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## Ramadan fasting among pregnant women with diabetes: An International neglected phenomenon

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### ABSTRACT

**Purpose:** To explore the literature looking for European or international guidelines about the management of diabetes during Ramadan fasting among pregnant women.

**Design/Methods:** A systematic database search using Scopus, PubMed, Medline and Web of Science, using key words 'Ramadan fasting', 'diabetes' and 'pregnancy' was conducted in November 2015.

**Findings:** There are only two studies conducted in the United Kingdom (UK) and two studies in Islamic majority countries, mainly in Malaysia with a total sample size of 348 and 67, respectively.

**Originality/value:** Despite the fact that Muslim pregnant women are exempted from fasting during Ramadan, it is documented that some pregnant women with diabetes choose to fast. This review was conducted to assist in developing sustainable evidenced based care for this group of women. The findings reflected an urgent need for more





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studies to investigate the prevalence of Ramadan fasting among diabetic women, and its effect on maternal and foetal wellbeing.

**Keywords:** Ramadan fasting; diabetes; pregnancy.

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## INTRODUCTION

The International Diabetes Federation (IDF) estimated that there are 415 million adults with diabetes globally, 199.5 million are women. In addition, 318 million adults are at high risk of developing diabetes due to impaired glucose tolerance. By the year 2040, diabetes could affect 642 million people worldwide and around half of them are women (International Diabetes Federation, 2015a,b). It is also estimated that 20.9 million (16.2%) child births of live infants are to women who suffered from hyperglycaemia during pregnancy, and 85.1% of these were due to gestational diabetes (International Diabetes Federation, 2015a,b).

In 2015, the United Nations Member States in New York adopted the post-2015 Development Agenda and the Sustainable Development Goals (SDGs) at the United Nations Summit. This included diabetes as one of the non-communicable diseases that are targeted within the goal on health.

All recognised diabetes management and evidenced based practice guidelines are aimed at individualising care in order to attain the patient's physiological, psychological and cultural needs (American Diabetes Association, 2016; Canadian Diabetes Association Clinical Practice Guidelines Expert Committee, 2013; Diabetes UK, 2016; The Royal Australian College of General Practitioners and Diabetes Australia, 2014). Several countries were not able to develop such guidelines, due to either a lack of expertise or financial resources, or a lack of awareness of the IDF developed guidelines that can be used by healthcare providers in such countries (International Diabetes Federation, 2015a,b).

There are some religious and cultural practices that can lead to changes in eating behaviours and life style of diabetics that might result in complications; Ramadan fasting is one of these practices. It is an obligatory religious practice performed by all healthy adult Muslims; during the lunar month of Ramadan Muslims abstain from eating, drinking and sexual activities from dawn to sunset for 28–30 days. The length of the fasting day is variable according to the geographical location and season, and it can reach a maximum of 18 hr.

Around 25% (1.6 billion) of the world population are Muslims, and this is projected to reach 28.1% (2.49 billion) by year 2040 (Pew Research Center, 2016). Table 1 shows the projected number and percentage of Muslims in the six regions of the world.

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**Table 1 Projected number of Muslims in the six regions of the world (198 countries and territories)\***

<i>Region</i>	<i>Year 2010</i>	<i>Year 2040</i>
Asia-pacific	986,420,000 (24.3%)	1,380,160,000 (28.3%)
Middle East-North Africa	317,070,000 (93.0%)	500,870,000 (93.5%)
Sub-Saharan Africa	248,420,000 (30%)	543,470,000 (34.1%)
Europe	43,470,000 (5.9%)	63,980,000 (9.0%)
Latin America-Caribbean	840,000 (0.1%)	940,000 (0.1%)
North America	3,480,000 (1%)	8,410,000 (2%)

\*(Pew Research Center, 2015).

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Islam exempts travellers, pregnant, lactating or menstruating women and people with temporary or chronic diseases such as diabetes from fasting during Ramadan.

Despite this permission, some people choose to fast regardless of the risks and complications that can occur. The literature revealed that up to 90% of healthy pregnant women choose to share the ritual of Ramadan fasting with their families, although they know that they can postpone fasting and practice it after child birth (Hui et al., 2012).

Many studies examined the prevalence and effect of Ramadan fasting among type 1 diabetics (Al Alwan and Al Banyan, 2010; Bin-Abbas, 2008; Eltoum et al., 2014; Hawli et al., 2009; Kassem et al., 2005; Mucha et al., 2004; Reiter et al., 2007; Salman et al., 1992) and type 2 diabetics (Aziz, 2013; Belkhadir et al., 1993; Katibi et al., 2001; Mygind et al., 2013; Salti et al., 2004; Yousif et al., 2003; Yarahamadi et al., 2003). Diabetes management recommendations are generated based on experiences of healthcare providers due to a limited number of randomised controlled trials, including those concerning Ramadan fasting among diabetic pregnant women. Current (Ibrahim et al., 2015) and previous (Al-Arouj et al., 2005, 2010) diabetes management recommendations did not include pregnant women.

The aim of this review is to look for European or international guidelines about the management of diabetes during Ramadan fasting among pregnant women.

Design/Methods searching the literature showed that there are no specific diabetes evidence based guidelines or recommendations to manage pregnant women during Ramadan. A systematic database search used the Google Scholar search engine; the results were then entered into the Scopus, PubMed, Medline and Web of Science websites using key words 'Ramadan fasting', 'diabetes' and 'pregnancy', this was conducted in November 2015, looking for relevant studies regardless of the study design, language or date of publication. Only four studies were found and reviewed.





## FINDINGS

The four studies found that diabetic Muslim pregnant women fast during Ramadan despite the exemption from fasting.

Nor Azlin et al. (2011a,b) conducted a prospective cohort study in Malaysia to evaluate the safety and tolerability of once or twice daily Neutral Protamine Hagedorn (NPH) insulin in fasting pregnant diabetics during Ramadan (Nor Azlin et al., 2011a,b). At the beginning of the study, four women discontinued fasting because they were worried about the safety of their foetuses. A total of 24 participants were provided with regular follow up, education and evaluation during the month of Ramadan. Fourteen women (58.3%) were diagnosed with gestational diabetes mellitus, 9 (37.5%) had type 2 and 1 (4.2%) had type 1 diabetes mellitus. Most participants managed to fast more than 15 days with no episodes of hypoglycaemia or foetus loss. Blood glucose levels during Ramadan were low, which impacted the overall control of diabetes as reflected in the levels of glycosylated haemoglobin and serum fructosamine after Ramadan. The insulin dose was increased during Ramadan from week one through week four. The study concluded that diabetic pregnant women can fast safely during Ramadan providing they are under the care of an antenatal and endocrine team. The study did not examine the effect of fasting on foetus health status and outcome.

The second study also took place in Malaysia in order to examine the glycaemic control in pregnant diabetic women on insulin who fasted during Ramadan. The 37 women who joined the study insisted on fasting during Ramadan; they were recruited over three years. 24 of them had type 2 diabetes while the rest (13) had gestational diabetes (Nor Azlin et al., 2011a,b). The findings are similar to what had been found by Nor Azlin group (Nor Azlin et al., 2011a,b).

The other two studies were in Europe, particularly the United Kingdom (UK). One of the studies looked retrospectively at the practice of fasting and roles of healthcare professionals and Imams in the decision to fast (Hui et al., 2012). The survey was at four antenatal centres in London. Five out of 48 participants decided to fast during Ramadan; one had type 1 diabetes, 2 had type 2 diabetes and 2 had gestational diabetes. They managed to fast between 5 and 30 days and had episodes of hyperglycaemia and hypoglycaemia; most of them did not discuss fasting with healthcare providers or Imam (religious leader).

The largest study was in Bradford, UK. It was not about Ramadan fasting and diabetic pregnant women *per se*, but it did assess the prevalence, characteristics of fasting behaviours and offspring health outcomes in Asian and Asian-British Muslim women (Petherick et al., 2014); gestational diabetes was one of the health measures in the study. It is a prospective sub-cohort study as part of a longitudinal multi-ethnic birth cohort study called Born in Bradford (BiB), with a sample size of





12,453. The sub cohort sample was 358, eligible participants were 300. Of a total of 300 participants, 127 (43%) experienced Ramadan fasting. 20 (17.9%) out of the fasting group had gestational diabetes: 23 of the diabetics were part of the group that did not fast (172 out of 300). However, it was not clear if the diabetics who fasted during Ramadan has chosen to avoid the medical exemption from fasting or were fasting prior to diagnosis with gestational diabetes. In general there was no association between fasting and pre-term delivery among all the study population (Petherick et al., 2014). Table 2 summarises the characteristics of the studies included in this paper.

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**Table 2 Characteristics of the studies included in this paper**

Author and year	Nor Azlin et al. (2011a,b)	Nor Azlin et al. (2011a,b)	Hui et al. (2012)	Petherick et al. (2014)
Study location	Malaysia	Malaysia	UK	UK
Age (years)	30–39	32.1±4.7	32±5	27.6±4.7 (fasting group)
Method and design	Prospective cohort	Retrospective cohort	Cross sectional	Prospective cohort
Fasting (hours)	14	14	—	18
Type of diabetes				
GDM	14	13	2	20
T2 DM	9	24	2	—
T1 DM	1	—	1	—
Total number diabetic participants	24	37	48 (fasting=5)	43 (fasting=20) out of 128 w Sample size=300
GA	1st trimester=2 w 2nd trimester=13 w 3rd trimester=9 w	2nd trimester (25 weeks)	—	Out of 128 w 1st trimester=42 w 2nd trimester=74 w 3rd trimester=11 w
**Number of fasting days	>15 days (19 w) 30 days (6 w)	>15 days Median=25	30 days=3 w 5 days=1 w 14 days=1 w Average=21.8	1–9 days=26 w 10–19 days=26 w 20–29 days=76 w
Weeks of study	BR, R1 to R4, AR	BR1, R2, AR	AR	AR
Biochemical and medical parameters	BG, HbA1c, GSP, CBC, TAUS, Glycosuria, Proteinuria, hypoglycaemia, hyperglycaemias	BG, HbA1c, GSP, hypoglycaemia, hyperglycaemias	hypoglycaemia, hyperglycaemias	Body Mass Index, hypertension, birth outcome

*Abbreviations:* T1DM=Type 1 Diabetes Mellitus, T2DM=Type 2 Diabetes Mellitus, GDM=Gestational Diabetes Mellitus, GA=Gestational Age, BR=Before Ramadan, R1=first week of Ramadan, R2=second week of Ramadan, R4=fourth week of Ramadan, AR=after Ramadan, BG=Blood Glucose, HbA1c=glycosylated haemoglobin, GSP=glycated serum protein (fructoseamine), CBC=Complete Blood Count, TAUS=Trans Abdominal Ultra Sound, w=women.

## DISCUSSION

This review showed that around 80% of the diabetic pregnant Muslim women recruited in the related studies have fasted for more than 15





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days, and fasting the whole month of Ramadan is common. The fasting occurred in the different trimesters of pregnancy, mainly the second one.

Despite the fact that Muslim pregnant women are exempted from fasting during Ramadan, it is documented that some of the diabetic women choose to fast.

There is no clear evidence about the impact of fasting on maternal and foetal health even when it is practiced by non-diabetic or healthy pregnant women due to data discrepancies (Petherick et al., 2014).

The accumulated data from Ramadan fasting and diabetes studies in general proved that diabetics are at risk of developing serious complications during fasting, such as hyperglycaemia and hypoglycaemia (Ibrahim et al., 2015). In addition, the timing and contents of meals are changed. Two main meals are consumed, the first meal is Iftar (breaking the fast) at sunset and the second is Sahur (before dawn). There are special traditional dishes prepared during Ramadan, and most of these dishes are high in sugar or/and fat (Eltoun et al., 2014). Part of the spiritual activities during Ramadan is Taraweeh. Taraweeh is a prayer performed only during Ramadan and it can last for one hour and sometimes more, it involves physical movement in addition to the spiritual act.

Assuming that a Muslim diabetic pregnant woman is exposed to all the above life style changes, concerns should be raised about the physiological and metabolic risks that she and her foetus might go through, also the long term effects later during infancy and childhood.

Muslims consider Islam as a way of life, and Ramadan fasting is one of the important spiritual activities for Muslims who believe that their faith will empower them to fast, even if they are exempted from fasting or faced by struggles. In a qualitative study exploring the experiences of fasting diabetic Muslims (Peterson et al., 2012), the participants reflected how important Ramadan fasting was; "To not do it? No, Ramadan has been in my life since childhood, it is a religious duty and obligation, it is part of my life". They also stated that they are familiar with their bodies and they know when to break the fast (Peterson et al., 2012).

## CONCLUSIONS AND RECOMMENDATIONS

This review was conducted to assist in developing sustainable evidenced based care for this group of women. The findings reflected that there is a dearth of relevant well-designed studies, and that there is an urgent need for large scale studies to investigate the prevalence of Ramadan fasting, its metabolic effect and outcome on both diabetic maternal and foetal wellbeing, bearing in mind all associated epidemi-





ological, demographic, cultural and political aspects. More education is needed to empower health care providers about Ramadan fasting and diabetes, especially in non-major Muslim countries. Women should be encouraged to discuss this issue with the medical team and religion scholars.

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## BIOGRAPHICAL NOTES

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