



*Opinion article*

מאמר דעה

## Fasting during the COVID-19 pandemic

A. Al Ashhab

Dead Sea and Arava Science Center

Correspondence: ashraf@adssc.org + 972 52 6764006

Prior to the month of Ramadan in 2020, many Muslims became concerned whether fasting will lower their immunity and increase susceptibility to COVID-19 infection. The World Health Organization (WHO) stated that healthy people should be able to fast during this Ramadan as usual (WHO Interim Guidance, 2020). However, unverified and/or misleading recommendations on social media, suggesting that dehydration increases susceptibility for COVID-19 infection, caused many people to reconsider fasting. Many religious scholars called for non-fasting, leaving Muslims uncertain about the safety of fasting during Ramadan, how fasting may affect their immunity, and how it affects transmission of COVID-19.<sup>1</sup>

While hydration and sufficient water intake are crucial for health, as far as we know, there is no evidence showing that continuous water drinking or keeping the throat wet will prevent, reduce or affect COVID-19 infection, nor is there any evidence that temporary dehydration or dry mucous membranes increase the risk of COVID-19 infection. Leiper et al. (2003) indicated that during the days of Ramadan, practicing Muslims are undoubtedly dehydrated, but not necessarily chronically dehydrated during the entire month of Ramadan (Leiper et al., 2003). A study that assessed the mucociliary clearance of individuals practicing intermediate and longer fasting showed that longer fasting times contribute to proper mucociliary clearance, while intermediate fasting showed no influence on

mucociliary clearance (Develioglu et al., 2013). This may be explained by Muslims' tendency to increase their fluid uptake by up to 50% during the nights of the month of Ramadan, resulting in higher hydration compared to non-fasting days (Faris et al., 2019).

While there are no direct relations between dehydration, COVID-19, mucociliary clearance, and Ramadan fasting, some people suspect that fasting during Ramadan may weaken their immunity. Based on literature screening the effects of intermediate fasting (similar to Ramadan fasting) on immunity, a recent review of Ramadan fasting among various populations indicated that fasting mildly influences the immune system of healthy people. Studies indicated that fasting has a beneficial effect on the lipid profile and may alleviate oxidative stress. They showed that fasting is even safe for patients with human immunodeficiency syndrome and autoimmune disorders (Adawi et al., 2017; Anon, 2020; Yakasai et al., 2011).

In a paper published in 2012, the proinflammatory cytokines and immune cells of fifty volunteers were analyzed before and after Ramadan fasting, showing that fasting significantly reduced the inflammatory status of the body (Faris et al., 2012). Another study suggested that fasting during Ramadan provides some protection against elevated inflammatory markers (Almeneessier et al., 2019; Faris et al., 2019), which are induced during COVID-19 infection (McGonagle et al., 2020). In

<sup>1</sup> Please note that elderly people who are physically weak and/or people with chronic diseases may not be advised to fast, regardless of the COVID-19 pandemic.

addition to the slightly enhanced immunity as a result of direct fasting, fasting was shown to reduce lipids in the blood and reduce body weight – another factor which positively affects immunity and the ability to fight pathogens (Andersen et al., 2016; Fernando et al., 2019).

Fasting was shown to enhance the human gut microbiome and reduce autoimmune diseases. A recent study showed a significant increase in the microbial richness of the human gut after Ramadan fasting. Specifically, a few important endosymbionts, namely *Butyrivibrio pullicaecorum*, proliferated (Ozkul et al., 2020). It has been recommended to administer this bacterium to alleviate stomach and small intestine conditions (Geirnaert et al., 2014). A study that investigated the effect of fasting during *Mycobacterium tuberculosis* infection showed a significant increase in peripheral blood mononuclear cells and macrophages compared to control groups (Lahdimawan et al., 2014). Fasting also significantly simulates interferon-gamma neuroprotective signaling (Lee et al., 2006), a process that has been shown to be effective in blocking Ebola virus infectivity (Di Francesco et al., 2018; Rhein et al., 2015).

Moreover, fasting has been shown to enhance skin health (Bragazzi et al., 2019). Lower caloric uptake significantly reduced skin irritation and affected antioxidant levels in mice (Varani et al., 2008). Another study, which investigated the effect of intermediate fasting on wound healing in mice, showed improved healing for the fasting group compared to the control (Hayati et al., 2011). Other studies showed a reduction of up to 40% in the severity of *Propionibacterium acnes* during periods of caloric restriction in adults and young humans (Downing et al., 1972; Pochi et al., 1970).

In conclusion, healthy people, whether Muslim or not, should not be worried about fasting, or be discouraged to fast during the COVID-19 pandemic. Fasting has not been shown to harm healthy individuals, nor does it significantly affect immunity profiles or the status of body hydration. Moreover, there is no scientific evidence or scientific belief that fasting may increase the susceptibility to COVID-19 infection.

## Reference

- Adawi, M., Watad, A., Brown, S., et al., 2017. Ramadan fasting exerts immunomodulatory effects: Insights from a systematic review. *Frontiers in Immunology* 8, 1144.
- Almeneessier, A. S., BaHammam, A. A., Alzoghaibi, M., Olaish, A. H., Nashwan, S. Z., BaHammam, A. S., 2019. The effects of diurnal intermittent fasting on proinflammatory cytokine levels while controlling for sleep/wake pattern, meal composition and energy expenditure. *Plos One* 14 (12), e0226034.
- Andersen, C. J., Murphy, K. E., Fernandez, M. L., 2016. Impact of obesity and metabolic syndrome on immunity. *Advances in Nutrition (Bethesda, Md.)* 7 (1), 66–75.
- Anon 2020. Effects of intermittent fasting on health, aging, and disease. *The New England Journal of Medicine* 382 (3), 298.
- Bragazzi, N. L., Sellami, M., Salem, I., et al., 2019. Fasting and its impact on skin anatomy, physiology, and physiopathology: A comprehensive review of the literature. *Nutrients* 11 (2).
- Develioglu, O. N., Sirazi, S., Topak, M., Purisa, S., Kulekci, M., 2013. Differences in mucociliary activity of volunteers undergoing Ramadan versus Nineveh fasting. *European Archives of Oto-Rhino-Laryngology* 270 (5), 1655–1659.
- Di Francesco, A., Di Germanio, C., Bernier, M., de Cabo, R., 2018. A time to fast. *Science* 362 (6416), 770–775.
- Downing, D. T., Strauss, J. S., Pochi, P. E., 1972. Changes in skin surface lipid composition induced by severe caloric restriction in man. *The American Journal of Clinical Nutrition* 25 (4), 365–367.
- Faris, M. A-I. E., Jahrami, H. A., Obaideen, A. A., Madkour, M. I., 2019. Impact of diurnal intermittent fasting during Ramadan on inflammatory and oxidative stress markers in healthy people: Systematic review and meta-analysis. *Journal of nutrition & intermediary metabolism* 15, 18–26.
- Faris, M. A-I. E., Kacimi, S., Al-Kurd, R. A., et al., 2012. Intermittent fasting during Ramadan attenuates proinflammatory cytokines and immune cells in healthy subjects. *Nutrition research (New York, N.Y.)* 32 (12), 947–955.
- Faris, M. A-I, E., Madkour, M. I., Obaideen, A. K., et al., 2019. Effect of Ramadan diurnal fasting on visceral adiposity and serum adipokines in overweight and obese individuals. *Diabetes Research and Clinical Practice* 153, 166–175.
- Fernando, H. A., Zibellini, J., Harris, R. A., Seimon, R. V., Sainsbury, A., 2019. Effect of Ramadan fasting on weight and body composition in healthy non-athlete adults: A systematic review and meta-analysis. *Nutrients* 11 (2), 478.

- Geirnaert, A., Steyaert, A., Eeckhaut, V., et al., 2014. *Butyricoccus Pullicaecorum*, a butyrate producer with probiotic potential, is intrinsically tolerant to stomach and small intestine conditions. *Anaerobe* 30, 70–74.
- Hayati, F., Maleki, M., Pourmohammad, M., Sardari, K., Mohri, M., Afkhami, A., 2011. Influence of short-term, repeated fasting on the skin wound healing of female mice. *Wounds: A compendium of Clinical Research and Practice* 23 (2), 38–43.
- Lahdimawan, A., Handono, K., Indra, M. R., Prawiro, S. R., 2014. Effect of Ramadan fasting on the ability of serum, PBMC and macrophages from healthy subjects to kill *M. tuberculosis*. *IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)* 9 (1), 24-9.
- Lee, J., Kim, S. J., Son, T. G., Chan, S. L., Mattson, M. P., 2006. Interferon-gamma is up-regulated in the hippocampus in response to intermittent fasting and protects hippocampal neurons against excitotoxicity. *Journal of Neuroscience Research* 83 (8), 1552–1557.
- Leiper, J. B., Molla, A. M., Molla, A. M., 2003. Effects on health of fluid restriction during fasting in Ramadan. *European Journal of Clinical Nutrition* 57, S30–S38.
- Lewis, B. W., Patial, S., Saini, Y., 2019. Immunopathology of airway surface liquid dehydration disease. *Journal of Immunology Research* 2019. <https://doi.org/10.1155/2019/2180409>
- McGonagle, D., Sharif, K., O'Regan, A., Bridgewood, C., 2020. The role of cytokines including Interleukin-6 in COVID-19 induced pneumonia and macrophage activation syndrome-like disease. *Autoimmunity Reviews*, 102537.
- Ozkul, C., Yalinay, M., Karakan, T., 2020. Structural changes in gut microbiome after Ramadan fasting: A pilot study. *Beneficial microbes*, 1–8.
- Pochi, P. E., Downing, D. T., Strauss, J. S., 1970. Sebaceous gland response in man to prolonged total caloric deprivation. *The Journal of Investigative Dermatology* 55 (5), 303–309.
- Rhein, B. A., Powers, L. S., Rogers, K., et al., 2015. Interferon- $\gamma$  inhibits Ebola virus infection. *PLoS Pathogens* 11 (11), e1005263.
- Varani, J., Bhagavathula, N., Aslam, M. N., et al., 2008. Inhibition of retinoic acid-induced skin irritation in calorie-restricted mice. *Archives of Dermatological Research* 300 (1), 27–35.
- World Health Organization. Safe Ramadan practices in the context of the COVID-19: Interim guidance. <https://apps.who.int/iris/handle/10665/331767> Accessed 27.4.2020
- Yakasai, A. M., Muhammad, H., Babashani, M., Jumare, J., Abdulmumini, M., Habib, A. G., 2011. Once-daily antiretroviral therapy among treatment-experienced Muslim patients fasting for the month of Ramadan. *Tropical Doctor* 41 (4), 233–235.