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Nutritional Status and Beverage Intake Patterns among Civil Servants in Southwestern Nigeria

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ABSTRACT

Background: The consumption of various beverages is prevalent, particularly among professional populations including civil servants. However, the caloric contribution of these beverages is frequently underestimated by consumers, as their intake is often driven by hedonic factors rather than nutritional considerations. This oversight can significantly impact total caloric intake and, consequently, influence overall nutritional status nutritional status.

Aims: This study aimed to assess the nutritional status and patterns of beverage intake among civil servants in Southwestern Nigeria.

Methods: A descriptive cross-sectional design was employed, involving 300 civil servants recruited from four Southwestern states of Nigeria (Lagos, Ogun, Ondo, and Oyo) using a multistage sampling technique. Data were collected through an interviewer-administered multi-component questionnaire, administered by trained experts in nutrition surveys. Statistical analysis involved the use of descriptive and inferential statistics. Associations between variables were examined using an independent samples t-test. Statistical significance was set at p-value < 0.05.

Results: The demographic profile of the respondents indicated that the majority (71%) of the respondents were aged between 25 and 49 years, 55.3% were female, and 80% were married. Nutritional status assessment revealed a high prevalence of overweight and obesity (66.5% of respondents), with 28% being at risk of abdominal obesity. Significant variations in the intake of water ($p = 0.003$), sodas ($p = 0.001$), alcoholic beverages ($p < 0.001$), and herbal drinks ($p = 0.006$) were observed between male and female respondents. Additionally, soda intake was highest among obese respondents, fruit juice consumption was lowest among underweight respondents, and the intake of energy drinks and alcoholic beverages was highest among overweight respondents.

Conclusions: The current study identified a high prevalence of overweight, obesity, and abdominal obesity among the surveyed civil servants. Water, alcoholic beverages, and sodas were found to be the primary contributors to the total beverage intake. These findings highlight the critical need for targeted, work-based nutrition education strategies to improve the nutritional status and promote healthier lifestyle among employed individuals.

Keywords: Nutritional Status; Beverage intake; Water intake; Civil servant.

1 INTRODUCTION

Globally, overweight and obesity have emerged as significant public health concerns public health concerns, especially among adult working populations, affecting over 1.9 billion and 650 million adults aged 18 years and older, respectively (Anoshirike *et al.*, 2019; WHO, 2021). Excess weight and obesity elevate the risk of developing cardiovascular diseases such as diabetes mellitus type 2, coronary heart disease, and stroke. These conditions, in turn, result in substantial medical expenditures, reduced workplace productivity, and economic losses stemming from incapacitation and illness (Goettler *et al.*, 2017). Civil servants contribute significantly to the national productivity, rendering their health and nutritional status crucial for national development. Considering their vital contributions to nation's economy, the escalating prevalence of overweight and obesity among civil service workforce poses a severe threat to productivity, overall health, and well-being, ultimately affecting the nation's economic stability (Issahaku & Alhassan, 2021).

The susceptibility to overweight and obesity is particularly pronounced among white-collar professionals, a phenomenon associated with numerous profession-specific

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nutritional and lifestyle determinants. These include energy imbalance, physical inactivity, and suboptimal dietary practices, such as breakfast skipping and frequent consumption of high-calorie snacks, confectioneries, and sugar-sweetened beverages (Olaitan *et al.,* 2020).

A beverage is broadly defined as any potable drink, including water, tea, coffee, beer, or milk, intended for human consumption. The etymology of 'beverage' traces to the Latin 'bever', signifying a respite from labor. Consequently, in numerous global contexts, beverages are primarily consumed for thirst quenching, hydration, and relaxation during social engagements, including occupational settings, rather than for their nutritional content (Bolajoko *et al.,* 2022). These beverages include different categories of drinks, such as non-alcoholic carbonated beverages, packaged water, carbonated soft drinks, fruit juices, concentrated syrups, functional drinks, tea and coffee infusions, fermented alcoholic beverages, ciders, and other flavored beverages.

The global beverage industry has experienced substantial growth over recent years, driven by rapid industrialization and economic development, especially in developing countries (Yong, 2020; Sovacool *et al.*, 2021). This growing urban population, family incomes, taste preference, pervasive social media influence, easy access to drinks, and the stress-relieving properties of beverages were identified as drivers of beverage consumption (Block *et al.*, 2013; Sarhan *et al.*, 2024). The expansion of the beverage industry not only impacts a nation's economic development but also exert a considerable influence on the nutritional status of the population and workforce. Carbonated beverages frequently consumed in Nigeria have been reported to contain high amounts of sugar, calories, caffeine, colorings, and flavoring agents (Damle *et al.*, 2011). Their consumption is often driven by palatability and flavor with insufficient consideration of the associated health implications (Idumah *et al.*, 2020). Fruit-based beverages similarly contain a substantial proportion of sugar, thereby augmenting the dietary energy content.

Access to nutritious foods poses a significant challenge in numerous occupational environments, and as a result, consequently leading several employees to adopt suboptimal dietary selections. The consumption of beverages in various workplaces is favored is favored due to their convenience, ready availability, and accessibility. However, frequent and excessive consumption may contribute to a high prevalence of overweight and obesity (Luger *et al.*, 2017). Excess weight and obesity confer a substantial risk of developing chronic health disorders, including type 2 diabetes mellitus, hypertension, coronary heart disease, osteoarthritis, certain malignancies, and respiratory system dysfunctions (Agha & Agha, 2017; Oladoyinbo *et al.*, 2019). Furthermore, overweight and obesity are recognized risk factors for temporary job displacement due to illness, elevated healthcare expenditures, and diminished productivity (Anoshirike *et al.*, 2019). Additionally, the elevated sugar and acid contents of carbonated beverages present some detrimental dental consequences teeth, increasing the likelihood for dental caries and gradual erosion of tooth enamel (Idumah *et al.*, 2020).

Considering that civil servants dedicate a substantial portion of their day to occupational activities (Aladeniyi *et al*, 2017), adopting and maintaining healthy dietary habits within the workplace are paramount for enhancing work output and preserving employee health (FSEAP, 2013). Optimal nutritional status is crucial for workplace productivity. According to the World Health Organization (WHO, 2021), a dietary pattern characterized by elevated consumption of free sugars, fatty foods, with low intake of fruits and vegetables is associated with a 66% increase in productivity loss, primarily by increasing the risk of Overweight and Obesity (Okondu *et al.*, 2021). The WHO, therefore, recommends that adults should reduce their daily intake of free sugars to less than 10% of their daily total energy intake (Pan & Hu, 2011).

Bolajoko *et al.* (2022) identified a notable knowledge paucity in the availability of nationally representative data on beverage intake in Nigeria. Additionally, extant published literature demonstrating the relationship between beverage intake and the nutritional status of civil servants in Nigeria remains scarce. Consequently, the present study aimed to assess the nutritional status and beverage intake patterns among civil servants in the southwestern states of Nigeria.

2 MATERIAL AND METHODS

2.1 Study Design

This descriptive and cross-sectional study was conducted across four southwestern states of Nigeria. The South-West geopolitical zone of Nigeria comprises six states, namely, Ondo, Osun, Oyo, Ekiti, Lagos, and Ogun States, with one hundred and thirty-seven (137) Local Government Areas (LGAs). According to the National Population Census (NPC, 2006), this geopolitical zone had a population of approximately 38 million individuals. Recent estimates from the National Bureau of Statistics (2021) indicate that the population has exceeded 45 million individuals. In addition to agriculture, which serves as the primary economic activities in rural communities, commerce and trading activities constitute additional sources of income for residents in the zone. The majority of micro, small, and medium-sized indigenous enterprises operate in the manufacturing, fabrication, and agro-allied production sectors. The zone possesses fertile land, rendering agriculture a lucrative endeavor in rural communities, where numerous food crops including yam, cassava, cocoyam, and maize, alongside cash

crops such as rubber, cocoa, and banana, are cultivated. However, extensive rural-urban migration has led to a significant number of individuals seeking employment in governmental institutions. The proliferation of distilleries, brewery factories, and beverage advertisements by food industry professionals in urban centers is increasing.

2.2 Study Population

The study population consisted of permanent administrative staff employed at the headquarters (Secretariat) of the selected states. Participants with a minimum of two years of service within the state administration were included. Individuals who reported illness within 24 hours preceding the interview day, as well as pregnant or lactating women, were excluded from the study.

2.3 Sample Size Determination

The minimum sample size was calculated using the sample size formula for estimating simple proportions described by Rainer et al. (1997). A prevalence value (35 ± 2.5%) of individuals not adhering to recommended water intake was utilized. This prevalence was derived from the findings of a pilot survey and a prior study on beverage consumption patterns (Gandy, 2015) conducted within the survey area. A margin of error of 5% and an anticipated non-response rate at 10% were applied yielding a minimum required sample size of 294. Consequently, a total of 300 participants were recruited for the study.

2.4 Sampling Procedure

The primary sampling units comprises the ministries, with individual civil servants constituting the final sampling units. The study employed a multi-stage sampling technique. At the first stage, four of the most populous states (Lagos, Ogun, Ondo, and Oyo) were purposively selected from the six states within the geopolitical zone. At the second stage, proportionate stratified sampling was conducted at the state level to allocate participants based on the relative population sizes of the four selected states, resulting in 100 respondents each for Lagos and Oyo, and 50 respondents each for Ogun and Ondo. At the third stage, simple random sampling by balloting was employed to select ten ministries from the fifteen available in each of the selected states. In the final stage, civil servants were randomly selected from the sampled ministries by assigning unique serial numbers to all names on the ministry's nominal list and subsequently conducting a ballot draw. For Lagos and Oyo, 10 respondents were selected from each ministry, while 5 respondents were selected from each ministry in Ogun and Ondo.

2.5 Ethical Consideration

Ethical approval for the study was secured from the Ogun State Ministry of Health (Ref: HPRS/381/304, 27th of May 2019). Permission was obtained from either the Permanent Secretary or the Commissioner's office in each surveyed Ministry. Written informed consent was procured from the selected participants subsequent to a comprehensive explanation of the study's objectives. Participants were additionally assured of the research team's commitment to maintaining the confidentiality of all provided information. Participants received no monetary or other material incentives.

2.6 Data Collection

Data for this study were collected using a multi-component questionnaire consisting of demographic and socioeconomic sections, anthropometry section, and a dietary recall section. Demographic and socioeconomic data (age, gender, marital status, and income, among others) were obtained via a semi-structured, pre-tested, interviewer-administered questionnaire. This section incorporated questions adapted from the Nigeria Food Consumption and Nutrition Survey (Maziya-Dixon, 2004). Interviews were conducted face-to-face by trained Nutritionists/Dietitians who had undergone refresher training in nutrition survey methodologies and data collection techniques.

Anthropometric data such as body weight, height, waist circumference, and hip circumference were assessed using a digital weighing scale, height meter, and metric tape, respectively (FANTA, 2016; Amoda et al., 2022). Anthropometric measurements were performed in duplicate, and the average values were utilized for data analysis. Body Mass Index (BMI) was calculated as weight in kilograms divided by height squared in meters and classified using the WHO reference cutoffs (WHO, 2000). Respondents with a BMI less than 18.5kg/m^2 were categorized as underweight, those with a BMI between 18.5 and 24.9kg/m^2 as having normal nutritional status, those between 25.0 to 29.9kg/m^2 as overweight, and those with a BMI of 30.05kg/m^2 as obese. Abdominal obesity was assessed using the waist-to-hip ratio (WHR), calculated as the waist circumference divided by the hip circumference. For males, a WHR of ≥ 0.90 was considered indicative of risk, while for females, a WHR of ≥ 0.85 was used to define abdominal obesity. Individuals with WHR values exceeding these thresholds were classified as at risk, and those below were considered at no risk.

The beverage intake of respondents was assessed using the Multiple-pass 24-hour dietary recall method, as described by Bolajoko et al. (2022). Maziya-Dixon et al. (2004) identified the 24-hour intake recall as an appropriate tool for fluid intake determination in contexts where the 7-day dietary diary method is not feasible. The respondents were probed for drinks and fluids intake both during and outside meal events, in both home and out-of-home settings. Volume intake was estimated using household utensils such as sachets, local cups,

mugs, and bottles of known volumes. The study utilized household utensils of known, standard volumes during data collection. In instances where respondents were unable to accurately ascertain their intake volume, trained research assistants provided calibrated mugs and cups to facilitate more reliable quantity estimation. The Percentage of Total Beverage Intake (%TBI) for each beverage category was calculated by dividing the mean intake of each beverage type by the total mean beverage intake of the participant group, subsequently multiplying by 100 to express it as a percentage.

2.7 Statistical Analysis

All statistical analyses including descriptive statistics were carried out using Statistical Package software (SPSS version 27). Data from 24–hour dietary recall were analyzed using the Total Dietary Assessment (TDA) (Version 3). Anthropometric data were sorted, cleaned, and entered into Microsoft Excel, then analyzed using SPSS version 27 and classified according to standards. Continuous variables are presented using means and standard errors, while proportions with percentages were calculated for categorical variables. The independent *t*-test was employed to assess associations between two categorical groups and continuous variables, such as gender differences in mean beverage intake. Analysis of Variance (ANOVA) was employed to compare mean differences across more than two groups for variables such as nutritional status and dietary intake. Statistical significance was set at $p < 0.05$.

3 RESULTS

3.1 Characteristics of the Respondents

Table 1 presents the sociodemographic characteristics of the respondents in the study. A majority (55.3%) of the respondents were females, with approximately 80% being married. Furthermore, 71% of the respondents were aged between 25 and 49 years, and a substantial majority (83%) of participants occupied higher-grade level categories within the civil service. Over half (56.6%) of the respondents possessed a first degree from a tertiary institution, while 30% held a diploma, and a minority (11.7%) had completed secondary school. However, 37.7% and 38.7% of the respondents reported an average monthly income ranging from ₦30,000 - ₦59,999 ($19.59 - $39.18) and ₦60,000 - ₦99,999 ($39.19 - $65.31), respectively, with only a small proportion (1.7%) earning above ₦200,000 ($130.62) per month.
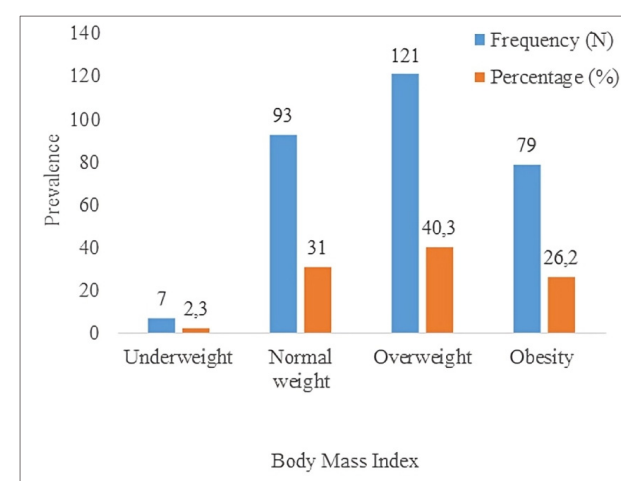
Figure 1 illustrates the distribution of Body Mass Index (BMI) categories among the study participants. The x-axis denotes the established BMI classifications (Underweight, Normal Weight, Overweight, and Obese). The y-axis represents the proportion of respondents within each BMI category. As presented by the bar graph, 31% of participants

exhibited normal weight, whereas 40.3% were classified as overweight and 26.2% as obese.

**Table 1.** Characteristics of the Respondents (n = 300)

Characteristics	Frequency (N)	Percentage (%)
Sex		
Males	134	44.7
Females	166	55.3
Age		
Less than 25	15	5.0
25–39 years	111	37.0
40–49 years	104	34.7
50 and above	70	23.3
Marital Status		
Married	238	79.3
Single	52	17.3
Widow/Widower	5	1.7
Divorced/Separated	5	1.6
Grade Level		
Grade Level 1–6	50	16.7
Grade Level 7–12	188	62.7
Grade Level ≥12	62	20.7
Average Monthly Income		
< ₦20, 000 (< $13.06)	7	2.3
₦ 20,000–29,999 ($13.06–19.59)	24	8.0
₦ 30,000–59,999 ($19.60–39.18)	113	37.7
₦ 60,000–99,999 ($39.19–65.31)	116	38.7
₦ 100,000–200,000 ($65.32–130.62)	35	11.7
> ₦ 200,000 (> $130.62)	5	1.7
Education Level		
Primary	5	1.7
Secondary	35	11.7
Diploma/Certificate	90	30.0
Degree	170	56.6

Note: ₦1 = 1531.19USD

Figure 1. Nutritional Status of the Respondents (Body Mass Index)

Figure 2 presents the distribution of Waist-Hip Ratio categories among the participants. The result indicates that 28% of respondents were at risk of abdominal obesity, while 72% demonstrated no such risk.
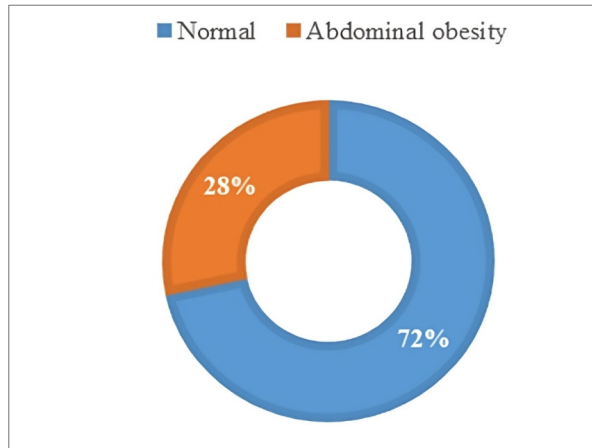
Figure 2. Nutritional Status of the Respondents (Waist-Hip Ratio)

3.2 Mean Intake and Percentage Total Beverage Intakes of the Participants

Table 2 presents the mean beverage intake and the percentage contribution to total beverage intake by sex. Water constituted the largest proportion of total beverage intake among respondents, consumed by approximately 65% of males and 73% of females. A statistically significant difference was observed in the mean drinking water intake between male and female respondents (p = 0.003). Sachet water accounted for the largest proportion of total drinking water intake among both male (37.4%) and female (42.4%) respondents. Yogurt constituted the highest proportion of total milk intake among male (13.1%) and female (11.5%) participants; however, milk's overall contribution to total beverage intake was limited to 3.5% for males and 5.1% for females. Regular soda contributed 14.6% and 13.2% to the total soda intake for male and female respondents, respectively; a statistically significant difference was noted in the contribution of sodas to total beverage intake between male and female participants. A percentage of 100% fruit juice accounted for 8.7% to male fruit juice intake and 7.7% of female fruit juice intake. A statistically significant difference was observed in the contribution of alcoholic beverages to total beverage intake between male and female groups. Alcoholic beverages

Table 2. Mean Intake and Percentage of Total Beverage Intakes of the Respondent

Beverage categories	Type of beverage	Males		Females		*p-value
		Mean Consumption (mL)	%TBI	Mean Consumption (mL)	%TBI	
Drinking water		2853.96 ± 98.17	64.98	2969.1 ± 129.68	72.64	**0.003**
	Sachet Water	1642.91 ± 92.57	37.40	1733.68 ± 89.23	42.42	0.917
	Bottle Water	652.8 ± 76.65	14.86	548.16 ± 70.55	13.41	0.723
	Tap Water	152.239 ± 43.14	3.47	264.7 ± 52.35	6.48	**0.004**
Total Milk		155.25 ± 22.57	3.53	210.21 ± 21.18	5.14	0.475
	Liquid Milk	239.82 ± 44.67	5.46	269.00 ± 30.36	6.58	0.449
	Milk alternate	263.57 ± 46.08	6.00	291.25 ± 53.63	7.13	0.354
	Yogurt	575.00 ± 41.33	13.09	472.22 ± 33.51	11.55	0.889
Sodas		287.8 ± 37.08	6.55	373.03 ± 22.77	9.13	**0.001**
	Regular	640.61 ± 53.52	14.59	539.43 ± 19.55	13.20	**0.019**
	Diet	410.00 ± 79.69	9.33	312.5 ± 33.59	7.65	**0.045**
Fruit juices		102.8 ± 17.61		108.07 ± 15.25	0.20	0.820
	100%	383.75 ± 49.48	8.74	315.94 ± 34.52	7.73	0.807
	Sugar-sweetened	325 ± 40.31	7.40	335.71 ± 32.36	8.21	0.554
	Fruit drink	475 ± 101.40	10.81	513.33 ± 124.54	12.56	0.331
	Non-alcoholic wine	450 ± 93.54	10.25	300 ± 43.30	7.34	0.159

Table 2. (Continued)

Beverage categories	Type of beverage	Males Mean Consumption (mL)	%TBI	Females Mean Consumption (mL)	%TBI	*p-value
Hot beverages		175.75 ± 18.12	4.00	210.33 ± 16.36	5.15	0.380
	Tea	307.56 ± 22.70	7.00	304.63 ± 22.07	7.45	0.312
	Coffee	207.14 ± 10.29	4.72	246.15 ± 22.97	6.02	0.305
	Chocolate	285.58 ± 34.06	6.50	253.28 ± 21.48	6.20	0.939
Sports &energy drinks		51.12 ± 11.89	1.16	43.01 ± 14.45	1.05	0.571
	Sports	367.14 ± 36.04	8.36	382 ± 38.35	9.35	0.903
	Energy	356.67 ± 51.02	8.12	664 ± 334	16.25	**0.005**
Alcoholic beverages		551.72 ± 77.38	12.56	79.61 ± 22.97	1.95	**0.000**
	Beer	1138.75 ± 99.29	25.93	769 ± 265.41	18.81	0.263
	Stout	897.67 ± 105.40	20.44	625 ± 125	15.29	0.343
	Wine	1270.67 ± 280.75	28.93	732.22 ± 238.77	17.91	0.313
	Brandy	662.5 ± 200.84	15.08	86.67 ± 33.33	2.12	0.619
	Gin	602.86 ± 179.64	13.73	20.0 ± 8.21	0.49	0.581
Herbal drinks		194.44 ± 55.42	4.43	78.3 ± 12.27	1.92	**0.006**
	Local	310.81 ± 29.06	7.08	192.63 ± 15.64	4.71	**0.042**
	Proprietary alcohol	275.71 ± 56.88	6.28	235.91 ± 80.17	5.77	0.943
	Non-proprietary alcohol	1038 ± 682.04	23.63	189.27 ± 36.72	4.63	**0.019**

Note: *Independent t-test p-value. DWI: Drinking water intake, TBI: Total beverage intake, BMI: Body mass index, WHR: Waist-Hip Ratio.

contributed higher (12.6%) to the total beverage consumption among male respondents, whereas their contribution to female intake was only 2.0%. Among male respondents, beer, stout, and wine were the primary contributors to total alcoholic beverage consumption. Herbal drinks also contributed a higher proportion (4.4%) to total beverage intake among male respondents compared to 1.9% among females, however, and this difference was statistically significant.

3.3 Mean Beverage Intake Stratified by the Nutritional Status of Respondents

Table 3 describes the mean beverage intake of the respondents across different BMI categories. The findings indicate that the mean intake of sodas was highest among obese respondents, while underweight individuals exhibited the lowest mean intake. Similarly, the mean consumption of

Table 3. Beverage intake by body mass index category of the respondents

BMI (kg/m²)	Underweight	Normal	Overweight	Obesity	F	df	p-value*
Milk (mL)	155.00 ± 122.23	190.31 ± 30.89	219.46 ± 26.06	130.33 ± 19.78	7.99	5	0.144
Sodas (mL)	281.25 ± 106.88	341.27 ± 37.52	327.11 ± 36.09	345.13 ± 35.57	12.25	5	**0.024**
Fruit Juices (mL)	43.75 ± 31.95	102.85 ± 23.01	100.58 ± 16.61	123.46 ± 23.23	4.09	5	0.577
Hot Beverages (mL)	118.75 ± 59.71	193.33 ± 26.72	195.62 ± 16.82	203.40 ± 21. 59	7.54	5	0.178
Energy drinks (mL)	116.67 ± 116.67	417.78 ± 53.45	501.42 ± 251.67	330.00 ± 9.68	2.17	2	0.511
Alcohol (mL)	0.0000	296.13 ± 79.68	342.60 ± 64.04	232.69 ± 61.30	4.05	4	0.455
Herbal drinks (mL)	37.50 ± 26.31	90.83 ± 15.76	179.17 ± 60.83	110.58 ± 23.87	1.70	5	0.914

Note: *Anova p-value; F: F-value; df: degree of freedom; BMI: Body mass index.

energy drinks and alcohol was greater among respondents with overweight compared to those with normal or underweight BMI. In addition, the mean intake of fruit juices was lowest among underweight respondents, whereas overweight and obese individuals recorded higher consumption levels. Consumption of hot beverages was also elevated among respondents with overweight and obesity, although these differences did not reach statistical significance. Importantly, only soda intake exhibited a statistically significant difference across BMI categories (p = 0.024), suggesting a potential association between soda consumption and nutritional status within this population.

4 DISCUSSION

This study aimed to assess the nutritional status and beverage intake patterns among civil servants in the Southwestern States of Nigeria. The findings revealed a high prevalence of overweight and obesity within this population. Furthermore, sodas, alcoholic beverages, energy drinks, and herbal drinks contribute significantly to the total beverage intake of the participants. Specifically, sodas, energy drinks, alcohol, and hot beverages contribute significantly to the beverage intake of overweight respondents, while fruit juices contribute less to the total beverage intake of overweight respondents. This also supports the body of evidence that sodas, alcohol, energy drinks, and herbal drinks are notable components of civil servants' total beverage intake of civil servants (Bolajoko et al., 2022).

The majority of the respondents in this study were aged between 21 and 49 years, indicating that a substantial proportion of civil servants are within their economically productive years, capable of contributing significantly to national economic growth. Research has consistently established the critical importance of civil servants' health and nutritional status for the overall growth and development of a nation's economy (Issahaku & Alhassan, 2021). Prior studies have advocated for increased female participation in the civil service, positing that their involvement not only fosters economic development but also improves household food security and promotes healthier dietary choices (Falola et al., 2020). This study demonstrated that over half (55.3%) of the respondents were female. This finding agrees with the observation of Oladosu et al. (2023) in Ogun State, who reported a greater percentage of women in university settings. This suggests the recognition of women's roles in both economic development and household food security. The income level of civil servants, to a large extent, influences their consumption patterns. This study indicated that the majority of the respondents reported a low monthly income, a finding consistent with Amoda et al. (2022), who reported that over half of the civil servants in Ogun state earned between ₦51,000 and ₦99,999.

Studies have consistently documented an increasing burden of overweight and obesity among civil servants, frequently associated with unhealthy eating practices and sedentary lifestyles (Olukayode et al., 2023). The present study corroborates these findings revealing a high percentage (66.5%) of overweight and obese individuals among the participants. A similar study (Emiloju et al., 2017) conducted among civil servants in Nigerian universities reported a 60% prevalence of overweight and obesity, while another study indicated a 69.7% prevalence among tertiary institution workers in Southwestern Nigeria (Adeomi et al., 2021). These consistent findings underscore the imperative for workplace-based interventions to mitigate the prevailing burden of overweight and obesity among civil servants.

Beverages serve as essential sources of fluids for maintaining hydration (Olukayode et al., 2023). Beyond their hydration function, however, they also contribute to total sugar intake, thereby increasing the risk of overweight and obesity. Sodas, alcoholic beverages, and energy drinks were found to be the primary contributors to the total beverage intake among obese and overweight participants, whereas fruit juices exhibited the lowest intake among underweight respondents. This further strengthens the claim of Oladosu et al. (2023) that a majority of civil servants tend to consume readily available and convenient foods which are usually high in calories rather than being nutritionally dense. Additionally, this observation may be attributed to findings such as those reported by Lima et al. (2018), who reported that 92.8% of university employees preferred to consume meals at their workplace, often selecting foods characterized by high sugar content and low nutritional value. A statistically significant difference between was observe in the contribution of sodas, water, alcoholic beverages, and herbal drinks to the total beverage intake among male and female respondents.

Water, being an indispensable beverage, was the most commonly consumed liquid, contributing approximately 65% to 73% to the total beverage intake among the respondents. This aligns with the findings of Singh et al. (2015), who reported that water's contribution to the total beverage intake ranged from 47 to 78% across 187 countries. Sachet water contributed the largest proportion of total water intake among the respondents. Bolajoko et al. (2022) explained that sachet water represents a more convenient and affordable source of drinking water compared to bottled water for several Nigerian towns and cities.

4.1 Limitations of the study

This study acknowledges several limitations. A potential selection bias exists as the study sample predominantly consisted of permanent administrative staff working at the headquarters (Secretariat) of the selected states. While the estimated sample size was representative of this specific

population, the findings may not be generalizable to the entire population of Southwestern Nigeria. These limitations should be carefully considered when interpreting the findings of the study.

5 CONCLUSIONS

There is a high prevalence of overweight, obesity, and abdominal obesity among the study respondents. Furthermore, water, alcoholic beverages, and sodas contribute most significantly to the total beverage intake of the respondents, with notable sex differences. Sodas, alcoholic beverages, energy, and herbal drinks were consumed in higher quantities by respondents classified as overweight and obese. These findings underscore the imperative for developing and implementing work-based nutrition education strategies aimed at improving the nutritional status and promoting increased water intake among civil servants. Additionally, further research is recommended to investigate the impact of sugar-sweetened beverage consumption on overweight and obesity among civil servants, particularly utilizing study designs capable of exploring causal relationships.

Conflicts of Interest: The authors declare that there is no competing interest.

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