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Dietary patterns in the United Arab Emirates and their alignment with global healthy and sustainable diet recommendations: a scoping review

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Introduction: In the United Arab Emirates (UAE), dietary patterns and food systems—like in many countries elsewhere—contribute to rising burdens of diet-related non-communicable diseases while also intersecting with global challenges of climate change and environmental degradation. Sustainable dietary models, such as the Mediterranean diet and the EAT-Lancet recommendations, provide frameworks that can support both health and environmental sustainability.

Methods: We assessed the alignment of the UAE diet with global sustainable diet guidelines through a scoping review of studies assessing UAE dietary intake and an analysis of national food data, using national databases and those from the Food and Agriculture Organization of the United Nations (FAO). The study focused on the general population, with available evidence covering key demographic groups including children and adults. Alignment was evaluated against the EAT-Lancet and the Mediterranean diet to generate policy-relevant evidence.

Results: The review identified 14 eligible studies, of which one assessed environmental sustainability and none benchmarked UAE dietary patterns against the EAT-Lancet Commission recommendations. Overall, dietary patterns in the UAE showed substantial misalignment with both EAT-Lancet and Mediterranean Diet recommendations. Plant-based food intake was consistently low, with 83% of adults and up to 100% of male adolescents failing to meet fruit and vegetable recommendations, while sugar, fast food, and animal-based food consumption was high. Women's dietary intake deviated markedly from EAT-Lancet targets, with plant-based foods well below recommendations, including whole grains (−77%) and nuts (−94%), and animal-based foods and added sugar exceeding targets, including red meat (+151%), poultry (+224%), and added sugar (+455%). Abu Dhabi food supply data showed red meat availability sevenfold above EAT-Lancet recommendations (+663%), while legumes (−68%) and nuts (−94%) were markedly underrepresented. Nationally, animal protein supply more than doubled between 2010 and 2021 (25 to 58 g/capita/day).

Conclusion: The findings highlight the need for collaborative efforts to promote healthier, sustainable food systems and diets in the UAE, advancing both public health and environmental sustainability goals.

KEYWORDS

dietary patterns, EAT-Lancet recommendations, food systems, mediterranean diet, sustainable diets, United Arab Emirates

1 Introduction

The industrialized global food system and its associated dietary patterns significantly contribute to climate change and other environmental degradation (Hallström et al., 2015; Nelson et al., 2016; Owino et al., 2022; Shukla et al., 2019). In turn, climate change further exacerbates food insecurity and malnutrition (Owino et al., 2022). Diets high in animal-based food and ultra-processed food – often high in nutrients of concern – have particularly detrimental environmental impact (Willett et al., 2019). The livestock sector alone accounts for approximately 18% of total greenhouse gas (GHG) emissions, 80% of total land use, and high levels of water consumption (Shukla et al., 2019; Willett et al., 2019). Sugar production is linked to biodiversity loss, water use, and soil erosion, and pollution from fertilizer (WWF, 2005).

Environmentally sustainable and healthy dietary patterns often align, with plant-based foods offering both environmental and health benefits (Hallström et al., 2015; Nelson et al., 2016). The global EAT-Lancet recommendations for planetary diets provide evidence-based targets for achieving diets that are both healthy and environmentally sustainable (EAT-Lancet, 2019). These guidelines emphasise increasing plant-based food consumption while reducing intake of several other food categories, particularly red meat, refined grains, added sugar, and highly processed food as part of a global dietary transition to be achieved by 2050 (Hallström et al., 2015; Irz et al., 2019; Mason and Lang, 2017). The Mediterranean diet is another widely recognized sustainable dietary pattern that integrates nutritional adequacy with sustainability dimensions, aligning closely with planetary health objectives (Lorca-Camara et al., 2024; Petrillo et al., 2012). Higher adherence to the Mediterranean diet has been associated with lower environmental pressures, including reduced greenhouse gas emissions, land use, water consumption, and energy use, as shown in studies conducted in Mediterranean and European settings such as Italy and Spain (Bôto et al., 2022; Lorca-Camara et al., 2024). Characterized by its emphasis on plant-based foods and limited red meat, moderate fish intake, and healthy fats (Trichopoulou and Lagiou, 1997), the Mediterranean diet is also associated with reduced non-communicable diseases (NCDs) and ecological advantages (Cordain et al., 2005; Grosso et al., 2020). Recognizing the multifaceted nature of healthy sustainable diets, the Food and Agriculture Organization of the United Nations (FAO) and World Health Organization (WHO) define a healthy sustainable diet as "dietary patterns that promote all dimensions of individuals' health and wellbeing; have low environmental pressure and impact; are accessible, affordable, safe and equitable; and are culturally acceptable" (FAO and WHO, 2019).

Global transitions to healthy diets from sustainable and climate-resilient food systems have substantial climate mitigation and adaptation potential (IPCC, 2023). Such shifts would significantly reduce greenhouse gas emissions and land use, and promote ecosystem restoration, enhancing biodiversity. The total technical mitigation potential of dietary changes might be in the order of 0.7–8 $GtCO_2$-eq $year^{-1}$ by 2050 (Shukla et al., 2019). Such dietary transitions were a call for action during the first United Nations Food Systems Summit 2021 to help achieve the international targets for greenhouse gas emission reduction such as in the 2015 Paris Agreement and the United Nations Framework Convention on Climate Change (UN FCCC) COP-28 accords (COP28) (COP28 UAE, 2023; Shukla et al., 2019).

Countries of the Gulf Cooperation Council (GCC), a political and economic alliance of six high-income Arab countries including the United Arab Emirates (UAE), are particularly vulnerable to the impacts of climate change, and food security is a national priority for each. Like many other GCC countries, the UAE is characterized by an arid climate and water scarcity, limited land suitable for agriculture, and high dependency on food imports (>90%) (Ajaj et al., 2019). In parallel, the country faces a substantial burden of diet-related non-communicable diseases. According to the 2024–2025 National Health and Nutrition Survey, 22.4% of adults are obese, 54.2% have high cholesterol, 25.9% have high blood pressure, and 12.5% have elevated blood glucose. Dietary behaviours contribute significantly to this burden, with 96.2% of adults exceeding recommended sodium intake, 56.1% exceeding recommended fat intake, 27.3% exceeding recommended sugar intake, and 27.4% consuming sugar-sweetened beverages daily (UAE Ministry of Health and Prevention, 2026). Obesity alone imposes substantial economic burdens in the UAE, estimated at US$11.7 billion (≈2.8% of GDP) in 2019 and projected to rise to approximately US$179 billion (≈11% of GDP) by 2060 (Okunogbe et al., 2022). Thus, adopting a healthier and more sustainable diet can enable the UAE to address the intertwined challenges of climate change, food insecurity, malnutrition, and non-communicable diseases.

Despite the increased focus of the UAE on the food security agenda since 2018 (UAE Government, 2018), with several initiatives launched related to sustainable agriculture and the agri-tech sector, less emphasis is placed on changing dietary patterns. However, the UAE hosted the 28th session of the Conference of Parties (COP 28) in 2023 (COP28 UAE, 2023), and the government is increasingly focused on improving food system governance as part of climate change mitigation and adaptation through an inter-sectoral approach and involving appropriate leadership (COP28 UAE, 2023). This presents an opportunity to integrate food consumption and dietary patterns in the food security strategy of the UAE and address further the nexus between health and the environment.

To evaluate the health and sustainability of UAE dietary patterns, we benchmarked them against the EAT-Lancet recommendations, a globally recognized planetary health diet, and the Mediterranean diet, a culturally established pattern associated with both nutritional adequacy and lower environmental impact. This study examined the extent to which the UAE diet aligns with global sustainable dietary recommendations, specifically those of the EAT-Lancet reference diet

and the Mediterranean diet, to inform policy aimed at transitioning toward a healthy and sustainable diet in the region.

2 Methodology

We conducted a scoping review of the literature assessing dietary intake in the UAE and compared the findings to two examples of sustainable diets: the EAT-Lancet reference diet and the Mediterranean diet. This approach was used to assess alignment with dietary patterns that promote both health and environmental benefits. A scoping review methodology was selected to allow for exploratory mapping of the available evidence, which is limited and heterogeneous in terms of study design, populations, dietary assessment methods, and outcomes. Due to the lack of national-level dietary studies, we supplemented the analysis with data from food supply databases.

2.1 Search strategy

We reviewed the published literature assessing UAE dietary patterns from 2012 to 2024. The search was limited to English-language publications to ensure consistency. Sources included academic literature, government reports, and publicly available documents. The databases searched were Ovid MEDLINE, Web of Science, and Google Scholar, using search terms such as "United Arab Emirates," "sustainability," and "nutrition," along with related terms including UAE, Gulf, Gulf Cooperation Council (GCC), dietary intake, food consumption, planetary health, and climate change. A detailed search strategy for Ovid MEDLINE is provided in the Supplementary material.

Included studies assessed the diet of the UAE population, with or without comparisons to sustainable diets such as the Mediterranean or EAT-Lancet diets in terms of health and environmental impacts. Studies of infants and children under 4 years of age were excluded due to insufficient evidence on planetary diets for this age group.

Data charting was conducted by the lead author (MEG) using Excel, to extract key categories of interest from the included sources of evidence. While no formal duplicate data charting was performed, elements of the process were discussed and reviewed with a second investigator (HW) to ensure accuracy and consistency. The following data items were charted from the included studies: author, year of publication, study aims, methodology used to assess dietary patterns, population group, and reported outcomes.

2.2 Dietary comparisons

The Mediterranean diet and the EAT-Lancet reference diet were selected as benchmarks for evaluating dietary patterns in the UAE. The EAT-Lancet recommendations provide globally recognized, evidence-based targets for a planetary health diet, integrating nutritional adequacy with environmental sustainability. The Mediterranean diet, a culturally established dietary pattern, is associated with a reduced risk of NCDs and lower environmental impact, making it a practical reference for assessing both the health and ecological dimensions of the UAE diet. Using both benchmarks enables a comprehensive comparison that captures global sustainability targets as well as regionally relevant dietary patterns.

Identified UAE dietary studies were compared to the EAT-Lancet recommendations. However, environmental sustainability assessment was constrained by the limited availability of environmental footprint data specific to the UAE. Only one study (Naja et al., 2022) examined both dietary intake and environmental impacts (GHG emissions, water use, and land use) among UAE women. While this dataset enables comparability with existing global dietary sustainability assessments, it may not fully capture comprehensive regional variations in agricultural production systems, supply chains, or environmental conditions. Unlike most studies that primarily focused on the healthiness of dietary intake, this study by Naja et al. uniquely evaluated the environmental implications of dietary patterns, addressing a significant research gap.

To quantitatively compare UAE dietary intake with sustainable dietary benchmarks, we extracted mean daily intake values (g/day) for key food categories – including fruits, vegetables, legumes, whole grains, meat, dairy, nuts, and added sugars – from Naja et al. (2022), and from Abu Dhabi Food Balance data. These data were harmonised to correspond to EAT-Lancet reference diet categories, enabling direct comparison of the daily intakes across food groups, by calculating the percentage deviation.

UAE dietary intake was then benchmarked against the EAT-Lancet reference diet. For each food group, UAE intake was expressed as a percentage deviation from the recommended level to facilitate interpretation. This approach enabled identification of both underconsumption and overconsumption relative to sustainable dietary targets.

The percentage deviation of UAE (and Abu Dhabi) food intake from the EAT-Lancet recommendation was calculated using the following formula:

$$Percentage\ deviation = \frac{UAE\ intake\left(\frac{g}{day}\right) - EAT\ Lancet\ recommendations\left(\frac{g}{day}\right)}{EAT\ Lancet\ recommendations\left(\frac{g}{day}\right)} \times 100$$

Where available, environmental impact metrics (GHG emissions, water, and land use) were drawn from Naja et al. (2022) for UAE women to contextualize the sustainability implications of observed dietary patterns. This approach allowed identification of key gaps in both the healthfulness and environmental sustainability of UAE diets.

2.3 Evaluation of the food supply database

Due to the limited availability and low quality of the UAE dietary intake studies identified, annual food supply data from FAOSTAT (2010–2021) were analyzed to examine trends in supply, import, and production of plant- and animal-based foods, and per capita protein supply from these sources. This approach provides a more comprehensive indication of the prevailing dietary patterns. Data for 2022 and 2023 were not available on the FAOSTAT database at the time of analysis.

Additionally, food supply data in the Emirate of Abu Dhabi, the capital city of the UAE, was benchmarked against the EAT-Lancet recommendations to assess levels of adherence or deviation. Due to the lack of published governmental food supply data from the other six emirates that make up the UAE, we also used FAOSTAT national-level food supply data to assess dietary alignment with EAT-Lancet recommendations at the country level. While the findings offer

important insights into UAE dietary patterns, they should be interpreted with caution, as subnational variation may not be fully captured and results may more closely reflect the Abu Dhabi context.

This analysis involved evaluating daily caloric intake across food categories and assessing alignment with EAT-Lancet targets. All identified data from dietary studies and food supply databases were analyzed descriptively, with findings synthesized narratively by population group and dietary component. Reported intakes were compared with EAT-Lancet reference values.

3 Results

3.1 Literature review

The PRISMA flow diagram summarises the screening and selection process (Figure 1). We identified a total of 485 publications assessing UAE dietary patterns. After removing duplicates, 375 records remained, from which 324 were excluded due to irrelevancy. The remaining 51 articles underwent full-text screening, leading to the exclusion of 37 articles that did not meet the selection criteria. Fourteen publications were ultimately included. Among these, only one study (Naja et al., 2022) assessed both the nutritional quality and environmental footprint of the UAE diet by comparing it to a benchmark healthy and sustainable diet, in this case, the Mediterranean diet. None of the identified studies compared UAE dietary patterns to EAT-Lancet recommendations. The remaining studies evaluated the UAE diet solely from a nutritional perspective.

As shown in Table 1, nine of the fourteen studies focused on the dietary habits of children and adolescents. Across these studies, findings consistently indicated inadequate fruit and vegetable intake. Between 56–72% of adolescents failed to meet recommendations (Faris et al., 2024; Haroun et al., 2017; Makansi et al., 2018), increasing to 91–94% in some studies (Hwalla et al., 2023), and up to 100% in certain subgroups, particularly among male adolescents. A similar trend was observed among adults, with 83% failing to meet the recommended five daily servings (Hashim et al., 2024; Sabbah et al., 2024; SARC, 2018). A low intake of legumes was also reported across age groups (Hashim et al., 2024; Hwalla et al., 2023; Naja et al., 2022), contributing to significant deviation from the Mediterranean diet. These dietary patterns translate into an insufficient intake of dietary fiber; notably, 100% of children in one study failed to meet recommended fibre intake levels (Hwalla et al., 2023). Moreover, high consumption of high-fat, sugar-sweetened (HFSS) foods was noted across the whole population (Abduelkarem et al., 2020; Ali et al., 2013; Al-Yateem and Rossiter, 2017; Al-Zalabani, 2024; Faris et al., 2023; Haroun et al., 2017; Hwalla et al., 2023; Makansi et al., 2018; Sabbah et al., 2024; SARC, 2018). Between 70–90% of children exceeded WHO recommendations for sugar (Makansi et al., 2018), with 41% consuming at least one sugar-sweetened beverage daily (Makansi et al., 2018). Fast food consumption was also high (Abduelkarem et al., 2020; Al-Yateem and Rossiter, 2017; Faris et al., 2023, 2024; Haroun et al., 2017; Makansi et al., 2018), with 25% of school children reporting consuming it twice or more per week (Faris et al., 2023) and 27% of

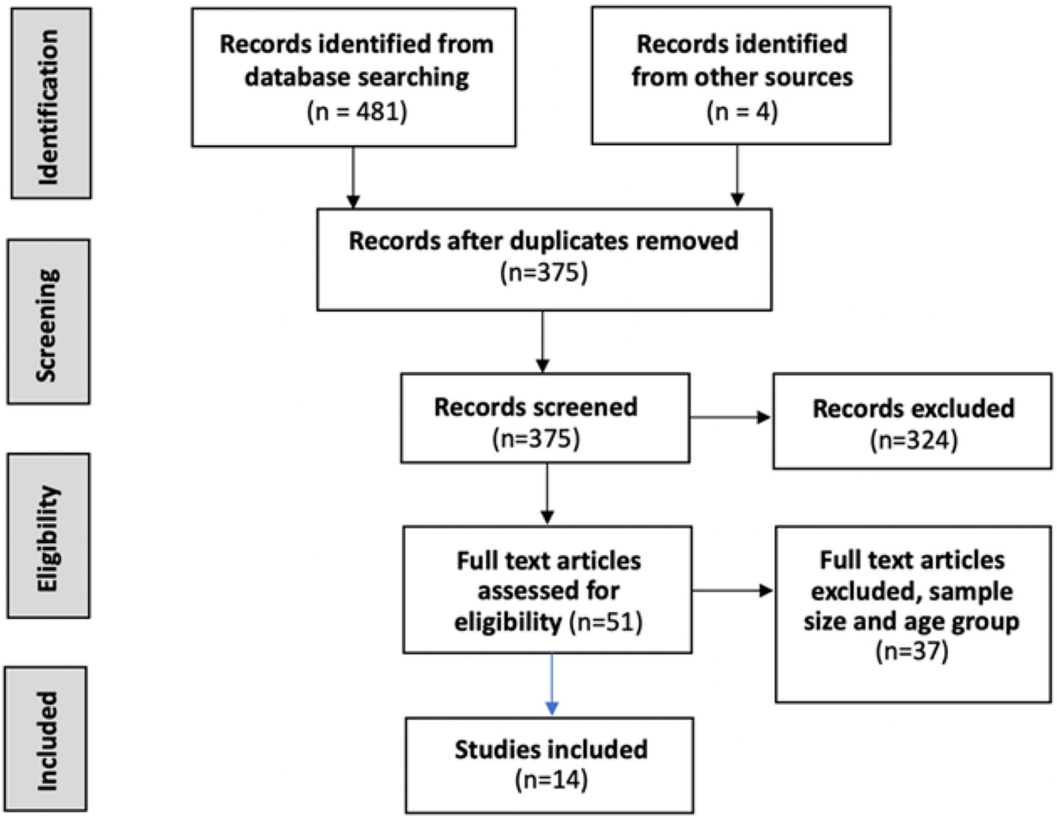

FIGURE 1
Prisma flow diagram of study selection process.

TABLE 1 Summary of published papers assessing the UAE dietary intake and comparison to the EAT-Lancet dietary recommendations.

Study	Aims	Methodology used to assess dietary patterns	Population group	Outcomes	Comparison to EAT-Lancet recommendations
Ali et al. (2013)	Assessed dietary intake of children and adolescents in the UAE.	A 24-h recall was used to collect dietary intake data	253 children (6–10 years old) and 276 adolescents (11–18 years old)	• 80% of females (9–13 years) and 100% of males (9–18 years) did not meet the recommended intake of fruits and vegetables and 100% of males (9–18 years) did not meet vegetable recommendations. • 28% of males (9–13 years) and 45.9% of males (6–8 years) exceeded WHO recommendations for saturated fat. • Females (9–13 years) exceeded sugar intake from candy/sweets and SSBs.	Around 80–100% of children and adolescents do not meet the EAT-Lancet recommended intake of fruits and vegetables. Excessive sugar and saturated fat intake do not align with the EAT-Lancet recommendations of minimizing sugar intake and replacing saturated fats with unsaturated options.
Al-Yateem and Rossiter (2017)	Assessed understanding of nutritional knowledge and eating habits of adolescents in the emirate of Sharjah in the UAE	Adapted Health Behaviour Questionnaire and School-Based Nutrition Monitoring Student Questionnaire were used to evaluate dietary behaviours	300 adolescents (9–13 years old)	• 33% did not consume or consumed only one vegetable the previous week. • 25% consumed unhealthy snacks 3 or more times daily. • 19% consumed fast food frequently or daily.	A third of adolescents did not meet the recommended intake of fruits and vegetables. High snacking and frequent fast-food consumption deviate from EAT-Lancet recommendations to reduce processed and ultra processed foods.
Haroun et al. (2017)	Obtained information about dietary and activity habits of adolescents in the UAE	Short self-completed questionnaire relating to students' food and drink choices and preferences	1,022 female and male adolescents (12–16 years old)	• 31 and 12% of the students reported drinking SSBs and eating fast food on a daily basis. • 61% of the students reported eating fruits every 1–2 days. • 18% of the students never drank milk.	High intakes of SSBs do not align with the EAT-Lancet recommendations to limit them. Daily fast-food consumption and insufficient fruit and vegetable intake also deviate from EAT-Lancet guidelines. The refraining from having milk aligns suggest some alignment with the EAT recommendations to limit its intake.

(Continued)

TABLE 1 (Continued)

Study	Aims	Methodology used to assess dietary patterns	Population group	Outcomes	Comparison to EAT-Lancet recommendations
Makansi et al. (2018)	Assessed factors associated with fruit and vegetable intake among teenagers in Dubai.	Quantitative and qualitative data collection were used: EAT survey and Adapted YRBS survey as well as semi-structured interview guide	620 adolescents of grades 10–12	• Only 28% of UAE nationals adolescents met the recommendations for fruit and vegetables. • 27% consumed fast food ≥3 times per week, considered high level • 41% have at least one SSB per day.	Less than a third of adolescents met the recommended intake of at least 5 servings of fruits and vegetables daily. High intakes of fast food do not align with the EAT-Lancet recommendations of reducing ultra processed foods. At least half of the participants deviate from the recommendation of limiting SSBs.
SARC (2018)	Assessed the risk factors of NCDs	STEP survey (STEP 1) was used to collect data on dietary practices	9,000 households as a representative sample	• 83% ate less than 5 servings of fruits and vegetables. • 70% consumed white meat daily (poultry and fish). • 22% consumed red meat daily with a higher percentage of Emiratis (32%) compared to non-Emiratis (24%), and a gender gap favouring men.	Only 17% of participants met the recommended intake of at least 5 servings of fruits and vegetables daily. High consumption of meat, particularly red meat, which is less ecologically sustainable than other types of meat, does not align with the EAT-Lancet recommendations of limiting animal-based proteins.
Abduelkarem et al. (2020)	Investigated the prevalence of childhood obesity and its risk factors among UAE school-aged children	Questionnaire was used to collect information about child eating habits and lifestyle	678 female and male school-aged children (6–11 years old)	• 55 and 35% of the children consumed candy always and often, respectively. • 29% of the children consumed 1 healthy food (fruit and vegetable) daily and 43% reported to consume 2. • 48 and 16% of children reported to consume fast food often and rarely, respectively.	Excessive sugar intake and high fast-food consumption deviate from EAT-Lancet recommendations. Around half of children did not meet the recommended intake of fruits and vegetables.
Ali et al. (2022)	Assessed adherence to the Mediterranean Diet among adults.	Quantitative FFQ contained 135 food items and 12 food groups commonly consumed in the UAE	610 UAE participants (18 years and older)	• Non-Emiratis had higher adherence odds to the Mediterranean Diet than Emiratis. • Older participants (≥50 years) and non-smokers had higher adherence to the Mediterranean Diet than younger participants and smokers.	With the EAT-Lancet recommendations having similar principles as the Mediterranean Diet recommendations, the data indicates that Emiratis have lower adherence to dietary patterns that align with the EAT-Lancet recommendations

(Continued)

TABLE 1 (Continued)

Study	Aims	Methodology used to assess dietary patterns	Population group	Outcomes	Comparison to EAT-Lancet recommendations
Naja et al. (2022)	Assessed adherence of the UAE's population to the Mediterranean diet and assessed its environmental footprint.	A 24-h recall was used to collect information on food and beverage consumption The c-MED index helped assess adherence to the MD	482 women (19–50 years old)	Main contributors to low adherence to the Mediterranean diet were low consumption of whole grains, seafood, legumes, and olive oil. High intake of fruit and vegetables and low intake of sweets were positive contributors to the diet. • Intake of refined grains and Sugar Sweetened Beverages (SSBs) contributed to all 3 sources of Environmental Footprints (EFPs): water use, energy use, and GHG emissions. • Meat, poultry/egg and vegetable contributed to high water use. • Milk/dairy, meat, poultry/egg contributed to high GHG emissions.	See table 2
Faris et al. (2023)	Examined the prevalence of caffeinated energy drink consumption and its associations among school children in the UAE	Online questionnaire was used to collect dietary intake data	4,648 female and male adolescents (14–18 years old)	• 57 and 67% of the students consumed ≤ 1 serving of vegetables and fruits, respectively • 36% of the children consumed energy dense snacks (i.e., chips, cookies,) ≥ 2 times per day. • 25% consumed fast food ≥ 2 times per week.	Most students did not meet the recommended intake of fruits and vegetables. High snacking and fast-food consumption deviate from EAT-Lancet recommendations to reduce ultra processed foods.
Hwalla et al. (2023)	Assessed the dietary intake and food consumption patterns among children living in the UAE	A 24-h recall was used to collect dietary intake data	690 children (4–12.8 years old)	• Only 36% adhered to recommendations of lean meat and beans. • Only 9 and 4% adhered to the recommendations of fruit and vegetable intake, respectively and 100% did not meet the recommended fiber intake. • 70–90% exceeded WHO recommendations for free sugar and saturated fat intake.	Only a minority followed the EAT-Lancet recommendations for plant-based proteins and lean meat. Less than 10% met the fruit and vegetable intake, and many did not meet fiber recommendations. The majority exceeded sugar and saturated fat intake, deviating from EAT-Lancet guidelines.

(Continued)

TABLE 1 (Continued)

Study	Aims	Methodology used to assess dietary patterns	Population group	Outcomes	Comparison to EAT-Lancet recommendations
Sabbah et al. (2024)	Investigated the prevalence of premenstrual syndrome and its associated factors among females in Dubai	FFQ included 12 questions on dietary behaviour	217 female university students (18–28 years old)	• 57 and 59% of the participants reported an intake of 1 serving per day of vegetables and fruits, respectively. • 89% of the participants reported consuming HFSS (high fat, sugar, and salt) foods • 24% reported no intake of milk.	Approximately 90% of participants consumed HFSS foods, deviating from the EAT-Lancet recommendations of reducing ultra processed foods typically high in nutrients of concern. Most students do not meet the recommended intake of fruits and vegetables. Low milk intake aligns with the EAT recommendations to limit its intake.
Al-Zalabani (2024)	Investigated the prevalence and predictors of soft drink consumption among adolescents within the Gulf Cooperation Council countries	Global school-based student health survey questionnaire	22,116 adolescent students (12–18 years old)	• 77% of students in the UAE consumed < 5 fruits and vegetable servings per day. • 34% of students in the UAE consumes soft drinks ≥ 1 time per day.	Most adolescents did not meet the recommended intake of fruits and vegetables. High intakes of SSBs do not align with the EAT-Lancet recommendations of limiting sugar intake.
Faris et al. (2024)	Estimated the total caffeine intake from foods and beverages among school children in the UAE	Food Frequency Questionnaires (FFQ) was leveraged: 19 questions regarding dietary caffeine and 5 questions regarding dietary patterns	1,027 children and adolescents in the UAE (6–18 years)	• 58 and 66% of students consumed < 2 servings of vegetables and fruits per day, respectively. • 19% consumed fast food ≥ 2 times per day and 28.8% consumed ≥ 2 snacks per day	Most students did not meet the recommended intake of five servings of fruits and vegetables daily. High fast-food consumption and frequent snacking deviate from EAT-Lancet recommendations to reduce ultra-processed foods and increase nutrient-rich options.
Hashim et al. (2024)	Assessed adherence to the Mediterranean diet among adults in the Sharjah Emirate of the UAE.	Mediterranean Diet Adherence Screener (MEDAS) was used to assess adherence to the Mediterranean Diet	1,340 male and female adults above 25 years of age	• A moderate adherence to the Mediterranean Diet is seen, with the lowest contribution to the diet being from fish (9%), fruits (12%) and legumes (18%).	Low intake of fish and insufficient fruit and vegetable consumption do not align with the EAT-Lancet recommendations. Additionally, only 18% of participants followed the guideline for legume consumption.

adolescents consuming it three or more times weekly (Makansi et al., 2018). Meat intake was substantial, with 70 and 22% of the population consuming white meat and red meat daily, respectively (SARC, 2018). The study also revealed marked differences by nationality and gender; with Emiratis consuming more red meat than non-Emiratis (32 and 24%, respectively) and men consuming more meat than women.

The only study assessing environmental impacts of the UAE diet (Naja et al., 2022) described how the low adherence of women in the UAE to the Mediterranean diet as primarily due to low intake of whole grains, seafood, and legumes.

Comparative analysis of the UAE dietary patterns reveals marked divergence from recommended sustainable diets. Analysis of UAE dietary intake among women, as reported by Naja et al. (2022), against the EAT-Lancet reference diet (Table 2), shows substantial divergence across food groups. Whole grain consumption was markedly low (−77% deviation), as were legumes (−73% deviation), nuts (−94%

deviation), and vegetables (−40% deviation). Fruit intake showed the smallest deviation (−12% deviation), representing the only food group approaching alignment. In contrast, animal-based food consumption substantially exceeded recommended thresholds, with red meat and poultry intake showing large positive deviations (+151% and +224% deviation, respectively), while fish intake also exceeded recommendations (+29% deviation). Added sugar intake demonstrated the greatest divergence (+455% deviation), indicating extreme overconsumption relative to planetary health targets.

These findings are aligned with Naja et al.'s (2022) benchmarking against the dietary patterns of the Mediterranean diet, except for fruits and vegetables, which were the main contributors to the Mediterranean diet score.

Benchmarking Abu Dhabi food balance data against the EAT-Lancet reference diet (Table 3) revealed similar patterns. Animal-source foods were substantially overrepresented, with red meat availability approximately sevenfold higher than recommended (+663% deviation), poultry supply nearly double (+92% deviation), and egg supply exceeding recommendations (+65% deviation). Dairy supply was also elevated, reaching almost twice the recommended intake (+92% deviation), while fish supply was about half of the recommended level (−52% deviation). In contrast, plant-based protein sources were markedly underrepresented, with legumes and nuts showing large deficits (−68% and −94% deviation, respectively). Vegetable and fruit supply were close to recommended levels (−1% and −2% deviation, respectively), whereas added sugar exceeded recommendations (+58% deviation).

3.2 Food supply database

Analysis of FAOSTAT food supply data (2010–2021) supports these findings, showing a sustained increase in the supply of animal-based food in the UAE over ten years, driven by growth in dairy and meat availability compared to that of plant-based products and cereals (Figure 2A). Imports of meat nearly doubled (from 378 kilotonnes to 796 kilotonnes), while milk imports increased approximately two and a half times (from 1,310 to 3,269 kilotonnes) (Figure 2B). Domestic production followed similar trends, with meat production increasing by approximately 50% (from 131 kilotonnes to 181 kilotonnes) and milk production nearly doubling (121 kilotonnes to 239 kilotonnes) (Figure 2C).

These changes correspond with livestock production, particularly sheep, goats, cattle and camels, increasing from 4.9 million in 2016 to 5.0 million in 2022 (UAE Ministry of Cabinet Affairs, 2022). Consequently, per capita protein supply from animal sources more than doubled during that period (25 to 58 g/capita/day), while plant protein supply increased modestly (48 g to 56 g/capita/day) (Figure 2D) (FAO, 2022a).

The extrapolation of data from the food supply of the Emirate of Abu Dhabi and comparing UAE dietary patterns to EAT-Lancet recommendations further highlight the divergence of the UAE population from a healthy and sustainable dietary pattern. Table 3 highlights that whether at a national level or local level (Abu Dhabi), the UAE population tends to have a supply around four times the amount of beef, lamb, and poultry, twice the number of eggs, and more than twice the amount of sugar, relative to the EAT-Lancet recommendations. Conversely, the supply per capita of legumes and nuts remains substantially below recommended levels, reinforcing the imbalance between animal- and plant-based food availability in the UAE.

4 Discussion

This study is the first to assess UAE dietary patterns against both the EAT-Lancet and Mediterranean diets, two widely recognised models of sustainable diets for addressing climate change mitigation. The findings demonstrate substantial divergence of the UAE dietary pattern from these recommendations, with low intake of plant-based foods and high consumption of animal-based foods, particularly meat, and ultra-processed foods high in sugar, fat, and salt, especially sugar-sweetened beverages and fast food.

The dietary pattern observed in the UAE reflects a structural imbalance characterized by insufficient intake of plant-based foods and excessive consumption of animal products and sugar-sweetened foods. Such patterns are associated with increased risks of non-communicable diseases and greater environmental pressures, particularly through higher greenhouse gas emissions, land use, and water consumption. This underscores the need for integrated policy and behavioural interventions to align dietary patterns in the UAE with sustainable diet principles to simultaneously support climate mitigation, resource conservation, and improve public health.

The UAE diet has a higher environmental footprint than that of many countries, including Mediterranean contexts such as Lebanon, across all three parameters of energy, water use, and GHG emissions (Naja et al., 2018). It also exceeds the US diet in this way across both energy use and GHG emissions (Heller et al., 2013). This is likely due to low intake of plant-based foods including legumes and nuts, high intake of animal-based foods, and a food system heavily reliant on imports.

The dietary pattern in the UAE is consistent with findings from other GCC countries. For example, studies have found that only a quarter of adolescents in Bahrain meet the daily fruit and vegetable requirements (Musaiger et al., 2011), and over half of Saudis never or rarely consume them (Washi and Ageib, 2010). The high intake of animal-based foods, especially meat, is consistent with global consumption patterns in high-income, urbanized countries including of the GCC (Sans and Combris, 2015). The high meat consumption of the UAE population (84 kg/year/capita) aligns with that of Western countries such as Canada (87 kg/year/capita), France (86 kg/year/capita), and the United Kingdom (82 kg/year/capita), and neighbouring GCC countries such as Qatar (83 kg/year/capita), although surpassing that of Saudi Arabia (56 kg/year/capita), and Lebanon (36 kg/year/capita) (FAO, 2022b).

It is important to note that the studies assessing the UAE diet from a nutritional perspective predominantly relied on food frequency questionnaires focused on specific food groups such as fruits, vegetables, and sugary drinks, limiting their scope. Additionally, the increase in animal-based food supply from the FAOSTAT database does not directly reflect consumption due to factors such as population growth, economic conditions and food waste, but it nonetheless offers insight into broader dietary patterns.

Dietary patterns in the UAE are further shaped by its highly diverse and dynamic population, comprising over 200 nationalities (UAE Ministry of Foreign Affairs, 2023). Dietary practices are shaped by pronounced heterogeneity across nationality, socioeconomic status, and cultural background. The particularly high meat consumption among Emiratis compared to other nationalities in the UAE suggests the need for a tailored behavioural change approach, likely needed to be catalysed and supported by policy interventions. These interventions should respect culinary traditions, social norms, and values,

TABLE 2 Comparing UAE dietary intake as presented by Naja et al. (2022) to Eat-Lancet dietary recommendations.

Food items	Eat-Lancet recommendations		UAE dietary intake		Percentage deviation of the UAE diet from Eat-Lancet recommendations
	Macronutrient intake (g/day)	Caloric intake (Kcal/day)	Macronutrient intake (g/day)	SD (g/day)	Percent deviation (%)
Whole grains	232	811	53	98	−77%
Tubers or starchy vegetables (potato and casava)	50 (0–100)	39	3[a]	24	−94%
Vegetables	300 (300–600)	78	181	N/A	−40%
Fruits	200 (100–600)	126	176	N/A	−12%
Dairy foods (whole milk or derivative equivalents)	250 (0–500)	153	142	152	−43%
Protein sources					
Beef, lamb and pork	14 (0–28)	30	35.15	N/A	+151%
Chicken and other poultry	29 (0–58)	62	94[b]	N/A	+224%
Eggs	13 (0–25)	19	N/A	N/A	N/A
Fish	28 (0–100)	40	36	N/A	+29%
Legumes	75 (0–100)	284	20	N/A	−73%
Nuts	50 (0–75)	291	3	N/A	−94%
Added fats					
Unsaturated fats	40 (20–80)	354	N/A	N/A	N/A
Saturated fats	12 (0–12)	96	N/A	N/A	N/A
Added sugar					
All sugars	31 (0–31)	120	172[c]	N/A	+455%

All values taken from the EAT-Lancet recommendations EAT-Lancet (2019) and Naja et al. (2022). N/A indicates data unavailability.
[a]For the tubers or starchy vegetables group, only starchy vegetables were assessed by Naja et al. (2022).
[b]For chicken and poultry groups as per the Eat-Lancet, eggs are included in that dietary intake study (Naja et al., 2022).
[c]For the all sugar groups as per EAT-Lancet recommendations, sugar-sweetened beverages and sweets are included in Naja et al. (2022).

particularly regarding hospitality. The gender differences in meat consumption seen in the UAE and the association of meat with masculinity with plant-based foods viewed as unappealing are global issues (Clonan et al., 2016; United Nations, 2021).

The GCC countries have increasingly prioritised strengthening food security through strategies aimed at expanding domestic food production and improving supply chain resilience (Vicente-Vicente and Piorr, 2021). For example, Qatar accelerated local food production following the 2017 land and sea blockade as part of its national food security response (Al Jazeera, 2020). However, expanding livestock production in arid environments can carry substantial environmental costs due to the high resource intensity of animal agriculture, and so, shifting to more plant-based organic regional consumption patterns may help achieve both food self-sufficiency and environmental sustainability (Vicente-Vicente and Piorr, 2021). Nevertheless, evidence regarding the impact of dietary patterns on climate, such as shifting to organic and regionally-or-locally-based food (HLPE, 2020; Irz et al., 2019; Mason and Lang, 2017), is mixed and complicated by several considerations. Factors other than food miles are important to reducing GHG emissions, such as related to the intensity of input use in food production, and water use, necessitating a case-by-case consideration (Avetisyan et al., 2014; Vicente-Vicente and Piorr, 2021). Specifically, Naja et al. highlighted that the dietary pattern in the UAE of refined grains and sugar-sweetened beverages contributed the most to water use, energy use, and GHG emissions, while meat, poultry/eggs, and vegetables contributed the most to water use; and milk and dairy products, meat and poultry/eggs contributed the most to GHG emission in regards the UAE diet (Naja et al., 2018).

Shifting to a healthy, sustainable diet necessitates the use of comprehensive policy instruments to reshape the food environment and drivers including trade dynamics to promote healthier and more sustainable food options. Such instruments include taxation, subsidies, and marketing strategies that prioritize healthy and sustainable options while ensuring affordability and accessibility through appropriate pricing and labelling. This aligns with global recommendations advocated by key organizations (FAO and WHO, 2019; United

TABLE 3 Comparison of the food supply in Abu Dhabi and the UAE to EAT-Lancet dietary recommendations.

Food Items	EAT Lancet recommendations		Abu Dhabi food balance data (2019)	Benchmarking Abu Dhabi's food supply to the EAT-Lancet recommendations[a]	UAE Food balance data (2021)	Benchmarking UAE's food supply to the EAT-Lancet recommendations[b]
	Macronutrient intake (g/day)	Caloric intake (Kcal/day)	Caloric intake (Kcal/day)	Percent deviation (%)	Caloric intake (Kcal/day)	Percent deviation (%)
Whole grains	232	811	N/A[c]	N/A	N/A[c]	N/A
Tubers or starchy vegetables (potato and casava)	50 (0–100)	39	27.7	−29%	52.2	+ 34%
Vegetables	300 (300–600)	78	77.4	−1%	118	+ 51%
Fruits	200 (100–600)	126	123.4	−2%	182	+ 44%
Dairy foods (Whole milk or derivative equivalents, e.g., cheese)	250 (0–500)	153	293.1	+ 92%	173.0 (milk exc. butter)	+ 13%
Protein sources						
All meat types (beef, mutton, goat, camel, chicken and others)		92	352.3[d]	+ 283%	339.0[d]	+ 268%
Beef, lamb and pork	14 (0–28)	30	229.0[e]	+ 663%	140.0[f]	+ 367%
Chicken and other poultry	29 (0–58)	62	119.2	+ 92%	185.5	+ 199%
Eggs	13 (0–25)	19	31.4	+ 65%	24	+ 26%
Fish	28 (0–100)	40	19.3	−52%	48	+ 20%
Legumes	75 (0–100)	284	92.1	−68%	147.0 (pulses)	−48%
Nuts	50 (0–75)	291	16.6	−94%	70	−76%
Added fats						
Unsaturated fats	40 (20–80)	354	N/A	N/A	N/A	N/A
Saturated fats	12 (0–12)	96				
Added sugar						
All sugars	31 (0–31)	120	190	+ 58%	150	+ 25%

Source: Statistics Center- Abu Dhabi (Statistics Centre, 2020). N/A indicates data unavailability. EAT. Scientific targets for a planetary health diet, with possible ranges, for an intake of 2,500 kcal/day.

[a]Percent divergence is calculated as caloric intake (Kcal/day) of food item from the Abu Dhabi Food Balance Data divided by caloric intake (Kcal/day) of food item from the EAT-Lancet Recommendations.

[b]Percent divergence is calculated as caloric intake (Kcal/day) of food item from the UAE Food Balance Data divided by caloric intake (Kcal/day) of food item from the EAT-Lancet Recommendations.

[c]The food supply database in Abu Dhabi shows cereals and related products irrespective of the type of grains. Hence, comparison to whole grain is not feasible.

[d]The food supply database in Abu Dhabi shows sources of animal food combined, including beef, mutton, goat, camel, chicken, and others.

[e]Beef, lamb, and pork are categorized as protein sources based on the EAT-Lancet recommendations, however, the Abu Dhabi population does not consume pork, thus the value is based on protein sources from beef, mutton and goat, and camel meats.

[f]The food supply database in UAE includes bovine meat, mutton and goat meat, and pork.

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Nations, 2021; Willett et al., 2019). However, it is essential to identify the most effective and politically feasible policy instruments and assess the level of support among policymakers for such policy changes, particularly in the context of the UAE's liberal trade economy. Addressing these knowledge gaps will be critical in advancing sustainable nutrition policies and fostering meaningful change in the region's food systems.

It is important to note that the EAT-Lancet targets have also been widely critiqued for issues like flawed methodology and assumptions (Zagmutt et al., 2019); the diet's affordability, lack of consensus on implementation (Coleman et al., 2021), and potential nutritional deficiencies (Beal, 2021). The EAT-Lancet Commission has since released its updated recommendations in 2025 (Rockström et al., 2025); however, the 2019 targets were used in this study as they were the most current reference available at the time of analysis.

Sustainability frameworks recognize that diets should not only be nutritionally adequate and low in environmental impact, but also culturally acceptable and context-specific to be effective in practice (Macheka et al., 2025), as outlined in FAO and WHO's global sustainable diet definition (FAO and WHO, 2019). While the EAT-Lancet and the Mediterranean diets are widely used as benchmarks for healthy and sustainable eating (Cambeses-Franco et al., 2022; Petrillo et al., 2012), their cultural adaptability and practical feasibility in the UAE and wider GCC context warrant careful consideration. The substantial divergence of current UAE dietary patterns identified in this review from both EAT-Lancet and Mediterranean diets reflects cultural preferences, prevailing food environments, and socioeconomic influences that shape food choices. A key obstacle is addressing these entrenched social norms in a diverse population with high disposable income and a preference for meat, a challenge common with other HICs (Australian Bureau of Statistics, 2016). With the EAT-Lancet diet proposing markedly low levels of red meat and animal-source foods (EAT-Lancet, 2019), this contrasts sharply with observed consumption levels in the UAE, where

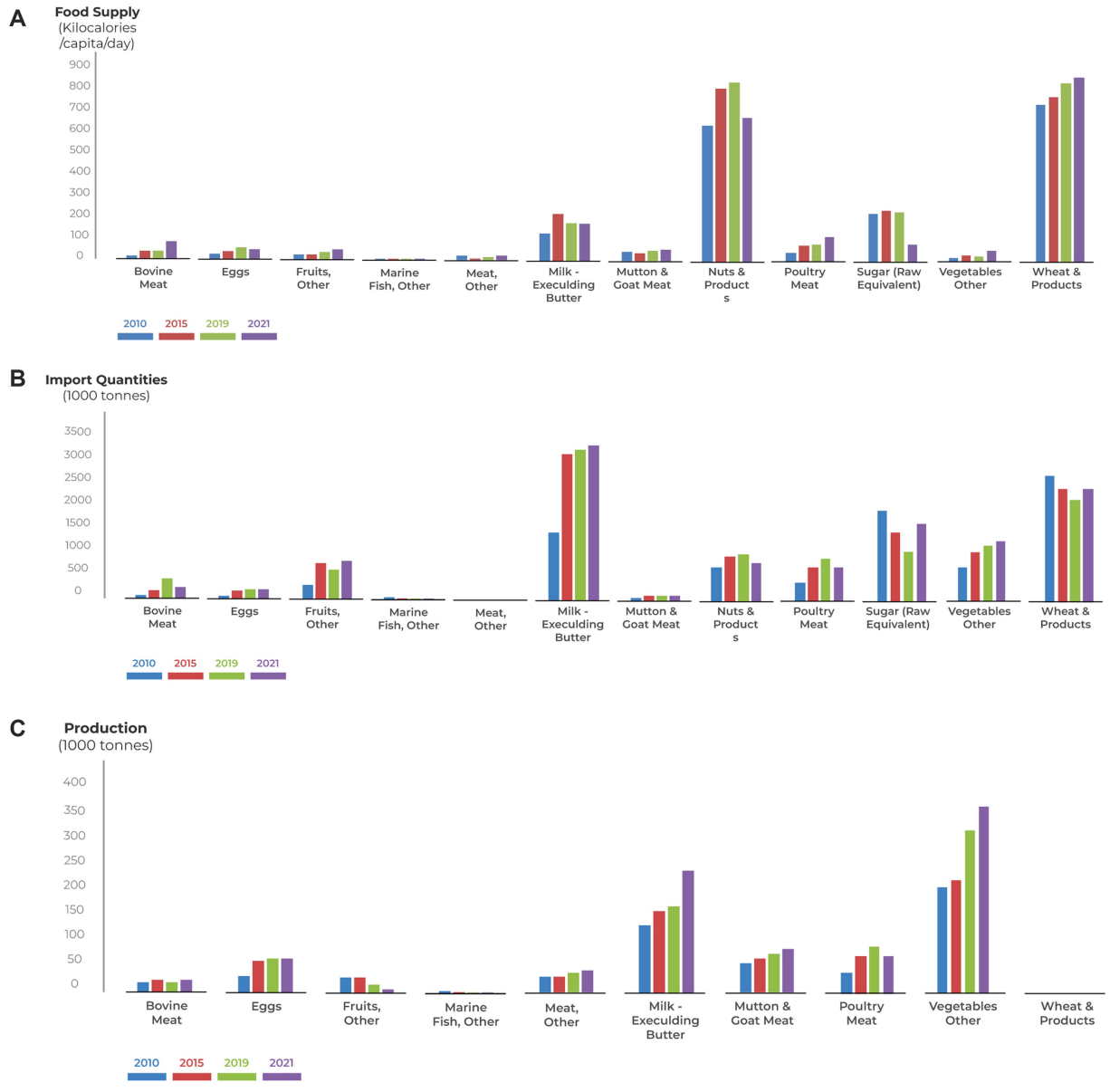

FIGURE 2 (Continued)

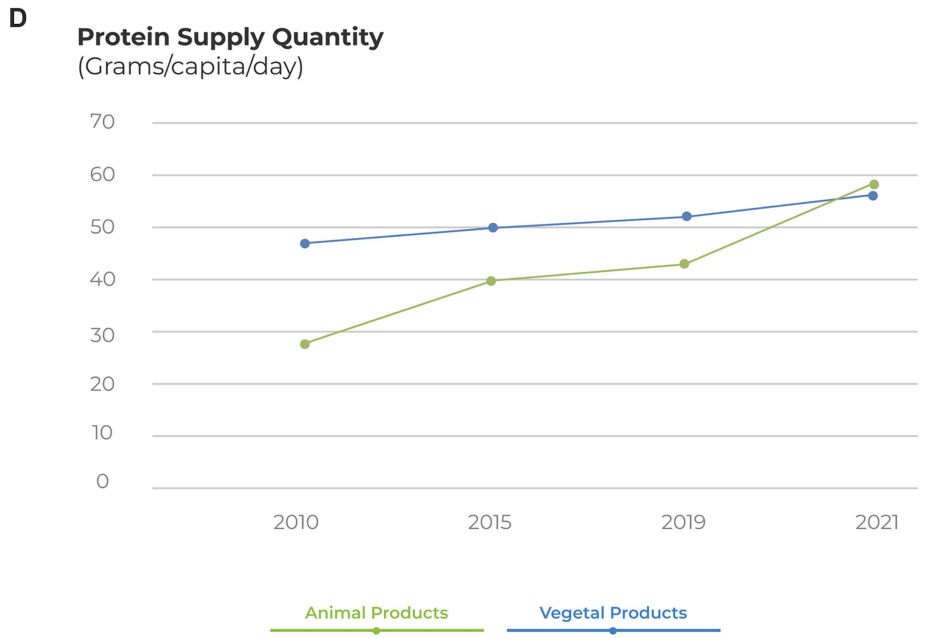

FIGURE 2
Trends in food supply, imports, local production, and protein sources in the UAE (2010–2021). **(A)** Food supply trends in the UAE by food category (2010–2021). **(B)** Trends in food import quantity to the UAE by food category (2010–2021). **(C)** Trends in local production of food categories in the UAE (2010–2021). **(D)** Protein supply quantity of food categories in the UAE (2010–2021). Source: FAOSTAT data, 2022 (FAO, 2022a).

animal protein supply has more than doubled over the past decade. Similarly, the Mediterranean diet, which originates from traditional food systems, seasonal food availability, and culinary practices specific to Mediterranean regions such as Italy, Spain, Greece, and Lebanon (Bôto et al., 2022; Macheka et al., 2025), differs markedly from those prevalent in the UAE. This highlights the need for future studies to assess how sustainable dietary frameworks can be culturally adapted to the UAE and GCC context while aligning their core health and environmental principles with local dietary norms, market realities, and cultural food practices.

In recent years, the UAE has made substantial progress in increasing local plant-based food production through key governmental initiatives and the adoption of Controlled Environment Agriculture (CEA) technologies such as vertical farming and greenhouses and undergone an overall increase in the number of local farms. These efforts led to ambitious plans to increase local food production to 70% by 2025 and 100% by 2030 (Webster, 2023). However, local production still faces significant limitations due to environmental conditions, such as arid land and low rainfall, highlighting the need for climate resilience in local food production to ensure future food security (Benitez-Alfonso et al., 2023).

A draft of the UAE Nutrition Strategy (2022–2031), issued in 2022, acknowledges the need for a "healthy diet from sustainable food systems" (UAE Government, 2023). Proposed policies to enhance the availability of healthy food include eliminating trans fats, reformulating HFSS products, restricting unhealthy food advertising, and reviewing food subsidies to promote healthier diets. However, the strategy primarily focuses on dietary aspects, and lacks attention to environmental factors, such as balancing plant-based and animal-based food consumption, supporting local food production, promoting organic farming, and addressing the environmental impact of highly processed foods. This reveals key gaps in the strategy's approach to nutrition and sustainability.

The UAE is focused on driving the food security agenda by ensuring food self-sufficiency, through the acceleration of global agri-food trade, diversification of food import sources, adoption of sustainable agricultural practices, and the advancement of local food production, especially in organic and vertical farming, hydroponics and aquaculture, and the creation of a supportive ecosystem for farmers, entrepreneurs, and SMEs (Godinho, 2021; UAE Ministry of Climate Change and Environment, 2022; Webster, 2023). Livestock is identified as a key sector needing increased local production (UAE Ministry of Climate Change and Environment, 2022), suggesting that reducing animal-based food intake is not a political priority, with less emphasis on altering consumption patterns for climate change mitigation.

4.1 Limitations

The study has several limitations. First, it is based on the few dietary studies that we identified relevant to the UAE, with a notable scarcity of national-level data. This gap poses a significant challenge to understanding dietary patterns in the UAE. Existing studies predominantly assess selected food categories rather than overall dietary patterns, which restricts the precision of benchmarking against holistic sustainable diet frameworks. Second, and more critically, environmental sustainability evidence is extremely limited. Only one study (Naja et al., 2022) assessed environmental footprints associated with dietary intake in the UAE, and this analysis was restricted to women of childbearing age using data collected in 2010. As a result, conclusions regarding

environmental alignment cannot be generalized to the broader UAE population and environmental impact estimates should be interpreted as indicative approximations. Future research would benefit from the development of regionally contextualized environmental footprint datasets to improve the precision of sustainability assessments of dietary patterns in the UAE. Third, food transportation and import-related emissions (food miles) represent only one contributor to GHG emissions. It is not always clear whether shifting to local food production or relying on imports reduces the overall environmental footprint (Avetisyan et al., 2014). This ambiguity calls for a context-specific approach that considers the diet's dependence on environmental resources, local conditions, agricultural practices, and the food production system (Hess et al., 2014; Naja et al., 2022). Hence, determining whether locally produced or imported foods are more sustainable requires Life Cycle Assessment (LCA), which provides the most comprehensive method for evaluating environmental impacts across the entire food value chain, and is essential for informed decision-making. However, LCA studies for diet-related assessments remain limited in the GCC region, and globally (Clune et al., 2017; Naja et al., 2022), highlighting the need for locally specific environmental footprint evaluations in the UAE. Finally, the scoping review relied solely on only three databases. Although these databases capture a substantial proportion of peer-reviewed literature, the absence of searches in other major databases may have resulted in the omission of relevant regional publications.

5 Conclusion

The current UAE dietary patterns diverge substantially from global sustainable diet recommendations such as the EAT-Lancet and Mediterranean diets. The UAE diet is heavily reliant on animal-based foods, sugar and ultra-processed products, with insufficient plant-based food intake. This contributes to health issues such as obesity and diabetes and exacerbates environmental challenges such as high greenhouse gas emissions and resource depletion. While recent initiatives focus on food security and enhancing agri-food trade and sustainable agricultural practices, as pillars of the UAE National Food Security Strategy, there remains a critical gap in addressing the dietary changes necessary for promoting both public health and environmental sustainability. Aligning UAE dietary patterns with sustainable food consumption is complex but achievable, requiring efforts from key stakeholders including policymakers and private actors to foster an environment that supports healthier and sustainable food choices. Further research is essential to refine strategies and evaluate their impacts, ensuring that the UAE can meet its unique challenges while contributing to global sustainability goals.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

MG: Writing – review & editing, Writing – original draft, Formal analysis, Methodology, Conceptualization, Data curation. TC: Formal analysis, Writing – original draft. MT: Writing – original draft, Formal analysis. SP: Formal analysis, Writing – original draft. LC: Formal analysis, Writing – original draft. AD: Writing – original draft, Formal analysis. HW: Writing – original draft, Formal analysis, Supervision.

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Conflict of interest

Author MG has been employed by: HealthyPath, Nutrition and Food Sustainability Consultancy, Dubai. MG declares that this research was conducted as part of her Master's program in Global Health Policy at the London School of Hygiene and Tropical Medicine. The research was undertaken independently and without financial support from commercial entities.

The remaining author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fsufs.2026.1788648/full#supplementary-material

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