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Effects of Ramadan adherence on the Muslim population

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Abstract
The practices and traditions of Ramadan are adhered to throughout the Muslim population. This large group of individuals, all fasting and following other guidance for one month out of the year, will see the effects on their health. In this paper, I discuss what health effects will be experienced by the Muslim population during and after Ramadan and how they may differ from person to person. I will discuss both the effects of fasting and the many other practices and traditions.

Keywords: *Biology; Health; Muslim; Ramadan; Fasting*

Introduction.
Ramadan is a month of the year in the Islamic calendar. Within this month, Muslims across the globe refrain from eating or drinking from sunrise until sunset. While other papers have discussed the effects of this fasting on health, herein I will include the effects of other Ramadan adherences that many Muslims follow. This provides a better-encompassing understanding of the effects of Ramadan on the Muslim population.

Ramadan adherence
Ramadan is a holy month for Muslims who believe that on one of the last 10 nights of this month, their holy book, the Quran, was revealed to the prophet Muhammad [1]. It is a time when they focus on their worship and religious observance. Among other things, they do this by praying in the mosque, reading the Quran and fasting during the day. This fast is compulsory for Muslims and includes not just food but also drinking any fluids, smoking, intercourse and masturbation. Many also avoid other negative or unhealthy things in their lives, such as arguing, fighting, lying and distractions such as watching television. This is done so that the individual can spend more time and have better focus during their worship.

General health effects of Ramadan adherence
Studies have linked Ramadan fasting to reductions in inflammatory molecules in healthy individuals. One specific study found that during the period of Ramadan fasting, proinflammatory cytokines (signalling molecules that induce and elevate inflammation) were significantly reduced [2]. This study also found that systolic and diastolic blood pressures, body weight and body fat percentage were also lower during the period of fasting. These values, when lowered, are associated with reduced inflammation throughout the whole body [3]. Muslims break their fast at the end of each day with 3 dates (*Phoenix dactylifera*) which have also been shown in studies to have anti-inflammatory effects [4]. Elevated inflammatory levels are associated with body pain, chronic fatigue, insomnia, depression, anxiety, mood disorders and gastrointestinal complications. As well as this, chronic inflammation-mediated diseases include diabetes, cardiovascular diseases, arthritis and allergies [5].

Smoking is prohibited during the fasting hours due to residual particles that remain in the mouth and lungs and may enter the stomach. While many Muslims will abstain from smoking during the whole month, some will start smoking again once the fast is broken in the evening. In both cases, the number of cigarettes smoked is reduced during the month of Ramadan [6]. This reduction in smoking is highly beneficial for the adherents, as smoking is closely linked to several serious diseases such as cancer, heart disease and stroke [7].

Although disputed by others, some studies have found that Ramadan fasting has a direct negative effect on sleep [8. In combination with this, many Muslims also adhere to a religious practice known as tarawih or taraweeh during the month of Ramadan. This practice involves adherents praying for extended periods of time during the night, with some praying for up to 2 hours, depending on the imam (Leader of the prayer within the mosque). This keeps them up during the night and further reduces the duration and quality of their sleep. Sleep quality reduction has been associated with many short- and long-term health effects. These include somatic pain, emotional distress, cognitive, memory, and performance deficits in the short term and hypertension, cardiovascular disease, weight-related issues, metabolic syndrome, type 2 diabetes mellitus, and colorectal cancer in the long term [9]. For this reason, maintaining sleep quality should be treated seriously by making sure enough time is spent sleeping each night.

Differing effects on distinct groups

Ramadan fasting has been shown to increase the risk of falling over in elderly individuals. During the period of Ramadan, the postural balance of 15 males between 65 and 80 years old was found to be negatively affected. This reduction in ability to balance remained for more than three weeks after Ramadan had ended [10].

Individuals who are ill are exempt from needing to fast if fasting will worsen the sickness, delay recovery, or cause harmful effects. Despite this, many people with acute or chronic medical conditions still fast. There are several conditions that have been shown to be safe to fast with, especially if precautions are taken, such as taking medicine at night. On the other hand, those with others are at risk of their conditions worsening if they fast. For these individuals, doctors will advise them not to fast, and it is best that they follow the guidance. One disease that increases the risks associated with a fasting is Type 2 Diabetes. While most doctors as well as many scholars advise against it 79% of Muslims with the disease still fast often putting their health at risk [11].

Studies have shown directly that Ramadan fasting does not influence physical performance of endurance athletes but does negatively affect sprint athletes. For athletes who put intense strain and their bodies already to reach the forefront of their sport it is essential to manage fasting in Ramadan very seriously. They need to receive sufficient nutrition and sleep to be able to reduce these detrimental effects. [12].

Effects of Eid and post Ramadan celebrations

Eid al-Fitr marks the end of the month of Ramadan and the end of fasting for Muslim individuals. Traditional Eid celebrations involve eating together with family and friends as well as attending large congregational prayers. The food that is consumed at these celebrations has changes drastically throughout the years and varies between countries and cultures. While it is not recommended by Islamic scholars some modern Muslims see Eid al-fitr as an opportunity to indulge in excessive eating and overconsumption of unhealthy foods such as deep-fried foods and sweet treats. Consumption of these foods has been linked with increases in risks for many diseases especially cardiovascular diseases [13].

Conclusion

The greatest health benefit of fasting is the improvement of immune functioning by reducing proinflammatory cytokines. These benefits can be seen among most of the Muslim population without any detrimental effects especially if proper guidance is followed. For the elderly and those with medical conditions discussing the risks of fasting with a doctor is essential. For some of these individuals with specifically risky conditions fasting will be too dangerous, and they should not partake. Many however will still be able to fast, given they take additional precautions such as taking medicine at night. On the other hand, many Muslims do not accept these exemptions and prefer to fast as they feel it shows stronger faith [11]. It is therefore essential that scholars inform the Muslim population of the exemptions to fasting compulsion and the importance of looking after one's health. Beside those risks there is a risk that some people use Ramadan as an excuse to eat more unhealthy sweets and fried foods when breaking fast and on Eid al-fitr. Avoiding this can guarantee that health benefits received from fasting will not be squandered.

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