

Nutrition-related knowledge, practice, and weight status of patients with chronic diseases attending a district hospital in Nigeria

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ABSTRACT

Background: Africa is experiencing an epidemic of non-communicable diseases (NCDs), and the projected mortality from NCDs by 2030 will overtake the combined mortality from communicable diseases. Nutrition is a key modality for preventing and treating NCDs, and optimal nutrition knowledge is essential for self-care. **Aim:** This study assessed the nutritional-related knowledge, dietary practice, and weight status of patients with non-communicable diseases attending State Specialist Hospital, Ring Road, Ibadan, Nigeria. **Methods:** This hospital-based descriptive cross-sectional study was conducted among 302 adult patients with chronic diseases attending a district hospital in Ibadan, Nigeria. Data were obtained using a semi-structured interviewer's administered questionnaire on sociodemographic, diet-related knowledge and dietary practices, sources of dietary information and body mass index. The knowledge and practice score was calculated, and Chi-squared test was used to evaluate associations between socio-demographics, nutrition-related knowledge and practices; statistical significance was set at $P < 0.05$. **Results:** The mean age of respondents was 61.94 ± 10.60 , and 74.4% were women. Overall, 61.3% of the respondents had good nutrition knowledge, with a higher proportion among women (61.8%) than men (59.5%). However, more women were overweight (33.2%) or obese (21.7%). There was a significant difference in the knowledge of respondents based on income ($P < 0.034$), duration of illness ($P < 0.012$), as well as nutrition practice ($P < 0.000$). **Conclusion:** There was a high prevalence of overweight and obesity among the participants despite the overall satisfactory nutritional knowledge. Hence, primary care physicians as frontline doctors coordinating care need to advocate for holistic weight reduction strategies in managing chronic diseases.

Keywords: Chronic diseases, dietary practice, Ibadan, nutrition knowledge, weight status

Introduction

Diet is a significant risk factor for chronic diseases. Poor diet and unhealthy lifestyle have been identified as major risk factors of cardiovascular diseases (CVDs) and other non-communicable diseases.^[1] Worldwide, the disease burden

is changing, with the emergence of chronic diseases including obesity, diabetes mellitus, hypertension, and cardiovascular diseases leading to higher mortality in developing than in developed countries.^[2]

Non-Communicable Diseases (NCDs) are chronic diseases that are not contagious but reduce the quality of life of the affected individuals and can also lead to death.^[3] NCDs are currently responsible for over 60% of global deaths, and about 80% of these deaths occur in low- and middle-income countries (LMICs).^[4,5] These countries with fragile health systems are challenged with the increasing burden of NCDs;^[6] hence there

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is a need to promote disease prevention and health promotion strategies delivered through primary care physicians (PCPs).

A systematic analysis for the Global Burden of Disease (GBD) revealed diet as a major factor in the rising incidence of chronic non-communicable diseases.^[6] Nutrition knowledge is necessary, although not sufficient for dietary change. In line with the social cognitive theory,^[7] knowledge is one of several factors required to change behavior, and the significance of knowledge needs to be investigated in terms of its impact on dietary behavior. An underlying assumption of nutrition education is that increasing knowledge will change behavior. A systematic review conducted in 2014 involving 29 studies reported significant, positive, but weak associations between higher nutrition knowledge and dietary intake.^[8] Also, findings from a large community study in the United Kingdom revealed an association between nutrition knowledge and dietary intake.^[9] Nutrition knowledge is vital in determining the dietary intake of individuals living with chronic diseases. Studies have shown that good nutrition knowledge is important to stimulate nutritional habits that promote a healthy weight. Both overweight and obesity affect health and favor the development of chronic diseases.^[10] The World Health Organization (WHO) Global NCDs Action Plan is aimed at a 25% relative reduction in premature mortality from long-term NCDs by 2025.^[11] The adoption of a holistic approach based on common risk factors was emphasised as a global strategy. From the frontline health care providers and gatekeepers to secondary healthcare, primary care physicians are involved in longitudinal care and coordinating care of chronic illnesses. Hence, the management of NCDs should adopt a holistic approach that promotes healthy dietary practices and weight management.^[12] This study, therefore, aimed to assess the nutritional-related knowledge, dietary practice, and weight status of patients with NCDs attending Ring Road State Hospital, Ibadan, Nigeria. Findings from this study can serve as a template based on which further interventions for risk reduction and dietary management of patients with chronic diseases can be planned by PCPs.

Materials and Methods

Study design, study population, and sampling

This hospital-based, descriptive, cross-sectional study was conducted at the Medical Out-patient (MOP) Clinic of Ring Road State Hospital, Ibadan, Nigeria, between September and November 2017. Ring Road State Hospital, Ibadan is a government-owned secondary health care level hospital situated in an urban area of the capital city serving peri-urban and rural communities of Ibadan. It also serves as a referral center to primary health care centers in its environs. It is a 150-bedded hospital offering in-patient and out-patients services rendered through the general out-patient, medical out-patient clinics (MOP) and surgical out-patients clinic, and gynecological/maternity clinics. It also provides emergency services, accident and trauma care, and specialist care such as maxillofacial, orthopedics, otolaryngology and dental services.

302 eligible and consenting adult patients (18 years and above) with hypertension and diabetes mellitus who had been diagnosed (clinically and biochemically) and had been receiving treatment for at least six months, and who attended the MOP clinics within the study period were interviewed. The sample size was calculated using the Leslie Kish formula, $n = Z^2pq/d^2$, where n is the minimum sample size, Z is the standard normal deviate, usually set at 1.96, which corresponds to 95% C.I., P is the proportion in the target population estimated to have a particular characteristic (22% based on the combined prevalence rate of hypertension in Nigerian populations)^[12]; $q = 1.0 - p = 1.0 - 0.22 = 0.78$, d = degree of accuracy desired, set at 5% = 0.05.

Data was collected with the use of a semi-structured questionnaire designed, reviewed, and validated before data collection. Content validity was done by experts in the field of nutrition and primary care. Questions on nutrition-related knowledge and practices were structured using previous studies,^[13-16] but culture-specific modifications were introduced such as examples of locally available foods were included. The questionnaire was pre-tested at the General Outpatients Clinic of Family Medicine Department, UCH Ibadan on 20 patients with hypertension and diabetes mellitus to ensure the reliability of the research instrument. Analysis was carried out on the outcome of the pre-test, and necessary modifications were made to the tools. Data were collected using the modified questionnaire. Written informed consent was obtained, and the respondents were interviewed in a private setting. The questionnaires were translated into Yoruba as this is the local language commonly spoken by most people living in the study area and back-translated to English to ensure the original meaning was retained. The Yoruba translation was used as needed. Data were obtained on participants' information on socio-economic data, diet-related knowledge and dietary practices, sources of nutrition information and thereafter, weight and height were measured and body mass index calculated.

Data analysis

All knowledge questions with correct responses were scored 1, while the incorrect responses and "not sure" were scored 0. A knowledge score was calculated based on the number of correct answers to knowledge questions with scores ranging from 0 to 22; the higher the score, the higher the knowledge. A mean score of ≥ 11 was taken as sufficient knowledge, while ≤ 11 was taken as insufficient knowledge. Dietary practices were assessed using a practice scale of 0–5 marks. Good practices scored ≥ 3 marks, and the fair had < 3 marks. Data collected were analysed using SPSS version 20 after sorting, cleaning, and data entry. The univariate analysis involved the use of descriptive statistics such as frequency distribution, bar and pie chart. Chi-squared test was used to evaluate associations between socio-demographics, nutrition-related knowledge and practices; the level of statistical significance was set at $P < 0.05$.

Weight was measured without shoes to the nearest 0.5 kg using a Seca optimal scale; it was validated with a standard weight and

corrected for zero error. Height was measured without shoes to the nearest 0.5 cm using a stadiometer. Body mass index (BMI) was calculated as weight (kg) divided by height-squared (m²) and used as a marker for nutritional status.^[10] Underweight was defined as BMI less than 18.5 kg/m². Normal weight was defined as BMI of 18.5 to 24.9 kg/m²; overweight was defined as BMI of 25.0 to 29.9 kg/m²; while obesity was defined as BMI of 30.0 kg/m² and above.

Ethical considerations

Ethical approval was sought and obtained from the Ethical Review Committee of the Ministry of Health, Oyo State, Nigeria, with Ethics Number A.D./13/479/580. Permission was also sought and obtained from the Head, Medical Out-patient (MOP) Clinic of the Ring Road State Hospital, Ibadan. Written informed consent was obtained from the participants before data collection after the study procedure, including possible risks and benefits have been explained to them.

Results

Out of the 302 respondents that were studied, a significant proportion of the respondents (74.5%) were women while 24.5% were men, giving a female-male ratio of 3:1 [Table 1]. 98% of the respondents were aged 40 years and above. The modal age group was 60 to 69 years (38.7%), with the mean age at 61.94 ± 10.60. The majority of the respondents (95.4%) were Yoruba. There were more Christians (64.2%) than Muslims (35.8%). Most of the respondents (73.5%) were married; a good proportion (71.2%) were in a monogamous family setting. Half of the respondents (50.0%) had post-primary school education.

Most of the patients gave correct answers for food rich in fats 68.2%, protein 73.2%, and starch 76.2%. Majority (82.1%) of the respondents were not aware of foods that raise the blood sugar quickly, while almost half (45.4%) of the respondents did not know of foods that helped control blood sugar [Table 2]. More than half of the respondents (65.2%) did not know the symptoms of hypoglycemia, and only a small proportion of respondents (20.9%) correctly listed foods that could be taken to correct hypoglycemia. Most of the respondents (71.2%) correctly answered that being overweight was a risk factor for hypertension. Most of the respondents (81.8%) also correctly answered that eating excess salt had a negative effect on blood pressure. However, only 34.8% of the respondents were aware that smoking was a risk factor for hypertension [Table 2].

Figure 1 reveals that 55% of the respondents sourced their information on healthy eating from health care workers. However, 24% and 14% reported that their source of information on healthy eating was from the radio and television, respectively. Those who said family members were their source of information on healthy eating were about 5%, while about 1% sourced their information on healthy eating from friends and online media, respectively.

Table 1: Sample characteristics of respondents (n=302)

Variable	Frequency (n)	Percentage (%)
Gender		
Male	74	24.5
Female	228	75.5
Age		
<40 years	5	1.7
40-49 years	34	11.3
50-59 years	70	23.2
60-69 years	117	38.7
≥70 years	76	25.2
Mean age	61.94±10.60	
Ethnicity		
Yoruba	288	95.4
Igbo	7	2.3
Others	7	2.3
Religion		
Christianity	194	64.2
Islam	108	35.8
Marital status		
Single	3	1.0
Married	222	73.5
Widowed	61	20.2
Divorced/Separated	16	5.3
Family type		
Monogamous	215	71.2
Polygamous	87	28.8
Educational level completed		
No formal	55	18.2
Primary	96	31.8
Secondary	75	24.8
Tertiary	76	25.2

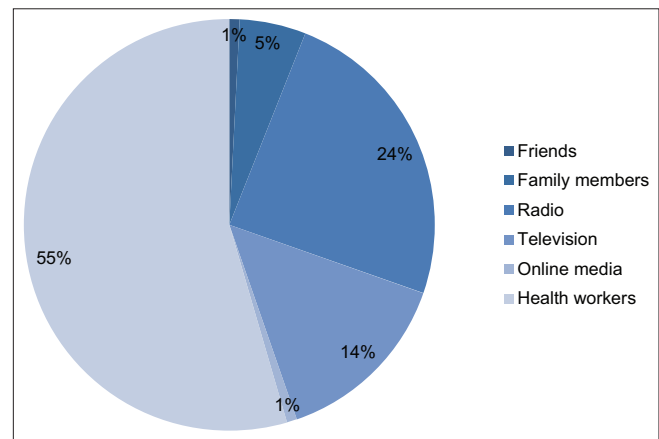


Figure 1: Sources of information on healthy eating

The dietary practice of respondents

A higher proportion of the respondents (179, 59.3%) do not eat visible skin/fat on meat. Almost all respondents (284, 94.0%) do not add salt to food at the table, and only 14 respondents (4.6%) often eat fried foods. Also, only 50 (16.6%) and 62 (20.5%) the respondents consume at least three servings of vegetables and fruits per day, respectively, as shown in Table 3.

Table 2: Responses to nutrition knowledge

Nutritional Knowledge Tested	Answered Incorrectly n (%)	Answered Correctly n (%)
Which food is rich in fat?	96 (31.8)	206 (68.2)
Which food is rich in protein?	81 (26.8)	221 (73.2)
Which food is high in starch?	72 (23.8)	230 (76.2)
Which food raises blood sugar levels quickly?	248 (82.1)	54 (17.9)
Which food helps in controlling blood sugar?	137 (45.4)	165 (54.6)
How many meals per day are recommended for people with diabetes?	257 (85.1)	45 (14.9)
How many times should people with diabetes eat snacks between meals?	289 (95.7)	13 (4.3)
Type of snacks recommended for diabetics.	154 (51.0)	148 (4.0)
What are the symptoms of diabetes mellitus?	114 (37.7)	188 (62.3)
What are the symptoms of hypoglycemia?	197 (65.2)	105 (34.8)
Which immediate food could be taken to correct very low blood sugar?	239 (79.1)	63 (20.9)
Is smoking a risk factor for hypertension?	197 (65.2)	105 (34.8)
Is eating fatty food a risk factor for hypertension?	87 (28.8)	215 (71.2)
Being overweight increases the risk of hypertension.	87 (28.8)	215 (71.2)
Regular physical activity lowers the risk for hypertension.	86 (28.5)	216 (71.5)
Eating more salt affects blood pressure.	55 (18.3)	247 (81.7)
Diet plays an important role in controlling hypertension.	60 (19.9)	242 (80.1)

Table 3: Dietary practice of respondents

Variable	Frequency n	Percentage (%)
Do respondents eat visible fat/skin on beef, chicken, and turkey?		
Yes	123	40.7
No	179	59.3
How often do respondents add salt to food at the table?		
Never	284	94.0
Occasionally	18	6.0
How often do respondents consume fried and oily foods?		
Never	69	22.8
Occasionally	219	72.5
Most of the time	14	4.6
How many servings of vegetables do respondents consume per day?		
0	39	12.9
1-2	213	70.5
3-4	44	14.6
5	6	2.0
How many servings of fruits do respondents consume per day?		
0	77	25.5
1-2	163	54.0
3-4	54	17.9
5	8	2.6

Table 4 shows that those with good nutrition knowledge were 61.3%, while 38.7% had poor knowledge. To compare the proportions among sex, the proportion of women were reportedly higher (61.8%) than that of men (59.5%). However, the proportion of men (91.9%) with good nutrition practice was higher than that of women (68.5%), while the overall nutrition practice was 91.1% good.

From the data in Figure 2, it can be seen that the proportion of BMI among both sexes were as follows: underweight

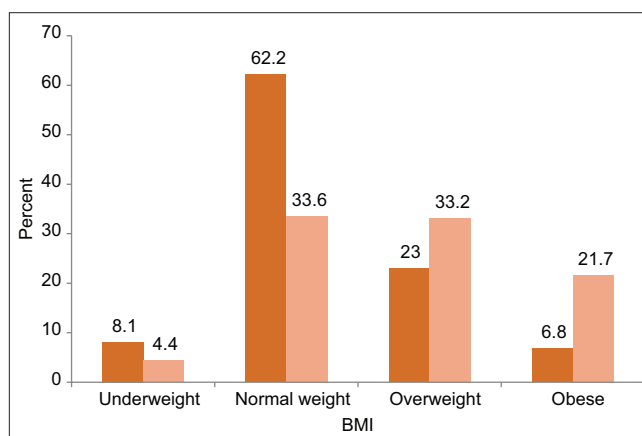


Figure 2: Body Mass Index (BMI) of respondents

men (8.1%) and underweight women (4.4%); those with normal weight were 61.2% (men) and 33.6% (women); overweight women were 33.2%, while overweight men were 23.0%. About 21.7% of women were obese, whereas 6.8% of men were obese.

Factors influencing nutrition knowledge

There was statistical significance between nutrition knowledge and some selected parameters such as income ($X^2 = 4.504, P < 0.034$), duration of illness ($X^2 = 8.839, P < 0.012$), as well as nutrition practice ($X^2 = 46.884, P < 0.000$) as shown in Table 4. While age ($X^2 = 3.919, P > 0.141$), educational level ($X^2 = 3.139, P > 0.076$) and BMI ($X^2 = 1.976, P > 0.577$) showed no statistical significance. More than half (57.8%) of those who earned < NGN 30000 (minimum wage in Nigeria) expressed good nutrition knowledge as against 71.4% of those who earned more with good nutrition knowledge. Also, 54.2% of those whose illness was less than 5 years had good nutrition knowledge, while 76.1% of those whose duration of their illness was more than 10 years had good nutrition knowledge.

Significantly, a higher proportion (67.3%) of those who reported good nutrition practice had good nutrition knowledge [Table 5].

Discussion

The increasing prevalence of NCDs in LMICs, coupled with the long-term consequences, requires that patients are well-informed on nutrition-related knowledge of common diet-related chronic diseases. Nutrition knowledge affects the dietary habits and nutritional status of individuals.^[14,16,17]

Unhealthy diet, overweight, and obesity are recognized risk factors for NCDs. Hence, nutrition is a key modality for preventing and treating NCDs, and optimal dietary practices are essential for self-care.

The mean age (61.94 ± 10.60) of participants in this study is similar to that reported in other studies.^[7,11,12] This is expected as hypertension is commoner in adults older than 40 years. More

patients aged 60 years and older in this study had better nutrition knowledge, though age was not significantly associated with nutrition knowledge scores ($P = 0.141$). Similar findings were reported by Breen *et al.*^[13] among 124 adults with Type 2 diabetes managed in primary care.

The educational level observed in this study is relatively high with 50% of the respondents having been schooled beyond primary school. The study was conducted in the urban city of Ibadan, Oyo State, Southwest Nigeria, and the southwest region has been adjudged as the most educated region in the country due to its early exposure to western education and free health policies of the then Western Region. The respondents' educational level was statistically related to nutrition knowledge, and individuals with formal education were more likely to report good nutrition knowledge. These findings corroborate the results of previous studies, which suggested that the educational level was a predictor for good nutrition knowledge.^[18] Similarly, studies have shown that educational status, occupation, and dietary knowledge affect dietary practice,^[19] although this association has not been consistently reported in other studies.^[14,17-20] Individuals educated and knowledgeable about healthy eating are more likely to opt for healthy dietary choices. Higher education is associated with regular consumption of a wider variety of foods; however, this depends on an individual's application of knowledge.^[18] Educating the population requires correct and constant messages. Also, lack of information and cooking skills can prevent purchase and meal preparation from healthy ingredients.

Findings from our hospital-based study revealed that the majority of the respondents sourced their information on nutrition

Table 4: Nutrition knowledge and practice among respondents

Variable	Male		Female		Total	
	n	%	n	%	n	%
Nutrition Knowledge						
Good	44	59.5	141	61.8	185	61.3
Poor	30	40.5	87	38.2	117	38.7
Nutrition Practice						
Fair	6	8.1	21	9.2	27	8.9
Good	68	91.9	207	68.5	275	91.1

Table 5: Factors influencing nutrition knowledge

Variable	Nutrition Knowledge		Total n (%)	χ^2	P
	Bad n (%)	Good n (%)			
Age (years)					
<40	1 (20.0)	4 (80.0)	5 (100.0)	3.919	0.141
40-60	55 (45.1)	67 (54.9)	122 (100.0)		
60	61 (34.9)	114 (65.1)	175 (100.0)		
Educational level					
No formal	66 (43.7)	85 (56.3)	151 (100.0)	3.139	0.076
Formal education	51 (33.8)	100 (66.2)	151 (100.0)		
Income					
<N30,000	95 (42.2)	130 (57.8)	225 (100.0)	4.504	0.034*
N30,000 and above	22 (28.6)	55 (71.4)	77 (100.0)		
Duration of illness					
<5 years	76 (45.8)	90 (54.2)	166 (100.0)	8.839	0.012*
5-10 years	30 (33.3)	60 (66.7)	90 (100.0)		
>10 years	11 (23.9)	35 (76.1)	46 (100.0)		
Body Mass Index (BMI)					
Underweight (<18.5 kg/m ²)	5 (31.3)	11 (68.8)	16 (100.0)	1.976	0.577
Normal weight (18.5-24.9 kg/m ²)	55 (42.0)	76 (58.0)	131 (100.0)		
Overweight (25-29.9 kg/m ²)	46 (38.7)	73 (61.3)	119 (100.0)		
Obese (30-34.9 kg/m ²)	11 (30.6)	25 (69.4)	36 (100.0)		
Nutrition Practice					
Fair	27 (100.0)	0 (0.0)	27 (100.0)	46.884	0.000*
Good	90 (32.7)	185 (67.3)	275 (100.0)		

*Significant at $P < 0.05$ level

from health care workers, as opposed to the conclusions from Quaidoo and Ohemeng.^[21] They reported that online resources were the most popular source (92.7%) among young adults recruited in Accra Metropolis, Ghana.^[21] Quaidoo and Ohemeng also reported that health care professionals were perceived to be the most reliable source of nutrition information and that participants who used health care professionals as a source of nutrition information were 61% (95% C.I.: 0.15–0.99) more likely to have a high nutrition knowledge than participants who did not consult health care professionals for nutrition information.^[21]

The consumption of fruits and vegetables in Nigeria is far below the WHO/FAO minimum requirement despite its health benefits. It was observed that less than a quarter of the respondents consumed at least three (3) servings of vegetables and fruits per day. However, most of our respondents (94.0%) do not add salt to food at the table, and only a few (4.6%) respondents eat fried foods often. A healthy diet contributes to reducing NCDs through early intervention such as reducing salt intake to less than 5 g of salt/day, reduction of fat intake, and weight management with BMI of 18.5–24.9.^[22,23]

It was observed that a higher proportion of the participants (61.3%) had good nutrition-related knowledge. Nutrition knowledge is necessary, although not sufficient for dietary change. The participants' knowledge scores translated to good dietary practice scores in this study. It was observed that all the respondents who had good nutrition knowledge scores (185, 100%) had good dietary practices, which are comparable with findings in previous studies.^[11,17–20,24] However, Agbozo *et al.*^[15] observed that optimal nutrition knowledge did not translate into optimal dietary intake nor improved nutritional status.

Normal BMI is important for better glycemic and blood pressure control, and prevention of complications from diet-related NCDs. However, more than half of the women participants in this study were either overweight or obese. This was generally in keeping with previous studies from Nigeria.^[18,20]

A systematic review and meta-analysis of population-based studies on overweight and obesity in Nigerians reported a prevalence rate of 25.0% and 14.3% respectively. Prevalence was higher in women and urban dwellers.^[25] Similarly, a review of population-based studies on diabetes mellitus in Nigeria reported the prevalence of overweight as 26% and 37% in men and women, respectively, while the prevalence of obesity was 3% and 8.1% in men and women, respectively.^[26] Bowen *et al.*^[27] also reported that obesity was twice as high in women than in men and that women were more at risk of cardiovascular diseases.

Bivariate analysis of the relationship between nutrition knowledge and the BMI of the participants shows no statistical significance ($P < 0.001$) [Table 5]. The results demonstrate that obese individuals and those of healthy weight had comparable levels of nutrition knowledge, suggesting that there may be reasons other than poor nutrition knowledge that is responsible

for the higher BMIs of the overweight and obese respondents. Similar findings were observed in previous studies that assessed the impact of nutrition knowledge^[26,28]

The higher BMIs may be due partly to the increased sedentary lifestyle amongst urban dwellers, largely the study respondents. Also, there is a misconception of a higher social status associated with eating processed foods as against Nigerian staple foods, which are higher in vitamins and nutrients. Hence, with the proliferation of processed food outlets, more Nigerians tend to eat more energy-dense foods despite their perceived good nutrition knowledge.

There was also a significant association between nutrition knowledge and educational level ($P = 0.049$), income ($P = 0.030$), as well as the duration of illness ($P = 0.012$). This is quite instructive that the more educated patient has a better understanding of the nutrition information given by the health care workers and the media. Therefore, health care workers need to avoid medical jargon during nutrition counselling and cite locally available foods as examples to ensure a two-way communication with the less educated in the communities. Electronic media (radio and television) are also important sources of nutrition information.^[18,19] Hence there is a need to develop short, simple, and culturally acceptable nutrition messages for community information. Respondents with higher income had better nutrition knowledge scores. Fatema *et al.*, in a cross-sectional study among 18,697 Bangladeshis, reported that nutrition knowledge significantly correlated with respondents' income.^[20] This report was consistent with the findings reported in other studies.^[14,19] There are strong social, cultural, and economic influences on the population's eating pattern. Higher-income suggests better education and more exposure to relevant nutrition information. Money is needed to purchase healthy meals, and it is believed that the understanding of the association between nutrition and health would help citizens choose healthy diets.

The duration of illness was positively associated with the nutrition knowledge of the patients; these findings seem to be consistent with an earlier study that reported that those living with diabetes for a longer period were more likely to have better nutrition knowledge.^[20]

Conclusion

Despite the overall satisfactory nutrition knowledge, there was a high prevalence of overweight and obesity among respondents with chronic illness, especially women. Findings from this study can be helpful for primary health care providers in designing gender-sensitive nutrition intervention programmes that focus on translating nutritional knowledge into dietary practices. Primary care physicians as frontline doctors coordinating care need to advocate for holistic weight reduction strategies and healthy lifestyle practices in managing chronic diseases.

Ethical approval

Institutional Ethics Committee approval was obtained for the study.

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Conflicts of interest

There are no conflicts of interest.

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