

# The Grounding of the Construct of Self-Efficacy in Type 2 Diabetic Patients' Own Thinking

## Öz-Yeterlilik Kavramının Tip 2 Diyabet Hastalarının Kendi Düşüncelerine Dayalı Olarak Temellendirilmesi

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**ABSTRACT Objective:** Theoretically driven approach to the measurement of self-efficacy and perceived barriers to treatment cannot capture the challenges that Type 2 diabetic patients experience in following their diet. Qualitative research is necessary to identify the nature and the range of specific challenges to diet in ways that are not shaped by psychological theory. However, quantification is necessary if clinicians are to be informed about the challenges that patients are likely to experience. The aims of this study were two-fold. First aim was to ground the construct of self-efficacy on the basis of challenges to diet. The second aim was to develop a questionnaire to quantify patients' perception of their ability to overcome each challenge. **Material and Methods:** In the present study, qualitative and quantitative methods were combined. The sample of the qualitative study consisted of 19 Type 2 diabetic patients whereas the sample of the quantitative study consisted of 200 Type 2 diabetic patients. **Results:** Qualitative analysis identified a range of specific challenges to diet. Among these were practical constraints, being with others, unpleasant internal states and craving. The most common challenges were unpleasant internal states. A smaller number of patients perceived social situations, craving and practical constraints as challenges to diet. In the principal components analyses, all items of the Management of the Diabetic Diet Questionnaire (MDDQ) were loaded in one factor. The findings also showed that this questionnaire was reliable. **Conclusion:** The present study has provided a detailed systematic account of the challenges that Type 2 diabetic patients experience in following their diet. The findings help identify potential targets for educational interventions to improve compliance with diet. The findings suggest that grounded self-efficacy is a unitary phenomenon but it incorporates a wide spectrum of specific challenges.

**Key Words:** Diabetes mellitus, type 2, Self efficacy

**ÖZET Amaç:** Hastaların tedavi ile ilgili algıladığı engelleri ve öz-yeterliliği ölçmek için teori temelli bir yaklaşım Tip 2 diyabet hastalarının diyetlerini uygularken yaşadıkları zorlukları anlamak için yeterli olmayabilir. Diyete yönelik belirgin zorlukların doğasının ve çeşitliliğinin tespit edilmesi için psikolojik teoriler tarafından şekillendirilmemiş, nitel araştırmalara ihtiyaç bulunmaktadır. Klinisyenleri hastaların yaşama olasılığının yüksek olduğu zorluklar hakkında bilgilendirmek için bu zorlukların nicelleştirilmesi gerekir. İki amacı bulunan bu araştırma öz-yeterlilik kavramını hastaların diyetleri ile ilgili algıladığı zorluklara dayalı olarak temellendirmeyi ve hastaların her zorluk ile başetme yetilerine dair algılarını nicelleştirmeye yönelik bir anket oluşturmayı amaçlamaktadır. **Gereç ve Yöntemler:** Bu çalışmada nitel ve nicel yöntemler birlikte kullanılmıştır. Nitel çalışmanın örneklemini 19 Tip 2 diyabet hastası, nicel çalışmanın örneklemini ise 200 Tip 2 diyabet hastası oluşturmuştur. **Bulgular:** Nitel analizler sonucunda diyete yönelik belirgin bir dizi zorluk tespit edilmiştir. Bunların arasında pratikte yaşanan kısıtlamalar, başkalarıyla bir arada olmak, hoş olmayan içsel durum ve 'can çekmesi' bulunmaktadır. En yaygın zorluklar hoş olmayan içsel durum olarak tespit edilmiştir. Daha az sayıda bir grup hasta ise, sosyal durumları, 'can çekmesini' ve pratikte yaşanan kısıtlamaları diyete yönelik zorluklar olarak algılamışlardır. Temel bileşen analizleri, Diyabetik Diyeti İdare Etme Ölçeğinin (Management of the Diabetic Diet Questionnaire/MDDQ) tüm maddelerinin bir faktör altında toplandığını göstermiştir. Bulgular, bu ölçeğin güvenilir olduğuna da işaret etmiştir. **Sonuç:** Bu çalışma Tip 2 diyabet hastalarının diyetlerini uygularken yaşadıkları zorluklar konusunda detaylı bilgi sağlamıştır. Elde edilen bulgular, diyete uyumu arttırmayı hedefleyen eğitimsel müdahaleler için potansiyel hedefleri belirlemede yardımcı olmuştur. Ayrıca, bulgular, hastaların diyetleri ile ilgili algılarına dayalı öz-yeterliliğin, belirgin zorlukları kapsayan geniş spektrumlu ancak bölünmez bir kavram olduğunu düşündürmektedir.

**Anahtar Kelimeler:** Diyabet, Tip 2, öz yeterlilik

The treatment of Type 2 diabetes requires that the patients maintain their blood sugar levels within acceptable limits by monitoring and controlling their dietary intake, although some patients may also require oral hypoglycaemic tablets or insulin. Therefore dietary restrictions are crucial components of the treatment of Type 2 diabetes.

In Type 2 diabetes, the effectiveness of dietary recommendations is compromised by poor compliance. Psychosocial variables, particularly beliefs, predict significant levels of these outcomes. Although medically prescribed, dietary restrictions are subject to patients' own interpretation, in contrast to prescribed medication. Therefore the range and the nature of the challenges to diet and fluid restrictions is harder to predict than those to prescribed medication because they require the most active involvement from the patients and diverse aspects of patients' environment and life circumstances are likely to challenge them.

Two models that emphasize the role of attitudes, beliefs and intentions in compliance with diet have influenced quantitative work. These models include the Health Belief Model (HBM)<sup>1</sup> and the Social Cognitive Theory.<sup>2</sup> Perceived barriers are one of the central constructs in the HBM and self-efficacy is the central construct in the Social Cognitive Theory. This refers to a belief in one's capacity to perform relevant healthcare behaviours. Although the constructs of perceived barriers and self-efficacy originate from different theoretical models, they overlap considerably. Self-efficacy is implicit in the construct of perceived barriers in that self-efficacy refers to perceived ability to overcome barriers. In fact, one major criticism of the HBM is that it does not explicitly incorporate self-efficacy.

The assessment of these constructs has been typically theoretically driven among diabetic patients.<sup>3,4</sup> The limitation of this approach is that the questions asked of patients may not correspond to the difficulties that they experience. Another approach has been to measure these constructs by designing questions from interviews with the patients.<sup>5</sup> Although this approach incorporates pa-

tients' views, the items have incorporated barriers that are related only to a few of the situations that may compromise diet. Other kinds of situations, not included in those measures, are likely to challenge diet. Moreover, internal factors, such as emotional or physical state, are also likely to be important. Qualitative methods offer an alternative approach to understand the nature and the range of challenges to diet. However, despite some qualitative evidence among diabetic patients on areas related to treatment,<sup>6-8</sup> limited evidence is available on the challenges to diet. In Peel et al. study,<sup>9</sup> patients recounted a number of reasons for their failure to follow their diet including cravings and health professionals allowing a certain amount of non-dietary food. Bissell, et al.<sup>10</sup> found that financial factors, poverty, demanding working patterns, desire to enjoy normal food and depression were barriers to diet.

The grounding the construct of self-efficacy on the basis of patients' views of the challenges to diet could be one possible way to undertake qualitative research among Type 2 diabetic patients. To inform their clinical practice, clinicians need evidence, not just of the range of challenges to diet, but their frequency. However, qualitative research alone does not provide information of this kind that can be generalized. We therefore combined qualitative and quantitative methods. More specifically, the construct of self-efficacy was grounded on the basis of challenges to diet experienced by Type 2 diabetic patients and these findings were then used to develop a questionnaire to quantify their perception of their ability to overcome each challenge in a large sample of patients.

## MATERIAL AND METHODS

### SAMPLE

In the qualitative study, 'typical sampling' was used. This helped to ensure transferability of the findings to other Type 2 diabetic patients.<sup>11</sup> Specifically, a 'typical' Type 2 diabetic patient was a patient who received treatment for Type 2 diabetes and met pre-defined medical criteria including the presence of no major complications such as retinopathy, nephropathy, neuropathy or cardiovascular

disease. Diabetic nurses identified such patients from those attending the diabetic clinics of a university teaching hospital. The sampling continued until no new information was forthcoming.<sup>12</sup>

23 suitable Type 2 diabetic patients were approached. Four refused to take part and 19 were interviewed (9 female, 10 male; mean age was 67 years, range: 40 to 78 years). Mean duration of diabetes was 6 years (range: 4 months to 18 years) and no patient was treated with insulin. One patient was in employment; 1 was homemaker; 1 was unemployed; 13 were retired (2 of those were retired on health grounds), and 3 were made redundant or gave up work because of ill-health. Eleven patients were married, 4 were widowed, 1 was divorced and 3 were single. Exclusion criteria were insufficient understanding of English, and presence of a medical condition preventing participation, including blindness (Table 1).

The quantitative study included consecutive attenders (N = 250) from the population described above; 200 patients agreed, including 123 (61%) male and 77 (39%) female. Mean age was 63 years

(range: 20 to 84 years); mean duration of diabetes was 8 years (range: 6 months to 50 years); 160 patients (80%) were treated by medication and no patient was treated by insulin. Thirty-eight patients (19%) were employed, 24 patients (12%) were unemployed and 114 patients (57%) were retired.

#### PROCEDURE FOR QUALITATIVE STUDY

Following ethical approval from the relevant Ethics Committee, the patients were approached consecutively and asked for informed consent to interview about the difficulties that they experienced in following their diet. Those who consented were interviewed individually for 60-90 minutes in a private room. Patients were prompted to describe the difficulties that they experienced in following their diet and the ways in which they responded to these difficulties. The pace and sequencing of the interview were adjusted to the individual patient. Patients were encouraged by the interviewer (MRKB) to talk in their own way. Interviews were audio-recorded and transcribed anonymously.

**TABLE 1:** The demographic and medical characteristics of the interviewed Type 2 diabetic patients.

No	Age	Sex	Marital Status	Years of Schooling	Employment Status	Duration of Diabetes (years)
1	78	Male	Married	6	Retired	2
2	65	Male	Married	11	Retired (on health grounds)	5
3	72	Female	Married	10	Retired	2
4	67	Female	Widowed	10	Gave up Work (on health grounds)	1
5	40	Female	Single	12	Unemployed	6
6	70	Female	Married	10	Housewife	18
7	74	Female	Single	10	Retired	5
8	71	Female	Widowed	10	Retired	10
9	76	Female	Married	10	Retired	13
10	63	Male	Married	11	Retired (on health grounds)	6
11	68	Male	Married	10	Retired	3
12	69	Male	Widowed	14	Retired	0.3
13	66	Male	Divorced	16	Retired	18
14	78	Male	Married	10	Retired	6
15	67	Male	Married	12	Retired	7
16	66	Male	Widowed	10	Retired	4
17	62	Female	Single	14	Employed	14
18	53	Female	Married	6	Gave up Working (on health grounds)	0.5
19	60	Male	Married	10	Made Redundant (on health grounds)	0.8

Thematic analysis was carried out in parallel with interviews, and interview transcripts were anonymised. These transcripts were analyzed inductively. Established conventions were followed to ground the analysis in the data rather than pre-existing ideas.<sup>13-15</sup> Preliminary analysis by one author (MRKB), based on reading 10 transcripts was developed by discussion with a second author (PS). Recurrent patterns were identified, tested and modified by cycling between additional data and the developing analysis. As the procedures are insufficient to guarantee useful findings,<sup>16,17</sup> some criteria were set to test the analysis. These included coherence and 'theoretical validity'<sup>18</sup> whereby conclusions should relate to theoretical knowledge. Another criteria was 'catalytic validity'<sup>19</sup> which refers to the extent to which the analysis can influence practice and research. The analysis was stopped when no further changes emerged and when all relevant text was accommodated by it. The same procedure was followed previously by the present authors.<sup>20,21</sup>

Each category of themes identified in the final analysis was represented by several patients' data. In the results that follow, illustrative transcript (in italics) demonstrates the range and commonality of content of each category. Omitted text is indicated by the ellipsis.

#### PROCEDURE FOR QUANTITATIVE STUDY

In the construction of the Management of Diabetic Diet Questionnaire (MDDQ), the aim was to write an item for each type of challenge that would be applicable to most patients. Nevertheless, as the qualitative analysis continued after the construction of the questionnaire, for one type of challenge, 'not being understood' no item is available in the questionnaire. The questionnaire consisted of 13 items.

Following ethical approval from the relevant Ethics Committee, and before the main study, in a pilot study with 10 patients, comprehensibility and comprehensiveness of the questionnaire was checked. Patients responded on a seven-point scale ranging from 1 (completely agree with the left pole of an item) to 7 (completely agree with the right pole of an item), 4 representing uncertainty. A high

score on this questionnaire indicated more 'grounded' self-efficacy.

#### STATISTICAL ANALYSES

Frequencies and percentages were calculated for each item on the Management of the Diabetic Diet Questionnaire. Numbers of patients agreeing or disagreeing with the relevant pole of the item were calculated as those responding with the first, second or third points versus fifth, sixth or seventh points on the scale, disregarding those at midpoint. Factor analysis was used to assess the structure of this questionnaire. During the principal components analysis, a scree test before varimax rotation helped to decide the number of components to retain. Items loading at  $> 0.45$  were used to interpret the components. Component based scale score was calculated by summing scores on the items loading on the single factor that was retained. Reliability of the scale was established by Cronbach's alpha coefficient, coefficient of  $\geq 0.70$  being considered good. SPSS 10 for Windows was used for all analyses.

## RESULTS

#### QUALITATIVE STUDY

Initial attempts to separate patients' accounts in terms of areas of life including social, family, vocational and emotional areas were unsatisfactory. This idea probably reflected the authors' previous views. Instead, patients' accounts emphasized other characteristics including the characteristics of different situations and particularly, the patients' experiences of others' behaviour in these situations. Table 2 outlines the main challenges to diet.

The predominant theme in patients' experience involved being with others in common and non-routine situations. Common situations involved visiting or being visited by others. The most commonly mentioned non-routine social situations included holidays, anniversaries and celebrations (including Christmas), and eating out. Patients' experiences of others' behaviour in these situations help to group these challenges.

Most situations that challenged patients' management were perceived as inherently positive. In

**TABLE 2:** Responses to the MDDQ and its structure: The ratios show numbers of patients who think they would not/would follow their diet in each situation as stated (neglecting those scoring at the midpoint). The loadings of each item on the single factor are shown.

Item	Frequencies	%	Factor Loadings
1 Being bored with diet	71/48	36/24	0.73
2 Feeling tired or run down	65/110	33/55	0.69
3 Feeling anxious or have some personal or financial problem	60/121	30/61	0.66
4 Being with people who are eating or drinking	58/104	29/52	0.58
5 Craving for a food or drink	52/125	26/63	0.75
6 Feeling depressed or fed up	51/129	26/65	0.71
7 Someone making or bringing some food	51/109	26/55	0.56
8 Being away from home	42/123	21/62	0.55
9 People saying just this once will not matter	40/136	20/68	0.65
10 Going to a café or restaurant	36/139	18/70	0.66
11 Buying or cooking food for other people	36/129	18/65	0.63
12 Feeling disappointed with yourself because you have just eaten something	34/153	17/77	0.49
13 Diabetes being completely under control for the past few months	19/159	9/79	0.59
Cronbach's Alpha			0.88

MDDQ: Management of Diabetic Diet Questionnaire

fact, it was this aspect that complicated the refusal of food or drink. Mere observation of others eating and drinking was sufficient to challenge many patients. Patients described trying to cope with this challenge by self-restraint (*At parties, I see friends eating and drinking. I try not to eat but it's difficult*) as well as challenging those who were challenging them (*I may have to sit there while they're probably eating trifle and cream cakes. I'll sit there and I'll make them feel uncomfortable. I'll probably make some remark. ... I'll say 'What do you think you are doing?'*).

Other instances were ways in which others' behaviour was experienced as more directly challenging of the patient's diet., frequently pertaining to normal instances of hospitality in routine social situations (*I'm offered a piece of gâteau when I visit friends. So I eat it*), as well as in non-routine social situations e.g. at Christmas (*You're offered mince pies - you've got to eat. You have the family. Hospitality is in question. You're offered drinks, meals*). Nevertheless, meeting social and dietary constraints without refusing hospitality was also possible (*If I go to a party, I'll have low calorie lemonade*).

The offer of hospitality was also felt going beyond social conventions. This represented a gift

which had a personal meaning, and the rejection of food was also felt as the rejection of the person offering the food (*You can't refuse drinks, sweets*

*...Especially when grand children offer you can't refuse, or their hospitality is in question. At my birthday, my grandson brought me a packet of chocolate; I can't say 'no'. Indeed, for only one patient, refusal in these circumstances was a viable option (*My grandchildren offer me sweets, but I just say 'no'*). Although most offers of food were benevolent, some were felt as inherently threatening (*My friend used to say 'How do you threaten diabetics? Show them a Mars bar.'*).*

When offering hospitality to others, disallowed food was also present (*When people come to visit us I treat myself to an ice-cream*), but, in most cases, management of diet was easier because the refusal of food was free from connotations of rejection (*I do hundreds of cakes for other people but I never feel tempted*).

Patients' accounts also described other diverse challenges to diet. These included boredom with diet that only disallowed food could really deal with (*... I know I should eat the brown but I don't really like brown bread. Sometimes my daughter has brown bread. I say 'That's nice, I'll try that' and*



then I got fed up after a few tries. I can manage sometimes for a few days then I think I'm fed up and change to white), and simple desire for disallowed food which was responded to by self-restraint (*I always have craving for chocolate, but I rarely eat chocolate or sweets. I keep myself mentally active and make use of my spare time, but also substituting an alternative, less 'forbidden' food (If I want something sweet I pick a banana or an apple. There's been chocolate in the fridge for nearly 12 months. ... When I have a craving I'll have an orange or digestive biscuits. Last week, I took the cream out from the biscuit and I ate it).* However, boredom with diet could be also circumvented (*I'm not really bored with my diet. I change it to different things every day).*

Other physical states also challenged patients' diet. As well as feeling hungry and having a minor illness, these involved feeling tired (*When I feel tired I'll have a sandwich although it's white bread. I should have brown really*) and feeling hot (*It's very seldom that I have ice-cream. Probably if it's a really hot day and you know you feel...we might just have in the middle of the afternoon. But it isn't very often).*

Patients also needed disallowed food to cope with emotional distress. This included not only disappointment with oneself, because of not following the diet, but also feeling depressed or fed up (*I do break the rules when things go wrong, when my parents fight. I smooth it over, I'm sick of listening to them. I say to myself I won't do it again but I do. I don't go for sweets but I go for a cake and lasagna*), and feeling anxious (*When I'm anxious, I tend to eat a little bit more chocolate, I think. I go out to the shops to get them*). However, emotional difficulties could be also managed without food (*When I'm anxious or depressed, I tend to buy clothes or a magazine. That's the treat but it isn't food. I don't buy that type of food, sweet and things*) and poor appetite could also be experienced in response to tiredness but also in response to emotional difficulties (*If I'm down, I get a little bit depressed sometimes, I tend not to want to eat. The same thing when I'm stressed up. It doesn't make me eat. In fact, it just does the opposite).*

Practical constraints included lack of time or expertise (*I think you need time and... When you're here [office] there's not the time to do it... I like pasta. But I'm not very good at making it*) were felt as factors that contributed to neglect of diet; this challenge was greatest when patients were away from home (e.g. *On holiday you can't control yourself because you're not cooking your own food*).

Nevertheless, these constraints could be generally circumvented simply by choosing from available foods or drinks or informing others (*If you wanted anything special [on holiday] if you told them, they'd make it for you. But I didn't do that... There was plenty there. If the dinners didn't agree with me, I could have all salads, you see*), and making special arrangements (*We go away on the caravan. [Wife] prepares the food. It's our own caravan. We just go and we live as we do here*). Consuming forbidden food but in small amounts or in combination with some suitable food (*Sometimes I'll have a cake but I know you shouldn't do really. Sometimes we'll have it after our tea in the afternoon, a pie or like pudding, apple pie with custard. Well it's low fat custard, no sugar custard*) constituted other ways that patients felt they coped with practical constraints.

Although inherent in most instances of challenges was food itself, in some instances others' attitude towards food rather than the food itself was a challenge for the patients (*When I go on holiday, the hotel doesn't care that I'm diabetic*). Nevertheless patients could circumvent this by simply informing other people about diet (*The family understands it. They do tend to accommodate me really. And when we go to other people's house, friends' or relatives', they accommodate us. They understand*).

Reasons for not following recommendations were not always described as 'challenges'. This also involved the feeling that it was unnecessary (*...I'm quite safe really. I know that it's always stable anyway. It isn't too bad. My diabetes is stable most of the time so I think, well if you're naughty now and again, it doesn't make any difference*). All patients who described making conscious decisions

to contravene their diet spontaneously provided some justification. As well as the notion that the non-compliance was minimal and restrained and had been decided upon reluctantly (*One of the things that [the dietician] told us is I must not eat butter and, of course, we tried all margarines and, of course, I didn't like them. So it's only small amount of butter and I only have one piece of toast. [Wife] doesn't saturate the toast with it. She only puts it on and takes it off again*), this involved the justification based on the infrequency or special nature of an occasion (*On holiday I don't worry about diet, I eat my apple pie. ... Other times I'm under control. At Christmas I enjoy my roast potatoes. I don't worry about diet*).

## QUANTITATIVE STUDY

Unpleasant internal states such as boredom with diet, feeling tired and anxious or having personal problems constituted the most common challenges and exceeded feelings of depression. Observation of others eating and drinking and simple desires for forbidden foods ranked similarly as difficulties. A significant minority of patients reported challenges concerning hospitality and special social situations. Denial of the importance of diet was a challenge for a small minority of patients (Table 2).

One factor, on which all items loaded accounted for 40.7% of the variance (Table 2). Therefore all the 13 items were retained to form a single scale. Cronbach's alpha coefficient was satisfactory. 3-month test-retest reliability was  $r = 0.66$  ( $N = 38$ ;  $p < 0.001$ ).

## DISCUSSION

Qualitative and quantitative results are discussed together. References to number of challenges refer to qualitative findings, whereas references to number of patients perceiving a challenge refer to quantitative findings.

The findings indicated that Type 2 diabetic patients experienced a number of diverse and specific challenges, and they had a different view of compliance with diet from that of professionals. That is, even if the patients believe that they comply with diet, this does not necessarily correspond to the pro-

fessional understanding of compliance. This is in line with previous evidence which identifies important differences in the way physicians and patients experience Type 2 diabetes across a number of dimensions including causes and symptoms of diabetes, factors affecting blood sugar levels and implications of diabetes for the future.<sup>22</sup> The present findings suggest that applying rigid categories to patients such as compliant and non-compliant within the context of Type 2 diabetes may be futile. Hence, the terms concordance and lay expertise have been proposed. The former refers to the notion that healthcare consultations are interactions between professionals and patients whereby they both agree on a number of goals using each other's expertise.<sup>23,24</sup> Lay expertise refers to the processes whereby patients gradually come to accept their diabetes and develop strategies to cope with it.<sup>10,25</sup>

Previous quantitative studies have recognized some of the challenges to diet identified in the present study whereas others were surprising. The value of food/drink went beyond its nutritional use. Patients recounted non-nutritional use of food/drink in that they used disallowed foods or drinks to cope with physical discomfort including symptoms arising from minor illness and emotional difficulties. In fact, the commonest difficulties were a function of emotional state. Both previous quantitative and qualitative work have identified stress and depressive feelings as interfering with compliance with treatment.<sup>26-28</sup> The present findings provide more insight into these previous reports by showing that patients use food to cope with discomfort and distress. The non-nutritional use of food and in particular, the use of food as a coping response to discomfort and distress is a very general and expected but a neglected finding in that it is expected that non-patients would also use food or drink similarly.

Types of social challenge to diet formed a continuum. There were many situations which concerned merely the social facilitation of eating; being with others who were consuming disallowed foods/drinks created an appetite for those foods/drinks or a desire to join in. There were also situations which varied in the degree to which social

behaviour was targeted at the patient individually. At the extreme, there was the feeling that offers of food might be maliciously targeted at a patient, although situations in which the targeting of the patient was benevolent were more common. Other type of social challenge concerned the social significance of the food, particularly in special social situations: the notion that rejecting the food is equated to rejecting the giver. Special social situations also introduced an additional perception that providers or manufacturers of food did not 'care' about patients' needs, and that people in general did not understand their diet.

Previous qualitative research reported the belief that accepting food/drink is equated with respect was a mechanism by which food challenged the management of diabetic diet in Indian, although not in English, patients.<sup>7</sup> By contrast, the present findings indicate that English patients are *not* free from social challenges. Therefore the present qualitative findings extend the previous literature by showing that management of diet is compromised by social situations and by providing detailed information on the functions and the mechanisms of food in social situations explaining the difficulties experienced by the patients.

A smaller number of patients reported social situations, craving and practical constraints as challenges to their diet. This is in contrast with previous quantitative reports among Type 1 and Type 2 diabetic patients<sup>29,30</sup> which indicate that these challenges are the most common barriers to diet. These discrepant findings are probably due to the difference in approach. That is, there was a qualitative phase in the present study that helped to identify diverse challenges to diet, and to put these specific challenges in context by identifying different challenges for comparison.

The present study identified a number of diverse and specific challenges to diet experienced by Type 2 diabetic patients. Our findings contribute to an evidence base for patient-centered care of these patients which can alert clinicians to specific challenges that are likely to compromise adherence to diet. These include the functions and the

mechanisms of food in social situations and emotional challenges (including discomfort and distress and boredom with diet). That is, patients can be helped to comply with diet by providing them with alternative strategies for managing these challenges to diet.

Earlier educational programs designed for diabetic patients<sup>31</sup> mainly provided patients with information on what they need to do to restore their health. However, they gave little attention to strategies to help patients cope with the requirements of treatment. Recent educational programs have circumvented this by targeting self-management issues particularly barriers<sup>32-34</sup> but these programs have been developed on the basis of theoretical or professional views. It is necessary to move away from giving prescriptive advice about diet, understand challenges that patients face and build educational interventions on these challenges. Educational interventions which build on patients' views will likely be more effective in helping to follow diet than those which challenge patients' views.<sup>35,36</sup> Therefore, the present study provides an evidence base towards the development or improvement of self-management programs for Type 2 diabetic patients that target dietary requirements if the aim is to develop truly patient-derived interventions for these patients. That is, future psycho-educational interventions may seek to improve compliance with diet by teaching patients strategies to help them cope with each type of challenge to diet identified in the present study.

The principal components analyses indicated that grounded self-efficacy was a unitary phenomenon consisting of one dimension defined by the characteristics of different situations that the patient might be in. Nevertheless, it incorporated a wide spectrum of specific challenges. The MDDQ was reliable.

It remains for future prospective studies to examine the validity of this questionnaire. This can be done by examining the ways in which the present questionnaire converges or diverges from existing measures of self-efficacy and related concept of perceived barriers. Future prospective studies can also examine whether or not the scores on the



present questionnaire predict compliance with diet and adjustment among Type 2 diabetic patients.

The present qualitative and quantitative findings may not be transferable or generalizable to other cultural and religious groups. In general terms, the prevalence of Type 2 diabetes is increasing on the basis of a number of issues such as economical, cultural and environmental changes, increased urbanization and under nourishment or obesity.<sup>37,38</sup> In specific terms, patients' views about diet can be derived from a number of sources. One source can be commonly held medical beliefs. Another source can be individual factors. These views will also probably be shaped by broader factors such as social and environmental influences in general, cultural emphasis on individual responsibility for health, societal messages about healthy eating and diet, media and self-help literature. Therefore, future research should examine the ways in which the present findings are relevant to other cultural and religious groups.

In a UK based large scale study involving 23 hospital clinics, with a sample of 3867 newly diagnosed Type 2 diabetic patients, Gray et al,<sup>39</sup> found that mean age of the patients was 53 years (range: 25-65 years). this finding suggests that type 2 diabetes is an illness of middle age.

Nevertheless, Type 2 diabetes is increasingly affecting the young people as well as middle aged people.<sup>37,38</sup> In the present studies, the mean age was 67 for qualitative and 63 for quantitative studies. Therefore, the present findings may not be transferable to younger patients. Future research should also examine the ways in which the present findings are relevant to other age groups.

The sample of the quantitative study consisted of 200 Type 2 diabetic patients with no major complications. It has been shown that age of onset of diabetes influences the risk of the development of diabetic complications. For example, Hillier and Pedula<sup>40</sup> found that adults with early-onset Type 2 diabetes (<45 years of age) did not differ from usual-onset Type 2 diabetes (≥45 years) in terms of overall risk of microvascular complications but the risk of developing any macrovascular complication in early-onset Type 2 diabetic patients was higher than in usual-onset Type 2 diabetic patients. On the other hand, it has been argued that the development of diabetic complications can be also due to regional, racial and genetic factors.<sup>41</sup> In the present study, it is therefore not surprising that the sample consisted of 200 Type 2 diabetic patients with no complications and with a mean age of 63. It remains for future research to examine the ways in which the present findings are relevant to Type 2 diabetic patients with complications.

## CONCLUSION

The present findings contribute to an evidence base for patient-centered care of Type 2 diabetic patients by identifying a number of diverse and specific challenges to diet experienced by these patients. The present findings indicated that grounded self-efficacy was a unitary phenomenon incorporating a wide range of specific challenges to diet. The MDDQ was reliable. Nevertheless, future studies should examine the validity of the MDDQ and the ways in which the present findings are relevant to other cultural, religious and age groups as well as to those with complications.

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