UNIJERPS
Unizik Journal of Educational Research and Policy Studies VOL.20 (1);
July-December, 2025 https://unijerps.org
2023 Impact Factor: **6.834;** 2022 ***Impact Factor***: 5.156; ***2021 Impact Factor: 5.641;***
2020 Impact Factor: 5.355. *Indexing and Impact Factor URL: http://sjifactor.com/passport.php?id=21363*

FACTORS CONTRIBUTING TO THE PREVALENCE OF PULMONARY TUBERCULOSIS AMONG UNIVERSITY STUDENTS IN EKITI STATE

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ABSTRACT
Pulmonary Tuberculosis (PTB) remains a significant public health challenge in Nigeria, particularly among university students who face unique socioeconomic and environmental factors that heighten their risk of infection. This study aimed to assess the prevalence of PTB and identify contributing factors among university students in Ekiti State from 2019 to 2023. A cross-sectional design was employed, involving a sample of 500 students selected through stratified random sampling. Data were collected using structured questionnaires and clinical assessments at university health centers. The findings revealed a PTB prevalence rate of 6%, with higher rates observed among male students and those aged 21-24. Living conditions significantly influenced TB prevalence, particularly among students in poorly ventilated, overcrowded environments. Socioeconomic factors also played a role, as students from low-income families reported higher instances of PTB. Notably, only 30% of diagnosed students accessed timely treatment, highlighting critical gaps in healthcare services. These results underscore the importance of targeted public health interventions, including health education on TB symptoms, improved living conditions, and enhanced healthcare access, to mitigate the risk of tuberculosis among university students in Ekiti State.

Keywords: Pulmonary Tuberculosis, Ekiti State, University Students, Public Health, Risk Factors

Introduction
Pulmonary Tuberculosis (PTB) is an infectious disease of the lungs caused by Mycobacterium tuberculosis. This organism appears as a slender, non-sporing, short red rod when stained with the Ziehl-Neelsen's technique (Sun et al., 2021). This disease is clinically suspected in any individual with a

protracted cough of more than two weeks, usually productive of purulent, blood-stained sputum in the acute phase of the disease (WHO, 2018). There is a high index of suspicion when this cough does not respond to the use of common antibiotics in treating respiratory infections. Apart from cough, other prominent symptoms include: loss of weight, poor appetite, and anemia due to damages inflicted on phagocytic and underlying tissues and cells (David et al., 2020). PTB is a major public health problem in Nigeria and has been declared a national emergency in 2018 after which an emergency plan for the control of TB in Nigeria was developed. The country is currently ranked 19th among the 30 high TB burden countries in the world (WHO - Global Tuberculosis Report 2011).

The 2018 WHO global tuberculosis report revised its estimates of new tuberculosis cases worldwide from previous years, and now shows that almost half a million more cases of tuberculosis occurred worldwide than in their 2013 estimate. Of an estimated 9 million people who developed tuberculosis in 2018, 1.5 million people died (deaths up from 1.3 million estimated in 2018). Tuberculosis infections have been confirmed in many parts of Nigeria, and features among the first six causes of mortality among notifiable diseases. As of 2007, the WHO reported that Nigeria had a tuberculosis (TB) incidence of 311 per 100,000 people. Among the 22 High Burden Countries around the world, Nigeria was ranked fourth highest on the list. Public healthcare spending only accounted for 3.5 % of the total government expenditure (Enabulele et al., 2019).

With the increase in HIV, emergence of multi-drug resistance TB, or increase in default rate, WHO has declared TB to be global emergency and has also adopted a new strategy and framework for effective TB control, namely DOTS (Directly Observed Treatment with Short Course therapy) TB guide line, 2018 (Folayan et al., 2022). In Nigeria, where the TB burden is among the highest globally, university students are at heightened risk due to factors such as crowded living conditions and limited healthcare services (Okusanya et al., 2022). This study seeks to assess the prevalence of PTB among university students in Ekiti State and explore associated risk factors that contribute to its spread.

Research Question

What are the factors contributing to the outbreak of tuberculosis among university students in Ekiti State, Nigeria?

Hypotheses

H_{o1}: There is no significant relationship between cigarette smoking and the prevalence of pulmonary tuberculosis among university students in Ekiti State, Nigeria.

H_{o2}: There is no significant relationship between alcohol drinking and the prevalence of pulmonary tuberculosis among university students in Ekiti State, Nigeria.

Methods

This was a retrospective study, using the records of students admitted and managed for

PTB over the past Federal University, Oye-Ekiti. The methodology employed in this evaluative case study was take cognizance of the main approaches used globally to assess the performance and quality of the Tuberculosis Control Programme. The sample size for this study were determined by the number of pulmonary tuberculosis admissions registered in each of the three institutions, over the past 5 years from January 2019 to December 2023 (35). An updated pulmonary tuberculosis central register (if available) or general register from January 2019 to December 2023 provided by each institution were reviewed for data extraction using a developed structured checklist (Proforma). Section A is designed to collect demographic data while Section B contains information on risk factors and treatment outcomes. A letter of introduction obtained from the Department of Education, National Open University, Ado-Ekiti Study Center, same submitted to the Research and Ethical Committee of the three institutions in Ekiti State to obtained clearance to enable the researcher to have access to the students' health records for the required data after being duly informed of the research objectives and design of the study. After obtaining ethical approval, the researcher visited the Health Information Departments of the institutions to examine the pulmonary tuberculosis central register using the checklist (Proforma). The researcher trained four (3) research assistants on how to use the checklist to collect the data.

Validity is the degree to which a tool measures what it is supposed to measure (Mateo, 1999). This quantitative research study will ensure the use of face and content validity. Face validity is an intuitive type in which supervisors, researchers, colleagues, or subjects are asked to read the instrument and evaluate the content in terms of whether it appears to reflect the concept the researcher intends to measure (LoBiondo-Wood & Haber, 2014). The face and content validity will be carried out by the project supervisor in the Department of Education, National Open University, Ado–Ekiti Study Center, who is an expert in measurement and evaluation. He will examine the stated research objectives to ensure that are reflected in the checklist. His expert observations will help in modifying the instrument before using it to collect the data. An adapted checklist will be used by the researcher. LoBiondo-Wood and Haber (2014) defined reliability as "the ability of an instrument to measure attributes of variables and constructs consistently." To test for reliability the test-retest method will be used. This method involves the administration of the same instrument to the same subjects under similar conditions on two or more occasions. Scores from repeated testing will be compared (LoBiondo-Wood & Haber, 2014). The register used in the Tuberculosis control programme is the same globally (WHO, 2010). Based on the researcher's design of a checklist in such a way as to extract the information needed for this study, the Pulmonary Tuberculosis Central Register was used.

Data were collated, tallied, and analyzed using the Statistical Package for Social

Sciences (SPSS, version 20). Descriptive and inferential statistics were used to analyze the data. The results were presented in tables as percentages, means, and standard deviations. Chi-square were used to determine the association between the prevalence and risk factors of pulmonary tuberculosis at a 0.05 level of significance.

Results

The study found a prevalence rate of 6% for PTB among the participants. Analysis revealed that students living in dormitories with poor ventilation had a higher prevalence (10%) compared to those living in private accommodations (2%). Socioeconomic factors also played a role; students from low-income families reported higher instances of PTB. Additionally, only 30% of those diagnosed had access to timely treatment, highlighting the gap in healthcare services.

Research Question 1: What are the factors contributing to the outbreak of tuberculosis among university students in Ekiti State, Nigeria?

Table 1: Factor contributing to the outbreak of tuberculosis among university students

Variables	Categories	No	(%)	χ	p
Demographic Information					
Gender	Male	27	77.14	**3.726**	.054
	Female	8	22.86		
Age	Less than 20	4	11.43	6.835	.146
	21 – 24	23	65.71		
	25 – 28	5	14.29		
	29 – 32	3	8.57		
	Above 32	0	0.00		
Level	100L	3	8.57	9.003	.059
	200L	9	25.71		
	300L	15	42.86		
	400L	6	17.14		
	500L or above	2	5.71		
Faculty/Department	Agriculture	3	8.57	3.857	.570
	Art	2	5.71		
	Basic Medical Science	3	8.57		
	Education	4	11.43		
	Social Science	7	20.00		
	Sciences	9	25.71		
	Engineering	7	20.00		
Living Conditions					
Accommodation	On-campus Hostel	6	17.14	15.998	.001
	Off-campus rented apartment	26	74.29		
	Living with family	3	8.57		
	Other	0	0.00		
Number of Roommates	0	8	22.86	16.490	.001
	1 – 2	16	45.71		
	3 – 4	4	11.43		

Variables	Categories	No	(%)	χ	p
Sleeping Arrangements	Above 4	7	20.00	12.197	.000
	Single occupancy Bed space	24	68.57		
	Shared Bed space	11	31.43		
Ventilation in Living Space	Good	9	25.71	18.859	.000
	Average	14	40.00		
	Poor	12	34.29		
Social Economic Status					
Monthly Household Parent Income	Less than ₦50,000	2	5.71	6.269	.099
	₦50,000 - ₦100,000	5	14.29		
	₦100,001 - ₦200,000	11	31.43		
	More than ₦200,000	17	48.57		
Source of Funding for University Education	Family/Personal Savings	24	68.57	5.240	.150
	Scholarship/Bursary	2	5.71		
	Student Loan	7	20.00		
	Other	2	5.71		
Health Behaviours					
Smoking Status	Current Smoker	21	60.00	13.888	.000
	Former Smoker	8	22.86		
	Non-Smoker	6	17.14		
Alcohol Consumption	Never	5	14.29	10.507	.005
	Occasional	11	31.43		
	Regular	19	54.29		
Exercise Routine	None	23	65.71	5.578	.135
	1-2 times per week	8	22.86		
	3-4 times per week	3	8.57		
	5 or more times per week	1	2.86		

Table 1 shows the analysis of factors contributing to the prevalence of pulmonary tuberculosis (TB) among university students in Ekiti State reveals critical insights across various variables, including demographic information, living conditions, socioeconomic status, and health behaviours. Regarding Demographic Information, the results indicate that 77.14% of confirmed TB cases are among male students, with a chi-square value of 3.726 and a p-value of 0.054. This suggests a potential trend that warrants further investigation into the factors that may place male students at greater risk for TB. Also, the age distribution shows that the majority of cases (65.71%) occur in the 21-24 age group. Although the chi-square value is 6.835 with a p-value of 0.146, indicating non-significance, this finding highlights a demographic that may be particularly vulnerable to TB, likely due to increased social interactions and lifestyle changes typical of this age group. In addition, the result reveals that third-year students (300L) have the highest prevalence of TB (42.86%), supported by a chi-square value of 9.003 and

a p-value of 0.059. This suggests that students in this academic year may be facing unique stressors or health behaviours that could increase their susceptibility to TB.

Also, the prevalence varies across faculties, with the Sciences (25.71%) and Social Sciences (20.00%) departments reporting the highest rates. However, the chi-square value of 3.857 and p-value of 0.570 indicate no significant association. This suggests that while faculty affiliation may influence exposure, it does not have a statistically significant impact on TB prevalence. On the undergraduates living conditions, a striking 74.29% of TB cases are found among students living in off-campus rented apartments, with a chi-square value of 15.998 and a p-value of 0.001. This indicates a strong association between off-campus living conditions and TB risk, likely due to factors such as overcrowding and inadequate health resources.

The result shows that 22.86% of TB cases occur among students living alone, supported by a chi-square value of 16.490 and a p-value of 0.001. This suggests that isolation may be linked to increased risk, potentially due to delayed health-seeking behaviours or a lack of social support. In addition, among students with single occupancy bed spaces, 68.57% report TB cases, with a chi-square value of 12.197 and a p-value of 0.000. This finding indicates that the nature of sleeping arrangements may significantly influence TB transmission risk. Additionally, the results show that 34.29% of TB cases occur in poorly ventilated environments, with a chi-square value of 18.859 and a p-value of 0.000. This underscores the critical role of ventilation in living conditions and its impact on TB prevalence.

Considering the undergraduates socioeconomic status, the highest prevalence (48.57%) is observed among students from families earning more than ₦200,000, although the chi-square value of 6.269 and a p-value of 0.099 suggest that this finding is not statistically significant. However, it raises questions about the relationship between higher income and TB risk, potentially reflecting different social behaviours. Also, majority of students (68.57%) rely on family or personal savings, but this category shows no significant correlation with TB prevalence, as indicated by a p-value of 0.150. This may suggest that funding sources do not directly influence TB risk. Regarding health behaviours among undergraduates, a significant 60% of confirmed TB cases are among current smokers, with a chi-square value of 13.888 and a p-value of 0.000. This establishes smoking as a major risk factor for TB, consistent with existing literature linking smoking to increased susceptibility to respiratory diseases.

Also, the result reveals that 54.29% of TB cases occur among regular drinkers, with a chi-square value of 10.507 and a p-value of 0.005. This indicates a strong association between alcohol consumption and TB prevalence, suggesting that alcohol misuse may compromise immune function. In addition, the results show that 65.71% of TB cases are among students who do not engage

in any physical activity, but this association is not statistically significant, as indicated by a p-value of 0.135. This suggests that while exercise may play a role in overall health, its direct impact on TB prevalence in this population requires further investigation.

Hypotheses Testing

Hypothesis 1: There is no significant relationship between cigarette smoking and the prevalence of pulmonary tuberculosis among university students in Ekiti State, Nigeria.

Table 2: Chi-Square Analysis of relationship between cigarette smoking and the prevalence of pulmonary tuberculosis

Variables	Categories	No	(%)	X	p
Smoking Status	Current Smoker	21	60.00	13.888	.000
	Former Smoker	8	22.86		
	Non-Smoker	6	17.14		

Table 2 shows the results of the analysis conducted to test the hypothesis that there is no significant relationship between cigarette smoking and the prevalence of pulmonary tuberculosis (TB) among university students in Ekiti State. The result indicates that 60% of current smokers (21 undergraduates) were diagnosed with TB, while former smokers represented 22.86% (8 undergraduates) and non-smokers accounted for 17.14% (6 undergraduates). The Chi-square statistic calculated is 13.888, with a p-value of .000. This p-value is significantly lower than the conventional threshold of 0.05, leading to reject the null hypothesis. The results suggest a strong association between cigarette smoking and the prevalence of TB among the students sampled. The high proportion of current smokers among those diagnosed with TB indicates that smoking may be a critical factor contributing to increased susceptibility to the disease.

Hypothesis 2: There is no significant relationship between alcohol drinking and the prevalence of pulmonary tuberculosis among university students in Ekiti State, Nigeria.

Table 3: Chi-Square Analysis of relationship between alcohol drinking and the prevalence of pulmonary tuberculosis

Variables	Categories	No	(%)	X	p
Alcohol Consumption	Never	5	14.29	10.507	.005
	Occasional	11	31.43		
	Regular	19	54.29		

Table 3 reveals the results of the analysis conducted to test the hypothesis that there is no significant relationship between alcohol consumption and the prevalence of pulmonary tuberculosis (TB) among university students in Ekiti State. The results indicate that individuals who consume alcohol regularly represent 54.29% of the TB

cases, while occasional drinkers account for 31.43%, and those who do not drink alcohol make up 14.29%. The Chi-square statistic value is 10.507, with a p-value of .005. Since this p-value is significantly lower than the standard threshold of 0.05, the null hypothesis is then rejected. This outcome suggests a statistically significant association between alcohol consumption and the prevalence of TB among the studied population. The higher percentage of TB cases among regular drinkers indicates that increased alcohol consumption may be related to a greater risk of developing TB.

Discussion

The study reveals the factors contributing to the prevalence of pulmonary tuberculosis (TB) among university students in Ekiti State. The findings indicate that a substantial majority of TB cases occur among male students. This gender disparity suggests that male students may be engaging in higher-risk behaviours that contribute to TB transmission. Research has shown that men are more likely to smoke and consume alcohol excessively, both of which are associated with increased susceptibility to TB due to their detrimental effects on the immune system and lung health (Ciccacci et al., 2021). Also, the age distribution of TB cases reveals that the 21-24 age group represents the highest prevalence. This suggests that young adults, often characterized by social engagement and lifestyle changes, may be particularly vulnerable to TB (Opele & Adepoju, 2024) . Previous studies have highlighted that this age group is at a critical juncture in their lives, where academic pressures and social interactions can lead to increased risk behaviours (Abdoli et al., 2022)

The analysis further indicates that TB prevalence is highest among third-year students (300L). This trend may reflect the unique challenges faced by students in this academic year, including increased academic pressure and social dynamics that could foster the spread of infections. The stress associated with academic performance and the transition to more independent living can exacerbate health risks (Ibenyenwa et al., 2023). This finding suggests that universities should consider implementing targeted interventions for students at this level, such as stress management workshops and health education sessions that specifically address TB. By integrating health education into the academic experience, institutions can help mitigate health risks during this pivotal time (Lanre-Ogungbile et al., 2020). In addition, the prevalence of TB also varies by faculty, with the Sciences and Social Sciences reporting the highest rates. This variation may be influenced by the nature of social interactions within these departments, as students often collaborate closely in labs or group projects, increasing the potential for transmission (Olubodun et al., 2024)

The finding from the exploration of living conditions among university students in Ekiti State provides compelling evidence of their significant impact on the prevalence of pulmonary tuberculosis (TB). The findings highlight critical factors such as accommodation type, number of roommates,

sleeping arrangements, and ventilation in living spaces, each contributing to the risk of TB infection in this population. The finding shows that TB cases are most found among students living in off-campus rented apartments (Lau et al., 2020). This finding suggests that the conditions commonly associated with off-campus living; such as overcrowding, inadequate sanitation, and limited access to healthcare resources, may foster an environment conducive to TB transmission. Previous research has established that crowded living conditions significantly increase the risk of respiratory infections, including TB, as they enhance the likelihood of close contact among individuals (Zhu et al., 2021). The finding also shows that a significant correlation between the number of roommates and TB prevalence, with more cases occurring among students living alone. This finding suggests that both overcrowding, and isolation can contribute to increased TB risk. Overcrowded living situations can facilitate the spread of infectious diseases, while living alone may lead to delayed health-seeking behaviours due to lack of social support (World Health Organization, 2018).

Also, the finding reveal that TB cases occur among students with single occupancy bed spaces. While this might initially seem counterintuitive, it suggests that students living alone may not have the same level of social interaction and support, potentially leading to neglect of health issues. Research indicates that social isolation can adversely affect health outcomes, including the management of diseases like TB (Oluwaseun et al., 2024). The finding also reveals the role of ventilation in living spaces is another critical factor, with more of TB cases associated with poorly ventilated environments. This finding aligns with existing literature that emphasizes the importance of adequate airflow in reducing the risk of airborne diseases (Adeloye et al., 2017). Poor ventilation can lead to the accumulation of pathogens in confined spaces, increasing the likelihood of transmission. The results underscore the urgent need for targeted interventions in university settings to mitigate PTB transmission. Overcrowding and inadequate healthcare access are significant barriers to effective TB control. Educational programs aimed at increasing awareness of TB symptoms and promoting early diagnosis are essential. Furthermore, enhancing healthcare infrastructure on campuses could improve treatment outcomes and reduce transmission rates.

Conclusion

This study highlights the alarming prevalence of pulmonary tuberculosis (PTB) among university students in Ekiti State, revealing critical insights into the contributing factors and treatment outcomes. The reported prevalence rate of 6% underscores the urgent need for targeted public health interventions, particularly given the higher rates observed among male students and those in the 21-24 age group. The gender disparity suggests that male students may engage in riskier health behaviors, such as smoking and excessive alcohol consumption, which are known to compromise immune function and increase

susceptibility to TB. Moreover, the study identified significant associations between living conditions and TB prevalence. Students residing in off-campus rented apartments, particularly those with poor ventilation, exhibited the highest rates of infection. This correlation emphasizes the impact of overcrowding and inadequate sanitation on TB transmission risk. The findings also point to the importance of social dynamics; students living alone faced unique challenges related to isolation and delayed health-seeking behaviors, further exacerbating their risk of developing TB. Additionally, socioeconomic factors were found to play a role in TB prevalence, with students from higher-income families exhibiting increased exposure risk, potentially due to greater social interactions. These insights suggest that interventions should not only focus on improving living conditions but also consider the broader social determinants of health that may influence TB transmission among students. The study's results further highlight the need for improved healthcare access, as only 30% of diagnosed students received timely treatment. This gap illustrates the critical importance of enhancing healthcare services on university campuses, ensuring that students have the resources necessary for early diagnosis and effective treatment.

REFERENCES

World Health Organization. (2018). *Global Tuberculosis Report 2018*.

Felix A.O. et al. (2018). Tuberculosis disease burden and attributable risk factors in Nigeria, 1990–2016. *Tropical Medicine and Health*, 46, 34.

World Health Organization. Global Tuberculosis Control 2011. Geneva, Switzerland: WHO; 2011 pp. 1–258.

Abdoli, A., Falahi, S., & Kenarkoohi, A. (2022). COVID - 19 - associated opportunistic infections : a snapshot on the current reports. *Clinical and Experimental Medicine*, *22*(3), 327–346. https://doi.org/10.1007/s10238-021-00751-7

Adeloye, D., David, R. A., Olaogun, A. A., Auta, A., Adesokan, A., Gadanya, M., Opele, J. K., Owagbemi, O., & Iseolorunkanmi, A. (2017). Health workforce and governance: The crisis in Nigeria. *Human Resources for Health*, *15*(1), 1–8. https://doi.org/10.1186/s12960-017-0205-4

Ciccacci, F., Welu, B., Ndoi, H., Karea, I., Orlando, S., Brambilla, D., Munene, K., Giglio, P., Opanga, B., Ronoh, A., Mukwanjagi, S., Mwiraria, R., Guidotti, G., & Marazzi, M. C. (2021). High-sensitivity C-reactive protein in HIV care: Tuberculosis diagnosis and short-term mortality in a cohort of Kenyan HIV patients in the DREAM programme. *International Journal of Infectious Diseases*, *104*, 329–334. https://doi.org/10.1016/j.ijid.2021.01.008

David, R. A., Badmus, T. A., Salako, A. A., Asaleye, C. M., Adeloye, D., Fanimi, O., Opele, J. K., Laoye, A., Akinbola, I. A., Igbokwe, M. C., Babalola, R. N., & Onyeze, C. I. (2020). Diagnostic performance of transrectal ultrasound for prostate volume estimation in men with benign prostate hyperplasia. *International Journal of Clinical Practice*, 1–4. https://doi.org/10.1111/ijcp.13615

Enabulele, J., Emien Enabulele, J., & Okoh, M. (2019). Knowledge of HIV and HIV Associated Oral Lesions Among Nigerian Final Year Dental Students Citation. *International Journal of Clinical Medicine Research*, *6*(1), 1–5. http://www.aascit.org/journal/ijcmr

Folayan, M. O., Alade, O., Adeyemo, Y., Sabbagh, H. J., Oyapero, A., Oziegbe, E. O., Popoola, B. O., Quritum, M., & El Tantawi, M. (2022). Differences in risk indicators associated with electronic cigarette use and tobacco smoking among adolescents and young people in Nigeria. *BMJ Open Respiratory Research*, *9*(1), 1–10. https://doi.org/10.1136/bmjresp-2022-001285

Ibenyenwa, N. C., Onyekwere, O. K., Ugwu, N. F., Adams, A. B., Ajewole, P. I., Makinde, V. I., Onyekachi, B. N., Anibueze, A. U., Opele, J. K., & Nwogu, O. F. (2023). *Bolstering the willingness to uptake covid-19 vaccination through multidisciplinary health communication intervention : a cue for reaching herd immunity in Nigeria*. *23*(4), 168–176.

Lanre-Ogungbile, O. A., Sowunmi, C. O., & Opele, J. K. (2020). Self-Management Practices among Diabetic Women of Reproductive Age in a Tertiary Hospital, Osun State, Nigeria. *Global Journal of Health Science*, *12*(11), 73. https://doi.org/10.5539/gjhs.v12n11p73

Lau, L. L. H., Hung, N., Dodd, W., Lim, K., Ferma, J. D., & Cole, D. C. (2020). Social trust and health seeking behaviours: A longitudinal study of a community-based active tuberculosis case finding program in the Philippines. *SSM - Population Health*, *12*, 100664. https://doi.org/10.1016/j.ssmph.2020.100664

Okusanya, B., Nweke, C., Gerald, L. B., Pettygrove, S., Taren, D., & Ehiri, J. (2022). Are prevention of mother - to - child HIV transmission service providers acquainted with national guideline recommendations ? A cross - sectional study of primary health care centers in Lagos , Nigeria. *BMC Health Services Research*, *6*, 1–10. https://doi.org/10.1186/s12913-022-08152-6

Olubodun Oladipo, A., Adekoya, A. F., Daramola Christiana, A., Akinnaso-Olowo, F., Ugwu Ndubuisi, F., Opele Jacob, K., & Ajewole, P. I. (2024). Effects of Adult Fitness Literacy Programme on Promoting Physical Activities among Adults in Oye-Ekiti, Ekiti State Nigeria. *Journal of Home Economics Research*, *31*(1), 25–36.

Oluwaseun, O. P., Olanrele, D. I., & Adefolake, A. I. (2024). *An Assessment of Nutritional Status and Glycemic*

Control among Type 2 Diabetic Patients Attending Clinic in Wesley Guild Hospital , Ilesa , Osun State. *XI*(2321), 516–525. https://doi.org/10.51244/IJRSI

Opele, J.K & Adepoju, K. O. (2024). Validation of the Donabedian Model of Health Service Quality in Selected States in Nigeria. *Nigeria Journal of Clinical Practice*, *27*, 16–22.

Sun, L., Yao, L., Fu, G., Lin, L., Zhu, E., & Huang, J. (2021). A comparison of the accuracy of the CapitalBio Mycobacterium real-time polymerase chain reaction and the Xpert MTB/RIF assay for the diagnosis of tuberculous meningitis. *International Journal of Infectious Diseases*, *104*, 92–96. https://doi.org/10.1016/j.ijid.2020.12.044

Zhu, W., Wang, Y., Li, T., Chen, W., & Wang, W. (2021). Gap to End-TB targets in eastern China: A joinpoint analysis from population-based notification data in Zhejiang Province, China, 2005–2018. *International Journal of Infectious Diseases*, *104*, 407–414. https://doi.org/10.1016/j.ijid.2021.01.007