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Assessment of workhour feeding practices, healthy behaviour score and body mass index of physicians in Northern Nigeria: a cross-sectional multi-centre study

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Keywords

Body mass index • Lifestyle behaviour • Obesity • Physicians • Workhour feeding practices

Summary

Background. *The increasing prevalence of obesity and overweight among health workers calls for an appraisal of their lifestyle. This study assessed medical practitioners' workhour feeding and lifestyle practices and explored the relationship between these practices and their body mass index (BMI).*

Methods. *The survey involved 321 medical practitioners selected from 9 northern Nigeria hospitals in 2021. Data collected included biodata, medication history, workhour feeding characteristics, lifestyle behaviours, blood pressure, height, and weight measurements. Data were analyzed using Epi info software (version 7).*

Results. *Most respondents were male (70.7%). Their mean age was 38 ± 7.4 years. During their last workhours, 84.1% had lunch, and 46.4% took sugary drinks. Usually, 41.7% source their lunch from the hospital canteen, and 18.7% patronize their canteen at least weekly. Most reported healthy behaviour towards alcohol consumption (99.7%), fruit and vegetable consumption (54.8%) and smoking (98.4%). However, only 22.4% were physically active. Their mean healthy behaviour score and BMI were 2.8 ± 0.7 and 26.1 ± 4.6 kg/m^2, respectively. The obesity and overweight rates were 18.4% and 37.7%, respectively. Their source of lunch during workhours, age, sex, years of practice, employment duration, marital status, job category, systolic blood pressure, anti-hypertensive, and antidiabetic medication use were significantly associated with mean BMI. However, only antihypertensive medication use, being married, inadequate fruit/vegetable consumption and workhour sugary drinks consumption predicted obesity. The predictors of overweight/obese were years of practice (< 10 y) and use of antihypertensive medications.*

Conclusions. *Obesity and overweight rates were high. Most were physically inactive. Workhour sugary drink consumption predicted obesity. Effective workplace and community interventions to improve practitioners' lifestyle behaviour and curtail obesity and overweight are needed.*

Introduction

Obesity and overweight have become a global public health problem. In 2016, about 1.9 billion adults aged ≥ 18 years globally were at least overweight. Out of this, 650 million were obese [1]. Unhealthy lifestyle behaviours, including unhealthy diet, physical inactivity, smoking and alcohol consumption are important modifiable factors responsible for the development of non-communicable diseases (NCDs), including obesity [2, 3]. In Nigeria, NCDs were estimated to have caused 29% of the total mortalities in 2016, with cardiovascular diseases (11%), cancers (4%), and diabetes (1%) being the top three causes [4]. The link between lifestyle health behaviours and NCDs has been demonstrated with individual lifestyle practices and the collection of lifestyle practices (*i.e.,* health behaviour score) [3, 5].

Studies have shown that many healthcare industry employees are overweight and obese; at least half of healthcare workers in several studies are obese or overweight [6-13]. This clearly endangers their position as role models of healthy behaviour to their patients. Also, physicians who exercise sufficiently are more likely to counsel their patients on physical activity and healthy diet [14, 15]. Unfortunately, studies indicate that many healthcare professionals are physically inactive, consume unhealthy foods and drinks, and do not consume enough fruits and vegetables, even during workhours [16-20]. The risk factors for obesity in healthcare workers include older age, gender, marital status, job category, black race, and comorbidity [7, 9-11, 13]. Given the mentally and physically demanding nature of the hospital-based physician's job, it is essential to provide healthy

nutrition needed for optimal performance in the workplace [21]. However, access to healthy workplace nutrition can be challenging during workhours. Earlier studies in the UK showed that National Health Service (NHS) doctors had difficulty obtaining healthy nutrition during workhours due to unsupportive employers, unfavourable canteen opening times, lack of selection and meal breaks [22]. Similar findings were also reported among nurses [23, 24].

To our knowledge, no data exists on the feeding practices of Nigerian medical doctors during workhours or the association between their workhour feeding practices and body mass index (BMI). Hence, we examined the workhour feeding practices, healthy behaviour scores, and the BMI of medical practitioners in Northern Nigeria. We also assessed for any associations between the workhour feeding practices, healthy lifestyle practices and BMI. We hope the study provides valuable baseline information for strategic planning toward improving the health of medical practitioners in the region.

Materials and methods

Study design, setting, and population

This multicentre survey was carried out in 2021 (September to December). It involved medical practitioners of different specialties working in selected federal tertiary hospitals in Northern Nigeria. Northern Nigeria comprises three geopolitical zones: the northcentral (with five states and the Federal Capital Territory), northeast (6 states) and northwest (7 states). Each state has at least one federal tertiary hospital. Nine hospitals were selected for the study: Northcentral zone (Jos University Teaching Hospital [JUTH] Jos, Federal Medical Centre [FMC] Keffi, and FMC Lokoja); Northeast zone (FMC Nguru, University of Maiduguri Teaching Hospital [UMTH] Maiduguri and Abubakar Tafawa Balewa University Teaching Hospital [ATBUTH] Bauchi; and Northwest zone (Aminu Kano Teaching Hospital [AKTH] Kano, Usmanu Dan Fodio University Teaching Hospital [UDUTH] Sokoto, and FMC Birnin Kudu).

Eligibility criteria

Medical practitioners who had worked for at least six months during the study period were included in the study. Those who declined consent to participate were excluded.

Sample size estimation

A sample size of 347 was calculated using Epi info (version 7), considering a 95% confidence interval, an empirical physician obesity rate of 50% (given the lack of data in Nigeria), a finite population of 990 (estimated number of practitioners available for selection in the nine hospitals during the study period), and a non-response/missing data rate of 20%.

Sampling technique

A multistage sampling technique was employed. First, three states were selected from each of the three geopolitical zones by balloting. Second, one federal tertiary hospital was selected from each of the nine selected states also by balloting. Finally, the principal investigator sent the Google form link via WhatsApp or email to the study site coordinators. Then, the site coordinators sent the link to the WhatsApp platforms of resident doctors and consultants association in their hospital. Monthly reminders were sent until the study was completed.

Data collection

Following an extensive review of the literature, we developed a semi-structured interviewer-administered questionnaire in English. The questionnaire was then pretested on 30 medical practitioners at Murtala Mohammed Specialist Hospital in Kano (not selected for the main study) for comprehensibility, reduction of measurement error, and internal validity. It was modified based on information obtained from the pretest. For logistic reasons, the questionnaire was deployed for online (Google form) interviews in eight study sites and face-to-face interviews at one site. Data collected were sociodemographic characteristics, workhour feeding characteristics, medication history and lifestyle behaviours, blood pressure and anthropometric measurements. As a prerequisite, participants obtained their heights (metres), and recent weights (kg) and blood pressure (mmHg) following standard protocols before completing the questionnaire. Recent measurements were measurements taken not more than one week from the day of filling the form. They were also instructed to fill out the questionnaires only once. The online form required all entries in the form before submission. Self-reported blood pressures, heights, and weights were used because the participants were tertiary hospital medical doctors, and this strategy has been successfully used in other studies [16, 19].

Definition and measurement of variables

1. Outcome variable: Body mass index (BMI); Calculated by the investigator using the formula (weight/height^2[kg/m^2]). Categorized into: Normal weight (18.5-24.9), overweight (25.0-29.9), obesity (≥ 30), and underweight (< 18.5) [25].
2. Independent variables: Sociodemographic characteristics, medication history, blood pressure, healthy lifestyle behaviours, and workhour feeding characteristics.
3. Healthy behaviours: (a) Sufficient physical activity: Engaging in moderate and vigorous physical activities for 150 and 75 minutes the preceding week, respectively. We used the Physical Activity Assessment Tool [26]. (b) Fruits and vegetable consumption: Using the question, "*In the last 7 days, how many days did you eat fruits/vegetables?*" Adequate, if responses were "All times", or "Most times", and inadequate, if responses were "Sometimes",

"Rarely" or "None" [27]. (c) Alcohol consumption: Using the question: *"In the last 12 months, how often did you drink alcohol?"* It was described as healthy behaviour if responses were "Sometimes", "Rarely', or "None", and unhealthy behaviour if responses were 'All times" or "Most times" [27]. (d) Current smoker (Unhealthy behaviour): currently smoking or stopped smoking < 1 year before the study; healthy behaviour: not a current smoker [28]. (e) Healthy behaviour scores: One point was awarded for each healthy behaviour. The minimum score was 0 (no healthy behaviour), and the maximum was 4 (presence of all four healthy behaviours) [29].

4. Systolic blood pressure ≥ 140 mmHg and or diastolic blood pressure ≥ 90 mmHg were considered hypertension [30].
5. Workhour feeding practices: (a) Skipping breakfast: Assessed using the question, "*Do you take breakfast at home on a typical workday?*" A response of "Yes" was a healthy practice, while "No" was an unhealthy practice [31]. (b) Lunch meal: assessed using the question, "*What did you take for lunch during your last workhours?"* responses of "Full meal" or "Nothing (skipped lunch)" were considered healthy practices, while responses of "Snacks with sugary drinks" or "Sugary drinks only" were considered unhealthy practices [32]. (c) The usual source of lunch during workhours: Responses were categorised into "Hospital canteens or Other sources" and "Home or Skips lunch"

Ethical approval

Ethical approvals were obtained from the Research Ethics Committee of Aminu Kano Teaching Hospital, Kano (NHREC/28/01/2020/AKTH/EC/2798), the Health Research Ethics Committee of Federal Medical Centre Birnin Kudu (FMC/HREC/APP/CLIN/001/187), and Research Ethics Committee of Federal Medical Centre Lokoja (FMCL/MED/115/Vol.II/484). The study objectives were explained before seeking respondents' consent to participate. The study protocol conformed with all other principles of the Helsinki Declaration.

Data analysis

Data from the online Google form entries were exported to Microsoft Excel. Data received from one site were entered manually. All data were analyzed using Epi Info Version 7.2.4 (CDC, Atlanta, GA, USA). Categorical variables were summarized in tables as frequencies and percentages, while numerical variables were reported as mean and standard deviation. Fisher's exact test was used to assess the association between categorical variables. Normally distributed numerical variables were compared using the Student's t-test, while the Mann-Whitney test was used to compare skewed numerical data. The predictors of obesity and combined overweight and obesity were determined using a multivariate logistic regression analysis. The logistic regression model included independent variables with a *p*-value of < 0.1 in the bivariate analysis. Use of lipid-lowering medication, and alcohol consumption were excluded because of their low cell frequency sizes. Skipping breakfast, other healthy behaviours and behaviour scores were considered a priori confounding variables and were included in the final model. A p-value of < 0.05 was considered significant.

Results

There were 249 online and 74 face-to-face respondents. Two (face-to-face) respondents had insufficient data. Therefore, 321 respondents were analyzed, representing a 92.5% completion rate.

Sociodemographic, anthropometric, and blood pressure characteristics

The respondents' mean age was 38 ± 7.4 (range: 23-60) years. Most were male (n = 227, 70.7%), married (256, 79.8%), and from the Northwest geopolitical zone (169, 52.6%, comprising Kano [97, 30.2%], Birnin Kudu [21, 6.5%], and Sokoto [51, 15.9%]). Other zones included Northcentral (92, 28.7%), comprising Jos [2, 0.6%], Lokoja [74, 23.1%] and Keffi [16, 5.0%], and the Northeast (60,18.7%, comprising Bauchi [30, 9.4%], Maiduguri [21, 6.5%] and Nguru [9, 2.8%]) (Tab. I). Most (181, 56.4%) had practiced for ≥ 10 years since graduation.

Their mean height and weight were 1.7 ± 0.1 (range: 1.50-1.98) metres and 74.8 ± 14.1 (range:43.0-130.0) kg, respectively. Their mean BMI was 26.1 ± 4.6 (range: 17.0-42.2) kg/m^2. Also, 121 (37.7%) respondents were overweight, while 59 (18.4%) were obese. Their mean systolic and diastolic blood pressures were 118.5 ± 10.2 (range: 90-150) and 76.3 ± 8.0 (range: 50-100) mmHg, respectively.

Workhour feeding practices

About 136 (42.4%) respondents skipped breakfast on a typical workday (Tab. II). Most (273, 85.1%) had no official meal or break time in their hospital; 270 (84.1%) respondents had lunch during their last workhours. About 46.4% (n = 149) of respondents snacked on carbonated sugary drinks with or without cakes, meat pie, biscuits, *etc*. during their last workhours. About 41.7% (n = 134) usually got their lunch from their hospital canteen during workhours. However, 46.7% (n = 150) had never or rarely used their hospital canteen; 5% (16) used canteen services daily, while 18.7%(n = 60) used the canteen at least weekly. Although 226 (70.4%) respondents rated the hospital canteen meals as healthy, 27.1% (n = 87) felt otherwise. Reasons given for this position were under the themes "Dirty canteen environment" 41.4% (36/87), followed by "Poor quality/Not balanced/No variety/No fruits" 33.3% (29/87).

Healthy lifestyle behaviours and medication history

Most respondents reported healthy behaviours regarding alcohol consumption (320, 99.7%), smoking (316, 98.4%), and fruit and vegetable consumption (176,

Tab. I. Sociodemographic characteristics and body mass index (BMI, kg/m^2).

Variables	Sample n (%)	Mean[t] BMI (SD)	BMI < 18.5 n (%)	BMI 18.5-24.9 n (%)	BMI 25.0-29.9 n (%)	BMI ≥ 30 n (%)	p[(f)]
Sex							
Male	227 (70.7)	26.2 (4.3)*	4 (1.8)	89 (39.2)	97 (42.7)	37 (16.3)	0.013*
Female	94 (29.3)	25.9 (5.3)	5 (5.3)	43 (45.8)	24 (25.5)	22 (23.4)	
Age, mean (SD)	38.1 (7.4)						
< 30	34 (10.6)	22.9 (3.8)*	4 (11.8)	30 (58.8)	9 (26.5)	1 (2.9)	0.001*
30-39	169 (52.7)	26.0 ((4.5)	4 (2.4)	75 (44.5)	60 (35.5)	30 (17.7)	
40-49	88 (27.4)	27.0 (4.7)	1 (1.1)	29 (33.0)	39 (44.3)	19 (21.6)	
≥ 50	30 (9.3)	27.7 (3.9)	0 (0)	8 (26.7)	13 (43.3)	9 (30.0)	
Geopolitical zone							0.306
Northcentral zone[a]	92 (28.7)	26.4 (4.7)	2 (2.2)	37 (40.2)	31 (33.7)	22 (23.9)	
Northeast zone[b]	60 (18.7)	25.7 (3.9)	0 (0)	28 (46.7)	25 (41.7)	7 (11.7)	
Northwest zone[c]	169 (52.6)	26.0 (4.7)	7 (4.1)	67 (39.6)	65 (38.5)	30 (17.8)	
Specialty							0.773
Medical	211 (65.7)	26.2 (4.4)	5 (2.4)	84 (39.8)	83 (39.3)	39 (18.5)	
Surgical	110 (34.3)	25.9 (4.9)	4 (3.6)	48 (43.6)	38 (34.6)	20 (18.2)	
Years of practice							< 0.001*
Median (IQR)[mw]	10 (5-15)						
< 10 y	140 (43.6)	24.6 (4.5)*	8 (5.7)	72 (51.4)	46 (32.9)	14 (10.0)	
≥ 1 0 y	181 (56.4)	27.3 (4.2)	1 (0.5)	60 (33.2)	75 (41.4)	45 (24.9)	
Job category							0.052
Non-consultants	236 (72.5)	25.6 (4.6)*	8 (3.4)	104 (44.1)	88 (37.3)	36 (15.2)	
Consultants	85 (26.5)	27.4 (4.3)	1 (1.2)	28 (32.9)	33 (38.8)	23 (27.1)	
Duration of current employment							
Median (IQR)[mw]	5 (2-9)						
< 5 y	168 (52.3)	25.3 (4.5)*	6 (3.6)	82 (48.8)	58 (34.5)	22 (13.1)	0.033*
≥ 5 y	153 (47.7)	27.0 (4.5)	3 (2.0)	50 (32.7)	63 (41.2)	37 (24.1)	
Current marital status							0.001*
Married[d]	262 (81.6)	26.5 (4.7)*	9 (3.4)	96 (36.6)	101 (38.6)	56 (21.4)	
Single	59 (18.4)	24.2 (3.2)	0 (0)	36 (61.0)	20 (33.9)	3 (5.1)	
SBP (mean [SD]) mmHg	118.5 ± 10.2						
< 140	308 (96.0)	26.0 (4.5)*	9 (2.9)	130 (42.2)	116 (37.7)	53 (17.2)	0.041*
≥ 140	13 (4.0)	29.5 (4.5)	0 (0)	2 (15.4)	5 (38.5)	6 (46.1)	
DBP (mean [SD]) mmHg	76 ± 8.0						
< 90	294 (91.6)	26.0 (4.5)	8 (2.7)	125 (42.5)	110 (37.4)	51 (17.4)	0.279
≥ 90	27 (8.4)	27.4 (5.1)	1 (3.7)	7 (25.9)	11 (40.7)	8 (29.6)	

* Significant ($p < 0.05$); [f] Fisher's exact test; [t] Student t-test; mw Mann-Witney test; [a] Jos University Teaching Hospital, Federal Medical Centre (FMC) Lokoja, and FMC Keffi; [b] Abubakar Tafawa Balewa University Teaching Hospital Bauchi, University of Maiduguri Teaching Hospital, FMC Nguru; [c] Aminu Kano Teaching Hospital, FMC Birnin Kudu, Uthman Dan Fodio University Teaching Hospital Sokoto; [d] Married (n = 256), divorced, and widowed.

54.8%) (Tab. III). However, only 22.4% (n = 72) were physically active. Their mean healthy behaviour score was 2.8 ± 0.7 (range: 0-4). One respondent (0.3%) had 0 healthy behaviour score, and another one had 1 healthy behaviour score; 121 (37.7%), 151 (47.1%), and 47 (14.6%) respondents had 2, 3 and 4 healthy behaviour scores, respectively. Forty-six respondents (14.3%) were using antihypertensive medications.

Comparing workhour feeding practices and body mass index

Table IV shows that respondents who usually brought lunch from home or skipped it had significantly higher mean BMI than those who obtained lunch from the hospital canteen or other sources ($p < 0.05$).

Comparing sociodemographic variables, blood pressure and body mass index

The mean BMI was higher in male (26.2 ± 4.3 kg/m^2) than in female (25.9 ± 5.3 kg/m^2) respondents (Tab. I). The combined overweight and obesity rates were also higher in males (59%) than in females (48.9%). Respondents' mean BMI increased with age; the ≥ 50 years age group had the highest mean BMI (27.7 ± 3.9 kg/m^2). Similarly, a higher mean BMI was observed among some respondents (*i.e.* those who had practiced for ≥ 10 years, who were consultants, who had spent ≥ 5 years in current employment, who were married and who had a systolic blood pressure ≥ 140mmHg) than their corresponding counterparts. These findings were statistically significant.

Tab. II. Workhour feeding characteristics (n = 321).

Variables	n (%)
Do you have breakfast at home on a typical workday?	
Yes	185 (57.6)
No	136 (42.4)
How often do you take lunch during work hours?	
Occasionally	230 (71.7)
Always	34 (10.6)
Often	56 (17.4)
Never	1 (0.3)
Do you have an official lunchtime in your hospital?	
Yes	19 (5.9)
No	273 (85.1)
Don't know	29 (9.0)
Usual source of lunch meal/snack during workhours	
In-hospital canteen	134 (41.7)
Out-of-hospital canteen	73 (22.7)
Home	73 (22.7)
Department meetings	23 (7.2)
Hospital shops/Kiosks	8 (2.5)
Skips lunch	4 (1.3)
Both in- and out-of-hospital canteens	6 (1.9)
What did you take for lunch during your last working hours?	
Full meal	121 (37.7)
Snack on sugary drinks and meat pie/cake/ biscuits, *etc.*	103 (32.1)
Sugary drinks only	46 (14.3)
Skipped lunch	51 (15.9)
Does your hospital have a canteen?	
Yes	289 (90.0)
No	32 (10.0)
How often do you use your hospital canteen?	
Daily	16 (5.0)
2, 3, and > 3 times weekly	44(13.7)
Occasionally	111 (34.6)
Rarely	146 (45.5)
Never	4(1.2)
Do you think the food served by your hospital canteen is healthy?	
Yes	226 (70.4)
No	87 (27.1)
Neutral/Not applicable	8 (2.5)
If your answer is No, why do you think it is unhealthy? (n = 87)*	
Dirty canteen environment	36 (41.4)
Poor quality/unbalanced diet/no variety/no fruits	29 (33.3)
I had diarrhoea after a meal/found a dead insect in my food	9 (10.4)
Unprofessional handling of food/cooking at an unknown place and bringing it here	7 (8.1)
Too spicy/oily/salty	6 (6.9)
No provision for takeaway/small space	2 (2.3)
No reason given	2 (2.3)

* Some respondents gave more than one reason.

Comparing lifestyle behaviours, medication history and body mass index

The respondents using antihypertensive, and antidiabetic medications had higher mean BMI than those who were not ($p < 0.05$) (Tab. III). Although the respondents using lipid-lowering medication had higher mean BMI than those who were not, this association was not statistically significant ($p > 0.05$). The individual healthy lifestyle behaviours and healthy behaviour scores were not significantly associated with BMI ($p > 0.05$).

Predictors of obesity and overweight/ obesity

After adjusting for confounding factors, respondents who were single (OR = 0.25, CI [0.07-0.96], p = 0.043), refrained from sugary drinks during workhours (OR = 0.45, CI [0.23-0.88], p = 0.018), and consumed enough fruits and vegetables(OR = 0.21, CI [0.05-0.87], p = 0.031) were less likely to be obese compared to those who were not (Tab. V). Those using antihypertensive medications were 2.27 times more likely to be obese compared to those who were not (OR = 2.27, CI [1.00-5.11], p = 0.049). Using antihypertensive medication increased the odds of overweight/obesity by 4.83 times compared to those who were not (OR = 4.83, CI [0.12-0.95], p = 0.04). Also, practicing for < 10 years lowered the odds of overweight/obesity compared to those who had not (OR = 0.43, CI [0.19-0.96], p = 0.039).

Discussion

This study investigated the work hour feeding practices, lifestyle practices and BMI of medical practitioners in northern Nigeria. We found that despite evidence linking skipping breakfast to obesity [31], 42% of respondents skip breakfast on a typical workday. This finding is lower than the 76.9% found among Ghanaian health workers [20]. The higher proportion of nurses in the Ghanaian study may explain this difference since nurses usually resume duties earlier than doctors in many settings. However, this finding indicates that some respondents may require meals during work hours, corroborating the 84% of respondents who had lunch during their last work hours.

About 85% of respondents reported the absence of breaks or mealtimes in their hospitals, which aligns with a previous study [22]. This suggests that some practitioners may need to leave their duty post at some point during work hours to eat or drink. Further research is required on how practitioners manage this challenge that can possibly affect patient care.

Sadly, about 10% of respondents stated that their hospital did not have a canteen. This could be hospitals that outsourced their canteen services to private entities within the hospital, while in others, canteen services are outrightly unavailable. This finding indicates limited access to food or drinks during work hours in such settings, leading to employees patronizing external food vendors with its potential negative health implications [16].

Again, 18.7% of respondents used canteen services at least once weekly, differing from the 70% of UK doctors who used canteen services [22]. This difference could

Tab. III. Healthy lifestyle characteristics, medication history, and body mass index (BMI, kg/m^2).

Variables	Sample	Mean t BMI	BMI < 18.5	BMI 18.5-24.9	BMI 25.0-29.9	BMI ≥ 30	p **
	n (%)		n (%)	n (%)	n (%)	n (%)	
Healthy lifestyles							
Healthy alcohol consumption							0.697
Yes	320 (99.7)	-	9 (2.8)	131 (40.9)	121 (37.8)	59 (18.4)	
No	1 (0.3)	-	0 (0)	1 (100)	0 (0)	0 (0)	
Physically active							0.526
Yes	72 (22.4)	26.2 ± 4.3	1 (1.4)	27 (37.5)	32 (44.4)	12 (16.7)	
No	249 (77.6)	26.1 ± 4.7	8 (3.2)	105 (42.2)	89 (35.7)	47 (18.9)	
Eat enough fruits/vegetables							0.619
Yes	176 (54.8)	26.1 ± 4.5	5 (2.8)	68 (38.6)	72 (40.9)	31 (17.6)	
No	145 (45.2)	26.0 ± 4.7	4 (2.8)	64 (44.4)	49 (33.8)	28 (19.3)	
Not currently smoking							0.269
Yes	316 (98.4)	26.1 ± 4.5	9 (2.9)	128 (40.5)	121 (38.3)	58 (18.3)	
No	5 (1.6)	24.5 ± 8.0	0 (0)	4 (80.0)	0 (0)	1 (20.0)	
Healthy behaviour score							
Mean (SD)	2.8 (0.7)						0.777
0-2	123 (38.3)	26.0 ± 4.7	3 (2.4)	55 (44.7)	44 (35.8)	21 (17.1)	
3-4	198 (61.7)	26.2 ± 4.5	6 (3.0)	77 (38.9)	77 (38.9)	38 (19.2)	
Medication history							
Antihypertensive medication use							< 0.001*
No	275 (85.7)	25.6 ± 4.5*	9 (3.3)	126 (45.8)	96 (34.9)	44 (16.0)	
Yes	46 (14.3)	28.8 ± 4.2	0 (0)	6 (13.0)	25 (54.4)	15 (32.6)	
Antidiabetic medication use							0.280
No	314 (97.8)	26.0 ± 4.6*	9 (2.9)	131 (41.7)	118 (37.6)	56 (17.8)	
Yes	7 (2.2)	28.6 ± 2.9	0 (0)	1 (14.2)	3 (42.9)	3 (42.9)	
Lipid-lowering medication use							0.562
No	315 (98.1)	26.1 ± 4.6	9 (2.9)	131 (41.6)	118 (37.5)	57 (18.1)	
Yes	6 (1.9)	27.3 ± 3.2	0 (0)	1 (16.7)	3 (50.0)	2 (33.3)	

* Significant ($p < 0.05$); ** Fisher's exact test; t Student t-test.

be due to barriers such as unfavourable canteen opening times, absence of break time, lack of meal options [22], high cost [19, 20], and perceived unhealthy meals reported by 27% of our respondents. From the business perspective, the low canteen utility may pose a challenge in sustaining services.

Furthermore, 46% of respondents consumed sugary drinks with or without snacks during their last work hours. This percentage is higher than 21.7% reported among healthcare workers in Saudi Arabia and 39.4% in Ghana, but lower than the 55% reported in South Africa [18-20]. Healthcare workers often consume sugary drinks due to their convenience (easy to consume while working), widespread availability and the misconception that they are healthy [20].

Almost all the respondents (99.7%) reported healthy behaviours regarding alcohol consumption. This proportion is higher than the 83.8% of Australian nurses and midwives who did not engage in risky drinking, and much higher than the 35% of healthcare professionals in South Africa who rarely consume alcohol [16, 18]. The predominance of muslims in northern Nigeria may explain this difference, as Islam prohibits the consumption of alcoholic beverages.

Although the consumption of sufficient fruits and vegetables has been associated with weight loss and prevention of weight gain [33], only about half (54.8%) of the respondents consumed sufficient fruits and vegetables. This finding agrees with the 59% of Saudi Arabian healthcare workers who usually consume fruits and vegetables at home, but is higher than the finding in South African healthcare workers who frequently consumed fruits (23%) and vegetables (27%) [18, 19].

The low prevalence of current smokers (1.6%) among the respondents was similar to 1.95% obtained among American doctors between 2010 and 2011 [34], but lower than the rates among medical doctors in Riyad, Saudi Arabia (10.4%) and Australian nurses and midwives (10.3%) [16, 35]. Notably, our finding is lower than the national pooled prevalence of 10.4% for the general population [28]. While this finding could be linked to respect for local cultural values, it also suggests that most respondents would likely counsel their patients who smoke to quit smoking [36].

Remarkably, only 22.4% of the respondents were physically active, which is lower than the 40.4% obtained among medical doctors in Kano, Nigeria and 46.6% of Australian nurses and midwives [16, 17]. These findings are less than the WHO target of 85% [37], suggesting the

Tab. IV. Workhour feeding characteristics and body mass index (BMI, kg/m^2).

Variables	Mean BMI	BMI < 18.5	BMI 18.5-24.9	BMI 25.0-29.9	BMI ≥ 30	p**
Skip breakfast on a typical workday?						0.442
No	26.1 ± 4.3	4 (2.2)	76 (41.1)	75 (40.5)	30 (16.2)	
Yes	26.1 ± 5.0	5 (3.7)	56 (41.2)	46 (33.8)	29 (21.3)	
Have an official lunchtime in your hospital?						0.321
Yes	26.9 ± 3.9	0 (0)	6 (31.6)	11 (57.9)	2 (10.5)	
No	26.1 ± 4.7	9 (3.3)	110 (40.3)	101 (37.0)	53 (19.4)	
Don't know	25.5 ± 4.2	0 (0)	16 (55.2)	9 (31.0)	4 (13.8)	
How often do you have lunch during workhours?						0.706
Always/often	26.1 ± 4.5	2 (2.2)	41 (45.6)	30 (33.3)	17 (18.9)	
Occasional/never	26.1 ± 4.9	7 (3.0)	91 (39.4)	91 (39.4)	42 (18.2)	
Usual source of lunch during workhours						0.640
Home/skipped lunch	27.0 ± 4.8*	1 (1.3)	30 (39.0)	29 (37.6)	17 (22.1)	
Canteens/shops/meetings	25.8 ± 4.5	8 (3.3)	102 (41.8)	92 (37.7)	42 (17.2)	
What did you have during your last workhours?						0.074
Sugary drinks	26.1 ± 5.1	5 (3.3)	64 (43.0)	46 (30.9)	34 (22.8)	
No sugary drinks[a]	26.1 ± 4.3	4 (2.3)	68 (39.5)	75 (43.7)	25 (14.5)	
Does your hospital have a canteen?						0.507
No	25.7 ± 4.4	2 (6.2)	15 (46.9)	10 (31.3)	5 (15.6)	
Yes	26.2 ± 4.6	7 (2.4)	117 (40.5)	111 (38.4)	54 (18.7)	
How often do you use the hospital canteen?						0.302
Rarely/Never	26.5 ± 4.6	4 (2.7)	60 (40.0)	57 (38.0)	29 (19.3)	
Occasionally	26.3 ± 4.5	3 (2.7)	39 (35.1)	48 (43.2)	21 (18.9)	
At least weekly***	24.9 ± 4.6	2 (3.3)	33 (55.0)	16 (26.7)	9 (15.0)	
Perception about canteen meals						0.439
Healthy	25.9 ± 4.4	6 (2.6)	96 (42.5)	89 (39.4)	35 (15.5)	
Unhealthy	26.5 ± 5.0	3 (3.5)	34 (39.1)	29 (33.3)	21 (24.1)	
Neutral	27.7 ± 3.3	0 (0)	2 (25.0)	3 (37.5)	3 (37.5)	

* Significant; ** Fisher's exact test; [a] Full meal and skipped lunch; *** Daily, twice-, thrice- and more than thrice weekly.

need for appropriate interventions, given that sufficient physical activity has numerous health benefits and physically active doctors are more likely to counsel their patients on physical activity [15].

Furthermore, the overweight and obesity rates (37.7%/18.4%,) found in this study were high and were similar to findings among healthcare workers in Benin City, South-south Nigeria (31.7% /25.2%), Malaysia (33.1%/21.1%), and Saudi Arabia (35%/16%), but were lower than rates found in Lagos, Southwest Nigeria (44.7%/27.3%), and Palestine (39.2%/) [6,10,11,13,19]. It differed slightly from a Ghanaian study, with 39.4% overweight and no obesity [20]. Notably, our finding was higher than a national overweight and obesity prevalence (27.6%/14.5%), a situation similarly recorded in Malaysia but differed from that of Canadian healthcare workers, where their obesity prevalence (8%) was lower than that of the general population [11, 38, 39]. Obesity impacts medical practitioners' health and job performance and has multiple etiological factors such as genetics, lifestyle, environment, and certain disease conditions. The high prevalence among the respondents could be due to interplay factors such as disrupted sleep patterns with chronic work stress, skipping breakfast, snacking on energy-dense, fatty and sugar-loaded foods, prolonged sedentary work hours with insufficient physical activity, and having an averagely higher income, than the general population [10, 31, 32, 40, 41].

In the bivariate analysis and consistent with previous studies, increasing age and male gender were associated with higher mean BMI [10, 42]. But interestingly, the consultants in this study had a higher mean BMI than the non-consultants. This finding could be because they are usually older and earn higher incomes than the non-consultants.

Another notable finding was that respondents who usually brought lunch from home or skipped lunch had significantly higher mean BMI than those who got lunch from their hospital canteens or other sources. The explanation for this association is unclear and requires further investigation.

We found no significant association between the individual healthy behaviours, the healthy behaviours scores and mean BMI, although this is consistent with other studies [6, 13]. However, after including as a priori confounding variables in the final logistic regression

Tab. V. Predictors of obesity and combined overweight and obesity among respondents.

Variables	Obesity (BMI ≥ 30 kg/m²)		Overweight and obesity (BMI ≥ 25 kg/m²)	
	OR (CI)	p-value	OR (CI)	p-value
Age (≥ 39 y)	1.11 (0.46-2.68)	0.816	1.19 (0.58-2.42)	0.635
Sex (female)	1.89 (0.92-3.91)	0.086	0.76 (0.43-1.34)	0.342
Marital status (single)	0.25 (0.07-0.96)	0.043*	0.64 (0.32-1.29)	0.211
Years of practice (< 10 y)	0.39 (0.14-1.10)	0.075	0.43 (0.19-0.96)	0.039*
Duration of current employment (≥ 5 y)	0.59 (0.23-1.50)	0.270	0.62 (0.28-1.35)	0.227
Job categories (non-consultants)	0.76 (0.35-1.66)	0.491	0.96 (0.48-1.93)	0.911
Skip breakfast on typical workday (Yes)	1.53 (0.78-3.01)	0.213	1.31 (0.79-2.19)	0.298
What did you take during last workhours? (No sugary drinks)**	0.45 (0.23-0.88)	0.018*	1.33 (0.78-2.24)	0.293
Source of lunch (hospital canteens and other sources)	0.56 (0.27-1.16)	0.121	0.92 (0.51-1.64)	0.764
Physically active (Yes)	0.58 (0.19-1.78)	0.340	1.54 (0.71-3.34)	0.279
Eat enough fruit/Vegetable (Yes)	0.21 (0.05-0.87)	0.031*	1.81 (0.62-5.23)	0.275
Not currently smoking (Yes)	0.33 (0.02-4.95)	0.421	4.70 (0.46-47.77)	0.191
Healthy behaviour score (≥ 3)	4.12 (0.87-19.47)	0.074	0.54 (0.16-1.79)	0.313
Antihypertensive medication use (Yes)	2.27 (1.00-5.11)	0.049*	4.83 (1.89-12.33)	0.001*
Antidiabetic medication use (Yes)	4.13 (0.75-22.89)	0.105	3.41 (0.37-31.43)	0.279
SBP (< 140 mmHg)	0.30 (0.08-1.09)	0.067	0.42 (0.08-2.12)	0.293

OR: Odds ratio; CI: Confidence interval; * Bold: Significant (p < 0.05).** Full meal or skipped lunch.

model, we found that respondents who consumed enough fruits and vegetables had lower odds of obesity than those who did not, which is consistent with existing evidence [33], but differed from the result of another similar study [42].

Remarkably, refraining from workhour sugary drink consumption also had lower odds of obesity compared to those who had full meals or skipped lunch which aligns with a previous study [32]. Sugary drinks are energy-dense diets, and their habitual consumption has been associated with obesity, suggesting the need for effective educational interventions to discourage this habit and to provide healthy alternatives.

Consistent with other studies, singlehood was associated with decreased odds of obesity compared to being married [9, 13]. It has been hypothesized that married persons have better social support and regularly eat energy-dense diets compared to those who are single and are therefore prone to obesity [43]. In addition, practitioners who were using anti-hypertensive medications were two times and four times more likely to be obese and overweight/obese, respectively. These findings are consistent with another study where having hypertension (elevated systolic blood pressure as demonstrated in this study) increased the risk of overweight and obesity [13].

Finally, practicing for < 10 years lowered the odds of being overweight and obese, which is consistent with a previous study [13], and could be due to younger age, lower income, and fewer years of exposure to work-related stress.

Strengths and limitations

This study had a multicentre and regional design with a probability sampling strategy. It provided valuable data on the link between work hour sugary drink consumption and obesity. However, it had some limitations. The recruitment of practitioners from federal tertiary hospitals limits generalization to other types of hospitals. BMI calculations based on self-reported weight and height may be inaccurate in some cases. Its cross-sectional design precludes the examination of temporal relationships between variables. Also, comparison with similar studies with a homogenous population of medical practitioners was limited due to the paucity of such studies. Future intervention studies are needed to fully understand the effect of workhour feeding practices on obesity. Also, research is required to investigate the relationship between the lifestyle of practitioners in the region and their counselling of patients on related issues.

Conclusions

The obesity and overweight rates were high. Most practitioners feed, and many snack on energy-dense drinks and foods during workhours. Workhour consumption of sugary drinks increased their risk of obesity. Additionally, most practitioners are physically inactive, and many do not consume enough fruits and vegetables. Their overweight and obesity rates exceeded those of the general population. Therefore, stakeholders such as employers, medical unions, and the government should urgently provide effective workplace and community interventions that would encourage behaviour change towards healthy lifestyles. These interventions should include continuous nutritional education, therapeutic programs, healthy meals, and healthy alternatives to energy-dense food and drinks during work hours. The identified predictors of obesity and overweight should be considered when planning these interventions.

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Conflict of interest statement

The authors declare that no conflict of interest exists.

Authors' contributions

MGC: conception, data analysis and first manuscript drafting. MGC, EDN, FFA, IH, GBA, MYB, AI, MAA, SAK, OE, FAG, MJKA: study design and data collection. All authors: data interpretation, manuscript revision and approval for publication. MJKA: supervisor.

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