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Generational shifts in food practices: Cooking techniques, quality, and unhealthy ingredient intake and their influence on type 2 diabetes development among ethnic minorities in London

Arif Ahmed [a,b,*], Amalia Tsiami [a], Hafiz T.A. Khan [c]

[a] London Geller College of Hospitality and Tourism, University of West London, London, UK
[b] Department of Health and Social Care, Arden University, London, UK
[c] Public Health Group, University of West London, London, and Oxford Institute of Population Ageing, The University of Oxford, UK

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ABSTRACT

Introduction: Changing dietary habits can be attributed to health psychology model within the wider determinants of life model. Unhealthy dietary habits of immigrants at the host country leads to higher risk in developing long term conditions. Our previous study reported that the first-generation ethnic minority immigrants who live in the UK consume less fruits and vegetables than the second and third generation. However, it is not known how these people who live in London prepare their food, which affects nutritional value and health. The aim of the study is to examine the habits and views of immigrants in London related to dietary habits and food practices and perception of how this affects type-2 diabetes risk.

Methods: Qualitative data were gathered conducting semi-structured interviews from 20 South Asian, African, and Caribbean adults in between November 2023 and January 2024, representing the three generations of each population. Thematic analysis was used to analyse the data.

Results and discussion: The first-generation older people consume more homemade food; however, their cooking methods include high fat and frying. On the contrary, the younger first generation consume hybridized food, whereas the 3rd generation emphasized healthy choices and balanced diet. High nutritional quality ingredients are used more by the 3rd generation, emphasizing their value to healthy ingredients and health awareness. Whereas the older first-generation people believe diabetes was attributed to divine will. Policymakers need to consider interventions appropriate to diverse ethnicity and generational differences to improve healthy food practices and reduce health inequalities within ethnic minority groups.

1. Introduction

Migration mainly occurs in industrialised countries (Martin, 1996), as people migrate to another country to earn and live, usually from developing countries (Bennett et al., 2011; Holmboe-Ottesen and Wandel, 2012; Ochieng, 2013). The number of ethnic minorities increases from 1960s up to 2006 in the UK mainly due to high immigration and high fertility rate of immigrants than the national average of the host country (Coleman and Dubuc, 2010; Moridian et al., 2024). More than 98 % of those ethnic minority people, especially Bangladeshi, Pakistani and Black African, live in London (Trend, 2021). Those ethnic minorities have a 2 to 4 times higher risk of developing T2D than Caucasians due to their genetic predisposition and their dietary and lifestyle habits (Ahmed et al., 2023; Diabetes, 2019). Thus, increased ethnic minority people in the UK, especially in London can concern in health services (Stanaway et al., 2020). The health concern regarding diabetes demands urgent priority in this ethnic minority group in the UK as more than half of the T2D cases are preventable or can be delayed through healthy diet and lifestyle (Diabetes, 2019; Holman et al., 2011).

The theoretical basis of the current study is the COM-B model (Fig. 1). This model is considered to explore elements of change of food habits and map why people over the generations change their behaviour and the implementation of the required changes to reduce the risk of T2D in South Asian, African and Caribbean people in London. The COM-B theoretical framework showed the system or pathways and how their capability, available opportunity and motivation change a person's

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* Corresponding author. University of West London, St Marys' Road, W5 5RF, London, UK.
E-mail addresses: arif.ahmed.su@gmail.com, arifahmed@arden.ac.uk (A. Ahmed).

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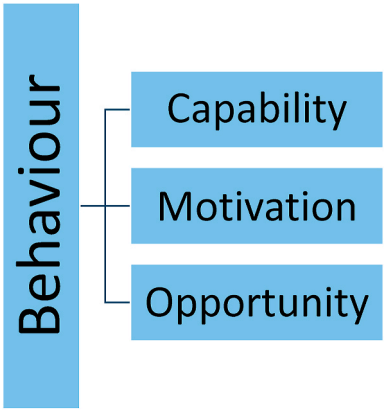

Fig. 1. COM-B model has three elements that provides a structured approach to understand how food practices influence type 2 diabetes development (Michie et al., 2011).

behaviour such as the risk factors/protective factors of diabetes like cooking style, cooking methods, food/ingredients choice, maintenance of ingredients' quality, and so on. Capability considers lack of health knowledge, healthy diet, and decision-making capability, physical strength or ability (Carney et al., 2016). In more detail, the COM-B framework is available at Michie et al. (2011).

Opportunity includes social support, environmental feasibility of resources, healthier and cheaper food availability and time availability (Carney et al., 2016; Moore et al., 2019; Olaya-Contreras et al., 2019; Patel et al., 2012). Motivational factors to change lifestyle in different generations include, for example, acculturation influences lifestyle changes, such as dietary choices with more fruits & vegetables, to change cooking methods, such as avoiding fried and spicy foods. Motivation includes cultural identity, family celebrations, food choices, cooking style, and self-motivation to prefer specific food and drinks, typical cooking style, smell, taste and flavour (Patel et al., 2012; Moore et al., 2019; Olaya-Contreras et al., 2019).

In more detail, the COM-B framework is available at Michie et al. (2011).

Dietary habits are dynamic and are influenced by individual choice, health benefits, and culture, where people grow and live for a long time (Pieroni et al., 2007; Lillekroken et al., 2024). First-generation migrants tend to maintain stronger ties with their country of origin, including extended periods of residence and dietary habits that involve the consumption of vegetable varieties native to their homeland. Immigrants think consuming such vegetables and following a traditional cooking style strengthens their cultural identity (Pieroni et al., 2007; Vinitchagoon et al., 2024). However, second-generation migrants who grow up and live in the host country are likely to follow the host country's way of life, e.g. cooking style (Pieroni et al., 2007).

Cooking styles, and choice of ingredients are different in South Asian, African and Caribbean people from the locals even though they are living in same host country. First generation people consume low fruits and vegetables and maintain their traditional cultural food behaviour, however, second and third generation people consume mixed foods as they are accustomed to the Western lifestyle (Gilbert and Khokhar, 2008; Ahmed et al., 2023). This behaviour was observed in other countries for the first-generation migrants such as in Netherlands where South-Asian Surinamese consumed high amounts of rice (staple food), and chicken, however, demonstrated a significant reduction on red meat and vegetables consumption (Gilbert and Khokhar, 2008). During the acculturation period they did not demonstrate any difference in fruits consumption, however there was an increase in fish and chicken consumption; as well as an increase in consumption of potato, pasta, and red meat (Gilbert and Khokhar, 2008). South Asian people in Australia maintained traditional food practices in relation to staple foods, and reluctant to change cultural food as they are closer to their culture (Gupta et al., 2018).

South Asians, African and Caribbeans in Europe consume more processed foods with high energy, fat, sugar and salt (Gilbert and Khokhar, 2008). A qualitative study on South-Asian Refugees in USA observed an increased meat consumption upon their resettlement ($P < 0.05$) (Dharod, 2015). The improved economic status of refugees increases the odds of consuming different types of meat. Shift in food choices towards meat consumption increases the likelihood of poor health in them (Dharod, 2015). Alternative to this diet native people consume healthy diet like fruits, vegetables, grains and nuts (Gilbert and Khokhar, 2008).

South Asian immigrants in Western countries show decreased energy intake with acculturation and generational shifts, lower protein and monounsaturated fat intake, however the trend is not consistent for all immigrants (LeCroy and Stevens, 2017).

Quality of life depends on nutrition, and nutritional sustainability depends on dietary habits and cooking process, which is modified by physiological, psychological and social changes over the life-course (Yannakoulia et al., 2018; Karavelioglu et al., 2024). Inadequate micronutrients, energy and protein intake are common in older people due to their food choices; and the quality of life of older people is affected by their nutrition intake level that would result in increasing the risk to develop T2D (Yannakoulia et al., 2018; Jin et al., 2021). This might be one of the mechanisms to increase the risk of T2D as the age increases.

The current literature lacks detailed understanding of food quality, food preparation, cooking styles, and food choices across generations and awareness of their relationship to T2D risk in the specific ethnic minority groups of interest in London. Research based on the above gap over the three generations will lead to a better understanding and contribute to developing knowledge in the selected research area. This gap is supported by Wang and Li (2019) with a recommendation for further research on "the complex mechanisms of generational transition in health behaviours".

The preceding discussion indicates a need for further research on the identified research. The choice of dietary habits might be related to their awareness on the effect of dietary habits on T2D. In this essence, the researcher aimed to conduct a qualitative investigation with the following specific objectives:

(i) To explore the food preparation and cooking methods used across three generations of ethnic minority people in London.
(ii) To compare perceptions of ingredient quality and nutritional value across these generations.
(iii) To explore their sources of food like homemade versus takeaway food in the diets of participants. And
(iv) To investigate participants' awareness of the links between their food practices and T2D development.

2. Methods

2.1. Study population

Data were collected using semi-structure interview from three generations who do not have T2D, except two participants who belong to older 1st generation Bangladeshi and Caribbean. Non-diabetic respondent was preferable in data collection as a diagnosis may influence their dietary habits, however, it was challenging to identify participants for the older first-generation in these two ethnic groups. In any way, the data were collected from diabetic patients about regarding their dietary and lifestyles habits managed before the diagnosis of diabetes and after the diagnosis of diabetes. Data collection from diabetic patients provided additional information to explore dietary management before and after diagnosis. Even though there might have recall bias as both of them suffered from T2D for couple of years. Thus, selection of diabetic

patients will not affect our results based on data regarding dietary and lifestyle habits managed by non-diabetic respondents, rather, it will provide extra benefits to discuss lifestyle change after diagnosis of T2D. The participants were adult people of South Asian, African and Caribbean (see Table 1 as the respondents were from most of the ethnic minority groups. Moreover, respondents were selected from diverse geographical location from almost all areas of London, and maintained diversity of age, generation, and broad ethnic groups. Which demonstrates representativeness of the results of the sample for these ethnic minority people. First generation people were identified as those who immigrated to UK in around 1955–1975 and aged 65+ years. The rationale for selecting first-generation older participants is to enable meaningful comparisons with second- and third generation, as all groups have resided in the same environment for a long period. Because these people are the oldest alive first-generation respondents who are available to conduct interviews. Older first-generation migrants who immigrated long term ago and have received long acculturation in the host country. This means they got social influence on their diet and lifestyle over a long period compared to the younger first generation, who received only 3 years acculturation or social influence to change their diet and lifestyle in the host country.(see Tables 2–6)

This study collected data from younger first-generation ethnic minority adults aged under 35 years who immigrated within 3 years prior to interview. As the younger first generation belongs to the millennial who may have different characteristics than older first-generation who belong to baby Boomers or Gen X.

Second generation people were defined as those who were born in the UK and aged 32–60 years. Finally, third generation people were considered as those who born in the UK, aged 18–30 years, and at least one parent of them was born in UK. Data were collected through semi-structured interviews using a convenience and snowball sampling technique (Naderifar et al., 2017) to access ethnic adults living in London. In convenience and snowball sampling technique interviews were conducted among a few students from University of West London who belong to younger first generation and 3rd generation. After that information about the study population, study aims, inclusion and exclusion criteria, interview procedure, time, location, participants' responsibility, their risk etc., were explained to them. Respondents were given flexibility of interview time and location according to their convenient time and location. They are also informed that respondents can withdraw from this study at any time. Data security and privacy were discussed mentioning the data protection Act 2018. The initial participants were asked to give information about other respondents who satisfy the study population criteria and belong to either the first or second or 3rd generation. During data collection respondents were selected, no more than one person from a single household and almost from all areas of London. Thus, the respondents are selected with the help of initially interviewed respondents at their convenient time and location to conduct interviews.

2.2. Study sample, data collection and data analysis method

Semi-structured interviews were conducted with 20 adults who can speak in English. The sample size in qualitative research depends on the type of study. Commonly, in descriptive method ideally at least 20 participants are suggested (Creswell and Creswell, 2023, p. 198). Ethical approval (id no. UWL/REC/SHT-01111) was taken from University of West London. Thematic analysis was used to analyse the data using the six steps: "familiarising yourself with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report/manuscript" (Kiger and Varpio, 2020; Braun and Clarke, 2022). Thematic analysis was used as the focus on

Table 1
Background characteristics of the sample ethnic minority adults over three generations in London.

Respondents	Ethnicity	Ethnic country of origin	Generation	Respondents' acronyms	Gender	Immigration Year for 1st generation	Age (Years)	Living area	Non-diabetic
1	South Asian	Bangladesh	Younger1st	G1YB	Male	2022	27	White Chapel	Yes
2	South Asian	Bangladesh	Older1st	G1OB	Male	1961	80	Brick lane	No
3	South Asian	Bangladesh	2nd	G2B	Male	Born in UK	37	White Chapel	Yes
4	South Asian	Bangladesh	3rd	G3B	Female	Born in UK	24	Canary Warf	Yes
5	South Asian	India	Younger 1st	G1YI	Male	2022	26	Westham	Yes
6	South Asian	India	Older 1st	G1OI	Female	1975	65	Southall	Yes
7	South Asian	India	2nd	G2I	Male	Born in UK	57	Leyton	Yes
8	South Asian	Indian	3rd	G3I	Male	Born in UK	22	West Ham	Yes
9	South Asian	Pakistan	Younger 1st	G1YP	Male	2020	32	Manor Park	Yes
10	South Asian	Pakistan	Older 1st	G1OP	Male	1968	81	Heathrow	Yes
11	South Asian	Pakistan	2nd	G2P	Male	Born in UK	32	Hackney Marshes	Yes
12	South Asian	Pakistan	3rd	G3P	Male	Born in UK	27	West Ham	Yes
13	African	Nigeria	Younger 1st	G1YA	Female	2022	26	Ealing Broadway	Yes
14	African	Nigeria	Older1st	G1OA	Male	1973	80	Elephant and Castle	Yes
15	African	Nigeria	2nd	G2A	Male	Born in UK	60	Woolwich	Yes
16	African	Nigeria	3rd	G3A	Male	Born in UK	24	Camberwell	Yes
17	Caribbean	Jamaica	Younger 1st	G1YC	Female	2021	20	Southall	Yes
18	Caribbean	Jamaica	Older 1st	G1OC	Female	1979	67	South London	No
19	Caribbean	Dominica	2nd	G2C	Female	Born in UK	58	South Hall	Yes
20	Caribbean	Jamaica	3rd	G3C	Female	Born in UK	21	Hanwell	Yes

Table 2
Food preparation/preservation strategies practiced in different ethnic generations.

Themes	Sub-themes	Observation or quotes from the interviews
Food preparation/ preservation strategies	Dried or smoked preservation method	G1Y: People cannot apply the traditional way to preserve food in the UK, rather choose refrigeration. E.g., G1YA reported "….. *majority of the meat we have in Nigeria is either it is smoked or it is dried …. but there is also fresh red meat available, but majority that happens in my home because we buy in bulk like half of a cow or one for like one quarter of a bigger, to preserve it, we either dry it or we smoke it …..So another thing I do right now is maybe during the weekend when I have time, I cook in bowls and I just store them in the fridge. So, within the week I can just eat ……*". G1O: Cook for couple of days and preserve in the fridge. E. g., G1OP reported "*My wife mostly cook. Sometimes she cook ….for maybe two days and preserve in fridge. Otherwise, daily fresh food.*". G3B reported " ….*I will buy enough then put it in the freezer and then plan in my ahead meals. That I could be cooking. Throughout the week or even if it's within the month …..*".
	Awareness about hygiene maintenance and nutrient loss in preservation stage	G1Y: Not typical of hygiene maintenance properly. G1O: Not typical of hygiene maintenance properly. G2: Not typical of hygiene maintenance properly. Better hygiene practice is revealed in 3rd generation. E. g., G3C reported *"So first I of course wash my hands before I start preparing any food. and I also wash my vegetables and meats to remove dirt and pesticides. This is very crucial for like preparing food. I also to store, I make sure to store foods properly, such as just keeping cold foods cold and sealing them to prevent nutrition loss …."*.

identifying, analyzing, and interpreting patterns of meaning (themes) within qualitative data, the aim is to find out the awareness that participants have and the ways that they are using ingredients and recipes. The data analysis procedure starts with transcribing the audio-recorded data using transcribe option available in Microsoft word. Next, the author listens to the audio recording and transcribed data of the conducted interviews to cross-check whether the transcription has been made correctly or not. Then, the transcribed data were read several times to familiarise with data and to understand the common points to code the data. Coding was generated in a combination of both inductive and deductive coding approaches. After coding the data, the author again and again read the codes to identify the relevant themes based on the research questions. The author (AA) identified the themes across the generations and contextualised for each generation separately where appropriate (if need or have different trend).

Table 3
Cooking methods used in different ethnic generations.

Themes	Sub-themes	Observation or quotes from the interviews
Theme 2: Habit of cooking	Over-cooking ingredients	G1Y: Boil vegetables, overcooked vegetables. E.g., G1YC reported "*So when it comes to the vegetables, we cook them properly ….Some people like overcooked. Some people like medium cooked, some people don't like to cook them. Some people just eat it. … I like it overcooked*". G1O: Vegetables cooked. E.g., G1OA reported "*We cook some vegetables …*". G2: Boil vegetables, low heat, however, some said overcooked vegetables. E.g., G2I reported "*One week ago I cooked myself and I cooked it in olive oil and on the low, very low heat. And covered it up with vegetables, different types of vegetables with garlic, fruit, ginger and basically just cooked it ….*". **G2A** reported "*The vegetables are first of all cut into pieces, then soaked in hot water and left there, then squeezed, then cooked again. So it is overcooked ….*". G3: Boil potatoes, avoid overcooked vegetables. E.g., G3P reported " ….*a lot of vegetable …. like both salad and cook*".
	Traditional Frying to healthy alternatives	G1Y: Traditional frying method like with oil on a pan/saucepan; red meat grill or fry chicken. E.g., G1YB reported "… *Asian, we would like to have fish ….Sometime we fried with onions. And like some spice, ….*". G1YC reported "*there is some people that fry vegetables. We normally fry …. … We can also do fried chicken with no sauce ….*". G1O: Traditional frying method. E.g., G1OC reported "… *if you are frying the chicken, now you have to have plenty of oil to fry it.*". G2: Fried using air fryer, which is better in terms of health benefits than the traditional frying method. E.g., G2I reported "… *We've cut down fried food ….we've invested in a hundred*150 lbs *in air fryer. …. we're saved from frying and the older you know process wins …. It's really good. Yeah.*". G3: Shallowed fry because healthy; bake and roast. E.g., G3B reported "… Fish also so far shallow fry or put the fish in the oven like a seabass. I then have that with a salad, French dressing, croutons, loads of spinach, and yes, a good intake of greens".
	Patterns and habits of raw vegetable consumption	G1Y: Sometimes salad. E.g., G1YB reported "*Like vegetable, sometime I made salad …. It's like tomato …. cucumber, coriander mix and I made salad.*". G1O: Sometimes salad. E.g., G1OA reported "… *Something like Spanish, carrot, cucumber for salad.*". G2: Eat salad or uncooked vegetables at a moderate level. E.g., G2P reported "*salad, every day, once in a day*.". G3: Raw vegetables or salad consumption is a bit more common in the 3rd generations, say, every day. E. g., G3I reported "… *I eat salad everyday. So within my food there'll be a lot of vegetable coriander. You know,*

(*continued on next page*)

Table 3 (*continued*)

Themes	Sub-themes	Observation or quotes from the interviews
		lettuce, just mainly low fat products. So, salad every meal with salad.".
	Changing habit to improve fibre consumption	G1Y: Vegetable soup. E.g., G1YA reported "*Then we have vegetable soup that is already enriched with vegetable*". G1O: Not typical of food preparation. G2: Not typical of food preparation. G3: Awareness about nutrient loss due to making soup with fruits and vegetables. E.g., G3C reported "*… I do tend to juice a lot of the fruits and vegetables, but I know it breaks down the nutrients …, so I tend to not really do that as much. So, I more steam them. …*".
	Adopting to steam or stew food	G1Y: Not typical of food preparation. G1O: Stew food consumption is reported by only first-generation older Caribbean, not other ethnic groups. E.g., G1OC reported "*We call it brunch stew chicken more ….*". G2: steam food because it is a healthier option rather than frying. E.g., G2C reported "*… I tend to steam a lot of my foods, which I think is a healthier option rather than frying*". G3: Steaming vegetables. E.g., G3C reported "*instead of frying. I more tend to steam vegetables instead of boiling them, as this just uses less heat. So nutrients aren't lost*".

The second author (AT) reviewed the themes whether those are logical and relevant to answer the research questions or not. Next, relevant themes are named and based on those themes the research is carried out to answer the research questions. Themes and sub-themes that were created from the transcripts separately for each generation initially were used for systematically comparing generations. A qualitative data analysis software, NVivo was used to analyse the data.

3. Results and discussions

3.1. Population characteristics

This study conducted interviews from a totalof 20 respondents from 1st, 2nd and 3rd generations Over generations the distribution of respondents are: 5 respondents from first generation younger, 5 respondents from first generation older, 5 respondents from 2nd generation and 5 respondents from 3rd generation (Table 1). Out of these 20 respondents 7 were female and 13 respondents were male.

3.2. Food preparation in different generations

The five themes identified from the interviews are presented in Fig. 2, and those are: the food preparation/processing strategies; cooking methods used; strategies applied to maintain ingredients' quality and nutritional value; the sources of food; and awareness of the influence of ingredients and cooking practices on their risk to develop T2D. This section compares the food practices in terms of generations and ethnic identity among the selected populations.

a Theme 1: Food preparation/preservation strategies

Food preparation/preservation strategies practiced in different ethnic generations means the strategies applied to prepare or preserve food in different ethnic generations. This preservation is done before cooking such as the ingredients, and after cooking such as the cooked

Table 4
Strategies applied to maintain ingredients' quality and nutritional value by the ethnic minority generations.

Themes	Sub-themes	Observation from different generations
Theme 3: Strategies applied to maintain ingredients' quality and nutritional value	Reading package information	G1Y: Less concerned about checking expiration date. E.g., G1YI reported " *….in this country they are very much keen on product expiring and also as soon as it is about to expire they put it in a different section. So, sometimes you don't have to like put too much focus on the expired.*". G1O: Checked it, however, not emphasized on it always. E.g., G1OB reported "*Yeah. Yes, I check expire date ….*". G2: For fruits and vegetables, don't really check the expiry just look at the fruits quality. E.g., G2P reported "*Generally yes. For fruits and vegetables, no, we don't really check the expiry just to get the fruit we look at the fruit if it's OK ….*". G3: The most consciousness exists and don't buy that if expired. E.g., G3P reported "*Yeah, we checked the expiry date. And make sure it's not expired. We don't buy that if expire*d.".
	Priority during shopping ingredients' quality or cheaper	G1Y: Mixed opinion, some buy cheaper one. E.g., G1YA reported "*….in the UK when I go to the supermarket … as a student, I just get the one that is cheaper and I just buy it.*". G1O: Mostly prioritized the cheaper one than the top quality. E.g., G1OA reported "*Normally I do always want to go for cheaper one*". G2: Aware of the importance of the quality of ingredients. Some are ready to spend more to maintain quality. E.g., G2A reported "*Well, price is a factor. If price now brings the nutrition, yes, … I must confess that If you want to eat the nutritious one then you need to cut out your pocket, ….*". G3: More aware of ingredient quality and health. E.g., G3C reported "*I make sure to just check the nutrition label … saturated fats amounts as well as the total sugars and trans fats …. amount of calories, as I don't want to consume over the required amount in a day, required for women …..*".
	Ingredients' nutritional value	G1Y: Fruits and vegetables in their back home are fresh and chemical free, less frozen ingredients, however, in the UK they are not fresh, and the ingredients are already processed. E.g., G1YA reported "*… we just go to like eating fresh in Nigeria, ….. There is nothing like, ….*".

(*continued on next page*)

Table 4 (*continued*)

Themes	Sub-themes	Observation from different generations
		G1O: We get our food from the farm, everything is freshly picked off the tree, nothing spraying it, however, over here (UK) is not fresh. E.g., G1OC reported *"OK. So when I was in the West (Jamaica), we have fresh food, fresh fruit. So we have our fresh food, we get our food from the farm, everything is fresh*". G2: Try to avoid processed foods and attempt to find fresh ingredients. E.g., G2C reported "*The nutritional value of food as you consume. I like to choose quality … and I look for things with the ingredients in them, not so high in fat. Just things that are low in fat ….*". G3: More aware of the nutrient loss due to processing fruits and vegetables. *use fresh vegetables to gain nutrients. E.g.,* G3C reported "*I consume fruits and vegetables in their whole and fresh form. As of course processing such as juice, it may lead to nutrient loss.*".
	Unhealthy ingredients	G1Y: Consume high amounts of oil. E.g., G1YC reported "*Yeah, we use a lot oil to be honest …..*". G1O: Too much oil. E.g., G1OA reported "*We use too much oil*". G2: Consume less oil and try to choose quality oil which has health benefits. E.g., G2B reported "*so again quality wise, for example oil, … We prefer to use olive oi*l". G3: Balance in oil consumption. E.g., G3B reported "*I do tend to have a balance of Very oily and not as oily …..*".

Table 5
Sources of food in ethnic minority generations who live in London.

Themes	Sub-themes	Observation from different generations
Theme 4: Sources of food	Home made	G1Y: Used to eating at home; however, they consumed processed food a little bit as well. E.g., G1YA reported "*Ohh in Nigeria, 80 % home made and 20 % processed food ….. When you eat a processed food. Maybe you're going out with your friends. Yes, you understand.*". G1O: Don't buy a lot of processed food. They cook homemade food because it is known what you're putting in your food, so it has to be healthier. E.g., G1OC reported "*I don't buy a lot of processed food. I made my own food, my homemade food …. My own food and I cook homemade food. You know what you're putting in your food, so it has to be more healthier.*". G2: Homemade food more due to healthier and tastier, however, they order takeaway sometimes. E.g., G2B reported "*… homemade food more due to healthier and tastier. …. You know exactly what's going on in there, but processed food, it's at the end of the day, it's business …*". G3: Agreed that homemade food is absolutely the healthier option, however, they try to have a healthy diet, a balanced diet. E.g., G3B reported " *So, I would say that homemade food absolutely is the healthier option. Like I said, I'm someone who tries to have a healthy diet, a balanced diet …..*".
	Dining out/take away/processed	G1Y: Consume fast food or processed foods in London more than their back home. E.g., G1YA reported "*Now, yes, me in UK have tends to increase the number of processed foods …..that's because they are readily available on my street*". G1O: Do not like take away or dining out. E.g., G1OC reported "*I don't like process food, that my homemade I do my home.*". G2: Eat more processed food. E.g., G2C reported "*It's because it's just easy and it's about timing as well. …. So people will just pick up something real quick and eat it*". G3: They do dine out, however, try to choose healthier food. E.g., G3P reported "*Now we eat more processed food. We try to eat more homemade food ….*".

food and their awareness about nutrient loss or hygiene maintenance due to different preservation methods/strategies.

The participants talked about the usual way of preserving their food. People cannot apply the traditional way to preserve food, i.e. smoking is used in Africa. They chose refrigeration in the UK. For example,

G1YA reported "… ….*majority of the meat we have in Nigeria is either … it is smoked or it is dried for preservation. So, another thing I do right now is maybe during the weekend when I have time, I cook in bowls and I just store them in the fridge. …"* .

The older first-generation participants cook for couple of days and preserve the rest in the fridge. G1OP reported "*My wife mostly cook. Sometimes she cook bit more than twice, then for maybe two days. Otherwise, daily fresh food.*".

The 3rd generation Caribbean showed better knowledge about hygiene maintenance and nutrient loss in preservation stage than other generations and ethnic groups. G3C reported "*… I … store foods properly, such as just keeping cold foods cold and sealing them to prevent nutrition loss. … I consume fruits and vegetables … fresh form. As of course processing such as juice, it may lead to nutrient loss.*". The current theme related to knowledge and awareness of hygiene maintenance; refrigeration is the mostly used method to plan their meals in advance. The third generation were more focused on hygiene practices than other generations and Caribbean were focused on nutritional value. This is the first time that those aspects have been discussed. It is evident though that the younger generation, as it belongs to GenZ, are more aware about nutrition (Raptou et al., 2024).

b Theme 2: Cooking methods used

The participants were focusing on different ways to cook their meals and habits were different in relation to generations as well as their heritage.

Boiling is common in all generations and in all ethnic groups and generations.

G1YB reported "*Some vegetables I would like to have by boiling …."*. Further, G2B reported " *….if it's Curry, the vegetable would be boiled …."*. G3B reported "whether it be mashed potatoes ….. which I will boil then …..".

Cooked and over cooked food is common in many ethnic groups. The first-generation older Pakistani, G1OP reported " …. *mostly eat meat with "Sourah" means watery. Other "sabji" means vegetable with "sourah" …. … we cook*".

Table 6
Awareness of the influence of ingredients and cooking practices on T2D risk.

Themes	Sub-themes	Observation from different generations
Awareness of the influence of ingredients and cooking practices on their risk to develop T2D	Ingredients' nutritional value	G1Y: They think that high amounts of salt, sugar, oil, carbohydrates in diet are the risk factors for T2D development. E.g., G1YC reported "*And it's everything that we normally eat is very high in salt and in sugar. So it's really that's why diabetes is very common in that country. … The lifestyle that we have got, it is more risky …..The rice, this is carbohydrate, yeah as well, it's risky. That's why Dominican Republic is a really high in diabetes …..*". G1O: Mixed information is provided. Some believe diabetes is from God and some believe diet and lifestyle have a major contribution for developing T2D. E.g., G1OB reported "*I guess the diabetes is normal. No, no, not lifestyle is liable … god gave me …..*". G2: More aware about the contribution of diet has on the development of T2D. E.g., G2A reported "*Yeah, I think the food processing of the African way would do, would contribute to diabetes because the food. Since the food are overcooked, the nutrition of the of the food is gone with the cooking ….*". G3: Thought lack of balanced diet has a contribution for developing diabetes. E.g., G3B reported "*I do think that cooking technique does play a role in type 2 diabetes …. There are goanna be some issues with type 2 diabetes or if you're having too much rice, too much carbohydrates, too much meat, not enough vegetables. Then yes, I do believe that there's going to be some impact on your health because …. you're not having a balanced diet basically*".
	Cooking methods applied	G1Y: Overcooked food is the risk factor for T2D development. G1O: Diabetes is from Allah. Whatever is written in luck. E.g., G1OP reported "*Everything less, less sugar, less salt. Sukor from Allah for my life. Whatever is written, our luck, we have to get*". G2: More aware about the contribution of cooking style has on the development of T2D, like, overcooked food. E.g., G2A reported "*Yeah, I think the food processing of the African way would do, would contribute to diabetes because the food. Since the food are overcooked, the nutrition of the of the food is gone with the cooking ….*". G3: *Cooking technique does play a role in type 2 diabetes.* E.g., G3B reported "I do think that. Cooking technique does play a role in type 2 diabetes …".

In addition, first generation younger Caribbean, G1YC reported overcooked vegetables like "*So when it comes to the vegetables, we cook them properly. I like it overcooked. ….*". However, the 2nd generation people showed mixed awareness about level of heat used in cooking food.

G2I reported "….I cooked myself … on the low, very low heat.……..". However, G2A reported "The vegetables ….. soaked in hot water and left there, then squeezed, then cooked again. So, it is overcooked.". The 3rd generations are more cautious about nutrients loss due to cooking. For example, G3C reported "….*I .. avoid overcooking as this ensures that food retains its nutritional value*". G3P reported *"[…] a lot of vegetable […] we wash and slice it like salads and both salad and cook …. ….we try not to add too much oil or something too much with it, so that all the nutrients go [. …]"*.

Thus, over cooked vegetables are more common among first-generation people. The traditional cooking style has not been followed over the generations. A possible reason is that they adapted with other cooking styles. Especially, the 3rd generation people are more cautious about nutrition loss due to cooking style. Similar findings observed by Pieroni et al. (2007), they observed that South Asian 2nd generation in UK showed unfamiliarity with some of their traditional cooking style, while the older first generation showed their ability to prepare vegetables in traditional method of cooking style. The 2nd generation illustrated hybrid dietary habits, such as combination of their traditional diet and host countries diet towards healthy (Pieroni et al., 2007). Food habit diversification is revealed in 2nd generation Indian in the USA, they consume both traditional Indian and non-Indian food (Venkatesh and Weatherspoon, 2018). South-Asian Surinamese consume more rice and has remained same level, however, second-generation is turning towards host country's food like pasta, potato, red meat, and fruits adopting the basic dietary habits from Netherlands (Raza et al., 2017). Gen Z showed their tendency to eat plant-based "green" diet which is more environmentally friendly and healthy. Available meal recipes and cooking style in different domains like social media, mass media, etc., are beneficial for them to shift to plant-based diet and to practice ethical consumption (Raptou et al., 2024).

Frying is mostly used for fish, eggs and vegetables in all groups, however, frying style is different among the ethnic generations. First generation people usually follow their traditional frying method like with oil on a pan/saucepan.

G1YB reported "*[…] As Asian …. fish […]sometimes we fry it ….with onions and like some spice […]*". The 2nd generation fried using air fryer, which is better in terms of health benefits than the traditional frying method. G2I, reported "*[…] We've cut down fried food […] I think we've invested in a 150 pounds in air fryer.".*

Health knowledge/consciousness is more disclosed in 3rd generation. G3B reported "*[…] if it's a fried fish, it would be a shallowed fry".*

Grilled meat is more common in first generation younger Caribbean. G1YC reported "*Mostly red meat grill. Yeah, grilled or fry chicken.".* However, Asian first-generation younger people reported they consume grilled meat occasionally. The 3rd generation prefer to consume less fatty foods, like G3B, reported "*put the fish in the oven […]*". G3C reported "*I bake and roast*".

Salad is more common in Asian than the African and Caribbean. Moreover, compared to the older generations, younger generations consume more salad or raw vegetables. First generation older African, G1OA reported "… *Something like Spanish, carrot, cucumber for salad.*".

On the other hand, Asian first-generation younger people,

G1YB reported "*Like vegetable, sometimes I made salad. […] It's like*

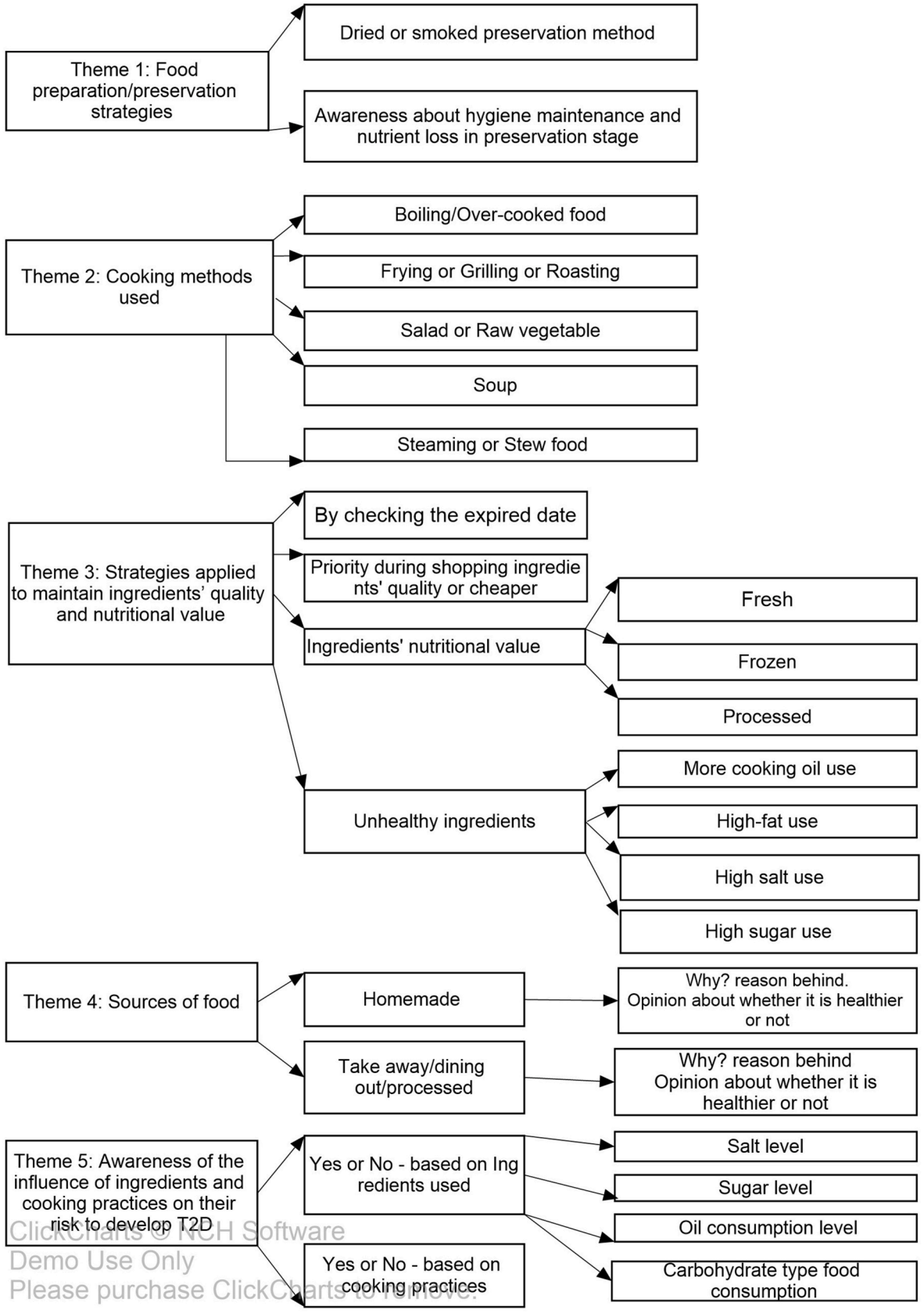

Fig. 2. Themes and their categories for food practices and the awareness about their influence on type 2 diabetes development among ethnic minorities in London.

tomato and cucumber, coriander mix […]". Raw vegetables or salad consumption is a bit more common in the 2nd and 3rd generations. G2P reported "*salad, every day, once in a day.*". In line with habits of GenZ observations (Raptou et al., 2024). In the 3rd generation, the tendency to consume raw vegetables/salad is more common due to their awareness about nutrient value of food.

G3I reported "*[…] I eat salad everyday. So within my food there'll be a lot of vegetable coriander. You know, lettuce, just mainly low-fat products. So, salad every meal with salad.*". Therefore, food nutrients are better maintained by the 3rd generation avoiding cooking vegetables and eating raw vegetables compared to other generations.

Soup consumption is more common in African and Caribbean. It is noted that the 3rd generation Caribbean reported their awareness regarding nutrient loss due to making soup with fruits and vegetables.

G1YA reported "*Then we have your vegetable soup that is already enriched with vegetable.*". Moreover, the 3rd generation Caribbean, G3C reported "*[…] I know juice breaks down the nutrients in the fruits and vegetables, so I tend to not really do that as much.*". Thus, the 3rd generation showed better awareness regarding nutrients maintenance avoiding making juice rather they consume fruits and vegetables as it is as has been observed by Raptou et al. (2024).

Steam food is more common in the Caribbean and in 2nd and 3rd generation.

The second generation are aware about food nutrients. For example, the 2nd generation Caribbean, G2C reported "*[…] I tend to steam a lot of my food, which I think is a healthier option rather than frying.*".

Steaming fish is reported by the 3rd generation Bangladeshi.

G3B reported "*If I was to cook a salmon, I would foil it up and put all the ingredients […] and then put it in the oven in a foil.*".

Stew food consumption is reported by only first-generation Caribbean, not other ethnic groups.

G1OC reported "*[…] Sometimes we'll have fried chicken. But most brunch stew chicken.*".

Thus, compared to other generations the third generations are more aware about the value of food and nutrients, and they try to maintain cooking techniques that do not lose the nutrients in the food and less fatty or oily food. They prefer raw fruits and vegetables, if they cook using less heat, shallow frying, baking, roasting and steaming methods. Frying style is different over generations, the older people are using the traditional way, whereas the younger participants were choosing healthier ways to fry the foods, which is in line with the trends among the millennial and GenZ people (Ermawati et al., 2024; Halicka et al., 2025). Similar to our findings, another study observed that the second generation changes their diet with healthy choices, for example, increases salad and whole grains (Venkatesh and Weatherspoon, 2018). Good sources of dietary fibre and antioxidants are considered as raw vegetables and fruits; however, it is important to wash and clean it before consumption to avoid dangerous pathogen microorganisms (Koukkidis et al., 2017; Karavelioglu et al., 2024). Heating or cooking is a solution to kill pathogens, however, overcooking or long duration of cooking vegetables may cause nutrients loss (Berger et al., 2010; Karavelioglu et al., 2024). It is observed that boiling, baking, and grilling are healthier options than frying food (Venkatesh et al., 2024), and deep frying is unhealthier than shallow frying (Rana and Raghuvanshi, 2013). However, different types of vitamins antioxidants and minerals are lost due to boiling vegetables (Karavelioglu et al., 2024). Boiling causes greatest loss of iron and ascorbic acid, while least by microwaving (Sharma and Sharma, 2022). Thus, steaming is the healthier method of cooking (Karavelioglu et al., 2024), and which is followed by the 3rd generation, thus, this is evident that they followed healthier cooking methods. Our findings are quite similar to other studies that knowledge about food practices and the importance to maintaining healthy dietary habits increases over generations (Mukherjea et al., 2013; Raptou et al., 2024).

c Theme 3: Strategies applied to maintain ingredients' quality and nutritional value

The categories that were identified relevant to the third theme are discussed below.

3.2.1. Reading package information

The first generation people are less concerned about checking expiration date. G1YI reported " *….in this country, they are very much keen on product expiring and also as soon as it is about to expire, they put it in a different section. So, sometimes you don't have to like to put too much focus on the expired."*.

Over generations the awareness about the importance ness of checking expiry dates increased.

G2P reported "Generally, yes. For fruits and vegetables, no, we don't really check the expiry just … we look at the fruit if it's OK …".

The most consciousness exists in the 3rd generation people. G3P reported "*Yeah, we checked the expiry date. And make sure it's not expired. We don't buy that if expired.*".

Priority during shopping ingredients' quality or cheaper: There is a mixed opinion among the first-generation people regarding the prioritisation of quality ingredients or cheaper price. The older first generation buy cheaper ones, some younger first generation as well. The older first generation mostly prioritized the cheaper one than the top quality, like, G1OP reported "*Sabji, no quality, what i found in grocery i buy …..you know sabji no quality, all the same.*".

Other generations are aware of the importance of the quality of ingredients and shopping habits.

G2A reported "*Well, price is a factor. If price now brings the nutrition, …. then you need to cut out your pocket"*.

The 3rd generation people in this study expressed a greaterawareness of ingredient quality and health than the other generations, they chose fresh ingredients with high nutritional value. Moreover, they tried to avoid sugar, salt and fatty foods. G3B reported "*So I'll try and get my iron and my vitamins in through balance my meal. Also, I do tend to enjoy having a salad, a protein box which would be also two to three times a week* ….". It is evident that older first generation across ethnic groups and some first-generation younger people emphasize that they prefer cheaper ingredients rather than high nutritional quality. The trend is clear across the board for genZ as reported also by Raptou et al. (2024).

Ingredients' nutritional value like fresh/frozen or highly processed ingredients: First generation both younger and older immigrants reported that fruits and vegetables in their back home are fresh and chemical free and easy access to buy, however, in the UK most of the items are not fresh and the ingredients are already processed. Food is cooked everyday usually, not preserve in refrigerator and used less frozen ingredients compared to the UK. G1YA reported " *….we just go to like eating fresh in Nigeria, …. You and your family will finish the cooked food that day. There is nothing like, ok, let's keep it in the freezer"*. G1OC reported " *….in the West (Jamaica), we have fresh food, fresh fruit …..we get our food from the farm, …..freshly picked off the tree ….nothing spraying it or whatever. And you have fresh meat. Fruit. …. . food over here (UK) is not fresh. The food in Jamaica, is fresh.*".

Second generation immigrants try to avoid processed foods and attempt to find fresh *ingredients*. G2P reported "*Products we buy more raw products, raw products will be cooking curries and rice […]*".

The 3rd generation immigrants in this study expressed a greater awareness of the nutrient loss due to processing fruits and vegetables.

G3P reported "*So the vegetables, we tried to see which is fresh. We tried to buy them and. Try to use it fresh vegetables and cook these, so we gain nutrients*".

First generation people are less likely to check expire date of the product before buying, they consumed very fresh foods in their back home, however, in the host country they are very busy with work and earning money thus, they do not have much time to prepare food regularly and thus, they eat food cooked for couple of days and put into

freeze, ingredients also not good quality due to choice of cheaper one. On the other hand, the 2nd generation consume some portions of processed food, however, they are a bit more aware about their food value than the first generation. Finally, the 3rd generation people in this study expressed a greater awareness about nutrients loss due to food processing and try to maintain nutritional balance in food. Similar findings observed for genZ as reported also by Raptou et al. (2024). Moreover, Venkatesh and Weatherspoon (2018) observed that health awareness increases due to long acculturation which helps South Asian to move to healthy dietary habits like choice of healthy food and reduces processed and packaged foods. In contrast, another study observed that diet and acculturation level are not associated in Asian students in USA (Chai et al., 2019).

3.2.2. Unhealthy ingredients like more cooking oil, high-fat, high salt, high sugar use

African and Caribbean first-generation people consume high amounts of oil compared to the other ethnic groups and generations.

G1YC, *reported* "*Yeah, we use a lot of oil to be honest. […]"*. G1OA reported "*We use African oil. Too much oil …..*".

The second generation across ethnic groups consume less oil and try to choose quality oil which has health benefits.

G2B reported "*so again quality wise, for example oil, we prefer to use olive oil. […] If you had a choice, it would be olive oil, you know, but I think due to price, we tend to go for sunflower oil.*".

Bangladeshi 3rd generation respondent mentioned balance in oil consumption.

G3B reported "*[…] If I was to make a curry. It would usually be quite oily if it's your meat. […] However, if it's a fish dish, […] less oil.*

African and Caribbean consume *more fatty food* than Asian people.

G1YA reported "*I tend to eat more fatty food*". G3B reported "*And I also try and get myself some avocado because I absolutely love avocados, so it's high in fat, so it's good fat as well.*". Demonstrating that the third-generation people are concentrating on shifting to plant based fat or healthy fat consumption.

Salt consumption is more than normal in African and Caribbean as they use more seasoning. It is also noted in Indian who use salt in rice. G1YA reported "*In Nigeria, we use more than normal, […] and yeah, we eat lots of salt and lots of spicy food*.

The first generation of older Caribbean reduced salt consumption after diagnosis of diabetes.

G1OC *reported* "*No, I don't take salt anymore. […] I got diabetes about two years now, […] Before diagnosed diabetes Yes, I used to take salt in my food*.

Second generation Indian reduced salt in rice after diagnosis of pre-diabetes. However, 3rd generation Indian consume less salt,

G3I reported "The minimum amount of salt. I even try not to put salt in my food as less as I can.

Caribbean and African used more seasoning which contains much salt. Indian use salt with rice. However, over generations they are more aware about it and reduce the salt consumption level.

Consumption of *more sugar* is common in Caribbean and African than Asian.

G1YC reported "*We put oil and sugar brown sugar in a pot so we can give colour to the chicken*.

On the other hand, Asian consume less sugar. G2B reported "*Teaspoon sugar. And want tea once a day."*. Moreover, G3P reported "*Sugar. We try less, less as well.*".

d Theme 4: Sources of food

The categories that were identified relevant to the fourth theme are discussed below.

Homemade food: The first-generation younger respondents were used to eating at home; however, they consumed processed food a little bit as well.

G1YB reported " …. *I always focus on my nutrition, so I always maximum 90 % time I have my homemade food. Definitely, it's homemade food is very healthy because outside food is all junk food, OK, they use more oil, more sugar for the increasing tasty. So it's very like to harmful for our body.*". G1OC reported "*I don't buy a lot of processed food. I made my own food, my homemade food again is like my own porridge …. …..my own food and I cook homemade food ….. know what you're putting in your food, so it has to be more healthier.*".

However, even though all generations know home-made food is healthier first-generation people *consume* homemade food more than others.

Second *generation* people eat more homemade food because home-made food is healthy. However, they order takeaway food sometimes as well. For example, G2I reported " …. *more food at home, more vegetables as well. We eat, more homemade food. Homemade food is healthy …... we might order another takeaway one day ….. every week*.".

G3B reported "*So, I would say that homemade food absolutely is the healthier option. Like I said, I'm someone who tries to have a healthy diet, a balanced diet …..*"

It appears that the 2nd generation people consume more *processed* foods than the first-generation people. The third-generation people also know the positive benefit of homemade food. Thus, they try to consume balanced food or try to choose healthy items.

3.2.3. Take-away/dining out

The first-generation younger respondents said they consume fast food or processed foods in London more than they do in the country of origine. The reasons behind include business due to work creating time problems, making lazy to cook, on the other hand processed food is readily available in the UK, which results in consumption of more processed food.

G1YA *reported* " ….. *in UK have tends to increase the number of processed foods I'm eating … because they are readily available on my street …."*. Similar reason is depicted by the 2nd generation respondents. They highlighted easy access to processed food, quicker to get it and it makes life easy.

First generation older people do not like take away or junk food. For example, G1OP reported "*Junk Food, ……. I don't like …*.". And G1OC reported "*I don't like process food that my homemade I do my home*.".

G2C *reported* "*About the processed food, yeah, I think we eat way too much processed food. It's because it's just easy … People haven't got time and it's a bad thing to say, …"*.

The 3rd generation also mentioned similar reasons for consuming processed food. They highlighted easier to make food. Like, G3P reported "*Now we eat more processed food. We try to eat more homemade food"*.

However, a few reported that they do not like processed food. For example, G3B "*I rarely ever have processed food*". G3I reported *"I'll eat some take away. Maybe once or twice a week. process food is healthy or the homemade food, It depends where you go for if you get sushi healthier; if you get vegetarian food healthier ……"*.

Thus, African, and Caribbean people reported they consume more processed food. This tendency is common in young generations like the 1st generation younger, then slightly increased in 2nd generation and a bit more in 3rd generation. They mentioned the reason as business due to work, tiredness to cook after work, readily available, easy access to the processed foods. Similar findings were observed by Lawrence et al. (2007), they observed that the variety of fast-food availability and lack time to cook food at home influence eating processed foods from outside in Bangladeshi and Pakistani younger adults in UK, however, they did not consider generational perspective. In line to our findings, a study in the USA observed that fast food consumption increases over generations, with incidence rate ratio (IRR) 2.07 for second generation, and IRR is 2.87 for the 3rd or further generation than the 1st generation South Asian adults (Becerra et al., 2014).

e Theme 5: Awareness of the influence of ingredients and cooking practices on their risk to developing T2D

The 1st generation younger people think that high amounts of salt, sugar, oil, carbohydrate in diet and overcooked food are the risk factors for T2D development. However, Bangladeshi and Pakistani first-generation younger people thought their diet is healthy. G1YB, reported "*actually ….food I'm consume don't have the most sugar, whenever I use any ingredients like oil like sugar then I try to mix and minimise the sugar and fat … so I think the food I consume is less risk for the diabetics ……."*.

On the other hand, 1st *generation* younger Indian and Caribbean people thought their food habit, increase the risk of T2D in the UK compared to those habits at home country. G1YC reported "*we normally eat is very high in salt and in sugar. The lifestyle that we have got, it is more risky. My grandpa has diabetes. […] I cannot say my food processing or cooking style is healthy. Because it has too much oil. And too much salt and sugar. Sometimes it depends.*".

The 1st generation of older Bangladeshi believe diabetes is from God. G1OB reported "*I guess the diabetes is normal …., not lifestyle is liable for this disease. religious perspective i believe on god, god gave me, not lifestyle.*" On the other hand, the first generation of older Caribbean believes diet and lifestyle have a major contribution for developing T2D.

G1OC reported "*I think type 2 diabetes development was due to my food habit, […] because carbohydrates and all these sweet things […] that contributed ….".*

The 2nd generation respondents appear to be more aware about the contribution of diet and cooking style has on the development of T2D.

G2B *reported* high consumption of carbohydrates, like,

"*My dad's got type 2 and I think it's due to a lot of rice.* Furthermore,

G2A *reported*.

"*Yeah, I think the food processing of the African way would contribute to diabetes because […] the food are overcooked, the nutrition of the food is gone with the cooking …"*

The 3rd generation people thought lack of balanced diet has a contribution for developing diabetes. However, they try to maintain a balanced diet and avoid much sugar thus, they are at less risk to develop T2D.

G3B reported that "… *cooking technique does play a role in type 2 diabetes because if you are consistently eating foods with too much rice, too much carbohydrates, too much meat, not enough vegetables. Then yes, I do believe that there's going to be some impact on your health because you're not looking at other things like fish, you're not having a balanced diet basically.* On the other hand, the 3rd generation Caribbean maintains much healthy cooking techniques. For example, G3C reported "… *my cooking techniques … food processing. I don't think it really does contribute to the development of Type 2 diabetes.*".

Strengths: This study has included a wider ethnic group covering a wide range of ages and participants are from almost every part of London. Novel focus, highlighting the specific focus on cooking methods and food preparation practices as a mechanism for dietary change, which may be an under-explored area.

Hypothesis*generation*, framing the study as an exploratory investigation that generates rich, context-specific hypotheses about generational and ethnic differences that can be tested in future, larger-scale studies.

Giving *voice*, emphasizing the value of capturing the lived experiences and perspectives of individuals from these specific communities in their own words.

Limitations and Future Lines of Research: Small number of respondents in each ethnic group and in each generation severely limits the analytical power. It is expected that non-diabetics would be included, however, identifying participants that were free from T2D was challenging in those ethnic groups. Thus, the author considered diabetic patients to collect data from 2 respondents. It is a significant methodological limitation that might introduce potential recall bias. The author tried to collect data from same number of male and female in mixed age group (younger + older people), however, it could not be possible to maintain due to challenges to get access to the respondents who fulfil the inclusion criteria of this study population.

Moreover, convenience and snowball sampling may limit generalizability. Next, there might be a selection bias for the respondents. Recall and social desirability bias may affect the accuracy of reported dietary habits. In addition to acculturation, factors like socio-economic status, education, and cultural integration may influence dietary shifts which were not discussed in detail in this study. Further, the qualitative approach limits the ability to establish associations between dietary habits and type 2 diabetes risk. Data saturation might have arisen as the researcher conducted the interviews and did not find new themes. Future research might further explore cultural and religious influences on dietary choices for deeper insights along with larger data set.

4. Conclusion

Third-generation immigrants in this study expressed a greater awareness of nutrition, hygiene, and the importance of cooking and lifestyle on health. Cooking methods such as over-boiling, over-cooking, and deep frying are more common among older first-generation immigrants. However, traditional cooking styles have evolved over the generations. Younger generations have adopted their host country's diet, and have increased awareness about healthy eating, indicating that younger generations are more conscious of it.

Among ethnic groups, Caribbean individuals expressed greater awareness about healthy cooking styles, avoiding frying and consuming less overcooked food, particularly steamed and stewed dishes. First-generation older individuals show low awareness of checking expiration dates and often compromise on quality by choosing cheaper products. In contrast, quality maintenance has improved over generations, where the third-generation individuals in this study expressed a greater awareness and striving to maintain nutritional balance in their food.

In terms of unhealthy ingredient intake, third-generation individuals are shifting to healthier options like olive oil, plant-based fats, and reduced salt and sugar consumption. Home-made food is more common among first-generation older individuals, although their cooking methods are not always healthy. On the other hand, third-generation individuals aim to consume a balanced diet, which improves health benefits. Despite this, processed food and takeaway food consumption have increased over generations, with third-generation adults reporting healthier choices. Awareness of the impact of food processing and cooking techniques on the development of type 2 diabetes (T2D) has increased over generations, particularly among younger generations (Gen Z). The older first-generation Bangladeshi participant, the only one in this cohort, attributed diabetes to divine will. This immediately and honestly contextualizes the finding for the reader, while third-generation individuals believe that a lack of balanced diet significantly contributes to the development of diabetes.

Therefore, policymakers need to consider generational differences in dietary awareness to prevent T2D among these ethnic minority groups, even though the findings of this study are not free from limitations, as mentioned in the limitations section. Culturally tailored interventions are required to promote healthier food practices.

CRediT authorship contribution statement

Arif Ahmed: Writing – review & editing, Writing – original draft, Software, Methodology, Formal analysis, Data curation, Conceptualization. **Amalia Tsiami:** Writing – review & editing, Validation, Supervision, Methodology, Investigation, Conceptualization. **Hafiz T.A. Khan:** Writing – review & editing, Validation, Supervision, Methodology, Conceptualization.

Implications for gastronomy

The study falls within the landscape of gastronomy as it has investigated the dietary pattern of first, second and third generation of immigrants in London, including the cultural lifestyle and trends. The findings of this study such as the effect of culinary process, ingredients choices and the food practices on their T2D risk will give an insight of the dietary behaviour in different generations of the ethnic minority immigrants in the UK. This knowledge will help to focus on the effect of dieting on other cardiovascular diseases in this ethnic minority over generations in other developed countries. The current study examined data for both first generation younger and older people and those born in the host country. Their awareness about the effect of acculturation on T2D will help to generalise in other developed countries. This study used a wider range of age groups and different areas of London which will be helpful to extrapolate these findings globally especially in developed countries' contexts.

Declaration of competing interest

None to declare.

Data availability

Data will be made available on request.

References

Ahmed, A., Tsiami, A., Khan, H.T.A., 2023. Effects of dietary and lifestyle management on type 2 diabetes development among ethnic minority adults living in the UK: a generational shift. Int. J. Gastron. Food Sci. 31, 100634. https://doi.org/10.1016/j.ijgfs.2022.100634. ISSN 1878-450X.

Bennett, P.C., Lip, G.Y., Silverman, S., Blann, A.D., Gill, P.S., 2011. Validation of the Edinburgh claudication questionnaire in 1st generation black African-Caribbean and South Asian UK migrants: a sub-study to the ethnic-echocardiographic heart of England screening (E-ECHOES) study. BMC Med. Res. Methodol. 11, 85. https://doi.org/10.1186/1471-2288-11-85.

Becerra, M.B., Herring, P., Marshak, H.H., Banta, J.E., 2014. Generational differences in fast food intake among South-Asian Americans: results from a population-based survey. Prev. Chronic Dis. 11, E211. https://doi.org/10.5888/pcd11.140351.

Berger, C.N., Sodha, S.V., Shaw, R.K., Griffin, P.M., Pink, D., Hand, P., Frankel, G., 2010. Fresh fruit and vegetables as vehicles for the transmission of human pathogens. Environ. Microbiol. 12 (9), 2385–2397. https://doi.org/10.1111/j.1462-2920.2010.02297.x.

Braun, V., Clarke, V., 2022. Conceptual and design thinking for thematic analysis. Qual. Psychol. 9 (1), 3.

Carney, R., Bradshaw, T., Yung, A.R., 2016. Physical health promotion for young people at ultra-high risk for psychosis: an application of the COM-B model and behaviour-change wheel. Int. J. Ment. Health Nurs. 25 (6), 536–545. https://doi.org/10.1111/inm.12243. Available at:

Chai, S.C., Jiang, H., Papas, M.A., Fang, C.-S., Setiloane, K.T., 2019. Acculturation, diet, and psychological health among Asian students. J. Am. Coll. Health 67 (5), 433–440. https://doi.org/10.1080/07448481.2018.1484368.

Coleman, D.A., Dubuc, S., 2010. The fertility of ethnic minorities in the UK, 1960s-2006. Popul. Stud. 64 (1), 19–41. https://doi.org/10.1080/00324720903391201. Available at:

Creswell, J.W., Creswell, J.D., 2023. Research Design: Qualitative, Quantitative and Mixed Methods Approaches. Sage Publications Ltd.

Diabetes, U.K., 2019. Diabetes UK facts and figures 2019. https://www.diabetes.org.uk/about_us/news/new-stats-people-living-with-diabetes. (Accessed 1 March 2023).

Dharod, J.M., 2015. What changes upon resettlement: understanding difference in pre- and post-resettlement dietary habits among South-Asian refugees. Ecol. Food Nutr. 54 (3), 209–223. https://doi.org/10.1080/03670244.2014.964800.

Ermawati, K.C., Harwindito, B., Octavia, V.F., 2024. Differences in healthy lifestyle and healthy food consumption among millenials and generation Z. Int. J. Travel Hospitality Events 3 (2), 157–167.

Gilbert, P.A., Khokhar, S., 2008. Changing dietary habits of ethnic groups in Europe and implications for health. Nutr. Rev. 66 (4), 203–215. https://doi.org/10.1111/j.1753-4887.2008.00025.x.

Gupta, S.S., Teede, H., Aroni, R., 2018. Spicing up your advice for South Asian and anglo-australians with type 2 diabetes and CVD: do cultural constructions of diet matter? Appetite 120, 679–697. https://doi.org/10.1016/j.appet.2017.10.007.

Halicka, E., Kaczorowska, J., Rejman, K., Plichta, M., 2025. Investigating the consumer choices of Gen Z: a sustainable food system perspective. Nutrients 17 (3), 591.

Holman, N., Forouhi, N.G., Goyder, E., Wild, S.H., 2011. The Association of Public Health Observatories (APHO) diabetes prevalence model: estimates of total diabetes prevalence for England, 2010-2030. Diabet. Med.: J. British Diabetic Assoc. 28 (5), 575–582. https://doi.org/10.1111/j.1464-5491.2010.03216.x.

Holmboe-Ottesen, G., Wandel, M., 2012. Changes in dietary habits after migration and consequences for health: a focus on south Asians in Europe. Food Nutr. Res. 56. https://doi.org/10.3402/fnr.v56i0.18891, 10.3402/fnr.v56i0.18891.

Jin, G., Wang, J., Jiang, X., 2021. Association of folate, vitamin B-12 and vitamin B-6 intake with diabetes and prediabetes in adults aged 20 years and older. Asia Pac. J. Clin. Nutr. 30 (1), 75–86. https://doi.org/10.6133/apjcn.202103_30(1).0010.

Karavelioglu, B., Dayi, T., Hacet, F., 2024. The neutropenic diet: are well-cooked vegetables still good sources of nutrients? A mini-narrative review. Nutr. Res. (N.Y.) 121, 61–66. https://doi.org/10.1016/j.nutres.2023.11.003.

Kiger, M.E., Varpio, L., 2020. Thematic Analysis of Qualitative Data: AMEE Guide No. 131 Informa UK Limited.

Koukkidis, G., Haigh, R., Allcock, N., Jordan, S., Freestone, P., 2017. Salad leaf juices enhance salmonella growth, colonization of fresh produce, and virulence. Appl. Environ. Microbiol. 83, 1–13. https://doi.org/10.1128/AEM.02416-16.

Lawrence, J.M., Devlin, E., Macaskill, S., Kelly, M., Chinouya, M., Raats, M.M., Barton, K. L., Wrieden, W.L., Shepherd, R., 2007. Factors that affect the food choices made by girls and young women, from minority ethnic groups, living in the UK. J. Hum. Nutr. Diet. 20 (4), 311–319. https://doi.org/10.1111/j.1365-277x.2007.00766.x.

LeCroy, M.N., Stevens, J., 2017. Dietary intake and habits of South Asian immigrants living in Western countries. Nutr. Rev. 75 (6), 391–404. https://doi.org/10.1093/nutrit/nux023. PMID: 28591786; PMCID: PMC6280935.

Lillekroken, D., Bye, A., Halvorsrud, L., Terragni, L., Debesay, J., 2024. Food for soul—older immigrants' food habits and meal preferences after immigration: a systematic literature review. J. Immigr. Minority Health 26 (4), 775–805.

Martin, P., 1996. Increasing numbers of migrants challenge policymakers worldwide. Popul. Today 24 (5), 1–2 doi: PMID: 12291192.

Michie, S., van Stralen, M.M., West, R., 2011. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. Implement. Sci.: IS 6 (1), 42. https://doi.org/10.1186/1748-5908-6-42. Available at:

Moridian, A., Radulescu, M., Kumar, P., Radu, M.T., Mohammad, J., 2024. New insights on immigration, fiscal policy and unemployment rate in EU countries–A quantile regression approach. Heliyon 10 (13), e33519.

Moore, A.P., Rivas, C.A., Stanton-Fay, S., Harding, S., Goff, L.M., 2019. Designing the Healthy Eating and Active Lifestyles for Diabetes (HEAL-D) self-management and support programme for UK African and Caribbean communities: a culturally tailored, complex intervention under-pinned by behaviour change theory. BMC Public Health 19 (1), 1146. https://doi.org/10.1186/s12889-019-7411-z.

Mukherjea, A., Underwood, K.C., Stewart, A.L., Ivey, S.L., Kanaya, A.M., 2013. Asian Indian views on diet and health in the United States: importance of understanding cultural and social factors to address disparities. Fam. Community Health 36 (4), 311–323. https://doi.org/10.1097/FCH.0b013e31829d2549.

Naderifar, M., Goli, H., Ghaljaie, F., 2017. Snowball sampling: a purposeful method of sampling in qualitative research. Strides Dev. Med. Edu. 14 (3). https://doi.org/10.5812/SDME.67670.

Ochieng, B.M., 2013. Black African migrants: the barriers with accessing and utilizing health promotion services in the UK. Eur. J. Publ. Health 23 (2), 265–269. https://doi.org/10.1093/eurpub/cks063.

Olaya-Contreras, P., Balcker-Lundgren, K., Siddiqui, F., Bennet, L., 2019. Perceptions, experiences and barriers to lifestyle modifications in first-generation Middle Eastern immigrants to Sweden: a qualitative study. BMJ Open 9 (10), e028076. https://doi.org/10.1136/bmjopen-2018-028076. Available at:

Patel, M., Phillips-Caesar, E., Boutin-Foster, C., 2012. Barriers to lifestyle behavioral change in migrant South Asian populations. J. Immigr. Minority Health 14 (5), 774–785. https://doi.org/10.1007/s10903-011-9550-x. Available at:

Pieroni, A., Houlihan, L., Ansari, N., Hussain, B., Aslam, S., 2007. Medicinal perceptions of vegetables traditionally consumed by South-Asian migrants living in Bradford, Northern England. J. Ethnopharmacol. 113 (1), 100–110. https://doi.org/10.1016/j.jep.2007.05.009.

Rana, R., Raghuvanshi, R.S., 2013. Effect of different cooking methods on iodine losses. J. Food Sci. Technol. 50 (6), 1212–1216. https://doi.org/10.1007/s13197-011-0436-7.

Raptou, E., Tsiami, A., Negro, G., Ghuriani, V., Baweja, P., Smaoui, S., Varzakas, T., 2024. Gen Z's willingness to adopt plant-based diets: empirical evidence from Greece, India, and the UK. Foods 13 (13), 2076.

Raza, Q., Nicolaou, M., Snijder, M.B., Stronks, K., Seidell, J.C., 2017. Dietary acculturation among the South-Asian Surinamese population in the Netherlands: the HELIUS study. Public Health Nutr. 20 (11), 1983–1992. https://doi.org/10.1017/S1368980016000914.

Sharma, A., Sharma, S., 2022. Effect of different cooking methods on the levels of iron and ascorbic acid in green vegetables. JEI 5, 1–4. https://doi.org/10.59720/21-210.

Stanaway, F., et al., 2020. Mortality of ethnic minority groups in the UK: a systematic review protocol. BMJ Open 10 (6), e034903. https://doi.org/10.1136/bmjopen-2019-034903.

Trend, D., 2021. Demographic trends focusing on populations, ageing and migration. https://www.gov.uk/government/publications/trend-deck-2021-demographics.

Venkatesh, S., Leal, D.O., Valdez, A., Butler, P.I., Keenan, O.E., Montemayor-Gonzalez, E., 2024. Cooking well with diabetes: a healthy cooking school for diabetes prevention and management. Nutrients 16 (15), 2543. https://doi.org/10.3390/nu16152543.

Venkatesh, S., Weatherspoon, L.J., 2018. Food behaviors and dietary acculturation of Asian Indians in the US. J. Nutr. Educ. Behav. 50 (6), 529–535. https://doi.org/10.1016/j.jneb.2017.10.014.

Vinitchagoon, Thanit, Hennessy, Erin, Zhang, Fang Fang, Fauth, Rebecca C., Must, Aviva, Tovar, Alison, Choumenkovitch, Silvina F., Economos, Christina D., 2024. A dietary

pattern with more fruits and vegetables in children of mothers who immigrated to the United States from Latin America is associated with healthful nutrient intake and weight status. J. Acad. Nutr. Diet. 124 (8), 947–956.

Wang, S., Li, S., 2019. Exploring generational differences of British ethnic minorities in smoking behavior, frequency of alcohol consumption, and dietary style. Int. J. Environ. Res. Publ. Health 16 (12). https://doi.org/10.3390/ijerph16122241. Available at:

Yannakoulia, M., Mamalaki, E., Anastasiou, C.A., Mourtzi, N., Lambrinoudaki, I., Scarmeas, N., 2018. Eating habits and behaviors of older people: where are we now and where should we go? Maturitas 114, 14–21. https://doi.org/10.1016/j.maturitas.2018.05.001.