Iftikhar et al. J Fam Med Dis Prev 2016, 2:034
Volume 2 | Issue 2
ISSN: 2469-5793

Journal of
Family Medicine and Disease Prevention

Review Article: Open Access

Obesity and Lifestyle Recommendations in the Light of Islam

Rahila Iftikhar[1]*, Muhmmad Albar[2] and Mahdi Qadi[1]

[1]*Community and Family Medicine Department, King Abdulaziz University, Saudi Arabia*

[2]*Bioethics Department, International Medical Center, Saudi Arabia*

***Corresponding author:** *Rahila Iftikhar, Community and Family Medicine Department, King Abdulaziz University, PO Box 42806, Jeddah 21551, Saudi Arabia, Tel: +966-2-6402114, E-mail: rahila_iftikhar@hotmail.com*

Abstract

The prevalence of obesity and, consequently, obesity-related disorders is increasing globally, imposing a burden on health care and costs. Lifestyle interventions are the mainstay of treatment owing to the risks associated with surgery and medications. Although Islam advocates a healthy lifestyle and dieting, Muslim countries are also plagued by a rise in the prevalence of obesity and its associated disorders due to substitution of the traditional diet for a Western diet, which is rich in fats and free sugars. This review focuses on scientific based lifestyle recommendations for weight management that might be influenced by the Qur'an. We also describe evidence from contemporary research regarding the effectiveness of lifestyle interventions that are also encouraged in Islam.

Keywords

Behavior, Diet, Exercise, Fasting, Islam, Obesity

Introduction

Research has demonstrated that overweight and obese people have an increased risk of developing the following conditions: coronary artery disease, type 2 diabetes mellitus, dyslipidemia, cerebrovascular accident, cancers of the endometrium, breast and colon cancer, liver and gall bladder disease, osteoarthritis, sleep apnea, respiratory difficulties, as well as abnormal periods and infertility in women [1]. Unfortunately, over the last decade, Arab and gulf countries have witnessed an unprecedented increase in the incidence of heart disease and obesity-related diseases as well as an increase in the prevalence of obesity and overweight in both adults and children [2]. The prevalence of obesity among children and adolescents in Gulf nations range between 5-14% in males and from 3-18% in females. The rate varies from 2-55% among adult females and from 1-30% in adult males. An analysis of 46 Muslim countries demonstrated that the overall prevalence of obesity in these populations was 37.4%. Men and women were overweight in approximately 33.0% and 42.1% of the cases, respectively [3].

The increase in the prevalence of obesity and overweight in both adults and children in Arab and Gulf nations has been attributed to substitution of the traditional Arabic diet for a Western diet, which is rich in fats and free sugars [4]. This change in diet is associated with a concomitant increase in the prevalence of diet-related diseases, including congestive heart disease, diabetes, and cancers [4], which subsequently places a substantial health and economic burden on affected individuals and the society as a whole. The increasing wealth in Gulf Arab countries resulted in a sedentary life and less exercise.

In Saudi Arabia and other developing countries, there are limited pharmacological options for weight loss. Furthermore, bariatric treatment is costly and not within the reach of most individuals, and it has a few serious adverse effects. As a result, conservative treatment is the mainstay of any weight loss regime [5-7]. Several studies [8-10] have confirmed the role of exercise and diet on body weight; however, the role of religion on weight loss has received little attention, as evidenced by lack of epidemiological and randomized controlled trials that incorporate the religion of participants into the data analysis.

Reawakening the Muslim population to Islamic lifestyle recommendations to tackle this social and substantial health problem is main aim of this review .We also describe evidence from contemporary research regarding the effectiveness of lifestyle interventions that are also encouraged in Islam. Verses from the Qur'an and the teachings of Prophet Muhammad (peace be upon him [pbuh]) are used in this review to summarize the Islamic views of obesity and describe its similarity with current research. Verses from the Qur'an and the Hadith are used as sources of Islamic literature. Qur'anic citations are written as su¯ra and verse number, separated by a colon (su¯ra: verse), while Hadith citations are written as the cited book.

Lifestyle Interventions in the Prevention of Obesity

Over the last decade, exciting advances have occurred in all three modalities used to treat obesity: lifestyle intervention, pharmacotherapy, and bariatric surgery. Lifestyle and behavioral interventions have been reported in clinical trials [11,12] to produce and sustain weight loss, leading to favorable health outcomes, namely improvements in cardiovascular risk factors and the prevention and treatment of diabetes. Interestingly, the Islamic literature had emphasized the importance of behavioral practices, including the importance of dieting, approximately 15 centuries ago [13]. Although sustainable, lifestyle and behavioral interventions work only as long as patients are willing to do it. In addition, most conservative programs fail in the bariatric population [14].

Eating Behavior and Weight Management

Numerous factors within the food environment may trigger overfeeding. In Islam, Muslims are ordered by Allah Almighty to

Citation: Iftikhar R, Albar M, Qadi M (2016) Obesity and Lifestyle Recommendations in the Light of Islam. J Fam Med Dis Prev 2:034

Received: April 12, 2016: **Accepted:** June 17, 2016: **Published:** June 20, 2016

ClinMed International Library

make balances in food and drink; overeating is believed to be an enemy of moral, healthy, and spiritual life. In one verse, Almighty Allah said: "And those who, when they spend, are neither extravagant nor niggardly, but hold a medium (way) between those (extremes)" (su¯ra Al-Furqân: 67). In another Qur'anic verse, Allah almighty advices humans not to be extravagant: "Eat and drink, but be not excessive. Indeed, He likes not those who commit excess." (su¯ra Al-'A`raf: 31). "Eat of what Allah has provided for you, and follow not the footsteps of Shaitân (Satan). Surely he is to you an open enemy". (su¯ra Al-An'âm: 141-142).

According to modern research [15,16], hyperphagia may contribute to obesity, thus raising the potential of common underlying mechanisms involved in the development and treatment of obesity in persons who increase their caloric intake. Although it was previously thought that obesity was primarily due to an energy-sparing metabolic defect, recent research [17] suggests that obese persons overeat and actually demonstrate increased, rather than decreased, energy use. Some authors showed that glucose administration increased the expression of brain-derived neurotrophic factor (BDNF) [18], which is known to have potentially anorexigenic activity [16]. Conversely, it was shown that food deprivation reduced its expression in the hypothalamus and dorsal vagal complex [19,20]. Moreover, clinical and experimental models showed that BDNF was associated with obesity that was mainly the result of overeating [21-25], and some contributing brain sites were identified [18,26]. This knowledge has been utilized in promoting behavioral strategies to control the amount of food consumed.

Previous research [27,28] also shows that intermittent fasting is beneficial in the treatment of obesity. Recent studies on experimental models show that fasting periods increase longevity, improve health and reduce disease, including cancers [29,30], neurological disorders [31], and disorders of the circadian rhythm in laboratory animals [32,33]. Weight loss regimens were initially based upon intermittent starving, contrary to restricting calories [34]. Intermittent fasting was reported to cause significant reductions in body weight in individuals with obesity [35], suggesting that it was clinically relevant in inducing weight loss.

The basic format in intermittent fasting involves alternating days of "normal" calorie consumption with days when calorie consumption is severely restricted. This can be done by fasting on an alternate-day basis or, according to recent research [36], using a 5:2 strategy where every week two days are selected as "fasting days" (men are allowed to consume up to 600 calories and women 500 calories per fasting). The Sunnah of Prophet David (pbuh) recommends fasting every other day. Fasting on Monday and Thursday, which is observed by some Muslims, is also part of the Sunnah. Islam encourages facultative fasting on Monday and Thursday every week, three days in the middle of the lunar month, on the ninth and tenth day of the month of Muharram, and six days in the month of Shawwal, which follows Ramadan (Sahih Muslim). This type of intermittent fasting has notably demonstrated good results and has been reported to be similarly or more effective than continuous modest calorie restriction with regard to weight loss, improved insulin sensitivity, and other health biomarkers [37,38].

Caloric restriction may be a better option to control weight. In fact, a 20-year longitudinal study [39] was conducted in rhesus monkeys with the aim of at determining whether caloric restriction without malnutrition delayed aging and extended lifespan in diverse species. The investigators concluded that adult-onset, moderate caloric restriction delayed the onset of age-associated diseases and prolonged life in a primate species. It was also thought that the advantages of caloric restriction could also be observed in humans since it was closely related to the rhesus monkey [39].

Muslims are instructed by Almighty Allah to fast during Ramadan. The Ramadan fast is similar to intermittent fasting in that it involves temporary food restriction. During this period, Muslims must abstain from eating, drinking, taking oral medications, having marital intercourse, and smoking from early dawn (Sohur) till sunset (Iftar). However, there is no restriction on food or fluid intake between sunset and dawn, although Muslims are instructed not to be gluttons. They are advised to have long prayers (Taraweeh) collectively in mosques. The main meal, Iftar, is taken at sunset and should start with dates and water, followed by Maghrib (Sunset) prayers. Sohur, the lighter meal, is taken before dawn and is mainly composed of complex carbohydrates and yogurt.

Findings from a prospective, observational trial that investigated the effect of Ramadan fasting on middle-aged subjects showed a significant reduction in body weight (mean weight of 66.6 ± 13 Kg before versus 65.2 ± 12.7 Kg after Ramadan; $P < 0.0001$) [40]. Similar findings were reported in a larger study [41] that investigated the effects of Ramadan intermittent fasting on body weight and composition and the effects of age and gender. The results showed significant reductions in weight and body mass index (BMI) ($P < 0.001$) in almost all subjects, with the largest weight loss and body fat reduction was observed in men ≤ 35 years (-2.2% [SE 2.2%]; $P < 0.001$). Waist and hip circumferences decreased in most subjects, except in women aged 36 –70 years. In most subjects, fat mass decreased, ranging from 2.3% to 4.3% from baseline, except in women aged 36–70 years who did not show a significant change. Overall, the bottom line is for people to be disciplined regarding food choices and intake to maintain a healthy weight during Ramadan. Long-term studies are required to investigate the association between Ramadan fasting and weight control [42].

Eating Together

Islam emphasizes the concept of sharing meals. During Ramadan, Muslims get together to eat meals, either in public places such as mosques or in private such as in residences. While there is no strong scientific evidence, it is suggested that families who eat five or more meals together have children who are approximately 25% less likely to develop nutritional health issues than children who eat none or one meal with their families [43]. Furthermore, the authors found that shared family meals apparently prevented overweight, unhealthy eating, and disordered eating.

Childhood Obesity

Childhood obesity is an issue of concern in middle eastern countries. In Saudi Arabia, for example, data from a national survey indicated that 23.1% of children and adolescents were overweight and 9.3% were obese; severe obesity was documented in 2.0% of the sample [44]. Several risk factors were associated with childhood obesity, including poor feeding habits and lack of physical activity as a result of rapid modernization and urban residence, which has been observed in other Gulf States [45].

Islam encourages mothers to breastfeed their babies. In one verse of the Qur'an, it is stated: "The mothers shall give suck to their children for two whole years, (that is) for those (parents) who desire to complete the term of suckling)."(su¯ra al-Baqarah: 233). In contemporary medicine, researchers have attempted to investigate the association between breastfeeding and obesity prevention in children; however, conflicting results have been published in this regard. Some authors advocate breastfeeding as a means to prevent childhood obesity [46,47]. Indeed, a meta-analysis demonstrated that breastfeeding was protective against childhood obesity [48] and recent research suggests that breastfeeding probably conferred a decreased risk owing to intestinal microbiota [49]. Other investigators [50] concluded that the duration and exclusivity of breastfeeding did not prevent overweight or obesity in children.

A number of strategies have been suggested to combat childhood obesity. These include active game involvement, limiting screen time and school intervention programs regarding healthy food choices [45,51].

Diet

Islam encourages dieting, as seen in several verses of the Holy Qur'an, which promote the consumption of pure and healthy food [13].

Part of the etiquette of eating is moderation in eating and not filling the stomach. According to the Islamic scriptures, "A man does not fill any vessel worse than his stomach. It is sufficient for the son of Adam to eat enough to keep him alive. But if he must do that, then one-third for his food, one-third for his drink and one-third for his air." (Narrated by al-Tirmidhi, 2380; Ibn Maajah, 3349; classed as saheeh by al-Albaani in Saheeh al-Tirmidhi, 1939). This keeps the body healthy and light, because eating one's fill makes the body heavy and leads to laziness in worship and work. One-third is defined as being one-third of that which would make you feel full. Muslims are also instructed to eat only meat that has been prepared following Islamic laws and to avoid eating pork. "He has only forbidden to you dead animals, blood, the flesh of swine, and that which has been dedicated to other than Allah. But whoever is forced [by necessity], neither desiring [it] nor transgressing [its limit], there is no sin upon him. Indeed, Allah is Forgiving and Merciful". (su¯ra al-Baqarah: 173).

Some fruits and plant extracts that have been used in traditional Arabic and Islamic medicine, such as *Alchemilla vulgaris* (lady's mantle), *Cuminum cyminum L.* (cumin), *Mentha logifolia L.* (sorting menthe) and *Olea europaea L.* (olive) have been shown to cause weight loss in modern research [52]. Besides being an important element in traditional Arabic and Islamic medicine, olive oil is one of the staples of Mediterranean diets. In one randomized controlled trial [53], it was found that the Mediterranean diet, when enriched with extra-virgin olive oil, decreased diabetes risk in persons with high cardiovascular risk. Furthermore, a low-carbohydrate Mediterranean diet causes a greater reduction of HbA1c levels, higher rate of diabetes remission, and delayed need for diabetes medication compared with a low-fat diet in patients with newly diagnosed type 2 diabetes [54]. In another report [55], it was shown that persons who consumed the Mediterranean diet had a significant decrease in body weight and BMI. A recent investigation [56] also found that the seeds and extracts of *Nigella sativa* (black seeds) had beneficial effects in persons with diabetes mellitus, insulin resistance syndrome, dyslipidemia, and cardiovascular diseases.

Dates are a staple food in the Arab world and are traditionally consumed by Muslims, especially during fasting periods. Although raw dates are rich in sugars as well as dietary fiber, enzymes, protein, fat, minerals, vitamins, phenolic acids, and carotenoids [57], a large proportion of date varieties are low in carbohydrates, refuting the belief that when consumed regularly, they have the potential to cause chronic diseases, similar to sweets [58].

Islam encourages the consumption of water. One Hadith says: "Zamzam water is what one intends to drink it for. When one drinks it to be healed, Allah heals him; when one drinks it to be full, Allah makes him full; and when one drinks it to quench his thirst, Allah quenches it. "(Ahmad and Ibn Majah). The Prophet (pbuh) is also quoted, "The most sublime of all earthly waters is that of Zamzam; therein one finds food for the hungry and medicine for the ill."(At-Tabarani).

In contemporary research [59], there is evidence that the consumption of ≥ 1500 mL of water causes a modest decrease in body weight and BMI in overweight persons. Furthermore, findings from one investigation [60] revealed that water intake in place of sugar-sweetened beverages or fruit juices was associated with lower long-term weight gain.

Islam also encourages the consumption of milk, as seen in this verse of the Qur'an: "And indeed, for you in grazing livestock is a lesson. We give you drink from what is in their bellies - between excretion and blood - pure milk, palatable to drinkers." (su¯ra Al-Nahl: 66). While the Holy Qur'an does not indicate why milk is important in preventing obesity, data from current research [61] suggest a neutral effect of dairy intake on adiposity in early and middle childhood and a modest but protective effect during adolescence.

Exercise

The health and social benefits of exercise have been known for several decades. Exercise is mainly considered for its effects on energy expenditure for the prevention and treatment of both overweight and obesity. Several studies [62-64], including randomized controlled trials [11,65] have shown the benefits of exercise, either singly or in combination with other weight-loss modalities, in causing weight loss. Furthermore, there is evidence that brisk walking or regular exercise caused a slight decrease in body weight and body fat in postmenopausal women and moderate physical activity appeared to be as effective as aerobic exercise in improving and sustaining weight loss [66].

Muslims are encouraged to be physically active. Muslims can walk for any of the following worthy purposes: worshiping, working, seeking knowledge, exercising, participating in a race, and visiting. Walking for the purpose of worship is regarded as the worthiest in Islam, and it is believed that a Muslim's reward is increased depending on the number of steps taken to the mosque. In one Hadith, Abu Hurairah (radi Allahu anhu) reported that the Prophet (pbuh) said: "He who purifies himself (performs Wudhu) in his house and then walks to one of the houses of Allah (Masjid) for performing an obligatory Salat (prayer), one step of his will wipe out his sins and another step will elevate his rank (in Jannah)" (Sahih Muslim).

Prophet Muhammad (pbuh) ordered his companions to learn wrestling, riding horses, archery, swimming, running fast, and all types of arts of fighting. He usually had racing competitions with his wife Aisha (r.a).

Obesity and Sleeping Patterns

Late bedtime and night time snacking are associated with obesity. A recent report found that clock genotype is an important factor that affects eating patterns [67]. Similarly, Islamic scriptures recommend that Muslims should sleep early and wake up at dawn for worship, preferably to pray and meditate. Prophet Muhammad (pbuh) advised his followers to pray at night when people are asleep. The best time for facultative night prayers is the last third of the night (before dawn) when Almighty God approaches his servants with his mercy. Although there might be concerns that changes in sleep architecture (including a decrease in stage 2 sleep, rapid eye movement [REM] sleep, and slow wave sleep) may lead to excess weight gain in the long run [68], there is no evidence that Muslims who wake up for night prayers are necessarily REM-deprived as long as they had slept for 7 to 8 hours.

Several narrations suggest that early bedtime and early morning awakening is encouraged in Islam. 'To Allah belongs the Kingdom of the heavens and the earth. Allah has power over all things. Surely, in the creation of the heavens and the earth, and in the alternation of night and day, there are signs for those with minds. Those who remember Allah when standing, sitting, and on their sides, and contemplate upon the creation of the heavens and the earth (saying:) 'Lord, You have not created these in falsehood. Exaltations to You! Guard us against the punishment of the Fire.(Al 'Imran: 189-191). They slept but a little at night, and at dawn would ask forgiveness. (Ath-Thariyat: 17-18). As for the night there is a voluntary deed for you to keep vigil in part it. Perhaps your Lord will raise you to a praiseworthy station. (Al-'Isra' 79).

Narrated by Bukhari and Muslim in their hadiths narrated from Abu Barza Aslami may Allah be pleased with him: "The Messenger of Allah, peace be upon him, hated sleeping before Isha." "The dearest of prayer to Allah is the prayer of Dawood (peace be upon him). He used to sleep for half the night, get up and pray for one third of it, and sleep for one sixth of it".

Implications for Treatment

The Islamic literature provides numerous clues to living a healthy lifestyle [13]. These interventions were utilized in the days of the Prophet (pbuh), and some of them have been proven to be scientifically beneficial in preventing obesity and / or obesity-related disorders. Strategies such as eating less or controlling the amount of food consumed, sharing meals in groups, eating fruits and plant

Table 1: Areas that merit further research.

Areas of interest	Current knowledge and future directions
Dates and obesity	'Ajwa' (a variety of Saudi dates) has been demonstrated to have antioxidant, anti-inflammatory and cardioprotective properties in animal models [74] However, there are limited on its effect in humans. It has been postulated that leptin resistance is probably involved in the pathogenesis of obesity, and the effects of Ajwa dates on weight maintenance / loss can be investigated.
Black seeds and obesity	A recent trial showed that the consumption of black seeds and turmeric improved metabolic parameters in patients with metabolic syndrome [75]. Further research over longer periods should be conducted to investigate the effect of black seeds on body weight.
Dietary regimens that alter gut microbiota	Gut microbiota plays an important role in weight maintenance [76]. Previous researches suggest that honey [77] and yogurt [78] help in maintaining healthy gut flora and promote weight stability. Another study suggests that dates alter gut microbiota and prevent colorectal cancer [79]. Further randomized controlled trials are however recommended to investigate this finding.
Systematic reviews on the benefits of Ramadan fasting, fasting and weight maintenance, as well as the effect of Thursday and Monday fasting	Fasting and weight gain / loss are major areas of interest for researchers [80]. Randomized controlled trials / meta analyses should be conducted to explore the long-term effects of different fasting regimens in obese patients.
The association between Ramadan fasting and sleep patterns	It has been suggested the sleep-wake cycle is altered during Ramadan [81]. In addition, it is known that eating patterns in Ramadan have implications on body metabolism and biochemical markers and fasting causes an increase in the levels of high-density lipoprotein [81]. Randomized controlled trials should be conducted to explore the effects of fasting on health, including its effect on glucose homeostasis, insulin metabolism, and blood pressure [81].
Breastfeeding	Findings from a meta-analysis suggest that breastfeeding is a significant protective factor against obesity in children [48]. Nevertheless, more research has to be conducted to investigate the association between breastfeeding and obesity.

extracts (lady's mantle, cumin, sorting menthe, and olive), fasting intermittently, consuming milk, breastfeeding, and exercising have been shown to be helpful in weight loss; however, the effectiveness of these strategies should be further investigated. Although cross-sectional and longitudinal studies have revealed a great breadth of knowledge regarding lifestyle interventions and their effect on body weight, randomized controlled trials would provide stronger evidence regarding the efficacy of these interventions.

Further considerations should be given to investigate the association between religiosity and body weight among Muslims, as most of the research on this topic was conducted among Christian populations. While some authors [69,70] found a positive association between religiosity and weight loss, other researchers [71,72] reported a negative association, with religious practices being associated with weight gain. However, findings from a recent report [73] conducted on Latino church leaders from 18 churches in San Antonio, Texas demonstrated the strong potential of faith-based communities to serve as an intervention setting for implementing successful obesity-prevention strategies. Bearing this in mind, we believe that the rising prevalence of obesity and obesity-related disorders in Muslim countries underscores the need for such studies to be conducted among followers of Islam. Areas that need further research are summarized in table 1.

Conclusion

Although recent technological advances have permitted scientists to understand and develop treatments against obesity, its prevalence is still increasing worldwide. Effective treatment options are limited by the adverse effects associated with pharmacotherapy and surgery, and until now, lifestyle interventions, which had been encouraged in Islam several decades ago, remain the cornerstone of treatment. However, research is still lacking in that there is no strong scientific evidence to support the efficacy of these strategies. Advances in obesity treatment may be achieved if Muslim scholars and scientists work together to explore the effect of the Islamic way of life on obesity. In the future, randomized controlled trials should be conducted to assess the long-term effects of lifestyle interventions suggested in Islam.

References

1. National Institutes of Health, National Heart, Lung, and Blood Institute Obesity Education Initiative (2014) Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults.
2. ALNohair S (2014) Obesity in gulf countries. Int J Health Sci (Qassim) 8: 79-83.
3. Kahan D (2015) Prevalence and correlates of adult overweight in the Muslim world: analysis of 46 countries. Clin Obes 5: 87-98.
4. Musaiger AO (1994) Nutritional status and dietary habits of adolescent girls in Oman. Ecol Food Nutr 31: 227–237.
5. Lang A, Froelicher ES (2006) Management of overweight and obesity in adults: behavioral intervention for long-term weight loss and maintenance. Eur J Cardiovasc Nurs 5: 102-114.
6. Tsigos C, Hainer V, Basdevant A, Finer N, Fried M, et al. (2008) Management of obesity in adults: European clinical practice guidelines. Obes Facts 1: 106-116.
7. Kmietowicz Z (2012) Obese patients get inadequate care before and after bariatric surgery, finds review. BMJ 345: e6890.
8. Miller CT, Fraser SF, Levinger I, Straznicky NE, Dixon JB, et al. (2013) The effects of exercise training in addition to energy restriction on functional capacities and body composition in obese adults during weight loss: a systematic review. PLoS One 8: e81692.
9. Aller EE, Larsen TM, Claus H, Lindroos AK, Kafatos A, et al. (2014) Weight loss maintenance in overweight subjects on ad libitum diets with high or low protein content and glycemic index: the DIOGENES trial 12-month results. Int J Obes (Lond) 38: 1511-1517.
10. Hopkins M, Gibbons C, Caudwell P, Hellström PM, Näslund E, et al. (2014) The adaptive metabolic response to exercise-induced weight loss influences both energy expenditure and energy intake. Eur J Clin Nutr 68: 581-586.
11. Look AHEAD Research Group, Pi-Sunyer X, Blackburn G, Brancati FL, Bray GA, et al (2007) Reduction in weight and cardiovascular disease risk factors in individuals with type 2 diabetes: one-year results of the look AHEAD trial. Diabetes Care 30: 1374-1383.
12. Blumenthal JA, Babyak MA, Hinderliter A, Watkins LL, Craighead L, et al (2010) Effects of the DASH Diet Alone and in Combination With Exercise and Weight Loss on Blood Pressure and Cardiovascular Biomarkers in Men and Women With High Blood Pressure: The ENCORE Study. Archives of Internal Medicine 170: 126–135.
13. Hossain MZ (2014) What does Islam say about dieting? J Relig Health 53: 1003-1012.
14. Wolfe BM, Kvach E, Eckel RH (2016) Treatment of Obesity: Weight Loss and Bariatric Surgery. Circ Res 118: 1844-1855.
15. Unger RH, Scherer PE (2010) Gluttony, sloth and the metabolic syndrome: a roadmap to lipotoxicity. Trends Endocrinol Metab 21: 345-352.
16. Noble EE, Billington CJ, Kotz CM, Wang C (2011) The lighter side of BDNF. Am J Physiol Regul Integr Comp Physiol 300: R1053-1069.
17. Prentice AM (2001) Obesity and its potential mechanistic basis. Br Med Bull 60: 51-67.
18. Unger TJ, Calderon GA, Bradley LC, Sena-Esteves M, Rios M (2007) Selective deletion of Bdnf in the ventromedial and dorsomedial hypothalamus of adult mice results in hyperphagic behavior and obesity. J Neurosci 27: 14265-14274.
19. Xu B, Goulding EH, Zang K, Cepoi D, Cone RD, et al. (2003) Brain-derived neurotrophic factor regulates energy balance downstream of melanocortin-4 receptor. Nat Neurosci 6: 736-742.

20. Bariohay B, Lebrun B, Moyse E, Jean A (2005) Brain-derived neurotrophic factor plays a role as an anorexigenic factor in the dorsal vagal complex. Endocrinology 146: 5612-5620.

21. Coppola V, Tessarollo L (2004) Control of hyperphagia prevents obesity in BDNF heterozygous mice. Neuroreport 15: 2665-2668.

22. Gray J, Yeo GS, Cox JJ, Morton J, Adlam AL, et al. (2006) Hyperphagia, severe obesity, impaired cognitive function, and hyperactivity associated with functional loss of one copy of the brain-derived neurotrophic factor (BDNF) gene. Diabetes 55: 3366–3371.

23. Gray J, Yeo G, Hung C, Keogh J, Clayton P, et al. (2007) Functional characterization of human NTRK2 mutations identified in patients with severe early-onset obesity. Int J Obes (Lond) 31: 359-364.

24. Han JC, Liu QR, Jones M, Levinn RL, Menzie CM, et al. (2008) Brain-derived neurotrophic factor and obesity in the WAGR syndrome. N Engl J Med 359: 918-927.

25. Yeo GS, Connie Hung CC, Rochford J, Keogh J, Gray J, et al. (2004) A de novo mutation affecting human TrkB associated with severe obesity and developmental delay. Nat Neurosci 7: 1187-1189.

26. Cordeira JW, Frank L, Sena-Esteves M, Pothos EN, Rios M (2010) Brain-derived neurotrophic factor regulates hedonic feeding by acting on the mesolimbic dopamine system. J Neurosci 30: 2533-2541.

27. Birkenhäger JC, Haak A, Ackers JG (1968) Changes in body composition during treatment of obesity by intermittent starvation. Metabolism 17: 391-399.

28. Ball MF, Canary JJ, Kyle LH (1970) Tissue changes during intermittent starvation and caloric restriction as treatment for severe obesity. Arch Intern Med 125: 62-68.

29. Thomas JA, Antonelli JA, Lloyd JC, Masko EM, Poulton SH, et al. (2010) Effect of intermittent fasting on prostate cancer tumor growth in a mouse model. Prostate Cancer Prostatic Dis 13: 350-355.

30. Buschemeyer WC, Klink JC, Mavropoulos JC, Poulton SH, Demark-Wahnefried W, et al. (2010) Effect of intermittent fasting with or without caloric restriction on prostate cancer growth and survival in SCID mice. Prostate 70: 1037-1043.

31. Singh R, Lakhanpal D, Kumar S, Sharma S, Kataria H, et al. (2012) Late-onset intermittent fasting dietary restriction as a potential intervention to retard age-associated brain function impairments in male rats. Age (Dordr) 34: 917-933.

32. Casiraghi LP, Alzamendi A, Giovambattista A, Chiesa JJ, Golombek DA (2016) Effects of chronic forced circadian desynchronization on body weight and metabolism in male mice. Physiol Rep 4 pii: e12743.

33. Froy O, Chapnik N, Miskin R (2009) Effect of intermittent fasting on circadian rhythms in mice depends on feeding time. Mech Ageing Dev 130: 154-160.

34. Klempel MC, Kroeger CM, Bhutani S, Trepanowski JF, Varady KA (2012) Intermittent fasting combined with calorie restriction is effective for weight loss and cardio-protection in obese women. Nutr J 11: 98.

35. Arguin H, Dionne IJ, Senechal M, Bouchard DR, Carpentier AC, et al. (2012) Short- and long-term effects of continuous versus intermittent restrictive diet approaches on body composition and the metabolic profile in overweight and obese postmenopausal women: a pilot study. Menopause 19: 870-876.

36. Brown JE, Mosley M, Aldred S (2013) Intermittent Fasting: A Dietary Intervention for Prevention of Diabetes and Cardiovascular Disease? British Journal of Diabetes and Vascular Disease 13: 68-72.

37. Varady KA (2011) Intermittent versus daily calorie restriction: which diet regimen is more effective for weight loss? Obesity Reviews 12: e593-e601.

38. Azevedo FR, Ikeoka D, Caramelli B (2013) Effects of intermittent fasting on metabolism in men. Revista da Associação Médica Brasileira 59: 167-173.

39. Colman RJ, Anderson RM, Johnson SC, Kastman EK, Kosmatka KJ, et al. (2009) Caloric restriction delays disease onset and mortality in rhesus monkeys. Science 325: 201-204.

40. M S, Ah SA, Sr S, Km B (2014) Effect of Ramadan Fasting on Body Weight, (BP) and Biochemical Parameters in Middle Aged Hypertensive Subjects: An Observational Trial. J Clin Diagn Res 8: 16-18.

41. Norouzy A, Salehi M, Philippou E, Arabi H, Shiva F, et al (2013) Effect of fasting in Ramadan on body composition and nutritional intake: a prospective study. Journal of Human Nutrition and Dietetics 26: 97-104.

42. Yakoob MY (2011) Fasting during Ramadan and obesity. J Pak Med Assoc 61: 303-304.

43. Hammons AJ, Fiese BH (2011) Is frequency of shared family meals related to the nutritional health of children and adolescents? Pediatrics 127: e1565-1574.

44. El Mouzan MI, Foster PJ, Al Herbish AS, Al Salloum AA, Al Omer AA, et al. (2010) Prevalence of overweight and obesity in Saudi children and adolescents. Ann Saudi Med 30: 203-208.

45. Mirmiran P, Sherafat-Kazemzadeh R, Jalali-Farahani S, Azizi F (2010) Childhood obesity in the Middle East: a review. East Mediterr Health J 16: 1009-1017.

46. Spatz DL (2014) Preventing obesity starts with breastfeeding. J Perinat Neonatal Nurs 28: 41-50.

47. Jimenez-Cruz A, Bacardi-Gascon M, Pichardo-Osuna A, Mandujano-Trujillo Z, Castillo-Ruiz O (2010) Infant and toddlers' feeding practices and obesity amongst low-income families in Mexico. Asia Pac J Clin Nutr 19:316-323.

48. Yan J, Liu L, Zhu Y, Huang G, Wang PP (2014) The association between breastfeeding and childhood obesity: a meta-analysis. BMC Public Health 14: 1267.

49. Korpela K, Salonen A, Virta LJ, Kekkonen RA, de Vos WM (2016) Association of Early-Life Antibiotic Use and Protective Effects of Breastfeeding: Role of the Intestinal Microbiota. JAMA Pediatr.

50. Martin RM, Patel R, Kramer MS, Guthrie L, Vilchuck K, et al. (2013) Effects of promoting longer-term and exclusive breastfeeding on adiposity and insulin-like growth factor-I at age 11.5 years: a randomized trial. JAMA 309: 1005-1013.

51. Friedrich RR, Polet JP, Schuch I, Wagner MB (2014) Effect of intervention programs in schools to reduce screen time: a meta-analysis. J Pediatr (Rio J) 90: 232-241.

52. Salas-Salvadó J, Bulló M, Estruch R, Ros E, Covas MI, et al. (2014) Prevention of diabetes with Mediterranean diets: a subgroup analysis of a randomized trial. Ann Intern Med 160: 1-10.

53. Esposito K, Maiorino MI, Petrizzo M, Bellastella G, Giugliano D (2014) The effects of a Mediterranean diet on the need for diabetes drugs and remission of newly diagnosed type 2 diabetes: follow-up of a randomized trial. Diabetes Care 37: 1824-1830.

54. Greco M, Chiefari E, Montalcini T, Accattato F, Costanzo FS, et al. (2014) Early effects of a hypocaloric, Mediterranean diet on laboratory parameters in obese individuals. Mediators Inflamm 2014: 750860.

55. Shabana A, El-Menyar A, Asim M, Al-Azzeh H, Al Thani H (2013) Cardiovascular benefits of black cumin (Nigella sativa). Cardiovasc Toxicol 13: 9-21.

56. Tang ZX, Shi LE, Aleid SM (2013) Date fruit: chemical composition, nutritional and medicinal values, products. J Sci Food Agric 93: 2351-2361.

57. Vayalil PK (2012) Date fruits (Phoenix dactylifera Linn): an emerging medicinal food. Crit Rev Food Sci Nutr 52: 249-271.

58. Rahmani AH, Aly SM, Ali H, Babiker AY, Srikar S, et al. (2014) Therapeutic effects of date fruits (Phoenix dactylifera) in the prevention of diseases via modulation of anti-inflammatory, anti-oxidant and anti-tumour activity. Int J Clin Exp Med 7: 483-491.

59. Vij VA, Joshi AS (2013) Effect of 'water induced thermogenesis' on body weight, body mass index and body composition of overweight subjects. J Clin Diagn Res 7: 1894-1896.

60. Pan A, Malik VS, Hao T, Willett WC, Mozaffarian D, et al. (2013) Changes in water and beverage intake and long-term weight changes: results from three prospective cohort studies. Int J Obes (Lond) 37: 1378-1385.

61. Dror DK (2014) Dairy consumption and pre-school, school-age and adolescent obesity in developed countries: a systematic review and meta-analysis. Obes Rev 15: 516-527.

62. Holt J, Warren L, Wallace R, Neher JO (2006) Clinical Inquiries. What behavioral interventions are safe and effective for treating obesity? J Fam Pract 55: 536-538.

63. No authors listed (2013) Calories and weight loss. Complicated, yet simple. Mayo Clin Health Lett 31: 6.

64. Nock NL, Owusu C, Kullman EL, Austin K, Roth B, et al. (2013) A Community-Based Exercise and Support Group Program in African-American Breast Cancer Survivors (ABCs). J Phys Ther Health Promot 1: 15-24.

65. Ryan AS, Ge S, Blumenthal JB, Serra MC, Prior SJ, et al. (2014) Aerobic exercise and weight loss reduce vascular markers of inflammation and improve insulin sensitivity in obese women. J Am Geriatr Soc 62: 607-614.

66. Nawawi, Yehia Z (2003) Riyadh al Saleheen commented by M.A.Saboni, Alofoq, Beirut, 398.

67. Valladares M, Obregón AM, Chaput JP (2015) Association between genetic variants of the clock gene and obesity and sleep duration. J Physiol Biochem 71: 855-860.

68. Shechter A, O'Keeffe M, Roberts AL, Zammit GK, RoyChoudhury A, et al. (2012) Alterations in sleep architecture in response to experimental sleep curtailment are associated with signs of positive energy balance. Am J Physiol Regul Integr Comp Physiol 303: R883-889.

69. Cline KM, Ferraro KF (2006) Does Religion Increase the Prevalence and Incidence of Obesity in Adulthood? J Sci Study Relig 45: 269-281.

70. Ayers JW, Hofstetter CR, Irvin VL, Song Y, Park HR, et al. (2010) Can religion help prevent obesity? Religious messages and the prevalence of being overweight or obese among Korean women in California. J Sci Study Relig 49: 536-549.

71. Taylor J Jr, Belay B, Park S, Onufrak S, Dietz W (2013) Association of church-sponsored activity participation and prevalence of overweight and obesity in African American Protestants, National Survey of American Life, 2001-2003. Ethn Dis 23: 322-328.

72. McCabe MP, Waqa G, Dev A, Cama T, Swinburn BA (2013) The role of cultural values and religion on views of body size and eating practices among adolescents from Fiji, Tonga, and Australia. Br J Health Psychol 18: 383-394.

73. He M, Wilmoth S, Bustos D, Jones T, Leeds J, et al. (2013) Latino church leaders' perspectives on childhood obesity prevention. Am J Prev Med 44: S232-239.

74. Al-Yahya M, Raish M, AlSaid MS, Ahmad A, Mothana RA, et al. (2015) 'Ajwa' dates (Phoenix dactylifera L.) extract ameliorates isoproterenol-induced cardiomyopathy through downregulation of oxidative, inflammatory and apoptotic molecules in rodent model. Phytomedicine.

75. Amin F, Islam N, Anila N, Gilani AH (2015) Clinical efficacy of the co-administration of Turmeric and Black seeds (Kalongi) in metabolic syndrome - a double blind randomized controlled trial - TAK-MetS trial. Complement Ther Med 23: 165-174.

76. Patterson E, Ryan PM, Cryan JF, Dinan TG, Ross RP, et al. (2016) Gut microbiota, obesity and diabetes. Postgrad Med J 92: 286-300.

77. Erejuwa OO, Sulaiman SA, Wahab MS (2012) Honey--a novel antidiabetic agent. Int J Biol Sci 8: 913-934.

78. Tremblay A, Doyon C, Sanchez M (2015) Impact of yogurt on appetite control, energy balance, and body composition. Nutr Rev 73 Suppl 1: 23-27.

79. Eid N, Osmanova H, Natchez C, Walton G, Costabile A, et al. (2015) Impact of palm date consumption on microbiota growth and large intestinal health: a randomised, controlled, cross-over, human intervention study. Br J Nutr 114: 1226-1236.

80. Antoni R, Johnston KL, Collins AL, Robertson MD (2016) Investigation into the acute effects of total and partial energy restriction on postprandial metabolism among overweight/obese participants. Br J Nutr 115: 951-959.

81. Reilly T, Waterhouse J (2007) Altered sleep-wake cycles and food intake: the Ramadan model. Physiol Behav 90: 219-228.