



Gender and diet management in type 2 diabetes

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Abstract:	<p>Introduction: Type 2 diabetes is a chronic health condition that requires ongoing self-management. This often includes changes in diet, which may be open to influences from relatives. Family support in terms of diet may be linked with gender and the assumption that meal preparation is a traditionally female activity. This article looks at the role of gender in diet management in people with type 2 diabetes and their relatives.</p> <p>Methods: Seventeen semi-structured interviews were conducted with 23 participants (10 people with type 2 diabetes, 13 relatives of people with type 2 diabetes) in Scotland, UK. The aim was to uncover changes people have made to their diet following diagnosis of type 2 diabetes in oneself or a family member. Data were analysed using Framework Approach.</p> <p>Findings: Female relatives were more likely to manage the patient's diet while male relatives provided support but were less likely to monitor the person's diet. Female patients may prioritise the needs of their family while male patients are more likely to rely on their female relatives in terms of diet management.</p> <p>Discussion: The study findings have implications for family-based interventions as gender may play a crucial role in the management of type 2 diabetes.</p>

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Abstract

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Methods: Seventeen semi-structured interviews were conducted with 23 participants (10 people with type 2 diabetes, 13 relatives of people with type 2 diabetes) in Scotland, UK. The aim was to uncover changes people have made to their diet following diagnosis of type 2 diabetes in oneself or a family member. Data were analysed using Framework Approach.

Findings: Female relatives were more likely to manage the patient's diet while male relatives provided support but were less likely to monitor the person's diet. Female patients may prioritise the needs of their family while male patients are more likely to rely on their female relatives in terms of diet management.

Discussion: The study findings have implications for family-based interventions as gender may play a crucial role in the management of type 2 diabetes.

Key words: type 2 diabetes, diet management, family, gender, interviews.

Introduction

Type 2 diabetes is a chronic health condition that requires ongoing self-management in order to minimise negative health consequences such as developing comorbidities¹. People with type 2 diabetes are advised to monitor their diet in order to maintain certain blood-glucose levels². A "healthy and balanced" diet that is rich in fibre and low in salt and sugar is recommended². Diabetes self-management can be facilitated by relatives and partners who can provide advice and support, and assist with daily activities^{3,4}. This is particularly relevant to diet management, which as a shared activity, may be more open to influences from family members than other behaviours^{4,5}. However, family support in terms of diet may be linked with gender and the assumption that meal preparation is a traditionally female activity^{6,7}. This may be particularly relevant to middle-aged and older women who are less likely to rely on spouses with everyday activities⁸. However, in families in which women are ill, although we might expect a narrowing in the gender gap in the division of these activities and men engaging in meal preparation, research shows that this is often not the case.

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Previous research in diabetes suggests specific gender differences in relation to diet management. For example, Maclean⁹ found that married men with type 1 diabetes were at “an advantage” because in almost all cases of their sample the wives prepared meals, which conformed to the prescribed diet. Women with type 1 diabetes in Maclean’s⁹ study, however, often had to balance their personal needs with the food needs of their family. More recent research shows a similar pattern. A systematic review by Li et al.¹⁰ found that ~~W~~women with type 2 diabetes often prioritise the needs of their family and ~~show low dependence on their spouses adopt multicare-giving responsibilities~~^{40,44}. ~~Men, on the other hand, are more likely to be dependent on their spouses in relation to diet management~~⁴⁰. ~~This may also be relevant to men with type 2 diabetes who live with their daughters, as the daughters may adopt a caring role and assist them in their diet management.~~ Traditional gender role orientation in terms of meal preparation and diabetes has been reported in different cultures (African-Americans¹²; Japan¹⁰; Canada⁹). However, ~~research on the role of gender in relation to diet management and type 2 diabetes in the UK is limited.~~ They often subjugate their own needs for the needs of their family members and cook separate meals for themselves¹¹. As a result, women show low dependence on their spouses and do not identify their spouse as a source of support¹⁰⁻¹². On the other hand, men with type 2 diabetes are more likely to be dependent on their spouses in relation to diet management and identify their wife as a main source of support^{11,12}. This is particularly problematic in respect to morbidity and mortality: women with type 2 diabetes are at increased risk of death from cardiovascular disease and stroke, compared to men^{13,14}. In addition, women with caregiving responsibilities may experience higher levels of perceived burden which can lead to poor physical and mental health¹⁵. Traditional gender role orientation in relation to diet management may be particularly prominent in certain cultures. For example, in a Mexican sample, women were viewed as “food preparers” so they took the responsibility for managing a patient’s diet¹⁶. Similarly, a qualitative study conducted in Pakistan showed that men view diet change as a matter for wives whose job it is to prepare the right food¹⁷. In an African-American sample, traditional gender roles extended to daughters, who were the main providers of diabetes-related care, including diet management¹⁸.

In the UK, there has been a decline in traditional gender role perceptions with 72% of respondents in 2019 disagreeing that women should be viewed as homemakers¹⁹. However, there is still a gap in understanding how gender plays a role in diet management following diagnosis of type 2 diabetes in oneself or a family member. In addition, the majority of previous research has explored this from the perspective of the person with type 2 diabetes. The experiences of family members and the role gender plays in providing support for someone with type 2 diabetes are seldom the focus of

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3 research. A better understanding of traditional gender roles in diet management can provide insight
4 into ways to improve self-care in patients and provide support for relatives.
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7 The objective of this article is to describe the role of gender in diet management in response to a
8 recent diagnosis of type 2 diabetes. The study builds on previous research by presenting the views of
9 both patients with type 2 diabetes and relatives of such patients.
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15 ~~This article looks at the role of gender in diet management in people with type 2 diabetes and their~~
16 ~~family members.~~
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19 20 73 **Methods**

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22 Ethical approval for this study was granted by the University of Stirling, School of Health Sciences
23 ethics committee (SREC 15/16, Paper No. 37, version 17th Oct. 2015).
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26 This was a qualitative study, conducted in Scotland (UK), which explored the way people respond to
27 and cope with diagnosis of type 2 diabetes in oneself or in a family member. The aim was to
28 interview people who had recently been diagnosed with type 2 diabetes and at least one of their
29 non-diabetic family members ~~or a spouse/partner~~ in order to uncover people's shared experiences
30 of diabetes. A recent diagnosis in oneself or a family member decreased the risk of recall bias and
31 optimised the chance of participants recollecting specific changes that occurred as a result of the
32 diagnosis. This article presents the findings related to diet management.
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38 39 83 **Recruitment**

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41 Recruitment was carried out through community outreach in Forth Valley, Scotland. Posters and
42 flyers, explaining the study, were distributed at 109 community locations, such as community
43 centres, libraries, charity shops, bowling clubs, golf clubs, local post office branches and the
44 University of Stirling. In addition, Diabetes UK advertised the study on their website, newsletter and
45 social media pages. The study was also advertised by word of mouth.
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49 ~~Interested participants were invited to contact the researcher by using the given email address or~~
50 ~~phone number.~~ People who expressed interest were screened for eligibility on the basis of the
51 following criteria: 1) over the age of 18 years; 2) able to speak and write in English; 3) a recent
52 diagnosis of type 2 diabetes in oneself or a family member. As type 2 diabetes is a chronic condition,
53 people's perception of what constitutes a recent diagnosis may differ so a specific timeframe was
54 not used. If a participant was eligible to take part, they were asked to nominate one non-diabetic
55 family member who might be willing to take part in the study (or nominate the relative with
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3 96 diabetes if it was the family member who got in touch). The participant was then asked to provide
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5 97 their family member with the study flyer and the researcher's contact details.
6

7 98 **Data collection**

8 99 Semi-structured face to face or phone ~~(where face to face was not possible)~~ interviews were
9
10 100 conducted with people with type 2 diabetes and relatives of people with type 2 diabetes. ~~Before the~~
11 ~~start of the interview, participants were given the opportunity to ask questions before written~~
12 101 ~~informed consent was obtained. After that participants were asked to~~ First, participants completed a
13 102
14 103 brief questionnaire that collected information about duration of type 2 diabetes, route to diagnosis,
15 104 relationship with the person with type 2 diabetes (for relatives), gender, age, highest education,
16 105 employment status, relationship status and postcode to enable calculation of the Scottish Index of
17 106 Multiple Deprivation (SIMD) or full address if the participant wanted to receive information about
18 107 study findings. The SIMD is used to identify areas of multiple deprivation in Scotland by ranking small
19 108 areas from most deprived (ranked 1) to least deprived (ranked 10)¹³. ~~The interview started with~~
20 109 ~~questions asking participants about how they were diagnosed with type 2 diabetes or how they~~
21 110 ~~found out their relative had type 2 diabetes. After that they moved on to ask people about changes~~
22 111 ~~in their life since the diagnosis of type 2 diabetes in themselves or in a family member. The interview~~
23 112 ~~aimed to uncover changes in participants' lives since the diagnosis of type 2 diabetes in themselves~~
24 113 ~~or in a family member. The topic areas included psychological changes in perceptions of diabetes~~
25 114 ~~severity and risk of complications (or developing type 2 diabetes in relatives), behaviour changes in~~
26 115 ~~relation to physical activity, diet and responsibilities, communication about type 2 diabetes and~~
27 116 ~~suggestions for diabetes service improvements and intervention design. Example questions in~~
28 117 ~~relation to diet~~ included: "What changes in relation to diet have you made since the diagnosis?",
29 118 "What barriers have you experienced?", "Tell me more about your family and what they do in
30 119 relation to your diet?". The interviews were semi-structured so questions varied depending on the
31 120 participant's response. Probes included: "How easy was it to change your diet?", "Do you and your
32 121 partner do anything differently together?", "Have your responsibilities in the house changed?".
33
34 122 An important consideration for the study was whether to interview members of the same family
35 123 together or separately. Joint interviews are useful when the interviews seek to explore the way
36 124 people collectively cope with illness. Individual interviews are useful when each individual's
37 125 perspective is sought. Although the initial aim was to interview people together, not all participants
38 126 could agree on a suitable time, so some members of the same family were interviewed separately. In
39 127 some cases, the interviews also included only one member of a family as other family members did
40 128 not agree to take part. The decision not to exclude people whose se family members were unable to
41 129 take part was influenced by ~~practical considerations, such as time and money~~ three reasons 1) the

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3 130 study did not aim to explore discrepancies in the views of men and women from the same family; 2)
4 131 to reduce the risk of coercion from family members who want to take part and 3) practical
5 132 considerations, such as time and money, as this study was part of a PhD project.- Although a family
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8 133 interview would shed light into the way people interact when talking about diet management,
9
10 134 individual perspectives are important as in some cases people may be more open if family members
11
12 135 are not present.

13
14 136 The interviews were conducted by a female researcher with training and experience in collecting
15
16 137 qualitative data (EDD). Data collection continued until data saturation was reached. We
17
18 138 conceptualised data saturation in terms of the study target group and quality and quantity of
19 139 information. The study participants represented a group with specific characteristics (i.e. recent
20 140 diagnosis of type 2 diabetes in oneself or a family member, living in the UK). Participants openly
21 141 talked about their experience, which enabled the researcher to gain sufficient information and
22 142 notice similarities (or differences) in experiences throughout the data collection process. In order to
23 143 avoid data redundancy, saturation was deemed to have been achieved when no new data emerged.

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145 **Data analysis**

146 The interviews were audio-recorded, transcribed verbatim and checked against the recordings for
147 accuracy. All information was anonymised and participants were given study numbers. The file
148 linking the study numbers with participants' details was kept separately from the recordings and
149 transcripts. Data were analysed using Framework Approach, which is based on the assumption that
150 the researcher stays close to the original data in order to "*capture, portray and explain the social*
151 *worlds of the people under study*" (p.279)¹⁴. This approach was chosen because it is better adapted
152 to research that has specific questions and a priori issues that need to be explored and as it helps to
153 facilitate case analysis. In addition, it provides systematic and clear stages to the analytic process,
154 thus allowing people to see the stages, by which the results are obtained ¹⁵. This transparency
155 ensures trustworthiness of data, especially in terms of credibility and confirmability. In addition,
156 having a clear process increases study transferability and dependability making it easier for others to
157 explore the consistency of findings and compare them to other contexts and conditions. Analysis
158 followed the data analysis stages, suggested by Spencer et al.¹⁴, which include familiarisation,
159 constructing an initial framework, indexing and sorting, reviewing data extracts, data summaries,
160 developing categories, mapping linkages, and providing explanations and interpretations. The
161 interview questions were initially used to guide data analysis. During the developing categories
162 stage, while detecting elements initial themes had in common, it became apparent that participants'

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3 163 responses in relation to diet management appeared to differ between men and women. This
4
5 164 enabled the identification of the themes presented in this article. Analysis was conducted by the
6
7 165 primary author. Another author with extensive experience in qualitative research (VS) reviewed the
8
9 166 data analysis stages to ensure that the final themes emerged from the data.

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13 168 Findings

15 169 Forty two people showed interest in the study ~~by contacting the researcher over phone or email~~
16
17 170 (22 people with type 2 diabetes, 20 relatives). ~~These were screened by asking them when they/their~~
18
19 171 ~~relative was diagnosed with type 2 diabetes and if they considered themselves/their relative to be~~
20
21 172 ~~newly diagnosed.~~ Twenty three participants took part in 17 semi-structured interviews. Sample
22
23 173 characteristics are presented in Table 1.

24 174

26 175 *Insert Table 1 about here*

27 176

29 177 Thirteen of the interviews were individual and four included the person with type 2 diabetes and
30
31 178 their relative(s) ~~(Table 1)~~. Ten were people with type 2 diabetes and 13 were relatives of people with
32
33 179 type 2 diabetes. Relationships included two families (father, mother, two daughters; father, mother,
34
35 180 daughter); a mother-daughter dyad; and three couples. The remainder were either a person with
36
37 181 type 2 diabetes or a relative whose family members were unable to take part. Details about the
38
39 182 relationships between participants and how they were interviewed are presented in Table 2.

40 183 Interviews were conducted between November 2015 and March 2016 and took place in participants'
41
42 184 homes (N=6), private rooms at University of Stirling (N=6), a local hotel (N=1), a local library (N=1)
43
44 185 and a private office at a participant's workplace (N=1), and over the phone with the researcher in a
45
46 186 private room (N=2). Interviews lasted between 25 and 85 minutes. Participants were given £10 as
47
48 187 reimbursement for participation.

49 188

51 189 ~~*Insert Table 1 about here*~~

53 190

55 191 Participants' characteristics are displayed in Table 2.

57 192

59 193 *Insert Table 2 about here*

60

194

195 Data analysis yielded two ~~emergent~~ themes addressed by both people with type 2 diabetes and their
 196 relatives: Women – taking responsibility for diet management, and Men – “going along” with the
 197 new diet. Women – more likely to adopt a caring role and additional responsibilities, and Men – more
 198 likely to provide support and advice.

199 **Women – more likely to adopt a caring role and additional responsibilities**taking
 200 responsibility for diet management

201 Virtually all relatives of people with type 2 diabetes talked about supporting diabetes self-
 202 management. However, compared to men, women more often talked about a desire to manage the
 203 person’s condition, take an active role in trying to prescribe a specific diet regimen and ensure the
 204 person with type 2 diabetes adheres to it. ~~Female relatives of people with type 2 diabetes talked~~
 205 ~~about searching for information on dietary management by buying and borrowing books, and~~
 206 ~~searching on the internet. In line with such information, they made changes to the food they~~
 207 ~~cooked.~~

208 *“The female always has a bit of a problem because they usually stereotypically are the ones*
 209 *responsible for shopping and cooking food, so you’ve got to manage this condition for them, at*
 210 *least for one meal a day.” R5, wife of a man with type 2 diabetes*

211 ~~Similarly, daughters of men with type 2 diabetes were proactive in obtaining information and~~
 212 ~~adjusting their fathers’ diet accordingly: Female relatives of people with type 2 diabetes talked about~~
 213 ~~searching for information on dietary management by buying and borrowing books, and searching on~~
 214 ~~the internet. In line with such information, they made changes to the food they cooked:~~

215

216 *“Just trying to research food for dad, trying to make him better meals. Make him different*
 217 *sandwiches all the time at work.” R4, daughter, lives with father with type 2 diabetesR3,*
 218 *daughter*

219 This was not necessarily a change in roles as in both cases the women were responsible for meal
 220 preparation before the diagnosis of type 2 diabetes. However, they perceived it to be their role to
 221 change the meals to align with diabetes-related recommendations. This perceived need to
 222 manage the person’s diet often led to additional responsibilities and affected other aspects of the
 223 women’s lives:

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3 224 *"I make sure what he [father] has every day: "you are not allowed to eat that anymore" so it's*
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5 225 *quite hard to have to balance my university with all this watching his diet as well as mine, and*
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7 226 *they're just jumbled up with each other."* R6, daughter, lives apart from father with type 2
8 227 diabetes
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13 229 In other cases, it presented a difficulty in managing the diet of other family members:

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15 230 *"Yeah, I try and buy less sweet things but for me, the dilemma is very difficult, because our*
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17 231 *daughter is underweight and doesn't eat very much at all and she is much more likely to eat*
18
19 232 *biscuits and cakes and sweets than anything else, so it's trying to balance her need to have a*
20
21 233 *high calorie [diet]."* R5, wife of a man with type 2 diabetes
22

23 234 The perceived need to monitor the person's behaviour was described as "policing" where women
24 235 felt they need to ensure the e patients ey comply with the specific diabetes-related diet regimen:

25
26 236 *"... so for me one of the changes is knowing what's supportive and what's not, so the*
27
28 237 *challenge existing is trying to police and say "you can't do this and you can't do that, you*
29
30 238 *know, do you really need to eat that or should you be eating that, you know" because it's not*
31
32 239 *gonna help, you know, ' cause you can just eat it when I'm not there, if you wanted to, but I*
33
34 240 *find it hard to resist the urge to interfere."* R5, wife of a man with type 2 diabetes
35

36 241 *"...I think he eats sweet packets so that gives me a reason to shout at him for it."* R6, daughter,
37 242 lives apart from father with type 2 diabetes
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39

40 243 The second quote comes from the daughter of a person with type 2 diabetes and suggests a form of
41 244 role reversal where children tell parents what to do. Although it is perceived as expected for children
42 245 to look after parents at a certain stage of life, type 2 diabetes appeared to be a trigger for this role
43 246 reversal:

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47 247 *"I would say usually, growing up your dad looks after you, but I'm suddenly thinking I need to*
48
49 248 *look more after my dad as well."* R2, daughter, lives apart from father with type 2 diabetes
50

51 249 One woman with type 2 diabetes talked about the diagnosis as the moment when children may
52 250 realise they need to look after their parents:

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54
55 251 *"...I suppose because I had the diagnosis and because of the potential for strokes and things*
56
57 252 *like that, you can tell for the very first time they are thinking of me as someone who can die."*
58
59 253 P6, a woman with type 2 diabetes, lives alone
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3 254 In some families, the roles before diagnosis did not align with traditional roles and assumptions
4
5 255 where the wife does most of the cooking. However, diagnosis of type 2 diabetes in the husband
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7 256 appeared to affect this and change relationship balance:

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9 257 *"I think probably the balance in our relationship has changed. I would probably see me having*
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11 258 *more of a caring role than I had before. And I think like [husband]. said, [husband] used to do*
12
13 259 *all the cooking and the balance in that has changed."* R7, wife of a man with type 2 diabetes

14
15 260 *"She [wife] likes caring for people, you know, she likes caring for me so in fact one thing, here*
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17 261 *you go, that's one thing that's changed, she does a lot more cooking than she used to (...) she is*
18
19 262 *not a great cook but she is trying, she is doing a lot more of it to try and make things easier for*
20
21 263 *me"* P9, a man with type 2 diabetes, lives with family

22 264 Although in these cases, the men may have experienced diabetes-related symptoms that
23
24 265 interfered with their ability to continue cooking, this was not reported by women with type 2
25
26 266 diabetes. Women with type 2 diabetes continued to perceive that it was their responsibility to
27
28 267 prepare meals, which in some cases added additional diet-related responsibilities, such as
29
30 268 cooking two meals:

31 269 *"I'll sometimes cook whatever they [family members] want and I'll have something separate or*
32
33 270 *I'll do myself something separate."* P8, a woman with type 2 diabetes, lives with family

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35 271

36 272 Women did not always live with the person with type 2 diabetes. In one case (see R6 earlier), the
37
38 273 daughter phoned her father every day to monitor what he has eaten that day. In other cases, the
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40 274 likelihood of women taking an active role in the management of the person's diet appeared to be
41
42 275 influenced by geographical closeness. In a few of the cases, women did not live with the person with
43
44 276 type 2 diabetes. Although not directly explored, it appeared that these women managed the
45
46 277 patient's diet the likelihood of women taking an active role in the management of the person's diet
47
48 278 appeared to be influenced by geographical closeness. If relatives did not live with the person with
49
50 279 type 2 diabetes, they managed their diet only on the occasions when they visited them:

51 280 *"I am much less willing to offer him cakes or biscuits or anything like that... erm...I am much*
52
53 281 *more focused on giving him salads."* R1, mother, lives separate from son with type 2 diabetes

282

283 **Men – "going along" with the new diet ~~more likely to provide support and rely on relatives~~**

284 Compared to the women in this sample, men provided support for their relatives with type 2
 285 diabetes but were less likely to ~~actively engage in~~ intake responsibility for managing their relatives' diet
 286 management. The two male partners, who took part in this study, were both understanding of the
 287 changes required in their wives' diet. Men were understanding of the fact that their relative with
 288 type 2 diabetes needs to adopt diet changes and they expressed willingness to support them by
 289 complying with the new diet regimen. Although both of them were "happy" to eat the meals their
 290 wives prepared, one of them Men also provided advice and encouragement to their relative with
 291 type 2 diabetes. However, they made a clear distinction between themselves and their relatives his
 292 needs and his wife's needs: by highlighting that the responsibility for diet management falls on the
 293 person with type 2 diabetes:

294 *"I mean I understand that, you know, what [wife]'s got, you know, I am quite happy to go*
 295 *along with it and if I need to pig out or something, I'm probably gonna do it."* R12, husband of
 296 a woman with type 2 diabetes

297 Only one son of a person with type 2 diabetes was interviewed. Similarly to the husband above, he
 298 provided advice and encouragement but he also distinguished himself from his father:

299 *"So I do try and get him to go out, like I always invite him for runs and stuff like that (...) He is*
 300 *very aware that it's his diagnosis and it's up to him to manage it himself"* R11, son, lives
 301 together with father with type 2 diabetes

302 Sometimes, men believed that by complying with the new diet regimen, they have started eating
 303 more healthily: The other husband in the sample believed his diet has changed as a result of him
 304 eating the food his wife with type 2 diabetes prepared:

305 *"Yeah, as I say, she prepares the meals, so she prepares meals that are good so I eat more*
 306 *healthy because of what she is cooking."* R8, husband of a woman with type 2 diabetes

307 However, this participant's perception differed from his wife's opinion:

308 *"I make him be healthy but it's rubbish...he would just eat anything."* P3, female with type 2
 309 diabetes talking about her husband

310 This illustrates potential differences in the way men and women perceive making diet changes
 311 and providing support following diagnosis of type 2 diabetes. It further illustrates that women

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3 312 may take responsibility for managing the diet of the whole family by trying to “make” people eat
4 healthy food. These participants were interviewed separately so the difference in perception
5 313
6 could not be explored in more depth.
7 314

8
9 315 Men with type 2 diabetes also appeared to rely on their female relatives for diet management:

10
11 316 However, the interaction between a husband and wife below, where the husband has type 2
12 diabetes, suggests that women’s perception of diabetes management may differ from that of
13 317 men’s. He admitted to relying on his wife for diet management by saying:
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16
17 319 “She is telling me what to eat, I eat it.” P4, male with type 2 diabetes, lives with wife

18
19 320 He then explained that his wife has done “research” on the internet and tells him how much
20 vegetables and carbohydrates he should have at each meal. In his account, it is clear he has made
21 321 significant change to his diet. This man also appeared to avoid taking responsibility for his
22 322 diabetes management and relying on his wife and other people to ensure he complies with the
23 323 diet regimen:
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26
27 325 “If I do something that’s gonna make it [type 2 diabetes] worse, I’d hope somebody either the
28 326 doctor or a nurse or [wife] would point out that I was doing it.” P4, male with type 2 diabetes,
29 327 lives with wife

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33
34 328 However, in the interaction between him and his wife below, their views on the wider diabetes
35 329 management differed. The wife’s concern about her husband’s health is obvious, which aligns
36 330 with the woman’s perception that she adopted a caring role following the diagnosis of type 2
37 331 diabetes:

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39
40
41 332 Man with diabetes: “No butter in my potatoes now and oh...half the potatoes I used to take.
42 333 But it’s all within the allowances of the amount of carbohydrate I am meant to take of this or
43 334 that, and I’ve never before eaten brown bread in my life so that’s a difference. Anything else...”

44
45 335 Wife: “No, I don’t think...I don’t feel like it’s probably gonna make a huge difference. I think the
46 336 big difference would be the exercise and the alcohol.” R7, wife

47
48
49 337 Man with diabetes: “I told you earlier I like to have a good drink of whisky before I go to bed.
50 338 She doesn’t like me having a good drink of whisky before I go to bed because I prattle on.” P4,
51 339 male with type 2 diabetes

52
53 340 Wife: “No, I don’t like it because of your health.” R7, wife

54
55 341 This man also admitted to relying on his wife and other people to ensure he complies with the
56 342 diet regimen:

57
58 343 “If I do something that’s gonna make it [type 2 diabetes] worse, I’d hope somebody either the
59 344 doctor or a nurse or [wife] would point out that I was doing it.” P4, male with type 2 diabetes
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3 345 The potential difference in perceived responsibility for and approach to diet management
4 346 between men and women is illustrated below in a quote from a man who considered a
5 347 hypothetical situation where his wife, instead of him, had type 2 diabetes:

6
7 348 *"I would've sort of wanted to be more supportive but I wouldn't have got five textbooks and all*
8
9 349 *that kind of stuff."* P2, male with type 2 diabetes, lives with family

10
11 350 There was only one man with type 2 diabetes in the current study who said his wife did not
12 351 change her diet to support him in his diet management:

13
14
15 352 *"I think initially I probably drove her quite mad with my weighing portions and so on, I think*
16 353 *because she wasn't doing it. I think she found that a bit irritating but beyond that she was*
17
18 354 *quite accommodating"*. P10, male with type 2 diabetes, lives with wife

21 355 **Discussion**

22
23 356 The findings in this article illuminate the role of gender in diet management for people with type 2
24 357 diabetes and their families. The study found that female relatives are more likely to take
25 358 responsibility for ensuring the person with type 2 diabetes conforms to the new diet. Similarly,
26 359 women with type 2 diabetes believed it is their responsibility to change their own diet, which
27 360 sometimes resulted in adopting additional responsibilities. Men, whether patients or relatives, were
28 361 more likely to comply with diet changes, initiated by women, rather than actively manage diet.

32 362 Women – taking responsibility for diet management

33
34 363 In this study, women talked about their desire to take an active role in diet management in response
35 364 to type 2 diabetes in their relative. This is consistent with previous findings that women are more
36 365 likely, compared to men, to assume responsibility for the management of their partner's diabetes²³.

37
38 366 The behaviour exhibited by female relatives in the current sample can be described by using the
39 367 dyadic perspective of coping^{24,25}, according to which patient and partner interact with each other to
40 368 mutually influence the adjustment process. Although the model of dyadic coping was developed in
41 369 partners/spouses, it could apply to other family dyads, such as parent-offspring dyads. Women
42 370 appear to engage in delegated dyadic coping, where they take over certain responsibilities to
43 371 alleviate the burden from the person with type 2 diabetes²⁵. Women were more likely to monitor
44 372 other people's diet and engage in "policing", which in some cases resulted in a shift in relationship
45 373 balance (women adopting new roles) and role reversal (children telling parents what to do). Similar
46 374 patterns of behaviour in terms of family roles following diagnosis of diabetes have been observed
47 375 before^{16,18}. Samuel-Hodge et al.¹⁸ explored diabetes management in African-Americans and found
48 376 that family members often engage in food policing. A potential explanation for women's increased

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2
3 377 likelihood to adopt a caregiving role is the suggestion that women internalise and take the caregiving
4 role more seriously²⁶. This could be rooted in historical and social practices. Bourdieu²⁷ argues that
5 378 traditional gender roles have been maintained through social construction and gender socialisation,
6 so women are considered to be inherently more likely to be caregivers. This is further confirmed by
7 379 recent findings that women may be viewed by their husbands as “food preparers”^{16,17}. Bourdieu’s²⁷
8 380 suggestion also supports the finding that women with type 2 diabetes in the current study prioritised
9 the needs of their family thus adopting additional responsibilities (for example by cooking two
10 381 separate meals). Often, in families where men did the cooking, after their type 2 diabetes diagnosis
11 382 women’s role in the kitchen appeared to increase. However, when women were the ones diagnosed
12 383 with type 2 diabetes, they continued to cook without men taking additional responsibilities in
13 384 relation to food preparation.

14 385 Although not directly explored in this study, the likelihood of relatives to adopt a caring role may be
15 386 influenced by geographical distance. According to Carmichael and Charles²⁸ geographical distance is
16 387 a type of a “non-economic” factor that influences people’s decision to adopt a caring role. Some of
17 388 the participants in the current study admitted that they thought more often about their relative with
18 389 type 2 diabetes but having work and family obligations and living far away from their relative,
19 390 interfered with their ability to provide support. However, female relatives talked about changing the
20 391 meals they prepare when their relative with type 2 diabetes visits them.

392 **Men – “going along” with the new diet**

393 395 Men, in the current sample, often talking about relying on their relatives to make diet changes and
394 396 “going along” with these changes was perceived as supportive behaviour. This can be explained in
395 397 terms of supportive dyadic coping where men provided support, advice and encouragement²⁵. This
396 398 is consistent with previous research that men with type 2 diabetes are more likely to depend on
397 399 their spouses^{11,12}. Del Rio-Lozano et al.²⁶ suggests that men have a more flexible approach to care
398 400 and do not identify with the caregiving role. This may put men at a position of advantage because
399 401 their wives prepare meals that conform to the prescribed diet⁹. Although the sample of male
400 402 relatives in the current study was small, the results showed that men provided support and advice to
401 403 their relatives with type 2 diabetes but were less likely to feel responsible for monitoring the
402 404 patient’s diet. We were not able to explore differences in support provision between husbands and
403 405 sons but previous research suggests that there is a difference between sons’ and husbands’
404 406 perception of caregiving²⁹. Sons perceive a filial obligation to provide care for their mothers while
405 407 husbands see caregiving as an extension of their marital role²⁹.

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6 410 **Implications**

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8
9 411 The current study supports previous research suggesting that women are more likely than men to
10 412 provide hands-on care with instrumental activities of daily living, such as shopping and preparing
11
12 413 meals ^{30,24}. This has implications for family-focused care as women who adopt a care-giving role
13
14 414 experience more chronic health disorders, such as stress, anxiety and depression ^{10, 12, 15,20,25}. Also,
15
16 415 when women try to manage the other person's condition, they may undermine their confidence to
17 416 control their own condition ^{31,26}. ~~Martire et al.²⁶ conducted a meta-analysis of the effect of~~
18
19 417 ~~psychosocial family interventions on people with a chronic illness and their relatives. The review did~~
20
21 418 ~~not include interventions in people with diabetes but showed that family interventions have positive~~
22
23 419 ~~effects on patients' depression and on caregiving burden in relatives. Family interventions have the~~
24
25 420 ~~potential to reduce caregiving burden and depression³¹. A systematic review and meta-analysis by~~
26
27 421 ~~Armour et al.³² show that interventions which involve family members can lead to improved~~
28
29 422 ~~diabetes knowledge and better controlled diabetes, and reduction in family conflicts. Future~~
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31 423 ~~interventions can utilise established behaviour change techniques³³ to provide information about~~
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33 424 ~~diabetes, encourage communication within the family and set clear goals in terms of diet~~
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35 425 ~~management for the whole family. In addition, interventions could capitalise on dyadic coping~~
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37 426 ~~theory²⁵ to account for different coping styles and optimise family cooperation. This may be~~
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39 427 ~~particularly important as the current study shows women and men may engage in different types of~~
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41 428 ~~dyadic coping. Supportive dyadic coping (often adopted by men) is a stronger predictor of~~
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43 429 ~~relationship satisfaction than delegated coping (often adopted by women)³⁴. Family interventions~~
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45 430 ~~can help families discuss roles in relation to diet management and re-negotiate these roles by taking~~
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47 431 ~~into account potential gender differences.~~ However, interventions need to be sensitive to cultural
48
49 432 values when addressing gender roles and chronic illness. For example, Latinos are more traditionally
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51 433 gender role oriented than other cultures and women are encouraged to provide emotional support
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53 434 for their partners ^{34,27}. African American families may not talk about diabetes as they do not think it
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55 435 should be discussed with family members ^{35,28}. This could lead to the adoption of traditional gender
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57 436 roles where people with type 2 diabetes and their relatives do not establish what their new role in
58
59 437 the family is. For example, women with diabetes adopt a multi-caregiving role, assuming family
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438 members do not understand their needs and their husbands would not be supportive of diet change
439 ^{36, 37,29,30}. However, this may not be the case as husbands are often willing to modify their behaviour
440 to support the wife's dietary needs^{30,7}. ~~Having culture-sensitive interventions is particularly~~
441 ~~important in places where ethnic minority groups live. For example, in Scotland the percentage of~~

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3 442 ethnic minority groups varies from 6% to 12% in different council areas³⁸ so a population-wide
4 approach to diabetes management may not be suitable for these groups.
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7 444 The study also has implications for direct provision of diabetes-related care. It shows that the
8 experiences of diet management in response to type 2 diabetes are not limited to the patient, so
9 patients can be encouraged to bring relatives to their diabetes appointments. Currently, in the UK
10 446 explanations about what to expect at diabetes appointments do not specify whether the patient
11 447 could bring a relative^{39,40}. Attending a diabetes appointment together may provide a platform for
12 448 family discussion about the best way to manage dietary needs.
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451 **Study limitations**

452 The current study has several limitations that should be considered. Sampling bias cannot be
453 excluded as participants who took part in the interviews contacted the researcher so it is not clear
454 whether people who volunteer to take part, have different characteristics from people who are
455 randomly chosen. In addition, all participants were white and living in the UK so the findings are not
456 transferable generalisable to other countries-or cultures. A recent study in 5 European countries
457 shows that gender differences in relation to diet management may be particularly evident in Spain
458 and Greece⁴¹. The authors suggest that in countries with particularly strong family structures,
459 women take responsibility for diet management. The role of culture in relation to gender roles
460 should be further investigated in future studies. Another limitation is the fact that not all interviews
461 included a person with type 2 diabetes and a relative from the same family and that the form of the
462 interviews was not consistent (individual vs family interview). More work is needed to uncover
463 different perceptions of roles in relation to diet and type 2 diabetes among family members. Finally,
464 the number of male relatives was low and this should be taken into consideration when interpreting
465 the study findings.

466 **Conclusion**

467 The current study suggests that women (whether with type 2 diabetes or relatives) may be more
468 likely to prioritise the needs of their family and take an active role in relation to diet management.
469 This is consistent with previous findings on gender and diet management in diabetes. The study
470 builds on previous work by showing that traditional gender roles, where women are responsible for
471 food preparation, may be still prevalent in the UK. Family-based interventions should focus on the
472 role of gender when adapting to chronic illness. While the results in this paper are drawn from

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3 473 secondary analysis, they provide meaningful contribution to existing literature on gender and diet
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5 474 management in relation to type 2 diabetes.
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8 475 **References**

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Participant number	Type of participant and relationship with the person with type 2 diabetes (if a relative)	Form of interview
I1R1	Relative, mother	Relative only, interviewed alone
I2R2	Relative, daughter	Interviewed together with sister, mother and father (I2R3, I2R4, I2P1)
I2R3	Relative, daughter	Interviewed together with sister, mother and father (I2R2, I2R4, I2P1)
I2R4	Relative, wife	Interviewed together with daughters and husband (I2R2, I2R3, I2P1)

I3R5	Relative, wife	Interviewed together with husband (I3P2)
I5R6	Relative, daughter	Relative only, interviewed alone
I6R7	Relative, wife	Interviewed together with husband (I6P4)
I8R8	Relative, husband	Interviewed separately from wife (I4P3)
I9R9	Relative, daughter	Relative only, interviewed alone
I11R10	Relative, daughter	Interviewed separately from mother (I10P6)
I12R11	Relative, son	Relative only, interviewed alone
I13R12	Relative, husband	Interviewed together wife (I13P7)
I16R13	Relative, daughter	Interviewed separately from parents (I6P4, I6R7)
I2P1	Person with type 2 diabetes	Interviewed together with daughters and wife (I2R2, I2R3, I2R4)
I3P2	Person with type 2 diabetes	Interviewed together with wife (I3R5)
I4P3	Person with type 2 diabetes	Interviewed separately from husband (I8R8)
I6P4	Person with type 2 diabetes	Interviewed together with wife (I6R7)
I7P5	Person with type 2 diabetes	Person with type 2 diabetes only, interviewed alone
I10P6	Person with type 2 diabetes	Interviewed separately from daughter (I11R10)
I13P7	Person with type 2 diabetes	Interviewed together with daughter (I13R12)
I14P8	Person with type 2 diabetes	Person with type 2 diabetes only, interviewed alone
I15P9	Person with type 2 diabetes	Person with type 2 diabetes only, interviewed alone

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629 **Table 12.** Participants' characteristics

	People with type 2 diabetes	Relatives
No	10	13
Duration of type 2 diabetes	Range: 3 weeks – 18 months Mean: 7.9 months Median: 6.5 months	-
Route to diagnosis	5 presenting GP with symptoms; 3 periodic screening; 1 visit GP for other reasons; 1 after gestational diabetes	-
Relationships with the person with type 2 diabetes	-	6 daughters, 3 wives, 2 husbands, 1 son, 1 mother. 6 share genetics but live apart from the person with type 2 diabetes 2 share genetics and live together 5 do not share genetics and live together
Gender	5 male, 5 female	10 female, 3 male
Age	Range: 37-71 years Mean: 53.6 years Median: 51 years	Range: 18-68 years Mean: 41.17 years Median: 45.5 years
SIMD (Scottish Index of Multiple Deprivation)	Range: 2-10 Mean: 5.7 Median: 6	Range: 2-10 Mean: 6.92 Median: 6

Education	9 had education after high school (2 PhD, 1 MSc, 2 BAs/BSc, 1 one year at university, 1 Diploma, 1 Police promotion exam, 1 HNC, 2 current students)	9 had education after high school (3 PhD, 1 MSc, 2 BAs/BSc, 2 college, 1 SHND, 3 current students)
Employment	4 full-time, 3 retired, 2 unemployed, 1 part-time	4 full-time, 4 part-time, 2 unemployed, 1 self-employed, 1 retired, 1 other
Relationship status	8 in a relationship, 2 single	12 in a relationship, 1 single
Family history of diabetes	5 yes, 5 no Number of relatives with diabetes: 1-4	8 yes, 5 no Number of relatives with diabetes: 1-4
How they heard about the study	5 word of mouth (relative who took part or someone who saw advert) 2 University of Stirling portal 1 Diabetes UK newsletter 1 Poster at a community centre 1 Local Diabetes support group social media page	7 word of mouth (through someone who took part or someone who saw advert) 2 University of Stirling email advert 2 University of Stirling portal 2 Local council intranet

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Table 2. Participants and form of interview

<u>Form of interview</u>	<u>Participants' characteristics in the context of the study</u>
<u>Interviewed together</u>	<u>A man with type 2 diabetes (I2P1, 55 years old, 6 months since diagnosis), his wife (I2R3, 54 years old) and daughters (I2R2, 23 years old and I2R4, 20 years old).</u> <u>A man with type 2 diabetes (I3P2, 47 years old, 2 months since diagnosis) and his wife (I3R5, 46 years old).</u>

	<p><u>A man with type 2 diabetes (I6P4, 70 years old, 3 months since diagnosis) and his wife (I6R7, 60 years old).</u></p>
<p><u>Interviewed separately</u></p>	<p><u>A woman with type 2 diabetes (I4P3, 39 years old, 7 months since diagnosis) and her husband (I8R8, 47 years old).</u></p> <p><u>A woman with type 2 diabetes (I10P6, 65 years old, 6 months since diagnosis) and her daughter (I11R10, 29 years old).</u></p> <p><u>A woman with type 2 diabetes (I13P7, 60 years old, 10 months since diagnosis) and her husband (I13R12, 60 years old).</u></p> <p><u>A daughter of a man with type 2 diabetes (I16R13, 45 years old) and her parents (I6P4, I6R7).</u></p>
<p><u>Interviewed alone (relative did not take part)</u></p>	<p><u>A woman with type 2 diabetes (I7P5, 45 years old, 3 weeks since diagnosis).</u></p> <p><u>A woman with type 2 diabetes (I14P8, 47 years old, 18 months since diagnosis).</u></p> <p><u>A man with type 2 diabetes (I15P9, 37 years old, 8 months since diagnosis).</u></p> <p><u>A man with type 2 diabetes (I17P10, 71 years old, 18 months since diagnosis).</u></p> <p><u>A mother of a man with type 2 diabetes (I1R1, 68 years old, son diagnoses in the past 6 months).</u></p> <p><u>A daughter of a man with type 2 diabetes (I5R6, 18 years old, father diagnosed 8 months ago).</u></p> <p><u>A daughter of a man with type 2 diabetes (I9R9, age not reported, father diagnosed 6 weeks ago).</u></p> <p><u>A son of a man with type 2 diabetes (I12R11, 24 years old, father diagnosed 11 months ago).</u></p>

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Gender and diet management in type 2 diabetes

Abstract

Introduction: Type 2 diabetes is a chronic health condition that requires ongoing self-management. This often includes changes in diet, which may be open to influences from relatives. Family support in terms of diet may be linked with gender and the assumption that meal preparation is a traditionally female activity. This article looks at the role of gender in diet management in people with type 2 diabetes and their relatives.

Methods: Seventeen semi-structured interviews were conducted with 23 participants (10 people with type 2 diabetes, 13 relatives of people with type 2 diabetes) in Scotland, UK. The aim was to uncover changes people have made to their diet following diagnosis of type 2 diabetes in oneself or a family member. Data were analysed using Framework Approach.

Findings: Female relatives were more likely to manage the patient's diet while male relatives provided support but were less likely to monitor the person's diet. Female patients may prioritise the needs of their family while male patients are more likely to rely on their female relatives in terms of diet management.

Discussion: The study findings have implications for family-based interventions as gender may play a crucial role in the management of type 2 diabetes.

Key words: type 2 diabetes, diet management, family, gender, interviews.

Introduction

Type 2 diabetes is a chronic health condition that requires ongoing self-management in order to minimise negative health consequences such as developing comorbidities¹. People with type 2 diabetes are advised to monitor their diet in order to maintain certain blood-glucose levels². A "healthy and balanced" diet that is rich in fibre and low in salt and sugar is recommended². Diabetes self-management can be facilitated by relatives and partners who can provide advice and support, and assist with daily activities^{3,4}. This is particularly relevant to diet management, which as a shared activity, may be more open to influences from family members than other behaviours^{4,5}. However, family support in terms of diet may be linked with gender and the assumption that meal preparation is a traditionally female activity^{6,7}. This may be particularly relevant to middle-aged and older women who are less likely to rely on spouses with everyday activities⁸. Previous research in diabetes suggests specific gender differences in relation to diet management. For example, Maclean⁹ found that married men with type 1 diabetes were at "an advantage" because in almost all cases of their

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3 32 sample the wives prepared meals, which conformed to the prescribed diet. Women with type 1
4 33 diabetes in Maclean's⁹ study, however, often had to balance their personal needs with the food
5 34 needs of their family. More recent research shows a similar pattern. A systematic review by Li et al.¹⁰
6 35 found that women with type 2 diabetes often prioritise the needs of their family and adopt
7 36 multicare-giving responsibilities . They often subjugate their own needs for the needs of their family
8 37 members and cook separate meals for themselves¹¹. As a result, women show low dependence on
9 38 their spouses and do not identify their spouse as a source of support¹⁰⁻¹². On the other hand, men
10 39 with type 2 diabetes are more likely to be dependent on their spouses in relation to diet
11 40 management and identify their wife as a main source of support^{11,12}. This is particularly problematic
12 41 in respect to morbidity and mortality: women with type 2 diabetes are at increased risk of death
13 42 from cardiovascular disease and stroke, compared to men^{13,14}. In addition, women with caregiving
14 43 responsibilities may experience higher levels of perceived burden which can lead to poor physical
15 44 and mental health¹⁵. Traditional gender role orientation in relation to diet management may be
16 45 particularly prominent in certain cultures. For example, in a Mexican sample, women were viewed as
17 46 "food preparers" so they took the responsibility for managing a patient's diet¹⁶. Similarly, a
18 47 qualitative study conducted in Pakistan showed that men view diet change as a matter for wives
19 48 whose job it is to prepare the right food¹⁷. In an African-American sample, traditional gender roles
20 49 extended to daughters, who were the main providers of diabetes-related care, including diet
21 50 management¹⁸.

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36 51 In the UK, there has been a decline in traditional gender role perceptions with 72% of respondents in
37 52 2019 disagreeing that women should be viewed as homemakers¹⁹. However, there is still a gap in
38 53 understanding how gender plays a role in diet management following diagnosis of type 2 diabetes in
39 54 oneself or a family member. In addition, the majority of previous research has explored this from the
40 55 perspective of the person with type 2 diabetes. The experiences of family members and the role
41 56 gender plays in providing support for someone with type 2 diabetes are seldom the focus of
42 57 research. A better understanding of traditional gender roles in diet management can provide insight
43 58 into ways to improve self-care in patients and provide support for relatives.

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50 59 The objective of this article is to describe the role of gender in diet management in response to a
51 60 recent diagnosis of type 2 diabetes. The study builds on previous research by presenting the views of
52 61 both patients with type 2 diabetes and relatives of such patients.

62 **Methods**

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58 63 Ethical approval for this study was granted by the University of Stirling, School of Health Sciences
59 64 ethics committee (SREC 15/16, Paper No. 37, version 1).

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3 65 This was a qualitative study, conducted in Scotland (UK), which explored the way people respond to
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5 66 and cope with diagnosis of type 2 diabetes in oneself or in a family member. The aim was to
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7 67 interview people who had recently been diagnosed with type 2 diabetes and at least one of their
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9 68 non-diabetic family members in order to uncover people's shared experiences of diabetes. A recent
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11 69 diagnosis in oneself or a family member decreased the risk of recall bias and optimised the chance of
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13 70 participants recollecting specific changes that occurred as a result of the diagnosis. This article
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15 71 presents the findings related to diet management.

72 **Recruitment**

73 Recruitment was carried out through community outreach in Forth Valley, Scotland. Posters and
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75 74 flyers, explaining the study, were distributed at 109 community locations, such as community
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77 75 centres, libraries, charity shops, bowling clubs, golf clubs, local post office branches and the
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79 76 University of Stirling. In addition, Diabetes UK advertised the study on their website, newsletter and
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81 77 social media pages. The study was also advertised by word of mouth.

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83 78 People who expressed interest were screened for eligibility on the basis of the following criteria: 1)
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85 79 over the age of 18 years; 2) able to speak and write in English; 3) a recent diagnosis of type 2
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87 80 diabetes in oneself or a family member. As type 2 diabetes is a chronic condition, people's
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89 81 perception of what constitutes a recent diagnosis may differ so a specific timeframe was not used. If
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91 82 a participant was eligible to take part, they were asked to nominate one non-diabetic family member
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93 83 who might be willing to take part in the study (or nominate the relative with diabetes if it was the
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95 84 family member who got in touch). The participant was then asked to provide their family member
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97 85 with the study flyer and the researcher's contact details.

86 **Data collection**

87 Semi-structured face to face or phone interviews were conducted with people with type 2 diabetes
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89 88 and relatives of people with type 2 diabetes. First, participants completed a brief questionnaire that
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91 89 collected information about duration of type 2 diabetes, route to diagnosis, relationship with the
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93 90 person with type 2 diabetes (for relatives), gender, age, highest education, employment status,
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95 91 relationship status and postcode to enable calculation of the Scottish Index of Multiple Deprivation
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97 92 (SIMD) or full address if the participant wanted to receive information about study findings. The
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99 93 SIMD is used to identify areas of multiple deprivation in Scotland by ranking small areas from most
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101 94 deprived (ranked 1) to least deprived (ranked 10)¹³. The interview aimed to uncover changes in
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103 95 participants' lives since the diagnosis of type 2 diabetes in themselves or in a family member. The
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105 96 topic areas included psychological changes in perceptions of diabetes severity and risk of
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107 97 complications (or developing type 2 diabetes in relatives), behaviour changes in relation to physical
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3 98 activity, diet and responsibilities, communication about type 2 diabetes and suggestions for diabetes
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5 99 service improvements and intervention design. Example questions in relation to diet included:
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7 100 *“What changes in relation to diet have you made since the diagnosis?”*, *“What barriers have you*
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9 101 *experienced?”*, *“Tell me more about your family and what they do in relation to your diet?”*. The
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11 102 interviews were semi-structured so questions varied depending on the participant’s response.
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13 103 Probes included: *“How easy was it to change your diet?”*, *“Do you and your partner do anything*
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15 104 *differently together?”*, *“Have your responsibilities in the house changed?”*.

16 105 An important consideration for the study was whether to interview members of the same family
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18 106 together or separately. Joint interviews are useful when the interviews seek to explore the way
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20 107 people collectively cope with illness. Individual interviews are useful when each individual’s
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22 108 perspective is sought. Although the initial aim was to interview people together, not all participants
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24 109 could agree on a suitable time, so some members of the same family were interviewed separately. In
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26 110 some cases, the interviews also included only one member of a family as other family members did
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28 111 not agree to take part. The decision not to exclude people whose family members were unable to
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30 112 take part was influenced by three reasons 1) the study did not aim to explore discrepancies in the
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32 113 views of men and women from the same family; 2) to reduce the risk of coercion from family
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34 114 members who want to take part and 3) practical considerations, such as time and money, as this
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36 115 study was part of a PhD project. Although a family interview would shed light into the way people
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38 116 interact when talking about diet management, individual perspectives are important as in some
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40 117 cases people may be more open if family members are not present.

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42 118 The interviews were conducted by a female researcher with training and experience in collecting
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44 119 qualitative data (EDD). Data collection continued until data saturation was reached. We
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46 120 conceptualised data saturation in terms of the study target group and quality and quantity of
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48 121 information. The study participants represented a group with specific characteristics (i.e. recent
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50 122 diagnosis of type 2 diabetes in oneself or a family member, living in the UK). Participants openly
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52 123 talked about their experience, which enabled the researcher to gain sufficient information and
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54 124 notice similarities (or differences) in experiences throughout the data collection process. In order to
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56 125 avoid data redundancy, saturation was deemed to have been achieved when no new data emerged.

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58 127 **Data analysis**

59 128 The interviews were audio-recorded, transcribed verbatim and checked against the recordings for
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61 129 accuracy. All information was anonymised and participants were given study numbers. The file
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63 130 linking the study numbers with participants’ details was kept separately from the recordings and

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3 131 transcripts. Data were analysed using Framework Approach, which is based on the assumption that
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5 132 the researcher stays close to the original data in order to “capture, portray and explain the social
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7 133 worlds of the people under study” (p.279)¹⁴. This approach was chosen because it is better adapted
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9 134 to research that has specific questions and a priori issues that need to be explored and as it helps to
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11 135 facilitate case analysis. In addition, it provides systematic and clear stages to the analytic process,
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13 136 thus allowing people to see the stages, by which the results are obtained ¹⁵. This transparency
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15 137 ensures trustworthiness of data, especially in terms of credibility and confirmability. In addition,
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17 138 having a clear process increases study transferability and dependability making it easier for others to
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19 139 explore the consistency of findings and compare them to other contexts and conditions. Analysis
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21 140 followed the data analysis stages, suggested by Spencer et al.¹⁴, which include familiarisation,
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23 141 constructing an initial framework, indexing and sorting, reviewing data extracts, data summaries,
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25 142 developing categories, mapping linkages, and providing explanations and interpretations. The
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27 143 interview questions were initially used to guide data analysis. During the developing categories
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29 144 stage, while detecting elements initial themes had in common, it became apparent that participants’
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31 145 responses in relation to diet management appeared to differ between men and women. This
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33 146 enabled the identification of the themes presented in this article. Analysis was conducted by the
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35 147 primary author. Another author with extensive experience in qualitative research (VS) reviewed the
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37 148 data analysis stages to ensure that the final themes emerged from the data.
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150 Findings

151 Forty two people showed interest in the study (22 people with type 2 diabetes, 20 relatives).
152 Twenty three participants took part in 17 semi-structured interviews. Sample characteristics are
153 presented in Table 1.

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155 *Insert Table 1 about here*
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157 Thirteen of the interviews were individual and four included the person with type 2 diabetes and
158 their relative(s). Ten were people with type 2 diabetes and 13 were relatives of people with type 2
159 diabetes. Relationships included two families (father, mother, two daughters; father, mother,
160 daughter); a mother-daughter dyad; and three couples. The remainder were either a person with
161 type 2 diabetes or a relative whose family members were unable to take part. Details about the
162 relationships between participants and how they were interviewed are presented in Table 2.

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3 163 Interviews were conducted between November 2015 and March 2016 and took place in participants'
4 164 homes (N=6), private rooms at University of Stirling (N=6), a local hotel (N=1), a local library (N=1)
5 165 and a private office at a participant's workplace (N=1), and over the phone with the researcher in a
6 166 private room (N=2). Interviews lasted between 25 and 85 minutes. Participants were given £10 as
7 167 reimbursement for participation.
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14 169 *Insert Table 2 about here*
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18 171 Data analysis yielded two themes addressed by both people with type 2 diabetes and their relatives:
19 172 *Women – taking responsibility for diet management, and Men – “going along” with the new diet.*

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22 173 **Women – taking responsibility for diet management**
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24 174 Virtually all relatives of people with type 2 diabetes talked about supporting diabetes self-
25 175 management. However, compared to men, women more often talked about a desire to manage the
26 176 person's condition, take an active role in trying to prescribe a specific diet regimen and ensure the
27 177 person with type 2 diabetes adheres to it.

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31 178 *“The female always has a bit of a problem because they usually stereotypically are the ones*
32 179 *responsible for shopping and cooking food, so you've got to manage this condition for them, at*
33 180 *least for one meal a day.” R5, wife of a man with type 2 diabetes*

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37 181 Female relatives of people with type 2 diabetes talked about searching for information on dietary
38 182 management by buying and borrowing books, and searching on the internet. In line with such
39 183 information, they made changes to the food they cooked:

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43 184 *“Just trying to research food for dad, trying to make him better meals. Make him different*
44 185 *sandwiches all the time at work.” R4, daughter, lives with father with type 2 diabetes*

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47 186 This was not necessarily a change in roles as in both cases the women were responsible for meal
48 187 preparation before the diagnosis of type 2 diabetes. However, they perceived it to be their role to
49 188 change the meals to align with diabetes-related recommendations. This perceived need to
50 189 manage the person's diet often led to additional responsibilities and affected other aspects of the
51 190 women's lives:

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56 191 *“I make sure what he [father] has every day: “you are not allowed to eat that anymore” so it's*
57 192 *quite hard to have to balance my university with all this watching his diet as well as mine, and*
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3 193 *they're just jumbled up with each other.*" R6, daughter, lives apart from father with type 2
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5 194 diabetes

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7 195 In other cases, it presented a difficulty in managing the diet of other family members:

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9 196 *"Yeah, I try and buy less sweet things but for me, the dilemma is very difficult, because our*
10 197 *daughter is underweight and doesn't eat very much at all and she is much more likely to eat*
11 198 *biscuits and cakes and sweets than anything else, so it's trying to balance her need to have a*
12 199 *high calorie [diet]."* R5, wife of a man with type 2 diabetes

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17 200 The perceived need to monitor the person's behaviour was described as "policing" where women
18 201 felt they need to ensure the patients comply with the specific diabetes-related diet regimen:

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21 202 *"... so for me one of the changes is knowing what's supportive and what's not, so the*
22 203 *challenge existing is trying to police and say "you can't do this and you can't do that, you*
23 204 *know, do you really need to eat that or should you be eating that, you know" because it's not*
24 205 *gonna help, you know, 'cause you can just eat it when I'm not there, if you wanted to, but I*
25 206 *find it hard to resist the urge to interfere."* R5, wife of a man with type 2 diabetes

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28 207 *"...I think he eats sweet packets so that gives me a reason to shout at him for it."* R6, daughter,
29 208 lives apart from father with type 2 diabetes

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34 209 The second quote comes from the daughter of a person with type 2 diabetes and suggests a form of
35 210 role reversal where children tell parents what to do. Although it is perceived as expected for children
36 211 to look after parents at a certain stage of life, type 2 diabetes appeared to be a trigger for this role
37 212 reversal:

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41 213 *"I would say usually, growing up your dad looks after you, but I'm suddenly thinking I need to*
42 214 *look more after my dad as well."* R2, daughter, lives apart from father with type 2 diabetes

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45 215 One woman with type 2 diabetes talked about the diagnosis as the moment when children may
46 216 realise they need to look after their parents:

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49 217 *"...I suppose because I had the diagnosis and because of the potential for strokes and things*
50 218 *like that, you can tell for the very first time they are thinking of me as someone who can die."*
51 219 P6, a woman with type 2 diabetes, lives alone

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55 220 In some families, the roles before diagnosis did not align with traditional roles and assumptions
56 221 where the wife does most of the cooking. However, diagnosis of type 2 diabetes in the husband
57 222 appeared to affect this and change relationship balance:

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3 223 *"I think probably the balance in our relationship has changed. I would probably see me having*
4 224 *more of a caring role than I had before. And I think like [husband]. said, [husband] used to do*
5 225 *all the cooking and the balance in that has changed."* R7, wife of a man with type 2 diabetes

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9 226 *"She [wife] likes caring for people, you know, she likes caring for me so in fact one thing, here*
10 227 *you go, that's one thing that's changed, she does a lot more cooking than she used to (...) she is*
11 228 *not a great cook but she is trying, she is doing a lot more of it to try and make things easier for*
12 229 *me"* P9, a man with type 2 diabetes, lives with family

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16 230 Although in these cases, the men may have experienced diabetes-related symptoms that
17 231 interfered with their ability to continue cooking, this was not reported by women with type 2
18 232 diabetes. Women with type 2 diabetes continued to perceive that it was their responsibility to
19 233 prepare meals, which in some cases added additional diet-related responsibilities, such as
20 234 cooking two meals:

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25 235 *"I'll sometimes cook whatever they [family members] want and I'll have something separate or*
26 236 *I'll do myself something separate."* P8, a woman with type 2 diabetes, lives with family

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30 238 Women did not always live with the person with type 2 diabetes. In one case (see R6 earlier), the
31 239 daughter phoned her father every day to monitor what he has eaten that day. In other cases, the
32 240 likelihood of women taking an active role in the management of the person's diet appeared to be
33 241 influenced by geographical closeness. Although not directly explored, it appeared that these women
34 242 managed the patient's diet only on the occasions when they visited them:

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39 243 *"I am much less willing to offer him cakes or biscuits or anything like that... erm...I am much*
40 244 *more focused on giving him salads."* R1, mother, lives separate from son with type 2 diabetes

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45 46 246 **Men – "going along" with the new diet**

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48 247 Compared to the women in this sample, men provided support for their relatives with type 2
49 248 diabetes but were less likely to take responsibility for managing their relatives' diet . Men were
50 249 understanding of the fact that their relative with type 2 diabetes needs to adopt diet changes and
51 250 they expressed willingness to support them by complying with the new diet regimen. Men also
52 251 provided advice and encouragement to their relative with type 2 diabetes. However, they made a
53 252 clear distinction between themselves and their relatives by highlighting that the responsibility for
54 253 diet management falls on the person with type 2 diabetes:

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3 254 *"I mean I understand that, you know, what [wife]'s got, you know, I am quite happy to go*
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5 255 *along with it and if I need to pig out or something, I'm probably gonna do it."* R12, husband of
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7 256 a woman with type 2 diabetes

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9 257 *"So I do try and get him to go out, like I always invite him for runs and stuff like that (...) He is*
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11 258 *very aware that it's his diagnosis and it's up to him to manage it himself"* R11, son, lives
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13 259 together with father with type 2 diabetes

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15 260 Sometimes, men believed that by complying with the new diet regimen, they have started eating
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17 261 more healthily:

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19 262 *"Yeah, as I say, she prepares the meals, so she prepares meals that are good so I eat more*
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21 263 *healthy because of what she is cooking."* R8, husband of a woman with type 2 diabetes

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23 264 However, this participant's perception differed from his wife's opinion:

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25 265 *"I make him be healthy but it's rubbish...he would just eat anything."* P3, female with type 2
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27 266 diabetes talking about her husband

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29 267 This illustrates potential differences in the way men and women perceive making diet changes
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31 268 and providing support following diagnosis of type 2 diabetes. It further illustrates that women
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33 269 may take responsibility for managing the diet of the whole family by trying to "make" people eat
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35 270 healthy food. These participants were interviewed separately so the difference in perception
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37 271 could not be explored in more depth.

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39 272 Men with type 2 diabetes also appeared to rely on their female relatives for diet management:

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41 273 *"She is telling me what to eat, I eat it."* P4, male with type 2 diabetes, lives with wife

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43 274 This man also appeared to avoid taking responsibility for his diabetes management and relying
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45 275 on his wife and other people to ensure he complies with the diet regimen:

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47 276 *"If I do something that's gonna make it [type 2 diabetes] worse, I'd hope somebody either the*
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49 277 *doctor or a nurse or [wife] would point out that I was doing it."* P4, male with type 2 diabetes,
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51 278 lives with wife

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53 279 The potential difference in perceived responsibility for and approach to diet management
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55 280 between men and women is illustrated below in a quote from a man who considered a
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57 281 hypothetical situation where his wife, instead of him, had type 2 diabetes:

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59 282 *"I would've sort of wanted to be more supportive but I wouldn't have got five textbooks and all*
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283 *that kind of stuff."* P2, male with type 2 diabetes, lives with family

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3 284 There was only one man with type 2 diabetes in the current study who said his wife did not
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5 285 change her diet to support him in his diet management:

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7 286 *“I think initially I probably drove her quite mad with my weighing portions and so on, I think*
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9 287 *because she wasn’t doing it. I think she found that a bit irritating but beyond that she was*
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11 288 *quite accommodating”*. P10, male with type 2 diabetes, lives with wife

13 289 **Discussion**

15 290 The findings in this article illuminate the role of gender in diet management for people with type 2
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17 291 diabetes and their families. The study found that female relatives are more likely to take
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19 292 responsibility for ensuring the person with type 2 diabetes conforms to the new diet. Similarly,
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21 293 women with type 2 diabetes believed it is their responsibility to change their own diet, which
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23 294 sometimes resulted in adopting additional responsibilities. Men, whether patients or relatives, were
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25 295 more likely to comply with diet changes, initiated by women, rather than actively manage diet.

26 296 **Women – taking responsibility for diet management**

28 297 In this study, women talked about their desire to take an active role in diet management in response
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30 298 to type 2 diabetes in their relative. This is consistent with previous findings that women are more
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32 299 likely, compared to men, to assume responsibility for the management of their partner’s diabetes²³.

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34 300 The behaviour exhibited by female relatives in the current sample can be described by using the
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36 301 dyadic perspective of coping^{24,25}, according to which patient and partner interact with each other to
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38 302 mutually influence the adjustment process. Although the model of dyadic coping was developed in
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40 303 partners/spouses, it could apply to other family dyads, such as parent-offspring dyads. Women
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42 304 appear to engage in delegated dyadic coping, where they take over certain responsibilities to
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44 305 alleviate the burden from the person with type 2 diabetes²⁵. Women were more likely to monitor
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46 306 other people’s diet and engage in “policing”, which in some cases resulted in a shift in relationship
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48 307 balance (women adopting new roles) and role reversal (children telling parents what to do). Similar
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50 308 patterns of behaviour in terms of family roles following diagnosis of diabetes have been observed
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52 309 before^{16,18}. Samuel-Hodge et al.¹⁸ explored diabetes management in African-Americans and found
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54 310 that family members often engage in food policing. A potential explanation for women’s increased
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56 311 likelihood to adopt a caregiving role is the suggestion that women internalise and take the caregiving
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58 312 role more seriously²⁶. This could be rooted in historical and social practices. Bourdieu²⁷ argues that
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60 313 traditional gender roles have been maintained through social construction and gender socialisation,
314 so women are considered to be inherently more likely to be caregivers. This is further confirmed by
315 recent findings that women may be viewed by their husbands as “food preparers”^{16,17}. Bourdieu’s²⁷

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3 316 suggestion also supports the finding that women with type 2 diabetes in the current study prioritised
4 317 the needs of their family thus adopting additional responsibilities (for example by cooking two
5 318 separate meals). Often, in families where men did the cooking, after their type 2 diabetes diagnosis
6 319 women's role in the kitchen appeared to increase. However, when women were the ones diagnosed
7 320 with type 2 diabetes, they continued to cook without men taking additional responsibilities in
8 321 relation to food preparation.

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14 322 Although not directly explored in this study, the likelihood of relatives to adopt a caring role may be
15 323 influenced by geographical distance. According to Carmichael and Charles²⁸ geographical distance is
16 324 a type of a "non-economic" factor that influences people's decision to adopt a caring role. Some of
17 325 the participants in the current study admitted that they thought more often about their relative with
18 326 type 2 diabetes but having work and family obligations and living far away from their relative,
19 327 interfered with their ability to provide support. However, female relatives talked about changing the
20 328 meals they prepare when their relative with type 2 diabetes visits them.

26 329 **Men – "going along" with the new diet**

27 330 Men, in the current sample, often talking about relying on their relatives to make diet changes and
28 331 "going along" with these changes was perceived as supportive behaviour. This can be explained in
29 332 terms of supportive dyadic coping where men provided support, advice and encouragement²⁵. This
30 333 is consistent with previous research that men with type 2 diabetes are more likely to depend on
31 334 their spouses^{11,12}. Del Rio-Lozano et al.²⁶ suggests that men have a more flexible approach to care
32 335 and do not identify with the caregiving role. This may put men at a position of advantage because
33 336 their wives prepare meals that conform to the prescribed diet⁹. Although the sample of male
34 337 relatives in the current study was small, the results showed that men provided support and advice to
35 338 their relatives with type 2 diabetes but were less likely to feel responsible for monitoring the
36 339 patient's diet. We were not able to explore differences in support provision between husbands and
37 340 sons but previous research suggests that there is a difference between sons' and husbands'
38 341 perception of caregiving²⁹. Sons perceive a filial obligation to provide care for their mothers while
39 342 husbands see caregiving as an extension of their marital role²⁹.

40 343

52 344 **Implications**

53 345 The current study supports previous research suggesting that women are more likely than men to
54 346 provide hands-on care with instrumental activities of daily living, such as shopping and preparing
55 347 meals³⁰. This has implications for family-focused care as women who adopt a care-giving role
56 348 experience more chronic health disorders, such as stress, anxiety and depression^{10, 12, 15}. Also, when

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3 349 women try to manage the other person's condition, they may undermine their confidence to control
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5 350 their own condition³¹. Family interventions have the potential to reduce caregiving burden and
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7 351 depression³¹. A systematic review and meta-analysis by Armour et al.³² show that interventions
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9 352 which involve family members can lead to improved diabetes knowledge and better controlled
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11 353 diabetes, and reduction in family conflicts. Future interventions can utilise established behaviour
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13 354 change techniques³³ to provide information about diabetes, encourage communication within the
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15 355 family and set clear goals in terms of diet management for the whole family. In addition,
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17 356 interventions could capitalise on dyadic coping theory²⁵ to account for different coping styles and
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19 357 optimise family cooperation. This may be particularly important as the current study shows women
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21 358 and men may engage in different types of dyadic coping. Supportive dyadic coping (often adopted by
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23 359 men) is a stronger predictor of relationship satisfaction than delegated coping (often adopted by
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25 360 women)³⁴. Family interventions can help families discuss roles in relation to diet management and
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27 361 re-negotiate these roles by taking into account potential gender differences. However, interventions
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29 362 need to be sensitive to cultural values when addressing gender roles and chronic illness. For
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31 363 example, Latinos are more traditionally gender role oriented than other cultures and women are
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33 364 encouraged to provide emotional support for their partners³⁴. African American families may not
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35 365 talk about diabetes as they do not think it should be discussed with family members³⁵. This could
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37 366 lead to the adoption of traditional gender roles where people with type 2 diabetes and their
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39 367 relatives do not establish what their new role in the family is. For example, women with diabetes
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41 368 adopt a multi-caregiving role, assuming family members do not understand their needs and their
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43 369 husbands would not be supportive of diet change^{36,37}. However, this may not be the case as
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45 370 husbands are often willing to modify their behaviour to support the wife's dietary needs³⁷. Having
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47 371 culture-sensitive interventions is particularly important in places where ethnic minority groups live.
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49 372 For example, in Scotland the percentage of ethnic minority groups varies from 6% to 12% in different
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51 373 council areas³⁸ so a population-wide approach to diabetes management may not be suitable for
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53 374 these groups.

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55 375 The study also has implications for direct provision of diabetes-related care. It shows that the
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57 376 experiences of diet management in response to type 2 diabetes are not limited to the patient, so
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59 377 patients can be encouraged to bring relatives to their diabetes appointments. Currently, in the UK
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378 explanations about what to expect at diabetes appointments do not specify whether the patient
379 could bring a relative^{39,40}. Attending a diabetes appointment together may provide a platform for
380 family discussion about the best way to manage dietary needs.

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382 **Study limitations**

383 The current study has several limitations that should be considered. Sampling bias cannot be
384 excluded as participants who took part in the interviews contacted the researcher so it is not clear
385 whether people who volunteer to take part, have different characteristics from people who are
386 randomly chosen. In addition, all participants were white and living in the UK so the findings are not
387 transferable to other countries. A recent study in 5 European countries shows that gender
388 differences in relation to diet management may be particularly evident in Spain and Greece⁴¹. The
389 authors suggest that in countries with particularly strong family structures, women take
390 responsibility for diet management. The role of culture in relation to gender roles should be further
391 investigated in future studies. Another limitation is the fact that not all interviews included a person
392 with type 2 diabetes and a relative from the same family and that the form of the interviews was not
393 consistent (individual vs family interview). More work is needed to uncover different perceptions of
394 roles in relation to diet and type 2 diabetes among family members. Finally, the number of male
395 relatives was low and this should be taken into consideration when interpreting the study findings.

396 **Conclusion**

397 The current study suggests that women (whether with type 2 diabetes or relatives) may be more
398 likely to prioritise the needs of their family and take an active role in relation to diet management.
399 This is consistent with previous findings on gender and diet management in diabetes. The study
400 builds on previous work by showing that traditional gender roles, where women are responsible for
401 food preparation, may be still prevalent in the UK. Family-based interventions should focus on the
402 role of gender when adapting to chronic illness. While the results in this paper are drawn from
403 secondary analysis, they provide meaningful contribution to existing literature on gender and diet
404 management in relation to type 2 diabetes.

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19 555 **Table 1. Participants' characteristics**

	People with type 2 diabetes	Relatives
No	10	13
Duration of type 2 diabetes	Range: 3 weeks – 18 months Mean: 7.9 months Median: 6.5 months	-
Route to diagnosis	5 presenting GP with symptoms; 3 periodic screening; 1 visit GP for other reasons; 1 after gestational diabetes	-
Relationships with the person with type 2 diabetes	-	6 daughters, 3 wives, 2 husbands, 1 son, 1 mother. 6 share genetics but live apart from the person with type 2 diabetes 2 share genetics and live together 5 do not share genetics and live together
Gender	5 male, 5 female	10 female, 3 male
Age	Range: 37-71 years Mean: 53.6 years Median: 51 years	Range: 18-68 years Mean: 41.17 years Median: 45.5 years

SIMD (Scottish Index of Multiple Deprivation)	Range: 2-10 Median: 6	Range: 2-10 Median: 6
Education	9 had education after high school (2 PhD, 1 MSc, 2 BAs/BSc, 1 one year at university, 1 Diploma, 1 Police promotion exam, 1 HNC, 2 current students)	9 had education after high school (3 PhD, 1 MSc, 2 BAs/BSc, 2 college, 1 SHND, 3 current students)
Employment	4 full-time, 3 retired, 2 unemployed, 1 part-time	4 full-time, 4 part-time, 2 unemployed, 1 self-employed, 1 retired, 1 other
Relationship status	8 in a relationship, 2 single	12 in a relationship, 1 single
Family history of diabetes	5 yes, 5 no Number of relatives with diabetes: 1-4	8 yes, 5 no Number of relatives with diabetes: 1-4
How they heard about the study	5 word of mouth (relative who took part or someone who saw advert) 2 University of Stirling portal 1 Diabetes UK newsletter 1 Poster at a community centre 1 Local Diabetes support group social media page	7 word of mouth (through someone who took part or someone who saw advert) 2 University of Stirling email advert 2 University of Stirling portal 2 Local council intranet

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558 **Table 2. Participants and form of interview**

Form of interview	Participants' characteristics in the context of the study
Interviewed together	A man with type 2 diabetes (I2P1, 55 years old, 6 months since diagnosis), his wife (I2R3, 54 years old) and daughters (I2R2, 23 years old and I2R4, 20 years old). A man with type 2 diabetes (I3P2, 47 years old, 2 months since diagnosis) and his wife (I3R5, 46 years old).

	<p>A man with type 2 diabetes (I6P4, 70 years old, 3 months since diagnosis) and his wife (I6R7, 60 years old).</p>
<p>Interviewed separately</p>	<p>A woman with type 2 diabetes (I4P3, 39 years old, 7 months since diagnosis) and her husband (I8R8, 47 years old).</p> <p>A woman with type 2 diabetes (I10P6, 65 years old, 6 months since diagnosis) and her daughter (I11R10, 29 years old).</p> <p>A woman with type 2 diabetes (I13P7, 60 years old, 10 months since diagnosis) and her husband (I13R12, 60 years old).</p> <p>A daughter of a man with type 2 diabetes (I16R13, 45 years old) and her parents (I6P4, I6R7).</p>
<p>Interviewed alone (relative did not take part)</p>	<p>A woman with type 2 diabetes (I7P5, 45 years old, 3 weeks since diagnosis).</p> <p>A woman with type 2 diabetes (I14P8, 47 years old, 18 months since diagnosis).</p> <p>A man with type 2 diabetes (I15P9, 37 years old, 8 months since diagnosis).</p> <p>A man with type 2 diabetes (I17P10, 71 years old, 18 months since diagnosis).</p> <p>A mother of a man with type 2 diabetes (I1R1, 68 years old, son diagnoses in the past 6 months).</p> <p>A daughter of a man with type 2 diabetes (I5R6, 18 years old, father diagnosed 8 months ago).</p> <p>A daughter of a man with type 2 diabetes (I9R9, age not reported, father diagnosed 6 weeks ago).</p> <p>A son of a man with type 2 diabetes (I12R11, 24 years old, father diagnosed 11 months ago).</p>

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