**Evaluation of Prostate-Specific Antigen in Relation to Lipid Profile and Atherogenic Indices in Adult Males in Abuja**

**Abstract**

**Background:** Prostate-specific antigen (PSA) is widely used to detect prostate disorders, but its diagnostic accuracy is limited by nonspecific elevation. Emerging evidence suggests dyslipidemia and atherogenic indices may influence PSA levels and help indicate prostatic risk.
**Aim:** To assess the association between PSA levels, lipid profiles, and derived atherogenic indices in adult males in Abuja, Nigeria.
**Methods:** A hospital-based cross-sectional study was conducted among 150 adult males attending two tertiary hospitals. Participants were grouped by age: 18–39, 40–59, and ≥60 years. Venous blood samples were collected after overnight fasting. PSA was measured by electrochemiluminescence immunoassay; lipid parameters were analyzed using enzymatic methods. Atherogenic indices were calculated by standard formulas. Data were analyzed using t-tests, Pearson correlation, and logistic regression (p ≤ 0.05).
**Results:** Mean PSA levels rose significantly with age. LDL-C was higher in participants with elevated PSA (3.43 ± 1.24 vs. 2.93 ± 0.95 mmol/L, p = 0.009). Other lipid parameters and atherogenic indices showed no significant association. Age ≥60 years strongly predicted elevated PSA (OR = 15.26, p < 0.001).
**Conclusion:** LDL-C was significantly associated with PSA levels. Though atherogenic indices were not predictive, combining lipid profile screening with PSA testing may improve prostate risk assessment, especially in older men.

## 1. INTRODUCTION

Prostate cancer (PCa) is one of the most frequently diagnosed cancers in men worldwide, with global incidence exceeding 1.4 million cases annually and substantial morbidity and mortality, particularly in older men (WHO, 2022; Rebbeck et al., 2020). In sub-Saharan Africa, including Nigeria, the burden of prostate cancer and related prostate disorders is rising due to increasing life expectancy, urbanization, and limited screening coverage (Adeloye et al., 2016). Early detection remains key to improving prognosis and reducing mortality.

Prostate-specific antigen (PSA) is a glycoprotein produced by prostate epithelial cells and is widely used as a serum biomarker to detect and monitor prostate disorders (Mottet et al., 2022). Despite its clinical utility, PSA testing has notable limitations: elevated levels can occur in benign conditions such as benign prostatic hyperplasia (BPH), prostatitis, and post-procedural manipulation, leading to false positives (Loeb and Carter, 2013). This lack of specificity underscores the need to identify adjunctive markers to improve diagnostic accuracy.

Recent research highlights the potential role of metabolic factors, notably lipid disorders, in prostate pathophysiology (Allott & Hursting, 2015). Cholesterol and its subfractions (LDL-C, HDL-C, triglycerides) regulate cell membrane composition, hormone biosynthesis, and inflammatory processes, which may influence prostate cell proliferation and PSA secretion (Pelton et al., 2012; Freeman & Solomon, 2004). Observational studies suggest elevated LDL-C and total cholesterol may correlate with higher PSA levels and prostate cancer risk (Zhang et al., 2021; Liu et al., 2020).

Moreover, composite atherogenic indices, including Castelli Risk Indices (CRI-I, CRI-II), Atherogenic Index of Plasma (AIP), and Atherogenic Coefficient (AC), are used to assess cardiovascular risk and reflect systemic lipid derangements (Millán et al., 2009; Dobiásová, 2004). However, data on their relationship with PSA and prostate disease remain inconsistent and underexplored, especially in African populations.

Given the scarcity of local data in Nigeria, this study aimed to evaluate the association between PSA levels, serum lipid profiles, and derived atherogenic indices in adult males in Abuja. Understanding these relationships may support risk stratification, guide screening strategies, and deepen insight into shared metabolic pathways linking lipid dysregulation and prostate pathology.

**2. MATERIALS AND METHODS**

 **Study Design:** The study utilized an analytical cross-sectional design to recruit men aged 18 and above at a selected hospital in Abuja using systematic random sampling. This is because it examines the relationship between variables (PSA levels and lipid profiles/atherogenic indices) at a point in time. Furthermore, it aims to evaluate potential correlations rather than establish causation.

**Study Area:** The study was conducted in Abuja, Nigeria’s capital city, which has over three million residents (National Population Commission, 2021). Research activities were carried out at two major public tertiary hospitals: the University of Abuja Teaching Hospital in Gwagwalada and the Federal Medical Centre, Jabi. These facilities provide specialized urological care, including PSA testing and prostate cancer management (Agbo et al., 2017). By recruiting from these hospitals, the study captured a sample of men from varied socio-economic backgrounds, reflecting the broader male population of Abuja

**Smaple Size Determination**

The sample size was calculated using the correlation coefficient formula (Hulley *et al.,* 2013):

N = [(Zα + Zβ)/C]² + 3Where:

N = required sample size

Zα = Standard normal deviate at 95% confidence level (1.96)

Zβ = Standard normal deviate at 80% power (0.84)

 C = 0.5 × ln[(1+r)/(1-r)]

 r = Expected correlation coefficient

Based on previous studies:

 Expected correlation coefficient(r) between PSA and Total Cholesterol = 0.28(Zhang et al., 2020)

 Confidence level = 95 %( α = 0.05)

 Power = 80 %( β = 0.20)

Calculation:

1. C = 0.5 × ln[(1+0.28)/(1-0.28)] = 0.288

2. N = [(1.96 + 0.84)/0.288]² + 3

3. N = 93.7

To account for potential attrition and non-response:

Adding 10% for attrition

 Final sample size = 93.7 × 1.1 = 103 participants

Therefore, a minimum of 103 adult men were recruited for this study.

**Selection Criteria**

**Inclusion Criteria:**Participants in this study were adult males aged 18 years and above, residing in Abuja, Nigeria. Eligibility required willingness to provide informed consent, ensuring that each participant understood the study’s purpose and procedures and voluntarily agreed to take part.

**Exclusion Criteria:** The study excluded men with a known history of prostate cancer or other malignancies to avoid disease-related bias. Additionally, individuals diagnosed with chronic kidney disease or liver disease were not included, as these conditions could affect lipid metabolism and PSA levels. Men who were currently taking lipid-lowering medications or undergoing hormone therapy were also excluded to minimize the influence of external factors on the study’s biochemical measurements.

**Ethical Considerations:** Ethical approval was obtained from UATH (UATH/HREC/PR/607) and FMC Jabi (FMCABJ/HREC/2024/196). Participants provided written informed consent; data were anonymized and stored securely, following the Declaration of Helsinki (WMA, 2013).

**Sample collection and Processing:** A systematic random sampling technique was employed, using the clinic’s patient register as the sampling frame; every third patient who met the inclusion criteria was selected until the desired sample size was achieved. Participants were instructed to fast for approximately 12 hours before their clinic appointment to reduce postprandial variations in lipid levels. Upon arrival, a trained phlebotomist collected 5 mL of venous blood from each participant into a plain vacutainer tube. The blood samples were then allowed to clot at room temperature, centrifuged at 3000 rpm for 10 minutes to separate the serum, and the serum was aliquoted into labeled cryovials. All serum samples were stored at –20°C until analysis to preserve biochemical stability.

###  Laboratory Analysis

PSA was quantified using Roche Elecsys electrochemiluminescence immunoassay (ECLIA). Lipid parameters total cholesterol (TC), LDL-C, HDL-C, triglycerides (TG) were measured by enzymatic colorimetric assays on the ChemWell 2910 autoanalyzer (Awareness Tech, 2021).

Derived indices:

CRI-I = TC / HDL-C

CRI-II = LDL-C / HDL-C

AIP = log(TG / HDL-C)

AC = (TC – HDL-C) / HDL-C

###  Statistical Analysis: Data were analyzed with Python libraries (Pandas, SciPy, StatsModels). Descriptive statistics summarized means and standard deviations. Group comparisons used t-tests; Pearson’s correlation evaluated associations; logistic regression identified predictors of elevated PSA (p ≤ 0.05).

**3. RESULT**

Age Group Distribution in the Study Population

The study participants comprised 150 adult male participants, stratified into three age groups: 18–39 years, 40–59 years, and 60 years and above (Table 1). Each age group contributed equally to the study population, with 50 participants each, representing 33.33% per group

The youngest age group (18–39 years) had the lowest mean PSA level of 0.88 ± 0.20 ng/ml, indicating relatively normal prostate function in this age range. Participants aged 40–59 years showed a substantial increase in PSA levels, with a mean of 5.62 ± 15.99 ng/ml, suggesting a rising trend with age and possible early prostatic changes. The oldest age group(60 years and above) recorded the highest mean PSA level of 13.09 ± 19.32 ng/ml, highlighting a greater risk of prostate abnormalities in older men. The progressive increase in mean PSA levels across the age categories reflects the well-established association between advancing age and elevated PSA concentrations. These findings underscore the importance of age-specific PSA screening and interpretation in clinical evaluations of prostate health among men. This trend indicates a clear age-related increase in PSA levels, suggesting that PSA concentrations tend to rise with advancing age due to physiological and pathological changes in the prostate.

**Table 1: Age Group Distribution in the Study Population**

|  |  |  |  |
| --- | --- | --- | --- |
| **Age Groups** | **Frequency****(n)** | **Percentage****(%)** | **PSA (ng/ml)** **(mean ± SD)** |
| 18 – 39 | 50 | 33.33 | 0.88 ± 0.20 |
| 40 – 59 | 50 | 33.33 | 5.62 ± 15.99 |
| 60 and above | 50 | 33.33 | 13.09 ± 19.32 |

**3.2 Comparison of Lipid Profile Parameters between Men with Normal and Elevated PSA Levels in the Study Population**

The comparison of lipid profile parameters between men with normal and elevated PSA levels, stratified by age group (Table.2), reveals both age-dependent patterns and significant variations across several lipid markers. In the 18–39 years age group, all participants exhibited normal PSA levels. Consequently, no comparisons could be made between PSA categories for this age group. The mean values for lipid parameters in this group were: TC (4.56 ± 0.94 mmol/L), TG (1.04 ± 0.33 mmol/L), LDL (2.70 ± 0.75 mmol/L), and HDL (1.18 ± 0.38 mmol/L).

Among individuals aged 40 to 59 years, the mean total cholesterol(TC), low-density lipoprotein(LDL), and high-density lipoprotein(HDL) levels were higher in men with elevated prostate-specific antigen(PSA) compared to those with normal PSA. However, none of these differences were statistically significant. The mean TC was 5.40 ± 1.69 mmol/L in the elevated PSA group versus 4.94 ± 1.24 mmol/L in the normal group (p = 0.458). Similarly, LDL levels were 3.58 ± 1.16 mmol/L compared to 3.15 ± 1.15 mmol/L (p = 0.335), and HDL levels were 1.59 ± 0.53 mmol/L versus 1.34 ± 0.43 mmol/L (p = 0.206). Triglyceride(TG) levels were slightly lower in men with elevated PSA, measuring 1.09 ± 0.46 mmol/L compared to 1.20 ± 0.49 mmol/L(p = 0.541).

In the 60 years and above group, a significant difference in triglyceride levels was observed. Men with elevated PSA had significantly lower TG levels compared to those with normal PSA (1.04 ± 0.34 mmol/L vs. 1.33 ± 0.41 mmol/L, p = 0.012). While mean LDL and TC levels were slightly higher in the elevated PSA group (LDL: 3.39 ± 1.27 mmol/L vs. 3.05 ± 0.85 mmol/L, TC: 4.96 ± 1.58 mmol/L vs. 4.99 ± 1.24 mmol/L), the differences were not statistically significant (p = 0.267 and p = 0.945, respectively). HDL levels also showed no significant variation (p = 0.662).

These findings suggest that while lipid profiles appear non-significant in comparison across PSA groups in younger age categories, notable distinctions, particularly in triglyceride levels, emerge in older adults, underscoring the need to consider age-specific metabolic profiles in PSA evaluation and prostate health assessment.

**Table 2: Comparison of Lipid Profile Parameters between Men with Normal and Elevated PSA Levels by Age Group**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Age Group** | **Lipid Parameter** | **Normal PSA (mean ± SD)****(n = 110)** | **n\_normal** | **Elevated PSA (mean ± SD)****(n = 40)** | **n\_elevated** | ***P* –value** |
| 18 – 39 | TC | 4.56 ± 0.94 | 50 | - | 0 | - |
| (n = 50) | TG | 1.04 ± 0.33 |  | - |  | - |
|  | LDL | 2.70 ± 0.75 |  | - |  | - |
|  | HDL | 1.18 ± 0.38 |  | - |  | - |
| 40 – 59 | TC | 4.94 ± 1.24 | 41 | 5.40 ± 1.69 | 9 | 0.458 |
| (n = 50) | TG | 1.20 ± 0.49 |  | 1.09 ± 0.46 |  | 0.541 |
|  | LDL | 3.15 ± 1.15 |  | 3.58 ± 1.16 |  | 0.335 |
|  | HDL | 1.34 ± 0.43 |  | 1.59 ± 0.53 |  | 0.206 |
| 60+ | TC | 4.99 ± 1.24 | 19 | 4.96 ± 1.58 |  31 | 0.945 |
| (n = 50) | TG | 1.33 ± 0.41 |  | 1.04 ± 0.34 |  | 0.012 |
|  | LDL | 3.05 ± 0.85 |  | 3.39 ± 1.27 |  | 0.267 |
|  | HDL | 1.34 ± 0.46 |  | 1.28 ± 0.39 |  | 0.662 |

**3.3 Atherogenic Indices (CRI-I, CRI-II, AIP, and AC) Among Study Participants**

 The result of the analysis of atherogenic indices in the study population(Table.3) shows the distribution of atherogenic indices—Castelli Risk Index I(CRI-I), Castelli Risk Index II(CRI-II), Atherogenic Index of Plasma(AIP), and Atherogenic Coefficient(AC)—among participants categorized by age group.

Among participants aged 18–39, the mean CRI-I was 4.13 ± 1.28, while CRI-II was 2.40 ± 0.86, both of which fall within the moderate cardiovascular risk range. The AIP showed a mean of -0.04 ± 0.21(median: -0.04, IQR: -0.14–0.06), suggesting a low atherogenic risk. The AC averaged 3.13 ± 1.28, also indicating a moderate risk level.

In the 40–59 age group, CRI-I slightly decreased to 3.84 ± 1.29, and CRI-II slightly increased to 2.52 ± 1.12. AIP decreased to -0.08 ± 0.23(median: -0.08, IQR: -0.21–0.05), remaining within the low-risk range. Similarly, the AC declined to 2.80 ± 1.29, showing a marginal reduction in lipid-related cardiovascular risk compared to the younger age group.

Participants aged 60 and older exhibited a mild increase in mean CRI-I (4.04 ± 1.42) and CRI-I I (2.66 ± 1.00), suggesting a slight rise in lipid-related cardiovascular risk among older individuals. The AIP, while highly variable (-0.35 ± 2.27), had a median of -0.04(IQR: -0.20–0.10), remaining within the low-risk category. Notably, the AC displayed a significant increase in mean value to 7.25 ± 29.00, largely influenced by an extreme outlier (maximum value of 208.00). Despite this, the median AC (2.96, IQR: 2.19–4.09) stayed consistent with younger age groups, indicating that the high mean does not accurately represent the typical participant in this age category.

In summary, the atherogenic indices (particularly CRI-I and CRI-II) remained within moderate ranges across all age groups, with only mild fluctuations observed as age progressed. AIP consistently stayed in the low-risk category, indicating a more stable and reliable measure of atherogenic risk. The substantial variation in AC among older participants highlights the influence of outliers and the need to consider both mean and median values for a balanced interpretation of lipid-related cardiovascular risk across age groups.

**Table 3: Atherogenic Indices (CRI-I, CRI-II, AIP, and AC) by Age Group among Study Participants**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Age Group** | **Parameter** | **Mean ± SD** | **Min** | **Max** | **Median (IQR)** |
| 18 – 39 | Castelli Risk Index I (CRI-I) | 4.13 ± 1.28 | 2.13 | 8.37 | 3.98 (3.17–4.88) |
|  | Castelli Risk Index II (CRI-II) | 2.40 ± 0.86 | 1.26 | 5.19 | 2.17 (1.84–2.94) |
|  | Atherogenic Index of Plasma (AIP) | -0.04 ± 0.21 | -0.67 | 0.29 | -0.04 (-0.14–0.06) |
|  | Atherogenic Coefficient (AC) | 3.13 ± 1.28 | 1.13 | 7.37 | 2.99 (2.17–3.89) |
| 40 – 59 | Castelli Risk Index I (CRI-I) | 3.84 ± 1.29 | 1.55 | 8.52 | 3.46 (3.15–4.37) |
|  | Castelli Risk Index II (CRI-II) | 2.52 ± 1.12 | 0.55 | 6.07 | 2.24 (1.87–2.96) |
|  | Atherogenic Index of Plasma (AIP) | -0.08 ± 0.23 | -0.54 | 0.53 | -0.08 (-0.21–0.05) |
|  | Atherogenic Coefficient (AC) | 2.80 ± 1.29 | 0.55 | 7.52 | 2.44 (2.15–3.30) |
| 60+ | Castelli Risk Index I (CRI-I) | 4.04 ± 1.42 | 0.95 | 7.99 | 3.78 (3.12–4.90) |
|  | Castelli Risk Index II (CRI-II) | 2.66 ± 1.00 | 1.09 | 4.67 | 2.33 (1.94–3.58) |
|  | Atherogenic Index of Plasma (AIP) | -0.35 ± 2.27 | -16.00 | 0.51 | -0.04 (-0.20–0.10) |
|  | Atherogenic Coefficient (AC) | 7.25 ± 29.00 | 0.84 | 208.00 | 2.96 (2.19–4.09) |

**3.4 Comparison of Lipid Profile Parameters and Atherogenic Indices between Men with Normal and Elevated PSA Levels**

The analysis comparing lipid profile parameters and atherogenic indices between men with normal and elevated prostate-specific antigen(PSA) levels(Table 4) indicates that total cholesterol(TC) was slightly higher in the elevated PSA group(5.06 ± 1.59 mmol/L) compared to the normal PSA group(4.78 ± 1.12 mmol/L), however, this difference was not statistically significant(p = 0.229).

Triglyceride (TG) levels were lower in the elevated PSA group (1.05 ± 0.36 mmol/L) compared with the normal PSA group (1.15 ± 0.42 mmol/L), with a p-value of 0.185, suggesting no significant difference.

However, low-density lipoprotein (LDL) cholesterol levels were significantly higher in the elevated PSA group (3.43 ± 1.24 mmol/L) compared to the normal PSA group (2.93 ± 0.95 mmol/L), resulting in a p-value of 0.009. This indicates a statistically significant increase and may suggest a link between elevated PSA levels and increased LDL cholesterol.

High-density lipoprotein (HDL) levels were slightly higher in men with elevated PSA (1.35 ± 0.44 mmol/L) compared to those with normal PSA (1.27 ± 0.42 mmol/L), but the difference was not statistically significant (p = 0.268).

The Atherogenic Index of Plasma (AIP) showed more negative values in the elevated PSA group (-0.48 ± 2.53) compared to the normal group (-0.04 ± 0.22), however, the large standard deviation in the elevated group and a p-value of 0.075 indicate high variability and a lack of statistical significance.

For the Castelli Risk Indices, CRI-I was almost identical between groups (4.02 ± 1.38 vs. 3.96 ± 1.19, p = 0.812), and CRI-II was also not significantly different (2.47 ± 1.01 vs. 2.68 ± 0.97, p = 0.260).

The Atherogenic Coefficient (AC) was higher in the normal PSA group (4.89 ± 19.59) compared to the elevated PSA group (3.03 ± 1.17), however, the difference was not significant (p = 0.549). The wide standard deviation in the normal PSA group indicates the presence of extreme outliers.

In summary, among the lipid parameters and atherogenic indices compared between men with normal and elevated PSA levels, only LDL cholesterol showed a statistically significant difference, which is higher in the elevated PSA group. Other parameters, including TC, TG, HDL, AIP, CRI-I, CRI-II, and AC, did not show significant differences, however, AIP and AC values exhibited high variability, particularly in the elevated PSA group, likely due to outliers.

**Table 4: Comparison of Lipid Profile Parameters and Atherogenic Indices between Men with Normal and Elevated PSA Levels**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Normal PSA** **(Mean ± SD)** | **Elevated PSA (Mean ± SD)** | **P –value** |
| Total Cholesterol (TC) | 4.78 ± 1.12 | 5.06 ± 1.59 | 0.229 |
| Triglycerides (TG) | 1.15 ± 0.42 | 1.05 ± 0.36 | 0.185 |
| LDL | 2.93 ± 0.95 | 3.43 ± 1.24 | 0.009 |
| HDL | 1.27 ± 0.42 | 1.35 ± 0.44 | 0.268 |
| Atherogenic Index of Plasma (AIP) | -0.04 ± 0.22 | -0.48 ± 2.53 | 0.075 |
| Castelli Risk Index I (CRI-I) | 4.02 ± 1.38 | 3.96 ± 1.19 | 0.812 |
| Castelli Risk Index II (CRI-II) | 2.47 ± 1.01 | 2.68 ± 0.97 | 0.260 |
| Atherogenic Coefficient (AC) | 4.89 ± 19.59 | 3.03 ± 1.17 | 0.549 |

P < 0.05 was considered statistically significant

**Discussion**

This study found that serum LDL-C levels were significantly higher among men with elevated PSA compared to those with normal PSA, suggesting that LDL-C may serve as a metabolic marker associated with prostate enlargement or other prostate conditions. These findings are consistent with reports from other populations, such as the study by Kim et al. (2017) in Korean men and the large Chinese cohort examined by Zhang et al. (2021), which similarly observed higher LDL-C in men with increased PSA or prostate disease. Together, these results reinforce the hypothesis that lipid metabolism, particularly LDL-C, may influence PSA levels and potentially contribute to prostate pathology.

Mechanistically, elevated LDL-C can lead to greater cholesterol accumulation in the membranes of prostatic epithelial cells, which may alter androgen receptor signaling and stimulate cell proliferation (Pelton et al., 2012). Freeman and Solomon (2004) also described how cholesterol-rich membrane rafts could promote oncogenic signaling pathways within the prostate, potentially facilitating tumor development. These biological mechanisms provide a plausible explanation for the association between higher LDL-C and increased PSA observed in this study.

Interestingly, the composite atherogenic indices—CRI-I, CRI-II, AIP, and AC—did not emerge as significant predictors of elevated PSA in this cohort. This aligns with earlier findings from Nigerian studies such as Akinloye et al. (2010) and more recent work by Omoyinmi et al. (2021), both of which reported a lack of association between these indices and PSA levels. While these indices are established markers for cardiovascular risk (Millán et al., 2009; Dobiásová, 2004), our findings suggest they may not effectively reflect prostate-specific metabolic changes. This distinction highlights that while lipid ratios capture systemic cardiovascular risk, individual lipid fractions like LDL-C may be more relevant for prostate disease.

Age ≥60 years was identified as the strongest independent predictor of PSA elevation, consistent with the well-documented increase in prostate volume, benign hyperplasia, and risk of malignancy associated with aging (Thompson et al., 2005; Mottet et al., 2022). These age-related changes support the clinical recommendation to use age-adjusted PSA reference ranges (Loeb & Carter, 2013), which can help improve screening specificity and reduce unnecessary biopsies among older men.

The correlation analysis in this study revealed a strong positive relationship between total cholesterol and LDL-C (r = 0.85–0.92, p < 0.001), confirming LDL-C as a major contributor to total serum cholesterol. This pattern mirrors broader lipid metabolism trends described by Grundy et al. (2005), where LDL-C accounts for a substantial proportion of total cholesterol levels. In contrast, HDL-C showed only moderate correlations, suggesting a more independently regulated role in lipid homeostasis.

Beyond the statistical associations, these findings may have practical implications for prostate disease screening in Nigerian men and similar populations. Including lipid profile assessments—particularly LDL-C—in routine PSA testing could improve risk stratification, especially in men aged 60 and above who are at higher baseline risk. Additionally, lifestyle interventions that lower LDL-C, such as dietary modification and statin use, have been associated with reductions in serum PSA levels (Smith et al., 2022), hinting at potential dual benefits for cardiovascular and prostate health.

While this study's cross-sectional design limits causal interpretations, it contributes valuable localized evidence by highlighting LDL-C’s potential role in prostate health—an area previously underexplored in Nigerian settings. The data suggest that LDL-C may have a more direct relationship with PSA elevation compared to composite lipid ratios, supporting a more targeted approach to prostate risk assessment. Collectively, these findings emphasize the value of integrating metabolic profiling, demographic risk factors like age, and clinical history to enhance early detection and personalized management of prostate disorders. Such an integrated strategy could be particularly impactful in resource-limited settings, where access to specialized prostate care is constrained.

Ultimately, this study adds to the growing body of evidence linking metabolic health with prostate disease and underscores the importance of further longitudinal research to clarify these associations and inform evidence-based screening guidelines tailored to local populations.

**Conclution:** This study examined the relationship between prostate-specific antigen (PSA), serum lipid profiles, and atherogenic indices among adult males in Abuja, Nigeria. The findings revealed a significant positive association between elevated LDL-C and PSA levels, suggesting that LDL-C may have a role in prostate biology and could complement PSA in assessing prostate risk. In contrast, composite atherogenic indices did not independently predict PSA elevation.

Age ≥60 years emerged as the strongest predictor of higher PSA levels, highlighting the influence of advancing age on prostate changes. The results support the potential clinical benefit of including lipid profile testing, particularly LDL-C measurement, in routine prostate health assessments to improve early detection and risk stratification. Although this study’s cross-sectional design limits conclusions about causality, it provides valuable local evidence and suggests the need for larger prospective studies that explore additional metabolic and inflammatory markers. Integrating metabolic, demographic, and clinical factors could ultimately enhance early detection and personalized management of prostate disorders in this setting.

**ETHICAL APPROVAL**

Ethical approval was obtained from the Health Research Ethics Committees of UATH and FMC Jabi.

**COMPETING INTERESTS DISCLAIMER:**

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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