Interest: The authors declare no conflict of Interest in this study.

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