

Research Article

Prevalence of Non-Communicable Disease Behavioural Risk Factors and Their Sociodemographic Associates Among Adults in Limbe, Cameroon

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Abstract

Introduction: Non-communicable diseases (NCDs) account for over 36% of deaths in Cameroon, primarily attributable to behavioural risk factors. This study aimed to assess the prevalence of NCD behavioural risk factors and their sociodemographic associates among adults in Limbe, Cameroon. **Methods:** A community-based cross-sectional study was conducted among 298 adults recruited using a multistage sampling technique. Data were collected using a modified version of the WHO STEPs instrument for NCD risk factors. Multivariable logistic regression was used to ascertain sociodemographic associates. Statistical significance was set at $p\text{-value} < 0.05$ with a 95% CI. **Results:** The overall prevalence of tobacco use, alcohol use, unhealthy diet, insufficient physical activity, and overweight was 12.1%, 76.5%, 84.2%, 18.4%, and 37.9%. Smoking was significantly associated with females (AOR: 0.2, 95% CI: 0.1 - 0.4), employed individuals (AOR: 0.1, 95% CI: 0.02 - 0.3) and age 28 - 37 years (AOR: 7.6, 95% CI: 1.9 - 29.7). Current alcohol use was significantly associated with females (AOR: 0.4, 95% CI: 0.2 - 0.8), and age 38 - 47 years (AOR: 1.1, 95% CI: 0.7 - 4.3). Insufficient physical activity was significantly associated with females (AOR: 0.3, 95% CI: 0.2 - 0.7), age 48 - 57 years (AOR: 0.2, 95% CI: 0.1 - 0.8), and secondary education (AOR: 0.5, 95% CI: 0.3 - 0.7). Being married (AOR: 3.2, 95% CI: 1.1 - 9.4), employed (AOR: 3.9, 95% CI: 3.6 - 7.3), and retired (AOR: 4.6, 95% CI: 3.1 - 8.1) were significantly associated with overweight/obesity. **Conclusion:** We observed a high prevalence of tobacco use and alcohol use, low fruit/vegetable intake, and high prevalence of overweight/obesity. Gender, age, marital status, employment, and education significantly influence these risk factors. More population-specific interventions are required to address the growing NCD burden in Cameroon.

Keywords

Prevalence, Risk Behaviours, Non-communicable Diseases, Adults, Limbe, Cameroon

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1. Introduction

According to the World Health Organisation, non-communicable diseases (NCDs) were responsible for about 43 million deaths globally in 2021. Middle-income and low-income countries account for 82% of these premature deaths. The major risk factors associated with these deaths are tobacco use, unhealthy diets, harmful use of alcohol, and insufficient physical activity [1]. Globally, among the major risk factors, systolic blood pressure, dietary risk, and tobacco use contributed 12.8%, 10%, and 9.9%, respectively, to the age-standardised DALYs for NCDs [2].

Africa's NCD burden has been attributed to several factors, including ageing, rapid unplanned urbanisation and industrialisation, increasing food market globalisation, and the adoption of unhealthy lifestyle behaviours. Tobacco consumption, sedentary lifestyles characterised by physical inactivity, the harmful use of alcohol and unhealthy diets high in saturated fats, sugars and salt increase the risk of dying from NCDs [3].

Cameroon is experiencing a double burden of communicable and noncommunicable diseases, with about 35.7% of all deaths associated with NCDs in 2021 [4]. The age-standardised mortality rate across four major NCDs was 841 per 100,000 males and 652 per 100,000 females in 2021 [5]. Studies on the major risk factors associated with NCD burden have indicated high prevalence in behavioural risk factors. In Cameroon, studies have reported that almost 6.5% of adults smoke; 14.88% are obese [6]; 27% are physically inactive; and the mean daily salt consumption among adults may exceed 5 g/day [7]. These risk factors are poorly studied in Cameroon, although evidence points to their higher prevalence. The data on these risk factors and their distributions among different population subgroups are rarely available to inform interventions [8].

This study adds empirical literature to the limited existing information on the major behavioural risk factors of NCDs, to help inform policies and the development of cost-effective population-based interventions. This study helps inform health stakeholders at both the national and community levels in strengthening health literacy through health education campaigns, improving understanding of non-communicable disease behavioural risk factors and the prevention of NCDs.

The purpose of this study is to determine the prevalence of major behavioural risk factors of non-communicable diseases and their sociodemographic associates among adults in Limbe, Cameroon.

2. Method

2.1. Study Design and Setting

The study was a community-based cross-sectional study, based on the WHO STEPwise Approach to NCD Surveillance. The study area comprised three selected neighbourhoods (Mile 1, Mile 2, and Mile 4) in the Limbe municipality.

2.2. Study Participants and Sampling

The study population were adults aged 18 years and above. We included adults who were of the target age, permanent residents in the study area for at least 6 months, and who gave consent to participate in the study. Those with a known medical diagnosis of any of the four major NCDs and/or those who were mentally unfit to participate in the study were excluded. The sample size was determined using the formula $n = Z^2p(1-p)/d^2$, with a 95% confidence level, a 0.05 margin of error, a 26% prevalence of overweight [9], and an assumed 10% non-response rate. The estimated sample size for this study was 326. However, we had complete data from 298 participants. A multistage sampling method was used to recruit participants; in the first stage, we purposively selected three neighbourhoods (deemed relatively safe due to the ongoing socio-political crisis in the region). In the second stage, we spun a bottle at the roundabout in each neighbourhood to randomly select the direction for household sampling. In the third stage, all households along the selected streets were visited, and adults who met the inclusion criteria were invited to participate in the study. Using a simple sampling technique (lottery method), we recruited one consenting member from each household to be interviewed.

2.3. Variables

The study variables were sociodemographic and NCD risk factor variables. NCD risk factor variables included tobacco use, alcohol consumption, fruit and vegetable consumption, physical activity, and body mass index. Use of tobacco was categorised into current smokers (individuals who had smoked any tobacco product within one month before the study) and current non-smokers (individuals who had not smoked any tobacco product within one month before the study). Alcohol consumption was categorised into Past 12 months' abstainer (individuals who did not consume any alcoholic drink within the past 1 year before the study) and Past 12 months' drinker (individuals who had consumed any alcoholic drink within the past 1 year before the study). We measured fruit and vegetable consumption by recoding the number of days participants consumed them each week. Consumption was adequate when participants consumed fruits/vegetables daily. Physical activity was categorised into sufficient physical activity (defined as ≥ 150 minutes of moderate-intensity activity per week) and insufficient physical activity (defined as < 150 minutes of moderate-intensity activity per week). Height was measured in centimetres using a stadiometer with the participant standing barefoot and upright against a wall. Weight was measured in kilograms using a standard weighing scale. Body mass index (BMI) was calculated as: $BMI = \text{Weight (kg)} / \text{Height (m)}^2$. BMI was categorised according to the WHO classification into the following categories: underweight ($< 18.5 \text{ kg/m}^2$), normal weight ($18.5 - 24.9 \text{ kg/m}^2$), overweight ($25 - 29.9 \text{ kg/m}^2$), and obese ($\geq 30 \text{ kg/m}^2$).

2.4. Data Collection and Analysis

Data were collected using a self-administered modified version of the WHO STEPwise questionnaire between November and December 2021. The collected data were entered, cleaned, and coded in Excel 2016, then exported to SPSS version 22 for analysis. Descriptive tables were prepared to present qualitative variables as frequencies and percentages. A chi-square test was used to assess differences between proportions, and logistic regression was used to determine the association between variables. To adjust for possible confounders, only variables with p-values < 0.2 in the bivariate analysis were included in the multivariable logistic regression model. A p-value < 0.05 was considered statistically significant, and adjusted odds ratios with 95% confidence intervals were reported to reflect the strength and precision of associations.

2.5. Ethical Consideration

The study received ethical clearance from the Faculty of Health Sciences Institutional Review Board of the University of Buea with reference number 2020/1401-01/UB/SG/IRB/FHS. Administrative authorisation was obtained from the Regional Delegation of Public Health for the South West Region and local authorities at the data collection

sites. Informed consent was obtained from each participant after information about the study was explained in detail. Participants were assigned codes to ensure the confidentiality of information collected.

3. Results

3.1. Socio-demographic Characteristics of Study Participants

Table 1 shows the distribution of respondents according to sociodemographic characteristics. A total of 298 participants completed the study, of whom the majority, 67.8% (202), were women. The mean age of the respondents was 34 years (± 14), with most, 39.6% (188), in the 18 - 27 years' category. Regarding marital status, 50.5% (102) of women and 56.3% (54) of men were single. For educational status, 51.5% (104) of women and 50% (48) of men were of the secondary education category. Concerning occupational status, 67.3% (136) of women and 56.3% (54) of men were employed. For monthly income, 65.3% (132) of women and 52.1% (50) of men earned less than 50,000 FCFA monthly. There was a statistically significant difference between gender categories for age, occupation, and monthly income.

Table 1. Socio-demographic characteristics of study participants.

Socio-demographic variable	Female (n = 202; 67.8%), n (%)	Male (n = 96; 32.2%), n (%)	Both genders (n = 298; 100%), n (%)	p-value
Age (years)				0.02
18 - 27	86 (42.6)	32 (33.3)	118 (39.6)	
28 - 37	66 (32.7)	22 (22.9)	88 (29.5)	
38 - 47	22 (10.9)	18 (18.8)	40 (13.4)	
48 - 57	10 (5)	6 (6.3)	16 (5.4)	
58 - 67	12 (5.9)	10 (10.4)	22 (7.4)	
68 and above	6 (3)	8 (8.3)	14 (4.7)	
Marital status				0.4
Single	102 (50.5)	54 (56.3)	156 (52.3)	
Married	78 (38.6)	36 (37.5)	114 (38.3)	
Divorced	4 (2)	0 (0)	4 (1.3)	
Widowed	18 (8.9)	6 (6.3)	24 (8.1)	
Educational status				0.54
Primary	50 (24.8)	20 (20.8)	70 (23.5)	
Secondary	104 (51.5)	48 (50)	152 (51)	
Tertiary	48 (23.8)	28 (29.2)	76 (25.5)	

Socio-demographic variable	Female (n = 202; 67.8%), n (%)	Male (n = 96; 32.2%), n (%)	Both genders (n = 298; 100%), n (%)	p-value
Occupational status				0.03
Student/unemployed	56 (27.7)	30 (31.3)	86 (28.9)	
Employed	136 (67.3)	54 (56.3)	190 (63.8)	
Retired	10 (5)	12 (12.5)	22 (7.4)	
Monthly income/FCFA				0.03
Less than 50000	132 (65.3)	50 (52.1)	182 (61.1)	
50000 - 100000	24 (11.9)	10 (10.4)	34 (11.4)	
Above 100000	46 (22.8)	36 (37.5)	82 (27.5)	

3.2. Prevalence of NCD Risk Behaviours

Table 2 depicts the prevalence of NCD risk behaviours according to gender of the study participants. Among the study subjects, 22.9% (n = 22) of men and 6.9% (n = 14) of women were current smokers (p-value = 0.005).

Regarding alcohol consumption, 89.6% (n = 86) of men and 75.3% (n = 152) of women had consumed alcohol at one point in the past (p-value = 0.04). 83.7% (n = 72) of men and 72.4%

(n = 110) of women had consumed alcohol in the past 12 months before the study (p-value = 0.04).

The overall prevalence of daily consumption of fruits and vegetables was 15.8% (47), males and females had proportions of 12.5% (12) and 17.3% (35), respectively (p-value = 0.28). A total of 70.8% (68) of men and 86.9% (172) of women had sufficient physical activity (p-value = 0.001). Overweight was observed in 34.4% (33) of men and 39.6% (80) of women, while obesity was observed in 34.4% (33) of men and 32.7% (66) of women (p-value = 0.63).

Table 2. Prevalence of NCD risk behaviours.

Variable	Male (n = 96; 32.2%), n (%)	Female (n = 202; 67.8%), n (%)	Both genders (n = 298; 100%), n (%)	p value
Smoking status				0.005
Current smokers	22 (22.9)	14 (6.9)	36 (12.1)	
Current non-smokers	74 (77.1)	188 (93.1)	262 (87.9)	
Alcohol use				
Life-time abstainer	10 (10.4)	50 (24.8)	60 (20.3)	0.04
Ever consumed alcohol	86 (89.6)	152 (75.3)	238 (79.9)	
Past 12 months abstainer	14 (16.3)	42 (27.63)	56 (23.5)	0.04
Past 12 months drinker	72 (83.7)	110 (72.4)	182 (76.5)	
Consumption of fruits/vegetables				0.28
Inadequate	84 (87.5)	167 (82.7)	251 (84.2)	
Adequate	12 (12.5)	35 (17.3)	47 (15.8)	
Physical activity				0.001
Insufficient	28 (29.2)	26 (13.1)	54 (18.4)	
Sufficient	68 (70.8)	172 (86.9)	240 (81.6)	

Variable	Male (n = 96; 32.2%), n (%)	Female (n = 202; 67.8%), n (%)	Both genders (n = 298; 100%), n (%)	p value
Body mass index				0.63
Normal weight	30 (31.3)	56 (27.7)	86 (28.9)	
Overweight	33 (34.4)	80 (39.6)	113 (37.9)	
Obese	33 (34.4)	66 (32.7)	99 (33.2)	

3.3. Associated Factors

Table 3 illustrates that females were less likely to smoke (AOR = 0.2, 95% CI = 0.1 - 0.4). Respondents who were 28 - 37 years were 7.6 times more likely to smoke (AOR = 7.6, 95% CI = 1.9 - 29.7) compared to those aged 18 - 27 years. The odds of smoking were lower among respondents who were divorced (AOR = 0.2, 95% CI: 0.01 - 0.4) compared to those who were single. Respondents who were employed had significantly lower odds of smoking (AOR = 0.1, 95% CI: 0.02 - 0.3) compared to students/unemployed.

Females were less likely to consume alcohol than males (AOR = 0.4, 95% CI = 0.2 - 0.8). Respondents aged 38 - 47 years had significantly higher odds of drinking alcohol (AOR = 1.1, 95% CI: 0.7 - 4.3) compared to those aged 18 - 27 years (Table 4).

Table 5 shows that females had significantly lower odds of

physical inactivity (AOR: 0.3, 95% CI = 0.2 - 0.7). Respondents aged 28 - 37 years were less likely to be physically inactive (AOR = 0.2, 95% CI: 0.1 - 0.8) compared to those aged 18 - 27 years. Also, respondents aged 48 - 57 years had significantly lower odds of being physically inactive (AOR = 0.2, 95% CI = 0.1 - 0.8). Respondents who belong to the secondary education category were less likely to be physically inactive (AOR = 0.5, 95% CI = 0.3 - 0.7) compared to respondents belonging to the primary education category.

Table 6 illustrates that married respondents were 3.2 times more likely to be overweight/obese (AOR = 3.2, 95% CI = 1.1 - 9.4). Employed respondents have 3.9 times higher odds of overweight/obesity (AOR = 3.9, 95% CI = 3.6 - 7.3), and retired respondents have 4.6 times higher odds (AOR = 4.6, 95% CI: 3.1 - 8.1) of overweight/obesity compared to students/unemployed. Occupational status is a strong predictor of overweight/obesity.

Table 3. Factors associated with smoking among study participants.

Socio-demographic variables	COR (95% CI)	p value	AOR (95% CI)	p value
Gender (ref: males)				
Females	0.3 (0.1 - 0.5)	0.001	0.2 (0.1 - 0.4)	0.001
Age (ref: 18 - 27) years				
28 - 37	1.8 (0.7 - 5.0)	0.23	7.6 (1.9 - 29.7)	0.004
38 - 47	0.7 (0.3 - 2.1)	0.61	2.7 (0.7 - 9.9)	0.14
48 - 57	0.9 (0.2 - 4.6)	0.94	6.9 (0.7 - 7.8)	0.08
58 - 67	1.3 (0.3 - 6.4)	0.71	7.1 (0.7 - 9.5)	0.08
68 and above	0.2 (0.1 - 0.6)	0.005	0.4 (0.06 - 2.9)	0.37
Marital status (ref: single)				
Married	0.6 (0.3 - 1.3)	0.19	0.5 (0.1 - 1.6)	0.22
Divorced	0.1 (0.01 - 0.8)	0.02	0.2 (0.01 - 0.4)	0.001
Widowed	0.4 (0.1 - 1.6)	0.25	0.3 (0.1 - 2.6)	0.28
Educational status (ref: primary)				
Secondary	1.2 (0.5 - 2.8)	0.61	0.5 (0.1 - 1.7)	0.26

Socio-demographic variables	COR (95% CI)	p value	AOR (95% CI)	p value
Tertiary	1.4 (0.5 - 3.8)	0.49	1.3 (0.3 - 5.6)	0.77
Occupational status (ref: unemployed)				
Employed	0.5 (0.2 - 1.3)	0.16	0.1 (0.02 - 0.3)	0.001
Retired	0.2 (0.1 - 0.7)	0.01	0.2 (0.02 - 1.4)	0.27

Table 4. Factors associated with alcohol consumption among study participants.

Socio-demographic variables	COR (95% CI)	p value	AOR (95% CI)	p value
Gender (ref: males)				
Females	0.4 (0.2 - 0.7)	0.005	0.4 (0.2 - 0.8)	0.01
Age (ref: 18 - 27) years				
28 – 37	0.4 (0.2 - 0.8)	0.009	0.5 (0.2 - 1.2)	0.09
38 – 47	0.1 (0.02 - 0.5)	0.003	1.1 (0.7 - 4.3)	0.007
48 – 57	0.3 (0.1 - 1.4)	0.12	0.4 (0.1 - 2.1)	0.24
58 – 67			1.7 (0.4 - 2.6)	0.91
68 and above	0.8 (0.2 - 2.9)	0.78	0.4 (0.04 - 5.3)	0.58
Educational status (ref: primary)				
Secondary	2.1 (1.02 - 4.6)	0.05	1.2 (0.5 - 4.7)	0.38
Tertiary	0.9 (0.4 - 2.3)	0.84	0.7 (0.2 - 2.5)	0.63
Occupational status (ref: unemployed)				
Employed	0.4 (0.2 - 0.8)	0.006	0.7 (0.3 - 2.01)	0.62
Retired	0.5 (0.2 - 1.7)	0.26	9.2 (0.6 - 13.9)	0.54
Monthly income (ref: < 50000)/FCFA				
50000 – 100000	0.2 (0.1 - 0.9)	0.04	0.6 (0.1 - 2.9)	0.51
Above 100000	1.01 (0.3 - 3.2)	0.97	4.3 (1.9 - 6.5)	0.06

Table 5. Factors associated with physical inactivity among study participants.

Socio-demographic variables	COR (95% CI)	p value	AOR (95% CI)	p value
Gender (ref: males)				
Females	0.4 (0.2 - 0.7)	0.001	0.3 (0.2 - 0.7)	0.003
Age (ref: 18 - 27)				
28 – 37	0.2 (0.1 - 0.4)	0.001	0.2 (0.1 - 0.8)	0.02
38 – 47	0.3 (0.1 - 1)	0.05	0.7 (0.2 - 3.4)	0.67
48 – 57	0.1 (0.02 - 0.3)	0.001	0.2 (0.1 - 0.8)	0.02
58 – 67	0.1 (0.02 - 0.2)	0.001	0.2 (0.04 - 1.1)	0.06
68 and above	0.1 (0.02 - 0.3)	0.001	0.5 (0.1 - 3.5)	0.45
Marital status (ref: single)				

Socio-demographic variables	COR (95% CI)	p value	AOR (95% CI)	p value
Married	0.5 (0.3 - 1.1)	0.07	1.9 (0.8 - 4.6)	0.13
Divorced	2.4 (1.4 - 8.6)	0.99	4.2 (0.9 - 6.2)	0.99
Widowed	0.2 (0.1 - 0.5)	0.001	1.1 (0.3 - 4)	0.89
Educational status (ref: primary)				
Secondary	5.7 (2.7 - 11.8)	0.001	0.5 (0.3 - 0.7)	0.004
Tertiary	2.6 (1.2 - 5.6)	0.01	2.2 (0.9 - 5.6)	0.08
Occupational status (ref: unemployed)				
Employed	0.2 (0.1 - 0.6)	0.002	0.5 (0.1 - 2.2)	0.37
Retired	0.1 (0.01 - 0.2)	0.001	0.1 (0.02 - 1.04)	0.05

Table 6. Factors associated with overweight among study participants.

Socio-demographic variables	COR (95% CI)	p value	AOR (95% CI)	p value
Age (ref: 18 - 27)				
28 - 37	0.2 (0.1 - 0.4)	0.001	0.4 (0.1 - 2.2)	0.09
38 - 47	0.3 (0.1 - 0.7)	0.008	0.6 (0.2 - 2.2)	0.42
48 - 57	0.2 (0.1 - 0.9)	0.99	0.1 (0.2 - 1.4)	0.99
58 - 67	0.4 (0.1 - 1.4)	0.15	0.2 (0.1 - 2.1)	0.17
68 and above	0.8 (0.2 - 3.2)	0.79	0.4 (0.2 - 3.1)	0.35
Marital status (ref: single)				
Married	0.4 (0.2 - 0.8)	0.01	3.2 (1.1 - 9.4)	0.03
Divorced	0.6 (0.4 - 2.7)	0.85	0.2 (0.1 - 1.9)	0.99
Widowed	0.9 (0.3 - 2.7)	0.93	1.2 (0.1 - 13.1)	0.79
Educational status (ref: primary)				
Secondary	2.4 (1.3 - 5.3)	0.02	0.8 (0.2 - 2.8)	0.71
Tertiary	1.2 (0.5 - 3.1)	0.7	1.6 (0.4 - 5.6)	0.48
Occupational status (ref: unemployed)				
Employed	1.7 (0.1 - 2.3)	0.001	3.9 (3.6 - 7.3)	0.001
Retired	1.1 (0.4 - 3.6)	0.82	4.6 (3.1 - 8.1)	0.03
Monthly income (ref: < 50000)				
50000 - 100000	0.2 (0.04 - 0.7)	0.01	0.4 (0.1 - 2.04)	0.25
Above 100000	0.4 (0.1 - 1.8)	0.23	0.7 (0.1 - 4.5)	0.67

4. Discussion

Among the behavioural risk factors, the overall prevalence of current smoking was found to be 12.1%. This contradicts a

recent report by the World Bank. They reported that the prevalence of current smoking among adults in Cameroon is 6.5% [10]. Results from a study by Nansseu *et al.* in Yaoundé, Cameroon [9] demonstrated a lower prevalence of current smoking (5.1%; 95% CI 3.3-7.7%). The difference in demographic dy-

namics may explain the difference in results. Our study captured adults 18 years and above with varied occupations; the study by Nanseu *et al.* captured young adults 18 - 35 years old who were students.

We found that females were less likely to smoke (AOR: 0.2, 95% CI: 0.1 - 0.4), which is similar to a study by Mbatchesou *et al.*, in Douala, Cameroon [11], who found higher odds of smoking (OR: 3.61; 95% CI: 2.52 - 5.16) among males. Cultural norms usually promote or normalise smoking among males. Respondents who were 28 - 37 years were 7.6 times more likely to smoke (AOR: 7.6, 95% CI: 1.9 - 29.7). This result contrasts with an Ethiopian study by Gutema *et al.* [12], who found that respondents aged 55-64 years (AOR: 3.26, 95% CI: 2.37-4.48) were more likely to smoke than younger age groups. The difference may be attributed to economic influences; in Limbe, due to the town's coastal location, younger adults may have more disposable income and greater access to tobacco products. Respondents who were employed had significantly lower odds of smoking (AOR: 0.1, 95% CI: 0.02 - 0.3) compared to those who were students/unemployed. A study by Pefura-Yone *et al.* [13] in Yaoundé, Cameroon found higher odds of smoking 2.31 (95% CI: 1.27 - 4.21), among informal-sector workers. Unemployment is significantly positively related to mental disorders, including anxiety, depression, bipolar disorders, and drug use [14]. Unemployed adults may rely on smoking as a coping mechanism to manage these negative mental health outcomes.

The prevalence of alcohol consumption in this study was 76.5%, slightly higher among males. Results of logistic regression showed that females were 0.4 times (95% CI: 0.2 - 0.8) less likely to consume alcohol than males. A study by Kouémou *et al.* [15] in Buea, Cameroon, revealed a higher proportion of consumption of alcohol among men. Alcohol consumption is generally associated with masculinity and social bonding among men. Regarding the overall prevalence of alcohol consumption, the findings of this study contradict those of a study by Pancha *et al.* [16] in Ngaoundéré, Cameroon, who reported a prevalence of 18.1%. This difference may be associated with religious beliefs; Ngaoundéré is predominantly made up of Muslim communities, and in Islam, alcohol consumption is generally prohibited. It is worth noting that current evidence reports no safe level of alcohol; the risk of most alcohol related cancers increases with every drop of alcohol consumed [17].

The findings from this study revealed that respondents in the age category 38 - 47 years were 1.1 times (95% CI: 0.7 - 4.3) more likely to drink alcohol compared to those in the age category 18 - 27 years. These findings oppose those of a Nigerian study by Lasebikan and Ola [18], who demonstrated that respondents in the age category 34 - 44 years were 0.59 times (95% CI: 0.22 - 0.94) less likely to consume alcohol. Financial stability among those aged 38 - 47 years may significantly contribute to increasing trends in alcohol consumption; in younger age groups, peer pressure and social media influence may be key drivers.

The prevalence of sufficient physical activity in this study

was 81.6%. Women were found to be 0.3 times (95% CI: 0.2, 0.7) less likely to be physically inactive than males. This is similar to a study by Princewel *et al.* [19] in Ombe, Cameroon, who demonstrated a high prevalence (96.7%) of sufficient physical activity among study participants. The study also reported that females were more physically active than males. Both studies share similar sociocultural backgrounds, and women generally are known to be multitasking; their daily routines generally involve more physical tasks than those of men, who may not engage in as many.

In this study, physical activity tends to increase with age; adults aged 28 - 37 years and 48 - 57 years had 80% lower odds of being physically inactive as compared to those aged 18 - 27 years. This study found no significant relationship between physical inactivity and the age group 58 years and above. These results are consistent with the results of a Nigerian study by Ukegbu *et al.* [20], who discovered that middle-aged adults had lower odds of being physically inactive compared to younger adults. Middle-aged adults, apart from family responsibilities that may drive them to more physically demanding jobs and domestic roles, may become more motivated to engage in physical activities due to health-related concerns such as hypertension, diabetes, or weight gain.

Our findings revealed that participants with a secondary education had 50% lower odds of being physically inactive compared to those with only primary education. Thus, participants with higher levels of education were more likely to be physically active. This corroborates an Ethiopian study by Muche *et al.* [21], who revealed higher odds of physical activity among those with higher education compared to those with no formal education. Higher education attainment can significantly improve health literacy [22, 23], better access to resources, and more awareness of physical activity benefits.

The overall proportion of participants who consumed fruits and vegetables daily in this study was 15.8%. There was no significant difference between males and females. A similar study by Kufe *et al.* [24] in the East and Adamawa regions of Cameroon reported proportions of 41.8% and 21.7% for vegetable and fruit intake, respectively. Kufe *et al.* observed no significant difference between men and women. The underrepresentation of men in both studies may explain this.

Our findings indicate that the prevalence of overweight and obesity among the study participants was 37.9% and 33.2%, respectively. We observed no significant difference in the BMI between males and females. The national prevalence of overweight and obesity as of 2022 stands at 37.1% and 13.4% [25]. Slightly similar trends were observed by Nansseu *et al.* [26], where the prevalence of overweight and obesity was 26% and 15.1%. Although a high proportion of our study participants reported being physically active, this did not translate into lower rates of overweight/obesity. This may be due to increased consumption of energy-dense, processed food such as refined carbohydrates, sugary drinks, fried foods, and larger portions. Even with physical activity, these foods create a calorie surplus.

In this study, the odds of being overweight were 3.2 times

higher (AOR: 3.2, 95%CI: 1.1 - 9.4) among married participants compared to participants who have never been married. A similar finding was reported by Simo *et al.* [27], who observed that married participants had 2.5 (AOR: 2.52, 95% CI: 1.64-3.89) times higher odds of being overweight. Participants who have never been married may make an effort to maintain a slimmer or fitter appearance to attract a partner. After marriage, this external pressure may reduce, leading to more relaxed attitudes towards diet and exercise.

We discovered that employment and retirement were strongly associated with being overweight. Employed participants had about 3.9 times (AOR: 3.9, 95% CI: 3.6 - 7.3) higher odds of being overweight, and retired participants were 4.6 times (AOR: 4.6, 95% CI: 3.1 - 8.1) more likely to be overweight compared to students/unemployed. This contradicts findings by Dongmo *et al.* [28] in Douala and Manjo, Cameroon, who reported that students suffer the most from being overweight. This difference could be explained by the poor representation of employed participants in the Dongmo *et al.* study. Concerning retirement status, a Ghanaian study by Nuerter *et al.* [29] reported that pensioners had 1.8 times the odds of being overweight/obese. It has been hypothesised that retirement generally comes with lower physical activity levels due to advanced age and reduced mobility associated with chronic diseases such as osteoarthritis.

5. Strengths and Limitations of the Study

Considering the context of Limbe, this study has provided relevant data on the prevalence of behavioural risk factors of non-communicable diseases and their sociodemographic correlates, which many studies within Limbe have not covered. This study has also captured the cumulative consequences of risk behaviours for non-communicable diseases across various age groups, distinguishing risk factors that emerge in young adulthood from those that increase with age.

Despite the strengths, this study was conducted in an urban setting and may not be generalised to the rural populations of Cameroon. Purposive sampling was used to select neighbourhoods, which might have introduced selection bias. The findings suggest that gender was associated with the risk factors, however, this could be due to sample size variations between sub-groups. The predominance of female participants in the study may have impacted the study results. Measurement of the major behavioural risk factors (tobacco use, alcohol consumption, consumption of fruits/vegetables, and physical activity) were based on self-reported data, which may be prone to recall bias and social desirability bias. The study cannot establish a causal relationship as it made use of a cross-sectional design.

6. Conclusion and Recommendation

This cross-sectional survey reveals a high prevalence of

non-communicable disease behavioural risk factors: current smoking, consumption of alcohol, insufficient consumption of fruits/vegetables, and overweight/obesity. Physical activity levels were relatively high, but this did not appear to protect against overweight and obesity.

Concerning sociodemographic correlates, males showed higher odds of smoking and alcohol consumption. Young adults (28 - 37 years) had higher odds of smoking. Females were more likely to be physically active. Physical activity was found to increase with age and higher educational level. Employment and marital status were strongly linked to higher odds of overweight/obesity.

Future qualitative research is required to understand perceptions of the population of Limbe, Cameroon, towards behavioural risk factors and the effectiveness of targeted public health interventions. The Cameroon Ministry of Public Health, through healthcare workers and stakeholders at various levels of the healthcare system in Limbe, Cameroon, should reinforce smoking cessation programs and responsible use of alcohol, specifically targeting males and young adults. Strengthen health literacy through health education campaigns to improve understanding of non-communicable disease behavioural risk factors, with due attention to men, younger adults, the uneducated, employed and married individuals.

Abbreviations

NCD	Non-communicable Disease
WHO	World Health Organization
STEPS	Stepwise Approach to Surveillance
DALY	Disability Adjusted Life Years
BMI	Body Mass Index
AOR	Adjusted Odds Ratio
COR	Crude Odds Ratio

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Author Contributions

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Thomas Egbe Obinchenti: Methodology, Supervision, Validation, Visualization, Writing - review & editing

Data Availability Statement

The data is available from the corresponding author upon

reasonable request.

Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Noncommunicable diseases. [cited 2026 Feb 22]. Available from: <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>
- [2] Li J, Pandian V, Davidson PM, Song Y, Chen N, Fong DYT. Burden and attributable risk factors of non-communicable diseases and subtypes in 204 countries and territories, 1990-2021: a systematic analysis for the global burden of disease study 2021. *Int J Surg*. 2025 Mar; 111(3): 2385. <https://doi.org/10.1097/JS9.0000000000002260>
- [3] Institute NP. Non-communicable diseases in Cameroon - A growing threat to human capital. Nkafu Policy Institute. 2016 Dec 13 [cited 2026 Feb 23]. Available from: <https://nkafu.org/non-communicable-diseases-in-cameroon-a-growing-threat-to-human-capital/>
- [4] datadot. [cited 2026 Feb 23]. Cameroon. Available from: <https://data.who.int/countries/120>
- [5] Cameroon - Africa Health Actions. [cited 2026 Feb 23]. Available from: <https://africahealthactions.org/cameroon>
- [6] Search data on the Statbase website.. [cited 2026 Feb 23]. Available from: <https://statbase.org/data-search/?str=Prevalence%20alcohol%20consumption&cn=6180&nr=1&chg=0>
- [7] World Health Organization: Noncommunicable diseases. - Google Scholar. [cited 2026 Feb 23]. Available from: https://scholar.google.com/scholar_lookup?title=Non-communicable%20diseases%20country%20profiles%202018&publication_year=2018&
- [8] Changoh CM, Tatah L, Aroke D, Nsagha D, Choukem SP. Noncommunicable diseases behavioural risk factors among secondary school adolescents in Urban Cameroon. *BMC Public Health*. 2024 Feb 5; 24: 377. <https://doi.org/10.1186/s12889-024-17753-1>
- [9] Nansseu JR, Kameni BS, Assah FK, Bigna JJ, Petnga SJ, Tounouga DN, et al. Prevalence of major cardiovascular disease risk factors among a group of sub-Saharan African young adults: a population-based cross-sectional study in Yaoundé, Cameroon. 2019 Oct 1. <https://doi.org/10.1136/bmjopen-2019-029858>
- [10] World Bank Open Data. [cited 2026 Apr 1]. World Bank Open Data. Available from: <https://data.worldbank.org>
- [11] Mbatchou Ngahane BH, Atangana Ekobo H, Kuaban C. Prevalence and determinants of cigarette smoking among college students: a cross-sectional study in Douala, Cameroon. *Arch Public Health*. 2015 Dec 21; 73(1): 47. <https://doi.org/10.1186/s13690-015-0100-1>
- [12] Gutema BT, Chuka A, Ayele G, Estifaons W, Melketsedik ZA, Tariku EZ, et al. Tobacco use and associated factors among adults reside in Arba Minch health and demographic surveillance site, southern Ethiopia: a cross-sectional study. *BMC Public Health*. 2021 Mar 4; 21(1): 441. <https://doi.org/10.1186/s12889-021-10479-4>
- [13] Pefura-Yone EW, Balkissou AD, Theubo-Kamgang BJ, Afane-Ze E, Kuaban C. Prevalence and associated factors of smoking among adults in Yaoundé, Cameroun. *Health Sci Dis*. 2016 Aug 14; 17(3). <https://doi.org/10.5281/hsd.v17i3.612>
- [14] Yang Y, Niu L, Amin S, Yasin I. Unemployment and mental health: a global study of unemployment's influence on diverse mental disorders. *Front Public Health*. 2024 Dec 13; 12: 1440403. <https://doi.org/10.3389/fpubh.2024.1440403>
- [15] Kouémou NE, Yega VLA, Savo FM, Tamanji NL. Epidemiology of alcohol use and alcohol use disorders among the population of Buea, southwest region, Cameroon: A survey study. *Global Epidemiology*. 2026 Jun 1; 11: 100236. <https://doi.org/10.1016/j.gloepi.2025.100236>
- [16] Pancha Mbouemboue O, Derew D, Tsougmo JON, Tangyi Tamanji M. A Community-Based Assessment of Hypertension and Some Other Cardiovascular Disease Risk Factors in Ngaoundéré, Cameroon. *Int J Hypertens*. 2016; 2016(1): 4754636. <https://doi.org/10.1155/2016/4754636>
- [17] Alcohol and cancer. [cited 2026 Apr 14]. Available from: <https://www.who.int/europe/news-room/fact-sheets/item/alcohol-and-cancer>
- [18] Lasebikan VO, Ola BA. Prevalence and Correlates of Alcohol Use among a Sample of Nigerian Semi-rural Community Dwellers in Nigeria. *J Addict*. 2016; 2016(1): 2831594. <https://doi.org/10.1155/2016/2831594>
- [19] Princewel F, Cumber SN, Kimbi JA, Nkfusai CN, Keka EI, Viyoff VZ, et al. Prevalence and risk factors associated with hypertension among adults in a rural setting: the case of Ombe, Cameroon. *Pan Afr Med J*. 2019 Nov 14 [cited 2026 Apr 24]; 34(1). Available from: <https://www.ajol.info/index.php/pamj/article/view/211081>
- [20] Ukegbu P, Ukegbu B, Uche P, Ukegbu A. Factors associated with physical inactivity among community-dwelling adults in Umuahia, Nigeria : *World Nutr J*. 2022 Aug 26; 6(1): 49-57. <https://doi.org/10.25220/WNJ.V06.i1.0008>
- [21] Muche ZT, Teklemariam AB, Abebe EC, Agidew MM, Ayele TM, Zewde EA, et al. Prevalence and associated factors of physical inactivity among adults in Northwest Ethiopia: a multicenter study. *Front Public Health*. 2025 May 16; 13. <https://doi.org/10.3389/fpubh.2025.1513600>
- [22] Long Y, Jia C, Luo X, Sun Y, Zuo W, Wu Y, et al. The Impact of Higher Education on Health Literacy: A Comparative Study between Urban and Rural China. *Sustainability*. 2022 Jan; 14(19): 12142. <https://doi.org/10.3390/su141912142>

- [23] Rosário J, Raposo B, Santos E, Dias S, Pedro AR. Efficacy of health literacy interventions aimed to improve health gains of higher education students—a systematic review. *BMC Public Health*. 2024 Mar 22; 24(1): 882. <https://doi.org/10.1186/s12889-024-18358-4>
- [24] Kufe NC, Ngufor G, Mbeh G, Mbanya JC. Distribution and patterning of non-communicable disease risk factors in indigenous Mbororo and non-autochthonous populations in Cameroon: cross-sectional study. *BMC Public Health*. 2016 Nov 24; 16(1): 1188. <https://doi.org/10.1186/s12889-016-3837-8>
- [25] Obesity among adults, BMI ≥ 30 , prevalence (crude estimate) (%). [cited 2026 Apr 25]. Available from: [https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi--30-\(crude-estimate\)](https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-obesity-among-adults-bmi--30-(crude-estimate))
- [26] Nansseu JR, Noubiap JJ, Bigna JJ. Epidemiology of Overweight and Obesity in Adults Living in Cameroon: A Systematic Review and Meta-Analysis. *Obesity*. 2019; 27(10): 1682-92. <https://doi.org/10.1002/oby.22566>
- [27] Simo LP, Agbor VN, Temgoua FZ, Fozue LCF, Bonghaseh DT, Mbonda AGN, et al. Prevalence and factors associated with overweight and obesity in selected health areas in a rural health district in Cameroon: a cross-sectional analysis. *BMC Public Health*. 2021 Mar 10; 21(1): 475. <https://doi.org/10.1186/s12889-021-10403-w>
- [28] Dongmo FFD, Asongni WD, Mba ARF, Etame RME, Hagbe DN, Zongning GLD, et al. Knowledge, Attitude, and Practices regarding Obesity among Population of Urban (Douala) and Rural (Manjo) Areas in Cameroon. *Int J Chronic Dis*. 2023; 2023(1): 5616856. <https://doi.org/10.1155/2023/5616856>
- [29] Nuerter BD, Alhassan AI, Nuerter AD, Mensah IA, Adongo V, Kabutey C, et al. Prevalence of obesity and overweight and its associated factors among registered pensioners in Ghana; a cross sectional studies. *BMC Obes*. 2017 Jul 4; 4(1): 26. <https://doi.org/10.1186/s40608-017-0162-4>