



Risk factors associated with the onset of type 2 diabetes in Generation Z in the United Kingdom

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Abstract

Background: Type 2 diabetes, or non-insulin-dependent diabetes mellitus, is a well-known medical condition that increasingly affects the young generation. This paper looks at the role of genetic and ethnic background on food choices and obesity, among UK's Generation Z and their predisposition to T2D.

Methods: This study aimed to determine the dietary patterns, body weight indices, and T2D status of Generation Z people from diverse ethnic backgrounds. Self-administered questionnaires and medical records were used to assess the subjects' genetic and ethnic-culinary backgrounds.

Results: The study shows that genetic and ethnic factors have a strong relation to diet and weight gain, which in turn increases the probability of T2D. Hence, South Asians and Africans exhibited higher T2D prevalence attributable to their high-carbohydrate diets and insulin-resistance genes. Unhealthy foods and their unhealthy patterns were linked with obesity and high T2D risk mainly owing to the consumption of processed foods and high sugar. Such a situation with T2D if left uncontrolled, particularly in youths will result in long-term disastrous complications such as cardiovascular diseases, renal failure, and cognitive dysfunction.

Conclusion: The intervention for T2D using live modalities and other public health strategies is necessary for preventing complication-related ailments. The recommendations consequently adopt health promotion activities such as healthy nutrition, routine check-ups on health, and appropriate public health interventions that are culturally competent.

Keywords: Type 2 diabetes, Generation Z, dietary patterns, obesity, public health interventions

Introduction

Diabetes mellitus is classified as a persistent metabolic abnormality distinguished by heightened glucose concentrations within the bloodstream, arising from either impairment in insulin secretion, insulin functionality, or a combination of the two. Type 2 diabetes (T2D), the predominant variant, primarily manifests when the organism develops resistance to the effects of insulin [1]. The manifestations and clinical symptoms of Type 2 diabetes typically emerge gradually and may encompass frequent urination, pronounced thirst, augmented appetite, fatigue, visual disturbances, and the presence of slow-healing wounds. In the absence of appropriate management, Type 2 diabetes can precipitate severe complications, including cardiovascular disease, neuropathy, renal impairment, and ocular disorders [1,2].



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Evidence in Context

- The study explores genetic and ethnic influences on food choices, obesity, and T2D in UK's Generation Z.
- South Asians and Africans show higher T2D prevalence due to diet and genetics.
- Unhealthy diets, especially processed foods and sugar, increase T2D risk
- Uncontrolled T2D can cause severe long-term complications.
- Recommendations focus on culturally tailored health promotion and routine check-ups.

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Generation Z, commonly delineated as individuals born in the timeframe spanning from the mid-to-late 1990s to the early 2010s, represents the demographic cohort that succeeds the Millennials. The constituents of Gen Z are predominantly distinguished by their inherent proficiency with digital technologies, having been raised in an environment where the internet, social media, and advanced technological innovations are fundamental components of their existence. This generation places a high premium on inclusivity, diversity, and social equity and is often perceived as more pragmatic and risk-averse than preceding cohorts. Furthermore, they are recognised for their profound engagement with digital communication and online platforms, which significantly shapes their social interactions and modes of information acquisition. Gen Z encounters distinct challenges, which encompass navigating mental health complexities and adapting to swift technological advancements, which exert a considerable influence on their overall well-being and lifestyle decisions [3].

Over the age of 18, type 2 diabetes affects more than 8.5% of adults worldwide. It is estimated that approximately 468 million people have been affected throughout the past few decades [4], the mean age of diagnosis has declined [5]. However, Schnur et al. argued that more than half of Gen Z adults – about 56% of the UK aged 18 to 25 – are overweight or obese. By 2030, this number will increase to 552 million (9.9%) [6]. Serious problems linked to this disease impact the patient's productivity, quality of life, and health, especially Generation Z [3]. Conversely, the rapid advancement of worldwide urbanisation and modernisation has enduring consequences on lifestyle elements like bad food habits, inactivity, elevated stress levels, and environmental influences [7]. These factors contribute to increasing the prevalence of type 2 diabetes and obesity worldwide. Insulin resistance, characterised by decreased glucose absorption in fat and muscle and impaired liver function of insulin, is a condition that obese people experience more [8]. According to Diabetes UK [9], UK has 4.3 million more people living with diabetes than before. Because they have notable characteristics and are powerful forces in the modern economy, Gen Z cohorts have become popular research subjects, particularly their impact on market influence. According to Kramer and Shoham, it has been noted that Gen Z regularly displays suboptimal health as a result of their inclination towards unhealthy habits, such as consuming alcohol, soft drinks, and junk food, as well as avoiding regular physical exercise [10].

The literature reports the increasing rates of obesity and the connection between Type 2 diabetes and obesity, especially among Generation Z in the UK [11]. As much as 90% of diabetes in adults is caused by overweight, and obesity has been proven to increase the risk of being diagnosed with diabetes [12]. However, despite this understanding, there is still a deficit of research that focuses on the factors such as genetics, ethnicity, and food choices unique to Gen Z that contribute to obesity and diabetes risk factors. Furthermore, the repercussions of obesity on diabetes have been the subject of many studies. However, the mechanism by which these risks can be modified by ethnic group and genetic differences of Gen Z has been understudied. Therefore, this study is designed to fill the highlighted gaps by assessing the impact of genetics and ethnic diversity on food intake and obesity in Gen Z, thus creating personalised preventive recommendations. This research studies the effect of genetics, ethnicity, and food consumption trends on GenZ as obesity puts them at a high risk of Type2 diabetes - the project on preventive recommendations.

Methods

Design

This systematic review applied a secondary qualitative research methodology to explore the complex relationship between genetics, ethnicity, and food consumption patterns in the development of type 2 diabetes in the obese population among Gen Z in the UK. This approach allows more energy and focus to be directed towards understanding the complexities in the relation between these variables [11].

Search Strategy

The search strategy included an elaborate search in several databases: PubMed, Scopus, Web of Science, and Google Scholar. Search terms were adequately varied to capture all aspects of the research question, such as GenZ, Type 2 Diabetes, Obesity, Genetics, Ethnicity, and Food Consumption Trends. The use of 'AND' and 'OR' quasi-Boolean operators and truncation was applied

To focus the search. Another key feature of this search process was the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines used to show the selection and transparency around the inclusion and exclusion of criteria (Table 1) [13].

Table 1: PICO Framework

Component	Description
Population	Generation Z individuals (born between 1997 and 2012)
Intervention/Exposure	Examination of genetics, ethnicity, and food consumption trends
Comparison	Different ethnic groups, genetic profiles, or dietary patterns (if applicable)
Outcome	Risk or incidence of type 2 diabetes, measures of obesity (e.g., BMI, waist circumference), dietary patterns

Study Selection

Appendix B and C show that inclusion/exclusion criteria and the PICO framework are used in the article review. The requirements were designed for Generation Z to align with this population’s predisposing factors for type 2 diabetes. Exposures handled during the study selection process included genetics, ethnicity, and food consumption habits, and the outcomes were diabetes and obesity. Furthermore, only English and studies conducted for 2015-2024 were included to avoid unnecessary duplication and to keep things current. PICO was employed as well, an approach that helps determine the source of information and answer fairly specific questions in great detail (Table 2).

Inclusion and Exclusion Criteria

Table 2: The Inclusion and Exclusion Criteria

Criterion	Inclusion Criteria	Exclusion Criteria
Population	Generation Z individuals (born between 1997 and 2012)	Studies involving participants outside Generation Z
Intervention/Exposure	Studies examining the relationship between genetics, ethnicity, food consumption trends, and type 2 diabetes risk	Studies focusing on non-relevant factors (e.g., physical activity, environmental pollutants)
Comparison	Studies comparing different ethnic groups, genetic profiles, or dietary patterns	Studies without a clear comparison group (if applicable)
Outcome	Incidence or risk of type 2 diabetes, measures of obesity (e.g., BMI, waist circumference), dietary patterns	Studies focusing on type 1 diabetes, gestational diabetes, or other forms of diabetes
Study Design	Observational studies (cohort, case-control, cross-sectional), interventional studies, qualitative studies	Reviews, meta-analyses, case reports, editorials, letters, and commentaries
Language	Studies published in English	Studies published in languages other than English
Publication Date	Studies published between 2015 and 2024	Studies published before 2015
Full-text Availability	Studies with full-text available	Abstract-only studies

Critical Appraisal

CASP checklists were employed to assess the methodological quality of the included studies for quality assessment. These CASP tools are suitable for investigations such as cohort case-control and qualitative research studies [14,15]. The process consists of creating a tailored assessment template (CASP Sheet) to critically evaluate the strengths and limitations of each study, considering the aspects such as usefulness, research design, findings, and applicability. It is also worth noting that in cases where there was inconsistency in the grading of the article, the issues were handled in discussion to eliminate the discrepancies.

Critical Appraisal

Data Abstraction

Data abstraction involved extracting variables related to both exposures and outcomes. Exposures included genetic factors (e.g., specific gene variants), ethnicity (e.g., racial and ethnic backgrounds), and food consumption trends (e.g., dietary patterns, fast food intake). Outcomes focused on measures of obesity (e.g., BMI, waist circumference) and type 2 diabetes (e.g., incidence, prevalence, glucose levels) (Table 3).

Table 3: Critical Appraisal of the selected studies using the CASP tool

Author and Year	Did the paper address a focused question?	Did the authors look for the right kind of papers?	Do you think all the essential relevant studies were included?	Did the review authors do enough to assess the quality of the included studies?	If the results of the review have been combined. Was it reasonable to do so?	What are the overall results of the review?	How precise are the results?	Can the results be applied to the local population?	Were all important outcomes considered?	Are the benefits worth the harms and costs?	Study Quality
Ahmed et al. (2023) [9]	+	+	+	+	+	+	+	+	+	+	+
Alae-Carew et al. (2022) [26]	+	+	+	+	+	+	+	+	-	+	+
Priporas et al. (2022) [24]	+	+	-	+	-	+	+	+	+	+	+
Kaylor et al. (2023) [4]	+	+	+	+	+	+	+	+	+	+	+
Burns and Francis (2024) [20] [20][20] [27]	+	+	+	+	+	+	+	+	-	+	+
Kyrou (2020) [23]	+	+	+	+	+	+	-	+	+	+	+
Bjornstad et al. (2023) [34]	+	-	+	+	+	+	+	+	+	+	+
Naaz (2021) [18]	+	+	+	+	+	+	+	+	+	+	-
Narula and Nigam (2020) [31]	+	+	+	+	+	+	+	+	+	+	+
Sidhu, et al (2022) [5]	+	+	+	+	+	+	+	+	+	+	+
Marquez et al. (2024) [32]	+	+	+	+	-	+	+	+	+	+	-
Flórez et al, (2024) [20]	-	+	+	+	+	+	+	-	+	+	+
Henney et al., (2024) [29]	+	+	+	-	+	+	+	+	+	+	+

Result

Literature search

We identified 135 records through database searches, with 60 from PubMed and 75 from Google Scholar (Figure 1). After removing 250 duplicates, 200 records were screened. Of these, 105 records were deemed potentially relevant and full-text articles were retrieved for further evaluation. Upon detailed assessment for eligibility, 75 documents were reviewed, leading to the exclusion

Of several studies due to their retrospective design (n=11), reliance on self-reported data (n=9), nature as review articles (n=12), limited data from selected body sites (n=8), duplicates (n=10), and incomplete data regarding the study period (n=20). Ultimately, 13 studies met the inclusion criteria and were included in the final systematic review. These studies provided comprehensive insights into the genetic, ethnic, and dietary factors influencing the onset of type 2 diabetes among Generation Z in the United Kingdom.

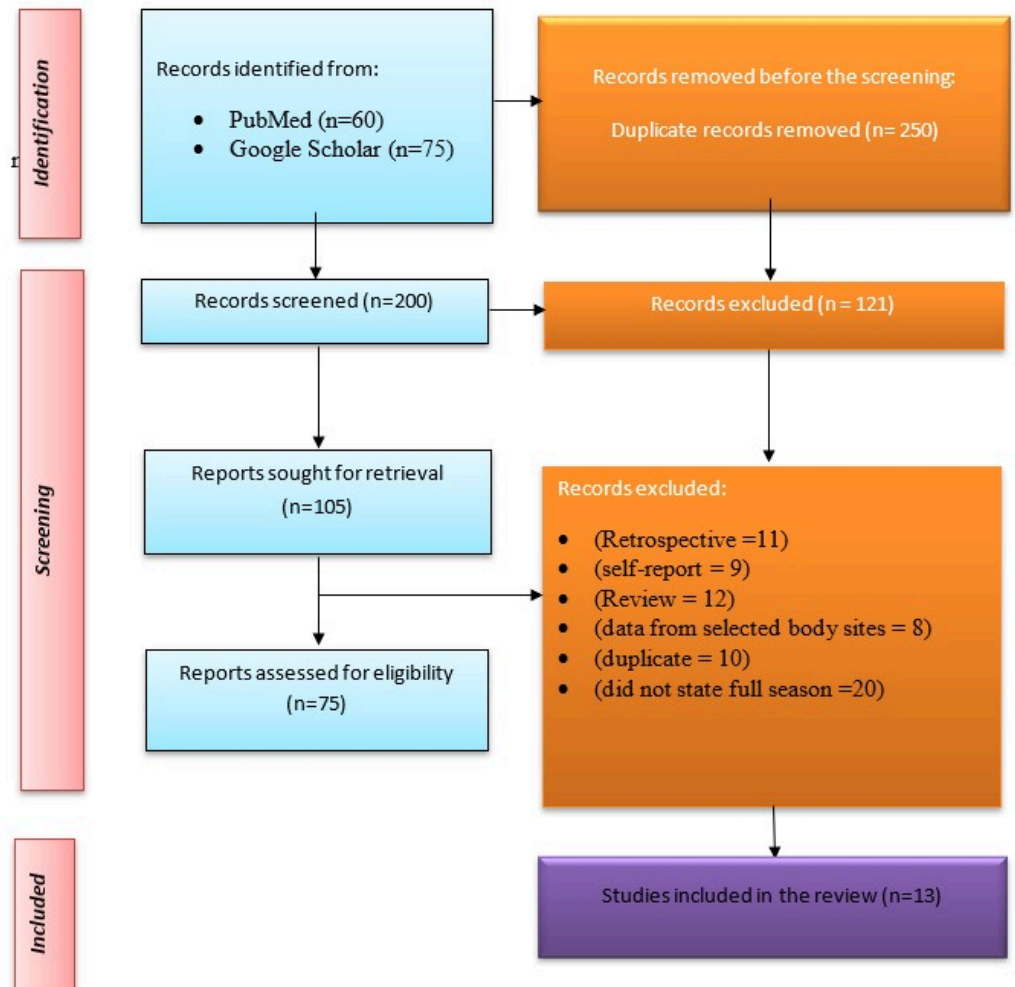


Figure 1: Preferred reporting items for systematic reviews and meta-analysis (PRISMA) flow diagram

Risk factors for T2D among Generation Z in the United Kingdom

The systematic review revealed multifactorial risk factors for T2D among Generation Z in the United Kingdom. In a study by Ahmed et al. (2023), significant emphasis was placed on the interplay between generational differences and dietary and lifestyle habits, as well as genetic and environmental impacts on T2D development among ethnic minorities [16] (Table 4). Similarly, Alae-Carew et al. (2022) highlighted a shift towards plant-based alternative foods, pointing to lifestyle modifications influenced by socioeconomic factors as pivotal in managing or potentially exacerbating T2D risk [17].

Research by Priporas et al. (2022) identified stress-induced eating behaviors and the complex role of cognitive processes in unhealthy lifestyle patterns contributing to the onset of T2D in youth [18]. Concurrently, Kaylor et al. (2023) explored the influence of social media on self-perception and eating disorders, delineating the blurred lines between healthy eating and disordered eating behaviours [19]. This was complemented by the findings of Burns and Francis (2024), who

Conducted a narrative review pinpointing socio-demographic and lifestyle-related risk factors including obesity, insulin resistance, poor diet, and insufficient physical activity [20].

Furthermore, Kyrou et al. (2020) focused specifically on Generation Z females, noting that age, ethnicity, family history, and low socioeconomic status, alongside obesity and metabolic syndrome, significantly contribute to the risk profile for T2D [8]. The studies by Bjornstad et al. (2023) and Naaz (2021) emphasised the critical role of knowledge, attitudes, and practices around healthy lifestyles, underscoring the barriers preventing the effective translation of health knowledge into practical action [21,22]. Additionally, Narula and Nigam (2020) addressed dietary patterns characterised by irregular food intake and high carbohydrate consumption, which are prevalent among Generation Z and contribute to obesity and T2D [23]. Sidhu, Lemetyinen, and Edge (2022) provided insight into the cultural and gender-specific values that affect dietary habits and physical activity levels, particularly noting a disconnect between awareness of T2D risks and actual health-promoting behaviours among young Punjabi Sikhs in the UK [24] (Figure 2).

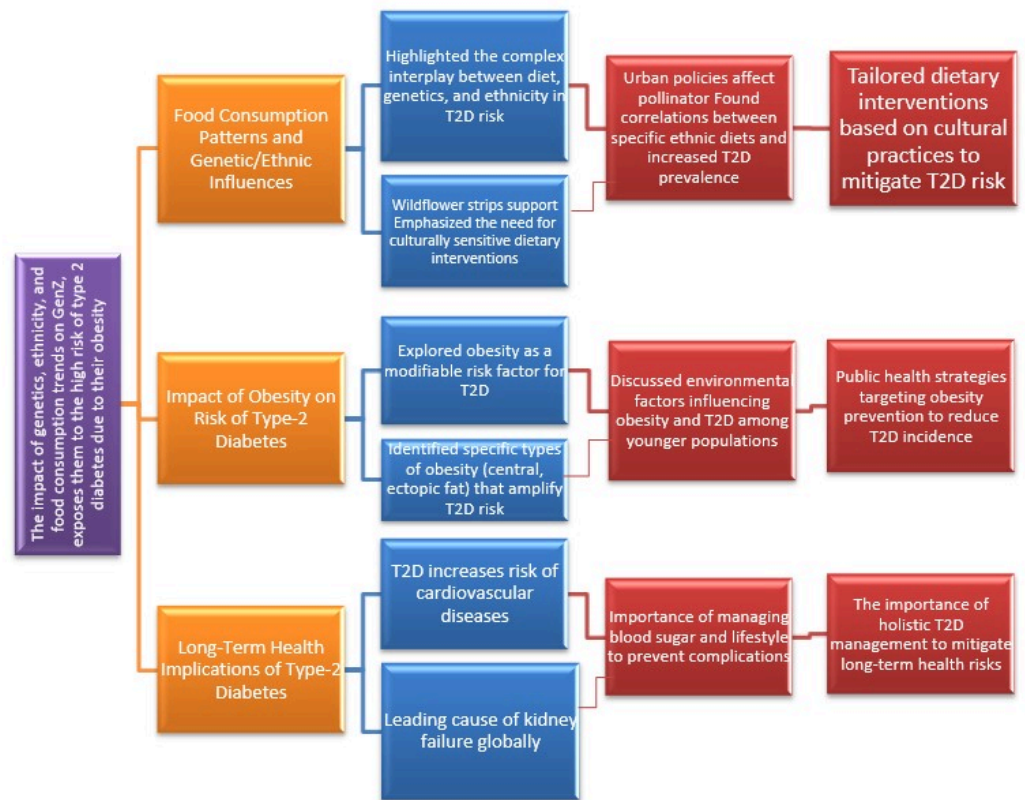


Figure 2: Risk Factors Associated with the onset of type 2 diabetes amongst Generation Z in the United Kingdom

Thematic Analysis

Theme 1: Food Consumption Patterns and Genetic/Ethnic Influences

Generation Z’s unique characteristics, including their high engagement with digital technology and social media, significantly influence their food consumption patterns and overall lifestyle choices. Naaz stated that this generation’s reliance on fast-paced, convenient solutions often leads to increased consumption of processed and high-calorie foods, which are readily promoted through online platforms [22]. Additionally, their busy and highly connected lifestyles contribute to irregular eating patterns, such as skipping meals or late-night snacking, which are linked to poor metabolic health. These dietary habits and sedentary behavior commonly associated with prolonged screen time create an environment that predisposes Gen Z to weight gain and obesity. Given the strong correlation between obesity and the risk of developing Type 2 diabetes, these consumption patterns are a significant concern for this generation. Furthermore, genetic and

Ethnic factors may compound these risks, as specific populations within Gen Z may have a higher genetic predisposition to insulin resistance and metabolic disorders [20]. Addressing these dietary and lifestyle habits is crucial in mitigating the rising incidence of Type 2 diabetes among young adults.

The central theme of the research looked at how people's eating habits and genetic or racial backgrounds affect their chance of developing type 2 diabetes. This shows the intricate relationships between dietary habits, genetic traits, and racial or ethnic origins. The most crucial element in determining an individual's risk of developing Type-2 Diabetes is their eating habits. The analyses focus on the effects of various food choices, like eating a lot of ultra-processed foods, sugar, and not enough vegetables and fiber, common among South Asians, Hispanics, and Generation Z [16]. The consumption of carbohydrate-rich diets (57.5%) and other nutritional risk factors play a significant role in the higher prevalence of T2D in these groups" [17]. Genetic factors also significantly influence how likely someone is to get T2D. Kaylor et al. say Gen Z's genetic diversity affects their susceptibility to obesity and diabetes risk [19].

Table 4: Details of the Studies

Title of Study	Year	Authors	Risk Factors Identified
Effects of Dietary and Lifestyle Management on Type 2 Diabetes Development Among Ethnic Minority Adults Living in the UK: A Generational Shift	2023	Ahmed et al. [16]	Generational differences, dietary and lifestyle habits, genetic or environmental impacts
The Role of Plant-Based Alternative Foods in Sustainable and Healthy Food Systems: Consumption Trends in the UK	2022	Alae-Carew et al. [17]	Consumption of plant-based alternative foods, dietary habits, socioeconomic factors
Youth-Onset Type 2 Diabetes Mellitus: An Urgent Challenge	2022	Priporas et al. [18]	Stressful eating behaviours, cognitive systems, unhealthy lifestyle patterns
Type 2 Diabetes: Etiology, Epidemiology, Pathogenesis, and Treatment	2023	Kaylor et al [19]	Social media influence, self-worth issues, blurred lines between healthy and disordered eating
Socio-demographic and Lifestyle-Related Risk Factors for Identifying Vulnerable Groups for Type 2 Diabetes: A Narrative Review with Emphasis on Data from Europe	2024	Burns and Francis [19,20]	Obesity, insulin resistance, beta-cell function, inadequate physical activity, poor diet, lack of early glycemic control
Calories and Control: Eating Habits, Behaviors, and Motivations of Generation Z Females	2020	Kyrou et al. [8]	Age, ethnicity, family history, low socioeconomic status, obesity, metabolic syndrome, unhealthy lifestyle practices
Knowledge, Attitude and Practices About Healthy Lifestyle in Prevention and Control of Chronic Diseases: A Rapid Review	2023	Bjornstad et al [21]	Childhood obesity, sedentary lifestyles, intrauterine exposure to diabetes, social and environmental factors
Understanding and Analysing the Role of Knowledge, Attitude, and Practices for the Prevention of Diabetes	2021	Naaz [22]	Barriers to practising healthy lifestyles, obstacles to translating information and attitudes into actions
Stressful Eating Indulgence by Generation Z: A Cognitive Conceptual Framework of New Age Consumers' Obesity	2020	Narula and Nigam [23]	Irregular food intake, carbohydrate-rich diets, overweight, age, alcoholism, stress
'Diabetes Doesn't Matter as Long as We're Keeping Traditions Alive': A Qualitative Study Exploring the Knowledge and Awareness of Type 2 Diabetes and Related Risk Factors Amongst the Young Punjabi Sikh Population in the UK	2022	Sidhu et al. [24]	Cultural and gender values impacting dietary habits and physical practices, awareness of T2D but low physical activity

This genetic difference is the most obvious in South Asians and African Americans. This is because they are more likely to have T2D. After all, they have a higher incidence of insulin resistance and metabolic syndrome. Also, where people live and their race can change how they eat, raising the risk of T2D. People like the Punjabi Sikhs in the UK value traditional foods that are often high in sugar [21]. This makes them more likely to get T2D, even though they know it. Dietary choices are strongly connected to social customs and family reputation.

The primary concept of the theme is that eating habits and lifestyle choices shaped by culture are much more important than genes in lowering the risk of T2D. Eliminating these associated factors will help reduce the escalating incidence of T2D among vulnerable populations like Gen Z and ethnic minorities in the UK. This can be achieved by supporting healthier food choices and nutritional practices and personalised eating plans specific to the cultural backgrounds of each group.

Theme 2: Impact of Obesity on Risk of Type-2 Diabetes

The theme of how obesity affects the risk of T2D is widely covered, showing obesity as a significant risk factor that can be changed and is closely linked to the development of T2D. The study results make it clear that being overweight increases the risk of T2D by changing insulin resistance and metabolic dysfunction. Obesity significantly contributes to insulin struggle and stomach beta-cell function, which are significant variables in the pathogenesis of type 2 diabetes [20]. The data make it clear that being overweight makes some race groups and younger generations, like Gen Z, more likely to get T2D than others. According to a study by Kyrou et al., Central obesity and ectopic fat accumulation, particularly visceral fat, greatly increase the risk of T2D because they are linked to diabetes-related insulin resistance and hyperinsulinemia [8]. Individuals of race and young people often have belly fat, this shows how that fat can mess up your metabolism and make you more likely to get T2D. The pieces also talk about how the way young people live now can make them fat and increase their risk of getting type 2 diabetes. Gen Z's exposure to an obesogenic environment that includes easy access to unhealthy, highly processed foods and sedentary lifestyles, contributes to their risk of obesity and type 2 diabetes [18].

People in this situation are more likely to eat poorly and not improve physical activity, which can lead to metabolic diseases and weight gain. The main idea of the theme is that being overweight increases the chance of T2D. This is especially true for the younger generation, which is having a hard time in today's world. To stop the growing number of people with T2D in these high-risk groups, it is important to fight fat through public health schemes that promote healthy eating, exercise, and house changes.

Theme 3: Long-Term Health Implications of Type-2 Diabetes

There is a lot of information in those articles about how T2D can hurt your health in the long run. This shows how hard this long-term illness is to deal with and how many problems it causes. The study talks about how people with T2D are more likely to get cardiovascular diseases (CVD). People who have diabetes are at higher risk for heart disease and stroke compared to those who do not have diabetes [22]. This demonstrates how severely T2D impacts heart health by influencing factors like insulin resistance, cholesterol, and chronic inflammation, making atherosclerosis happen faster and increasing the risk of cardiovascular diseases.

Furthermore, kidney problems are a major worry for people with T2D. Type 2 diabetes is the leading cause of kidney failure globally [23]. This sentence stresses how important it is that T2D is linked to the gradual loss of kidney function, mainly caused by damage to small blood vessels and the loss of nephrons over time. Keeping blood sugar and blood pressure under control is crucial for preventing kidney problems and maintaining the kidneys working well. Additionally, the research shows how T2D can affect the health of your brain. Type 2 diabetes is linked to a higher risk of cognitive impairment and dementia [24].

Brain microvascular disease, chronic hyperglycemia, and insulin resistance are all related to this relationship. All of these conditions contribute to neurodegenerative processes. Managing diabetes through changes in living and the right medical care is very important for lowering the chance of cognitive decline and dementia in people who have it. Furthermore, the main idea of the long-term health effects of type 2 diabetes shows how badly it affects the heart, kidneys, and brain. People with T2D need to use effective management techniques that include controlling their blood sugar, changing their lifestyle, and regular medical testing to avoid these problems and improve their general health. Dealing with these long-term effects is still necessary to improve people's quality of life and lessen the stress of the long-term issues that come with this common metabolic disease.

Discussion

The study has revealed a noteworthy correlation between genetics, ethnicity, and food intake factors strongly linked to obesity and T2D, affecting Gen Z in the UK. Some of the studies like Sun, Kovacs and Guiu-Jurado, stated that the susceptibility to T2D is higher among specific ethnical groups like Asian Indians and African Americans due to insulin resistance genes and the unfair diets that accompany their cultures, respectively [25]. Gen Z is already at a higher risk, compounded by unhealthy eating habits such as consuming heavily processed foods and sugary products [26]. Some of these include obesity, which is rated widely as a modifiable risk factor that worsens

The predisposition to T2D. This research demonstrated the potential advantages of pre-symptomatic genetic testing, culturally sensitive health programs, and campaigns to raise awareness about the benefits of healthy dieting and regular exercise, which will reduce these risks and enhance wellness for Gen Z.

The study's findings build upon previous research regarding the influence of genetic predisposition, ethnicity, and diet choice on the development of T2D among the Gen Z population in the UK. According to Diabetes UK, higher rates of each form of diabetes, predominantly Type 2 diabetes cannot be seen as separate from the causes of the disease such as obesity, which is linked to food and heritability factors [9]. Tahir et al. noted that obesity, which is common in the Gen Z population, is a direct result of inappropriate decisions made regarding food and physical activity [27]. A study by Lustig, supports these findings, revealing that Gen Z's diet of processed foods and sugary drinks greatly contributes to their obesity levels, making them more vulnerable to T2D [28]. The increased amount of unhealthiness by consuming unhealthy foods and lack of physical activity remains an issue among Gen Z [10]. Moreover, Abbasi et al., revealed that genetics and ethnicity have a tremendously strong association with T2D [29].

Alzamil and Ahmed went further, highlighting that due to their genes, South Asians and African Americans are prone to insulin resistance and metabolic disorders and consequent T2T [12,16]. These findings are backed up by Hwalla, who also claims that cultural dieting and genetic susceptibility to T2D cumulatively worsen disease risks for these ethnic groups [30]. The role of ethnicity exemplified in the consumption of foods is quite profound in this research.

It is equally important to note that obesity does have effects on the risk of T2D which has been researched quite often. Inaishi explained ways in which obesity contributes to insulin resistance and impairment of the pancreatic beta-cells, which play a central role in T2D [31]. This understanding is in line with this study's findings, showing that Gen Z with central obesity has worsening T2D risks, especially when accompanied by visceral fat accumulation. In support of this, Korac et al. revealed the effects of central obesity on metabolic dysfunction and diabetes progression [32]. Priporas claims that Gen Z lives in an obesogenic environment filled with available unhealthy foods, sugar-sweetened beverages, and limited physical activity which are also pointed out as potential factors of obesity and T2D in this study [18]. This integration with previous research indicates the lack of sufficient and more encompassing plans for improving young generations' health, as suggested in the existing literature.

Furthermore, Khin et al. [33] discussed the long-term health consequences of T2D including cardiovascular disease risk, kidney failure, and cognitive decline where Makowska et al. [34] supported the fact that if Gen Z doesn't try to restrain themselves from eating unhealthily, it can prove to be fatal for them in the long term. The studies explore various health issues related to obesity and T2DM, focusing on family dynamics, social networks, and dietary influences.

Henney et al. review the link between ultra-processed food consumption and non-communicable diseases in the UK, identifying socioeconomic factors and marketing influences as critical in dietary choices leading to obesity and related diseases [35]. Together, these studies underscore the complex interplay of social, cultural, and familial factors in health outcomes. The collected literature over the years emphasises the need for proper glycaemic control of diabetes type 2 and early intervention to avoid the development of the above-cited severe commodities. Overall, this study contributes to the existing knowledge according to the results obtained and opens new directions for further research. They have pointed out that understanding T2D development involves three features: genetics, ethnic background, and diet. They have specifically focused on the diet of Gen Z, resulting in increased T2D numbers.

Strengths and limitations

The present systematic review has several features that increase its solidity and the value of the findings for the disciplines. To begin with, using several databases such as PubMed, Scopus, Web of Science, and Google Scholar to review the studies assists in ensuring comprehensive coverage of the literature in the concerned field. Using different keywords along with Boolean operators ensures the review covers all forms of research on the effects of genetics, ethnicity, and food trends on T2D risk among Generation Z in the UK. Secondly, incorporating the PRISMA (Preferred Reporting Items

For Systematic Reviews and Meta-Analyses) Checklist in all review stages increases the review's methodological quality. Therefore, PRISMA makes the reporting of the study selection process clear & transparent and enables the replication of the process. Such a practice reduces bias and enhances the reliability of the findings of the conducted review on the specified topic.

The review is conducted so that the population is defined as Gen Z, exposures include genetics, ethnicity, and food consumption, and while the outcomes are obesity and T2D, the studies included are closely related to the research questions. The major strengths include providing a PRISMA flow chart for identifying studies and using Critical Appraisal Skills Program checklists for the critical appraisal of included studies is a strength. Such a methodological quality assessment guarantees that only quality-based materials are incorporated into the presupposed evidence synthesis. There is a systematic extraction of variables, which helps make the data more organised. The end-wise appraisal process entails multiple reviewer appraisals which reduce bias and increase the credibility of the whole procedure. The inclusion of studies only published between 2015 and 2024 in the review allows the identification of more recent trends and risk factors associated with T2D among Gen Z whose focus is on the management of T2D using modern scientific knowledge for the development of today's health promotion programs.

This systematic review study also has some limitations that could be associated with such a study. A major limitation is the issue of publication bias; for example, by restricting the review to include research in languages other than English or research published in non-peer-reviewed journals, the systematic review may have missed precious information. This can lead to gaps in the evidence synthesis and possibly influence the study's outcome. One of the limitations is that there is variability in the used studies in the reviewed research papers. There is a possibility for inaccuracy arising from differences in the study design features, population, and the outcome measures used. Variability can result from variations in the definition, measurements, and diagnostic criteria used to identify obesity and T2D [36]. This heterogeneity may also decrease the chances of replicating the results in other situations and groups of people.

Moreover, the use of secondary data only is also a limitation as it limits the understanding of contextual factors which could affect the T2D risk among Generation Z. Secondary analysis may not cover new tendencies that appear in society or peculiarities of specific regions reflected in original studies. This could make the review non-comprehensive and, therefore not capture all the available evidence without bias. Lastly, it is necessary to mention that even using CASP checklists for appraisal, several articles under consideration do not demonstrate high methodological quality. This variation may impact the overall strength of the study. In general, the review suggests functional implications and underscores the area for further research and public health priorities that may be useful for reducing the T2D risk in Gen Z.

Conclusion

The study highlights the severe chronic health consequences of T2D, especially among the Gen Z population in the UK, providing valuable genetic, dietary, and racial determinants of T2D and its complications. The study underlines the necessity of culturally appropriate and multifaceted interventions to prevent the risk factors. As reflected by this paper, ineffective management of T2D in youth crushes serious health consequences that include cardiovascular diseases, kidney failure, and cognitive decline. Thus, well-developed managerial measures, actions on population health, and informative campaigns are crucial for minimising these risks and ensuring better health among people with T2D. In practice, there is a need for healthcare providers to detect T2D early and monitor consistently such populations while putting into use culturally sensitive dietary and lifestyle changes as part of the management. It was further established that to strengthen the prevention and control of T2D among the youth, formal diabetes education and knowledge on its management should be taught to students in schools.

Other strategies comprise the implementation of targeted campaigns and legislations on health and healthy nutrition and physically active living among population groups affected or at risk of obtaining T2D. Furthermore, future research should strive to find more GT T2D patients for longitudinal analysis and research on the trends and outcomes of T2D management. Studying the effectiveness of individualised approaches according to gene and culture may also be useful in improving T2D prevention and management programmes.

Abbreviations

CVD: Cardiovascular diseases

Generation Z: Gen Z

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

T2D: Type 2 Diabetes

T2DM: Type 2 Diabetes Mellitus

Supporting information: None

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