Factors Associated with Successful Fasting among Type 2 Diabetic Mellitus Patients during Ramadan: A Retrospective Recall Study

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ABSTRAK

Pesakit kencing manis yang berpuasa mempunyai risiko keotasidosis, hipoglisemia dan kekurangan air. Kajian secara kawalan rawak dan kajian prospektif menunjukkan bahawa nasihat intensif sebelum Ramadan dapat membantu pesakit berjaya berpuasa. Tetapi, kajian observasi menunjukan bahawa banyak pesakit yang masih berjaya berpuasa hampir genap sebulan semasa bulan Ramadan tanpa pengetahuan berpuasa dan amalan hidup yang baik. Kajian ini dijalankan untuk meneroka faktor-faktor lain yang berkaitan dengan puasa yang berjaya. Kajian retrospektif ini dijalankan di Klinik Kesihatan Jalan Perak, Pulau Pinang. Sejumlah 113 orang pesakit telah menyertai kajian ini secara persampelan konvenien. Puasa yang berjaya ditakrifkan sebagai pesakit berpuasa tanpa berbuka atas gejala gula rendah atau tinggi, atau kemasukan hospital akibat daripada komplikasi kencing manis. Regresi logistik berganda digunakan untuk menguji kaktor-faktor yang berkait dengan puasa yang berjaya. Sebanyak 70.9% (n=80) pesakit berjaya berpuasa. Pengetahuan dan amalan puasa pesakit tiada kaitan dengan puasa yang berjaya. Tetapi, pesakit yang mengetahui nama ubat kencing manis (AOR=8.56, 95%CI: 2.04; 35.8, p=0.003) adalah berkaitan dengan puasa yang berjaya. Kita bercadang untuk menilai pemahaman pesakit tentang ubat-ubatan untuk mengenal pasti pesakityang mugkin tidak dapat Berjaya berpuasa supaya mereka mendapatkan kaunseling sebelum ramadan. Tetapi, nasihat berpuasa yang penuh adalah lebih bagus jika masa dan sumber tidak menjadi isu.

Kata kunci: kencing manis, pengetahuan, puasa

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ABSTRACT

Among diabetic patients, fasting is associated with increased risk of ketoacidosis, hypoglycaemia and dehydration. Previous randomised controlled trials and prospective studies have shown that intensive pre-Ramadan education on fasting is able to help patients fast successfully during Ramadan. At the same time, observational studies show that many diabetic patients are still able to fast successfully throughout Ramadan despite deficiencies in knowledge about fasting practices. We conducted a retrospective recall study in Klinik Kesihatan Jalan Perak, Penang to determine the factors associated with successful fasting. Patients were selected using convenience sampling. Successful fasting was defined as a patient fasted as intended, and not having to break-fast due to hypo/hyperglycaemia symptoms or hospitalization due to diabetic complications. Multiple logistic regression was used to determine independent factors associated with successful fasting. 113 patients were enrolled. 70.9% (n=80) of patients were able to fast successfully. Knowing the name of their diabetic medications were significantly associated with successful fasting (AOR=8.56, 95%CI: 2.04;35.8, p=0.003). Knowledge and fasting practices were not associated with successful fasting. We may identify patients who might not fast successfully by evaluating their understanding of their diabetic medications. They can then be targeted for further pre-Ramadan counselling. Nonetheless, an intensive pre-Ramadan counselling is still optimal if resources are available.

Keyword: diabetes, fasting, knowledge

INTRODUCTION

Fasting during Ramadhan requires careful adjustment of treatment and lifestyle during Ramadhan. This is because it poses a risk of acute diabetes mellitus (DM) complications among DM patients. The risks include ketoacidosis, hypoglycaemia and dehydration (Ministry of Health Malaysia (a) 2015; Ministry of Health Malaysia (c) 2014; International Diabetes Federation and the DAR International Alliance 2016; Mohd Fazrul & Tan 2018). Many studies showed inadequate preparation of patients for safe fasting. Although Ramadan fasting is one of the five Pillars of Islamic teaching (Al-Bakarah n.d.), teaching in Quran exempts the practice for individuals who might be exposed to ill health if fasting is practiced. Acute DM complication risks can be minimised if patient's DM controlled is satisfactory. However, many high-risk type 2 DM patients (56.6% to 93.4%) still chose to fast due to strong personal beliefs (Babineaux et al. 2015; Tan et al. 2018). Based on observational studies, 54.6% to 64 % of type 2 DM patients were able to fast every day during Ramadan (Babineaux

et al. 2015; Tan et al. 2018). The average number of fasting days for type 2 DM patients were 27 days, which is almost a full month. The association between patients who fasted, and DM control, was not mentioned. Since a great majority of DM patients chose to fast, much more than the proportions of DM with good control, a significant proportion of them have chosen to fast despite having high risk of acute DM complication (Malek et al. 2019; Ba-Essa et al. 2019). This unsafe fasting also included poor self-management in self-blood glucose monitoring (SMBG), where an estimated 46% to 83% did SMBG during Ramadan (Gaborit et al. 2011; Malek et al. 2019; Savas 2016; Ba-Essa et al. 2019) and 27-52.2% refused to break their fast despite having symptoms of hypoglycaemia (Gaborit et al. 2011; Babineaux et al. 2015; Ba-Essa et al. 2019). A few multinational studies, one of which Malaysia was one of the participating counties, showed many patients were not well prepared and have poor knowledge of self-care practice (Salti et al. 2004; Babineaux et al. 2015; Gaborit et al. 2011). As such, ensuring safe lifestyle practice during Ramadan is a challenge for many health care professionals.

Similar patterns were also noted in Malaysia, Brunei and Singapore. Although 89.3% of patient change their medication regime during Ramadan (Yaacob et al. 2007), only 38.1-62.7% do SMBG during Ramadan (Zainudin et al. 2017; Tan et al. 2018), and 47% of patients had experience hypoglycaemia during fasting, out of which, 10.8% had continued to fast (Zainudin et al. 2017). Many DM patients (24-82%) lacked knowledge on safe Ramadan fasting (Yaacob et al. 2007; Zainudin et al. 2017; Tan et al. 2018). Regarding diet practice, 40-58% considered sugary food as acceptable during breaking fast (Yaacob et al. 2007; Zainudin et al. 2017). Similarly, the proportion of type 2 DM patients fasted was estimated as 89.9% (Salti et al. 2004). This proportion was much higher than controlled DM in Malaysia, which was estimated at about 22.5 to 23.8% (HbA1c level <6.5%) (Ministry of Health Malaysia (b) 2013; Rahmah & Noraishah 2011).

To reduce the risk of complications during Ramadan, pre-Ramadan education is recommended. Randomised controlled trials (RCTs) and prospective studies have shown that intensive pre-Ramadan education reduces fasting risk for type 2 DM patients (Ahmedani et al. 2012; Ahmedani et al. 2014; Mustafa et al. 2012; Bravis et al. 2010). However, most pre-Ramadan education given in these studies were time consuming (more than 15 minutes) and need more than one session to complete. It also requires the involvement of dietician and diabetic educators.

These RCTs have demonstrated a positive relationship between good knowledge and safe lifestyle practiced and reduced acute DM complications during Ramadan. However, observational studies showed many still able to fast despite apparently poor knowledge and safe lifestyle practice. Thus, there could be other factors that might influence successful fasting.

We aimed to determine other factors associated with successful fasting. We

hope that results of this study will help in designing more focused strategies to improve diabetic management during Ramadan, especially in a busy and resource limited health care setting.

MATERIALS AND METHODS

Study Design

This retrospective recall study was conducted at Klinik Kesihatan Jalan Perak, Penang from February 2018 until April 2018. The sampling frame of our study was all DM 2 Muslim patients registered under Klinik Kesihatan Jalan Perak.

Inclusion and Exclusion Criteria

Inclusion criteria were all Muslim DM 2 patients who were diagnosed before Ramadan 2017 (26th May), had attempted to fast during from 26th May to 24th June 2017 and able to understand the questionnaire (Malay or English language). We had excluded pregnant patients, mentally impaired patients, aged less than 18 years and type 1 DM patients.

Sample Size

Sample size was calculated, using Epi-Info ®, based on an estimation that 50% of patients did not change their diet or exercise practice during Ramadan with 95% confidence level (CI) of estimation, 10% margin of error and infinity number of population (Salti et al. 2004). Taking into account of 20% non-respondent rate, the final sample size calculated was 116. The sampling was done using convenience sampling.

Sampling Method

Patients who came for their DM follow-up were approached at registration counter. Those who fulfilled the inclusion criteria and agree for participation were asked for their consent to participate. Once a participant completed the survey, the next available would be approached. There was no specific sequence or timing to the selection. Recruitment started at 8 am and completed at 4 pm on data collection day.

Questionnaire Development

This study was conducted using a questionnaire modified from a previous study in Kelantan (Yaacob et al. 2007). Modification of the original questionnaire was deemed necessary after reviewing new guidelines (Ministry of Health Malaysia (c) 2014; International Diabetes Federation and the DAR International Alliance 2016). The questionnaire was available in both English and Malay language and requires about 15 minutes to complete. It included: i) patients' sociodemographic backgrounds, ii) characteristics for their diabetic illness, iii) experiences of fasting in Ramadan 2017 iv) self-care practices, v) previous Ramadan education, vi) patients' knowledge of fasting during Ramadan, and vii) patients' lifestyle practice during Ramadan.

Back to back translation (English to Malay and back to English) were

done by two native Malay speaker who were proficient in English. The draft survey was reviewed for face and content validation by two experts compromised of two senior family medicine specialists of Universiti Kebangsaan Malaysia. Modifications were made based on feedback provided. A pilot test with 11 patients were conducted and after the feedback, some minor changes to wordings and sentences were done to make the questions clearer. Reliability testing for knowledge and practice questionnaire were done and the Cronbach alpha were 0.66 and 0.37, respectively.

A day of successful fasting was defined as patient fasted as intended without having to break-fast due to any hypo- or hyperglycaemic symptoms or any hospital admissions due to diabetic related complication (e.g. hyperosmolar hyperglycaemic state (HHS)/diabetic ketoacidosis (DKA)/hypoglycaemia). Patients who did not fast due to other reasons such as having a period, or medical reason that is not diabetic related (e.g. acute asthma exacerbation, gastritis) was not counted as failed fasting. Thus, patients who were able to fast successfully were those who fasted fully as intended through the Ramadan without DM related complications.

All sections of questionnaire were based on patients recall except characteristic of DM illness (duration of diabetes, types of diabetic medication, presence of comorbid and latest HbA1C level) which were collected based on their DM follow-up record books.

The patients' knowledge was assessed with questions that grouped into 4 domains focusing on different aspect of diabetic care during Ramadan: i) general knowledge and safety awareness about fasting in Ramadan (10 questions), ii) recognition of hypo- and hyper-glycaemic symptoms (7 questions), iii) tested patients on their diet during Ramadan (5 questions), and iv) exercise during Ramadan (3 questions). The questions were modified based on the latest recommendations in our local CPG for the management of DM during Ramadan (Ministry of Health Malaysia (c) 2014). Patients were required to answer 'Yes', 'No', and 'Unsure' for each question of the 25 questions on knowledge. Correct answers were given 1 mark while wrong answers and 'unsure' were given zero. The total score was 25.

As for patients' lifestyle practice during Ramadan, it contains 3 domains which evaluates patients' practices on diet (4 questions - total score 16), self-care practice (3 questions - total score 12), and their physical activity (1 question - total score 4). The answers to the practice questions were given as five Likert scale options 'Never', 'Seldom', 'Sometimes', 'Often', and 'Always' and were given a score of 0 to 4, respectively. The higher mean scores of the questions on each domain will reflect the positive practices for each domain.

Data Analysis

Data was analysed using SPSS version 23. Categorical data was described as frequency and percentage while

numerical data was described as mean and standard deviation (SD). The section on lifestyle practice was analyse descriptively without aggregating the score because the Cronbach alpha is poor. Bivariate analysis with simple logistic regression was used to identify significant factors associated with successful fasting (p<0.05) prior to simultaneous multiple logistic regression (MLR), where independent factors of successful fasting were identified. Multicollinearity and interaction term were assessed. Multicollinearity was found in 3 variables which were: i) latest HbA1c level, ii) types of medication patients were taking, and iii) patients with comorbid. These 3 variables were excluded in our MLR. Interactions term were found in between two sets of variables: i) age and sex, and ii) patients who had Ramadan fasting advice before and years of having DM, which were excluded in MLR analysis as they were found to be insignificant. Model

fitness tested with Hosmer-Lemeshow test and Nagelkerke R Square test. The model fitness for Hosmer-Lemeshow test showed satisfactory model fit (p=0.934) and Nagelkerke R Square was 0.295.

RESULTS

A total of 113 patients which fulfilled the inclusion criteria participated in this study. The demographic characteristics were shown in Table 1. The mean age of the patients were 60.6 ± 12.18 years. Majority of the patients were female (n=85, 75.22%). Most of the patients were of Malay race (n=107, 94.69%) while remaining participant were Indian Muslims (n=6, 5.31%). Almost all patients had formal education (n=111, 93.8%).

Most of the patients had successful fasting (70.7%, n=80). Those who failed to fast fully, 91% (n=30) experienced hypoglycaemia and 9% (n=3) experienced hyperglycaemic

Table 1: Patients' demographic characteristic

	Total n=113	Successful fasting n=80	Failed fasting n=33
Age (years), Mean (SD)	60.6 (12.2)	61.75 (11.7)	57.82 (12.9)
Sex, n (%)			
Female	85 (75.5)	60 (75.0)	25 (75.8)
Male	28 (24.8)	20 (25.0)	8 (24.2)
Race, n (%)			
Malay	107 (94.7)	76 (95.0)	31 (93.9)
Indian	6 (5.3)	4 (5.0)	2 (6.1)
Education Level, n (%)			
No formal schooling	7 (6.2)	5 (6.3)	2 (6.1)
Primary school	29 (25.8)	19 (23.8)	10 (30.3)
Secondary school	65 (57.5)	46 (57.5)	19 (57.6)
Tertiary education	12 (10.6)	10 (12.5)	2 (6.6)

Table 2: Medical characteristics of patients

	Total n=113	Successful fasting n=80	Failed fasting n=33
Knows own diabetic medications name	34 (30.09)	29 (36.25)	5 (15.15)
Change frequency and dose of medication during Ramadan, n (%)	6 (5.00)	4 (5.00)	2 (6.10)
Did SMBG during Ramadan, n (%)	47 (41.60)	34 (42.5)	13 (39.40)
Had DM education pre-Ramadan, n (%)	39 (34.50)	26 (32.5)	13 (39.40)
Types of diabetic medication, n (%)			
Diet Control	1 (0.88)	1 (1.25)	0 (0.00)
OAD	70 (61.94)	52 (65.00)	18 (54.54)
Insulin	6 (5.30)	4 (5.00)	2 (6.06)
OAD + Insulin	36 (31.88)	23 (28.75)	13 (39.4)
Comorbid, n (%)	112 (99.12)	79 (98.75)	33 (100)
Years having diabetes, Mean (SD)	9.26 (6.21)	9.4 (5.83)	8.91 (7.12)
HBA1c level, Mean (SD)	8.51 (2.17)	8.26 (1.96)	9.11 (2.55)

SMBG = Self-monitoring blood glucose, DM = Diabetes mellitus, OAD = oral antidiabetic drug

symptoms. None was admitted. The average fasting days were 27 days.

Medical characteristics of patients were shown in Table 2. In general, patients had poor practice on safe Ramadan fasting across both successful and failed fasting group. Very few (5.3%) patients change the dose and frequency of their DM medication during Ramadan 2017 and only 41.6% of patient did self-monitored blood glucose (SMBG), and only 34.5% had pre-Ramadan education prior to fasting. Interestingly, the number of patients knows their own diabetic medication name were double in the successful group comparing to those who failed.

Table 3a and 3b showed the mean score for knowledge and practice of patients with analysis of subdomains in the questionnaire. Patients generally had good knowledge about Ramadan fasting. However, sub-analysis in different domains in the knowledge questionnaire shows that patient had

Table 3a: Mean score for knowledge and practice of patients

	Total n=113	Successful fasting n=80	Failed fasting n=33
Total knowledge test score, Mean (SD)	17.53 (3.52)	17.29 (3.53)	18.12 (3.46)
Total practice score on diet during Ramadan, Mean (SD)	11.08 (2.27)	10.88 (2.14)	11.58 (2.54)
Total practice score on safe fasting, Mean (SD)	2.74 (3.3)	2.88 (3.48)	2.42 (2.83)
Total practice score on exercise, Mean (SD)	0.47 (0.67)	0.43 (0.69)	0.58 (0.63)

Table 3b: Sub analysis of domains in questionnaire

Sub analysis of knowledge questionnaire	Total n=113	Successful fasting n=80	Failed fasting n=33
Domain 1:			
Knows fully on safe fasting practice during Ramadan, %	5.3	5	6.1
Knows risk of hyperglycaemia during fasting, %	33.6	25	54.5*
Knows risk of hypoglycaemia during fasting, %	60.2	56.3	69.7
Knows risk of dehydration during fasting, %	64.6	56.3	84.8*
Knows SMBG does not void the fast, %	90.3	93.8	81.8
Knows the need to consult doctor before fasting, %	69.0	67.5	72.7
Knows the need to change dose or frequency of medication during fasting month, %	36.3	35	39.4
Domain 2:			
Knows fully hyperglycaemia symptoms, %	66.4	66.3	66.7
Knows fully hypoglycaemia symptoms, %	33.6	32.5	36.4
Domain 3:			
Knows fully on correct diet practice during Ramadan, %	35.4	38.8	27.3*
Domain 4:			
Knows fully on safe exercise practice during Ramadan, %	27.4	20	45.5*
Subanalysis of practice questionnaire	**Never/Seldom (%)**	**Sometimes (%)**	**Often/Always (%)**
Questions on Practice on diet during Ramadan			
You make sure to take sahur (pre-dawn) meal	0	12.4	87.6
You take supper before sleep	81.4	15.9	2.7
You take sugary food during breaking fast	35.4	34.5	30.1
You drink sugar free drinks only during breaking fast	39	30.1	30.9
Questions on Practice on safe fasting			
You change your medication schedule based on doctor's advice	75.3	0	24.7
You get doctor's advice regarding own fasting risk before fasting month	72.6	8.8	18.6
You monitor your blood glucose level (finger prick test) during fasting month	71.7	18.6	9.7
Questions on Practice on exercise			
You exercise as usual	72.6	19.5	7.9

*p<0.05

knowledge deficits in certain aspects. Nearly all patients did not know fully about safe fasting practices during Ramadan. About two third of patients did not recognise hyperglycaemia as a potential risk during Ramadan fasting and a third of the patients did not know the need to change dose and frequency their medication.

Regarding patients' practice, they showed better practice on diet comparing to safe fasting and exercise. Yet, sub-analysis of the practice questionnaire showed an unsafe diet practice that could pose a hyperglycaemia risk to patients: about two thirds of the patients tend to take sugary food or drinks during breaking

fast. They also had unsafe fasting practices such as: did not seek medical advice about their medication; did not get their fasting risk assessed by doctor before Ramadan; and did not perform SMBG monitoring during fasting month even though almost all patient know that SMBG did not void the fast. Lastly, patients tend to remain sedentary during fasting month.

Using simultaneous multiple logistic regression, adjusting for age, sex, patients who had Ramadan fasting advice before, knowing medication name, education level, years of having DM, and total knowledge score (Table 4), knowing name of the medication were positively associated with

Table 4: Factors associated with successful fasting

	Crude OR	95% CI	p value	Adjusted OR	95% CI	p value
Total knowledge score	0.91	(0.81; 1.03)	0.13			
Age (years)	1.03	(0.99; 1.06)	0.12			
Years of having DM	1.01	(0.95; 1.08)	0.70			
Sex						
Male	1	-				
Female	0.96	(0.37; 2.47)	0.93			
Had Ramadan fasting advice before						
No	1					
Yes	0.74	(0.32; 1.72)	0.48			
Know medication name						
No	1	-				
Yes	3.18	(1.11; 9.15)	0.03*	8.56	(2.04; 35.8)	0.003*
Education level						
No formal schooling	1	-	0.74			
Primary school	0.76	(0.12; 4.64)	0.77			
Secondary school	0.97	(0.17; 5.43)	0.97			
Tertiary Education	2.00	(0.21; 18.69)	0.54			

*$p<0.05$, OR=Odds Ratio, DM=Diabetes mellitus, OAD=oral antidiabetic drug. Simultaneous multiple logistic regression was applied. Hosmer-Lemeshow test showed satisfactory model fit ($p=0.934$). Nagelkerke R Square = 0.295.

successful fasting.

DISCUSSION

Studies have shown that patients on insulin with or without oral antidiabetic drugs (OAD) are associated with higher risk of having hypoglycaemia events and fasted less days during fasting month (Babineaux et al. 2015; Savas 2016). However, no previous study found an association between patient's knowledge about their medication name with hypoglycaemia risk during fasting. Our study showed that patients who knew the name of their diabetic medications were significantly more likely to fast successfully (AOR=8.56, 95%CI: 2.04; 35.8, p=0.003). We postulate that this could be because knowing their medication name indicate better access to knowledge about their medications (e.g. hypoglycaemic side effect of diabetic medication). Knowing the medication name could have also led to better ability of follow instructions over changes in medication regime during Ramadan.

Surprisingly, our study showed no association between knowledge and practice with successful fasting. This was in contrast with RCTs and prospective studies that showed that improved knowledge and practice with intense Ramadan advise increase the chance of successful fasting (Ahmedani et al. 2012; Ahmedani et al. 2014; Mustafa et al. 2012; Bravis et al. 2010). This could be due to validity of tool used in measuring their knowledge and practice. Further, the retrospective nature could subject the participants to

recall bias.

Compared to other studies, there seems to be a trend of similar poor practices among diabetic patients. For example, patients tend to take starchy or sugary food and drinks during breaking fast (Yaacob et al. 2007; Zainudin et al. 2017). Not only that, most had not sought medical advices for medication regime change prior to fasting (Gaborit et al. 2011; Yaacob et al. 2007; Tan et al. 2018; Savas 2016). Most patients did not perform SMBG monitoring during Ramadan even though this test does not nullify fasting (Gaborit et al. 2011; Salti et al. 2004; Masood et al. 2014). However, this could be because SMBG monitoring was not indicated as 62.8% of the patients in this study were not on insulin (Ministry of Health Malaysia (c) 2014). Lastly, patients also appear to not exercise during fasting month (Salti et al. 2004). These are important facts to note during pre-Ramadan counselling as unsafe practice cause higher risk of complications during fasting (International Diabetes Federation and the DAR International Alliance 2016; Ministry of Health Malaysia (c) 2014).

Deficiency of knowledge in certain domain were also similar to previous studies. About two thirds of our patients did not know that hyperglycemia is a potential risk during fasting. At the same time, we noticed that of those who failed fasting, only a small percentage failed because of hyperglycemia symptoms (Babineaux et al. 2015; Salti et al. 2004; Gaborit et al. 2011; Zainudin et al. 2017; Malek et al. 2019). Instead of assuming hyperglycemia is truly a rare occurrence among fasting patients, one should suspect

whether hyperglycemia symptoms are often missed by patients, because symptoms of hyperglycemia often resemble the discomfort of fasting (e.g. thirst and lethargy). Patients' inability to detect hyperglycemia puts them at risk of developing life-threatening complications of diabetes such as HHS or DKA. Due to the difficulty in separating hyperglycemia symptoms from fasting discomfort, pre-Ramadhan counselling should emphasize the similarities of these symptoms to patients and promote regular SMBG, especially when hyperglycemia is suspected.

The strength of our study was that we had modified our questionnaire based on the latest guideline available. Our limitations were that our sampling method (convenient sampling) and the single centre urban clinic setting may not be able to truly represent the DM population in Malaysia. Our study also had not collected enough data to classify fasting patient into mild, moderate, high and very high-risk group for fasting during Ramadan which may affect the successful fasting outcome. We also had not look into the fact that successful fasting in our study may not mean a safe fasting which has a serious health outcome for fasting patients. Our questionnaires' validity also needs to be looked into as the internal consistency was lowered after modification of questionnaire. Also, there may be a recall bias as our study was conducted retrospectively 8 to 10 months after the Ramadan in 2017. Nevertheless, patients' past practice experience would still have bearing as this would influence their choice

of practice in future. Their positive perception of their experience of successful fasting would reinforce their decision to fast in future, despite not having optimal fasting practices during Ramadan. All these limitations need to be looked into in future studies.

CONCLUSION

A targeted pre-Ramadan counselling is feasible to aid patients have a successful and safe fasting experience. In a short clinic session, we might evaluate patients understanding of medication to identify patient who might not fast successfully, for further pre-Ramadhan counselling. Physician can also improve patients' knowledge specifically on risk and symptoms of hyperglycemia during Ramadan, advocate SMBG monitoring, and advise patients to reduce starchy sugary food during breaking fast. However, a proper pre-Ramadan counseling is still the optimal if resources are not an issue.

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