

SYSTEMATIC REVIEW

Systematic review of the barriers and facilitators to dietary modification in people living with type 2 diabetes and pre-diabetes from South Asian ethnic populations

Amar Rai¹ | Rohan Misra² | Hasaan Khan¹ | Shivani Shukla³ | Dipesh C. Patel⁴ | Adrian Brown^{5,6,7} 

¹Imperial College London School of Medicine, London, UK

²University College London Medical School, London, UK

³School of Clinical Medicine, University of Cambridge, Cambridge, UK

⁴Division of Medicine, University College London, London, UK

⁵Centre for Obesity Research, University College London, London, UK

⁶Bariatric Centre for Weight Management and Metabolic Surgery, University College London Hospital NHS Trust, London, UK

⁷National Institute of Health Research, UCLH Biomedical Research Centre, London, UK

Correspondence

Adrian Brown, Imperial College London School of Medicine, London, UK.

Email: a.c.brown@ucl.ac.uk

Abstract

Aims: Lifestyle and dietary modification are effective in the prevention and management of Type 2 diabetes Mellitus (T2DM). However, South Asian (SA) populations living in Western countries have low adherence rates to healthcare advice and experience poor diabetes control and clinical outcomes compared with the general population. This systematic review aimed to summarise the barriers and facilitators of dietary modification within people from South Asian (SA) ethnicity with T2DM or pre-diabetes.

Methods: A systematic search of PubMed, Web of Science and Scopus generated 3739 articles, of which seven were included. Qualitative and quantitative data were inputted utilising COVIDENCE. Qualitative data were analysed by thematic analysis.

Results: Thematic analysis identified three facilitators: (1) cultural sensitivity, (2) health education and (3) support networks. Barriers include (1) healthcare inequity, (2) cultural insensitivity, (3) social pressures, (4) misconceptions and (5) time constraints. Good access to health care and motivation were the most common facilitators discussed. Misconceptions on T2DM management and cultural insensitivity contributed to the majority of barriers discussed.

Conclusions: Culturally tailored interventions could improve adherence to diet modification in people with T2DM from SA ethnicity. Interventions involving the application of social media to challenge intergenerational stigmas and misinformation, distributing culturally appropriate resources and providing diets tailored to the SA palate could help.

KEYWORDS

diet modification, ethnicity, health inequities, South Asian, type 2 diabetes mellitus, Western countries

Amar Rai and Rohan Misra are considered as joint first authorship.

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1 | INTRODUCTION

People from South Asian ethnicity (SA) constitute, 9.3% of the population in the most recent census data for the United Kingdom.¹ Type 2 diabetes (T2DM) disproportionately impact people from SA ethnicity, with them being 3–5 times more likely to be diagnosed with T2DM than those from White ethnic groups, especially before the age of 40.^{2,3} Furthermore, people from SA ethnicity have a greater metabolic risk at lower levels of body mass index (BMI) compared with other ethnic minority groups, while also being four to five higher risk of developing T2DM compared to other ethnic minority groups.^{4–6} This presents a particular concern in that despite experiencing the same environmental pressures as other ethnic groups in the west, people from SA communities have a greater risk for T2DM.² Thus, greater attention is required to help support people from the South Asian ethnicity living in western countries (SALWC) to address these environmental pressures. Wang et al. identified that lifestyle behaviours between generations in British ethnic minorities were different and this is attributed to variations in their ethnic identity. Wang et al. used fruit as a marker for dietary lifestyle; however, this may not represent the wider cuisine that makes up SA meals.⁷ Consequently, the findings of studies exploring lifestyle interventions in the broader SA population may not necessarily translate to SALWC.

Dietary modification is the cornerstone in the management of T2DM,^{8,9} with guidance recommending that lifestyle interventions should be culturally tailored.^{5,6,10} Despite this, and data showing effective dietary change improved glycaemia,¹⁰ individuals with T2DM from SA ethnic groups struggle to adhere to dietary advice, with dietary non-adherence varying from 48% to 77%.¹¹ Therefore, investigating people from SA ethnicity living with T2DM in western countries may reveal significant barriers and facilitators not seen in people from SA ethnicity living with T2DM in their native countries. Current evidence supports a combination of dietary changes and physical activity to reduce the incidence of T2DM.¹² For SA, it is documented that the community consumes traditional food practices due to strong ties with their cultural identity.¹³ However, there is relatively little evidence on the opinions of people from SA ethnicity on dietary modification as a strategy to prevent T2DM. This holds true for SA living in western countries.

Existing literature reports challenges to dietary modification facing people from SA communities living with T2DM include, but not limited to, social pressure to maintain a traditional diet, misconceptions of what a diabetic diet entails and how to incorporate this into a SA palate.¹⁴ Facilitators to this population include translated diabetes

What's new?

Three key facilitators and five barriers were identified that influence dietary modification in people with type 2 diabetes mellitus (T2DM) from the South Asian ethnicity living in western countries.

- Social factors were the most instrumental factors that influence the adherence to dietary modification for individuals living with T2DM.
- Elderly individuals reported language barriers when discussing diabetes management with their English-speaking general practitioner (GP).
- Culturally sensitive advice and tailoring programmes to SA cultures in diabetes education have the potential to improve adherence to dietary modification.

education and services, culturally relevant dietary advice and family involvement.^{14,15}

Whilst these findings are important in informing clinical practice, they are not specific to people from SALWC who may possess different beliefs to people from SA ethnicity living in their country of origin and may have adopted a more Westernised palate.³ In addition, there are other key factors that might impact these individuals, such as language barriers and the potential of healthcare staff being culturally unaware. The existing studies are excluded from technology-based interventions, which could be an efficacious method of targeting certain demographics.¹⁶ Technological approaches are being used more often in health care with a greater emphasis placed on these following the COVID-19 pandemic.¹⁶

Sohal et al. previously discusses the facilitators and barriers for SAs in lifestyle changes for T2DM management. Facilitators included family involvement and culturally appropriate interventions. The barriers were lack of knowledge, misperceptions and a lack of interventions that were culturally adapted.¹⁷ Additionally, due to variations in ethnic identity, it is appropriate to investigate facilitators and barriers in SALWC specifically. This systematic review therefore updates the evidence presented in a review cited from 2015 on the barriers and facilitators in dietary change but specifically investigating this in SALWC.¹⁷

2 | METHODS

This systematic review was prospectively registered on Prospero (CRD42021288315) and followed the Preferred

Reporting for Systematic Reviews and Meta-analysis guidelines (PRISMA).¹⁸

2.1 | Literature search strategy

An electronic search of databases: PubMed, Web of Science and Scopus was conducted for papers published from 1946 to 12th December 2022 by the following search strategy: (diet OR eating OR energy intake OR feeding behaviour OR nutrition) and (type 2 diabetes mellitus OR pre-diabetes OR impaired glucose tolerance) and (barriers OR management OR self-management OR prevention OR risk) and (South Asian OR Indian OR Pakistani OR Bangladeshi OR Sri-Lankan OR minority groups OR ethnic minorities).

Results were limited to studies involving adults, reported in the English language and South Asian ethnicities. The last date for this literature search was 12th December 2022. Additional studies from a Google Scholar search and inspection of reference lists were included.

2.2 | Eligibility criteria

2.2.1 | Inclusion criteria

Publications were included in the review if they met all the following criteria:

- Adult population (Aged ≥ 18 years)
- $\geq 5\%$ of participants SA (Indian, Pakistani, Nepali, Bangladeshi or Sri Lankan)
- Population diagnosed with T2DM or pre-diabetes, impaired fasting glucose or impaired glucose tolerance
- Original qualitative research
- Evaluation of dietary modifications and management
- Western Studies: United Kingdom, United States or European studies¹⁷

2.2.2 | Exclusion criteria

- Studies where the intervention comprised the administration of a pharmacological agent
- Studies that do not include participant quotes in their analysis
- Studies applying dietary advice through supplementary dietary changes (e.g. vitamin and mineral supplementation)
- Lifestyle modification without dietary changes (e.g. focus on exercise only).

- Types of diabetes other than T2DM including gestational Diabetes, type 1 diabetes mellitus, maturity-onset diabetes of the young and latent autoimmune diabetes in adults
- Focus on cardiovascular risk as opposed to participants with T2DM or pre-diabetes.
- Populations with comorbidities unrelated to T2DM
- Systematic reviews and meta-analysis
- Abstracts

2.3 | Selection process

Conducted by two independent reviewers (AR, RM). Studies were assessed against the eligibility criteria utilising the screening software COVIDENCE, then title and abstract screening, full-text review, data extraction and risk of bias were completed. Any conflicts were resolved by a third reviewer (DP). A total of 4302 records were identified through the database searches, with 3739 records included after the duplicates were removed. Overall, from the 59 full-text articles reviewed a total of seven studies were included in this review. Studies were excluded because of incorrect participant population ($n=22$), study design ($n=19$), outcomes ($n=6$), intervention ($n=4$) and indication ($n=1$) (Figure 1).

2.4 | Risk of bias assessment and data extraction

The quality and risk of bias of the selected publications were completed using the Joanna Briggs institute (JBI) critical appraisal tools for qualitative research¹⁹ (Table 1) by two independent reviewers (AR, RM). Any differences between the two reviewers were assessed by a third reviewer (DP). The qualitative critical appraisal checklist included: research objectives, methods used to collect results, analysis of data, influence of the researcher, adequate representation of participants and relationship of conclusions to analysis drawn by the study (Table 3). A study was included if a minimum score of 7 was obtained as agreed by all 3 reviewers (AR, RM and DP) prior to the review.^{20,21} Qualitative data were inputted utilising COVIDENCE then transitioned to Microsoft Excel for data synthesis²⁰ (Appendix S1).

2.5 | Data synthesis

A grounded theory-based methodology for thematic analysis was used.²² This involves generating codes for data (the promoting and barrier themes) then grouping these into themes before a final review of the theme definitions and names. Thematic analysis was completed for the pooled

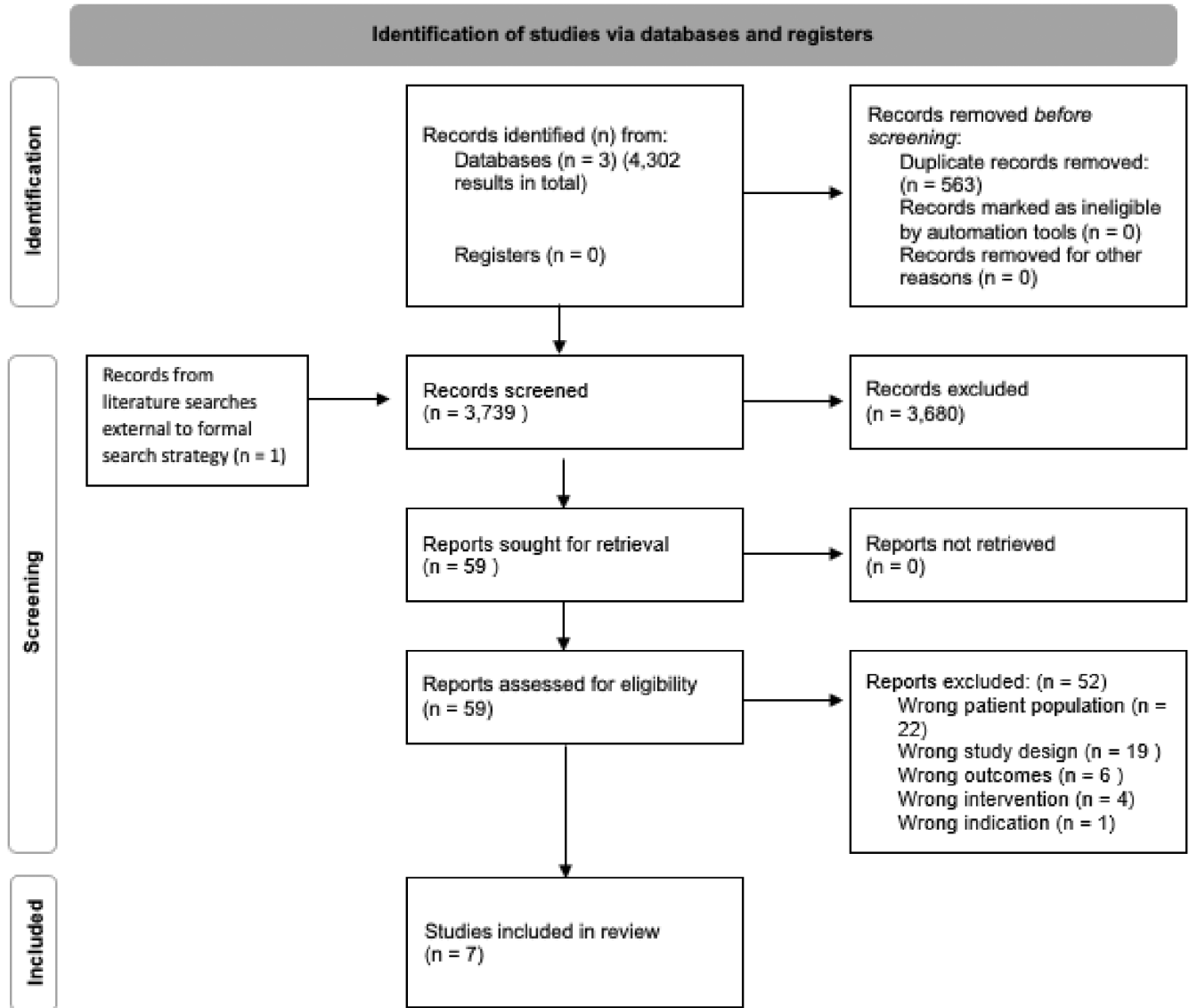


FIGURE 1 PRISMA flowchart illustrates our search and selection process for the systematic review.

qualitative data based on Thomas and Harden.²³ The data extraction was recorded via Microsoft Excel, and themes grouped as promoting or impeding dietary modification then categorised into subthemes (Table 2). This was done individually by AR and RM, then cross-referenced with outstanding issues resolved by DP. Quantitative results were extracted and recorded from Shah et al.²⁴ General comments on the weight and cardiometabolic parameters were provided to supplement this review.

3 | RESULTS

3.1 | Study characteristics

The database search identified 4302 records. Following the removal of duplicates, seven studies were included for

analysis (Figure 1). Studies were based in the UK ($n=6$) and United States (US) ($n=1$). All studies included participants diagnosed with pre-diabetes or T2DM ($n=260$). The proportion of overall participants who were of SA origin was 92.7% ($n=241$). In addition, 42.9% ($n=3$) of studies focused on those from a single SA ethnic group, namely, Indian, Pakistani or Bengali (Table 2).

The overall age range of participants across the studies which specified this information ($n=5$) was between 18 and 85 years old. The data collection strategies used across all studies were the following: focus groups discussion ($n=2$), individual motivational interviewing ($n=1$), semi-structure interviews ($n=2$), community-based programme ($n=1$), tailored group visit model ($n=1$) and interview study not specified ($n=1$). Shah et al. comprised of both a community-based programme and focus group discussion.²⁴

3.2 | Thematic analysis

From thematic analysis of the analysed articles, facilitators and barriers were identified, which promoted and prevented dietary modification respectively (Table 3). A facilitator was defined as a theme from people of SA ethnicity which support making positive dietary changes. Barriers were defined as a theme that prevented those in the study from making positive dietary changes.

Overall, there were three facilitators identified: cultural sensitivity; health education; and support networks. Six themes were identified as being barriers to dietary modification: healthcare inequity; cultural insensitivity, social pressure, educational misconceptions and time constraints.

3.3 | Facilitators

3.3.1 | Cultural sensitivity

Good healthcare access was jointly the most common facilitators discussed within the analysed literature alongside motivation for diet modification. Healthcare quality and access accounted for 71.4% ($n=5$) of all articles. The systems surrounding individuals played a key role in how supported they felt and consequently in their ability to control their diabetes.

Many individuals praised the healthcare professionals for being culturally sensitive which constituted 57.1% of articles ($n=4$), resulting in a harmonious relationship. Direct and indirect communication with healthcare teams was regarded as an important factor to individuals. Singh et al. shares that leaflets including information on dietary modification are information tools which participants can benefit from reading after their time-constrained appointments with healthcare practitioners.²⁵ Having access to healthcare teams allow them access to these resources.²⁵ Nurses with a similar cultural background were commented on positively:

‘I used to read all these leaflets in my free time due to which I am quite aware about diabetes ... the SA nurse can understand our language and she is a very nice lady’.—Singh et al.²⁵

Religious and cultural values were specified to be able to support diabetes self management by correcting preconceptions on diabetes and supporting in achieving a state of moderation. Leaders of religious groups were reported to have a health education role as reported by Greenhalgh et al.²⁶ Patel et al. identified within British Bangladeshi groups that seminars taking place in temples have been previously organised and there was an interest in these culturally sensitive forums.²⁷ Shah et al. further comments how participants reported that clinicians or

translators from the SA community could facilitate access to health information; however, a direct quote to supplement this is not provided.²⁴

3.3.2 | Health education

Health education involves individuals having the opportunity to understand practical matters of T2DM control.²⁹ This includes understanding what is involved in dietary change and portion control. Participants described positive dietary changes and perception of SA foods (28.6% of articles) as important factors for dietary change. Some individuals found recommendations from SA health and fitness trainers more useful due to a better understanding of the cultural palate.

Lawton et al. and Penn et al. discussed how improved health education can be a facilitatory factor. This theme was subdivided into education on dietary change and the perception of SA foods, respectively. Lawton et al. discussed how information on dietary change given to participants varies greatly, ranging from limited information from non-SA clinicians to detailed instructions from family members who have diabetes.²⁸ Despite this, Lawton et al. reports that a majority of respondents had made similar dietary changes by reducing oils and butter. The article does not, however, share why specifically individuals had made these changes and their understanding on the effect these food items have on T2DM. Respondents additionally shared that the methods used to cook foods such as grilling, or boiling were better than traditional methods of frying. Penn et al. provided additional methods of dietary change including portion size control through using smaller plates.²⁹ Penn et al. involved a community-based programme delivering physical activity, dietary advice and behavioural counselling. It was commented how such programmes from healthcare professionals can empower them in making positive changes and sharing this knowledge with their community:

‘By educating the women I think what you are doing is you are empowering the women to sort of make decisions, informed decisions cos they know that, “this is right,” “this is wrong.” Then they are in turn helping their younger, and extended elders’.—Penn et al.²⁹

3.3.3 | Support network

Individuals described that support, 42.9% of articles ($n=3$), from friends and family was beneficial in managing their diabetes. For example, situations where partners reminded individuals about medication and implemented dietary changes into their own routine resulted in a sense of solidarity instead of isolation.

TABLE 1 Risk of bias in qualitative studies.

JBI critical appraisal tool	Paper	Is there congruity between the stated philosophical perspective and the research methodology?	Is there congruity between the research methodology and the research question or objectives?	Is there congruity between the research methodology and the methods used to collect data?	Is there congruity between the research methodology and the representation and analysis of data?	Is there congruity between the research methodology and the interpretation of results?
Qualitative	Patel et al. ²⁷					
Qualitative	Penn et al. ²⁹					
Qualitative	Singh et al. ²⁵					
Qualitative	Lawton et al. ²⁸					
Qualitative	Greenhalgh et al. ²⁶					
Qualitative	Pardhan et al. ³⁰					
Qualitative	Shah et al. ²⁴					

Note: The Joanna Briggs institute critical appraisal tools¹⁴ were utilised to assess the risk of bias in the qualitative studies ($n=7$). The tool assessed studies for the extent to which potential bias in its design, conduct and analysis have been addressed. Subsequently, all papers ($n=7$) were included on this basis. Green indicates that meeting of the criteria. Red indicates that the criteria was not met. A study was included if a minimum score of 7 was obtained.

Penn et al., Singh et al., and Greenhalgh et al. reported this theme. Penn et al. discusses how community groups that incorporate supportive exercises are an opportunity for participants to support each other in their roles.²⁹ This was expanded upon that traditionally a pivotal role of the woman within the family was to cook. Support from community groups allowed women to modify family diets by food substitution:

‘We have stopped biscuits, we stopped cakes, we stopped crisps, we stopped everything, even we stopped white bread as well, we start brown bread and everything like brown rice’.—Penn et al.²⁹

Singh et al. emphasises that as SA households are commonly multigenerational, diabetes and subsequent dietary modification become a family issue.²⁵ Family involvement included reminders to take medication and support in challenging cravings for sugary foods. Through group diabetes story sharing, Greenhalgh et al. shared that individuals ‘rebuild’ their identity by engaging in positive diabetes control behaviours and this often involves engaging with family.²⁶ Family was involved in promoting positive lifestyle changes such as encouraging physical activity and control of food intake.²⁵

3.4 | Barriers

3.4.1 | Healthcare inequities

Healthcare inequity and access accounted for 57.1% of all articles. The systems surrounding individuals played a key role in how supported they felt and consequently

in their ability to control diabetes. Participants were concerned by language barriers between themselves and healthcare professionals, as well as being able to negotiate with healthcare services in arranging follow-ups.

Language barriers were noted in several studies with Greenhalgh et al. commenting how some participants were unaware about free interpreting services available to individuals locally.²⁶ However, Greenhalgh et al. did not characterise the specific proportion of participants this concerned. Pardhan et al. reported language barriers being the major barrier amongst those who cannot read, write or speak English in obtaining T2DM management advice.³⁰ It is further commented there are not opportunities to learn more about T2DM care in their local community centres held in their native language:

‘We don’t have opportunity to attend relevant learning events in local language in our local community centers’—Pardhan et al.³⁰

Being able to navigate through the healthcare system was challenging for multiple study participants in the focus group discussion by Pardhan et al.³⁰ All groups (i.e. literate, illiterate, younger and older) report having a lack of interaction with their healthcare providers. In addition to time constraints, participants reported that they are occasionally provided with non-specific recommendations such as to do ‘more exercise’ and written information being too detailed to comprehend:

‘When I received a leaflet or booklet I read everything, I try to stick to what it said but after just a few months I forget everything’—Pardhan et al.³⁰

Is there a statement locating the researcher culturally or theoretically?	Is the influence of the researcher on the research, and vice-versa, addressed?	Are participants, and their voices, adequately represented?	Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	Score (/10)	Include or exclude
Yes	No	Yes	Yes	Yes	8	Include
No	No	Yes	Yes	Yes	8	Include
Yes	No	Yes	Yes	Yes	8	Include
No	Yes	Yes	Yes	Yes	9	Include
No	No	Yes	Yes	Yes	9	Include
No	No	Yes	Yes	Yes	8	Include
No	No	Yes	Yes	Yes	8	Include

3.4.2 | Cultural insensitivity

Culture played a role in impeding dietary modification within the SA community.

Singh et al. offers a greater insight into the cultural pressures people from SA ethnicity face from within their communities.²⁵ Participants reported there are occasions where they are lax with adhering to their dietary recommendations to avoid stigma. Several reasons for this are given including avoiding coming across as ‘hard to please’ or due to special occasions taking place. Pardhan et al. reports that all groups in their study reported that there are social pressures to eat sugary sweets and a lack of ‘self-will’ at these occasions.³⁰ Older women participants additionally reported that they do not wish to upset the host at these events:

‘During wedding and festivals, we make lot of sweets in our culture. If I do not eat them that means I am making the host unhappy’—Pardhan et al.³⁰

Penn et al. shares that information on reading food labels is helpful for making dietary modifications.²⁹ Information on the quantities of oil and salt added to make dishes were understood by participants with efforts made for reduction. It was unclear from Penn et al. whether these foods are made from home by community members or if they are bought from stores.

3.4.3 | Social pressure

Some participants in studies report how social factors can be a barrier with family obligations, and one participant

commented that refusing sweets might result in failure of integration into Asian community.

Lawton et al. describes how people from SA ethnicity with families have led to regulated routines for family life which includes eating.²⁸ Previously, when migrant men entered the UK without their families, food times were irregular and often led to excessive eating. Respondents again report that the consumption of SA foods at community and religious events is expected despite being aware that these foods can negatively affect their blood glucose control. Lawton et al. describes that the engagement with foods in this setting is considered as ‘compulsory’ and would otherwise cause offense.²⁸

Singh et al. details another dimension of social pressure that individuals with T2DM face, namely the effect of diabetes on marriageability in the SA community.²⁵ This was considered to be greater for young and unmarried people from SA ethnicity with T2DM. Immediate family member’s comments have been recorded that reflect this reluctance to disclose a diagnosis of T2DM:

‘I have no problem telling anyone. My father does not really want anyone else to know. I remember my grandparents saying, “no one is going to marry him because he is a diabetic”’—Singh et al.²⁵

3.5 | Misconceptions

Misconceptions about diet modification and T2DM were commented on in all studies analysed. Some individuals experienced concerns including negative beliefs, the cold weather of the UK preventing outdoor physical activity as

TABLE 2 Study characteristics.

Title	Lead Author and year	Country	Study design	Time frame	Total participants included (proportion that were South Asian, %)	Ethnicities	Age range	Intervention description
A culturally adapted, social support-based, diabetes group visit model for Bangladeshi adults in the USA: a feasibility study	Shah 2022 ²⁴	USA	Mixed-methods single-arm feasibility study	16-week program	50 (100) in focus group discussions 14 (100) in intervention	Bangladeshi	>18 years old with T2D or pre-diabetes	Tailored group visit model AND focus group discussions (FGDs)
Barriers to diabetes awareness and self-help are influenced by people's demographics: perspectives of South Asians with type 2 diabetes.	Pardhan 2020 ³⁰	UK	Qualitative	N/A	35 (100)	Pakistani, Nepalese, Indian	30 plus	Focus group discussions
Storylines of self management: narratives of people with diabetes from a multi-ethnic inner-city population.	Greenhalgh 2011 ²⁶	UK	Qualitative	N/A	68 (83)	African-Caribbean, Bangladeshi, Tamil, Punjabi/Urdu, Somali	25–82	Group diabetes story sharing
An exploratory study into the health beliefs and behaviours of British Indians with type II diabetes.	Patel 2017 ²⁷	UK	Qualitative	March–April 2015	10 (100)	Indian	61 average age (range not given)	semi-structured interviews
Perspectives of UK Pakistani women on their behaviour change to prevent type 2 diabetes: qualitative study using the theory domain framework.	Penn 2014 ²⁹	UK	Qualitative	N/A	20 (100)	Pakistani	25–45	A community-based 8-week programme of group-delivered PA sessions

TABLE 2 (Continued)

Title	Lead Author and year	Country	Study design	Time frame	Total participants included (proportion that were South Asian, %)	Ethnicities	Age range	Intervention description
Support systems for and barriers to diabetes management in South Asians and Whites in the United Kingdom: a qualitative study of patients' perspectives.	Singh 2012 ²⁵	UK	Qualitative	N/A	20 (60)	South Asian (not specified) White British	N/A	Semi-structured interviews
We should change ourselves, but we cannot: accounts of food and eating practices amongst British Pakistanis and Indians with type 2 diabetes.	Lawton 2008 ²⁸	UK	Qualitative	2003–2004	32 (100)	Indian, Pakistani	N/A	Qualitative, interview study

Note: Study characteristics of all eligible studies ($n = 7$) were included. Studies were based in the UK ($n = 6$) and the United States ($n = 7$) and mixed-methods single-arm feasibility study ($n = 1$). All studies included participants diagnosed with pre-diabetes or T2DM ($n = 260$).

TABLE 3 Barriers and facilitators of dietary modification.

Thematic categories	Themes (n)	Subtheme (n).
Facilitatory	Cultural sensitivity (5)	Communication with healthcare teams (1)
		Culturally/religious sensitive programmes (4)
	Health education (2)	Dietary change (2)
Support network (3)		Perception of South Asian foods (2)
		Familial support (3)
		Wider community (2)
Barrier	Healthcare inequity (4)	Supportive exercises (2)
		Language barriers (2)
	Cultural insensitivity (5)	Navigating/negotiating with healthcare services (2)
		Stigma from within SA community (2)
		Nutritional value in SA foods (2)
	Social pressure (5)	Family obligations (2)
		Childcare (2)
		Marriageability (1)
	Misconceptions (7)	Alternative therapy (1)
		Exercise (3)
Cultural myths (3)		
Time constraints (3)	Medication adherence (1)	
	Motivation (2)	

Note: Comments from people of the South Asian ethnicity living in Western Countries about factors that promote and deter them from diet modification. The categories were stratified into three facilitators and five barriers, respectively. Following this, themes were subdivided into subthemes. N: number of articles contributing to each theme or subtheme are displayed within brackets.

well as a lack of motivation. Self-consciousness and ‘making a fool’ (as quoted by one person) for trying to improve lifestyle were barriers.

Pardhan et al. reported of cultural myths that their cohort shared.³⁰ This includes the view that sugary foods are not harmful to the body, with evidence being that relatives with T2DM do not have shorter lifespans:

‘We all have sugar in our body, my granddad has had it for 50 years and has been ticking along’—Pardhan et al.³⁰

Patel et al. specifically mentioned the use of alternative therapy amongst the SA population.²⁷ Examples included the consumption of bitter melon and fenugreek for diabetes control. This is information that was recommended by SA based community figures and relatives. However, within this group where additional views from other participants of

challenging these beliefs. Arguments against these alternative therapies stemmed from concerns of interactions with prescribed medications:

‘I am happy with my medication at the moment, no side effect, working perfectly so no need to change or experiment. I don’t want any possible side effect from any other medication I try’—Patel et al.²⁷

3.5.1 | Time constraints

Participants comment on a mismatch between the information required to manage T2DM and the length of consultations. Pardhan et al. further discusses how this can lead to inadequate engagement with healthcare providers.³⁰ A specific subgroup within the study was ‘literate younger groups’, defined as individuals <60 years of age and who were able to speak, read and write in English. This asymptomatic T2DM group reported that some primary care centres do not follow-up if appointments were missed and they themselves were subjectively not concerned if this occurred.

3.6 | Quantitative results

Shah et al. was a mixed methods single-arm feasibility study which recruited American Bangladeshi adults from a primary care setting living with T2DM or pre-diabetes.²⁴ Shah et al. created a community programme that involved tailored group visits. Fourteen participants were enrolled in the programme and four participants did not complete the programme due to schedule conflicts or comorbid health conditions. Information shared included diet modification and exercise. The intervention was delivered by a primary care physician with a focus on lifestyle medicine and a health coach of SA ethnicity, with sessions reported to be culturally adapted for SA community practices.

The authors report high satisfaction levels with the 16-week programme, alongside statistically significant reductions in weight and cardiometabolic parameters. The programme was associated with a 2% reduction (0.2 kg) in weight, a 12.7 mmHg absolute reduction in blood pressure and a lower of triglycerides by 62.6 mg/dL.²⁴

4 | DISCUSSION

The analysis of seven eligible studies yielded three facilitators and five barriers on the experiences of people with T2DM from SALWC implementing dietary

modification strategies for the management of their condition. Facilitators included cultural sensitivity, health education and support networks. Barriers included healthcare inequity, cultural insensitivity, social pressures, misconceptions and time constraints.

The review by Sohal et al. has commented on similar barriers facing SAs in diabetes control to the present review.¹⁷ Cultural adaptation to diabetes continues to an issue in the SA community and tailored intervention similar to that conducted by Shah et al. appear to be beneficial for these individuals.²⁴ There is no study that met our predefined inclusion criteria that compared different community interventions or explored in detail how T2DM advice should be tailored to ethnic minorities. The present review could give insight into themes that could be explored in future qualitative studies to investigate how these interventions should be adapted best for SALWC.

Social factors were reported to be amongst the most instrumental in encouraging dietary modification in individuals with T2DM. Family members providing social support has been observed within the literature to influence decision making, for example taking charge in organising follow-up healthcare appointments.³¹ However, family involvement could be perceived negatively by individuals with T2DM and become a source of conflict that hinders adherence to evidence-based dietary modifications. The recent COVID-19 pandemic demonstrates how misinformation can spread rapidly through social channels such as WhatsApp groups amongst the SA community.³² Beliefs in unfounded conspiracy theories were associated with disregard towards COVID-19 preventative behaviours such as social distancing whilst promoting adverse behaviours like panic buying.³³ It is suggested that healthcare services should address T2DM dietary modification strategies to families and the wider SA communities instead of exclusively to those living with pre-diabetes or T2DM. The benefit of this is increased awareness of the condition across generations and members within the family unit having an informed, evidence-based approach to supporting relatives with T2DM. This is relevant within the SA community where intergenerational living and shared mealtimes are a common affair.³⁴ Furthermore, this may contribute to a 'trickle down' effect where elder family members or heads of families have a greater influence in changing health beliefs in younger generations from an earlier age.³⁵

For those without close family, technological interventions and peer support groups are recommended. Prinjha et al. conducted eight exploratory focus groups in the UK and found that people from SA ethnic groups felt that short messages of support medical adherence and diet information would be relevant to their care.³⁶ Such information included portion sizing, which some participants felt

did not exist for SA diets. Muhammad et al. investigated the opinions of patients with coeliac disease in the UK on telemedicine and this sample contained a cohort of people from SA ethnicity (24.3%, $n=9$).³⁷ People overall reported that this technology was practical and flexible for their use. It has been documented that daily text message reminder systems have had a positive effect in increasing lifestyle adherence due to accessibility of information.³⁴ Similarly, face-to-face support groups can provide a platform for individuals from the same community to interact with each other which can reduce perceived cultural stigmas and loneliness from disease burden.³⁴

A lack of knowledge about the nutritional constituents in SA dishes mean people struggle to make informed food choices. If people from SA ethnic groups perceived their food to be high in sugar and fat, they may take measures to reduce portion sizes instead of substituting foods. As an alternative to the above, ingredient substitution may yield better T2DM control. Pavithran conducted a randomised control trial in Kerala, India where 80 individuals were allocated to either follow their usual diet or follow a diet using culturally similar recipes that contain foods with a low glycaemic index.³⁵ After a follow-up of 24 weeks, those who were following recipes with low glycaemic index food had a significantly lower weight, HbA_{1c}, and cardio-metabolic parameters such as high-sensitivity C-reactive protein. Similar initiatives could be explored for cuisines for the numerous subcultures within the sub-continent such as Punjabi, Bengali and Tamil communities. This would encourage palate-specific tailored advice and education that could be disseminated by physicians. Having dietary advice tailored to the target population has the potential to maintain enthusiasm and autonomy for mealtimes. This is important as positive thematic analysis showed 'enjoyment' to be the greatest motivational factor for adhering to lifestyle changes. Hagberg et al. showed that people who designed their own exercise programmes had 25% higher enjoyment levels than where a predetermined programme was imposed.³⁶ The Diabetes UK has created an adapted Eatwell guide for SAs and also has a 'Community Champion' initiative which trains ethnic minorities to advocate for T2DM awareness amongst their respective communities.³⁷ Resources are a much-needed next step in creating dietary advice and food suggestions that are more palatable and representative of an individual's backgrounds.

Beyond involving people from SA ethnic groups on learning topics such as prevention of T2DM via dietary modification, how this information is conveyed to minimise healthcare inequity is imperative. Language is a powerful tool in the delivery of education, the use of non-judgemental language to remove stigma has been shown to improve the education delivery in diabetes.³⁸ It prevents

the labelling of people with T2DM with traits attached with negative connotations, for example ‘uncontrolled’ and ‘noncompliant’. In 2018, NHS England published a document called ‘Language Matters’, a set of principles outlining good practice for interactions between healthcare professionals and people living with diabetes.³⁹ People with T2DM and key diabetes stakeholders (e.g., Diabetes UK and Trend UK) identified the importance of language and effective communication in this document and have placed emphasis on understanding situations and listening in patient-centred consultations. Many older generations from SA ethnic groups commented that they face a language barrier when discussing diabetes management with their English-speaking General Practitioners, which impedes progress and patient adherence. The South Asian Health Foundation carried out an education session delivered by a bilingual healthcare worker and provided support materials in major SA languages such as Punjabi, Gujarati, Urdu and Hindi. Pre- and post-questionnaires showed successful education, for example there was a 33% reduction in the belief that being prescribed insulin injections was synonymous with death soon after.^{40,41} Using cross-sectional analysis to understand the demographics of different regions would allow tailored brochures and leaflets to reach the intended patients.

Community healthcare workers have the potential to help overcome language barriers. Often originating from the target ethnicity, they demonstrate a thorough understanding of cultural nuances and are more likely to be trusted by members in the community for healthcare advice. Islam. et al. conducted a study utilising Community healthcare workers to improve T2DM management in the New York Bangladeshi community.⁴² Community healthcare workers (CHWs) led 2.5-h group sessions in Bengali that advocated healthier dietary practices and physical activity. Significant changes in HbA_{1c}, body mass index and blood pressure were recorded in participants following this intervention and are indicative of the benefits of CHWs.⁴³ Providing people from SA ethnic groups with patient-centred, culturally sensitive education surrounding T2DM allows them to be more involved with their own health care. Patient empowerment promotes autonomy, which is required to shift away from medical paternalism, and affords better patient satisfaction and outcomes.⁴³

4.1 | Strengths and limitations

This study has yielded key themes that physicians in western countries can contextualise and incorporate into their practice. It is vital that dietary modification advice for the management of T2DM is tailored to high-risk SA communities that suffer from comparatively worse clinical

outcomes. This study aims to provide healthcare professionals with an insight into the underlying barriers and facilitators in diet modification for the prevention and management of diabetes within SA households.

Several limitations exist within this study. Utilising the Joanna Briggs Institute (JBI) risk of bias scoring system identified six out of seven included papers as purely qualitative and one out of the seven involving quantitative analysis.¹⁹ The presence of heterogeneity within interventions and outcomes led to the limited ability to draw conclusions. Internal validity of the studies limited the representation due to the use of small population sizes in different cities across a handful of western countries. In addition, the majority of individuals volunteered to participate in the studies, which may have resulted in recall bias. Greenhalgh et al. included patients who were not from SA ethnicity and were from different ethnic groups. Therefore, it is uncertain which quotes and themes formed are expressed by people from SA ethnicity.²⁵ The review consisted of 260 individuals, but the reported barriers of dietary modification may not be representative of particular sub-groups of the SA ethnicity with T2DM or pre-diabetes.

5 | CONCLUSION

Overall, people living with T2DM from the SA ethnicity face barriers towards the modification of their diet to prevent and manage their condition. Social, educational and healthcare inequity factors add to the challenge; however, healthcare providers can improve adherence to diet modification by the development of culturally tailored interventions. Suggested interventions are the implementation of social media to educate the community away from cultural stigmas and to provide SA-tailored diets for people living with pre-diabetes and T2DM. Further quantitative research is required to evaluate how effective in the long-term culturally tailored interventions would be towards clinical outcomes.

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CONFLICT OF INTEREST STATEMENT

AB reports honoraria from Novo Nordisk, Office of Health Improvement and Disparity, Johnson and Johnson and Obesity UK outside the submitted work and is on the Medical Advisory Board and shareholder of Reset Health Clinics Ltd. DP reports personal fees from Astra Zeneca, Boehringer Ingelheim, Eli Lilly, MSD, Novo Nordisk, Sanofi non-financial support from Napp and Novo

Nordisk outside the submitted work. He is a member of the Medical Advisory Board and shareholder of Reset Health Clinics Ltd. DP is an executive committee member of the Association of British Clinical Diabetologists (ABCD) and member of the CaReMe UK group. All authors certify that they have no affiliations with or involvement in any organisation or entity with any financial interest or non-financial interest in the subject discussed in this manuscript.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Adrian Brown  <https://orcid.org/0000-0003-1818-6192>

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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