Nurses' therapeutic nutrition knowledge: A cross-sectional survey in Yemen

Khaled Mohammed Al-Sayaghi[1,2*], Faten Abdo Hassan[3,4], Abrar Sadiq Mohammed Ghanim[3], Haifa Abdulrahman Sultan Noman[3], Eglal Khaled Ahmed Mohsen[3], Ayat Abdulaziz Ali Mohammed[3], Afnan Hassan Hussein Saeed[3], Maram Mahmoud Ahmed Ali[3], Al-anood Saeed Mohammed Basarda[3], Abeer Mohammed Abdallah Mohammed[3], Richard Mottershead[5], Sadeq Abdo Mohammed Alwesabi[6] & Mohammed Musaed Al-Jabri[7]

[1]*Department of Medical Surgical Nursing, College of Nursing, Taibah University, Al-Madinah Al-Munawwarah, Saudi Arabia;* [2]*Nursing Division, Faculty of Medicine and Health Sciences, Sana'a University, Sana'a, Yemen;* [3]*Department of Therapeutic Nutrition, Faculty of Medical Science, Al-Janad University, Taiz, Yemen;* [4]*Faculty of Science, Department of Microbiology, Taiz University, Taiz, Yemen;* [5]*Department of Nursing, College of Health Sciences, University of Sharjah, Sharjah, United Arab Emirates;* [6]*Department of Medical Surgical Nursing, College of Nursing, Najran University, Najran, Saudi Arabia;* [7]*Department of Nursing Sciences, College of Applied Medical Sciences in Wadi Aldawaser, Prince Sattam bin Abdul-Aziz University, Saudi Arabia*

ABSTRACT

Introduction: Nutrition plays a critical role in improving the health of individuals struggling with chronic conditions. Nurses have the potential to reduce morbidity and mortality through effective nutritional counselling and advice. This study aimed to assess level of nurses' therapeutic nutrition knowledge and factors influencing their knowledge levels. **Methods:** A descriptive cross-sectional survey was conducted between December 2023 and February 2024 at two public hospitals in Taiz Governorate, Yemen, using self-administered questionnaire. A convenience sample of 207 nurses participated in the study. The questionnaire comprised two sections: demographic data and 31 items assessing nurses' therapeutic nutrition knowledge, divided into diabetes, obesity, and cardiovascular diseases. **Results:** Total scores for nurses' therapeutic nutrition knowledge ranged from 2 to 23, with mean total score of 14.43 out of 31 (46.5%). Only 13 out of 31 items were answered correctly by more than 50.0% of nurses, while eight items were answered incorrectly by over 80.0% of nurses. Only 35.5% of nurses had satisfactory knowledge, while 64.5% had unsatisfactory knowledge. Mean scores for therapeutic nutrition knowledge regarding diabetes, obesity, and cardiovascular diseases were 2.82 out of 5 (56.4%), 4.17 out of 9 (46.3%), and 7.44 out of 17 (43.8%), respectively. **Conclusion:** The findings revealed low level of nutrition knowledge among nurses, emphasising a critical gap that must be addressed. Integrating comprehensive nutrition content into nursing curricula and implementing targeted education can bridge this gap. Enhancing nurses' knowledge will improve patient outcomes and support broader public health goals through more effective nutrition policies.

Keywords: cardiovascular disease, chronic diseases, diabetes, nurses' therapeutic nutrition knowledge, obesity

*Corresponding author: Dr Khaled M. Al-Sayaghi
Department of Medical Surgical Nursing, College of Nursing, Taibah University
Al-Madinah Al-Munawwarah, 42353, Saudi Arabia
Tel: 00966(014)8618888; Fax: 00966(014)8618888; Email: ksayaghi@taibahu.edu.sa
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INTRODUCTION

Nutrition plays a crucial role in maintaining and improving health and supporting the long-term management of chronic conditions. It is recognised as a modifiable risk factor that can significantly influence health outcomes (Schaller & James, 2005). Poor early nutrition has been linked to the development of obesity and chronic diseases later in life, including diabetes and cardiovascular disease (Prasadajudio *et al.*, 2022). Obesity is a prevalent health concern and poses a substantial challenge to public health. It has profound effects on overall health and contributes to the onset of various associated conditions, referred to as co-morbidities, which elevate the risk of several diseases such as hypertension, diabetes, osteoarthritis, certain cancers, and lipid disorders (Kobylińska *et al.*, 2022). Obesity can be prevented through the adaptation of healthier dietary habits and participation in regular physical activity. The balance of carbohydrates, proteins, and fats in a person's diet plays a crucial role in determining body weight (Li *et al.*, 2022).

Diabetes mellitus type 2 (T2DM) constitutes a significant challenge for health systems worldwide (Petroni, 2021). The aetiology of T2DM is complex, including both non-modifiable risk factors, such as age, genetics, race, and ethnicity, as well as modifiable factors such as physical activity and diet (Backman *et al.*, 2002). Nutritionists stress the importance of nutrition in managing diabetes, focusing not only on the type of food but also the quantity consumed, as both influence blood sugar levels. Meals should be eaten at regular intervals, with a focus on low-fat, high-fibre foods and a limited intake of carbohydrates (Sami *et al.*, 2017). Cardiovascular disease (CVD) continues to be the leading cause of death worldwide, with an estimated 23 million deaths expected by 2030 (Tyrovola *et al.*, 2023). Poor diet quality is closely linked to an elevated risk of CVD morbidity and mortality. Overall, heart-healthy dietary patterns linked to a lower risk of CVD primarily include vegetables and fruits, whole grains, healthy protein sources, minimally processed foods and beverages, and liquid plant oils, along with limited amounts of added sugars and salt (Lichtenstein *et al.*, 2021).

The significance of nutrition in patient care cannot be overstated. Tailored nutritional interventions are essential for managing symptoms, preventing disease progression, and improving overall health outcomes for patients with chronic conditions such as diabetes, CVD, and renal disorders (Evert *et al.*, 2019). Nurses' regular interactions with patients place them in a unique position to promote proper nutrition, educate patients, monitor dietary intake, detect nutritional deficiencies early, and take appropriate action, thereby enhancing the overall quality of life for their patients (Schaller & James, 2005; Al-Shwaiyat *et al.*, 2013; Yalcin *et al.*, 2013). Nurses play a crucial role in assessing patients' nutritional needs, creating care plans, and offering consistent support. Their responsibilities in nutritional care also include advocating for higher nutritional standards in healthcare settings, collaborating with dietitians, educating patients and their families about healthy eating habits, and ensuring adherence to dietary guidelines (Yalcin *et al.*, 2013). Adequate nutrition knowledge enables nurses to provide accurate, patient-specific recommendations and enhance chronic disease management. Conversely, gaps in nutrition knowledge result in missed opportunities for early intervention and lead to poorer health outcomes. However, providing accurate and tailored nutritional recommendations to patients based on

their specific needs remains a challenge faced by healthcare professionals (Munuo *et al.*, 2016).

Nurses should be knowledgeable in nutrition; the lack of knowledge among nurses is a significant obstacle to providing adequate nutritional care in various hospital settings (Ibrahim & Aldawsari, 2024; Döngel, Kol & Gönderen, 2023). Understanding nutrition involves grasping essential information about food, nutrients, and their impact on the body's functioning (Zeldman & Andrade, 2020). Studies conducted in several Western and Eastern countries to examine nurses' nutrition knowledge concluded that nurses have inadequate nutrition knowledge (Bakre, Akodu & Akodu, 2012). Nurses' knowledge levels were reportedly 35% in South Africa (Kgaphola & Wodarski, 1997), 58.4% in Korea (Park *et al.*, 2011), 60.2% in Australia (Schaller & James, 2005), and 65% in the United States (Crogan, Shultz & Massey, 2001). In the Middle East, nurses' knowledge level was reported to be 58.8% in Jordan (Al-Shwaiyat *et al.*, 2013). These findings highlight a global gap in nurses' therapeutic nutrition knowledge across various healthcare systems.

Given the essential role nurses play in the nutritional management of patients and the absence of studies on the nutrition knowledge level of nurses in Yemen, this study aimed to assess the current level of therapeutic nutrition knowledge among nursing staff in Taiz, Yemen. By building on previous research, the study sought to identify gaps in knowledge related to therapeutic nutrition, examine factors influencing knowledge levels (such as age, sex, education, and experience), and provide recommendations for improving nutrition knowledge among nursing staff.

METHODOLOGY

Study design, setting and participants

This study was conducted as a descriptive cross-sectional survey using a detailed self-administered questionnaire at two major public medical institutions in the Taiz Governorate of Yemen: Al-Thawra Hospital and Al-Jumhury Hospital. A total of 450 nurses, regardless of their gender, qualifications, or experience, who were working at the two public hospitals in Taiz, were invited to take part in this study. Nurses not present at the time of data collection or those who were not willing to participate were excluded. The required sample size was determined using the online Raosoft Sample Size Calculator (Raosoft, Inc.) based on a 95% confidence level, 5% error margin, and 50% probability rate. Using a random sampling method, a convenience sample of 207 Yemeni nurses agreed to participate and completed the questionnaire, resulting in a 46% response rate.

Questionnaire and data collection

A valid and reliable self-reported questionnaire was used to assess the nurses' therapeutic nutrition knowledge. The questionnaire was adopted from previous studies (Al-Shwaiyat *et al.*, 2013; Park *et al.*, 2011). The previous study assessed the face validity of the questionnaire through a focus group and its reliability was measured by Cronbach's alpha coefficient (0.709) (Al-Shwaiyat *et al.*, 2013). The questionnaire consisted of two main sections: the first section collected demographic information, including gender, age, nursing education level, and years of nursing experience. The second section included 31 items dedicated to assessing nurses' therapeutic nutrition knowledge. These 31 items were further divided into three categories: 5 questions related to

diabetes, 9 questions related to obesity, and 17 questions related to CVD. Each category was designed to gauge the nurses' understanding and knowledge of these common health issues. Among the 31 questions, 16 offered three answer choices (agree, disagree, and don't know), while 15 questions had six possible answer choices. A score of 1 was awarded for a correct answer, while incorrect and 'don't know' answers received a score of 0. The maximum possible score was 31 points (5 for diabetes, 9 for obesity, and 17 for CVD). In this study, the Cronbach's alpha coefficient was 0.626.

The study took place from December 2023 to February 2024. The distribution of the questionnaire was conducted personally by the researchers. Prior to the distribution, the nurses were thoroughly informed about how to complete the questionnaire, with an emphasis on the importance of providing complete and honest responses.

Ethics approval and informed consent

The study complied with ethical standards and the 1964 Helsinki Declaration and its amendments. The Research Ethics Committee at the Faculty of Medical Sciences, Aljanad University for Science and Technology approved the study (JustMed12/2023001). Prior to the study, approval from relevant institutions and informed consent from all participating individuals were obtained. Information about the study's aims and significance, the role of participants, and risks and benefits were provided to nurses before completion of the questionnaire. Nurses were asked to voluntarily participate in the study. It was explicitly emphasised that all information provided would be kept confidential, in full compliance with applicable data protection laws and regulations. Personal data were anonymised to safeguard participants'

privacy. Additionally, participants were assured that they had the right to either participate in or withdraw from the research at any point.

Analysis of data

Data analysis was conducted using the IBM SPSS Statistics for Windows version 25.0 (IBM Corporation, Armonk, New York, USA). Participants' demographics and their responses to each question were described as frequencies (n) and percentages (%). The knowledge scores were presented as means and standard deviations (mean±SD). These scores were compared using t-tests and analysis of variance (ANOVA). If ANOVA test was significant, a post-hoc test was performed. A p-value <0.05 was considered statistically significant. The sum and mean of the scores in the therapeutic nutrition knowledge section were calculated for each participant, and the overall score was determined. Nurses' knowledge scores were categorised as unsatisfactory if they were below the 75th percentile (i.e., <4 for diabetes, <5 for obesity, <9 for CVD, and <17 for total score) and satisfactory if they were at or above the 75th percentile (i.e., ≥4 for diabetes, ≥5 for obesity, ≥9 for CVD, and ≥17 for total score) (Al-Sayaghi, 2021).

RESULTS

Of the 207 questionnaires that were returned, 200 were completed correctly and seven were excluded because they were incomplete. Table 1 showed that females made up 57.5% of the sample, while male respondents comprised 42.5%. The majority of the sample (69.5%) were young, aged 20-30 years old, while only 7.5% were aged greater than 41 years. The majority had a diploma degree in nursing (65.5%) and the remaining (34.5%) had a bachelor's degree. The majority of the participants (64.5%) had short experience (1-5 years)

in nursing, while nurses with experience >5 years represented 35.5%.

Table 1. Demographic characteristic of the participants (*N*=200)

Variable	n	%
Gender		
Male	85	42.5
Female	115	57.5
Age (years)		
20-30	139	69.5
31-41	46	23.0
>41	15	7.5
Education level		
Bachelor's degree	69	34.5
Diploma degree	131	65.5
Years of experience (years)		
1-5	129	64.5
> 5	71	35.5

Based on Table 2, the total mean score for therapeutic nutrition knowledge among nurses was 14.4 out of 31 (46.5%). Similarly, the nurses' mean scores for therapeutic nutrition knowledge in relation to diabetes, obesity, and CVD were 2.8 out of 5 (56.4%), 4.2 out of 9 (46.3%), and 7.4 out of 17 (43.8%), respectively. Interestingly, no significant differences in therapeutic nutrition knowledge mean scores were observed between the different gender subgroups, age subgroups, and years of experience. The only significant demographic variable observed to affect nurses' nutrition knowledge scores was nurses' education level subgroups. A significant difference was observed in the obesity-related nutrition knowledge mean score between nurses who had bachelor's degrees and those with diploma degrees (4.6 vs. 4.0 out of 9, *p*-value=0.018).

The nurses' therapeutic nutrition knowledge total scores ranged between 2 and 23, with mean total score of 14.4±3.9 out of 31. Only 71 (35.5%) nurses scored ≥17 (satisfactory) and 129 (64.5%) scored <17 (unsatisfactory), as illustrated in

Table 2. Effects of demographics on therapeutic nutrition knowledge scores of nurses (*N*=200)

Variable	Diabetes		Obesity		CVD		Total	
	Mean±SD out of 5	%	Mean±SD out of 9	%	Mean±SD out of 17	%	Mean±SD out of 31	%
Total	2.82±1.19	56.4	4.17±1.64	46.3	7.44±2.41	43.8	14.43±3.89	46.6
Gender								
Male	2.82±1.29	56.4	4.40±1.63	48.9	7.71±2.36	45.4	14.92±4.02	48.1
Female	2.80±1.11	56.0	4.00±1.63	44.4	7.24±2.43	42.6	14.06±3.76	45.4
p-value	0.931		0.095		0.180		0.119	
Age (years)								
20-30	2.83±1.18	56.6	4.14±1.60	46.0	7.20±2.27	42.4	14.17±3.63	45.7
31-41	2.71±1.20	54.0	4.26±1.76	47.3	8.15±2.51	47.9	15.13±4.19	48.8
≥42	2.93±1.22	58.6	4.27±1.75	47.4	7.47±2.97	43.9	14.67±5.15	47.3
p-value	0.783		0.884		0.067		0.342	
Education level								
Bachelor's	2.78±1.25	55.6	4.55±1.79	50.6	7.47±2.33	43.9	14.81±3.88	47.8
Diploma	2.83±1.16	56.6	3.98±1.52	44.2	7.42±2.45	43.6	14.22±3.89	45.9
p-value	0.781		0.018		0.871		0.315	
Years of experience								
1-5 years	2.84±1.21	56.8	4.31±1.62	47.9	7.38±2.33	43.4	14.56±3.63	47.0
≥6 years	2.76±1.15	55.2	3.92±1.65	43.6	7.52±2.55	44.2	14.20±4.33	45.8
p-value	0.633		0.097		0.725		0.531	

CVD: Cardiovascular diseases; *SD*: Standard deviation

Figure 1. The nurses' diabetes-related nutrition knowledge scores ranged between 0 and 5 out of 5, with a mean total score of 2.8±1.2. Only 63 (31.5%) nurses scored ≥4 (satisfactory) and 137 (68.5%) scored <4 (unsatisfactory). The nurses' obesity-related nutrition knowledge scores ranged between 0 and 8 out of 9, with a mean score of 4.8±1.6. Only 82 (41.0%) nurses scored ≥5 (satisfactory) and 118 (59.0%) scored <5 (unsatisfactory). The nurses' CVD-related nutrition knowledge scores ranged between 0 and 12 out of 17, with a mean score of 7.4±2.4. Only 71 (35.5%) nurses scored ≥9 (satisfactory) and 129 (64.5%) scored <9 (unsatisfactory).

The majority of nurses (76.5%) correctly identified that diabetic patients can consume fruits. Additionally, 58.0% disagreed with the notion that only carbohydrates need to be restricted for diabetic patients, and 61.0% agreed that a balanced diet is the recommended dietary approach for diabetes. However, only 43.5% of nurses were aware that animal fat should be restricted for diabetic patients and 37.5% that sugar-free carbonated beverages are not suitable for patients with hypoglycaemia (see Table 3).

The majority of nurses correctly answered three out of nine questions regarding the relationship between nutrition and obesity. About 52.0% of nurses knew that a high-fibre diet is recommended, 64.0% agreed that reducing carbohydrate intake aids in weight loss, and 69.0% acknowledged that removing animal fat from meals supports weight loss. However, nurses' knowledge was poor in the remaining
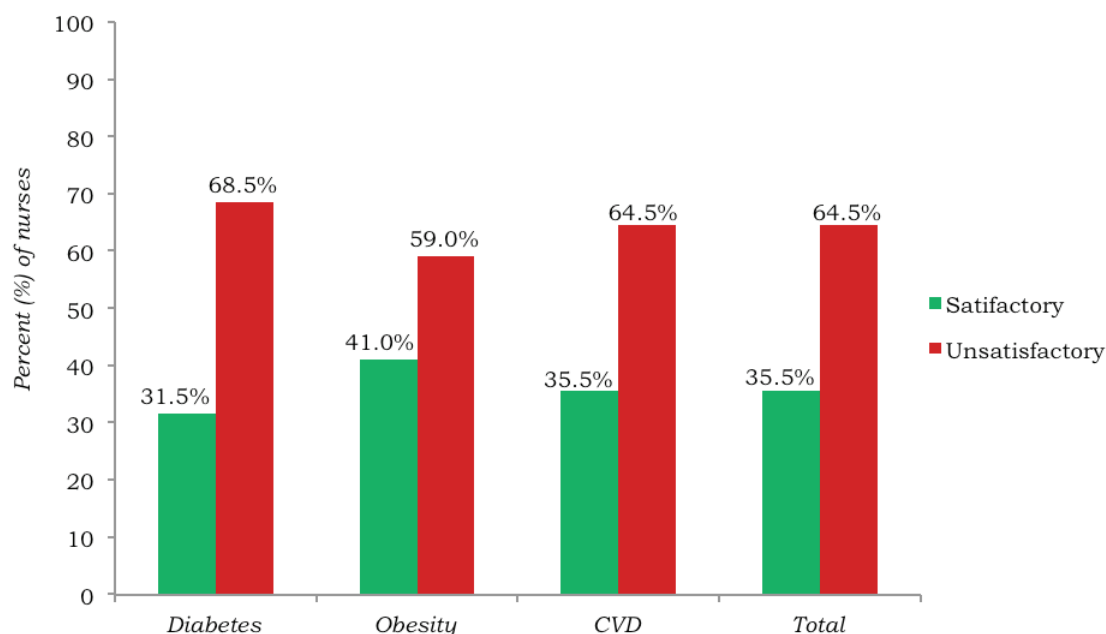

Figure 1. Distribution of nurses according to their level of therapeutic nutrition knowledge (*N*=200)

CVD: cardiovascular diseases. Satisfactory: knowledge score ≥ 75th percentile (≥4 out of 5, ≥5 out of 9, ≥9 out of 17, and ≥17out of 31, for diabetes, obesity, CVD, and total score, respectively). Unsatisfactory: knowledge score <75th percentile (<4 out of 5, <5 out of 9, <9 out of 17, and <17 out of 31, for diabetes, obesity, CVD, and total score, respectively).

Table 3. Correct responses for each item of the diabetes and obesity-related therapeutic nutrition knowledge (*N*=200)

Question	Nurses answered correctly	
	n	*%*
Diabetes-related nutrition knowledge		
1. Fruits should not be consumed by diabetic patients......(Disagree*)	153	76.5
2. Only carbohydrates have to be restricted for diabetic patients......(Disagree*)	115	57.5
3. Animal fat should be restricted for diabetic patients......(Agree*)	87	43.5
4. The product which should not be used for patients with hypoglycemia is:.....(Sugar-free carbonated beverages*)	75	37.5
5. What is the recommended diet for diabetic patients?.....(Balanced diet*)	122	61.0
Obesity-related nutrition knowledge		
1. High sugar intake is more responsible for causing obesity than high fat intake......(Disagree*)	89	44.5
2. A high-fibre diet is recommended for obesity......(Agree*)	103	51.5
3. Carbohydrate intake should be reduced to lose body weight......(Agree*)	128	64.0
4. Animal fat should be removed from meal to lose body weight......(Agree*)	138	69.0
5. Android (upper body) obesity has more complications such as hypertension and diabetes than gynoid (lower body) obesity......(Agree*)	95	47.5
6. An obese 45-year-old adult has a blood cholesterol level of 239 mg/dl. Which of the following dietary therapy is the first to be recommended?....(Decrease total fat intake*)	53	26.5
7. Which disorder is not related to android obesity?.....(Kidney failure*)	8	4.0
8. The food which contains the highest amount of carbohydrate is:.....(Potato*)	87	43.5
9. The food which contains the highest amount of fat is:.....(Low-fat milk*)	66	33.0

*The correct answer

six questions. It was observed that the percentage of correct answers was comparable to those who responded incorrectly or were unsure of the correct answer. Furthermore, only 4.0% knew the disorders related to android obesity, 26.5% of nurses were aware that limiting total fat intake is advised for adult patients with a borderline blood cholesterol level (239 mg/dl), and 33.0% of nurses were able to correctly identify foods that are sources of fat (see Table 3).

Out of the 17 items related to nutrition and CVD, only 7 out of 17 items were answered correctly by the majority of the participating nurses; 7 items were answered correctly by less than a quarter of the nurses (see Table 4). It is worth mentioning that about 85% of the participating nurses were aware of the strong connection between hypertension and obesity, the routine recommendation of a low-sodium diet for managing hypertension treatment, and the increased risk of

Table 4. Correct responses for each item of the CVD-related therapeutic nutrition knowledge (*N*=200)

Question	Nurses answered correctly	
	n	*%*
1. There is a close relationship between hypertension and obesity.... (Agree*)	171	85.0
2. For the treatment of hypertension, a low-sodium diet is routinely recommended....Agree*)	169	84.5
3. What kind of mineral is likely to be deficient in patients who are on diuretics?....(Potassium*)	63	31.5
4. The mineral which decreases the risk of hypertension is:....(Calcium*)	31	15.5
5. A lower intake of saturated fat decreases the risk of coronary artery disease....(Agree*)	150	75.0
6. High blood cholesterol increases the incidence of heart disease.... (Agree*)	171	85.5
7. *Trans* fats such as margarine are recommended for CVD....(Disagree*)	111	55.5
8. Omega-3 fatty acids such as fish oil help to reduce hyperlipidaemia.... (Agree*)	97	48.5
9. Caffeinated beverages are harmful for myocardial infraction.... (Agree*)	135	67.5
10. Low-fat milk is good for replacing whole milk, when trying to reduce total fat intake....(Agree*)	150	75.0
11. Which of the following foods is not a major source of the described fatty acids?....(Mayonnaise polyunsaturated fatty acids*)	23	11.5
12. Which of the following vegetable oils contain the highest amount of saturated fat?....(Palm oil*)	17	8.5
13. The dietary therapy which is not recommended for preventing coronary artery disease is:....(Replace iso-calories of unsaturated by saturated fatty acids*)	37	18.5
14. Which of the following foods is not a source of cholesterol?.... (Margarine*)	29	14.5
15. Intake of less than (....) mg of cholesterol is recommended for low-cholesterol diet....(300*)	9	4.5
16. The food which is not restricted for people with hyperlipidaemia is:....(Chicken breast*)	97	48.5
17. The incorrect way to lower fat intake is:....(Replace pie with roll cake between meals*)	26	13.0

CVD: cardiovascular diseases
*The correct answer

heart disease associated with high blood cholesterol. On the other hand, only 4% of the participants were aware of the recommended cholesterol intake for a low-cholesterol diet, 8.5% recognised that palm oil contains the highest amount of saturated fat among vegetable oils, and 11.5% knew that mayonnaise is not a significant source of polyunsaturated fatty acids. Thirteen percent of the nurses knew that replacing pie with roll cake between meals is not an effective way to reduce fat intake, 14.5% knew that margarine is not a source of dietary cholesterol, 15.5% knew that calcium helps reduce the risk of hypertension,

and 18.5% knew that replacing iso-calories of unsaturated fatty acids with saturated fatty acids is not recommended for preventing coronary artery disease.

DISCUSSION

Therapeutic nutrition is essential in managing chronic diseases such as CVD, diabetes, and obesity. Nurses play a vital role in providing nutritional guidance for patients with chronic conditions. This study was the first of its kind in Yemen, shedding light on this critical aspect of patient care. The majority of Yemeni nurses in Taiz city (64.5%) had unsatisfactory levels of therapeutic nutrition knowledge. The findings revealed a significant gap in Yemeni nurses' therapeutic nutrition knowledge, with a poor average score of 46.5%, indicating a low level of understanding in this vital area. This result aligns with similar studies conducted among nurses in the Gaza Strip (50.0%) (Naser *et al.*, 2021) and Turkey (49.4%) (Yalcin *et al.*, 2013). In Croatia, only 35.8% of general medical practitioners were found to have an adequate level of nutrition knowledge (Dumic *et al.*, 2018). However, the level of knowledge observed in the current study was notably lower compared to previous studies among nurses in Jordan (58.8%) (Al-Shwaiyat *et al.*, 2013), Korea (58.4%) (Park *et al.*, 2011), and Australia (60.2%) (Schaller & James, 2005).

The authors hypothesised that the poor level of therapeutic nutrition knowledge among Yemeni nurses stems from the decade-long conflict, which has significantly disrupted healthcare education and services (Alawadhi, 2024; AlMunifi & Aleryani, 2021). Given the crucial role of nutrition in promoting patient health, particularly for those with chronic diseases, and recognising the vital role nurses play in providing appropriate nutritional guidance, it is imperative to enhance the nutrition

knowledge of nurses working in these hospitals. Without a strong foundational knowledge, nurses are unable to deliver effective nutrition interventions (Yalcin *et al.*, 2013). It is clear that clinical nutrition has not received adequate attention in Yemeni nursing schools and acute care hospitals. Integrating nutrition-related topics into nursing school curricula and incorporating them into in-service education and training programmes can improve nurses' knowledge, attitudes, and practices. This, in turn, will enable them to better address their patients' nutritional needs, promote overall health and well-being, and ultimately achieve improved patient outcomes (Caulfield, 2014; Yalcin *et al.*, 2013; Çelik & Semerci, 2022).

This study highlighted a notable discrepancy in the knowledge base of Yemeni nurses, with a better understanding of diabetes compared to obesity and CVD. Although the knowledge levels in these subdomains were higher in previous studies, Al-Shwaiyat *et al.* (2013) and Park *et al.* (2011) reported similar patterns among Jordanian and Korean nurses. This suggests that topics related to therapeutic nutrition for diabetes may be better integrated into nursing curricula and in-service education, while issues related to obesity and CVD receive less emphasis. This consistent pattern across different studies underscores the urgent need for targeted education and training to enhance nurses' understanding of nutrition-related aspects of obesity and CVD, ultimately improving patient care outcomes.

Interestingly, no significant differences were found in therapeutic nutrition knowledge mean scores across gender, age, or years of experience subgroups. This could be attributed to factors, such as the homogeneity of the sample, potential limitations in sample

size, and a lack of specialised training in therapeutic nutrition, which may have contributed to the absence of observed differences. Additionally, the ongoing conflict in Yemen may have disrupted healthcare education, affecting all nurses similarly, regardless of demographic factors. However, a significant difference was observed in obesity-related nutrition knowledge mean scores between nurses with bachelor's degree and those with diploma (4.6 vs. 4.0 out of 9, *p*=0.018). This finding aligns with previous research by Al-Shwaiyat *et al.* (2013), Harkin *et al.* (2018), and Bauer, Halfens & Lohrmann (2015). The consistency of these results across various studies and populations suggests that nurses' demographic characteristics are not key determinants in acquiring or retaining therapeutic nutrition knowledge. This highlights the need for further investigation into other factors influencing knowledge levels in this area.

The study was limited to nurses in Taiz city, which may not fully represent the knowledge levels of nurses across Yemen. Broader geographic coverage would provide a more comprehensive understanding. While the study identified significant gaps in knowledge, it did not explore the underlying causes. Although the study acknowledges the impact of the ongoing conflict, it does not fully explore how this has affected nursing education and practice. Future studies addressing these limitations could help create more targeted and effective interventions to improve nurses' therapeutic nutrition knowledge in Yemen.

CONCLUSION

Overall, the findings highlighted a significant gap in therapeutic nutrition knowledge among Yemeni nurses in Taiz City, indicating that nurses may lack the necessary knowledge to implement effective nutritional interventions in their clinical practice. To bridge this gap, future training programmes should focus on enhancing nurses' therapeutic nutrition knowledge through targeted educational initiatives. Specifically, nutrition topics should be integrated into nursing school curricula, with a strong emphasis on practical application. Furthermore, continuous in-service training programmes should include regular updates on therapeutic nutrition. By addressing these gaps in education and training, we can improve the quality of nutritional care provided by nurses in clinical settings.

Authors' contributions

Al-Sayaghi KM, Hassan FA, Jabri MM, Mottershead R, Ghanim ASM, Noman HAS, Mohsen EKA, Mohammed AAA, Saeed AHH, Ali MMA, Ghanim ASM, Mohammed AMA, Alwesabi SAM, conceptualised and designed the study; Ghanim ASM, Noman HAS, Mohsen EKA, Mohammed AAA, Saeed AHH, Ali MMA, Ghanim ASM, Mohammed AMA, administered questionnaires to the participants, collected and organised data; Al-Sayaghi KM, Hassan FA, Ghanim ASM, Noman HAS, Mohsen EKA, Mohammed AAA, Saeed AHH, Ali MMA, Ghanim ASM, Mohammed AMA, Mottershead R, Alwesabi SAM, Al-Jabri MM, entered, analysed, and interpreted the data, outlined the result themes, reviewed and summarised the published literature and clinical studies, and wrote the initial draft; Al-Sayaghi KM, edited and reviewed the final manuscript draft. All authors read and approved the final version of this manuscript.

Conflict of interest

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