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Cultural Influences on Making Nutritional Adjustment in Type 2 Diabetes in Pakistan: The Perspectives of People Living with Diabetes and Their Family Members

Abstract

In Pakistan, type 2 diabetes is widespread, and although dietary recommendations from healthcare professionals are critical to its treatment, cultural norms can have a great influence on the dietary habits of people living with diabetes (PLwD). Therefore, understanding the social aspects of the lives of PLwD is crucial when examining the effectiveness of nutritional adjustments. Consequently, this study investigated (1) the enablers and barriers faced by PLwD living with their families in adhering to healthcare professionals' nutritional recommendations within the Pakistani culture, and (2) family involvement regarding PLwD's engagement in nutritional adjustments. Semi-structured interviews were conducted with 30 PLwD and 17 family members and the data were analysed thematically. Three themes emerged. First, 'Influence of family system, gender, and age on meals prepared at home': family hierarchy and opinions based on gender and age can enable or hinder nutritional adjustment in meals prepared at home. Second,

‘Temptations of ‘unhealthy’ foods, festivals, cultural interactions, and social etiquette’: family/social interactions can affect PLwD’s ability to resist temptations to eat foods prohibited by healthcare professionals at home, gatherings, or festivities. Third, ‘Folk knowledge, folk remedy, and the balance between culture and Western medicine’: PLwD and their family members in Pakistan hold strong beliefs concerning the medicinal properties of foods. Understanding power dynamics within families is crucial for making effective nutritional recommendations. Our findings imply a need for medical guidelines to acknowledge individuals' personal agency and consider family and cultural beliefs when recommending nutritional adjustments.

***Keywords*:** South Asia, food, meals, type 2 diabetes, culture, family

Introduction

In recent years, type 2 diabetes mellitus (T2DM) has become a growing concern. In 2021, China (141 million), India (74 million), and Pakistan (33 million adults; a 70% increase since 2019) showed the largest numbers of adults with diabetes worldwide (both type 1 diabetes mellitus and T2DM; aged 20–79 years); furthermore, the prevalence rate of diabetes in Pakistan is expected to increase from 30.8% in 2021 to 33.6% by 2045 (International Diabetes Federation, 2021).

In Pakistan, a low-middle-income country that faces various forms of financial constraint, there is a need to look at cost-effective methods to tackle diabetes. The World Health Organization has recommended lifestyle changes as a cost-effective measure for managing diabetes and described that people living with diabetes (PLwD) who make lifestyle adjustments could live longer/healthier lives with diabetes (World Health Organization, 2022). One of the self-care behaviours recommended for PLwD is nutritional adjustments

(Khan et al., 2020). This can help them achieve glycaemic control and reduce the risk of diabetes-related complications (Bukhsh et al., 2018; Farooq et al., 2018).

Similar to the dietary guidelines provided by institutions in Western countries, those provided by the Pakistan Endocrine Society focus on a balanced diet, including complex carbohydrates and high-fibre foods. PLwD are also encouraged to consume more lean protein, oily fish, and vegetables (Khan et al., 2020). Nonetheless, people in South Asian countries often eat meals with high amounts of saturated fats, refined carbohydrates, and a high glycaemic index. These practices are major environmental factors increasing the risk of uncontrolled T2DM and are common barriers to T2DM management. Traditional Pakistani cuisine meals (e.g., curry, rich in fats and carbohydrates), like those of other South Asian countries, are discouraged in these dietary guidelines (Khan et al., 2020). Still, while the guidelines advise PLwD to change their usual meals, they do not describe how nutritional adjustments are to be made in everyday life.

Adherence to nutritional recommendations among PLwD in South Asian communities can be difficult. A systematic review reported that they include established food habits, a lack of social support, inadequate knowledge, low socioeconomic status, food-sharing at weddings, and pressure to eat foods at social gatherings and festivals that conflict with recommended nutritional adjustments (Sohail et al., 2015). It can be challenging to maintain a recommended diet in social settings and at weddings because of temptations and pressure to indulge in specific foods (Bukhsh et al., 2020; Farooq et al., 2018; Mohamed Nor et al., 2019; Sohal et al., 2015). Perceptions of the strength-promoting properties and traditional medical qualities of foods can also influence PLwD's decisions about nutritional adjustments (Sohal et al., 2015).

The way people live their lives can affect their health outcomes, particularly for PLwD. Social determinants, which include the environments in which people grow up, live, work, and age, can influence lifestyle changes (Hill et al., 2013). Exploring factors that can serve as enablers and barriers for PLwD to change their lifestyles is essential for a better understanding of the topic (Sami et al., 2017). Research indicates that families are crucial in caring for individuals with PLwD. In South Asian countries, although family support is not directly related to glycaemic control, strong family ties can provide an environment where patients can receive management with optimal levels of satisfaction and happiness (Ahmed & Yeasmeen, 2016; Shawon et al., 2016).

The meaning of family diverges by culture. In this study, we used the following definition proposed by Giddens and Sutton (2013, p. 1057): ‘a group of individuals related to one another by blood ties, marriage or adoption that form a unit, the adult members of which are responsible for the upbringing of children’. Families are a part of society that influences lifestyle choices by exerting control over role definitions and accepted patterns of living, such as expected gender behaviours regarding nutritional adjustments. Understanding agency within the context of people's lives and their level of control when making decisions about lifestyle changes is crucial, especially when making recommendations that require significant shifts, such as nutritional adjustments. (Barolia et al., 2013). Considering contextual factors, such as family influence, is important when investigating self-care adjustments of PLwD in the family setting because these factors involve activities and interactions with family members that PLwD perceive to be related to family life (Giddens & Sutton, 2013).

These descriptions suggest the relevance of examining the influence of family on nutritional adjustments. Indeed, local and international studies related to South Asia show

that families can provide crucial support. For example, family members can offer emotional and moral support and assist PLwD in understanding nutritional adjustments (Ahmed & Yeasmeen, 2016; Rafique & Shaikh, 2006). Some people find their families helpful in managing type 2 diabetes, but some feel they are too strict about nutrition. Some nag and argue, while others offer praise and assistance with meal planning (Kandel & Wichaidit, 2020; Ravi et al., 2018). Although evidence exists, researchers suggest that further investigation is necessary to understand how PLwD adjust their self-care to the relevant recommendations while living with their families (Bukhsh et al., 2020).

The family systems in Pakistan can be categorized into nuclear and joint families. The former comprises parents and unmarried children, whereas the latter involves three or more generations living together, like grandparents and nephews/nieces (Lodhi et al., 2021). Pakistani culture emphasizes family interdependence and is patriarchal, with well-defined gender roles. As a result, family members rely on each other, and decision-making is influenced by age and family roles. Men are considered decision-makers, while women take on the roles of homemakers and family caregivers (Ahmad & Koncsol, 2022). However, the impact of Pakistani families and those in other South Asian countries on lifestyle changes for PLwD is yet to be explored in more detail. It is important to have a comprehensive understanding of the support required for managing TD2M, as family support plays a significant role. Unfortunately, we lack a comprehensive understanding of what this support entails (Farooq et al., 2018).

The society-community-family model (Imran et al., 2015), formulated on South Asians LwD, provides a conceptualisation of how personal, social and community networks may influence lifestyle change in PLwD. Imran et al. (2015) were interested in understanding the familial and cultural influences on the management of T2DM in South Asians attending

the University Heritage Institute clinic, a university-based free clinic in the USA. These PLwD were uninsured and had lower incomes. The majority of the participants spoke English, Hindi or Urdu. A total of six focus groups were conducted (n = 32, age = 30–74, men = 17 and women = 15, the majority were married = 28). Similar to in other studies, PLwD described the symbolic importance of food served by the host, and refusal to eat food as a sign of disrespect. Participants did understand the importance of diet and exercise, but only a few of them were able to carry it out. The authors also suggest that there is a traditional gender role, as one male participant described how 'our women take pride in caring for their families. This is a good thing. However, to the point that they ignore themselves' (p. 4). Women felt that their inability to look after their diet was due to their family duties, which require their utmost attention. The study reflects that the traditional role in the family for women LwD is a barrier compared to men LwD, as women's role is to ensure they look after others. The WHO discusses social determinants, and this is one aspect that needs to be addressed more in future studies. PLwD have been described as struggling with the social pressure to eat, which also needs to be explored in terms of how a family can be involved without disrespecting the host. These concerns cannot be overcome by culturally-tailored educational programmes; efforts are needed to address the multiple interactions within a family and a community.

This framework helps people understand their social networks and how they affect those with diabetes. Cultural influences impact how people manage their illnesses, and families play a significant role. The society-community-family model offers insights into lifestyle changes for South Asian communities.

The concept of familism can also understand social interaction at a family level. Familism is a social organization that emphasizes the importance of the family unit over

individual members. It is based on affection and concern for family and is driven by a set of role expectations, behaviors, and perceptions. Familism places great importance on the success and failure of the family and is regarded as a critical criterion for value judgments. (Hee Park, 2004). Moreover, the family relationship within the family in Pakistan can be better explained within patriarchy within the family relationship.

Given Pakistan's low-income status, one may question whether families can afford the recommended meals for PLwD or whether PLwD can provide financial support for their families to follow these meal recommendations (Ansari et al., 2019). As abovementioned, like the nutritional guidelines in Britain and America, Pakistan's guidelines for PLwD emphasise the importance of understanding nutritional adjustments and meal preparation to manage blood glucose. However, these guidelines do not address the practical aspects of making these nutritional adjustments in a home setting. This highlights the importance of exploring the experiences of PLwD and their families with nutritional adjustments in daily life. By examining the perspectives of PLwD and their families on nutritional adjustments, we can gain new insights into the contextual factors that influence adjustments among Pakistani PLwD. This information can then assist stakeholders in setting treatment goals and creating personalised interventions for PLwD in Pakistan.

The studies cited thus far demonstrate that the enablers and barriers to nutritional adjustments among PLwD relate to the educational understanding of TD2M and individual, social, and community factors. Particularly, the mentioned literature shows that traditional cultural health beliefs influence the nutritional adjustments of PLwD in South Asian communities at the individual level; PLwD and their family members influence each other’s

behaviours at the social level; and communities influence how people act (e.g., through community norms that influence individual decision-making) at the community level.

Accordingly, this study aimed to understand the experiences of PLwD and their family members in Pakistan regarding PLwD's nutritional adjustments for managing T2DM. To this end, the following research questions were posed:

- How do PLwD living in Pakistani families adjust their nutrition to the recommendations of healthcare professionals to manage T2DM?
- What do PLwD living in Pakistan and their family members perceive as enablers and barriers to the necessary nutritional adjustments for managing T2DM?
- What strategies do PLwD living in Pakistan and their family members employ to enable the necessary nutritional adjustments?

Methods

Study design

The methodology was influenced by a focused ethnographic approach. In social research, focused ethnography is a method that zooms in on a specific issue within a particular setting. This approach involves studying a subset of people who share similarities with the researcher's culture, rather than those who are vastly different. The researcher analyzes the common actions and experiences of the participants, assuming that they share a similar cultural perspective, despite not being familiar with each other (Wall, 2015). It uses an interpretivist paradigm that looks at the meaning behind people's responses within their social and cultural settings (Chowdhury, 2014; Mackenzie & Knipe, 2006; Ritchie et al., 2013). This qualitative study employed semi-structured interviews for data collection. This

188 method was chosen because it adds depth to the examinations on the targeted study topic
189 (Cohen et al., 2011; Denscombe, 2007; Gill et al., 2008). Appendix A provides details of the
190 study methods.

191 **Interview guides**

192 Interview guides (one for PLwD; one for family members), developed based on the
193 research by Keogh et al. (2011), Sullivan-Bolyai et al. (2014), and the researchers' reading of
194 the relevant literature, were created. The initial interview guide was pilot-tested and
195 modified as needed (e.g., some questions needed elaboration and others were changed
196 regarding word choice).

197 The interview guide for PLwD focused on their understanding of own condition,
198 details of the nutritional practices they performed, and how such practices influenced their
199 T2DM management. Regarding nutritional practices, they were asked about what did and
200 did not work for them and their views on their family's involvement in their meals.

201 The interview guide for family members of PLwD focused on their understanding of
202 the condition of PLwD in the family. Regarding nutritional practices, they were asked what
203 had and had not worked for PLwD in the family and their views on family involvement with
204 nutritional practices.

205 **Data collection**

206 The participants in this study were selected using purposive and snowball sampling
207 methods. The study was conducted in three diabetes centres, which are not named for
208 confidentiality reasons. During their regular appointments, doctors asked PLwD and their
209 family members whether they were interested in participating in the study. If they were
210 interested, they were provided with an invitation letter and information sheet that

211 explained the study in more detail. Interviews were then scheduled with the researcher (i.e.
212 either on the same day of their regular appointment or at a later time based on the
213 participants' preferences) and took about an hour to complete. All participant were
214 residents of Lahore speak either Urdu and/or Punjabi. Lahore is a metropolitan city located
215 in Punjab, Pakistan.

216 The inclusion criteria for PLwD were as follows: having T2DM for at least 1 year, as
217 we deemed that this would allow them to be familiarised with and speak knowledgeably
218 about their experiences with TD2M; living with at least one adult family member, because
219 those living on their own would have different environmental factors influencing them than
220 someone living with family members; and being aged 30 years and above. The inclusion
221 criteria for family members were being 18 years or older and living in the same household as
222 the PLwD. It did not matter if the family member had a medical condition if it did not hinder
223 one's ability to support the PLwD.

224 **Ethics statement**

225 This study was approved by the responsible Ethics Committee [anonymised as
226 required by journal guidance]. The recruitment sites granted permission for study
227 conduction, and all participants provided verbal and written informed consent before data
228 collection.

229 **Participants' characteristics**

230 Tables 1 and 2 show the demographic details of PLwD and family members of PLwD.

231 **Table 1.** Participants' detailed characteristics

Characteristics of persons living with diabetes	Male persons living with diabetes	Female persons living with diabetes

	(n = 13)	(n = 17)
Age group (in years)		
30–54	6	10
55+	7	7
Education		
No formal education	2	9
Reception to grade 6	5	2
Grade 7–11	1	5
Grade 12–13/further education	--	1
University/higher education	5	--
Marital status		
Single	--	--
Married	12	14
Widow/widower	1	3
Use of medication		
Oral medication	11	10
Insulin	2	6
Both (oral medication + insulin)	--	1
Family system		
Joint	6	12
Nuclear	7	5
Occupational status		
Homemaker	--	11
Middle-income job	5	1
Low-income job	7	4
Retired	1	1
Years since diagnosis		
1–5 years	8	5
6–10 years	1	1
11–15 years	2	4
16–20 years	2	7

Table 2. Detailed characteristics of the family members of people living with diabetes

Characteristics of family members of persons living with diabetes	Family members of male persons living with diabetes (n = 7)	Family members of female persons living with diabetes (n = 10)
Age group (in years)		

30–54	1	7
55+	6	3
Gender		
Men	1	4
Women	6	6
Education		
No formal education	2	--
Reception to grade 6	--	2
Grade 7–11	2	2
Grade 12–13/further education	---	4
University/higher education	3	2
Marital status		
Single	1	4
Married	6	6
Family system		
Joint	2	6
Nuclear	5	4
Employment		
Student	---	2
Middle-income job	2	1
Low-income job	1	5
Homemaker	4	2

Data analysis

The interviews were audio recorded, transcribed in Urdu, and then translated into English by the first author, who is bilingual. Thematic analysis techniques were used to analyse the transcripts, following the approach by Braun and Clarke (2006). The first step was to become familiar with the data by rereading the transcripts. Using a deductive approach, the initial thematic categories were drawn from various theoretical backgrounds and literature, but they proved to be unhelpful as they did not fully reflect the ideas from the interviews. Therefore, the authors reviewed the first 16 transcripts, re-evaluated the codes, and adopted a data-driven approach that could better answer the research questions and provide more informative insights about the participants' experiences. During the

research, similar codes were analysed and grouped to determine how they related to the subthemes. The themes and subthemes were not fixed and were refined as the Results section was written. To better answer the research questions and provide clarity on what participants said, the subthemes required additional refinement. Saturation was achieved when no new codes emerged, indicating that all themes had been identified. To ensure accuracy, the researchers continuously discussed the themes and subthemes, refining the codes and themes. This involved researcher triangulation, and the researchers agreed on the presentation of quotes that reflected the themes (Appendix A provides more details).

Results

The message provided by healthcare professionals that 'a change in nutrition was necessary' was understood by most respondents, and some participants (13 PLwD, nine men and four women) actively made nutritional changes to manage their diabetes at home. The findings indicate that differences in the perspectives of male and female PLwD regarding nutritional adjustments were influenced by the culturally defined roles/positions held by PLwD in the family and the cultural and family health beliefs. Extracts are shown in Appendix B Table and elaborate on the ideas discussed within each theme below.

Theme 1: Influence of family system, gender, and age on meals prepared at home

Family support can affect how PLwD follow nutritional recommendations at home, and there are differences by age, gender, and willingness to adapt. It can also have positive and negative effects depending on the type of support offered and the willingness to accept it.

Meal preparation for PLwD is seen as a joint effort instead of a single person's responsibility. During family meals, everyone eats together, and accommodations or

separate meals may be provided based on factors such as the family's budget and cultural expectations surrounding age and gender (see extract 1-2,4). In households with multiple generations living together, adult males are often willing to assist their mothers with diabetes by modifying family meals (see extract 3). If older women are involved in meal preparation and can make recipe modifications that suit their husbands' tastes, they can easily make nutritional adjustments to family meals (see extracts 4). For male PLwD, if they were willing to make nutritional adjustments, either the whole meal was adjusted by family members or a separate meal was provided according to the PLwD's request (see extracts 5–10).

Middle-aged and older female PLwD in both joint and nuclear families stated that they could better manage their nutritional intake if their adult children could prepare and serve recommended meals on time (see extract 11, 14). Adult women were typically responsible for meal preparation, while adult men often provided information on nutritional requirements through verbal communication or pamphlets (see extract 12). Having adult children around reportedly facilitated nutritional adjustments. However, family members must be mindful not to pressure older female PLwD to change, as forceful efforts were reported to sometimes cause family conflicts (see extract 13).

In traditional joint family contexts, daughters-in-law were often described to assist older family members (see extracts 14-15), and cultural practices were shown to be both barriers and enablers of nutritional adjustments among older female PLwD. Some older female PLwD mentioned that the daughter-in-law could not prepare the recommended meals owing to having young children to care for, which served as a barrier for older female PLwD's nutritional adjustments (see extract 16).

In the nuclear family context, the situation is similar, as the unmarried daughters' failure to serve meals on time could lead older female PLwD to eat unhealthy foods at home (see extract 17). These descriptions highlight the expectations placed on younger women in the family. However, older female PLwD could overcome this barrier by planning and making nutritional adjustments if they were actively involved in meal preparations (see extract 18).

Meanwhile, older and younger male PLwD (vs. older female PLwD) preferred a less intrusive approach from family members. They described informing their family members of their meal needs, allowing the latter to prepare the meals accordingly (see extracts 19-20). However, male PLwD needed to communicate their nutritional needs to their wife with effectiveness, as this assisted the wife understand the nutritional expectations, leading to a cooperative effort towards a healthier lifestyle (see extracts 21-22). Failure to communicate these expectations was described to potentially lead to improper meals. Additionally, male PLwD who had lost their wives could face difficulties with their meals if they were not capable of communicating their needs to someone other than their daughter or wife. This was as a potential barrier for male PLwD who could not cook or live without their daughters (see extract 23).

In contrast to older female and male PLwD, younger female PLwD could not make nutritional adjustments for themselves or were not offered help. The importance of family roles is highlighted here, with younger mothers describing being fully absorbed with their children. The interviews also showed that the cultural expectations of women to make sure that the family's needs are met could clash with the nutritional recommendations, as female PLwD sometimes preferred to value the family's nutrition over food affordability (see

315 extracts 24-25). These results show that both PLwD and their family members can act as
316 barriers and facilitators to nutritional adjustments in Pakistan.

317 **Theme 2: Temptations of 'unhealthy' foods, festivals, cultural interactions, and social**
318 **etiquette**

319 The way families are structured can affect how they deal with 'unhealthy' foods
320 during festivities, special occasions, and social gatherings. During festive seasons or
321 gatherings in Pakistan, it is common for people to indulge in traditional and unhealthy sweet
322 dishes, disrupting normal cooking routines. This can be particularly challenging for PLwD, as
323 they may be tempted to eat these foods they are not supposed to (see extract 26-27). Some
324 families either directly stop PLwD or prepare separate meals for PLwD, but maintaining
325 control over their own nutrition is ultimately up to the PLwD (see extract 28–30). Thus,
326 festive occasions in Pakistan can be barriers to nutritional adjustments.

327 During social gatherings, social etiquette can also serve as a barrier to nutritional
328 adjustments for many PLwD, as they often feel pressured to consume sugary or oily foods
329 that are harmful to their health. Unfortunately, sharing information about own condition
330 may not always be helpful, as some individuals may still force them to eat unhealthy foods
331 (see extract 31–32). This lack of sensitivity towards the seriousness of the situation can
332 make social situations difficult for PLwD. To combat these pressures, some older female
333 PLwD, or their family members, reported having developed strategies to take control of
334 their diet and navigate social situations with the help of adult family members (i.e. children
335 or daughter-in-law, see extract 33–35). Older female PLwD were offered more practical
336 help in social situations. A daughter-in-law reported that she gave support by providing
337 suggestions or actively refusing the unhealthy meals proposed by the hosts of the house
338 that the PLwD were visiting (see extracts 36–37). Thus, the role of counteracting social

pressure seemed to be assigned to younger female family members accompanying the PLwD in social gatherings. Nonetheless, such family support was possible in these situations because the particular older female PLwD were willing to receive such help. Other family members described being able to offer help in social settings only if the older female PLwD were willing to receive it (see extracts 37–38). When persuading reluctant older female PLwD, some younger children described using a respectful approach by discussing the value of the PLwD's presence in their lives (see extract 39).

Furthermore, it was crucial to be mindful of the expected normative behaviours when interacting with women of different hierarchical statuses within both the joint family (for daughters-in-law) and nuclear family contexts (for adult children showing respect towards older parents). This was deemed more important than forcing people to resist temptation (see extracts 40–41).

Sometimes, older female PLwD felt obligated to consume unhealthy foods because of formal social situations or their husband's disapproval, and they willingly took responsibility for their choices (see extracts 42–43).

Moreover, although men offered help to older female PLwD, they also expected younger female PLwD (e.g. their wives) to take responsibility for their actions, and did not think that they had to stop a host from offering unhealthy foods to younger female PLwD. Younger female PLwD were expected to learn methods similar to those used by men to counteract social pressures related to eating unhealthy foods (see extracts 44–45).

Meanwhile, male PLwD described taking personal responsibility for their health choices (see extracts 46–48) as it may not be culturally acceptable for family members to offer them assistance publicly, especially women (see extract 49). Older male PLwD may be more receptive to help from their sons in social situations (see extract 50). Notwithstanding,

363 they cannot always refuse unhealthy foods in social interactions. When male PLwD are not
364 in a position of power, it can sometimes be challenging for them to make healthy choices,
365 such as when they receive a request from their boss or mother to eat sweet foods (see
366 extracts 51–53). Despite these social pressures, male PLwD can still make healthier choices
367 when allowed to make their own decisions.

368 **Theme 3: Folk knowledge, folk remedy, and the balance between culture and Western**
369 **medicine**

370 Many Pakistani PLwD and their family members strongly believe in certain foods'
371 health-boosting and symptom-alleviating nutritional properties. Participants' remarks
372 regarding T2DM management knowledge/practices confirmed that personal beliefs about
373 food properties significantly influenced their nutritional adjustments (see extracts 54–55).
374 These beliefs were mainly based on traditional cultural beliefs on the nutritional properties
375 of foods. For example, foods that were culturally perceived as 'healthy' were described by
376 PLwD and family members as having nutritional properties that helped PLwD overcome the
377 'weaknesses' they experienced or control blood sugar level (see extract 56–57)

378 Sometimes, healthcare professionals' nutritional recommendations for blood
379 glucose management did not align with these cultural beliefs about what makes a 'meal
380 strong'. For instance, a male person living with diabetes (see extract 58) did not consider
381 chicken nutritious and good for his health because he believed it lacked body strength.
382 Other participants considered food with religious significance safe to consume, even if their
383 doctors advised against it (see extracts 59). Thus, recommendations that contradicted
384 cultural beliefs or religious practices regarding foods and their health benefits were less
385 likely to be followed, serving as barriers to nutritional adjustments.

Many Pakistani PLwD and their family members described having considered using homemade cultural remedies for TD2M management. These remedies have been passed down through generations and are often learned from acquaintances, the Internet, or newspapers (see extract 60-61). While researching these remedies, people may also discover how to make better nutritional choices. As aforementioned, some PLwD chose specific foods—such as mixtures with vegetables—based on cultural beliefs about their impact on blood sugar management (see extracts 60, 62–64). However, some participants realised that these 'totkas' could be unhealthy (see extract 65).

Accordingly, both Pakistani PLwD and their family members had a strong interest in the medicinal properties of foods, making cultural beliefs regarding food an important enabler and barrier of nutritional adjustments for Pakistani PLwD.

Discussion

In countries like Pakistan, social behaviour is shaped by various factors, including age, gender, and family status in a joint or nuclear family system. Our findings emphasise that these factors are important when providing personalised nutritional recommendations. While prior studies have focused on gender-based power dynamics (Barolia et al. 2013 Bukhsh et al., 2020; Farooq et al., 2018; Mohamed Nor et al., 2019), this study brings to light how cultural norms surrounding not only gender but also age work in a complex manner to impact nutritional choices. The findings show that family dynamics can be both enablers and barriers to nutritional adjustments for T2DM management depending on position and authority within the family. Cultural family roles, health beliefs, and the appeal of festive and religious foods were found to pose challenges for PLwD in making nutritional adjustments as per healthcare professionals' recommendations. Accordingly, the social

environment in which Pakistani PLwD live can significantly influence their nutritional adjustments; future studies and intervention programmes could focus on this aspect to address the challenges these individuals and their families face.

Our findings show that it is common for Pakistani women to be responsible for meal preparation, and men to rely on them for their meals. This corroborates the findings of previous research on South Asian communities living abroad (Bukhsh et al., 2020; Farooq et al., 2018; Mohamed Nor et al., 2019; Sohal et al., 2015). However, our evidence also demonstrates that family nutritional practices go beyond meal preparation, as family members share related decision-making and responsibilities. Furthermore, the results demonstrate the amount of agency involved in meal decision-making. For example, men decide whether PLwD need separate meals or must share family meals. This traditional role of men is seemingly associated with traditional concepts of respect within cultural structures (Ahmad & Koncsol, 2022), and ensures that Pakistani male PLwD receive the necessary support (i.e. increases their agency) for T2DM management because their wives make the necessary nutritional adjustments. Healthcare professionals could thus endeavour to understand these inviolable role expectations, as making inadequate requests could cause family conflicts and/or affect the men's self-image. Despite the significant impact of cultural practices and daily environment on nutritional adjustments, researchers and authorities in nutrition in Pakistan have not given sufficient attention to these aspects of such adjustments thus far. By providing more valuable insights into the specific social contexts of Pakistani PLwD, this study extends our understanding of the situation of their nutritional adjustments in Pakistan and further emphasises that stakeholders should focus on the topic in the future.

Younger female Pakistani PLwD in our sample were at a disadvantage regarding family meal decision-making. Although women were typically the ones with cooking skills, this did not mean that they could make nutritional adjustments to ensure that the family's diet concurred with medical recommendations for PLwD. Barolia et al. (2013) showed similar findings regarding gender differences in the ability to make changes in family meals. Nonetheless, the current study adds that age differences, specifically being an older female PLwD, can influence control over family meals. Pakistani older female PLwD (e.g. a mother-in-law) had advantages over younger female PLwD (e.g. a daughter-in-law) because older women had more control and power over the family, including over nutritional practices. Older female PLwD (in our sample, mothers-in-law) were also more aware of the tastes of family members higher in the hierarchy and could decide on nutritional adjustments if they satisfied their husbands' tastes. Thus, stakeholders should not exert direct control over older female PLwD but rather learn from them about their different taste preferences or those of male family members.

PLwD in our sample struggled with temptations during festivities and religious events, and this was similar to the situation in other countries, including other South Asian communities (Gallant et al., 2007; Gupta et al., 2017). Studies on both Western and South Asian communities show that the consumption of sweet foods is an issue (Lawton et al., 2007; Singh et al., 2012). Despite these similarities, if male PLwD in our sample wanted to cope with the temptations, they reportedly could ask for additional meals to be prepared for them. The findings explored so far show that the current study has identified small details about the social behaviours of Pakistani PLwD, a topic that has been overlooked by researchers (Ahmed & Yeasmeen, 2016). Thus, while family support is a crucial factor in nutritional adjustment, this research provides more specific details on its potential to act as

456 a barrier or enabler in this process—and on the intricacies of family support in relation to
457 nutritional adjustment. Contrastingly, past scholars have only broadly described family
458 support as either supportive or non-supportive.

459 Similar to the findings of the study by Sohail et al. (2015), our results suggest that
460 PLwD face social pressure to make unhealthy food choices when they attend social
461 gatherings/events (e.g. weddings). Still, the current study extends the evidence by
462 demonstrating that the agency of PLwD is limited depending on the formality of the social
463 setting, which in turn is informed by the hierarchy of the host and its control over the PLwD.
464 For example, male PLwD were reportedly unable to refuse the pressure from a boss to eat
465 sweets because this could be interpreted as a disrespect towards an authority, which may
466 have consequences. Hence, in such a formal social setting, the hierarchical interactions can
467 make Pakistani PLwD feel obliged to comply with the demands of the host based on the
468 cultural understanding of the relevant norms of interaction. These structural influences are
469 an essential part of communities with clearly established hierarchal interactions and levels
470 and may be shared by other communities (e.g. other South Asian communities).

471 In informal social settings (e.g. a visit to a relative), some older female PLwD were
472 able to ask their children or daughters-in-law for help to ensure that they would receive the
473 recommended foods. However, they did not ask for such help in formal social settings (e.g.
474 going to discuss a wedding proposal). Moreover, older female PLwD were less able to
475 control nutritional adjustments in settings where they had lower levels of power and where
476 their disagreement could result in some form of disrespect towards—or even bother for or
477 burden on—the host. Accordingly, formal settings seem to limit the agency of Pakistani
478 PLwD regarding taking responsibility for own nutritional adjustments, as they may feel less
479 in control of the social interaction.

Exploring ways to modify Pakistani cuisine to help PLwD resist food temptations is important. Based on our qualitative data, Pakistani customs significantly influence gender roles, as well as festive expectations and the accompanying meals. Given these cultural norms, it is important to consider introducing healthier recipes that adhere to the relevant nutritional guidelines while still appealing to the entire family during festive celebrations. Creating campaigns to promote these options could be beneficial.

In South Asian communities, the society-community-family model tackles some structural issues affecting those with diabetes. It recognizes that family members often provide support to the PLwD, traditional diets, and a patriarchal society can impact cultural norms. However, this model has limitations as it does not fully explain the process of socialization within families and the structural influences highlighted by this study. The model may not fully account for the intricate socialization involved in lifestyle behavior within a particular community. However, these models do not consider the varying levels of control and social support that different individuals receive during lifestyle changes.

According to the findings, PLwD interacts differently with family members based on power dynamics. This can make it difficult for them to make lifestyle changes, as they may not be able to refuse certain family members. This lack of control can be problematic. The study reflects on Cockerham's theory that public health education is important to promote individual responsibility for health. However, it also suggests that social factors can play a role in behavior change. According to Cockerham's health lifestyle theory (2014, p. 1036), health lifestyles refer to collective patterns of health-related behavior that are based on the choices available to individuals depending on their life circumstances. Structural factors such as gender also play a role in determining these choices (Cockerham, 2018). This theory helps to explain the patterns identified in the study. For instance, the results indicate that the

gender of PLwD is not just a demographic characteristic, but it also shapes expectations and cultural norms that restrict women more than men.

Women are expected to follow their husbands' demands as a sign of respect, which is also a religious obligation. Thus, they may not be willing to disagree or refuse to make lifestyle changes. The findings suggest that women are reluctant to disrupt the power dynamics within their families. The study highlights that lifestyle behaviors are influenced by cultural norms of interaction, which is consistent with previous research (Cockerham, 2018; Cockerham et al., 2017) that indicates people conform to group expectations to be part of a community. It is crucial to address the power dynamics within families when developing interventions for lifestyle change within South Asian communities.

In recent years, public health has given more attention to the intersectionality between demographic characteristics, such as gender and social class, within a person's identity (Bowleg, 2012; Richman, and Zucker, 2019). Even within the same gender, people are treated differently, and the combination of demographic factors influences cultural influences on acceptable behavior within South Asian communities. According to Bowleg (2012, p. 1268), intersectionality is essential because "multiple social identities at the micro-level intersect with macro-level structural factors to illustrate or produce disparate health outcomes." The intersectionality theory was created by feminist legal scholar Kimberlé Crenshaw, who discussed the differences in the experiences of white women from black women, and gender differences within the black community. Even within a marginalized group, the intersection of gender and ethnicity informs people’s different experiences (Bowleg, 2012). Similarly, the findings of this study show that age and gender combinations can differently affect nutritional practices and need to be taken into consideration by doctors and policymakers when updating the current guidelines.

Implications

To improve nutrition in families with PLwD in Pakistan, health professionals, policymakers, and researchers should target men and older women as the main decision-makers. They can educate these decision-makers directly or when accompanying their family members to the doctor. An effective strategy is to engage influential people outside the home, such as religious scholars, in the encouragement of nutritional adjustments. The national action plan suggests involving influential people at the domestic level to increase the likelihood of PLwD and family members listening to them. By using this approach, men can be encouraged to make nutritional adjustments and become more likely to support women in preparing these meals, and women can be provided with healthy and accessible recipes.

Educating Pakistani women on recipes that comply with current recommendations can help with T2DM management. This education could be provided at the doctor's office, through cookbooks, or during cooking shows. Additionally, community-based lifestyle interventions, similar to those used in India (Balagopal et al., 2008), could prove effective, as Pakistani female PLwD are seemingly more motivated by their contextual influences than individual efforts. These interventions could also involve PLwD, their families, and community members.

Regarding future research, scholars could explore the traditional Pakistani meals served during festivities and collaborate with chefs to create healthier options that can be enjoyed by all generations and genders. Regarding healthy lifestyle promotion, interventions could be focused on the community as a whole, with a particular emphasis on men, who often are family decision-makers on nutrition. Research by Gupta et al. (2017) has shown that modifications to celebratory meals during Navratri fasts for Hindus can be

suggested to families and stakeholders without completely eliminating traditional foods. This is important because festive and religious meals hold significant cultural value and completely changing them can be challenging for individuals with dietary restrictions and their families.

Regarding TD2M management in Pakistan, cultural beliefs about food are highly influential. To properly address any concerns related to these beliefs, doctors and diabetes educators should inquire about the perceptions of Pakistani PLwD regarding food properties. These beliefs are shaped by various factors, including personal experiences of PLwD with family and friends, media, and religious beliefs. Rather than disregarding these opinions, it would be beneficial for educators and professionals to gain an understanding of the benefits and risks associated with certain foods. This understanding can facilitate interventions that incorporate cultural food beliefs into nutritional recommendations.

Strengths and Limitations

This study had a relatively large sample size, and the semi-structured interviews provided rich person-centred data that were used to elicit the perspectives of PLwD and their family members in Pakistan about nutritional adjustments related to T2DM management. However, the study scope was limited to the setting where the interviews were conducted, limiting the generalisability of the observations; studies in different contextual environments (e.g. formal/informal settings) could provide complementary evidence.

Another limitation was that the clinical data of the participants were not obtained. Researchers could combine qualitative interview data with assessments of biological markers of self-care and disease status in future studies.

The sample reflected people from lower or middle socioeconomic backgrounds, limiting the generalisability of the findings to these demographics. Still, this limitation was partially overcome as the targeted socioeconomic backgrounds represent the major demographic in the target society, which is a positive aspect of this study.

Conclusion

The study highlights a discrepancy between the scientific evidence supporting the importance of culture in nutritional recommendations and the actual actions taken by relevant authorities in Pakistan. One important finding of this study is that nutritional recommendations should not be prescribed uniformly. Instead, they should consider the specific needs and preferences of those belonging to different age groups, genders, and family positions within a community. The medical teams and Ministry of Health in Pakistan need to recognise the cultural barriers faced by Pakistani PLwD, which can hinder their choice of healthy nutritional habits. To address this issue and promote healthier behaviours, stakeholders should work within the cultural norms of Pakistani society.

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