

Fasting Ramadaan: Pregnancy, Breastfeeding & You

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Preface

Ameer ul-Mu'mineen, Abu Hafs `Umar ibn al-Khattaab (r.a), said:
I heard the Messenger of Allah (s.a.w) say: “Actions are but by intentions and every man shall have only that which he intended...”

The intent of this booklet is two-fold: to clarify common misconceptions on the status of fasting for pregnant and breastfeeding women, and to encourage one another in good.

What we aim to present here inshaAllah is an earnest effort to collate all the available knowledge and information that we have with regards to fasting in pregnancy and whilst breastfeeding.

We begin with an overview of the various standpoints in fiqh that we had access to and then turn to scientific literature to assess any potential risk, precautionary measures and advice.

Throughout our collection we bear in mind the hadith of Jabir (r.a) warning us that we need to have mercy and exercise caution whenever this is applicable:

Jabir (r.a) said, "We were on a journey and one of us got injured. Later, he had a wet dream. He asked his companions, 'Can I perform tayammum?' They said, 'No, not if you have water.' He performed ghusl and died. When they came to the Messenger of Allah, they informed him of what had transpired. He said, 'They killed him, Allah will kill them. Do you not ask if you do not know? The rescue of the ignorant person is the question. He could have performed tayammum and dropped water on his wound or wrapped it with something and wipe over the wrapping, and wash the rest of his body.'" (Abu Dawud, Ibn Majah, and others)

Our intention is not to push those already in genuine hardship into fasting; rather, the following pages are an encouragement for healthy sisters and an attempt at raising awareness surrounding the Islamic and scientific standpoints on fasting. In essence, this is that it is our duty to fast, it is safe to do so and that the minimum requirement upon us is to TRY.

We hope to fulfil the obligation presented to us by the Prophet s.a.w. upon each other: “None of you will truly believe until you love for your brother what you love for yourself.” May each and every one of us reap the barakah and unimaginable rewards of the blessed month of Ramadaan.

May Allah s.w.t purify our intentions and accept this work from us and make it a means of salvation for all who contributed to it, ameen.

Umm-Hasan bint Salim & Umm-Eesa bint Sayeed
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Many books begin with 'All praise and thanks is for Allah' but subhanAllah, we have really felt Allah's Hand in this little project. His help, guidance and assistance in every stage has been humbling; all praise is due for Him alone.

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Finally, a thank you to our parents who have supported us through thick and thin and are always pushing us to strive for excellence in all we do. May Allah (swt) bless them with ever-increasing imaan and good health in this life, and Jannatul Firdaws in the next. Aameen.

The Commandments of Allah (swt) to Fast in Ramadaan

يَا أَيُّهَا الَّذِينَ ءَامَنُوا كُتِبَ عَلَيْكُمُ الصِّيَامُ كَمَا كُتِبَ عَلَى
الَّذِينَ مِن قَبْلِكُمْ لَعَلَّكُمْ تَتَّقُونَ ﴿١٨٣﴾

"O you who have believed, decreed upon you is fasting as it was decreed upon those before you **that you may become righteous.**" [2:183]

أَيَّامًا مَّعْدُودَاتٍ فَمَن كَانَ مِنكُم مَّرِيضًا أَوْ عَلَى سَفَرٍ فَعِدَّةٌ
مِّنْ أَيَّامٍ أُخَرَ وَعَلَى الَّذِينَ يُطِيقُونَهُ فِدْيَةٌ طَعَامُ مِسْكِينٍ فَمَن
تَطَوَّعَ خَيْرًا فَهُوَ خَيْرٌ لَهُ، وَأَن تَصُومُوا خَيْرٌ لَّكُمْ إِن كُنتُمْ
تَعْلَمُونَ ﴿١٨٤﴾

"[Fasting for] a limited number of days. So whoever among you is ill or on a journey [during them] - then an equal number of days [are to be made up]. And upon those who are able [to fast, but with hardship] - a ransom [as substitute] of feeding a poor person [each day]. And whoever volunteers excess - it is better for him. **But to fast is best for you, if you only knew.**" [2:184]

شَهْرَ رَمَضَانَ الَّذِي أُنزِلَ فِيهِ الْقُرْءَانُ هُدًى لِّلنَّاسِ
وَبَيِّنَاتٍ مِّنَ الْهُدَى وَالْفُرْقَانِ فَمَن شَهِدَ مِنكُمُ الشَّهْرَ
فَلْيَصُمْهُ وَمَن كَانَ مَرِيضًا أَوْ عَلَى سَفَرٍ فَعِدَّةٌ مِّنْ أَيَّامٍ
أُخَرَ يُرِيدُ اللَّهُ بِكُمُ الْيُسْرَ وَلَا يُرِيدُ بِكُمُ الْعُسْرَ
وَلِتُكْمِلُوا الْعِدَّةَ وَلِتُكَبِّرُوا اللَّهَ عَلَى مَا هَدَىٰكُمْ
وَلَعَلَّكُمْ تَشْكُرُونَ ﴿١٨٥﴾

The month of Ramadaan [is that] in which was revealed the Qur'an, a guidance for the people and clear proofs of guidance and criterion. So whoever sights [the new moon of] the month, let him fast it; and whoever is ill or on a journey - then an equal number of other days. Allah intends for you ease and does not intend for you hardship and [wants] for you to complete the period and to glorify Allah for that [to] which He has guided you; and **perhaps you will be grateful.** [2:185]

Virtues of Fasting in the month of Ramadaan

We begin by highlighting the position of Ramadaan and the virtues of fasting in our deen in order to awaken the greatness of Ramadaan in our hearts and its position in the eyes of Allah (swt). It is essential that we adopt the appropriate attitude, together with the correct beliefs with regards to Ramadaan fasting, as this forms the basis of our approach to this month.

Ramadaan and the fasting that is due in this month is a huge symbol of Allah. It demands a heightened reverence, a deep love and motivating drive in fulfilling the month's duties to the best of our abilities.

This beloved month and its status are indisputable. Fasting is no less than obligatory and leaving it without a valid excuse is an abominable crime. Abu Hurairah (r.a) reported that the Messenger of Allah (s.a.w) said: *"Whoever breaks his fast during Ramadaan without having one of the excuses that Allah would excuse him for, then even a perpetual fast, if he were to fast it, would not make up for that day."* by Bukhari, Abu Dawud, Ibn Majah, and Tirmidhi, with some difference in wording.

From the very inception of Ramadaan, Allah (s.w.t) assigns a special caller with an extraordinary invitation to each one of us, as Rasoolullah (s.a.w) said, *"When the first night of Ramadaan comes, the doors of Paradise will be opened and the doors of Hell will be closed, and the devils will be chained, and it will be said, 'O you who desires virtue! Come forth and O you who desires evil! Stay behind', and Allah has people whom He frees from Hell every night (in that month)."* Bukhari and Muslim

SubhanAllah, from the very beginning of this month, Allah (swt) marks the commencement of a spectacular race; one for virtuous good deeds. And what deed can overtake that of fasting for Allah in this month. Fasting is the only deed that Allah Himself singles out over and above *any* other deed, and that He takes upon Himself to reward without measure due to His love for it. What an honoured status indeed.

Abu Hurairah (r.a) reported a hadeeth qudsi: *"Allah says: All the deeds of Adam's children belong to them, except fasting, which belongs to Me, and I will reward it. Fasting is a shield (against the Hell and sins). If one of you happens to be fasting then he should avoid relations with his wife, and should avoid quarrelling. If someone quarrels with him, let him say: 'I am fasting.' By Him in Whose Hand is my soul, the smell of the mouth of a fasting person is better in the sight of Allah than musk. There are two times of joy for the fasting person; when he breaks his fast he is happy; and when he meets his Lord he is happy due to his fasting."* Bukhari and Muslim

This hadith qudsi also captures numerous beautiful merits of fasting, namely the protection from sins and immoral behaviour as well as Hellfire, and a ticket to a special station in the sight of our Lord that will result in a joyous meeting with Him, inshaAllah!

Some final special rewards, attainable only through the sincere intention to fast in Ramadaan, include:

- An entire history of sins being forgiven;
Narrated Abu Hurairah that Rasoolullah (s.a.w) said: *“He who observed the fasts of the month of Ramadaan out of eeman and ihtisaab (hoping for the reward from Allah), then all his past sins will be forgiven.”* Bukhari

- Du’as that are guaranteed to parallel nobody else's except two other supreme categories of people;
Abu Hurairah reported that the Prophet (s.a.w) said: *“There are three people whose supplications are not rejected: the fasting person when he breaks the fast, the just ruler and the supplication of the oppressed.”* Tirmidhi, Ibn Majah

- and last but certainly not least, fasting will petition Allah on our behalf so much so that it will be our aid to Jannah:
Rasoolullah (s.a.w) said: *“Fasting and the Quran intercede for a servant on the Day of Resurrection. Fasting will say: "oh my Lord I prevented him from food and desires so accept my intercession for him" and the Quran will say: "I prevented him from sleep at night, so accept my intercession for him." So their intercessions will be accepted”.* Ahmad

Note that the only two things on the Day of Judgement that will be of any avail to us will be fasting and the Quran - how they go together so completely! Our fasting will be there for us on the Day that the mother will abandon her child and no person will have concern for any other but themselves, subhanAllah.

We'd like to add here that Ramadaan is both the month of fasting and the month of the Quran. Ramadaan is not quite Ramadaan when either of the two are lacking.

Quran during pregnancy and when our babies are still breastfed has a unique impression on our children, shaping them, comforting them and forming the foundation of a life-long companionship with them, inshaAllah.

Pregnancy and the duration of breastfeeding, both during and outside of Ramadaan, is a wonderful time to exert ourselves in the recitation of the Quran, listening to it wherever we can, whenever we can so that Quran is a determining component in the formative months of our child's life.

We end with a powerful hadith that portrays the magnitude of Ramadaan, the effects it is supposed to have upon us, and the basis of our striving to please Allah s.w.t in it:

‘Ubaadah Ibn as-Saamit narrated that the Prophet (s.a.w) said: *“Ramadaan has arrived to you, a month of barakah (blessings), Allah envelops you (with His mercy & blessings), so He descends His mercy, erases the sins, answers your du’as, and He watches your competition in virtuous deeds and He boasts in front of the angels about you. So let Allah see the best from you for truly, the miserable one is he who is deprived from the mercy of Allah (in this month).”* Tabarani

Rulings on Fasting for Pregnant/Breastfeeding Women

Abu al-Darda' (r.a) narrates that the Messenger of Allah (s.a.w) said, "Scholars are the inheritors of the prophets."¹

We are truly blessed to have had scholars throughout our history who have dedicated their lives to the preservation of this deen and made our practice of it today so easy. May Allah (s.w.t) reward them abundantly and grant them Jannatul Firdaws, Ameen.

In this section we present a collection of fatawa or legal rulings that describe the position on pregnant and breastfeeding women fasting during Ramadaan. The essence of each is that pregnant and breastfeeding women are obliged to fast, unless they fear harm for themselves or their child. This rukhsa (dispensation) is based upon the hadith of Anas (r.a) where he reports that the Messenger of Allah (s.aw) said, "Verily, Allah has lifted half of the prayers and fasting from the traveller, and [fasting] from those pregnant and nursing."²

The commentators and fuqaha have agreed that this exemption is conditioned by the inability to fast or fear of harm, which is confirmed by ahadith such as the narration in Abu Dawud from Ibn Abbas (r.a) where he limited it to "if they fear." Imam Abu Dawud (r) explained this as meaning, "That is, if they fear for themselves or their child." Imam Bukhari said likewise in the relevant chapter-heading in his Sahih.³

Within the Hanafi school, we quote from three texts: Mukhtasar al-Qudoori, Noor al-Idah and al-Hidaayah. 'Umdatul-Fiqh is used to take the Hanbali position, for Shafi'i fiqh we quote from 'Umdatul-Saalik. For Imam Malik's opinions we rely upon his Muwatta. We close with a fatwa from Shaykh Uthaymeen and Imam Bukhari.

Mukhtasar al-Qudoori

A renowned treatise on Hanafi fiqh written by the 11th Century scholar Imam Abul-Hasan Ahmed ibn Muhammed al-Qudoori, states:

*"...and the pregnant woman and the breastfeeding woman **if they fear for their children**, they may break the fast and make it up, and there is no ransom for them."*

The commentary further mentions: "breastfeeding is necessary upon the mother from a religious standpoint, especially when the husband is under financial difficulty [and therefore cannot afford a wet-nurse] i.e. the make-up fast is necessary upon both women without expiation or compensation."

Two important points arise: first, the fast can be attempted and then broken at any time if one fears harm, and second, that according to the Hanafi madhab no expiatory payment or feeding of poor people is to be offered in place of the fast.

¹ Related by Tirmidhi, Abu Dawud, Nasa'i, Ibn Majah, Ahmad, Ibn Hibban, and others. Ibn al-Mulaqqin, Zayla'i, Ibn Hajar, and others deemed it sound (hasan) or rigorously authentic (sahih)

² Tirmidhi 649, Abu Dawud 2056, Nasa'i 2237, Ibn Maja 1657, Ahmad 18270, with different wordings and narrations

³ Shaykh Faraz Rabbani - http://spa.qibla.com/issue_view.asp?HD=1&ID=317&CATE=6

The commentary is also important in that Imam al-Qudoori stresses the importance of breastfeeding and clarifies that if any fasts are left in Ramadaan by pregnant or breastfeeding women then these fasts need to be made up by fasting another day, one for each missed fast, outside of Ramadaan.

Al-Hidayah

This is one of the early works on Hanafi fiqh, by Imam Abul-Hasan Ali ibn Abi-Bakr al-Marghinani, in which he states:

“...and the pregnant and breastfeeding women, if they fear for themselves (or their children) they should break the fast and make it up (to prevent hardship), and there is no expiation required of them (as they broke their fast with valid reason).”

This reiterates the position stated in the previous works but in the commentary to this section ‘Allama Abul-Fadl ‘Asqalaani writes: *“Here what is intended by ‘breastfeeding woman’ is the wet-nurse because a mother will not break her fast if the child has a father [who can afford a wet-nurse] as fasting is compulsory upon her before breastfeeding. And Shaykh Abdul ‘Aziz (r) states that it is necessary to restrict this to a situation where the father is affluent and the child takes to a breast other than his mother’s.”*

It was commonplace in the past for children to have wet-nurses, as is apparent also in the seerah of our beloved Prophet (s.a.w). ‘Allama ‘Asqalaani was therefore of the opinion that if the child’s right to breast milk is fulfilled via a wet-nurse, the child’s mother does not fall under the category of ‘breastfeeding women’ and fasting takes precedence for her.

It should be noted here however that whilst this shows the emphasis placed on fasting by the esteemed scholar, it is not the relied upon opinion of the Hanafi madhab, as seen below.

Noor al-Idah

This is a 17th Century manual on Hanafi jurisprudence written by a great scholar of the time, Imam Hasan Shurunbulali. On the topic at hand, he writes:

*“...and leaving the fast is allowed for a pregnant or breastfeeding woman if she fears a loss of mind, death, or illness upon herself or her child, whether it is her own child or a child she nurses. **And the ‘fear’ that is considered [genuine] is that which is based upon one’s predominant belief through past experience or on the information from a Muslim doctor who is skilled and upright.**”*

We can see that the reasons considered legitimate for one to leave the fast are far from minor. In everyday cases, one would need reasonable cause to be worried about getting ill or making one’s child ill, in order to warrant abandonment of the fast.

Crucially, ‘Allama Shurunbulali qualifies what fear is and how to act upon it. He differentiates a particular type of fear - not fear about anything from anywhere, but fear that stems from one’s own first-hand experience of having fasted, such as in a previous pregnancy under the same conditions, or from one’s current attempt to fast,

or fear that is justified in the opinion of an upright Muslim doctor who knows the importance of fasting in Ramadaan.

In his commentary, Maraqi al-Falah, ‘Allama Shurunbulali further states: *“the Prophet (s.a.w) said: ‘Indeed Allah has excused for the traveller fasting, and excused half the Salaah, and (excused) for the pregnant and breastfeeding woman fasting’ and whosoever has restricted [this ruling] to the [hired] wet-nurse, [that view] is rejected.”* Maraqi al-Falah, Chapter on Fasting, Fasl fil ‘Awaaridh, pg. 250

Here we find that ‘Allama Shurunbulali is refuting the opinion given above from the commentary of Al-Hidayah by ‘Allama ‘Asqalaani, by stating that any breastfeeding woman whether it be the mother or the wet-nurse, may take the exemption from fasting if they fear for themselves or the child.

‘Umdat-us-Saalik

Said to consist of the soundest opinions of the Shafi’i madhab, this is a 14th Century text in which the great Imam Abu al-‘Abbas Ahmad ibn an-Naqib al-Misri states:

“A woman who is breast-feeding a baby or is pregnant and apprehends harm to herself or her child may omit the fast and make it up later, though if she omits it because of fear (of harm) for the child alone (not for herself) then she must give 0.51 litres of food in charity for each day missed, as an expiation (in addition to making up each day).”¹

Shaykh Abdul-Karim Yahya expands on this: *“A pregnant or breastfeeding woman who breaks her fast because she fears an illness afflicting her (by herself or along with the child) has to make up the fast without paying an expiation... Here an illness means having or fearing a significant illness (not something like minor headache or pain), or fearing the increase or prolongation of the illness.”²*

Once again this indicates that the only valid reason for a pregnant or breastfeeding woman to break her fast is due to fear of an illness for her or her child, and importantly, the illness has to be something that is not minor. Fasts can also be left if resuming fasting will prolong or worsen the illness, or delay recovery. In such cases, the fast is to be made up, and a penalty is not due if she only fears for herself, however Imam al-Shafi’i states that the ransom is necessary when a woman fears for her child [and not herself], because the breaking of the fast is of benefit to the one upon whom the fast is not necessary, and that is the child.³

‘Umdatul-Fiqh

Relied upon to this day as a manual of simplified Hanbali fiqh, the 12th Century text written by Imam Abdullah ibn Ahmad ibn Qudaamah sheds light upon the issue of fasting for pregnant and breastfeeding women:

¹ As translated by Shaykh Nuh Ha Mim Keller in Reliance of the Traveller, Book I on Fasting, Section 11.8, pg. 113

² http://spa.qibla.com/issue_view.asp?HD=3&ID=8216&CATE=412

³ Commentary on Mukhtasar al-Qudoori

^{4,5} Tuhfatul Ahwazi Sharh of Sunan Tirmidhi, Book of Fasting, Chapter on Breaking the fast for the pregnant and breastfeeding

“Breaking the fast is permissible in Ramadaan for four types of people... The third type is a pregnant woman and one who is breastfeeding. If they fear for themselves, they break their fast and make up for it. And if they fear for their unborn child, they break their fast and make up for it and feed one poor individual per day.”

In his commentary on this great text, Hatem al-Haj states: ‘The position of al-Umdah, here above, is the correct position of the Hanbali School of Fiqh’.

Al-Muwatta

Imam Malik narrates in his Muwatta, expanding on his opinion, that ‘Abdullah ibn ‘Umar was asked regarding the fast of a pregnant woman who fears for the safety of the unborn child and finds fasting difficult. He advised that she should not fast and for every fast missed feed one poor person one Mud (a measure) of barley according to the Mud (measure) of the Prophet (s.a.w).

Imam Malik further mentions that scholars are of the opinion that she has to make up the missed fasts as is mentioned in the ayah, “So whoever among you is ill or on a journey [during them] - then an equal number of days [are to be made up]”. They consider hers to be an illness from amongst the illnesses [mentioned in the ayah], *provided she fears for the safety of her child.*⁴

A minority opinion

Imam Abu Dawud mentions in his sunan narrating from Ibn Abbas regarding the ayah, “And upon those who are able [to fast, but with hardship]”:

“There is a concession for the elderly (man and woman) that they can abstain from fasting and feed in place of every fast one poor person; therefore a pregnant woman and wet nurse will fall under the same category if they fear for the child. So they are able to choose either to make up the fast or feed the poor person.” Imam Bazaar has mentioned at the end that Ibn Abbas said to a pregnant lady, 'You fall under the category of those who are unable to fast therefore you are able to give Fidyah and no Qadha is upon you'.”³

There appears to be a similar discussion amongst Salafi scholars, as the abovementioned opinion of Ibn Abbas (r.a) was relied upon in the contemporary text “Fiqh al-Sunnah”. However, the renowned Shaykh ibn Uthaymeen is quoted thus in Fataawa al-Siyaam (p. 161):

If a pregnant woman or breastfeeding mother does not fast without an excuse, and she is strong and in good health, and is not affected by fasting, what is the ruling on that?

He replied:

It is not permissible for a pregnant woman or breastfeeding woman not to fast during the day in Ramadaan unless they have an excuse. If they do not fast because they have an excuse, then they have to make up the missed fasts,

³ Tuhfatul Ahwazi Sharh of Sunan Tirmidhi, Book of Fasting, Chapter on Breaking the fast for the pregnant and breastfeeding

because Allah says concerning one who is sick: “and whoever is ill or on a journey, the same number [of days which one did not observe Sawm (fasts) must be made up] from other days.” [al-Baqarah 2:185]

Pregnant women and breastfeeding mothers come under the same heading as those who are sick. If their excuse is that they fear for the child, then as well as making up the missed fasts, according to some scholars they also have to feed one poor person for each day missed, giving wheat, rice, dates or any other staple food. Some of the scholars said that all they have to do is make up the missed fasts, no matter what the situation, because there is no evidence in the Quran or Sunnah for giving food in this case, and the basic principle is that there is no obligation unless proof of that is established. This is the view of Abu Haneefah (may Allah have mercy on him) and it is a strong view.”

We will end with the eminent Imam Bukhari (may Allah be pleased with him), who mentions in his Saheeh, “Hasan and Ibrahim have mentioned that if a pregnant woman or wet nurse fears for her life or for the life of her unborn child she should not fast and make up the fast later.” Bukhari

What to do about the missed Ramadaan fasts

Do I have to "pay for" missed fasts?

As we have seen through the unanimity of the scholars, missed or broken fasts sit as a debt that we owe to Allah (s.w.t), just like missed prayers. Women who miss fasts due to pregnancy/breastfeeding cannot substitute making up the fasts with payments alone. In the contemporary work *Al-Fiqh al-Islami wa Adillatuhu*, Shaykh Wahbah al-Zuhaili has summarised for us the legal rulings of the four main schools of thought, he states:

“If they (either the breastfeeding or pregnant woman) break their fast,

- Making up the fast is necessary *without any payment* – according to the **Hanafi** school
- And (making up the fast is necessary) *along with a payment if they fear for their child only* – according to the **Shafi’i** and **Hanbali** schools
- And (making up the fast is necessary) *along with a payment for the breastfeeding woman only*, not the pregnant woman – according to the **Maliki** school of thought.”⁴

I fall into one of the above categories which require payment of “fidya” along with making up my fasts. What do I need to pay?

- The "payment" comprises paying one "mudd" or 0.51 litres of food per fast missed, according to the Shafi’i madhab.
- One must pay whatever food is considered the main staple in the area where one lives. This could be wheat, barley, rice or something else.³
- One must pay with the actual food and not the monetary value of the food, although some Shafi’i scholars have given the Hanafi opinion of allowing fidya to be paid in its monetary value.

Do I have a time limit for making up my fasts?

- In the Hanafi madhab there are no time constraints given with regards to make-up fasts, although it is recommended to make them up as soon as one’s health allows.
- According to the Shafi’i madhab it is not permissible for a person to delay their make-up fasts up until the next Ramadaan unless they have a valid excuse. If one delays making up the fast until another Ramadaan comes, then one must pay compensation along with making up the fast, this payment is cumulative if one delays further.⁵

Can I feed all the people on one day at a big feast?

- The poor must be given possession of the food (e.g. a bag of wheat) and then they can do with it as they wish (e.g. eat it, sell it, give it away to someone else, give it back to you and ask you to cook it for them, etc). Therefore, it *would*

⁴ *Al-Fiqh al-Islami wa Adillatuhu*, Volume 2, pg. 646

⁵ *Reliance of the Traveller*, Book I- Fasting, Section i1.33, pg. 117

not be sufficient to invite the people to a feast. One would have to give them the actual staple food.

It is valid, however, to give everyone the food the same day. It suffices to give multiple mudds to one person (so one could calculate everything one owes and give everything to one person). However, it is not acceptable to divide a single mudd between multiple people.⁶

⁶ http://spa.qibla.com/issue_view.asp?HD=3&ID=16286&CATE=412

Fasting whilst Pregnant: Is it Safe to Fast?

Most women worry about the potential adverse effects of fasting, both for themselves and their unborn children. This is especially true for pregnancies in the first and last trimesters when the greatest demands on the body take place.

Many women are unwilling to take any risks when it comes to their babies. This is certainly a most praiseworthy attitude with regards to our health and children, but when it comes to fasting this approach alone is not a valid reason not to fast. We have established in the previous chapters that worries alone are not a sufficient excuse or automatic exemption from fasting, rather, fear of serious harm has to be perceived or expected based upon personal experience or sound medical advice.

We aim to determine whether there is a cause for concern, a potential for serious harm or risk and at what stages in pregnancy they are applicable that would therefore exempt pregnant women from fasting.

Ramadaan falling in the summer, with long fasts on hot days, is the immediate concern for pregnant women, their family members and health care providers. Morning sickness can add to problems with keeping hydrated. Feeling nauseous itself is obviously not a serious harm, but repeated vomiting that could lead to dehydration certainly is.

Sufficient fluid intake for anybody fasting is necessary, and for pregnant women it is a must. We would encourage everyone to remain alert about any warning signs of dehydration, namely feeling light-headed or dizzy, breaking their fast if symptoms persist or worsen. Aside from hydration there are no other major concerns regarding maternal health in societies where food is abundant, alhamdulillah.

There is a growing body of research indicating that fasting does not cause us or our babies harm. More specifically, fasting does not induce early labour or increase the risk of premature babies^[1], nor does it affect birth weight^[2] ^[3]. The same studies and others ^[4] also show this remains true for every stage of pregnancy during which Ramadaan occurs; fasting in early or late pregnancy has no disadvantageous impact on labour and birth.

Detailed measures of estimated foetal weight gain, the tiny heart and its functions^[5] ^[6], the umbilical cord^[7], the placenta^[8] and amniotic fluid^[9] have all been studied and any changes that have been reported in the mother^[10] or foetus have not been shown to be damaging.^[11]

The findings can often be astounding, with some authors even confidently concluding that "fasting during Ramadan does not lead to maternal ketonemia or ketonuria^[12] in pregnant women. In addition, fasting during Ramadan has no significant adverse effect on intrauterine fetal development or the fetus's health."^[13]

This is not to say that fasting cannot and does not affect pregnant women. Fasting can produce "increased irritability and incidences of headaches with sleep deprivation and lassitude (weariness or a lack of energy)." However, there are few serious health problems that are attributable to fasting itself and none that are known to be specific to pregnant women. This means that there are also very few cases where the exemption for fasting when pregnant is applicable for otherwise normal pregnancies.

It is important to bear in mind that the sick person is exempt from fasting under certain conditions and we need to be particularly wary of this during pregnancy. It is worth noting common conditions and illnesses [14] when pregnant and what doctors perceive as being severe and with which fasting should be left.

The above research is based upon healthy women with straight forward pregnancies. If there are any complications or health problems then this advice is not applicable and it is our duty to act upon personal medical advice in such cases. This would include pregnancy-specific conditions such as gestational diabetes and pre-eclampsia.

Muslim women across the globe continue to observe fasting whilst pregnant in countries as diverse as Turkey, in rural African villages [15] and Singapore where "most of them do not experience any adversities during fasting and even if they do, most were able to overcome them." [16] We have also found similar experiences when collecting personal accounts of fasting in Ramadaan (see pg. 23).

Generally, pregnancies continue as normal during Ramadaan although some women may have a little weight loss. Not all women will actually lose weight [17] as it is easy to continue to consume the same amounts of energy when fasting and not fasting. It is important to ensure that we are not only meeting pure energy intakes but are choosing healthy balanced meals. A poor diet is more likely to affect the mother than her baby.

Long-term effects of Ramadaan fasting during pregnancy, beyond the effects in *utero* and at birth, are in their primary stages of study and authors in this field state that they are far from being in a position to extrapolate or to set guidelines and parameters in decisions on fasting [18]. We do have some evidence, such as measuring intelligence in children aged 4 to 13 using appropriate IQ tests, that have found no adverse effects of fasting during pregnancy. [19] What research has been published showing negative long-term effects is based on weak statistical correlations without any evidence of causation and in contrast to clear medical advice. [20] Because a disproportionate amount of attention has been given to these handful of fringe studies, there is a fuller discussion of them in the appendix.

We reviewed over 40 papers [21] and believe that in the light of current research, fasting in normal, healthy pregnancies is safe, at any stage of pregnancy.

In conclusion, we provide a statement from the British Journal of Midwifery: "It would appear that most health care professionals advise against fasting during pregnancy... in the light of available research, Ramadaan fasting has no long-term effects on normal healthy mothers or their full term offspring." [20]

"Then when you have reached a firm decision, put your trust in Allah." (Surah Aale-Imran, verse 159)

"Whoever puts his trust in Allah; He will be enough for him. Surely Allah brings about what He decrees; Allah has set a measure for everything." (Surah Talaq, verse 3)

[1] Awwad, J., I. M. Usta, et al. (2012). "The effect of maternal fasting during Ramadan on preterm delivery: a prospective cohort study." BJOG **119**(11): 1379-1386.

[2] Cross, J. H., J. Eminson, et al. (1990). "Ramadan and birth weight at full term in Asian Moslem pregnant women in Birmingham." Arch Dis Child **65**(10 Spec No): 1053-1056.

[3] Kavehmanesh, Z. and H. Abolghasemi (2004). "Maternal Ramadan fasting and neonatal health." J Perinatol **24**(12): 748-750.

[4] Ozturk, E., O. Balat, et al. (2011). "Effect of Ramadan fasting on maternal oxidative stress during the second trimester: a preliminary study." J Obstet Gynaecol Res **37**(7): 729-733.

[5] Hizli, D., S. S. Yilmaz, et al. (2012). "Impact of maternal fasting during Ramadan on fetal Doppler parameters, maternal lipid levels and neonatal outcomes." J Matern Fetal Neonatal Med **25**(7): 975-977.

[6] Mirghani, H. M., M. Salem, et al. (2007). "Effect of maternal fasting on uterine arterial blood flow." J Obstet Gynaecol Res **33**(2): 151-154. see also Mirghani, H. M., D. S. Weerasinghe, et al. (2003). "The effect of maternal fasting on the fetal biophysical profile." Int J Gynaecol Obstet **81**(1): 17-21 where they report reduced no changes with the exception of reduced foetal breathing movements which are infrequent or absent in late pregnancy anyway. The foetus most likely adopts a new sleep-wake cycle just like its mother.

[7] Dikensoy, E., O. Balat, et al. (2009). "The effect of Ramadan fasting on maternal serum lipids, cortisol levels and fetal development." Arch Gynecol Obstet **279**(2): 119-123.

[8] Alwaseel SH, Abotalib Z, Aljarallah JS, Osmond C, Alkharaz SM, Alhazza IM, Badr G, Barker DJ. (2010) Changes in placental size during Ramadan.. Epub 2010 Jun 2.

Placenta. 2010 Jul;31(7):607-10. doi: 10.1016/j.placenta.2010.04.010

[9] Dikensoy, E., O. Balat, et al. (2008). "Effect of fasting during Ramadan on fetal development and maternal health." J Obstet Gynaecol Res **34**(4): 494-498.

[10] Kiziltan, G., E. Karabudak, et al. (2005). "Dietary intake and nutritional status of Turkish pregnant women during Ramadan." Saudi Med J **26**(11): 1782-1787

[11] Tug, N., H. Ayyaci, et al. (2011). "Effects of short-term maternal fasting in the third trimester of pregnancy on fetal biophysical profile and Doppler indices scores." Arch Gynecol Obstet **283**(3): 461-467. Fasting decreased BPP reversibly, but not to a level below 8/10.

[12] Ketonemia: excessive ketone bodies in blood. Ketonuria: ketone bodies are present in the urine. Ketones indicate that the body is using an alternative source of energy and is therefore found during starvation.

[13] Dikensoy, E., O. Balat, et al. (2008). "Effect of fasting during Ramadan on fetal development and maternal health." *J Obstet Gynaecol Res* **34**(4): 494-498.

[14] For examples, see the chapter on common illnesses in pregnancy in the Queens Charlotte's hospital 'Guide to Pregnancy and Birth' which can be viewed online on Amazon using the search inside this book function: http://www.amazon.co.uk/Queen-Charlottes-Hospital-Guide-Pregnancy/dp/0091815959#reader_0091815959.

[15] Prentice, A. M., A. Prentice, et al. (1983). "Metabolic consequences of fasting during Ramadan in pregnant and lactating women." *Hum Nutr Clin Nutr* **37**(4): 283-294.

[16] Joosop, J., J. Abu, et al. (2004). "A survey of fasting during pregnancy." *Singapore Med J* **45**(12): 583-586.

[17] Leiper, J. B. and A. M. Molla (2003). "Effects on health of fluid restriction during fasting in Ramadan." *Eur J Clin Nutr* **57 Suppl 2**: S30-38.

[18] Van Ewijk, R. J. G. et al. (2013). "Van Ewijk et al. Respond to Ramadan Prenatal Fasting" *Am. J. Epidemiol.* (2013)177 (8): 741-742.

[19] Azizi, F., H. Sadeghipour, et al. (2004). "Intellectual development of children born of mothers who fasted in Ramadan during pregnancy." *Int J Vitam Nutr Res* **74**(5): 374-380.

[20] Cross-Sudworth, F (2007) Effects of Ramadan fasting on pregnancy

British Journal of Midwifery, Vol. 15, Iss. 2, 01 Feb 2007, pp 79 - 81

[21] The papers can be found in Appendix ii

Fasting whilst Breastfeeding

Concerns for breastfeeding mothers whilst fasting in Ramadaan vary depending on the age of the baby, previous breastfeeding experience, any solid intake of the child, and the number of children being breastfed. Mothers with twins, or with older babies who rely heavily on breast milk have the greatest demand on lactation as do mothers with exclusively breastfed babies.

Even with the presence of such demands, it is anticipated that fasting is within the means and abilities of the vast majority of women. General advice is that fasting whilst breastfeeding is safe, particularly for women whose babies are not exclusively breastfed, and that fasting should not be readily left.

It is a myth that inadequate fluids and food intake create a poor milk supply. The most common causes of poor milk supply when babies are small are due to infrequent feeds, a poor latch, positioning, or sucking problems on the baby's part[1]. Malnutrition is rarely a cause and "even in societies where women are on marginal diets, most are able to produce breast milk in amounts that are adequate for good infant growth." [2]

It is not uncommon for women to have a perceived supply problem when nourishment levels are at least adequate, both when fasting and not. There is evidence that fasting does not decrease breast milk, even though 22% of women report a perceived decrease in one particular study.[3] It is very rare for women actually to fail to lactate.

This is not to say that fasting can, and may well, alter breastfeeding habits, particularly early on in Ramadaan when the body is adjusting to new patterns. It can take a few days, perhaps even up to two weeks, for some women and their babies to adjust to a Ramadaan fasting routine after which it is much easier. Some women may not need any time to adjust, or will have adjusted by fasting in Sha'ban.

It is comforting to know that fasting will not result in a breastfed baby gaining less weight or not growing properly, even for exclusively breastfed babies.[4] There is no evidence demonstrating that fasting whilst breastfeeding a baby of any age has adverse consequences on breastfeeding itself, or on the child.

As for difficulties for the mother, women may worry about dehydration or not being able to meet the nutritional demands of their children. It is easy, and natural, to switch adequate fluid intake to night time when fasting. Prentice et al. (1984) found lactating Gambian women fasting in Ramadaan for 14.5 hours had normal levels of hydration where temperatures are around 30 degrees. The women "superhydrated" themselves at night by drinking about 2 litres more than other women at night.[5]

This may have been because it is a common belief that by drinking lots we can protect our milk supply. However, "evidence suggests that lactating women can

tolerate a considerable amount of water restriction and that supplemental fluids have little effect on milk volume... there appears to be no justification for emphasizing high fluid intake as a way to improve milk production.”[6]

We would still encourage women to drink plentifully throughout the night as this advice is for women in general and not specific to fasting. Food abstinence won't affect milk supply but dehydration, when severe, will. If for some reason you cannot or have not taken in too much extra fluid this should not affect your milk supply. Note that the body utilises water not only from beverages but also from foods, accounting for a sizeable percentage of fluid intake. All foods naturally have a high percentage of water and some fruit and vegetables contain lots of water, such as cucumbers and lettuce.

A second interesting finding with the Gambian mothers were some changes in their breast milk which have also been reported in other cultures. Milk volume was not affected but milk composition did change. Fasting affects the biochemical/nutrient content of breast milk to a certain extent as the body makes several metabolic adaptations whilst fasting to ensure that milk production is not affected.

The "micronutrient" content of breast milk is affected, such as mineral levels, but the "macronutrient" content is not.[7] Macronutrients are proteins, carbohydrates and fat that are needed in large quantities for growth and energy. Fasting doesn't change these in breast milk but affects levels of micronutrients that are only needed in small quantities, such as magnesium, zinc and potassium. Even twenty hours of fasting has no discernible effect on the output of milk, milk secretion rate or its macronutrient composition.[8] "Breast-milk is incredibly resilient, and can retain its major nutrients even during fasting." [9]

Considering the evidence indicating that fasting does not harm breastfeeding mothers and their children, the remaining factors to consider when making decisions on fasting are fairly simple. First and foremost, the mother's health is a consideration as is illness, such as fever, that automatically exempts any person from fasting, or pregnancy-related conditions where medical advice is not to fast.

A second, equally important, consideration would be the child's health. If a baby is ill and the mother has concerns about her child's levels of hydration, or if a child remains distressed to a degree that could harm them, or the mother is unsure of their nutrient intake then these needs must be weighed to determine how much of a worry this is and if it is significant, if it is a fear, then fasting can be left.

The balancing of fear for oneself, or for the baby, is essentially down to each individual and if the fear for adverse health outcomes or the continuation of breastfeeding is present then a woman can break her fast.

It is also important to consider any other forms of nutrition a baby has. If formula milk is given in addition to breast milk, or there is an expressed milk store that can be used, or if the baby eats solids then these need to be factored in when deciding

whether to fast. All of these additional forms of nutrition obviously reduce the demands on lactation during fasting and any worries about milk can be settled easily by choosing the alternate feeding choice in most cases.

Please note that formula milk is not a substitute for breast milk^[10] and we are not encouraging its use or its adoption during Ramadaan in order to facilitate fasting. However, if women are already giving their babies formula milk and have no intention to cease doing so then they have the option of offering formula milk as a complement. For example, if the baby usually has one bottle feed at night and the family intends to continue formula milk irrespective of Ramadaan then the mother would have the option of switching the bottle to the day-time nap instead and continue to fast and breastfeed at night.

We also would not advise increasing bottle feeds and reducing breastfeeding in order to manage fasting. Reducing breastfeeding could eventually result in a decrease in milk supply as breast milk is made upon a demand basis^[11]. The more breast milk a baby takes, the more the mother produces and so introducing more formula feeds, or more solids, will lessen milk production. The speed at which this happens varies immensely between women.

Having said this, there is no harm in increasing solid intake gradually to some degree whilst maintaining existing levels of breastfeeding. This is not to encourage anyone to reduce breastfeeding, but to provide women with some assurance that their babies' nutritional needs are met, to bring peace of mind and to support fasting. There is some evidence that despite increasing a child's food intake in Ramadaan when the mother is fasting, breast milk is not reduced.^[12]

Also, if women express milk, or have a frozen store of breast milk that is intended for later use then Ramadaan may be a time to utilise that store. Again, we would not advocate a habit of expressing and storing milk as there are benefits to feeding directly from the breast whenever possible, but if this is something that helps, particularly perhaps towards the evening before breaking fast, then it can be used to make things easier rather than leaving breastfeeding or fasting.

Finally for babies that also eat solids, based upon exclusive breastfeeding practices where solids are introduced at a minimum age of 6 months and increased to 3 meals a day by the time a baby reaches 12 months, there does not seem to be a warrant for abandoning fasting when babies are aged around 12 months onwards. No perceivable serious risk should be present unless the baby is still heavily reliant on breast milk.

Of course, even when a baby takes solids, breast milk is most often the primary source of nutrition during the first year.^[13] This does not automatically exempt mothers with babies under 12 months, especially if solids were started earlier^[14], or when breast milk is replaced with formula. Furthermore, as stated earlier, most women with exclusively breastfed babies will also be fine if they choose to fast.

We do realise that breastfeeding during Ramadaan may be disruptive but the inconvenience of having to breastfeed more at night, a reduction in daytime feeds, and moderate agitation in the child or mother are not serious reasons not to fast. They do not fulfil the conditions of fear of harm to oneself or to the baby that permit women not to fast.

We should continually bear in mind the health of the baby and the mother when making decisions on fasting, highlighting that if breastfeeding itself is perceived to be at risk, even if the health of the child or the mother is fine, this is sufficient as a reason for exemption. Breastfeeding presides over fasting.

Finally, we would also encourage all mothers to continue suckling frequently during Ramadaan, both whilst fasting and after having broken fast, during the day and at night, and even when they feel that their breasts are 'empty'. Babies don't suckle purely for nutritional needs to be met and one very important reason for suckling is stimulation of an adequate milk supply. Milk removal is what drives supply.

Lactating women are always making milk. Milk production actually only slows down or speeds up. When there is more milk in the breast, less milk is produced. When the breast is empty, milk production is increased. It is a supply that is based upon demand.

The emptier the breast, the faster the body makes milk to replace it and so it is a good idea to nurse whilst fasting and immediately after breaking fast, ensuring that one breast is drained before switching to the other and offer both breasts in order to further encourage milk supply. The fuller the breast, the more milk production calms down, and so there is no need to wait to feel full before feeding.

Breastfeeding is an incredible process and one that is a moral obligation upon every mother. Its importance and value is signified by the concessions that apply to any breastfeeding mother who can leave fasting in order to ensure continued and successful, healthy breastfeeding.

This is to be balanced with the fact breastfeeding in itself does not automatically and universally exempt women from fasting. The bar for permission to leave fasting is set high and from the discussion above, fasting is safe.

[1] Hill, P. Insufficient milk supply syndrome. *NAACOG's Clin Issues* 1992; 3(4):605-13.

[2] World Health Organization. Not enough milk. *Division of Child Health and Development Update* Feb 1995 21. <http://www.who.ch/programmes/cdr/pub/newslet/update/updt-21.html>

[3] Ertem, I. O., G. Kaynak, et al. (2001) Attitudes and practices of breastfeeding mothers regarding fasting in Ramadan

[4] A. Khodel , S. K., J. Nasiri, E. Taheri, M. Najafi, A. Salehifard , A. Jafari (2008). Comparison of Growth Parameters of Infants of Ramadan Fasted and Non-Fasted Mothers

[5] Prentice AM, Lamb WH, Prentice A, Coward WA The effect of water abstention on milk synthesis in lactating women

[6] Mohrbacher, N. et al. (2010) *Breastfeeding Made Simple* ISBN-10: 1572248610

[7] Rakicioğlu et. al. (2006) The effect of Ramadan on maternal nutrition and composition of breast milk. *Pediatr Int.* Jun;48(3):278-83

[8]Neville MC, Sawicki VS, Hay WW Jr. 1993 Effects of fasting, elevated plasma glucose and plasma insulin concentrations on milk secretion in women.

[9] Dr Hessa Khalfan Al Ghazal, Director of the Executive Committee for the Sharjah Baby Friendly Emirate Campaign

[10]For example, breast milk is full of antibodies and immunoglobulins that no other milk can match

[11] Wilde, C. et al. Breastfeeding: matching supply with demand in human lactation. *Proc Nutr Soc* 1995; 54:401-06.

[12] Ertem, I. O., G. Kaynak, et al. (2001) Attitudes and practices of breastfeeding mothers regarding fasting in Ramadan. *Child Care Health Dev.* 2001 Nov;27(6):545-54.

[13] Goldman, A. Immunologic components in human milk during the second year of lactation. *Acta Paediatr Scand* 1983; 72:461-62.

[14] The age at which solids are introduced are worth careful consideration as links have been made between not breastfeeding on demand, formula feeding, late solid introduction and obesity. See Kramer, M. Do breastfeeding and delayed introduction of solid foods protect against subsequent obesity? *J Pediatr* 1981; 98:883-87

Closing Advice

“The breastfeeding mother by default is obliged to fast. However, if illness or harm is genuinely feared upon herself or the baby, only then is she exempted from fasting. She will have to do Qadhā’ later.

Genuine reason to omit fasting are ascertained by:

- 1) Doctor
- 2) Previous experience
- 3) Clear and unmistakable signs”

– **Mufti Faraz Adam al-Mahmudi**

“In essence, it is obligatory for a pregnant or nursing woman to fast in Ramadan as long as she does not fear harming herself, such as if she fears:

1. Falling ill
2. Worsening an existing illness
3. Delayed recovery from an existing illness

In the above cases it is permissible for her to break her fast.

Similarly it is permissible for her to break her fast if she fears for her child, meaning that, for example she fears that she will miscarry due to malnutrition or the milk will decrease (obviously something which you have explicitly disproved), thereby causing her child to fall ill or increase in illness.”

– **Shaykha Umm Anas bint Adam**

" [With regards to fasting in pregnancy,] the psychological effect of mother not fasting should not be ignored... advise healthy meals, dates, other slow release foods for suhoor - seeds etc, hydration and maybe a maternity vitamin supplement and give it a go. [And fasting whilst breastfeeding for] western women with western diet & reserves shouldn't really cause any major problem.... hydrate between maghrib and fajr and eat healthy balanced meal with protein etc. not just fried food! Also suitable vitamin supplement and fresh fruit/veg & dates will help inshaAllah."

–**Dr. Umm-Safiyah**

"With regards to general advice, it is safe to fast in pregnancy. With regards to the advice re preeclampsia, gest diabetes, I don't think you will find that the advice would be to fast- generally it would be very case specific."

– **Dr. Ahsan Alvi**

Personal Accounts

Our final section is a composite of various pregnancy and breastfeeding 'stories' told by sisters who tried to fast in Ramadaan. Enjoy!

Early Pregnancy

"Fasting ramadan between 9-13wks pregnant - alhamdulillah managed to do this as I wasn't eating much anyway & sickness was there whether I ate or not, so alhamdulillah that wasn't too difficult. Was October time so days were quite short."

"Last year I was preg, it was the first trimester and I kept them.. just missed 2 or 3. But I did find it quite hard especially towards the end of the day.. I'd be exhausted!"
– Umm Z

"I was in the early stages of pregnancy and I fasted Ramadan. I would feel sick, tired and pretty miserable but I knew I would feel like that even if I wasn't fasting!! I had 3 other children to look after so, no, I didn't sleep all day to cope!" – Umm H

"I fasted last Ramadan and was 4 months pregnant. Alhamdulillah I never had any morning sickness throughout pregnancy and so found fasting quite easy Alhamdulillah. Only missed three due to being ill. If anything would just feel a bit tired at the end of the day but can't say I was starved or anything!" – Umm U

"Family members told me not to fast as I was in the early days of pregnancy. I missed the first couple of weeks and then I felt that I could fast so I did and I was fine!"
Umm U

Late Pregnancy

"2 Ramadans ago I was expecting and was nearly 6 months pregnant at the time. Started off with the best intentions, yet because my baby was pushing on my lungs and the fact that I've had asthma myself since childhood I really struggled, I was constantly coughing, tight-chested and wheezy throughout the entire day - despite this I carried on fasting for the first 10 days after which my husband was becoming concerned and annoyed with me. My midwife recorded that my bp was all over the place and that my son was showing signs of an erratic heart rate... so I stopped fasting because I really was very ill and needed my medication, fluids and food to strengthen me. Things did improve and so I made a compromise and fasted every odd fast for the last 10 days of Ramadan.

The following Ramadan my son was being breast fed, in order not to exert myself I would breastfeed morning and evening and during the day he was bottle fed which worked well for both myself and him.

There is no right or wrong answer in my opinion as to whether to fast, breastfeed etc in Ramadan, Allah is Merciful and He knows our limitations. You mustn't be weak about it and not bother or give up without trying but certainly give it a go if after your efforts you feel you genuinely can't then Allah knows your intentions and sees our efforts." – Umm AR

"I have had 2 shawwal babies so fasted ramadan in last month of pregnancy. I found this tiring but manageable alhamdulillah. The baby (in belly) was less active during the day, but picked up after eating & resting. I did find that other ibadah was much harder as I was very tired & sleepy after maghrib. Often I would sleep after maghrib for a couple of hours and then get up for isha/taraweeh, that worked for me. One child was born on 6th dhul hijjah and alhamdulillah I fasted the day he was born! I didn't feel those days as they were January and very short." - Umm S

"My first was a few months old when Ramadhaan approached and we already had issues with food and weight gain! She wasn't gaining weight and was rapidly dropping of the chart! Ramadhaan came I started fasting she still wasn't gaining weight and everyone got on my case health visitor family and friends so I broke my fasts she still didn't gain weight and I felt terrible! alhamdulillah I made them up and 5 years later my definitely not underweight daughter is fine mashallah. With baby number two I was about 6 or 7 months pregnant Alhamdulillah fasting was fine but I was preoccupied with a toddler and the days were quite short." - Umm A

"Both my children were born in Shawaal - so I have fasted two Ramadhan's being heavily pregnant. With my first child, I was sick throughout my pregnancy and I was worried about how I would feel whilst fasting. Nevertheless, I gave it a try and found it to be easy, alhamdullillah. Yes, I would be sick, but then I would just rinse my mouth out and carry on as normal - it was fine! I remember praying taraweeh at a local masjid when pregnant and miss those times where I could go to the masjid and not have to think about the kids!" Umm H

"I alternated my fasts when I was 7 months pregnant but had to stop in the last week coz I got really weak and used to feel dizzy." – Umm A

"I had my daughter (Child No. 3) 2 weeks after Eid ul Fitr. Alhamdulillah, I didn't find the fasting difficult, it felt pretty much the same as when I wasn't pregnant. And what was great was that I could fast the whole of Ramadan and pray the taraweeh and not miss any due to menses." - Umm N

"With my second child, I spent the majority of Ramadan with my in laws. I would crave fish nearly every day - my father-in-law was hoping I would be craving samosas or other goodies, but I would want tuna sandwiches or fish and chips! Towards the end of my pregnancy, they detected some glucose in my urine and I had to miss one fast for a gestational diabetes test - I really missed fasting that day - it just does not feel like Ramadan! I went through false labour several times in the last ten nights - I would be praying taraweeh and making dua to get through Ramadan - I wanted to be able to fast and pray in these precious days and I wanted my husband to be there in labour. Subhanallah, my duas were answered as my daughter arrived on Eid day!" - Umm H

"I was 35 weeks pregnant last Ramadan and alhamdulillah I was able to fast. I can honestly say I didn't feel weak or dizzy - I really do feel that it is a blessed month. I think it really helps to eat well during suhoor. I drank lots of water from iftaar time all the way to suhoor. I did most of my resting in the morning and stayed awake from Maghrib to suhoor. We had the older children (7, and 9 yrs) in a good routine of staying awake from Magrib to suhoor and then sleeping after Fajr. They would then sleep until Dhuhr, tired out from taraweeh and the fast itself. It helped me being in the last trimester that the children were resting so I could rest too. I plan to do the

same routine this Ramadan (inshallah!) and put my 10 month old in the same routine, so she will sleep when we sleep.” – Umm S

Breastfeeding in Ramadaan

"S was born before Ramadan and I was able to fast. He was six weeks old so my post partum bleeding had stopped. Alhamdulillah I had no problems and the health visitor was fine. I felt well and S was steadily putting on weight." - Umm S

"My first baby was 4 months old and I fasted. He would get hungry as it approached iftar time. It would upset me but soon after I had iftar and drunk a couple of glasses of milk or water, I would feed him and he would settle. Then I could enjoy my iftar! Sometimes I would drink and I could feel the water going straight into the milk factory rather than my stomach! It took about a week and then my baby and body adjusted to feeding on a different schedule." - Umm H

"Baby no.2 was 5 weeks old when Ramadan came. It had been 3 days since I started praying again after nifaas and was still adjusting to coping with a toddler and a new baby. The fasts were not difficult but I did find that prayer at night was not as easy. I was still pacing the corridor with my super-windy baby when my husband would return from the masjid at about midnight. I would often recite short surahs in taraweeh and not have much of a break in between rakatayn. After a week or two of fasting we all adjusted to our new routines and things settled. During some of the last ten nights my husband would take baby no.1 to the masjid so that I could have 'quality' time for Quran and to pray before putting them to bed, even if I had to finish the rest later." - Umm H

“Last year I fasted while breast feeding. I was really worried but alhamdulillah the blessings of Ramadan made it easy. My baby was about 5 months. I cut down everything in the days and tried to take it easy. I drank lots in the night and fed lots in the night! But u can read Quran at the same time! It was nice to keep all the fasts. I was very tired and didn't do as much other ibadahs but alhamdulillah I fasted! The year before, I was pregnant (I think about 5 months) the days were still quite long but alhamdulillah once I got into the routine of fasting it was easy. I tried to get everything done in the morning and rest in the afternoon and keep the other kids busy. I was tired when I broke my fast but picked up later in the evening. Insha Allah this year (8 months pregnant) goes as well. Lot of duas pls!” – Umm A

Umrah in Ramadan

"A-R was just under three months when Ramadan came and I had no problem with the first fasts, but when we went to Saudi Arabia for our umrah trip in Ramadan I found it difficult with the heat. My milk started to dry up because I was dehydrated so I had to abandon the fasts. Those fasts were really hard to make up afterwards, there is something special about the month of Ramadan. If I was not in such a hot country I would definitely have continued with the fasts." Umm S

"I fasted in Ramadan whilst breastfeeding my nearly 6 month old son, who had not started solids, so he was quite a guzzler! My milk took a few days to adjust to fasting, as it did with my previous children, but alhamdulillah my not-interested-in-food baby didn't seem too bothered by it! We were blessed with the opportunity to do umrah (with the guzzler and his siblings!) that Ramadan and alhamdulillah, he

coped with all that just fine too! I fasted the journeys, the umrah, and all our time there and can you believe I actually put on a few pounds in those 2/3 weeks?! Blessed dates and zam zam!" – Umm H

Appendix i

The developmental origins hypothesis or Barker Theory has received recent attention in the media and proposes that extended periods of nutritional restriction may be associated with changes in the body that result in poorer health outcomes later in life.

According to this theory, foetuses adapt themselves rather beautifully to hostile environments and this enables their survival. However, the very same changes could also lead to problems later in life such as coronary heart disease, hypertension and type 2 diabetes - diseases common amongst Muslims.

Research in this area includes determining health outcomes late in life and relating them to foetal occurrences. Almond and Mazumder (2011) were the first to investigate potential links between Ramadhan and poorer health outcomes. They go as far as purporting that fasting in Ramadhan in very early in pregnancy results in fewer male births and higher instances of disabilities in Ugandan and Iraqi populations. Rather scary claims.

We have found that no claims can be made based on the data presented that the supposed correlations is solely attributable to fasting. Various complex environmental factors have been shown to be key, none of which are accounted for.

The authors contend that they cannot distinguish those who do fast and those who did not during Ramadhan (a pretty essential factor) nor do they claim that all the women included amongst those who fasted Ramadhan are likely to be Muslim(!). Additionally, they apply a blanket assumption that all Muslims fast whilst pregnant.

This is often not true, and perhaps more so for their Ugandan sample which will comprise of a significant number of Indian immigrant Ismailis whose numbers currently total around 15,000 in Uganda. Ismailis believe the only compulsory fast is when a new moon occurs on Friday - about twice per year, and they do not see fasting in Ramadhan as obligatory.

If we begin with the findings of reduced rates of male births, there is considerable country-to-country variation across the globe. Confounding factors include the age of the mother, with very young or older mothers lowering and raising the rate of male births respectively. Particular birth years and different races can produce noticeably varying sex ratios.

The number of male babies born in the U.S. is dropping and has been on a steady decline for the last three decades. The decline in male births is equivalent to 135,000 fewer white males in the last 30 years in the U.S. and 127,000 fewer males in Japan^[1] from 1970 to 2002, suggesting that environmental factors are one explanation for these trends.

A similar shift in the sex ratio at birth has been found in numerous other countries: many Latin American populations, Finland, Norway, Wales and the Netherlands, several Arctic, cities in Italy and among fish-eating women in the Great Lakes region.

The highest sex ratio decline in the world is in the Aamjiwnaang First Nations in Canada. This small area has only 46 males born to every 132 females. The reservation is surrounded on three sides by petrochemical, polymer, and chemical industrial plants, it has a creek running plagued high levels of mercury and PCBs and the highest toxin levels in the air all of the country.

Highly interestingly, this nature reserve is on the border with Michigan and is only about an hour away from where most Muslims in Michigan live; Detroit. The two communities are linked by water: the Aamjiwnaang is on the shores of the St. Clair River which runs into Lake St. Clair of the Great Lakes (where fish eating women have also been found to have reduced male births) and becomes the Detroit River. The reduction of males in this area has evidence of effects that are wholly separate to Ramadhaan fasting.

In addition, stress effects other than from fasting have also been shown to impact the number of males born. For example, throughout the entire U.S., the chances of miscarrying a male foetus increased after the September 11, 2001, attacks compared to the months before and after[2]. Such national sources of stress and trauma most certainly affect Muslims in Uganda and in Iraq.

Iraq's history is littered with trauma. Participants in the Almond and Mazumder (2011) study were born in the years 1958-1977. Sadly, this entire period has events that may well impact results.

1958 was the year of the 14 July Revolution that ended the Hashemite dynasty, establishing the Republic of Iraq. When `Abd al-Karīm Qāsīm seized power, unrest and opposition continued until he was overthrown and shot during the 1963 Ramadan Revolution. Around 5,000 Iraqis were killed in the fighting from February 8–10, 1963.

There was also the presence of British forces in support of Kuwaiti independence from Iraq up until 1971. The First Kurdish–Iraqi War lasted from 1961 until 1970, resulting in the deaths of some 105,000 people. The Second Kurdish Iraqi War was only two years later and lasted until 1975.

Additionally, there was the 1971 Iraq poison grain disaster, the largest mercury poisoning disaster when it occurred, with worst cases resulting in blindness or death caused by central nervous system failure. 6,530 patients were admitted to hospital with poisoning, and 459 deaths were reported.

These huge events must have played a shaping role in the lives of all involved and to ignore the effects of trauma in *utero*, during childhood and adulthood, as a result of

such stresses and to attribute disability rates solely to fasting when pregnant is quite a leap.

Muslims in Uganda, along with other minorities, have long been marginalised and identified as needing "special protective and/or corrective measures to be able to attain a state of 'normalcy' in society." [3]

Most notable in Ugandan history is Amin's reign of terror where 300,000 [4] Ugandans were murdered and 90,000 Indians and Pakistanis were given 90 days to leave Uganda, resulting in chaos on Uganda's economy. Even after Amin's overthrow in 1979, Muslims were heavily discriminated against and hundreds killed.

Uganda is one of the world's poorest countries and Ugandan Muslims had been denied access to all public sectors until 1962, forcing them to open schools of their own as a reaction to overcome discrimination. It is only since the establishment of such schools that literacy rates have risen sharply.

The presence of war with neighbouring countries, internal conflict with rapid and violent changes of government and a lengthy civil war since independence from Britain 1962 have also been factors of instability.

Muslims in Uganda and Iraq are undoubtedly subject to the stress effects of national grief and trauma. These factors are probably a whole host of other socio-economic factors are far more likely to play a part in the health of pregnant women and their children. We have examples of such effects in other countries, for example, Arab women in Israel have worse birth outcomes than Jewish ones. [5] The same could be said of Ugandan Muslim women compared to non-Muslim women.

A causal link between fasting and adverse effects at any stage in life cannot be based upon the Ugandan and Iraqi samples used by Almond and Muzumder (2011) nor their findings. In terms of the Michigan sample, aside from a suspected environmental factors, their theory doesn't fit reality.

If we take Arab Americans over the age of 25 in Michigan (the same sample) we find that that they have lower mortality rates from cancer and chronic lower respiratory disease compared to both whites and blacks. Female Arab Americans had lower mortality rates from heart disease, cancer, stroke and diabetes than whites and blacks.

Mortality rates do not equate incident rates in a population but they are valuable indicators of the prevalence of the related causes of death. Mortality rates are compelling indicators of health whereas reliance on consensus data for disability with a lack of clear parameters for determining disability when applied cross-culturally is open to challenge.

In fact, the data on disability from Iraq and Uganda cannot be directly compared to such difference in measurement and the collected data itself is questionable as only

1.5% of Iraqis and about 5% of Ugandans reported disability compared to 12% percent in the US suggesting a significant missing proportion. Were the missing data incorporated the picture could be entirely different.

A similar study, by van Ewijk, R. (2011) claims a confirmation of Almond and Muzumder's (2011) findings[6] based on data collected in Indonesia by the RAND project. Indirect measures of health and serious disease were used, such as chest pain upon movement and time taken for wounds and cuts to heal. These are indicators of serious conditions but are not sufficient as indices in their own.

Furthermore, some of his results appear puzzling. van Ewijk, R. (2011) found the effects on adulthood to be related to Ramadan falling about halfway in the pregnancy whereas Almond and Mazumder (2011) report the effects for exposure early in pregnancy. Van Ewijk also reports evidence of effects of hypertension in younger people but not in older participants, turning the long-term damaging factor of the theory on its head.

In fact, the results could even be interpreted to suggest that foetal adjustments during Ramadhaan have positive outcomes in adulthood on some measures. They could equally be stretched to indicate that conception post Ramadhaan actually improves the health of the child born, perhaps due to improved maternal health and well being thanks to a Ramadhaan pre-cursor that prepares the mother's body for childbearing.

A new study by van Ewijk et al. (2013) in Indonesia[7] suggests that adult Muslims who had been in *utero* during Ramadan are slightly thinner and shorter, being on average 8mm shorter. I comment no further on their straw clutching. Others are also not convinced with the limitations in their work[8].

This team of economists have one study alone that is of relevance to us. In their assessment of 7 year olds they report to have found Ramadhaan fasting in early pregnancy to have detrimental effects on Key Stage 1 attainment. As with the studies above, the results are unreliable and better explained by existing common -sense theories. They fatally fail to have controlled for English not being the first language of these children.

The Department for Education report a gap between pupils whose first language is English[9]. This most certainly a factor in performance of Pakistani and Bangladeshi children as the sample selected are from areas in Britain where Muslim concentrations are very high. This would automatically include a greater proportion of children that do not have English as a first language, and those that maintain their mothers tongues more closely.

Interestingly, they compare Pakistani and Bangladeshi children to Black Caribbean children. Data is available for Black Africans but they exclude them from analyses, perhaps as a large proportion of them will be Muslim (though an number of Black

Caribbeans will also be Muslim). Black Caribbeans will not be disadvantaged by not having English at home yet Black Africans may well do.

The disadvantage of not having English as the first language is particularly prominent in Key Stage 1 rather than Key Stage 2, when children are younger and have had less exposure to English and schooling in general. The authors chose to study Key Stage 1.

The study only controls for the known differences in attainment of pupils eligible for free school meals, leaving aside not only the language the child speaks at home but also the identification of Special Education Needs (SEN). Note that the authors did have access to both these sets of data.

Pakistani and Bangladeshi children are over-represented^[10] in those with SEN. All children from all backgrounds with no identified SEN outperform pupils with SEN. Socio-economic disadvantage and gender have stronger associations than ethnicity with prevalence of SEN but even after controlling for these Pakistani and Bangladeshi children specifically are over-represented amongst those with SEN.

Note also that Pakistanis and Bangladeshis are most likely to live in the most deprived areas^[11] and that significant variations between minorities justify a separate focus on both deprivation and population concentration.

Furthermore, there is very little transparency in how they actually used KS1 scores and particularly the use of PLASC data (Pupil Level Annual School Census data) which were only available for 2 years of the 9 years studied. They do not explain what they did for remaining years or what they did with that data.

Finally, no account is made of classification of mixed race children in the Black Caribbean group where it is most prevalent, having done so for the Asians. When they did exclude mixed race Caribbeans the results were "less precise" but sure enough, they chose not to publish those.

We need to bear in mind that this isn't a body of evidence. It is one team of economists, not health professionals, churning out a few studies using similar methodology with the same ideology reporting evidence, by hook or by nook, to drive policies in targeting pregnant women not to fast. It must be balanced first with the large body of evidence indicating fasting is safe (see appendix ii for the 40+ papers we took) and we await publications that are in progress that challenge Almond and van Ewijk et al.

One such critique has been published. Brown's (2011) critique^[12] pulls apart the theoretical foundation of Almond's studies. This particular paper concentrates on a one of Almond's cornerstone pieces on the 1918 U.S. influenza pandemic and they systematically show that without having controlled for socioeconomic factors Almond's results are seriously flawed. When they are factored in the reported effects disappear altogether or are greatly diminished.

Brown highlighted a need for controlling household fixed effects and this has not been done but in one of their studies. This single study found exposure to Ramadan fasting in *utero* in Indonesia results in 4.5% fewer hours worked and a 3.2% increase in the probability of being self-employed. They interpret these as negative wealth effects. Not all would agree that they are. They also find lower cognitive test scores and math scores in children aged 7-15.

The authors make reference to "the possibility that behavioral changes related to schooling inputs may be one possible channel through which the tests score effects are taking place, apart from the direct effects on one's cognitive ability from fasting, it is not clear if the Ramadan effects are indeed driven solely by religious fasting (as medial theory predicts) or by some other factor not directly related to religiosity...the framework suggests that the above predictions may be biased by parental characteristics. When parents make decisions for children, parental characteristics may be important. Those who invest more in unexposed children's schooling may be those who also encourage their children to be involved in skilled occupations and who encourage hard work, leading to more labor supply."

They certainly have something there. Suryadarma (2011) has found that the large gap in education between Muslims and non-Muslims in Indonesia is entirely removed when scholastic ability and parental education are controlled for. The college gap remains and is likely to be caused by differences in the labour market for Muslims and non-Muslims.^[13]

There are massive differences in earnings post-college between Muslim males and non-Muslim males: 50.2% vs 128.5%. Non-Muslims also have a higher employment rate after college-level that does not exist for college-level educated Muslims. Thus possibly the best explanation as to why Muslims do not continue nor aspire within the secular education system are that factors that are shaped by education and employment, factors that are entirely aside from pre-natal associations.

Finally, there are basically two large education systems operating in Indonesia; a secular system and an Islamic system madrasah system. In the secular system, religion is one of among many taught subjects whereas Islam is the foundation of the curriculum in madrasahs. The children in the madrasah system are unaccounted for.

The general pattern of criticism in this small collection of papers by Almond and van Ewijk et al are that various glaring influences on Muslims within the selected populations are ignored and inaccuracies in the sampling and measurements leave the work incomplete and of no practical use.

These studies has provided a spring board for further investigation at best and we await the unfolding of a flurry of better quality research in this interesting area. To conclude on long term effects of Ramadan fasting which overlaps with pregnancy in three of every four birth, resulting in about 1 million Muslims alive today having being in *utero* during Ramadan, we state that it is currently spurious and

irresponsible to give rise to the idea that the vast majority of Muslims are susceptible to adverse outcomes due to their mothers having fasted Ramadhan.

[1] Davis, D. *Environmental Health Perspectives*, April, 9 2007. News release, University of Pittsburgh Schools of the Health Sciences.

[2] Bruckner et al. (2001), "Male Fetal Loss in the U.S. Following the Terrorist Attacks of September 11, 2001" *BMC Public Health*,

[3] Baker, (2001), "Uganda: The Marginalization of Minorities" MRG International Report

[4] In 1977 Amnesty International estimated 300,000 dead

[5] Torche and Shwed, (2013) "The Hidden Costs of War" *Mellon Biennial Conference at Columbia University*

[6] van Ewijk, R. (2011). "Long-term health effects on the next generation of Ramadan fasting during pregnancy." *J Health Econ* **30**(6): 1246-1260.

[7] van Ewijk R. J G., et al., (2013) Associations of Prenatal Exposure to Ramadan With Small Stature and Thinness in Adulthood. Results From a Large Indonesian Population-Based Study. *Am J Epidemiol.* 2013;177(8):729-736.

[8] Susser, E. & Ananth, C. V. (2013) Invited Commentary: Is Prenatal Fasting During Ramadan Related to Adult Health Outcomes? A Novel and Important Question for Epidemiology *American Journal of Epidemiology*

[9] Key Stage 1 Attainment by Pupil Characteristics, in England 2009/10 Department for Education

[10] Lindsay, G. et al., (2006) *Special Educational Needs and Ethnicity: Issues of Over- and*

[11] Dorsett, R. (1998) *Ethnic minorities in the inner city*, The Policy Press in association with the Foundation ISBN 1 86134 130

[12] Brown, R. (2011) *The 1918 U.S. Inuenza Pandemic as a Natural Experiment, Revisited*

<http://dupri.duke.edu/pdfs/ryanbrownpaper.pdf>

[13] Suryadarma, D. (2011) *What explains the Muslim Disparity in Education Attainment: Explanations from Indonesia*

Appendix ii

Study	Authors	Design	Sample size	Exposure	Outcomes	Author conclusions	Comments
Health capital and the prenatal environment: The effect of ramadan observance during pregnancy	(Almond & Mazumder, 2011;	census data	Iraq, Uganda, Michigan			20% more likely to be disabled, lower male birth rate	see text
Fasting During Pregnancy and Children's Academic Performance	Almond et al. (2013)	over 200,000 children of Pakistani and Bangladeshi				Key Stage 1 performance is compromised for Muslims with prenatal exposure to the Ramadan	see text
Comparison of Growth Parameters of Infants of Ramadan Fasted and Non-Fasted Mothers	A. Khodel , S. K., J. Nasiri, E. Taheri, M. Najafi, A. Salehifard , A. Jafari (2008).	cohort study throughout Ramadan&for five months after	exclusive breast-fed infants (n=116), aged between 15 days to 6 months		all growth parameters increased during the study period (P< 0.05) but the rate of increaseing was the same for both groups (P>0.05)	Ramadan fasting by breast-feeding mothers did not adversely affect growth parameters of exclusively breast-fed infants.	
Effect of short-term maternal fasting in the third trimester on uterine, umbilical, and fetal middle cerebral artery Doppler indices.	Abd-El-Aal, D. E., A. Y. Shahin, et al. (2009		110 healthy women in the third trimester of pregnancy after fasting for 10-12 hours and 2 hours after a balanced meal		glucose levels, FBM, biophysical profile improved after meal. Uterine, umbilical, and middle cerebral artery Doppler indices not sig. diff. after fasting and after meal	Short-term maternal fasting during the third trimester of pregnancy has no effect on uterine, umbilical, or fetal cerebral artery Doppler indices, and has a transient but significant effect on maternal serum glucose levels and fetal behavior	
Dietary intake and nutritional status of Turkish pregnant women during Ramadan.	Al-Dabbagh, T. Q. (2006).	letter			letter re: Kiziltan, G., E. Karabudak, et al. (2005).	wantst to add fasting upto 12 hrs and not too hot/cold temp	
Body composition, nutrient intake and physical activity patterns in young women during	Al-Hourani, H. M. and M. F. Atoum (2007)	Estimated food records over 3 days three-day activity diary	57 female subjects were recruited from The Hashemite University in Jordan,		Body weight and BMI decreased significantly.mean energy and nutrients intake before and during Ramadan were not significantly different. The mean physical activity level	significant weight loss during Ramadan. Estimates of energy, carbohydrates, protein, fat and sugar did not change, despite the reduction in the	

Ramadan					also not significantly different	number of meals taken. The overall activity patterns remained similar	
The implications of Ramadan fasting for human health and well-being.	Alkandari, J. R., R. J. Maughan, et al. (2012)				There are no adverse effects of Ramadan fasting on respiratory and cardiovascular systems, haematologic profile, endocrine, and neuropsychiatric functions.	Although Ramadan fasting is safe for all healthy individuals, those with various diseases should consult their physicians and follow medical and scientific recommendations.	
The effect of maternal fasting during Ramadan on preterm delivery: a prospective cohort study.	Awwad, J., I. M. Usta, et al. (2012)	prospective cohort	402 women in 4 medical centres in Beirut, Lebanon.	(20-34 weeks of gestation	fasting was not associated with an increased risk of PTB (odds ratio 0.72; 95% confidence interval 0.34-1.54; P = 0.397	Fasting doesn't increase risk of preterm delivery in pregnant women regardless of the gestational age	
Intellectual development of children born of mothers who fasted in Ramadan during pregnancy	Azizi, F., H. Sadeghipour, et al. (2004)	historical cohort	191 children, 4 to 13 years, 98 whose mothers fasted throughout Ramadan when they were pregnant		No significant differences were observed between the IQ scores of the two groups	Fasting during gestation did not adversely affect IQ of children whose mothers had fasted during Ramadan while being pregnant.	
South Asian consensus statement on women's health and Ramadan	Bajaj, S., A. Khan, et al. (2012).					general guidelines for these issues especially for the South Asian Muslim women	
The 1918 U.S. Influenza Pandemic as a Natural Experiment, Revisited	Brown (2012)				proxies for childhood environment are added to Almond's analyses, his findings are appreciably reduced in magnitude and sig.	Almond et al. method and results unreliable/inflated	
Fasting during the holy month of Ramadan does not change the composition of breast milk	Bener, A., S. Galadari, et al. (2001)	prospective descriptive	26 healthy nursing mothers		, total fat, protein, lactose, total solids, non-fat solids, triglycerides and cholesterol were measured. No significant differences were seen in the content of major nutrients of milk taken during and after	no major changes occur in the composition of human breast milk as a consequence of reverting to a normal alimentary pattern at the end of Ramadan	

					Ramadan		
Ramadan and birth weight at full term in Asian Moslem pregnant women in Birmingham	Cross, J. H., J. Eminson, et al. (1990).		birth weights of 13,351 babies born at full term from 1964-84 to Asian Moslem mothers in Birmingham			Ramadan had no effect on mean birth weight at whatever stage of pregnancy it occurred	
Effect of fasting during Ramadan on fetal development and maternal health	Dikensoy, E., O. Balat, et al. (2008).		Thirty-six consecutive healthy women	>or=20 weeks	mean maternal glucose level was significantly lower in the study group than in the control group (P = 0.003). No statistically significant differences were found between the two groups in the comparisons of other parameters	fasting during Ramadan does not lead to maternal ketonemia or ketonuria in pregnant women. In addition, fasting during Ramadan has no significant adverse effect on intrauterine fetal development or the fetus's health	
The effect of Ramadan fasting on maternal serum lipids, cortisol levels and fetal development.	Dikensoy, E., O. Balat, et al. (2009)		Thirty-six consecutive healthy women with uncomplicated pregnancies Gaziantep University Hospital, Ramadhan 2006	20+ wks	no sig increases in total cholesterol and triglyceride.cortisol levels on day 20 were sig higher (p < 0.05).low-density lipoprotein (LDL), high-density lipoprotein (HDL), significantly decreased (p < 0.05)	No untoward effect of Ramadan was observed on intrauterine fetal development.	
Increased fat oxidation during Ramadan fasting in healthy women: an adaptative mechanism for body-weight maintenance	el Ati, J., C. Beji, et al. (1995).				Total daily energy intake - no changed but qualitative nutrients affected. no body weight change. circadian evolution of nutrient oxidation rates modified. Fat oxidation was increased. carbohydrate oxidation was decreased	Ramadan might be counterbalanced by specific metabolic changes in order to preserve normal body weight and composition.	
Attitudes and practices of breastfeeding mothers regarding fasting in Ramadan	Ertem, I. O., G. Kaynak, et al. (2001)	Cross-sectional observational survey	164 Breastfeeding mothers of infants aged 12 months or younger, Ankara, Turkey		Belief that breastfeeding mothers should fast,fasting does not decrease breast milk associated with fasting. 22% perceived a decrease in their breast milk and 23% an increase in the amount of solid	rates of fasting are affected by beliefs of mothers on the effects of fasting on breastfeeding	

					supplements the infant got		
Effect of maternal fasting on basal electronic monitoring of fetal heart rate	Gonzalez Bruzzone, P., E. Donoso, et al. (1985).		32		review of literature: safe, american born muslims less likely to fast than immigrant	autonomy in decision making on fasting	
Effect of fasting on voice in women	Hamdan, A. L., A. Sibai, et al. (2007).	prospective study	28 female subjects		Vocal fatigue was the most common reported complaint (53.6%) followed by deepening of the voice (21.4%) and harshness (10.2%). phonatory effort increased (P value < 0.001). Laryngeal video-endostroboscopy=no sig change	Fasting affects voice. There is an increase in the phonatory effort, and vocal fatigue is the most common symptom.	Not pregnant/feeding
Impact of maternal fasting during Ramadan on fetal Doppler parameters, maternal lipid levels and neonatal outcomes	Hizli, D., S. S. Yilmaz, et al. (2012).		Fifty-six consecutive, healthy women	>= 28 week	lower levels of VLDL, triglyceride and higher incidence of ketonuria were detected in the fasting group (p < 0.05	Fasting of healthy women during pregnancy seems to have no adverse effects on amniotic fluid index, fetal Doppler and delivery parameters.	
The effects of dietary fasting on physical balance among healthy young women.	Johnson, S. and K. Leck (2010).	within subject counterbalanced 2-week crossover	22 young healthy women		declines in functional reach (p < 0.01), and balance in a single limb on both legs (p < 0.01 and p < 0.01, respectively)	implications for athletic performance in younger individuals as well as emphasizing the need for health education for young women to avoid skipping meals	
A survey of fasting during pregnancy	Joosop, J., J. Abu, et al. (2004).	survey, retrospective	182		Most fast during pregnancy, Most of them don't have experience adversities& if they do, overcome them. lack of basic religious knowledge among many pregnant women re:fasting	Doctors and health workers need to understand the religious obligations of a Muslim towards fasting during Ramadan	
Maternal Ramadan fasting and	Kavehmanesh, Z. and H. Abolghasemi	retrospective cohort	284 mothers with a history of Ramadan		birth weight100 g BMI greater so when controlled for 71 g	Ramadan did not have a significant effect on the	

neonatal health	(2004)		fasting during pregnancy Tehran		heavier than those of the nonfasted group - not significant (p=0.1)	neonatal birth weight	
Dietary intake and nutritional status of Turkish pregnant women during Ramadan.	Kiziltan, G., E. Karabudak, et al. (2005).		Forty-nine fasting Turkish pregnant women		weight gain, energy intake (p<0.05) less. increase in blood glucose, cholesterol and triglycerides (p<0.05 for first trimester) decrease in plasma urea, total cholesterol, triglycerides, .total protein and albumin levels.mineral/vitamin intakes low	Ramadan fasting had no significant adverse effect on the health of pregnant women	
Health beliefs and practices of Muslim women during Ramadan	Kridli, S. A. (2011).					healthcare professionals learn as much as possible about the multicultural best practices and research-driven information about fasting in order to help Muslim women make informed decisions	
Effects on health of fluid restriction during fasting in Ramadan."	Leiper, J. B. and A. M. Molla (2003).				significant metabolic changes but few health problems arising from the fast. lessn drug compliance increased irritability,headaches due to less sleep and lassitude. A small weight loss not universal. not clear whether they are chronically hypohydrated	No detrimental effects on health have as yet been directly attributed to negative water balance at the levels that may be produced during Ramadan	
The persisitent effects of in utero nutrition shocks over the life cycle: evidence from Indonesia	Majid, M. F. (2013)	longitudinal	IFLS (RAND) data		age 15-65 work 4.5% fewer hours,3.2% more likely self-employed ii) 7-15 5.9% lower on Raven's Matrices, 7.8% lower in math, more in child labor, study fewer hours in elementary school iii) younger than 5 have lower birth weights	van Ewijk's mate	novel religiosity data found strongest in religious Muslim
Metabolic changes in Asian Muslim	Malhotra, A., P. H. Scott, et		eleven Asian pregnant		not a completely normal set of biochemical values at	wary of the metabolic departures from	

pregnant mothers observing the Ramadan fast in Britain	al. (1989).				the end of the fast day. Pregnancy outcome in the two groups was comparable.	normal observed in the Ramadan fasting mothers	
Effect of maternal fasting on uterine arterial blood flow	Mirghani, H. M., M. Salem, et al. (2007)	cross-sectional observational study	of 106 pregnant women	between 20 and 24 weeks'	glucose level was significantly lower Mean (95% CI) of the uterine artery pulsatility index, resistance index, peak systolic velocity, end diastolic velocity and systolic/diastolic ratio was similar in both groups.	Maternal fasting is not associated with significant changes in the uterine artery Doppler flow velocimetry	
The effect of maternal fasting on the fetal biophysical profile	Mirghani, H. M., D. S. Weerasinghe, et al. (2003)	cross-sectional observational study	162 pregnant women	30 weeks or more	30 of 81 fetuses 6/8 vs. 11 of 81 in control(P=0.001). All fetuses with 6/8 showed no FBM. All other variable not sig incl. umbilical artery pulsatility index, vertical amniotic pool depth, and fetal bladder volume	Fetal breathing movements are reduced during maternal fasting.	FBM infrequent/absent=ornon-REM sleep. FBM can't be investigated alone
The effect of intermittent maternal fasting on computerized fetal heart tracing	Mirghani, H. M., S. Weerasinghe, et al. (2005).	cross-sectional study	124 pregnant women		Fetuses of fasted mothers had fewer episodes of large acceleration compared to the controls (p=0.001). This difference was significantly associated with maternal appreciation of fetal movement (p=0.003).	number of large accelerations in computerized fetal heart tracing is decreased in pregnant women	again baby is less active
The effect of intermittent maternal fasting on human fetal breathing movements.	Mirghani, H. M., S. D. Weerasinghe, et al. (2004)		63 healthy pregnant women	30 weeks' gestation or more	glucose (P = 0.01) lower and sig. ass.with no. days fasted (P = 0.01). time taken to detect FBM Sig. longer (P = 0.005) continuous variety of FBM sig. (P = 0.02) less	intermittent maternal fasting is associated with a significant alteration in the frequency and pattern of human FBM	see comments above on FBM
Perceptions and practices of fasting in Ramadan during pregnancy in Pakistan.	Mubeen, S. M., S. Mansoor, et al. (2013).	cross-sectional study	353 females from gynecology departments of hospitals in major cities of two provinces of Pakistan		309 fasted 43 didn't.150 fasted all, 84 did alternate days, 37 on weekends/hol, 38 on special days. 88% believed it fard.	Pakistani Muslim women showed a strong compassion for fasting in pregnancy despite overall decrease in maternal health indicators.	

Ramadan, fasting and educational outcomes	Oosterbeek &Klaauw (2011)		13 Uni students Amsterdam		one additional Ramadan week lowers the final grade of Muslim students by almost ten percent of a standard deviation	Ramadan observance has a negative impact on performance	Not pregnant/feeding, don't know if all muslim/fasted
Determination of fundal height increase in fasting and non-fasting pregnant women during Ramadan	Naderi, T. and Z. Kamyabi (2004).						
Effects of fasting, elevated plasma glucose and plasma insulin concentrations on milk secretion in women	Neville MC, Sawicki VS (1993), Hay WW Jr						
Effect of Ramadan fasting on maternal oxidative stress during the second trimester: a preliminary study	Ozturk, E., O. Balat, et al. (2011).	prospective controlled	42 fasting		No significant differences were observed between the groups studied in terms of TAS, TOS, OSI, maternal age, gestational age, parity, birth weight or weight gain during the pregnancy.	Maternal fasting during Ramadan during the second trimester does not have a significant effect on maternal oxidative stress, fetal development or fetal birth weight	
Health is a spiritual thing: perspectives of health care professionals and female Somali and Bangladeshi women on the health impacts of fasting during Ramadan	Pathy, R., K. E. Mills, et al. (2011).	cross-sectional qualitative study	6 Somali,7 Bangladeshi Muslim women who in Toronto, Canada		Many health care professionals-challenging to counsel patients about tfasting. Need to provide guidance on health maintenance while fasting.	need for improved communication between members of the Muslim community and health professionals in Canada	not pregnant/feeding
Metabolic consequences of fasting during Ramadan in pregnant and lactating women	Prentice, A. M., A. Prentice, et al. (1983).		22 pregnant, 10 lactating and 10 non-pregnant, non-lactating women in rural West African village		lactating women not sig. diff. women in late pregnancy were sig.lower than all other groups (P less than 0.01) Diffs in late and early pregnancy	failure to maintain glucose homeostasis in late pregnancy	

The effect of water abstinence on milk synthesis in lactating women.	Prentice AM, Lamb WH, Prentice A, Coward WA (1984)		ten lactating Gambian women		Lactating women lost 7.6% of their total body water between 07.00 hours and 19.00 hours. Control subjects lost significantly less	lactating women superhydrating overnight: 6.4L was 2L greater than in the controls. changes in milk osmolality, lactose, sodium and potassium concentrations indicative of a marked disturbance of milk synthesis.	see new studies in micro/macronutrients
The effect of Ramadan on maternal nutrition and composition of breast milk	Rakicioglu, N., G. Samur, et al. (2006).		21 breast-feeding mothers		energy/nutrient intakes below daily recommended dietary allowances necessary for lactating women (P<0.05). The mother's weight increased approximately 1 kg after Ramadan..	The nutritional status of lactating women was affected by Ramadan fasting. All of the nutrient intakes (except vitamins A, E and C) decreased during Ramadan.	
Invited Commentary: Is Prenatal Fasting During Ramadan Related to Adult Health	Susser, E. and Ananth, C. V				considers van Ewijks findings	current, admittedly	
one is a doctor for herself	Robinson, T. and J. Raisler (2005).	interview	32 Muslim women, Michigan		reported difference in muslim immigrant and US born muslims 30/32 preferred to fast if no health concerns feared, 28 did at some point whilst preg	women fast and judge whether or to on own without consulting health prof.	unreliable, inference based
Outcomes? A Novel and Important Question for Epidemiology	Shaikh, U. and O. Ahmed (2006).					research incomplete.evidence does not favor the Almond/van Ewijk et al.	
Fasting during the last 3 months of pregnancy and effect on birth weight	Sozmen, M. (1993).						
"Effects of short-term maternal fasting in the third trimester of pregnancy on fetal	Tug, N., H. Ayvaci, et al (2011).		30 pregnant				

biophysical profile and Doppler indices scores							
Van Ewijk et al. Respond to "Ramadan Prenatal Fasting and Adult Health	Van Ewijk et al. (2013)				Susser and Ananth note important directions for future	too early to formulate public health implications.	see text
Long-term health effects on the next generation of ramadan fasting during pregnancy	Van Ewijk et al. (2011)		Indonesia			more often reported symptoms that may indicate coronary heart problems and type 2 diabetes	see text
Associations of prenatal exposure to Ramadan with small stature and thinness in adulthood: results from a large Indonesian population-based study	Van Ewijk et al. (2013)				8mm shorter, slightly thinner		see text
Effects of Ramadan fasting on pregnancy					research	more current research is needed. Ramadan fasting has no long term effects on normal healthy mothers or their full term offspring	
Fasting in Islam -- implications for midwifery practice	Fawzia Zaidi				Current evidence on clinical outcomes during the fast of Ramadan is inconclusive	in the event of maternal and fetal compromise, medical concerns should be clearly explained so that informed decisions can be made	
Effect of a 24+ Hour Fast on Breast Milk Composition	Zimmerman et al 2009		48 healthy women nursing healthy babies between 1 and 6 months of age		sodium, calcium, and protein levels increase (P = .013, P < .0001, and P < .0001, respectively) and mean phosphorus and lactose levels decrease (P < .0001 and P = .003, respectively).	biochemical changes in breast milk	24 hr fast, not muslim fast