

Knowledge and practice of intermittent fasting: a cross-sectional study among university students in the United Arab Emirates

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ABSTRACT

Aim Intermittent fasting is a popular weight loss strategy that alternates between fasting periods and unrestricted eating. Research shows it can improve insulin resistance, lower HbA1c level, aid in weight management, and enhance cardiometabolic health. These effects can help address obesity, hypertension, and type 2 diabetes. Despite its popularity, research on intermittent fasting in the United Arab Emirates is sparse. This study aimed to evaluate the awareness and practice of different intermittent fasting regimens, including Alternate-Day Fasting, Modified Fasting, Time-Restricted Feeding, Ramadan Fasting, and Chinese Medical Nutrition Therapy, as well as to examine the relationship between intermittent fasting and obesity, hypertension, and type 2 diabetes.

Methods A cross-sectional study was conducted with 320 participants aged ≥ 18 years, irrespective of gender or nationality. An approval was obtained from the Institutional Review Board, and informed consent was secured. Data were collected via a validated questionnaire on Google Forms, covering sociodemographic details, knowledge and practice of intermittent fasting, information sources, and health conditions.

Results A total of 270 (87.4%) of participants were aware of intermittent fasting, and 149 (55.2%) practiced it. **There** was no significant link between knowledge and practice, but 29 (78.4%) of practitioners associated intermittent fasting with obesity. Among those with chronic conditions, 23 (91.2%) experienced positive changes.

Conclusion Despite the high awareness of intermittent fasting, individual beliefs influence its practice. The identified association between obesity and positive changes in those with chronic conditions implies potential benefits.

Keywords: dietary practices, health behaviour, health promotion, obesity, type 2 diabetes

INTRODUCTION

Intermittent fasting regimens are highly sought after as a method to initiate weight loss journeys. The definition of intermittent fasting involves "periods of fasting interspersed with periods of ad libitum eating and has been a dietary strategy in managing chronic disorders" (1). Considering that "Intermittent Fasting" was the number one food-related search phrase in 2019, there is abundant knowledge about intermittent fasting (2). In a research study from 2020, 24% of individuals in the United States had attempted intermittent fasting for weight management, making it one of the most well-liked diets in the US (3). According to a 2022 worldwide survey, 80.17% of participants reported having heard of intermittent fasting (4).

Intermittent fasting, an ancient tradition, is embraced by various cultural and religious communities. Philip Paracelsus, a pioneer in toxicology and medicine, deemed fasting a potent remedy (5). Numerous studies have been conducted on the long-term benefits of intermittent fasting, including "improvements in insulin resistance, HbA1c, long-term weight, and cardiometabolic benefits" (1). This evidence suggests that intermittent fasting can reduce the rates of obesity, hypertension, and type-2 diabetes mellitus (6).

Various types of intermittent fasting include Alternate-day Fasting (7), Modified Fasting regimens (8), Time-Restricted Feeding (9), Ramadan Fasting (10), and Chinese Medical Nutrition Therapy (CMNT) (11). All methods vary in their mechanisms of improving metabolic health. During the holy month of Ramadan, people fast from sunrise to sunset, and the most common dietary habit is consuming two meals per day, one heavier before dawn and one larger after sunset (12). Therefore, Ramadan's feast and fast days last about 12 hours. A recent intermittent fasting regimen, Chinese Medical Nutrition Thera-

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py (CMNT), has also been introduced (11).

Advocacy for intermittent fasting highlights its potential in addressing chronic diseases like obesity, hypertension, and type-2 diabetes (13). Recognizing the United Arab Emirates' (UAE) focus on combating obesity, this study is crucial for the health of the younger population (14,15). Limited studies exist on the knowledge and practice of intermittent fasting's impact on the UAE, specifically its association with prevalent conditions in the university-age demographic.

The aim of this study is to determine the level of knowledge and practice of intermittent fasting among university students, assess the association between knowledge of intermittent fasting and practice, and compare the prevalence of obesity, hypertension, and type-2 diabetes mellitus among participants practising and not practising intermittent fasting.

PATIENTS AND METHODS

Patients and study design

The research employed a cross-sectional study design and was conducted among students at the Medical University in Ajman, UAE, between May and December 2023. Inclusion criteria encompassed individuals of any gender, nationality, and age 18 and above who expressed willingness to participate. No other exclusion criteria except those who were not willing to participate. Based on the prevalence of intermittent fasting practice for less than three months during Ramadan, which was 58%, the sample size was adjusted to 320 participants to account for a 10% non-response bias.

The Institutional Review Board (IRB) of Gulf Medical University in Ajman, UAE approval was secured prior to the study, and an informed consent was obtained from all participants. Anonymity was strictly maintained, and access to data was limited to researchers, IRB members, and statisticians.

Methods

The investigators developed a questionnaire covering five key domains. The first domain focused on sociodemographic details, including gender, nationality, marital status, college degree, and year of study.

The second assessed participants' knowledge and awareness of various intermittent fasting regimens: Alternate-Day Fasting (7), Modified Fasting (8), Time-Restricted Feeding (9), Ramadan Fasting (10), and Chinese Medical Nutrition Therapy (11). Alternate-day fasting involves fasting for a day and then eating freely the following day, meaning dietary restrictions are only necessary 50% of the time; on fasting days, unlimited calorie-free beverages are allowed (7). Modified Fasting Regimens permit consuming 20-25% of energy requirements on fasting days, forming the basis of the 5:2 (energy restriction on two non-consecutive days, no restriction on other days) (8). Time-Restricted Feeding allows unrestricted calorie intake within set time limits, leading to consistent, extended fasting intervals (9,16). During Ramadan Fasting (10), Muslims fast from sunrise (Fajr) to sunset (Maghrib), with two meals eaten each day - one before sunrise and one after sunset - resulting in an approximate 12-hour fast daily (10). Chinese Medical Nutrition Therapy (11) is a newer form of intermittent fasting. It incorporates medicinal plants and whole grains with intermittent energy restriction to support glycaemic control.

This dietary approach aims to regulate blood sugar levels and may improve insulin sensitivity through combined nutritional and metabolic effects. Additionally, members of the Church of Jesus Christ of Latter-day Saints commonly practice long-term fasting, and some Seventh-day Adventists skip lunch, resulting in an extended overnight fast that may have physiological effects (11).

The third domain explored their practice of intermittent fasting, including whether they had followed any of these regimens and for how long. The fourth domain examined the sources of their knowledge, such as magazines, journals, family, friends, health professionals, or social media. The fifth domain addressed participants' chronic illnesses and their management. Participants were asked if they used intermittent fasting to manage their condition, and if so, what improvements they noticed, including any reduction or elimination of medication. The questionnaire was validated by three experts to check the contents included in the questionnaire (content validation). A pilot study conducted among five medical students with the draft questionnaire validated by the experts to check the clarity, feasibility, and timeliness.

Statistical analysis

Data were collected through online surveys administered to university students, which included a consent form and study objectives. Only participants who consented completed the survey. Data analysis was performed with descriptive statistics employed to calculate knowledge level across different nationalities, genders, and age groups. The χ^2 test was used to explore associations within the data ($p=0.01$).

RESULTS

This study involved 320 university students, with 212 (68.4%) being females. The majority were single, 290 (93.5%); 172 (53.7%) students were between 18 and 20 years of age.

Knowledge Out of the 320 students surveyed, 270 (87.4%) demonstrated awareness of intermittent fasting. Regarding recognition of specific intermittent fasting regimens most of the students were aware of Ramadan Fasting, and acknowledged Alternate Day Fasting, 214 (66.9%) and 176 (55.0%), respectively (Table 1). Among the 320 students, 236 (87.4%) were aware of the benefits of intermittent fasting.

Table 1. Distribution of the knowledge of intermittent fasting of 270 Participants

| Recognition of specific intermittent fasting regimens | Answer | No (%) of participants |
|---|--------|------------------------|
| Alternate-day fasting | NO | 93 (29.1) |
| | YES | 176 (55.0) |
| Modified Fasting regimens | NO | 173 (54.1) |
| | YES | 96 (30.0) |
| Time Restricted Feeding | NO | 124 (38.8) |
| | YES | 145 (45.3) |
| Ramadan Fasting | NO | 55 (17.2) |
| | YES | 214 (66.9) |
| Chinese Medical Nutrition Therapy (CMNT) | NO | 236 (72.8) |
| | YES | 33 (10.3) |

Out of 236 students, 174 (74.4%) were aware of the health benefits of fasting, with 193 (82.5%) acknowledging its potential for weight loss and 171 (73.1%) recognizing religious reasons. Regarding perceptions towards intermittent fasting, the majority, being 218, (93.2%) viewed it positively. The negative perspectives cited concerns about sustainability, social impact, potential health issues, decreased energy, cravings, eating disorders, altered nutrition, hormonal imbalance, mental health, stress, and lack of motivation (Table 2). Regarding opinions on junk food, 171 (72.5%) believed it affects fasting results. Some participants suggested that the impact may vary based on the quantity consumed, implying that a caloric deficit could mitigate its effects.

Table 2. Benefits of intermittent fasting in 236 participants

| Benefits | Answer | No (%) of participants |
|---------------------------------|----------|------------------------|
| Health | NO | 60 (25.6) |
| | YES | 174 (74.4) |
| Weight loss | NO | 41 (17.5) |
| | YES | 193 (82.5) |
| Religious reasons | NO | 63 (26.9) |
| | YES | 171 (73.1) |
| Others (Improved sleep, memory) | NO | 233 (99.6) |
| | YES | 1 (0.4) |
| View on intermittent fasting | Positive | 218 (93.2) |
| | Negative | 16 (6.8) |

Practice Investigating students' engagement in intermittent fasting, out of 270 participants, 149 (55.2%) practiced intermittent fasting, while 121 (44.8%) did not. Of the 121 (44.8%) students who viewed intermittent fasting as negative, 53 (44.5%) lacked the desire to practice it, 27 (22.7%) anticipated mood changes, 26 (21.8%) cited time constraints (Table 3).

Concerning attitudes towards intermittent fasting among 120 participants, 79 (65.8%) were unwilling to try it, while 41 (34.2%) considered it for metabolic health. Among the 149 intermittent fasting practitioners, 107 (72.3%) followed alternate-day fasting, 30 (20.3%) practised Modified Fasting, 47 (31.8%) implemented Time-Restricted Fasting, and 101 (68.2%) observed Ramadan Fasting. Chinese Medical Nutrition Therapy was followed by only two (1.4%). Out of 149 students, 87 (58.4%) practised intermittent fasting regularly, with 52 (35.3%) doing so a few times a week. Generally, the motivation behind practicing all the intermittent fasting regimens included weight loss in 74 (50.0%), religious reasons 100 (67.6%), and

health concerns 76 (51.4%). Effects were reported as gradual weight loss in 76 (52.1%), feeling happier in 63 (42.9%), and feeling distressed in 29 (19.9%).

Diseases Of the total 320 students, 81 (26.1%) suffer from chronic diseases. Among the students with chronic diseases, diabetes was mostly reported, 41 (52.6%), seven (9%) thyroid issues. Of the 34 students with chronic conditions practising intermittent fasting, 31 (91.2%) noticed differences, while three (8.8%) reported no changes. Among intermittent fasting practitioners, 18 (69.2%) reduced medicine intake, and eight (30.8%) did not. Among those on medication, 18 (90%) continued their medications, while two (10%) stopped due to intermittent fasting.

Associations Among the 320 participants, 270 demonstrated knowledge about intermittent fasting. Within this group, 149 (55.2%) actively practised intermittent fasting. When examining the association between the practice of intermittent fasting and morbidities, it was found that among those with obesity, 29 (78.4%) were practising intermittent fasting ($p < 0.01$). No statistically significant associations were found with other chronic conditions (Table 4).

Participants aged ≥ 20 years were more frequently engaged in intermittent fasting than those < 20 years of age. In terms of nationality, individuals from the African region practice intermittent fasting more than any other group.

DISCUSSION

A Chinese clinic found that the 5:2 intermittent fasting method led to greater weight loss than daily calorie restriction over 12 weeks; it improves insulin resistance, supports weight loss, and benefits metabolic health. This method is commonly used to manage diabetes, obesity, and cardiovascular disease, with long-term studies confirming its efficacy (1).

In our study, we observed a significant association between obesity and the practice of intermittent fasting. Among students with chronic conditions, more than 90% noted positive changes after adopting intermittent fasting; however, no significant associations were found concerning diabetes mellitus or cardiovascular disease. This lack of association may be due to factors such as non-compliance with prescribed medications or the severity of the patients' conditions (17,18). For instance, a non-compliant individual with type-2 diabetes may experience the progression of the disease from non-enzymatic glycation affecting small vessels to larger vessels, leading to complications such as diabetic foot and, ultimately, the need for amputation. In such

Table 3. Distribution of the practice of intermittent fasting and reason behind not practicing intermittent fasting

| Variable | Group | No (%) of participants |
|---|---|------------------------|
| Practice of intermittent fasting | Alternate day fasting | 41 (27.7) |
| | Modified fasting regimens | 30 (20.3) |
| | Time restricted fasting | 47 (31.8) |
| | Ramadan fasting | 101 (68.2) |
| | Chinese medical nutrition | 2 (1.4) |
| Reason | I did not know about intermittent fasting | 7 (5.9) |
| | I do not have the time | 26 (21.8) |
| | I foresee it affecting my mood | 27 (22.7) |
| | I have no desire to practice intermittent fasting | 53 (44.5) |
| | Other (already underweight, hungry, tired easily) | 6 (5.0) |

Table 4. Association of the practice of intermittent fasting and morbidities

| Variable | | No (%) of participants | | P |
|-----------------------------|-----|------------------------|-----------|-------|
| | | YES | NO | |
| Age group (years) | <20 | 65 (83.3) | 13 (16.7) | 0.01 |
| | ≥20 | 200 (88.5) | 26 (11.5) | |
| Obesity | NO | 15 (48.4) | 16 (51.6) | 0.01 |
| | YES | 29 (78.4) | 8 (21.6) | |
| Hypertension | NO | 31 (60.8) | 20 (39.2) | 0.241 |
| | YES | 13 (76.5) | 4 (23.5) | |
| Type 2 diabetes | NO | 37 (67.3) | 18 (32.7) | 0.362 |
| | YES | 7 (53.8) | 6 (46.2) | |
| Cardiovascular diseases | NO | 35 (61.4) | 22 (38.6) | 0.195 |
| | YES | 9 (81.8) | 2 (18.2) | |
| Increased cholesterol | NO | 42 (64.6) | 23 (35.4) | 0.942 |
| | YES | 2 (66.7) | 1 (33.3) | |
| Thyroid issues | NO | 42 (66.7) | 20 (32.3) | 0.092 |
| | YES | 2 (33.3) | 4 (66.7) | |
| Gastrointestinal conditions | NO | 42 (67.7) | 20 (32.3) | 0.092 |
| | YES | 2 (33.3) | 4 (66.7) | |
| Other reasons | NO | 42 (65.6) | 22 (34.4) | 0.526 |
| | YES | 2 (50.0) | 2 (50.0) | |

cases, the effectiveness of lifestyle changes alone in managing the condition diminishes it (19). Similarly, while long-term intermittent fasting may benefit individuals with acute coronary syndrome, patients with doxorubicin-induced dilated cardiomyopathy might respond better to short-term fasting. This highlights the variability in fasting's effects, which can differ significantly based on the underlying cause of cardiovascular disease and individual patient factors (20).

A Saudi Arabian study found intermittent fasting effective for short-term weight loss (under three months). Side effects were mild, requiring no medical intervention, and most participants reported significant weight loss and satisfaction (4). Similarly, in our study, the majority of participants viewed intermittent fasting positively; however, weight loss varied, with most individuals reporting slow weight loss. This variation could be due to the irregular practice of intermittent fasting. More consistent fasting practices could potentially yield more uniform weight loss results (21). Additionally, gender differences in metabolism and hormonal regulation may have contributed to the variation (22), as our sample included more females who generally have slower metabolic rates. This could also explain diverse outcome in weight loss.

A study examining Ramadan fasting among Thai participants found no changes in metabolic parameters before Ramadan, at the end of Ramadan, and one month post-Ramadan (23). In our study, only 11.6% reported no changes, while 13.0% indicated they experienced no weight loss during their intermittent fasting regimen.

The lack of noticeable changes could be due to an imbalanced diet during the eating window. To optimize results, a High Nutritional Quality Diet, based on the Mediterranean diet, is usually recommended for this period (24). This diet emphasizes anti-inflammatory foods and avoids processed items, focusing on whole grains, fresh fruits and vegetables (at least five servings per day), legumes, nuts, and daily olive oil use. Additionally, it prioritizes plant proteins and fresh fish over red meat. Notably, 72.5% participants in our study acknowledged

that consuming junk food during the eating periods could affect the outcome of intermittent fasting, while the remaining participants believed that the impact of junk food on results depended on the quantity consumed, arguing that as long as they maintain a caloric deficit, it may not significantly influence their results.

Some studies have concluded that fasting may have detrimental health effects on individuals with pre-existing conditions such as hypertension, high LDL cholesterol, elevated uric acid levels, hyperglycaemia, cardiovascular disease, and liver and kidney diseases (25–27). Those with these conditions may experience significant negative impacts on glycaemic control, insulin regulation, blood lipid profiles, weight management, and overall dietary intake. Additionally, research indicates that changes in dietary habits, physical activity, and sleep patterns during Ramadan fasting can adversely affect glycaemic control and blood lipid profiles (9,28). Although our study did not specifically examine the impact of pre-existing health conditions on metabolic parameters, it did address the negative effects related to mental health. While most participants reported positive experiences with intermittent fasting, some expressed concerns regarding sustainability, social interactions, energy levels, cravings, eating disorders, and hormonal balance. Interestingly, a portion of participants chose not to practice intermittent fasting, primarily due to negative perceptions and factors such as lack of knowledge, time constraints, and mood-related concerns.

Unhealthy dietary habits, significant cultural and environmental differences, circadian rhythm effects on the central and peripheral nervous systems, and pre-existing underlying health conditions collectively contribute to determining the health outcomes of intermittent fasting (29). If these factors are accounted for, it is possible that intermittent fasting can be viewed as a positive lifestyle approach, especially for those managing a chronic metabolic disease. Individualized considerations, education, and addressing concerns are crucial for promoting its safe and effective implementation. Further research and ongoing monitoring of health outcomes are recommended to refine guidelines for intermittent fasting practices.

Comparative analyses revealed a significant association between obesity and the practice of intermittent fasting, with 78.4% of obese participants reported engagement in it. Furthermore, among participants with chronic conditions, 91.2% reported positive changes after adopting intermittent fasting; additionally, 69.2% indicated that they had reduced their medication dosage (out of 20 participants on medication, 10% discontinued their medications due to the effects of intermittent fasting). These data highlight how intermittent fasting not only serves as a potential weight management strategy but may also lead to significant changes in how individuals manage their health conditions.

In conclusion, this study provides valuable insights into students' knowledge and practice of intermittent fasting. Although awareness is high, the actual practice is influenced by individual beliefs and attitudes. The identified association with obesity and the potential benefits for those with chronic conditions emphasize the necessity for further research and targeted health interventions within the university community.

AUTHOR CONTRIBUTIONS

Conceptualization, S.Z., M.D., F.T. and T.M.; methodology, S.Z., M.D., F.T. and T.M.; data curation, S.Z., M.D., F.T. and T.M.; writing – review and editing, S.Z., M.D., F.T., T.M. and N.Z.; supervision, J.S. All authors have read and agreed to the published version of the manuscript.

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