

## Pregnancy and fasting in women with diabetes mellitus

Faruque Pathan

### Abstract

Fasting during the Holy month of Ramadan is one of the obligatory prayer for all normal healthy Muslims. There are a few special situations as pregnant and breastfeeding women, who are exempted from fasting. Different surveys observed that 70-90% pregnant women prefer not to accept this fiqh. A complex series of metabolic and hormonal changes occur in pregnancy and this is augmented from fed to starvation stage during fasting from dawn to sunset. Adaptive metabolism is established by balance of insulin and other counter-regulatory hormones. This adaptive metabolism is decompensated by relative or absolute lack of insulin and exaggerated insulin resistance (IR) on preexisting defect altered by foeto-placental hormones. Thus in both fasting and fed states high blood glucose, triglycerides, free fatty acids and ketones are encountered. Unregulated fat catabolism with increased FFA and ketones can alter embryonic and foetal development. There is no definite consensus guideline on how to manage blood glucose during fasting in pregnant women with diabetes. Most authors advocate insulin therapy to manage diabetes. Pregnant women with diabetes who wish to fast during Ramadan must be aware of symptoms and signs of foetal and maternal distress, and must terminate the fast if these occur. More practical approach, with empathy, might be helpful instead of imposing absolute ban on fasting in women with pregnancy and diabetes.

**Keywords:** Ramadan fasting, Pregnancy with Diabetes/Ramadan, Pregnancy with Diabetes /fasting.

### Introduction

Currently there are about 2.08 billion Muslim inhabitants throughout the world. A 35% increase in Muslim population can be expected in the near future which will constitute 2.2 billion in 2030.<sup>1</sup> Side by side prevalence of diabetes mellitus (DM) is increasing in predominant Muslim countries in a similar trend due to changing lifestyle. At present 77 million Muslims above the age of 14 years are suffering from DM.<sup>2</sup> The Holy Quran in several

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Department of Endocrinology, Bangladesh Institute for Research and Rehabilitation in Diabetes, Endocrine and Metabolic disorders (BIRDEM), Bangladesh.

**Correspondence:** Email: pathan279@yahoo.com

places cited that fasting is an obligatory prayer and compulsory for every adult Muslim who is otherwise normal except for some special situations. This medical jargon between Preachers and expert medical physicians was clarified further by a recent decree issued on extensive review by a collaboration meeting between the International Islamic Fiqh Academy and the Islamic Organization for medical Science in 2009. Some individuals such as very old age, children, insane and mentally retarded persons, pregnant and nursing mothers, during menstrual cycle, and travelers are categorized to be exempted temporarily from fasting.<sup>3</sup> Different surveys from across the world have shown that nearly 70-90% of the pregnant women with diabetes prefer not to accept this exemption.<sup>4</sup> They wish to fast for spiritual satisfaction in spite of this concession advised by her physician and religious leaders. There are only few studies regarding health beliefs, practice and manners of Muslim women about fasting in Ramadan. They justify fasting due to socio-cultural and religious imperatives.<sup>5</sup> Firouzbakht M et al<sup>5</sup> revealed that 52.6% of the women felt guilty if they did not fast, 24.4% said they fast to get benefit from the spiritual effects of Ramadan.

During the Holy month of Ramadan Muslims observe fasting and abstain from all kind of food, beverages, cigarettes from sunrise to sunset. According to religious tenets, fasting is not meant to create excessive hardship, and pregnant women are allowed to abstain from fasting. In practical life, however, many women with diabetes and pregnancy insist on fasting, thereby creating a medical challenge for health seekers as well as health care providers. Medical professionals must be aware of potential risks associated with fasting and must assist the people to mitigate those risks.

### Fuel metabolism during Fasting in women with DM with pregnancy

In people with diabetes, glucose homeostasis and fatty acid mobilization are perturbed by defective pathophysiological mechanism of insulin secretion and inappropriately high glucagon and other counter-regulatory hormones.<sup>6</sup> These changes are further accommodated during the fasting and fed state in Ramadan by shifting of normal diurnal rhythm. In order to continuously supply nourishment to the foetus. A large number of changes occur in the nutrient milieu by

different hormonal over activities from endocrine glands of the mother and foeto-placental unit. These normal physiological changes again will be aggravated by hormonal imbalance in diabetes itself as well as delicate handling of hormonal performances of pregnancy. Considering all changes during Ramadan fasting in pregnancy with DM, adaptive metabolism produces undue nutrients for nourishment and development of foetus. Thus pregnant women with diabetes intending to fast in Ramadan will compromise the health of both the mother as well as the short and long term consequences for the foetus.<sup>7</sup>

### Metabolic consequences of fasting during pregnancy

Malhotra et al observed a significant decrease in insulin, lactate, carnitine levels with simultaneous rise in TG, FFA and ketones during fasting in women with pregnancy compared with normal non-pregnant women.<sup>8</sup> Impact of metabolic changes of Ramadan on placental size and foetal development and mother's health has been elaborately reviewed by Sarita Bajaj et al.<sup>9</sup> Details of impact on foetal outcomes by gestational age of delivery, birth weight, placental size, placental blood flow, sex ratio, type of delivery, Apgar score, use of intensive care and influence of nutrition, duration of fasting hours as well as duration of fasting days and period of fasting in Ramadan at different gestational age were discussed with equivocal results on the basis of data of Michigan Natality files and Uganda Census 2002.<sup>4</sup> Foetal programming of adult diseases describing long term effects on the next generation due to fasting was assumed to produce poorer health specially in older age group, increase incidence of heart diseases and DM based on low birth weight.<sup>9</sup>

### Management

Regardless of the effect of fasting on the health status of the mother along with the short and long term consequence of this on their unborn babies, many Muslim diabetic women choose to fast.<sup>10</sup> There are no well validated recommendations to manage diabetes in fasting state in women with pregnancy. However total management should be a team approach with combined consultation of endocrinologist, obstetrician, nutritionist, health educator and neonatologist. It should be clearly mentioned by the physician that fasting should be discontinued or stopped immediately if any medical or obstetrical related complications arise or if there is any sign of foetal distress. Different consensus opinions for diabetic non-pregnant females are available which are largely based on expert and clinical opinions, and not on

scientific data. American Diabetes Association (ADA) and South Asian Consensus Guideline focused different approaches of management for non-pregnant women with diabetes.<sup>11-13</sup> Poor compliance to insulin due to multiple doses, associated cost, injection pain, skillful storage and handling in resource constraint regions, has led to search for OAD as an alternate option.<sup>14</sup> Second generation Sulphonylureas like glyburide does not cross the placental barrier and has evidence of its better efficacy and perinatal outcomes in two randomized and prospective trials on women with gestational diabetes. Metformin has been demonstrated in several studies to be effective when it was continued in women with PCOS becoming pregnant. The mother and infant outcomes even after two years in exposed babies was favourable. Considering category B grading of both Glyburide and metformin during pregnancy, we advocate their use with caution.

While fasting is intended by women with GDM we can manage diabetes initially with medical nutrition therapy and then subsequently with insulin if Blood Glucose profile fails to reach the target ( HbA1c < 6.5% and Blood Glucose before iftar < 95 mg/dl (5.3 mmol/L) and post meals < 120 mg/dl (6.7 mmol/L). Fixed combination or split free combination of short and intermediate acting human insulin 2-3 times a day or basal-plus/bolus insulin analogues can be used according to BG profile and affordability. Dose and schedules of insulin during Ramadan will be modified and adjusted according to food habit and meal times advised by nutritionist.<sup>11,12</sup> There are few studies regarding use of conventional short and intermediate acting insulin in different combinations to evaluate safety and tolerability in fasting during Ramadan in small groups of pregnant Muslim women with diabetes.<sup>15</sup> Basal analogue Detemir, bolus analogue Lispro and Aspart have been recommended for use in pregnancy. Due to wide experience for almost a century, conventional human insulin is used in pregnant women with diabetes during Ramadan fasting. This is recommended in recourse constrained areas.

### Risk Stratification

Decision must be taken by health care providers to reach a consensus instead of imposing an absolute ban on fasting for pregnant diabetic women. A more practical approach and close consultation with health care providers with great sympathy and empathy might be more helpful for good pregnancy outcomes.

Islam has exempted pregnant women from fasting as stated in the Quran.<sup>16</sup> The reason is obviously based on the biochemical changes taking place in the long hours of

abstinence from food and water. It is for the caregiver to advise the pregnant woman against fasting after explaining the risks. Despite this, if the woman feels obliged to fast then those with GDM, controlled on medical nutrition therapy, may be allowed to fast, under close medical supervision. Women with GDM or pre-existing type 2 diabetes, well controlled on low dose of insulin, may do the same, while following dose modification strategies mentioned by Kalra and Jawad.<sup>17</sup> Women with type 1 diabetes, and those with type 2 diabetes, on high or frequent doses of insulin, or with erratic/suboptimal control, must be discouraged from fasting due to the high risk for the foetus and mother.

## References

1. The future of the global muslim population: Pew Research Center's Forum on Religion & Public Life. (Online) January 2011 (Accessed 2014 October 7). Available from URL: <http://www.pewforum.org/2011/01/27>.
2. International Diabetes Federation. IDF Diabetes Atlas (Online). (accessed on Sept 2014). Available from URL: <http://www.idf.org/diabetesatlas>.
3. Beshyah SA. Fasting during the month of Ramadan for people with diabetes: medicine and Fiqh united at last. *Ibnosina J Med Biomed Sc.* 2009; 1: 58-60.
4. Almond D, Mazumder B. Health capital and the prenatal environment: The effects of maternal fasting during Ramadan on birth and adult Outcomes. Cambridge MA: National Bureau of Economic Research; 2008 October, Working paper No 14428. (Online). Available from URL: <http://www.nber.org/papers/w14428>.
5. Firouzbakht M, Kiapour A, Jamali B, Kazeminaevaei F, Taglilin F, Gorji AH. Fasting in pregnancy: A survey of beliefs and manners of Muslim women about Ramadan fasting. *Ann Trop Med Public Health* 2013; 6: 536-40.
6. Butte NF. Carbohydrate and Lipid Metabolism in Pregnancy: normal compared with gestational diabetes mellitus. *Am J Clin Nutr* 2000; 71(suppl1): 1256s-1261s.
7. Buchnan TA. Intermediary metabolism during pregnancy: implications for diabetes mellitus. In: LeRoith D, Olefsky JM, Taylor SI (eds) *Diabetes mellitus: A Fundamental and Clinical Text*. 3rd ed., Philadelphia, Lippincott Williams and Wilkins; 2004; pp 1-22.
8. Azizi F. Islamic fasting and diabetes. *J Fasting Health* 2013; 1: 1-5.
9. Malhotra A, Scott PH, Scott J, Gee H, Wharton BA. Metabolic changes in Asian muslim pregnant mothers observing the Ramadan fast in Britain. *Br J Nutr* 1989; 61: 663-72.
10. Bajaj S, Khan A. Women's health in Ramadan. In: Muraganathan A, (ed). *Medicine Update 2013. The Association of Physicians of India, New Delhi* : Jaypee Brothers Medical Pub Ltd; 2013; pp 332-334.
11. Al-Arouj M, Assaad-Khalil S, Buse J, Fahdli I, Fahmy M, Hafez S, et al. Recommendations for management of diabetes during Ramadan: Update 2010. *Diabetes care* 2010; 33: 1895-1902.
12. Pathan MF, Sahay RK, Zargar AH, Raza SA, Azad Khan AK, Ganie MA, et al. South Asian consensus guideline: use of insulin in diabetes during Ramadan. *Indian J Endocrinol Metab* 2012; 16: 499-502.
13. Pathan MF, Sahay RK, Zargar AH, Raza SA, Azad Khan AK, Siddiqui NI, et al. South Asian consensus guideline: use of GLP-1 analogue therapy in diabetes during Ramadan. *Indian J Endocrinol Metab* 2012; 16: 525-527.
14. Kavitha N, De Somsubhra, Kanagasabai S. Oral hypoglycemic agents in pregnancy: an update. *J Obstet Gynecol India* 2013; 63: 82-87.
15. Ismail NAM, Raji HO, Norashikin Wahab A, Mustafa N, Kamaruddin NA, Jamil MA. Glycemic control among pregnant diabetic women on insulin who fast during Ramadan. *Iran J Med Sci* 2011; 36: 254-259.
16. Quran. Al-Baqarah 2, Verse 195.
17. Kalra S, Jawad F. Insulin in Ramadan. *J Pak Med Assoc* 2015; 65: (Suppl-1); S44-S46.