

Original Research

Assessing the dietary behaviours and food choices of people with type 2 diabetes in the Wa Municipality of Ghana

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Abstract

Introduction: Type 2 diabetes poses a growing global health challenge, with dietary behaviours and food choices playing a critical role in its management. This study assessed dietary practices, food preferences, and nutrition-related determinants among patients with type 2 diabetes in the Wa Municipality of Ghana, and further evaluated overall dietary behaviour using a dietary behaviour index derived from key dietary behavioural indicators.

Methods: A cross-sectional survey was conducted among 208 adult respondents selected from diabetes clinics in the municipality using structured interviewer-administered questionnaires and 24-hour dietary recalls. Descriptive statistics were used to summarize demographics, food-choice determinants, dietary practices, and 24-hour food-group consumption. A total dietary behaviour score was computed from 10 dietary behaviour indicators, classified into a dietary behaviour index. Independent samples *t*-tests and one-way analysis of variance were used to examine differences in dietary behaviour score across selected participant characteristics at a significance level of $p < 0.05$.

Results: Most participants were female (69.2%), aged 45–64 years (49.0%), married (73.6%), had no family history of diabetes (48.1%), and had no formal education (39.4%). Major influences on food choices included food availability (79.8%), financial constraints (76.0%), appetite (71.6%), and nutrition advice from healthcare

providers (72.1%). In the previous 24 hours, a high proportion of participants reported consuming meat, poultry, and fish (90.4%), whereas fewer reported consuming eggs (17.8%), fruits other than those rich in vitamin A (26.9%), and healthy fats (38.5%); 67.3% reported consuming foods containing trans fats. Participants had limited nutrition knowledge – 53.4% did not understand the glycaemic index, 60.6% did not know which carbohydrates raise blood sugar levels, and 63.9% never read nutrition labels. Most participants indicated moderate dietary behaviour (65.4%), while 23.6% had good dietary behaviour and 11.1% had poor dietary behaviour. Total dietary behaviour scores were significantly associated with eating situation ($p = 0.001$), meal decision making ($p = 0.004$), and nutrition label use ($p < 0.001$), but not with gender ($p = 0.070$), religion ($p = 0.254$), or family history of diabetes ($p = 0.112$). Participants demonstrated predominantly moderate dietary behaviour, with important gaps in fruit intake, carbohydrate monitoring, application of glycaemic knowledge, and nutrition label use. Household food arrangements and nutrition literacy were found to be more strongly associated with healthier dietary behaviour than basic sociodemographic characteristics.

Conclusion: Context-specific interventions that strengthen practical nutrition education, improve food label literacy, and support household-level dietary decision making may improve diabetes dietary management in this setting.

Keywords

diabetes mellitus, Ghana, glycaemic control, insulin, obesity, Wa Municipality.

Introduction

Diabetes mellitus is a metabolic condition characterized by high blood sugar levels caused by deficiencies in the action of insulin or low secretion of insulin. The prevalence of diabetes mellitus is increasing worldwide, in both developed and developing countries, making it one of the most important global health issues of the 21st century¹. About 537 million adults worldwide, or roughly 10% of the world's adult population are estimated to have diabetes². The WHO periodic projections of diabetes prevalence predicted that without immediate preventive action, the global prevalence is expected to reach 643 million by 2030 and 783 million by 2045. Diabetes contributes to complications like cardiovascular diseases, kidney failure, neuropathy, retinopathy, and amputations, all of which have a significant financial impact, making it a major cause of morbidity and mortality in addition to its prevalence³.

The global type 2 diabetes epidemic has quadrupled over three decades, with approximately 1 in 11 adults worldwide now affected, 90% having type 2 diabetes⁴. This crisis is primarily facilitated by rapid urbanization, nutrition transition, and increasingly sedentary lifestyles, with the epidemic growing parallel to worldwide obesity rates^{4,5}. Urbanization, sedentary lifestyles, and unhealthy eating patterns are particularly linked to the increasing epidemic. Obesity and type 2 diabetes are more likely to occur in diets heavy in processed foods, added sugars, saturated fats, and refined carbohydrates⁴. Healthy eating habits,

such as consuming whole grains, fruits, vegetables, legumes, nuts, and lean proteins, are essential for managing and preventing diabetes, according to WHO^{2,6}. Research demonstrates that medical nutrition therapy and wise food choices enhance glycaemic control, lower insulin resistance, and avoid complications. Therefore, eating habits and food selections are cornerstones in the successful management of diabetes worldwide.

The diabetes epidemic is spreading rapidly in Sub-Saharan Africa, with low-income households being the hardest hit. According to WHO², over 24 million adults in the region are experiencing diabetes, with the number being projected to more than double by the year 2045. The region faces unique challenges including lack of funding for non-communicable diseases, unavailability of population-specific studies and guidelines, medication shortages, and inequities between urban–rural and public–private healthcare sectors⁷. Poor access to health care, ignorance of dietary guidelines, and negative cultural influences on eating habits are also rife within the region, exacerbating the burden of diabetes. Affordability, accessibility, and tradition all influence food behaviour, which frequently makes dietary changes challenging. Economic constraints and cultural dependence on carbohydrate-dense staples like *fufu* (a traditional Ghanaian starchy staple prepared by pounding boiled cassava, yam, plantain, or combinations into a smooth dough-like meal usually eaten with soup), maize meal, and cassava make it difficult for diabetic

patients to adopt healthier diets, according to studies conducted in South Africa, Nigeria, and Kenya⁷. These facts emphasize the necessity of interventions tailored to the particular context.

In Ghana, diabetes prevalence is estimated at 4–9% depending on the region^{8–10}. Research in Ghana reveals complex challenges in diabetes management across urban and rural settings. Studies show that while diabetic patients possess knowledge about dietary recommendations, significant barriers prevent effective self-care implementation^{11,12}. Changing lifestyles, urbanization, and increasing consumption of processed, energy-dense foods have been identified as major drivers of diabetes in Ghana^{5,12}. According to Hushie, several factors such as difficulty in changing habitual diets, social functions interfering with dietary regimens, family members diverting patients from dietary goals, and economic constraints limit the compliance to dietary recommendations by diabetes in Ghana¹². In rural and peri-urban communities, traditional foods remain central, but many patients continue to consume large portions of starchy staples, fried foods, and sugary beverages despite medical advice. Limited access to diabetic-friendly foods, insufficient nutrition counselling, and financial barriers worsen the situation¹³.

The Wa Municipality of the Upper West Region of Ghana offers a distinctive setting for researching these issues. Maize, millet, sorghum, and tubers make up the majority of the local diet of the residents in the municipality, with legumes and seasonal vegetables serving as meal accompaniments. Despite the nutritional value of traditional foods, diets frequently lack variety and heavily rely on carbohydrates. Food choices have been impacted by the proliferation of processed foods, sugary drinks, and fried snacks. Despite the existence of dietary guidelines, little is known about how diabetic patients in the Wa Municipality comprehend, implement, or follow these guidelines. Therefore, designing successful interventions will require an understanding of their decisions as well as the socioeconomic and cultural elements that affect them.

Dietary considerations remain a critical component of diabetes management, both in preventing and controlling diabetes. However, studies have revealed that the majority of diabetic patients encounter challenges in maintaining healthy eating habits^{14,15}. Dietary recommendations are still not being followed widely, with fewer than 40% of patients in some settings meeting recommended targets¹⁶. More than half of study participants lacked knowledge about reading food labels in a study conducted in Ghana, although some demonstrated adequate meal planning skills and healthy eating habits¹⁷. Cultural norms, financial constraints, and knowledge gaps make this challenge even more pronounced in low-resource settings like the Wa Municipality of Ghana. Also, diabetes care in Ghana often focuses more on pharmacological treatment than on nutrition counselling. As a result, patients may make food decisions based on personal judgement, family traditions, or unverified advice. Many patients continue to consume foods rich in refined carbohydrates and unhealthy fats, according to studies^{18,19}, which raises the risk of complications and impairs glycaemic control. The lack of structured dietary education and diabetes-friendly foods makes outcomes even worse.

Diabetic patients in Kumasi in southern Ghana demonstrated positive adherence to dietary guidelines regarding sweetened foods and meal timing but were confused regarding the consumption of fruits, portion sizes, and processed foods, with economic barriers limiting access to recommended foods¹¹. Similarly, Mogre et al identified misconceptions about the causes

of diabetes, inadequate family support, social stigma, poor income levels and limited access to variety of foods due to seasonality as major obstacles to adherence²⁰, highlighting the need to design interventions culturally tailored to address household level economic challenges and family dynamics while providing clearer education about appropriate foods and portion control²¹.

Diabetes patients in the Wa Municipality have additional challenges as socioeconomic and dietary factors exacerbate these issues. They often struggle to replace cheap processed foods and traditional diets that are high in carbohydrates with healthy diets. Accessibility and affordability continue to be major obstacles, and cultural preferences negatively affect the ability to access medical advice. Therefore, assessing the eating habits and food preferences of diabetic patients in the Wa Municipality is an urgent necessity, as such studies will draw attention to current procedures, highlight the obstacles and possibilities and serve as a foundation for creating dietary plans that are appropriate for different cultural settings. Against this background, the present study assessed the dietary practices, food preferences, and nutrition-related determinants among type 2 diabetic patients in the Wa Municipality of Ghana, and further evaluated their overall dietary behaviour using a composite dietary behaviour index derived from key dietary behavioural indicators.

Methods

Study design

A cross-sectional design was employed to assess the dietary behaviours, food choices, and nutrition practices of patients diagnosed with type 2 diabetes in the Wa Municipality of Ghana. The design is appropriate because it allowed for the collection of snapshot information at a single point in time to describe the current dietary patterns and related determinants among the study population.

Study setting

The study was conducted in the Wa Municipality, located in the Upper West Region of Ghana. The municipality is predominantly rural with pockets of urban settlement and a diverse mix of sociocultural and religious practices. Staple foods in the area include maize, millet, sorghum, yam, and cassava, with limited but increasing availability of processed foods, fried snacks, and sugar-sweetened beverages. The municipality is predominantly agrarian and characterized by mixed crop–livestock farming systems. In addition to crop production, livestock rearing is common, including cattle, goats, sheep, and poultry, which serve as sources of household nutrition as well as income. Unlike coastal areas of Ghana, where fishing is a major livelihood activity, the Wa Municipality is not a fishing community, and access to fresh fish is relatively limited, with fish often obtained in dried or processed forms through market supply chains.

The presence of livestock within households and communities contributes to the availability of animal-source protein foods, particularly meat and poultry, although consumption patterns may still be influenced by seasonal variation, household income, and market access. Food markets within the municipality offer a mix of local foods and commercially available processed products, reflecting a gradual nutrition transition. The Wa Municipality was selected as the study site due to the rising prevalence of diabetes and the limited evidence on how local patients manage the condition in the context of low socioeconomic status and pervasive cultural constraints.

Study population

The study population consisted of adult men and women diagnosed with type 2 diabetes and residing in the Wa Municipality at the time of data collection; they were simple randomly selected using the following criteria: aged 20 years or above, clinically diagnosed with type 2 diabetes and attending review clinics or living within the municipality, and willingness to provide informed consent to participate in the study. Patients with type 1 diabetes, gestational diabetes, or those critically ill and unable to participate in interviews were excluded.

Sample size and sampling technique

A total of 208 respondents were randomly recruited for the study. Study participants were recruited from two major diabetes care facilities in the Wa Municipality: the Wa Municipal Hospital and the Upper West Regional Hospital in Wa. These facilities serve as the primary referral centres for diabetes management in the municipality and its surrounding districts. Study participants were identified from diabetes clinic attendance registers during routine outpatient review sessions. Patients diagnosed with type 2 diabetes who attended the clinics during the data collection period were approached by trained research assistants and the researchers. The purpose of the study was explained to each patient approached at the hospitals, and those who met the eligibility criteria and provided informed consent were enrolled in the study. Recruitment continued until the target sample size of 208 participants was achieved. The sample size was estimated based on Cochran's formula for cross-sectional studies, assuming a 95% confidence interval, a 5% margin of error, and a conservative prevalence of poor dietary adherence among diabetics ($p=0.50$) to maximize representativeness. Proportionate sampling was applied to select participants from the diabetes clinics at the Wa Municipal and regional hospitals, respectively. At each selected site, simple random sampling was employed to recruit eligible patients until the desired sample size was achieved.

Data collection instruments and procedure

A structured interviewer-administered questionnaire adapted from validated tools used in similar studies in Ghana was used to collect the data^{22,23}. The key sections of the instrument included questions to capture sociodemographic characteristics; determinants of food choices including eating situations, meal decision making, and factors influencing dietary decisions (income, availability, appetite, and nutrition information); and dietary practices and nutrition knowledge, including use of food labels, knowledge of the glycaemic index, adherence to dietary guidelines, and meal frequency. A snapshot dietary intake was assessed using a structured 24-hour dietary recall in which respondents were asked to report all foods and beverages consumed within the previous 24 hours. To ensure consistency in reporting and analysis, reported food items were subsequently classified into predefined food groups based on commonly consumed foods within the Ghanaian context. Each group was coded dichotomously (yes=1; no=0) depending on whether at least one item from the group was consumed within the recall period of the 24 hours. The food groups and their classifications were defined as follows:

- Whole grains, white roots, tubers, and plantains included staple carbohydrate foods such as maize, sorghum, millet, and foods derived from these grains, as well as root and tuber crops including yam, cassava, cocoyam, sweet potato, Irish potato, and plantain, and their derivatives.
- Refined grains comprised processed grain-based foods such as white rice, wheat products, polished corn products, bread, macaroni, noodles, and other refined cereal preparations.
- Pulses included legumes such as white beans, red beans, bambara beans, and soya beans.
- Nuts and seeds consisted of foods such as groundnuts, groundnut paste, *agushie* (melon seeds), and *neri* (locally called *werewere* or *wrewre*, the edible seeds of a melon species belonging to the Cucurbitaceae family, traditionally used in Northern Ghana to prepare soup and stew, similar in appearance and flavour to groundnut soup).
- Dairy products included milk and milk-based products such as fresh milk, powdered milk, yogurt, cheese, and locally available dairy beverages (eg Fan Milk).
- Meat, poultry, and fish comprised animal-source proteins including beef, goat meat, chicken, offal, and fish.
- Eggs included eggs from poultry sources such as hen or duck.
- Dark green leafy vegetables included vegetables such as *kontonmire* (cocoyam leaves), spinach, cassava leaves, *ayoyo* *Corchorus olitorius* (jute mallow leaves, a traditional leafy vegetable widely consumed in Ghanaian cuisine and commonly used in soups because of its characteristic mucilaginous texture), *alefu* (amaranth), moringa leaves, lettuce, and similar leafy greens.
- Other vegetables comprised commonly consumed vegetables such as onions, garden eggs (African eggplants, *Solanum aethiopicum*, commonly consumed as vegetables in Ghanaian diets; also the big purple eggplant, *Solanum melongena*), pepper, green pepper, green beans, cucumber and okra.
- Vitamin A-rich fruits and vegetables included fruits and vegetables known to be high in provitamin A carotenoids, such as ripe mango, pawpaw, cantaloupe, carrots, tomatoes, palm fruit, cabbage, beetroot, and 100% fruit juices derived from these sources.
- Other fruits comprised fruits such as watermelon, oranges, bananas, pineapple, soursop, guava, apples, grapes, and pears.
- Healthy fats included sources of unsaturated fats such as avocado, olive oil, sunflower oil, fish oils, and nut-based oils and spreads such as peanut butter.
- Trans fats included commonly consumed fats and oils such as margarine, and commercially processed frying oils, which are often associated with higher levels of saturated and trans-fat content.
- High-sugar foods and drinks referred to carbonated beverages, confectioneries (toffees, sweets), cakes, pastries, and other sugar-sweetened foods.
- Non-alcoholic beverages included drinks such as carbonated water, freshly prepared fruit juices, smoothies, herbal teas, green tea, coconut water, cocoa-based drinks, and milk or soy-based beverages.
- Alcoholic beverages included drinks such as beer, wine, and distilled spirits.

This classification framework was used to standardize dietary reporting and enable meaningful comparison of food group consumption patterns among respondents. The instrument was pre-tested among 20 diabetic patients at the diabetes clinic in the

neighbouring Jirapa district to assess clarity, cultural appropriateness, and reliability. Adjustments were made accordingly. Trained research assistants read the questionnaire to participants in English and translated into local dialects (Dagaare, Waali, and Twi) for participants who did not understand English.

Data analysis

Data were cleaned and entered into Statistical Package for the Social Sciences (SPSS) v20.0 (IBM Corp; <https://www.ibm.com/products/spss-statistics>) for analysis. Descriptive statistics, including frequencies and percentages, were used to summarize demographic data, dietary factors, and dietary consumption behaviours. To assess overall dietary behaviour, a dietary behaviour score was constructed using 10 questionnaire items assessing various diabetes dietary behaviours and nutrition-related practices. The use of composite dietary indices based on multiple indicators is widely applied in nutritional epidemiology as a practical approach for summarising complex dietary patterns and behaviours^{24,25}. To further provide a comprehensive assessment of participants' dietary behaviours, selected dietary practice variables were recoded into binary indicators as healthy and unhealthy behaviours. Specifically, 10 dietary items were considered: daily fruit consumption, weekly fruit consumption, checking carbohydrate content of foods, application of glycaemic index knowledge, sugary food consumption, sugary beverage consumption, fast food consumption, skipping breakfast, dinner timing, and adherence to dietary guidelines. For each item, responses were recoded into two categories: healthy behaviour (coded as 1) and unhealthy behaviour (coded as 0) based on established dietary recommendations for diabetes management. For example, frequent fruit consumption, checking carbohydrate content of foods before eating, regular breakfast intake, limited intake of sugary foods and beverages, and adherence to dietary guidelines were classified as healthy behaviours, whereas infrequent fruit intake, frequent consumption of sugary foods, and poor dietary monitoring practices were classified as unhealthy behaviours.

A total dietary behaviour score was then computed by summing the binary scores across the 10 variables, resulting in a possible score range of 0 to 10, where higher scores indicate healthier dietary practices and lower scores indicate poor dietary practices or behaviours. To enhance interpretability, the total dietary behaviour score was further categorized into a dietary behaviour index with three levels: poor dietary behaviour (scores 0–3), moderate dietary behaviour (scores 4–7), and good dietary behaviour (scores 8–10).

Independent samples *t*-tests were used to compare mean dietary behaviour score between two groups: gender (male, female) and religious affiliation (Christian, Muslim), while one-way analysis of variance was used to examine differences in dietary behaviour score across categorical variables with more than two groups: education level, family history of diabetes, eating situation, meal decision making and reading nutrition labels. For dietary intake variables derived from the 24-hour recall and factors influencing food choices, frequencies and percentages were reported. Statistical significance was set at $p < 0.05$.

Ethics approval

The study was approved by the Upper West Regional Health Directorate, and the approval letter was formally copied to the officers in charge of the diabetes clinics (UWR/RHD/ADM/TP-51). Informed consent was obtained from the participants before recruitment. The confidentiality and privacy of participants were

ensured throughout the study. Respondents were assured of anonymity, voluntary participation, and the right to withdraw from the study at any stage without penalty.

Results

The demographic characteristics of study participants (Table 1) indicated that the majority of the respondents were between 45 and 64 years (49.0%) and those aged 20–44 years (31.7%). A small fraction of the study sample was aged between 65–74 years (13.5%), with only 5.8% being ≥ 75 years. With regards to gender, more than half of the respondents were female (69.2%). A significant proportion had no formal education (39.4%), while 21.6% had completed basic education, 9.6% secondary education, and 28.4% tertiary education. The majority of respondents (73.6%) were married, with 16.8% widowed, 6.7% unmarried, and 2.9% divorced. More than half of the respondents identified as Muslim (69.2%), with only 30.8% confirmed as Christians. On the responses on family history of diabetes, 34.1% reported having diabetic family members, 48.1% declined having diabetic family members and 17.8% were unsure about family history of diabetes.

Table 1: Demographic characteristics of study participants (N=208)

Characteristic	Variable	Frequency (n)	Percentage (%)
Age (years)	20–44	66	31.7
	45–64	102	49.0
	65–74	28	13.5
	≥ 75	12	5.8
Gender	Male	64	30.8
	Female	144	69.2
Education	Basic	45	21.6
	Secondary	20	9.6
	Tertiary	59	28.4
	Non-formal [†]	2	1.0
	No formal [‡]	82	39.4
Marital status	Married	153	73.6
	Divorced	6	2.9
	Not married	14	6.7
	Widowed	35	16.8
Religion	Christianity	64	30.8
	Islam	144	69.2
Family history of diabetes	Yes	71	34.1
	No	100	48.1
	Not sure	37	17.8

[†] Informal or adult/community-based education outside the conventional school system.

[‡] No school attendance.

The study also sought to investigate the determinants of feeding choices among participants, and the results are shown in Table 2. Eating family-prepared foods constituted a significant eating situation of the respondents (37.5%), followed by those who prepared their own meals (29.3%) or occasionally bought meals from outside the home (28.8%). Only a small proportion (4.3%) reported buying most of their meals. For decision making on meals, more than half of the participants (54.3%) indicated that they made their own meal choices, while 32.2% relied on other family members, and 13.5% reported that their spouse decided meals they consumed. With regards to factors that influenced their food choices, a large proportion of participants agreed that their eating was influenced by the money they had available (76.0%), availability of food (79.8%), their appetite (71.6%), and nutrition advice from healthcare providers (72.1%). Over half (53.4%) acknowledged being influenced by nutrition information from the

media, while about half (51.4%) relied on their own understanding of a healthy diet. Further details regarding the determinants of feeding choices by participants are shown in Table 2.

Table 2: Determinants of feeding choices by respondents (N=208)

Characteristic	Variable		Frequency (n)	Percentage (%)
Eating situation	Buying most of my meals		9	4.3
	Most meals prepared by family		78	37.5
	Meals prepared by me		61	29.3
	Buy meals occasionally		60	28.8
Meal decision making	Me		113	54.3
	My spouse		28	13.5
	Other family member		67	32.2
Other factors affecting what I eat	Money I have	Agree	158	76.0
		Disagree	50	24.0
	Food I have appetite for	Agree	149	71.6
		Disagree	59	28.4
	Availability of food	Agree	166	79.8
		Disagree	42	20.2
	Nutrition advice by healthcare provider	Agree	150	72.1
		Disagree	58	27.9
	Nutrition information from radio, TV, or newspapers	Agree	111	53.4
		Disagree	97	46.6
	My own understanding of healthy diets	Agree	107	51.4
		Disagree	101	48.6

Summarizing the 24-hour food intake of study participants, the results indicated that a huge proportion reported consumption of meat, poultry, and fish (90.4%), while only 9.6% did not. Reported consumption of eggs among participants was very low (17.8%), with most participants (82.2%) reporting no egg intake. Over half of the respondents reported consuming dark green leafy vegetables (56.7%) while a little over half reported consuming vitamin A-rich fruits and vegetables (48.6%; Table 3). With respect

to fats, only 38.5% of participants reported consuming healthy fats, while a larger proportion (67.3%) reported intake of foods high in trans fats. Reported intake of high-sugar foods and drinks was minimal (5.8%) while a small percentage (13.5%) consumed non-alcoholic drinks. Only a few of the respondents consumed alcohol, with only 2.9% of them reporting intake within the 24-hour recall period (Table 3).

Table 3: Respondents' 24-hour dietary intake (foods consumed within the previous 24 hours)[†] (N=208)

Variable	Response	Frequency (n)	Percentage (%)
Meat, poultry, and fish	Yes	188	90.4
	No	20	9.6
Eggs	Yes	37	17.8
	No	171	82.2
Dark green leafy vegetables	Yes	118	56.7
	No	90	43.3
Fruits and vegetables rich in vitamin A	Yes	101	48.6
	No	107	51.4
Other fruits	Yes	56	26.9
	No	152	70.1
Healthy fats	Yes	80	38.5
	No	128	61.5
Trans fats	Yes	140	67.3
	No	68	32.7
High-sugar foods and drinks	Yes	12	5.8
	No	196	94.2
Non-alcoholic drinks	Yes	28	13.5
	No	180	86.5
Alcoholic drinks	Yes	6	2.9
	No	202	97.1

[†] Values represent self-reported 24-hour dietary intake by participants and should therefore be interpreted as a snapshot of recent intake rather than an indication of habitual dietary patterns.

The results reveal generally low levels of nutrition knowledge among study participants (Table 4). More than half of the participants (53.4%) reported that they did not understand the

glycaemic index at all, while only 7.7% reported a good understanding. Similarly, a substantial proportion of the study participants (60.6%) reported no knowledge of which

carbohydrates raise blood sugar levels, with only 1.4% reporting a high level of knowledge.

In terms of nutrition label use, the majority of participants (63.9%) reported that they never read nutrition labels when shopping for food, while only 13.9% indicated that they always read nutrition labels. These findings suggest limited nutrition literacy among the study participants.

Table 4: Nutrition knowledge and awareness among respondents (N=208)

Variable	Category	Frequency (n)	Percentage (%)
Understanding of glycaemic index	Not at all	111	53.4
	A little	60	28.8
	Somewhat	21	10.1
	Very good	16	7.7
Knowledge of carbohydrates raising blood sugar	Not at all	126	60.6
	A little	65	31.3
	Somewhat	14	6.7
	Very good	3	1.4
Reading nutrition labels	Never	133	63.9
	Rarely	13	6.3
	Sometimes	27	13.0
	Often	6	2.9
	Always	29	13.9

The reported dietary behaviours of respondents revealed mixed adherence to recommended dietary practices (Table 5). With regard to fruit consumption, over half of the respondents (51.4%) reported consuming fruits one or two times per day, although a considerable proportion (39.4%) reported not consuming fruits daily. Weekly fruit consumption followed a similar pattern, with 47.6% reporting consuming fruits one or two times per week, while 21.6% reported never consuming fruits in a typical week.

Concerning dietary monitoring practices, nearly half of the respondents (48.1%) reported that they never check the carbohydrate content of foods before consumption, and 43.3% indicated that they do not apply knowledge of the glycaemic index in their food choices.

Encouragingly, the majority of respondents indicated low consumption of unhealthy foods. A high proportion indicated that they never consumed sugary foods (62.5%) or sugary beverages (55.8%), while over half (53.4%) reported never consuming fast food. In terms of meal patterns, more than half of the respondents (52.9%) indicated that they never skip breakfast, while 39.9% typically had dinner before 6 pm. Regarding adherence to dietary recommendations, a relatively high proportion of respondents (41.8%) reported that they closely follow dietary guidelines provided by healthcare professionals, although a notable proportion (25.9%) reported low adherence to dietary guidelines.

Table 5: Dietary behaviours of respondents (N=208)

Variable	Category	Frequency (n)	Percentage (%)
Daily fruit consumption	Never	82	39.4
	1 or 2 times	107	51.4
	3 or 4 times	8	3.8
	Once in a while	11	5.3
Weekly fruit consumption	Never	45	21.6
	1 or 2 times	99	47.6
	3 or 4 times	36	17.3
	≥5 times	11	5.3
	Once in a while	17	8.2
Checking carbohydrate content of food before eating	Never	100	48.1
	Rarely	34	16.3
	Sometimes	33	15.9
	Often	16	7.7
	Always	25	12.0
Application of glycaemic index knowledge	Not at all	90	43.3
	A little	49	23.6
	Somewhat	33	15.9
	Very good	36	17.3
Sugary food consumption	Never	130	62.5
	<1 time weekly	47	22.6
	1 or 2 times weekly	21	10.1
	3 or 4 times weekly	8	3.8
	Daily	2	1.0

Sugary beverage consumption	Never	116	55.8
	Rarely	62	29.8
	Sometimes	25	12.0
	Often	5	2.4
Fast food consumption	Never	111	53.4
	1 or 2 times weekly	79	38.0
	3 or 4 times weekly	11	5.3
	≥5 times weekly	4	1.9
	Once in a while	3	1.4
Skipping breakfast	Never	110	52.9
	Rarely	45	21.6
	Sometimes	49	23.6
	Often	3	1.4
	Always	1	0.5
Dinner timing	Before 6 pm	83	39.9
	6–7 pm	76	36.5
	7–8 pm	39	18.8
	After 8 pm	10	4.8
Following dietary guidelines	Not at all	14	6.7
	A little	40	19.2
	Somewhat	67	32.2
	Very closely	87	41.8

The distribution of recoded dietary behaviour revealed varying levels of adherence to recommended dietary practices among respondents (Table 6). A majority of study participants demonstrated healthy behaviours in relation to the consumption of sugary foods (85.1%), sugary beverages (85.6%), and fast foods (92.8%). Similarly, a substantial proportion of the participants reported positive practices such as not skipping breakfast (74.5%) and adherence to dietary guidelines (74.0%).

However, areas of concern were identified. A high proportion of participants exhibited unhealthy behaviours in weekly fruit consumption (77.4%), checking carbohydrate content of foods before eating (64.4%), and application of glycaemic index knowledge to food choices (66.8%). Additionally, 60.1% of participants reported unhealthy dinner timing patterns.

Table 6: Distribution of recoded dietary behaviour indicators (N=208)

Variable	Unhealthy behaviour n (%)	Healthy behaviour n (%)
Daily fruit consumption	93 (44.7)	115 (55.3)
Weekly fruit consumption	161 (77.4)	47 (22.6)
Checking carbohydrate content	134 (64.4)	74 (35.6)
Application of glycaemic index knowledge	139 (66.8)	69 (33.2)
Sugary food consumption	31 (14.9)	177 (85.1)
Sugary beverage consumption	30 (14.4)	178 (85.6)
Fast food consumption	15 (7.2)	193 (92.8)
Skipping breakfast	53 (25.5)	155 (74.5)
Dinner timing	125 (60.1)	83 (39.9)
Following dietary guidelines	54 (26.0)	154 (74.0)

The total dietary behaviour scores ranged from 2 to 10, with the majority of participants clustering between scores of 5 and 7, indicating moderate levels of dietary adherence (Table 7).

When categorized into the dietary behaviour index, the results showed that most participants (65.4%) exhibited moderate dietary behaviour, while 23.6% demonstrated good dietary behaviour and

11.1% exhibited poor dietary behaviour.

These findings suggest that although participants reported some positive dietary practices, there remain notable gaps in dietary knowledge application and consistency of healthy diabetes dietary behaviours, particularly in relation to carbohydrate monitoring.

Table 7: Distribution of total dietary behaviour score and dietary behaviour index classification

Variable	Category	Frequency (n)	Percentage (%)
Total dietary behaviour score	2	7	3.4
	3	16	7.7
	4	25	12.0
	5	26	12.5
	6	50	24.0
	7	35	16.8
	8	34	16.3
	9	14	6.7
	10	1	0.5

Dietary behaviour index [†]	Poor behaviour	23	11.1
	Moderate behaviour	136	65.4
	Good behaviour	49	23.6

[†] Total dietary behaviour score was computed by summing 10 recoded dietary behaviour variables (healthy=1, unhealthy=0), yielding a score range of 0–10.

[†] The dietary behaviour index was derived by categorizing the total scores as poor (0–3), moderate (4–7), and good (8–10).

Independent samples *t*-test results

Independent samples *t*-tests was conducted to examine differences in total dietary behaviour score by gender and religion (Table 8). Female participants recorded a slightly higher mean dietary behaviour score (mean (M)=6.14, standard deviation (SD)=1.85) than males (M=5.64, SD=1.77); however, this difference was not statistically significant, $t(206)=-1.82$, $p=0.070$. Similarly,

participants who identified as Christians recorded a slightly higher mean dietary behaviour score (M=6.22, SD=2.05) than respondents who identified as Muslims (M=5.88, SD=1.72), but this difference was also not statistically significant, $t(104.26)=1.15$, $p=0.254$. These findings suggest that neither gender nor religious affiliation has significant association with overall dietary behaviour among the respondents.

Table 8: Independent samples *t*-test and one-way analysis of variance results for total dietary behaviour score

Predictor	Group/category	Mean±SD	Test statistic [†]	<i>p</i> -value
Gender	Male	5.64±1.77	$t(206)=-1.82$	0.070
	Female	6.14±1.85		
Religion	Christianity	6.22±2.05	$t(104.26)=1.15$ [†]	0.254
	Islam	5.88±1.72		
Education	Tertiary	5.80±1.72	$F(3, 204)=3.23$	0.023* [§]
	Secondary	5.10±2.43		
	Basic	6.53±1.67		
	No formal (never attended school)	6.04±1.76		
Family history of diabetes	Yes	5.62±1.87	$F(2, 205)=2.21$	0.112
	No	6.20±1.86		
	Not sure	6.11±1.61		
Eating situation	Buy most meals	5.78±1.92	$F(3, 204)=5.77$	0.001**
	Prepare own meals	6.56±2.00		
	Family-prepared meals	6.13±1.68		
	Mixed outside/home	5.25±1.61		
Meal decision making	Me	6.31±1.94	$F(2, 205)=5.63$	0.004**
	Spouse	6.11±1.26		
	Other family member	5.39±1.71		
Reading nutrition labels	Never	5.65±1.78	$F(4, 203)=7.26$	<0.001***
	Rarely	5.46±1.76		
	Sometimes	6.19±1.96		
	Often	8.17±1.17		
	Always	7.14±1.27		

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

[†] For the independent samples *t*-tests, the unequal variances result was interpreted where Levene's test was significant. For the analysis of variance models with significant variance heterogeneity, robust tests (Welch/Brown–Forsythe) were also examined.

[†] For religion, Levene's test was significant, so the unequal variances result was used.

[§] Significant overall; robust tests suggest cautious interpretation.

SD, standard deviation.

One-way analysis of variance results

One-way analysis of variance was used to examine differences in total dietary behaviour score across education level, diabetes family history, eating situation, meal decision making, and frequency of reading nutrition labels.

There was a statistically significant difference in dietary behaviour score across education levels, $F(3, 204)=3.23$, $p=0.023$. Participants with basic education recorded the highest mean score (M=6.53, SD=1.67), while those with secondary education recorded the lowest (M=5.10, SD=2.43). However, because Levene's test indicated unequal variances and the robust Welch test was marginally non-significant ($p=0.056$), this result should be interpreted with caution. Tukey post hoc analysis showed that participants with basic education had significantly higher dietary behaviour scores than those with secondary education.

There was no statistically significant difference in dietary behaviour scores based on family history of diabetes ($F(2, 205)=2.21$, $p=0.112$), indicating that diabetes family history was not significantly associated with dietary behaviour in this sample.

Significant differences were observed across eating situations ($F(3, 204)=5.77$, $p=0.001$). Participants who reported preparing their meals most of the time had the highest dietary behaviour score (M=6.56, SD=2.00), while those who indicated sometimes buying meals outside and at other times eating meals prepared at home had the lowest score (M=5.25, SD=1.61). Post hoc analysis indicated that participants who prepared their own meals had significantly higher dietary behaviour scores than those who relied on a mixed outside–home eating pattern. In addition, participants whose meals were usually prepared by family members had significantly higher scores than those in the mixed eating group.

Participants' dietary behaviour also differed significantly according to who made meal decisions ($F(2, 205)=5.63, p=0.004$). Participants who admitted making their own meal decisions recorded the highest mean score ($M=6.31, SD=1.94$), whereas those who said meals could be decided by other family members recorded the lowest mean score ($M=5.39, SD=1.71$). Post hoc comparisons showed that participants who made their own meal decisions had significantly higher dietary behaviour scores than those whose meals were decided by other family members in this sample.

Finally, 'reading nutrition labels when shopping for food' indicated a strong and statistically significant association with dietary behaviour ($F(4, 203)=7.26, p<0.001$). Participants who admitted 'often reading nutrition labels' recorded the highest dietary behaviour score ($M=8.17, SD=1.17$), followed by those who reported that they 'always read labels' ($M=7.14, SD=1.27$), whereas those who admitted 'never or rarely reading labels' recorded the lowest scores ($M=5.65, SD=1.78$ and $M=5.46, SD=1.76$, respectively). Post hoc analysis further showed that participants who often or always read nutrition labels had significantly higher dietary behaviour scores than those who never or rarely read labels.

Overall, the inferential statistics results suggest that household food arrangements and nutrition label use were more strongly associated with dietary behaviour than basic sociodemographic characteristics such as gender, religion, and family history of diabetes.

Discussion

This study examined the dietary practices, food choices, nutrition-related knowledge, and overall dietary behaviour of adults with type 2 diabetes in the Wa Municipality of Ghana. The findings reveal that dietary behaviour among participants is shaped less by basic sociodemographic characteristics and more by household food arrangements, food access conditions, nutrition-related knowledge, and behavioural practices such as food label reading. Overall, while many participants indicated some positive dietary behaviours, important gaps remain in fruit consumption, carbohydrate monitoring, and practical application of nutrition knowledge.

The demographic profile of the participants showed that the majority were middle-aged adults, female, married, Muslim, had no family history of diabetes, and had low levels of formal education. This pattern is broadly consistent with population and health study participation trends reported in Ghana, where women are often more represented in health-related surveys, particularly in rural and northern regions where educational disparities remain pronounced²⁶⁻²⁸. Although education has been linked to better dietary practices and household dietary diversity²⁹, the study found only a modest and cautious association between education and total dietary behaviour score. Specifically, participants with basic education recorded higher dietary behaviour scores than those with secondary education. This finding should be interpreted cautiously because robust analysis of variance results were only marginally supportive. This suggests that formal education alone may not fully explain dietary management practices among people living with diabetes.

The descriptive findings on food choice determinants highlighted the importance of structural and household factors in shaping what people eat. Most participants reported that food choices were influenced by food availability, financial capacity, appetite, and advice from healthcare providers. These findings align with earlier studies from Ghana and other Sub-Saharan African settings

showing that dietary decisions among people with diabetes are strongly shaped by economic constraints, family dynamics, and the local food environment^{7,12,20}. The finding that about three-quarters of participants reported being influenced by nutrition advice from healthcare providers is particularly important, as it aligns with previous evidence on the value of nutrition counselling in diabetes and non-communicable disease management in Ghana and similar settings^{30,31}. At the same time, the fact that only about half of participants reported reliance on their own understanding of healthy diets points to persistent nutrition literacy gaps that may undermine effective dietary self-management.

The 24-hour dietary recall provides a useful snapshot of recent food consumption, although it does not represent habitual intake. Within the 24-hour recall period, a high proportion of participants reported consuming meat, poultry, and fish, while much lower proportions reported consuming eggs, other fruits, and healthy fats. The high proportion reporting intake of meat, poultry, and fish reflects the central role of animal-source foods in many Ghanaian diets³²⁻³⁴. However, the low proportion of participants reporting egg intake is notable and is consistent with previous studies suggesting that egg consumption in African contexts may be limited by cost concerns, cultural beliefs, or misconceptions about cholesterol^{35,36}. While eggs provide important nutrients^{37,38}, this study does not support strong emphasis on eggs as a priority dietary target, especially since the 24-hour recall was not designed to estimate nutrient adequacy over time.

Similarly, the reported intake of dark green leafy vegetables and vitamin A-rich fruits and vegetables should be interpreted cautiously, as a single 24-hour dietary recall does not provide sufficient evidence to assess long-term dietary adequacy or adherence to recommended guidelines. Nevertheless, the relatively low proportion of study participants reporting fruit consumption during the recall period, together with the low frequency of regular fruit intake observed in the dietary behaviour data, suggests that fruit consumption may remain suboptimal within the study population. This pattern aligns with broader evidence that fruit and vegetable consumption is often below recommended levels in low- and middle-income settings due to affordability, access, seasonality, and preference-related constraints³⁹⁻⁴¹.

The results indicated low levels of understanding of the glycaemic index, which carbohydrates raise blood sugar levels, and low prevalence of nutrition label reading. These findings suggest that although participants may receive advice from health professionals, many may not have sufficiently strong functional nutrition knowledge to translate that advice into day-to-day dietary choices. This is consistent with studies in Ghana showing gaps in diabetes-related nutrition literacy and food label use^{17,42}. It also helps explain why some participants expressed positive intentions or partial adherence to dietary guidelines, while still exhibiting suboptimal behaviours in carbohydrate checking and application of glycaemic knowledge.

The recoded dietary behaviour indicators and the total dietary behaviour score provide additional support for this interpretation. Although most participants were within the moderate dietary behaviour category, the item-level recoding showed clear imbalances. Healthy behaviours were more common for low consumption of sugary foods, sugary beverages, and fast foods, and for breakfast consumption and guideline adherence. In contrast, unhealthy behaviours were more common for weekly fruit intake, checking carbohydrate content, application of glycaemic index knowledge, and dinner timing. This suggests that

participants may be better at avoiding certain obviously 'unhealthy' foods than at consistently applying more technical aspects of diabetes dietary management such as carbohydrate awareness and structured dietary monitoring. In practical terms, this distinction matters because diabetes self-care is not only about avoiding overtly unhealthy foods, but also about routine dietary regulation, informed food selection, and sustained meal planning^{14,15,19}.

The inferential analysis indicated that gender, religion, and family history of diabetes were not significantly associated with total dietary behaviour score. This indicates that dietary behaviour in this sample may be less influenced by broad personal characteristics than by daily food practices and immediate meal decision contexts. This pattern partly contrasts with some previous Ghanaian studies that have linked dietary diversity and food behaviour to gender or educational differences^{29,43}, but it is also plausible in a diabetes clinic population where shared disease experience and access to the same health services reduce some sociodemographic differences.

Eating situation, meal decision making, and reading nutrition labels were significantly associated with total dietary behaviour score, and these findings are particularly important. Participants who prepared their own meals or consumed family-prepared meals had better dietary behaviour scores than those who combined home-prepared meals with outside meals. This suggests that greater control over meal preparation may support healthier dietary behavioural practices. Home-prepared meals may allow better portion control, ingredient choice, and alignment with medical advice, whereas meals purchased outside the home may be more likely to contain refined carbohydrates, less healthy fats, or have preparation methods that are less suitable for diabetes management. This finding is consistent with evidence that food environment and household-level decision structures strongly influence dietary quality in Ghanaian settings^{12,20,32}.

Meal decision making also emerged as significant, with respondents who made their own meal decisions reporting better dietary behaviour scores than those whose meals were decided by other family members. This suggests that autonomy over food choice may be an important component of diabetes dietary management. Where other family members control meals of diabetics, the dietary needs of people with diabetes may be subordinated to household preferences, financial pressures, or customary meal patterns. This finding also resonates with Ghanaian evidence that household decision-making power is associated with dietary quality²⁹.

Among all the significant predictors, reading nutrition labels showed one of the strongest associations with total dietary behaviour score. Participants who often or always read nutrition labels indicated substantially higher dietary behaviour scores than those who never or rarely did so. This finding suggests the importance of food literacy in diabetes self-management and aligns with previous literature showing that nutrition label use is associated with healthier food selection and better diet quality⁴⁴⁻⁴⁶. However, the study also found that most participants never read nutrition labels, which suggests that this beneficial practice is not yet widespread. In this context, interventions that improve nutrition label comprehension, especially for individuals with limited formal education, may be particularly valuable. At the same time, caution is warranted, because reading a label does not necessarily imply full comprehension, and functional nutrition literacy may vary substantially even within the same education group^{17,42}.

Taken together, the findings suggest that the most relevant levers for improving dietary behaviour in this sample are not only clinical advice and general awareness, but also practical supports that help respondents act on that knowledge in everyday settings. These include promoting fruit accessibility, simplifying carbohydrate guidance, encouraging household support for diabetes-friendly meal preparation, and improving nutrition label literacy. In the Wa Municipality, where affordability and food availability remain important determinants of food choice, dietary interventions are likely to be most effective when they are culturally appropriate, household-sensitive, and responsive to local food realities.

Implications for health practice

The findings of this study have several implications for diabetes care and community nutrition practice in the Wa Municipality. First, nutrition counselling needs to place greater emphasis on practical, behaviour-oriented guidance, particularly around fruit intake, carbohydrate checking, meal planning, and application of glycaemic knowledge. Second, because household food arrangements and meal decision making were associated with dietary behaviour, diabetes education should target spouses and key family members as well as those with diabetes, where possible. Third, the strong association between nutrition label reading and better dietary behaviour suggests the need for interventions that improve food label literacy, including how to interpret package nutrition information. Finally, because financial capacity and food availability were major determinants of food choice, public health strategies should move beyond education and support improved access to affordable, diabetes-appropriate foods in local markets and retail environments.

Limitations

The study has some limitations that should be considered when interpreting the findings. First, the 24-hour dietary recall captured only foods consumed within the previous day and therefore provides a snapshot of only recent intake, not habitual dietary patterns. Second, all dietary data were self-reported and may be subject to recall error or social desirability bias, particularly for foods perceived as unhealthy. Third, the cross-sectional design does not allow causal inferences to be made about the relationships observed between dietary behaviour and its associated factors. Finally, the sample was predominantly female, which may limit the generalizability of the study findings across all adults with type 2 diabetes in the municipality.

Future research recommendations

Longitudinal design may be employed in future research to establish causal relationships between dietary decisions and health outcomes. More objective dietary assessment instruments, like food frequency questionnaires that have been validated for Ghanaian populations, should be included to increase accuracy. A comparative study may be conducted to emphasize regional and cultural dietary differences. Evidence for scaling up beneficial solutions may also come from intervention-based research that assess the efficacy of media campaigns, nutrition education, and food labelling regulations.

Conclusion

The study showed that adults with type 2 diabetes in the Wa Municipality demonstrated predominantly moderate overall dietary behaviour, with notable strengths in limiting sugary foods, sugary beverages, and fast foods, but important weaknesses in fruit intake, carbohydrate monitoring, and application of glycaemic knowledge. Food choices were shaped by affordability, food

availability, appetite, and advice from healthcare providers. While gender, religion, and family history of diabetes were not found to be significantly associated with dietary behaviour, household food arrangements, meal decision making, and reading nutrition labels were important correlates of healthier dietary behaviour. These findings reveal the need for diabetes nutrition interventions that move beyond general advice to include practical food literacy, household involvement, and context-specific strategies that reflect the everyday realities of food access and meal preparation in the Wa Municipality.

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References

- 1 Saeedi P, Petersohn I, Salpea P, Malanda B, Karuranga S, Unwin N, et al. Global and regional diabetes prevalence estimates for 2019 and projections for 2030 and 2045: results from the International Diabetes Federation Diabetes Atlas. *Diabetes Research and Clinical Practice* 2019; **157**: 107843. <https://doi.org/10.1016/j.diabres.2019.107843> <https://www.ncbi.nlm.nih.gov/pubmed/31518657>
- 2 World Health Organization. *The state of food security and nutrition in the world 2023*. Rome, Italy: Food and Agriculture Organization, 2023.
- 3 Anushree V, Jha DK, Bhattacharjee S. Global trends and burden of diabetes: a comprehensive review of global insights and emerging challenges. *Current Journal of Applied Science and Technology* 2025; **44(7)**: 134–150. <https://doi.org/10.9734/cjast/2025/v44i74580>
- 4 Zheng Y, Ley SH, Hu FB. Global aetiology and epidemiology of type 2 diabetes mellitus and its complications. *Nature Reviews Endocrinology* 2018; **14(2)**: 88–98. <https://doi.org/10.1038/nrendo.2017.151> <https://www.ncbi.nlm.nih.gov/pubmed/29219149>
- 5 Popkin BM, Corvalan C, Grummer-Strawn LM. Dynamics of the nutrition transition: the global obesity epidemic and rising diabetes. *The Lancet Diabetes and Endocrinology* 2020; **8(4)**: 282–292.
- 6 World Health Organization (WHO). *Healthy diet*. Geneva, Switzerland: WHO, 2020. <https://www.who.int/news-room/fact-sheets/detail/healthy-diet> (Accessed 4 March 2025).
- 7 Pastakia SD, Pekny CR, Manyara SM, Fischer L. Diabetes in sub-Saharan Africa – from policy to practice to progress: targeting the existing gaps for future care for diabetes. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy* 2017; **10**: 247–263. <https://doi.org/10.2147/DMSO.S126314> <https://www.ncbi.nlm.nih.gov/pubmed/28790858>
- 8 Narh CT, Sarfo-Kantanka O, Owusu D, Sarfo FS, Ansah EO. Trends in diabetes hospitalizations in Ghana. *International Health* 2022; **14(6)**: 588–596.
- 9 Grijalva-Eternod CS, Sedzro KM, Adjaye-Gbewonyo K, Kushitor SB, Lule SA, Kushitor MK, et al. Community-based assessment of diabetes prevalence and risk factors in Ga Mashie, Accra, Ghana: the CARE Diabetes community-based survey. *medRxiv* 2024. [preprint]

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Data availability

The datasets used/analysed that support the findings of this study are available upon reasonable request to the corresponding author.

<https://doi.org/10.1101/2024.03.15.24304379>

10 Ghana Health Service. *Ghana STEPS report 2023: nationwide non-communicable diseases risk factors assessment using the World Health Organization STEP-wise approach in Ghana*. Accra, Ghana: Ghana Health Service/World Health Organization, 2024.

11 Doherty ML, Owusu-Dabo E, Kantanka OS, Brawer RO, Plumb JD. Type 2 diabetes in a rapidly urbanizing region of Ghana, West Africa: a qualitative study of dietary preferences, knowledge and practices. *BMC Public Health* 2014; **14(1)**: 1069. <https://doi.org/10.1186/1471-2458-14-1069> <https://www.ncbi.nlm.nih.gov/pubmed/25312471>

12 Hushie M. Exploring the barriers and facilitators of dietary self-care for type 2 diabetes: a qualitative study in Ghana. *Health Promotion Perspectives* 2019; **9(3)**: 1–23. <https://doi.org/10.15171/hpp.2019.31> <https://www.ncbi.nlm.nih.gov/pubmed/31508343>

13 Sanuade OA, Okoibhole LO, Dankyi EK, Strachan D, Baatiema L, Kushitor SB, et al. Three lessons on diabetes for global health professionals, researchers and policy-makers from the people of Ga Mashie. *Frontiers in Nutrition* 2025; **12(5)**: 1534450. <https://doi.org/10.3389/fnut.2025.1534450> <https://www.ncbi.nlm.nih.gov/pubmed/40161298>

14 Salvia MG, Quatromoni PA. Behavioral approaches to nutrition and eating patterns for managing type 2 diabetes: a review. *American Journal of Medicine Open* 2023; **9**: 100034. <https://doi.org/10.1016/j.ajmo.2023.100034> <https://www.ncbi.nlm.nih.gov/pubmed/39035058>

15 Alrasheedday AM, Alshammari HS, Alshammari B, Alkubati SA, Llego JH, Alshammari AD, et al. Perceived barriers to healthy lifestyle adherence and associated factors among patients with type 2 diabetes mellitus: implications for improved self-care. *Patient Preference and Adherence* 2024; **18**: 2425–2439. <https://doi.org/10.2147/PPA.S432806> <https://www.ncbi.nlm.nih.gov/pubmed/39654628>

16 Ayele AA, Emiru YK, Tiruneh SA, Ayele BA, Gebremariam AD, Tegegn HG. Level of adherence to dietary recommendations and barriers among type 2 diabetic patients: a cross-sectional study in an Ethiopian hospital. *Clinical Diabetes and Endocrinology* 2018; **4(1)**: 21–36. <https://doi.org/10.1186/s40842-018-0070-7> <https://www.ncbi.nlm.nih.gov/pubmed/30519484>

- 17** Opoku-Addai K, Korsah KA, Mensah GP. Nutritional self-care practices and skills of patients with diabetes mellitus: a study at a tertiary hospital in Ghana. *PLOS One* 2022; **17**(3): 656–672. <https://doi.org/10.1371/journal.pone.0265608> <https://www.ncbi.nlm.nih.gov/pubmed/35320308>
- 18** Albadri AME, Al-Diwan JK. Effect of carbohydrate intake on glycemic control among adult patients with type 2 diabetes mellitus attending diabetes and endocrine diseases center in Babel, 2022. *Medical Journal of Babylon* 2023; **20**(1): 41–47. https://doi.org/10.4103/MJBL.MJBL_210_22
- 19** Al-Adwi ME, Al-Haswsa ZM, Alhmmadi KM, Eissa YA, Hamdan A, Bawadi H, et al. Effects of different diets on glycemic control among patients with type 2 diabetes: a literature review. *Nutrition and Health* 2023; **29**(2): 215–221. <https://doi.org/10.1177/02601060221112805> <https://www.ncbi.nlm.nih.gov/pubmed/35795964>
- 20** Mogre V, Johnson NA, Tzelepis F, Paul C. Barriers to diabetic self-care: a qualitative study of patients' and healthcare providers' perspectives. *Journal of Clinical Nursing* 2019; **28**(12): 2296–2308. <https://doi.org/10.1111/jocn.14835> <https://www.ncbi.nlm.nih.gov/pubmed/30791160>
- 21** Atuahene M, Quarshie F, Gorleku PN, Taylor R, Gorleku MO, Eshun D, et al. Nutritional diet knowledge and barriers to dietary recommendations adherence among diabetic patients in Central Region, Ghana: a cross-sectional study. *Health Science Reports* 2025; **8**(2). e70510. <https://doi.org/10.1002/hsr.2.70510> <https://www.ncbi.nlm.nih.gov/pubmed/39995797>
- 22** Glago P, Adjei-Frimpong A, Amisssah AA. Dietary diversity of fathers and their families in Ghana: a case in Mankessim in the Mfantseman Municipality. *American Journal of Food Science and Health* 2021; **7**(1): 6–13.
- 23** Boateng MA, Agyei-Baffour P, Angel S, Enemark U. Translation, cultural adaptation and psychometric properties of the Ghanaian language (Akan; Asante Twi) version of the Health Literacy Questionnaire. *BMC Health Services Research* 2020; **20**(1): 1064–1078. <https://doi.org/10.1186/s12913-020-05932-w> <https://www.ncbi.nlm.nih.gov/pubmed/33228648>
- 24** Kennedy G, Ballard T, Dop MC. *Guidelines for measuring household and individual dietary diversity*. Rome, Italy: Food and Agriculture Organization, 2010.
- 25** Institute of Medicine. *Dietary reference intakes: applications in dietary assessment*. Washington, DC: National Academies Press, 2000.
- 26** Ghana Statistical Service. *2021 population and housing census: General report, volume 3D–literacy and education*. Accra, Ghana: Ghana Statistical Service, 2021. <https://census2021.statsghana.gov.gh/gssmain/fileUpload/reportthemesub/2021> PHC General Report Vol 3D_Literacy and Education.pdf (Accessed 1 June 2025).
- 27** Ghana Statistical Service, Ghana Health Service, ICF. *Ghana demographic and health survey 2022*. Accra, Ghana: Ghana Statistical Service, Ghana Health Service and ICF, 2022. <https://www.dhsprogram.com/pubs/pdf/FR387/FR387.pdf> (Accessed 3 February 2026).
- 28** Nasage NN. Influence of demographic factors on individual's investment decisions in Wa Municipality, the Upper West Region of Ghana. *Texila International Journal of Management* 2019; **5**(2): 197–211. <https://doi.org/10.21522/TIJMG.2015.05.02.Art020>
- 29** Wiafe MA, Apprey C, Annan RA. Dietary diversity and nutritional status of adolescents in rural Ghana. *Nutrition and Metabolic Insights* 2023; **16**: 11786388231158487. <https://doi.org/10.1177/11786388231158487> <https://www.ncbi.nlm.nih.gov/pubmed/36923452>
- 30** Evert AB, Dennison M, Gardner CD, Garvey WT, Lau KHK, MacLeod J. Nutrition therapy for adults with diabetes or prediabetes: a consensus report. *Diabetes Care* 2019; **42**(5): 731–754. <https://doi.org/10.2337/dci19-0014> <https://www.ncbi.nlm.nih.gov/pubmed/31000505>
- 31** Chrvala CA, Sherr D, Lipman RD. Diabetes self-management education for adults with type 2 diabetes mellitus: a systematic review of the effect on glycemic control. *Patient Education and Counseling* 2016; **99**(6): 926–943. <https://doi.org/10.1016/j.pec.2015.11.003> <https://www.ncbi.nlm.nih.gov/pubmed/26658704>
- 32** Mingle CL, Darko G, Asare-Donkore. NK Borquaye LS, Woode E. Patterns in protein consumption in Ghanaian cities. *Scientific African* 2021; **11**. <https://doi.org/10.1016/j.sciaf.2020.e00684> e00684.
- 33** Mensah DO, Nunes AR, Bockarie T, Lillywhite R, Oyeboode O. Meat, fruit, and vegetable consumption in sub-Saharan Africa: a systematic review and meta-regression analysis. *Nutrition Reviews* 2021; **79**(6): 651–692. <https://doi.org/10.1093/nutrit/nuaa032> <https://www.ncbi.nlm.nih.gov/pubmed/32556305>
- 34** Mingle CL, Darko G, Asare-Donkor NK, Borquaye LS, Woode E. Patterns in protein consumption in Ghanaian cities. *Heliyon* 2021; **7**(1): e05959. <https://doi.org/10.1016/j.sciaf.2020.e00684>
- 35** Akinyemi O, Oyediran O, Adebayo A. Egg consumption patterns, perceptions, and nutritional contribution in Nigeria. *Food and Nutrition Bulletin* 2017; **38**(2): 223–231.
- 36** Abive-Bortsi M, Baidoo ST, Amiteye S. Assessment of consumers' perception of chicken eggs consumption and associated health implications in the Volta Region of Ghana. *Nutrition and Metabolic Insights* 2022; **15**(18): 1–12. <https://doi.org/10.1177/11786388221118872> <https://www.ncbi.nlm.nih.gov/pubmed/36003154>
- 37** Puglisi MJ, Fernandez ML. The health benefits of egg protein. *Nutrients* 2022; **14**(14): 2904. <https://doi.org/10.3390/nu14142904> <https://www.ncbi.nlm.nih.gov/pubmed/35889862>
- 38** Réhault-Godbert S, Guyot N, Nys Y. The golden egg: nutritional value, bioactivities, and emerging benefits for human health. *Nutrients* 2019; **11**(3): 684. <http://doi.org/10.3390/nu11030684> <https://www.ncbi.nlm.nih.gov/pubmed/30909449>
- 39** Aune D, Giovannucci E, Boffetta P, Fadnes LT, Keum N, Norat T, et al. Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality: a systematic review and dose–response meta-analysis. *International Journal of Epidemiology* 2017; **46**(3): 1029–1056. <https://doi.org/10.1093/ije/dyw319> <https://www.ncbi.nlm.nih.gov/pubmed/28338764>
- 40** Mustafa S, Haque CE, Bakshi S. Low daily intake of fruits and vegetables in rural and urban Bangladesh: influence of socioeconomic and demographic factors, social food beliefs and behavioural practices. *Nutrients* 2021; **13**(8).

<https://doi.org/10.3390/nu13082808>

<https://www.ncbi.nlm.nih.gov/pubmed/34444968>

41 Awuni TK, Kye-Duodu G, Duodu C, Zotor FB, Ellahi B. Knowledge and determinants of fruit and vegetable consumption among adults in Hohoe Municipality, Ghana. *Food Science and Nutrition Studies* 2018; **2(1)**: 1–10.

<https://doi.org/10.22158/fsns.v2n1p1>

42 Asalu G, Axame W, Letsa C, Laar A, Aryeetey R. Food label literacy among urban dwelling households in Ghana. *Food and Humanity* 2024; **2(4)**: 104–119.

<https://doi.org/10.1016/j.foohum.2024.100312>

43 Amoateng AY, Doegah PT, Udombos C. Socio-demographic factors associated with dietary behaviour among young Ghanaians aged 15–34 years. *Journal of Biosocial Science* 2017; **49(2)**: 187–205.

<https://doi.org/10.1017/S0021932016000456>

<https://www.ncbi.nlm.nih.gov/pubmed/27641949>

44 Miller LMS, Cassady DL. The effects of nutrition knowledge on food label use: a review of the literature. *Appetite* 2015; **92**: 207–216.

<https://doi.org/10.1016/j.appet.2015.05.029>

<https://www.ncbi.nlm.nih.gov/pubmed/26025086>

45 Christoph MJ, Ellison B. A cross-sectional study of the relationship between nutrition label use and food selection, servings, and consumption in a university dining setting. *Journal of the Academy of Nutrition and Dietetics* 2017; **117(10)**: 1528–1537.

<https://doi.org/10.1016/j.jand.2017.01.027>

<https://www.ncbi.nlm.nih.gov/pubmed/28330728>

46 Nogueira LM, Thai CL, Nelson W, Oh A. Nutrition label numeracy: disparities and association with health behaviors. *American Journal of Health Behavior* 2016; **40(4)**: 427–436.

<https://doi.org/10.5993/AJHB.40.4.4>

<https://www.ncbi.nlm.nih.gov/pubmed/27338989>

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