

## Research Article

# Determinants of Noncommunicable Diseases in Urban and Peri-urban Areas in Rivers State, Nigeria

Alozie Hanachor Alozie Nwafor <sup>1\*</sup>, Priscilia Nyekpunwo Ogbonda <sup>1</sup>, Clement Kevin Edet<sup>2</sup> and Anthony Ike Wegbom <sup>1</sup>

<sup>1</sup>Department of Public Health Sciences, Rivers State University, Port Harcourt, Nigeria.

<sup>2</sup>Department of Community Medicine, Rivers State University, Port Harcourt, Nigeria.

\*Corresponding author: [nwafor.alozie@rsu.edu.ng](mailto:nwafor.alozie@rsu.edu.ng)

## Article Info

**Keywords:** Noncommunicable diseases, Hypertension, Diabetes mellitus, Urban-peri-urban disparity, Epidemiology, Socio-demographic determinants.

**Received:** 03.09.2026;

**Accepted:** 29.09.2026;

**Published:** 06.10.2026



© 2026 by the author's. The terms and conditions of the Creative Commons Attribution (CC BY) license apply to this open access article.

## Abstract

Noncommunicable diseases (NCDs) constitute an increasing public health problem occasioned by rapid urbanisation and lifestyle transitions. In Rivers State, Nigeria, the contrast between industrial urban centres like Port Harcourt and surrounding peri-urban areas may create distinct NCD risk profiles. This study sought to determine the prevalence of key NCDs (hypertension, diabetes mellitus, and chronic respiratory disease) among adults in urban and peri-urban communities in Rivers State and to evaluate their socio-demographic determinants. A community-based cross-sectional study was conducted among 652 adult residents (326 urban and 326 peri-urban) aged 18 years and above in Rivers State. Data were collected using a structured, interviewer-administered questionnaire adapted from the World Health Organization (WHO) STEPwise approach to NCD risk factor surveillance. Self-reported healthcare provider diagnosis of NCDs served as the primary outcome variable. Descriptive statistics were summarized as frequencies and percentages, and multivariable logistic regression analyses were performed to estimate crude (COR) and adjusted odds ratios (AOR) at 95% confidence intervals (CI) for predictors of NCD status. NCD prevalence was consistently higher in urban compared to peri-urban communities. Hypertension was the most prevalent condition across both settings (33.0% urban vs. 23.3% peri-urban), followed by diabetes mellitus (14.7% urban vs. 8.6% peri-urban) and multimorbidity (18.6% urban vs. 11.8% peri-urban). Older age was strongly associated with NCDs in urban areas, with adults aged >64 years exhibiting higher odds of hypertension (AOR = 8.23, 95% CI: 2.35–28.82) and diabetes (AOR = 5.55, 95% CI: 1.09–28.25) compared to those aged 18–24 years. Currently married (AOR = 2.05, 95% CI: 1.12–3.75) and previously married (AOR = 2.68, 95% CI: 1.16–6.19) urban residents had significantly higher odds of hypertension. Higher educational attainment conferred a significant protective effect against diabetes in peri-urban areas (AOR = 0.42, 95% CI: 0.20–0.88). Monthly income was not a statistically significant predictor of NCDs in either setting. In view of the distinct patterns of socio-demographic risks, context-specific health interventions is recommended. Target strategies should include age-focused screenings in urban centres and health literacy initiatives in peri-urban communities.

## 1. Introduction

Noncommunicable diseases (NCDs) constitute a silent health crisis, impacting individuals, families, and healthcare systems [1, 2]. They develop gradually, often with no obvious warning signs and immediate consequences, shaping lives before their full impact is felt [3]. Their asymptomatic nature makes detection, monitoring, and effective management difficult. NCDs are medical conditions that cannot be transmitted from one person to another [4], and they are not caused by infectious agents [5]. They are driven principally by uncontrolled changes in the environment and unhealthy lifestyles and behaviours such as smoking, physical inactivity, unhealthy diets, etc [6].

The World Health Organisation reports that NCDs account for 75% of global mortality, with over 73% of this figure attributable to low- and middle-income countries [4, 7]. This situation is worsened by the shift in disease burden from communicable diseases such as malaria to noncommunicable diseases in sub-Saharan African countries [8, 9]. In Nigeria, it is estimated that NCDs are responsible for approximately 29% of all annual deaths [10, 11].

In the Nigerian context, Rivers State presents a peculiar and understudied scenario. Port Harcourt, the hub of Nigeria's oil and gas sector, has witnessed remarkable expansion and increased administrative and commercial activities [12]. This has given rise to steady rural-to-urban migration and has resulted in changes in livelihoods, diets, and daily activity patterns across Port Harcourt metropolis and its surrounding local government areas. Industrialisation has improved the standard of living [13], while at the same time indirectly contributing to the rise in NCD prevalence through changes in lifestyle and unhealthy diets [14, 15]. The peri-urban local government areas are socio-economically and environmentally distinct, lacking infrastructure and occupational characteristics present in urban centres [16]. This contrast between the industrial urban and peri-urban communities raises the possibility that residents of these two settings face different sets of NCD risks. However, the two are rarely examined together, in the same study, using comparable methods.

It is against this backdrop that the present study is undertaken to estimate the overall and disease-specific prevalence of key noncommunicable diseases, namely hypertension, diabetes mellitus, and obesity, among adult residents of selected urban and peri-urban areas of Rivers State, evaluate the independent socio-demographic determinants of these conditions, including age, gender, household income, educational attainment, and occupation, and to examine whether the strength or pattern of these associations differs between the urban and peri-urban populations.

## 2. Materials and Methods

### Study Area

This study was conducted in urban and peri-urban communities in Rivers State, Nigeria. Peri-urban areas are located between urban and rural areas, serving as a transition zone between the two settlements [17].

### Study Design

The cross-sectional comparative research design was adopted for the study because it allows the comparison of two distinct groups at one point in time.

### Study Population and Sampling

The population for the study consisted of all adult residents (18 years and above) who have lived in the state for at least 6 months. Visitors or temporary residents, and adults who cannot comprehend and respond accurately, were excluded from the study. The exact population is unknown due to the absence of official records. The sample size for the study was determined using the standard statistical sample size determination formula for comparing two proportions, giving 326 persons for both urban and peri-urban communities.

### Data Collection and Variables

Data were collected using a structured, interviewer-administered questionnaire adapted from the World Health Organisation (WHO) STEPwise Approach to Noncommunicable Disease Risk Factor Surveillance (STEPS) instrument, to elicit information on respondents' socio-demographic characteristics and self-reported history of selected noncommunicable diseases. The primary outcome variable was the presence of a noncommunicable disease, defined as a self-reported previous diagnosis of at least one of the selected NCDs by a healthcare professional. The independent variables included socio-demographic characteristics such as age, sex, marital status, educational level, occupation, employment status, monthly income, household size, and place of residence (urban or peri-urban).

### Statistical Analysis

Descriptive statistics were analysed using frequencies and percentages, while multivariable logistic regression was used to identify the socio-demographic predictors independently associated with NCD status.

## 3. Results

**Table 1:** Socio-demographic Characteristics of Respondents

| Characteristic              | Urban (%)       | Peri-Urban (%)  | p-value |
|-----------------------------|-----------------|-----------------|---------|
| <b>Age group (years)</b>    |                 |                 | 0.042   |
| 18–24                       | 32 (10.3)       | 41 (13.1)       |         |
| 25–44                       | 142 (45.5)      | 148 (47.3)      |         |
| 45–64                       | 109 (34.9)      | 92 (29.4)       |         |
| >64                         | 29 (9.3)        | 32 (10.2)       |         |
| Mean $\pm$ SD               | 43.1 $\pm$ 11.9 | 42.3 $\pm$ 12.7 | 0.358   |
| <b>Household size group</b> |                 |                 | 0.010   |
| 1 person                    | 18 (5.8)        | 12 (3.8)        |         |
| 2–3 persons                 | 84 (26.9)       | 63 (20.1)       |         |
| 4–5 persons                 | 130 (41.7)      | 126 (40.3)      |         |
| >5 persons                  | 80 (25.6)       | 112 (35.8)      |         |
| Mean $\pm$ SD               | 5.0 $\pm$ 1.9   | 5.4 $\pm$ 2.3   | 0.010   |
| <b>Sex</b>                  |                 |                 | 0.642   |
| Male                        | 143 (45.8)      | 149 (47.6)      |         |
| Female                      | 169 (54.2)      | 164 (52.4)      |         |
| <b>Marital status</b>       |                 |                 | 0.040   |
| Single                      | 85 (27.2)       | 60 (19.2)       |         |
| Currently married           | 192 (61.5)      | 216 (69.0)      |         |
| Previously married          | 35 (11.2)       | 37 (11.8)       |         |
| <b>Education level</b>      |                 |                 | <0.001  |
| No formal education         | 9 (2.9)         | 16 (5.1)        |         |
| Primary                     | 36 (11.5)       | 66 (21.1)       |         |
| Secondary                   | 117 (37.5)      | 151 (48.2)      |         |
| Higher                      | 150 (48.1)      | 80 (25.6)       |         |
| <b>Monthly income (₦)</b>   |                 |                 | <0.001  |
| < 100,000                   | 82 (26.3)       | 162 (51.8)      |         |
| 100,000 – 200,000           | 101 (32.4)      | 103 (32.9)      |         |
| > 200,000                   | 129 (41.3)      | 48 (15.3)       |         |
| <b>Type of dwelling</b>     |                 |                 | <0.001  |
| Detached/Apartment/Duplex   | 246 (78.8)      | 191 (61.0)      |         |
| Room/Slum/Other             | 66 (21.2)       | 122 (39.0)      |         |
| <b>Length of residence</b>  |                 |                 | <0.001  |
| < 1 year                    | 48 (15.4)       | 30 (9.6)        |         |
| 1–5 years                   | 140 (44.9)      | 105 (33.5)      |         |
| 6–10 years                  | 72 (23.1)       | 95 (30.4)       |         |
| > 10 years                  | 52 (16.7)       | 83 (26.5)       |         |

Table 1 shows that urban and peri-urban communities have considerable similarities in their age and sex profiles. The majority of respondents (approx. 45–47%) fall in the 25–44 age group, which is the economically engaged age band, while the mean age is  $43.1 \pm 11.9$  and  $42.3 \pm 12.7$  for urban and peri-urban settings, respectively. Females make up a narrow majority of the respondents in both settings (54.2% urban, 52.4% peri-urban). In terms of marital status of the respondents, peri-urban dwellers are more likely to be currently married (69.0% vs 61.5%) compared to their urban counterparts.

A wide socio-economic gap between the two populations is clearly observed in their level of education, monthly income and type of dwelling. Urban respondents are nearly twice as likely to hold higher education (48.1% vs 25.6%) and to earn above N200,000/month (41.3% vs 15.3%), and are far more likely to live in detached houses, apartments, or duplexes (78.8% vs 61.0%). This shows that the urban and peri-urban dichotomy in Rivers State represents distinct socio-economic strata, not just different locations.

**Table 2:** Prevalence of Self-reported NCDs Among Respondents

| Disease Condition               | Urban (%)  | 95% CI    | Peri-urban (%) | 95% CI    |
|---------------------------------|------------|-----------|----------------|-----------|
| Hypertension                    | 103 (33.0) | 27.8–38.2 | 73 (23.3)      | 18.6–28.0 |
| Diabetes Mellitus               | 46 (14.7)  | 10.8–18.6 | 27 (8.6)       | 5.5–11.7  |
| Chronic Respiratory Disease     | 23 (7.4)   | 4.5–10.3  | 15 (4.8)       | 2.4–7.2   |
| Heart Disease / Stroke          | 14 (4.5)   | 2.2–6.8   | 8 (2.6)        | 0.8–4.4   |
| Cancer                          | 5 (1.6)    | 0.2–3.0   | 2 (0.6)        | 0.0–1.4   |
| Chronic Kidney Disease          | 7 (2.2)    | 0.6–3.8   | 2 (0.6)        | 0.0–1.4   |
| Multimorbidity ( $\geq 2$ NCDs) | 58 (18.6)  | 14.3–22.9 | 37 (11.8)      | 8.2–15.4  |

Table 2 shows the prevalence of non-communicable diseases (NCDs) among respondents. Generally, the urban group showed higher prevalence for all the conditions listed, compared to the Peri-urban group. Hypertension was the most common condition in both settings (33.0% Urban vs. 23.3% Peri-urban), followed by diabetes mellitus. Cancer and chronic kidney disease are the least prevalent conditions in both areas.

**Table 3:** Prevalence of NCDs (Hypertension, Diabetes Mellitus, and Chronic Respiratory Disease) across Socio-demographic Characteristics in Urban and Peri-urban Areas of Rivers State

| Characteristic             | Urban     |           | Peri-Urban |           | Chronic Respiratory Disease |          | Diabetes Mellitus |           | Hypertension |           | Chronic Respiratory Disease |          | Diabetes Mellitus |          | Hypertension |          | Chronic Respiratory Disease |          |
|----------------------------|-----------|-----------|------------|-----------|-----------------------------|----------|-------------------|-----------|--------------|-----------|-----------------------------|----------|-------------------|----------|--------------|----------|-----------------------------|----------|
|                            | Yes (%)   | 95% CI    | Yes (%)    | 95% CI    | Yes (%)                     | 95% CI   | Yes (%)           | 95% CI    | Yes (%)      | 95% CI    | Yes (%)                     | 95% CI   | Yes (%)           | 95% CI   | Yes (%)      | 95% CI   | Yes (%)                     | 95% CI   |
| <b>Age group (years)</b>   |           |           |            |           |                             |          |                   |           |              |           |                             |          |                   |          |              |          |                             |          |
| 18–24                      | 4 (12.5)  | 3.5–29.0  | 2 (6.3)    | 0.8–20.8  | 1 (3.1)                     | 0.1–16.2 | 6 (14.6)          | 0.1–16.2  | 6 (14.6)     | 0.1–16.2  | 2 (4.9)                     | 0.6–16.5 | 1 (2.4)           | 0.1–12.9 | 2 (4.9)      | 0.6–16.5 | 1 (2.4)                     | 0.1–12.9 |
| 25–44                      | 38 (26.8) | 19.7–34.7 | 16 (11.3)  | 6.6–17.7  | 7 (4.9)                     | 2.0–9.9  | 28 (18.9)         | 13.1–26.0 | 28 (18.9)    | 13.1–26.0 | 9 (6.1)                     | 2.8–11.2 | 4 (2.7)           | 0.7–6.8  | 9 (6.1)      | 2.8–11.2 | 4 (2.7)                     | 0.7–6.8  |
| 45–64                      | 45 (41.3) | 32.0–51.0 | 20 (18.3)  | 11.6–27.0 | 10 (9.2)                    | 4.5–16.2 | 28 (30.4)         | 21.4–40.9 | 28 (30.4)    | 21.4–40.9 | 11 (12.0)                   | 6.1–20.4 | 6 (6.5)           | 2.4–13.6 | 11 (12.0)    | 6.1–20.4 | 6 (6.5)                     | 2.4–13.6 |
| >64                        | 16 (55.2) | 35.7–73.6 | 8 (27.6)   | 12.7–47.2 | 5 (17.2)                    | 5.9–35.8 | 11 (34.4)         | 19.2–52.8 | 11 (34.4)    | 19.2–52.8 | 5 (15.6)                    | 5.3–32.8 | 4 (12.5)          | 3.5–29.0 | 5 (15.6)     | 5.3–32.8 | 4 (12.5)                    | 3.5–29.0 |
| <b>Sex</b>                 |           |           |            |           |                             |          |                   |           |              |           |                             |          |                   |          |              |          |                             |          |
| Male                       | 47 (32.9) | 25.2–41.3 | 21 (14.7)  | 9.4–21.6  | 11 (7.7)                    | 3.9–13.3 | 33 (22.1)         | 15.8–29.6 | 33 (22.1)    | 15.8–29.6 | 12 (8.1)                    | 4.2–13.6 | 7 (4.7)           | 1.9–9.4  | 12 (8.1)     | 4.2–13.6 | 7 (4.7)                     | 1.9–9.4  |
| Female                     | 56 (33.1) | 26.1–40.8 | 25 (14.8)  | 9.9–21.0  | 12 (7.1)                    | 3.7–12.1 | 40 (24.4)         | 18.0–31.8 | 40 (24.4)    | 18.0–31.8 | 15 (9.1)                    | 5.2–14.7 | 8 (4.9)           | 2.1–9.4  | 15 (9.1)     | 5.2–14.7 | 8 (4.9)                     | 2.1–9.4  |
| <b>Marital status</b>      |           |           |            |           |                             |          |                   |           |              |           |                             |          |                   |          |              |          |                             |          |
| Single                     | 18 (21.2) | 13.1–31.4 | 8 (9.4)    | 4.1–17.7  | 3 (3.5)                     | 0.7–10.0 | 9 (15.0)          | 7.1–26.6  | 9 (15.0)     | 7.1–26.6  | 3 (5.0)                     | 1.0–13.9 | 2 (3.3)           | 0.4–11.5 | 3 (5.0)      | 1.0–13.9 | 2 (3.3)                     | 0.4–11.5 |
| Currently married          | 70 (36.5) | 29.7–43.7 | 32 (16.7)  | 11.7–22.7 | 16 (8.3)                    | 4.8–13.1 | 55 (25.5)         | 19.8–31.9 | 55 (25.5)    | 19.8–31.9 | 21 (9.7)                    | 6.1–14.4 | 11 (5.1)          | 2.6–8.9  | 21 (9.7)     | 6.1–14.4 | 11 (5.1)                    | 2.6–8.9  |
| Previously married         | 15 (42.9) | 26.3–60.7 | 6 (17.1)   | 6.6–33.6  | 4 (11.4)                    | 3.2–26.7 | 9 (24.3)          | 11.8–41.2 | 9 (24.3)     | 11.8–41.2 | 3 (8.1)                     | 1.7–21.9 | 2 (5.4)           | 0.7–18.2 | 3 (8.1)      | 1.7–21.9 | 2 (5.4)                     | 0.7–18.2 |
| <b>Educational level</b>   |           |           |            |           |                             |          |                   |           |              |           |                             |          |                   |          |              |          |                             |          |
| No formal                  | 4 (44.4)  | 13.7–78.8 | 2 (22.2)   | 2.8–60.0  | 1 (11.1)                    | 0.3–48.2 | 5 (31.3)          | 11.0–58.7 | 5 (31.3)     | 11.0–58.7 | 2 (12.5)                    | 1.6–38.3 | 2 (12.5)          | 1.6–38.3 | 2 (12.5)     | 1.6–38.3 | 2 (12.5)                    | 1.6–38.3 |
| Primary                    | 14 (38.9) | 23.1–56.5 | 6 (16.7)   | 6.4–32.8  | 3 (8.3)                     | 1.8–22.5 | 18 (27.3)         | 17.1–39.6 | 18 (27.3)    | 17.1–39.6 | 7 (10.6)                    | 4.4–20.6 | 4 (6.1)           | 1.7–14.8 | 7 (10.6)     | 4.4–20.6 | 4 (6.1)                     | 1.7–14.8 |
| Secondary                  | 39 (33.3) | 24.9–42.6 | 18 (15.4)  | 9.4–23.2  | 9 (7.7)                     | 3.6–14.1 | 38 (25.2)         | 18.4–32.9 | 38 (25.2)    | 18.4–32.9 | 14 (9.3)                    | 5.2–15.1 | 7 (4.6)           | 1.9–9.3  | 14 (9.3)     | 5.2–15.1 | 7 (4.6)                     | 1.9–9.3  |
| Higher                     | 46 (30.7) | 23.4–38.7 | 20 (13.3)  | 8.3–19.8  | 10 (6.7)                    | 3.2–11.9 | 12 (15.0)         | 8.0–24.7  | 12 (15.0)    | 8.0–24.7  | 4 (5.0)                     | 1.4–12.3 | 2 (2.5)           | 0.3–8.7  | 4 (5.0)      | 1.4–12.3 | 2 (2.5)                     | 0.3–8.7  |
| <b>Monthly income (₦)</b>  |           |           |            |           |                             |          |                   |           |              |           |                             |          |                   |          |              |          |                             |          |
| < 100,000                  | 30 (36.6) | 26.2–47.9 | 13 (15.9)  | 8.8–25.6  | 7 (8.5)                     | 3.5–16.8 | 41 (25.3)         | 18.8–32.8 | 41 (25.3)    | 18.8–32.8 | 16 (9.9)                    | 5.8–15.5 | 9 (5.6)           | 2.6–10.3 | 16 (9.9)     | 5.8–15.5 | 9 (5.6)                     | 2.6–10.3 |
| 100,000–200,000            | 34 (33.7) | 24.6–43.7 | 15 (14.9)  | 8.6–23.3  | 8 (7.9)                     | 3.5–15.0 | 24 (23.3)         | 15.6–32.6 | 24 (23.3)    | 15.6–32.6 | 8 (7.8)                     | 3.4–14.7 | 4 (3.9)           | 1.1–9.6  | 8 (7.8)      | 3.4–14.7 | 4 (3.9)                     | 1.1–9.6  |
| > 200,000                  | 39 (30.2) | 22.5–38.8 | 18 (14.0)  | 8.5–21.1  | 8 (6.2)                     | 2.7–11.8 | 8 (16.7)          | 7.4–30.2  | 8 (16.7)     | 7.4–30.2  | 3 (6.3)                     | 1.3–17.2 | 2 (4.2)           | 0.5–14.3 | 3 (6.3)      | 1.3–17.2 | 2 (4.2)                     | 0.5–14.3 |
| <b>Household size</b>      |           |           |            |           |                             |          |                   |           |              |           |                             |          |                   |          |              |          |                             |          |
| 1 person                   | 6 (33.3)  | 13.3–59.0 | 2 (11.1)   | 1.4–34.7  | 1 (5.6)                     | 0.1–27.3 | 2 (16.7)          | 2.1–48.4  | 2 (16.7)     | 2.1–48.4  | 1 (8.3)                     | 0.2–38.5 | 0 (0.0)           | 0.0–26.5 | 1 (8.3)      | 0.2–38.5 | 0 (0.0)                     | 0.0–26.5 |
| 2–3 persons                | 27 (32.1) | 22.5–43.0 | 12 (14.3)  | 7.6–23.6  | 5 (6.0)                     | 2.0–13.4 | 13 (20.6)         | 11.5–32.7 | 13 (20.6)    | 11.5–32.7 | 5 (7.9)                     | 2.6–17.6 | 2 (3.2)           | 0.4–11.0 | 5 (7.9)      | 2.6–17.6 | 2 (3.2)                     | 0.4–11.0 |
| 4–5 persons                | 43 (33.1) | 25.0–42.0 | 20 (15.4)  | 9.7–22.8  | 10 (7.7)                    | 3.8–13.7 | 30 (23.8)         | 16.7–32.2 | 30 (23.8)    | 16.7–32.2 | 11 (8.7)                    | 4.4–15.1 | 6 (4.8)           | 1.8–10.1 | 11 (8.7)     | 4.4–15.1 | 6 (4.8)                     | 1.8–10.1 |
| > 5 persons                | 27 (33.8) | 23.6–45.2 | 12 (15.0)  | 8.0–24.7  | 7 (8.8)                     | 3.6–17.2 | 28 (25.0)         | 17.3–34.1 | 28 (25.0)    | 17.3–34.1 | 10 (8.9)                    | 4.4–15.8 | 7 (6.3)           | 2.5–12.5 | 10 (8.9)     | 4.4–15.8 | 7 (6.3)                     | 2.5–12.5 |
| <b>Type of dwelling</b>    |           |           |            |           |                             |          |                   |           |              |           |                             |          |                   |          |              |          |                             |          |
| Detached/Apartment         | 82 (33.3) | 27.5–39.6 | 37 (15.0)  | 10.8–20.1 | 18 (7.3)                    | 4.4–11.3 | 42 (22.0)         | 16.4–28.5 | 42 (22.0)    | 16.4–28.5 | 15 (7.9)                    | 4.5–12.7 | 8 (4.2)           | 1.8–8.1  | 15 (7.9)     | 4.5–12.7 | 8 (4.2)                     | 1.8–8.1  |
| Duplex                     |           |           |            |           |                             |          |                   |           |              |           |                             |          |                   |          |              |          |                             |          |
| Room/Slum/Other            | 21 (31.8) | 21.0–44.3 | 9 (13.6)   | 6.4–24.3  | 5 (7.6)                     | 2.5–16.8 | 31 (25.4)         | 18.0–34.1 | 31 (25.4)    | 18.0–34.1 | 12 (9.8)                    | 5.2–16.5 | 7 (5.7)           | 2.3–11.5 | 12 (9.8)     | 5.2–16.5 | 7 (5.7)                     | 2.3–11.5 |
| <b>Length of residence</b> |           |           |            |           |                             |          |                   |           |              |           |                             |          |                   |          |              |          |                             |          |
| < 1 year                   | 13 (27.1) | 15.3–42.0 | 5 (10.4)   | 3.5–22.7  | 2 (4.2)                     | 0.5–14.3 | 5 (16.7)          | 5.6–34.7  | 5 (16.7)     | 5.6–34.7  | 2 (6.7)                     | 0.8–22.1 | 1 (3.3)           | 0.1–17.2 | 2 (6.7)      | 0.8–22.1 | 1 (3.3)                     | 0.1–17.2 |
| 1–5 years                  | 44 (31.4) | 23.9–39.7 | 19 (13.6)  | 8.4–20.3  | 9 (6.4)                     | 3.0–11.8 | 22 (21.0)         | 13.7–29.9 | 22 (21.0)    | 13.7–29.9 | 8 (7.6)                     | 3.3–14.5 | 4 (3.8)           | 1.0–9.5  | 8 (7.6)      | 3.3–14.5 | 4 (3.8)                     | 1.0–9.5  |
| 6–10 years                 | 27 (37.5) | 26.4–49.7 | 12 (16.7)  | 8.9–27.3  | 6 (8.3)                     | 3.1–17.3 | 24 (25.3)         | 16.9–35.3 | 24 (25.3)    | 16.9–35.3 | 9 (9.5)                     | 4.4–17.2 | 5 (5.3)           | 1.7–11.9 | 9 (9.5)      | 4.4–17.2 | 5 (5.3)                     | 1.7–11.9 |
| > 10 years                 | 19 (36.5) | 23.6–51.0 | 10 (19.2)  | 9.6–32.5  | 6 (11.5)                    | 4.4–23.4 | 22 (26.5)         | 17.5–37.3 | 22 (26.5)    | 17.5–37.3 | 8 (9.6)                     | 4.2–18.1 | 5 (6.0)           | 2.0–13.5 | 8 (9.6)      | 4.2–18.1 | 5 (6.0)                     | 2.0–13.5 |



COR = Crude Odds Ratio; AOR = Adjusted Odds Ratio; CI = Confidence Interval; 1.00 = reference category. \* Statistically significant association (95% CI excludes 1.00).

Table 3 shows the crosstabulation of NCD prevalence across socio-demographic characteristics for the three most common conditions (hypertension, diabetes mellitus, and chronic respiratory disease). This provides the baseline (reference) values used to compute crude odds ratio (COR) and adjusted odds ratio (AOR).

Table 4 tests each socio-demographic factor against the three leading conditions in urban and peri-urban settings simultaneously. From the adjusted vs crude estimates, significant differences in the pattern of associations between urban and peri-urban communities were observed.

For hypertension, age showed a dose-response association that is statistically significant with increased odds of hypertension, with urban residents aged >64 years having more than 8 times odds of the condition (AOR = 8.23, 95% CI: 2.35-28.82), while the peri-urban residents aged >64 years had almost 3 times odds of hypertension (AOR = 2.98, 95% CI: 0.99-8.96). For marital status, findings from urban and peri-urban settings point in the same direction, though the effect is significant in urban settings. Urban residents who are currently married had twice the odds for hypertension (AOR = 2.05, 95% CI: 1.12-3.75), while those who were previously married had nearly three times the odds for the condition (AOR = 2.68, 95% CI: 1.16-6.19). Among the peri-urban residents, those who are currently married and those who were previously married have twice the odds for hypertension (AOR = 1.90, 95% CI: 0.88–4.10) and (AOR = 1.78, 95% CI: 0.65–4.88), respectively.

For diabetes mellitus, age was found to increase the odds of diabetes significantly among urban dwellers aged >64 years (AOR = 5.55, 95% CI: 1.09-28.25) relative to the reference group (18 - 24 years). In peri-urban settings, individuals with higher education had significantly lower adjusted odds of diabetes when compared to those with no formal or primary education (AOR = 0.42, 95% CI: 0.20-0.88). In peri-urban areas, residents with higher education demonstrated significantly lower crude odds of chronic respiratory disease (COR = 0.18, 95% CI: 0.03-0.99) compared to the reference group. This effect was not statistically significant when adjusted (AOR = 0.19, 95% CI: 0.03-1.05). Monthly income did not statistically predict the three most common conditions in both settings, but the estimates indicate slightly lower odds of these conditions in higher-income categories compared with the reference groups.

## 4. Discussion

This study examined socio-demographic determinants of the three most common NCDs in urban and peri-urban communities in Rivers State, Nigeria. From the results, age emerged as a primary determinant of these conditions across the two cohorts. Similar patterns have been reported by [18] in the United States and [19], where the prevalence of hypertension increased with age. It is also consistent with patterns reported by [20], that diabetes burden increased across age groups worldwide. This is in agreement with the findings of [21], that age drives diabetes prevalence in urban areas. For chronic respiratory disease, the age-related trend mirrors the patterns reported by [22], who found increasing COPD prevalence among older adults.

The positive graded (dose-response) association between older age groups and hypertension in urban settings (AOR = 4.76 for 45-64 years; AOR = 8.23 for >64 years) shows that an increase in exposure increases the severity of the outcome. Urban centres are marked by consumption of processed foods, reduced physical activity, and increased stressors [23]. Prolonged exposure to these risk factors contributes to metabolic dysfunction and elevated blood pressure, thereby increasing the odds of noncommunicable diseases [24]. Peri-urban residents aged >64 years had statistically significantly higher crude odds for hypertension (COR = 3.04). This statistical strength was lost after multivariable adjustment (AOR = 2.98, 95% CI: 0.99-8.96), suggesting that age may not be the primary driver of hypertension in peri-urban areas. This finding aligns with the findings of [25], that hypertension was a result of socio-demographic determinants and lifestyle.

Across both settings, educational level and monthly income demonstrated a protective effect on hypertension, diabetes mellitus, and chronic respiratory disease. This aligns with reports by [26, 27] that lower educational attainment was associated with greater diabetes and hypertension risks. Educational attainment is a powerful determinant of NCDs by protecting against them. Higher education equips people with the ability to obtain relevant health information and makes them capable of making informed decisions about diet, lifestyle, and environmental exposure. This enables them not only to adopt healthy lifestyles, but also to comply with screening, preventive, and management procedures [28]. It is also instructive to point out that higher education can equally contribute to NCDs indirectly. Better employment opportunities associated with higher education could lead to physical inactivity and eating more processed foods. Hence, education and income can be said to have contrasting gradients on NCDs.

Monthly income did not affect the three conditions in both urban and peri-urban settings. In other words, the availability or lack of finance does not raise or reduce the chances of having the conditions. This implies that income is not a strong determinant of noncommunicable diseases. This assertion does not agree with the findings of [29] that income influences the susceptibility to NCDs. This trend could be attributed to unhealthy feeding habits and lifestyles people adopt when they have more income at their disposal. This is corroborated by the findings of a survey by [30] that linked higher economic status to greater odds of alcohol use and of an unhealthy diet than lower economic status.

A statistically significant association was seen between marital status and urban hypertension, where currently married ("AOR"=2.05) and previously married ("AOR"=2.68) residents exhibited higher odds of hypertension relative to single individuals. This aligns with the findings from a Nigerian survey by [25], which significantly associated being married with hypertension. The higher NCD burden among married individuals may reflect age effects, as married individuals tend to be older than single individuals, or may be explained by lifestyle factors associated with marriage, including shared dietary patterns [31] and reduced physical activity [32]. Traditionally, marriage is considered a protective social support system in high-income countries, but literature from sub-Saharan Africa shows varying associations [33]. In a traditional Nigerian setting like Port Harcourt and its surrounding metropolitan areas, marital and family obligations are usually associated with increased domestic financial burden, larger household management demands, and elevated psychosocial stress [34]. Again, shared domestic dietary patterns may result in uniform exposure of married individuals to NCDs [23].

## 5. Conclusion

The findings of the study reveal a higher prevalence of NCDs among urban dwellers compared to their peri-urban counterparts, with hypertension as the most prevalent condition in both settings. Age and marital status are key socio-demographic factors that influence NCD patterns in both settings. Attainment of higher education served as a protective factor, while income had no statistically significant relationship with NCD. These research findings emphasise the different socio-demographic determinants influencing urban and peri-urban health profiles. To mitigate this trend, community-based screening clinics should be established in both urban and peri-urban primary health centres, with priority attention given to adults aged 45 years and above, particularly in urban centres where age-related risk is highest. Also, health promotion campaigns that would help individuals manage domestics and occupational stressors, encourage routine check-ups and healthy lifestyles, should be designed.

## Article Information

**Ethical Approval:** Ethical approval was obtained from the Research Ethics Committee of Rivers State University, prior to commencement of the study.

**Informed Consent:** Written informed consent was obtained from all participants before their inclusion in the study.

**Consent for Publication:** Consent to publish was obtained from the participants in the study.

**Data Availability:** The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** The authors declare that they received no external financial support for this study, and the research was fully self-funded.

**Author Contributions:** A.H.A.N. - Conceptualization, Data Curation, Software, Formal Analysis, Methodology, Writing – Original Draft, Writing – Review & Editing; P.N.O. - Conceptualization, Data Curation, Validation, Methodology, Writing – Original Draft, Writing – Review & Editing; C.K.E. - Conceptualization, Data Curation, Validation, Methodology, Writing – Original Draft, Writing – Review & Editing; A.I. W. - Conceptualization, Data Curation, Software, Validation, Methodology, Writing – Original Draft, Writing – Review & Editing.

**Acknowledgments:** The authors extend their profound appreciation to residents of Port Harcourt, Obio/Akpor, Eleme and Etche Local Government Areas of Rivers State for their collaboration during this research. We thank you for your time and effort.

**AI Use Disclosure:** No generative artificial intelligence tools were used in the preparation of this manuscript.

## References

- [1] I. R. Hambleton, R. Caixeta, S. M. Jeyaseelan, S. Luciani, and A. J. M. Hennis. The rising burden of non-communicable diseases in the Americas and the impact of population aging: A secondary analysis of available data. *Lancet regional health. Americas*, 21:100483, 2023. URL <https://doi.org/10.1016/j.lana.2023.100483>.
- [2] O. Freihat, D. Sipos, M. Aamir, and A. Kovacs. Global burden and future projections of non-communicable diseases (2000–2050): Progress toward SDG 3.4 and disparities across regions and risk factors. *PLoS One*, 20(12):e0336036, 2025. URL <https://doi.org/10.1371/journal.pone.0336036>.
- [3] A. Pirrello, D. G. Mancuso, C. Pace, A. Immordino, V. Meli, F. Tramuto, A. Casuccio, and P. Immordino. An observational study on non-communicable disease risk factors among healthcare workers in high-stress environments. *Front in Public Health*, 13:1609034, 2025. URL <https://doi.org/10.3389/fpubh.2025.1609034>.
- [4] World Health Organization. Noncommunicable diseases. *World Health Organization*, 2025. URL <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>.
- [5] B. N. Pham, R. Jorry, N. Abori, V. D. Silas, A. D. Okely, and W. Pomat. Non-communicable diseases attributed mortality and associated sociodemographic factors in Papua New Guinea: Evidence from the Comprehensive Health and Epidemiological Surveillance System. *PLOS global public health*, 2(3):e0000118, 2022. URL <https://doi.org/10.1371/journal.pgph.0000118>.
- [6] S. Alidoost, M. Maleki, and H. Poursaghari. Identifying drivers and factors affecting behavioral risk factors of noncommunicable diseases: A scoping review. *Journal of education and health promotion*, 10:398, 2021. URL [https://doi.org/10.4103/jehp.jehp\\_1379\\_20](https://doi.org/10.4103/jehp.jehp_1379_20).
- [7] D. Doh, R. Dahwa, and A. M. N. Renzaho. A Scoping Review of Non-Communicable Diseases among the Workforce as a Threat to Global Peace and Security in Low-Middle Income Countries. *International journal of environmental research and public health*, 21(9): 1143, 2024. URL <https://doi.org/10.3390/ijerph21091143>.
- [8] H. N. Gouda, F. Charlson, K. Sorsdahl, S. Ahmadzada, A. J. Ferrari, H. Erskine, J. Leung, D. Santamauro, C. Lund, L. N. Aminde, B. M. Mayosi, A. P. Kengne, M. Harris, T. Achoki, C. S. Wiysonge, D. J. Stein, and H. Whiteford. Burden of non-communicable diseases in sub-Saharan Africa, 1990–2017: Results from the Global Burden of Disease Study 2017. *The Lancet. Global health*, 7(10): e1375–e1387, 2019. URL [https://doi.org/10.1016/S2214-109X\(19\)30374-2](https://doi.org/10.1016/S2214-109X(19)30374-2).

- [9] Z. Li, J. Shi, N. Li, M. Wang, Y. Jin, and Z. Zheng. Temporal trends in the burden of non-communicable diseases in countries with the highest malaria burden, 1990–2019: Evaluating the double burden of non-communicable and communicable diseases in epidemiological transition. *Globalization and health*, 18(1):90, 2022. URL <https://doi.org/10.1186/s12992-022-00882-w>.
- [10] World Health Organization. Nigeria fulfils commitment, launches Plan for the Prevention and Control of Non-Communicable Diseases. *Regional Office for Africa*, 2019. URL <https://www.afro.who.int/news/nigeria-fulfils-commitment-launches-plan-prevention-and-control-non-communicable-diseases>.
- [11] M. A. Adesina, R. I. Oladele, I. I. Olufadewa, O. F. Onothoja, D. R. Oladipo, O. P. Iyiola, M. B. Ekott, P. C. Nwachukwu, A. Baru, and S. J. Akinloye. Addressing the high burden of noncommunicable diseases in Nigeria: A commentary. *Journal of Health Research*, 35(5):457–462, 2021. URL <https://doi.org/10.1108/JHR-02-2020-0039>.
- [12] B. G. Ameme, E. C. Dike, and F. C. Wachukwu. The dynamics of land use and urban sprawl in the outskirts of Port Harcourt, Rivers State, Nigeria. *The International Journal of Research and Scientific Innovation*, 12(2):491–499, 2025. URL <https://doi.org/10.51244/IJRSI.2025.12020042>.
- [13] P. Siyakiya, M. M. Erdoğan, and E. Ç. Akay. Impact of industrialisation on economic development in selected African and Asian economies: The role of institutional quality and investment climate. *SN Business & Economics*, 3(12):211, 2023. URL <https://link.springer.com/article/10.1007/s43546-023-00585-3>.
- [14] M. A. Bhuiyan, N. Galdes, S. Cuschieri, and P. Hu. A comparative systematic review of risk factors, prevalence, and challenges contributing to non-communicable diseases in South Asia, Africa, and Caribbeans. *Journal of health, population, and nutrition*, 43:140, 2024. URL <https://doi.org/10.1186/s41043-024-00607-2>.
- [15] E. N. Nweke. Noncommunicable diseases prevention in low- and middle-income countries: An overview of health in all policies (HiAP). *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, 58, 2021. URL <https://doi.org/10.1177/0046958020927885>.
- [16] I. O. Olamiju and J. O. Ojo. Exploring infrastructure development in peri-urban communities of developing nations: The Boluwaji example. *International Journal of Research and Innovation in Social Science*, 9(8):7806–7821, 2025. URL <https://doi.org/10.47772/IJRISS.2025.908000650>.
- [17] J. Ravetz and M. Sahana. Where is the peri-urban? A working definition and global typology. In M. Sahana, editor, *Remote Sensing and GIS in Peri-Urban Research: Perspectives on Global Change, Sustainability and Resilience*, pages 3–25. Elsevier, 2024. URL <https://doi.org/10.1016/B978-0-443-15832-2.00001-0>.
- [18] K. T. Mills, A. Stefanescu, and J. He. The global epidemiology of hypertension. *Nature reviews. Nephrology*, 16(4):223–237, 2020. URL <https://doi.org/10.1038/s41581-019-0244-2>.
- [19] A. V. Agho, H. L. Jiwo, T. B. Oni, O. O. Ayo, P. I. Oghenebrume, S. Nansimbi, O. L. Vera Colon, S. Khan, and O. E. Okobi. Trends in hypertension diagnosis and self-reported cases: A retrospective analysis of National Health Interview Survey (NHIS) database. *Cureus*, 17(3):e80655, 2025. URL <https://doi.org/10.7759/cureus.80655>.
- [20] NCD and Risk Factor Collaboration. Worldwide trends in diabetes prevalence and treatment from 1990 to 2022: A pooled analysis of 1,108 population-representative studies with 141 million participants. *Lancet (London, England)*, 404(10467):2077–2093, 2024. URL [https://doi.org/10.1016/S0140-6736\(24\)02317-1](https://doi.org/10.1016/S0140-6736(24)02317-1).
- [21] A. I. Wegbom, P. N. Ogbonda, and N. N. Akani Samuel. Determinants of diabetes-hypertension comorbidity among pregnant women attending primary healthcare centres in urban Rivers State, Nigeria. *World Journal of Public Health*, 11(2):92–104, 2026. URL <https://doi.org/10.11648/j.wjph.20261102.11>.
- [22] Y. Meng, Q. Ji, A. Zhang, and Y. Zhan. Trends in the prevalence and incidence of chronic obstructive pulmonary disease among adults aged  $\geq 50$  years in the United States, 2000–2020. *Chronic diseases and translational medicine*, 10(4):302–311, 2024. URL <https://doi.org/10.1002/cdt3.135>.
- [23] D. Adeloye, E. O. Owolabi, D. B. Ojji, A. Auta, M. T. Dewan, T. O. Olanrewaju, O. S. Ogah, C. Omoyele, N. Ezeigwe, R. G. Mpazanje, M. A. Gadanya, E. Agogo, W. Alemu, A. O. Adebisi, and M. O. Harhay. Prevalence, awareness, treatment, and control of hypertension in Nigeria in 1995 and 2020: A systematic analysis of current evidence. *Journal of clinical hypertension (Greenwich, Conn.)*, 23(5):963–977, 2021. URL <https://doi.org/10.1111/jch.14220>.
- [24] S. Cohen, D. Janicki-Deverts, and G. E. Miller. Psychological stress and disease. *JAMA*, 298(14):1685–1687, 2007. URL <https://doi.org/10.1001/jama.298.14.1685>.
- [25] A. S. Adeke, B. S. Chori, D. Neupane, J. E. Sharman, and A. N. Odili. Socio-demographic and lifestyle factors associated with hypertension in Nigeria: Results from a country-wide survey. *Journal of human hypertension*, 38:365–370, 2024. URL <https://doi.org/10.1038/s41371-022-00673-1>.
- [26] Y. Luo, X. Li, T. Yang, et al. Impact of education level on complications and mortalities in type 2 diabetes: A UK Biobank prospective cohort study. *BMC Public Health*, 25:3434, 2025. URL <https://doi.org/10.1186/s12889-025-24491-5>.
- [27] M. I. Hossain, M. Datta Gupta, T. F. Ohi, and M. M. Rahman. Bayesian analysis of non-communicable diseases risk factors: A focus on the lower-educated population in Bangladesh. *International health*, 17(4):499–508, 2025. URL <https://doi.org/10.1093/inthealth/ihae087>.

- [28] D. Nutbeam and J. E. Lloyd. Understanding and responding to health literacy as a social determinant of health. *Annual review of public health*, 42:159–173, 2021. URL <https://doi.org/10.1146/annurev-publhealth-090419-102529>.
- [29] M. O. Akpo, G. I. Edo, T. S. Gaaz, J. O. Orogun, R. S. Makia, E. E. A. Oghraro, J. O. Owheruo, E. Yousif, A. Jikah, A. Ufuoma, A. E. A. Essaghah, I. A. Fuwape, M. R. Aliyu, U. Huzaifa, and D. S. Ahmed. The burden of non-communicable diseases in Nigeria. *Discover Public Health*, 23:711, 2026. URL <https://doi.org/10.1186/s12982-026-02046-2>.
- [30] P. Vichitkunakorn, W. Bunyanukul, K. Apiwan, D. Tanasanchonakul, and M. Sittisombut. Prevalence of non-communicable disease risk factors and their association with economic status: Findings from the 2021 health behaviour of population survey in Thailand. *Glob Health Action*, 18(1):2485689, 2025. URL <https://doi.org/10.1080/16549716.2025.2485689>.
- [31] P. K. Singh, L. Singh, S. K. Saroj, C. Kumar, S. Kashyap, and S. Singh. Spousal concordance in overweight and obesity among Indian couples: A nationwide analysis of socioeconomic and dietary determinants. *Current developments in nutrition*, 9(7):107489, 2025. URL <https://doi.org/10.1016/j.cdnut.2025.107489>.
- [32] S. Yuan, K. K. Elam, J. D. Johnston, and A. Chow. The influence of marriage and cohabitation on physical activity among middle-aged and older people. *Journal of applied gerontology : the official journal of the Southern Gerontological Society*, 43(2):139–148, 2024. URL <https://doi.org/10.1177/07334648231203124>.
- [33] A. N. Odili, B. S. Chori, B. Danladi, P. C. Nwakile, I. C. Okoye, U. Abdullahi, M. N. Nwegbu, K. Zawaya, I. Essien, K. Sada, J. O. Ogedengbe, A. Aje, and G. C. Isiguzo. Prevalence, awareness, treatment and control of hypertension in Nigeria: Data from a nationwide survey 2017. *Global heart*, 15(1):47, 2020. URL <https://doi.org/10.5334/gh.848>.
- [34] D. Agomuo, M. Akpa, and D. Alasia. Lipid profile of healthy adult Nigerians in Port Harcourt, Nigeria. *Nigerian journal of medicine : journal of the National Association of Resident Doctors of Nigeria*, 15(2):137–140, 2006. URL <https://doi.org/10.4314/njm.v15i2.37097>.