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ORIGINAL RESEARCH

Impact of Fasting on Physical Activity Motivation and Weight Reduction in Patients Administered Glucagon-Like Peptide-1 Agonists: A Qualitative Study

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Purpose: This study aims to investigate the possible impacts of fasting on physical activity and weight loss in adult users of glucagon-like peptide-1 (GLP-1) agonists, specifically semaglutide and tirzepatide, using qualitative methods to gain in-depth insights into participants' experiences and perceptions.

Patients and Methods: A qualitative study was conducted at the Polyclinic at King Faisal University, Al-Ahsa, Saudi Arabia, during and after Ramadan in 2024, along with the completion of International Physical Activity Questionnaires (IPAQs). The semi-structured interviews and the IPAQ were used to assess physical activity levels. A thematic narrative and framework analysis were used to analyze the data, and a descriptive analysis was performed on the IPAQ data. All participants provided their informed consent, and ethical approval was acquired. A total of 14 interviews were conducted. Five refined themes and 3 sub-themes were identified. The findings were presented in accordance with the COREQ (consolidated criteria for reporting qualitative research) guidelines.

Results: Ten participants, aged 18–59, were included in the study. Half used semaglutide, four used tirzepatide, and one used both, primarily for blood glucose regulation and weight reduction. The average body mass index (BMI) decreased from 35.246 to 34.155. However, a paired *t*-test showed this change was not statistically significant, suggesting that Ramadan fasting did not significantly impact BMI in participants.

Conclusion: The research indicated that the combination of GLP-1 agonists and physical activity influenced weight loss during fasting in Ramadan among the participants. These findings suggest that combining these medications with increased physical activity and fasting can effectively reduce BMI and improve overall health outcomes for individuals managing weight and chronic diseases over an extended duration.

Keywords: physical activity, glucagon-like peptide-1 agonists, semaglutide, tirzepatide, weight loss, Ramadan, qualitative study, thematic analysis

Introduction

Ramadan is the month of fasting for all Muslims. It is the ninth month of the Islamic lunar calendar and is observed by millions of Muslims worldwide as a period of fasting from dawn to sunset.[1] This fasting practice is defined as abstaining from food and drink during daylight hours, which can significantly influence various physiological processes and lifestyle behaviours. Fasting has many effects; its impact on body weight can be influenced by dietary changes, emotional states, alterations in physical activity patterns, and metabolic adaptations.[2]

Physical activity is critical in weight management and overall health. When fasting during Ramadan, individuals often experience shifts in their physical activity levels due to changes in daily routines and energy intake. The timing of

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exercise, coupled with fasting, can influence its effectiveness in weight loss and metabolic health. Research have shown that incorporating physical activity during Ramadan can mitigate some of the weight gain associated with fasting. However, the optimal type, intensity, and timing of exercise remain areas of ongoing investigation.[3]

Weight loss is a complex physiological process influenced by various factors, including diet, physical activity, metabolism, and medication. Research indicates that a caloric deficit, achieved through reduced caloric intake and increased physical activity, is essential for weight loss. Additionally, behavioural interventions and lifestyle modifications are critical for sustaining long-term weight management.[4] Emerging evidence also highlights the importance of individualized approaches considering genetic, hormonal, and psychological factors.[5]

Glucagon-like peptide-1 (GLP-1) agonists are a group of medications with an important role in managing type 2 diabetes and obesity. These medications enhance insulin secretion, inhibit glucagon release, and reduce appetite, leading to significant weight loss in clinical trials.[6] The effect of GLP-1 agonists on weight loss and physical activity during periods of fasting, such as Ramadan, has not been extensively studied. Given their mechanisms of action, GLP-1 agonists may offer potential benefits in managing weight during Ramadan and physical activity by counteracting some of the adverse metabolic effects of fasting. The systematic review and meta-analysis by Liu et al found tirzepatide to be more effective than placebo. They also found tirzepatide safe and well-tolerated and nausea, vomiting, and diarrhoea were common side effects, as with other GLP-1 receptor agonists.[7]

Research has shown that GLP-1 agonists, promote weight reduction, reduce inflammation, and enhance insulin sensitivity. Fasting and physical activity can synergistically enhance fat metabolism, improve muscle function, and increase insulin efficacy.[8] Moreover, GLP-1 agonists may also work in concert with fasting-induced alterations in gut hormones to further reduce appetite and increase energy expenditure. In general, achieving these benefits can be difficult as they depend upon individual factors, including the intensity of physical exertion and the duration of fasting.[8]

This research aims to explore the impacts of fasting on physical activity and weight loss in adult users of GLP-1 agonists. By assessing how these factors interact during a period of altered eating and exercise patterns, this study seeks to provide insights into effective strategies for weight management in this unique context. Understanding these interactions can contribute to optimizing health interventions and improving outcomes for individuals observing Ramadan.

Materials and Methods

Research Design

This study was based on interpretive phenomenology and sought to investigate the effect of fasting during Ramadan on those using weight loss agents (semaglutide or tirzepatide) and agreeing to perform physical activity, as well as comprehend and interpret the phenomenon through shared perceptions and experiences.[9] Semi-structured interviews were selected as the preferred method for data collection to obtain an extensive amount of information, especially regarding the experiences, attitudes, and beliefs of the interviewees.[10] Purposive selection was also employed to guarantee that the sample represented various patients who regularly visited the Polyclinic, King Faisal University, Al-Ahsa, Saudi Arabia.

The recruitment phone message was sent to all GLP-1 users, inviting them to participate in the study. Additionally, the King Faisal University Polyclinic Centre received copies of the promotional poster. Women aged over 18 with or without diabetes were deemed eligible for participation. Notably, informed consent was sought before conducting any interviews. The interview questions were developed after reviewing relevant literature and consulting with the project's supervisor. Two individuals who were Arabic-speaking and using GLP-1 were pilot-tested to evaluate the guide's clarity, cultural relevance, and acceptability. Interviewees were asked about the advantages and disadvantages of using GLP-1, as well as the variations in Ramadan fasting.

Furthermore, knowledge, motivation, and variations in physical activity before and after Ramadan were discussed. (See the Appendix for the interview guide). Two pilot interviews were conducted to ensure understanding and impartiality, which assisted in changing the interview guide.[9] In this study, 14 adults using weight reduction agents (semaglutide or tirzepatide) were recruited during their routine visits to the Polyclinic, King Faisal University, Al-Ahsa, Saudi Arabia. The visit during Ramadan occurred at the beginning of the month of Ramadan (4 May–27 June, 2024), and

the visit after Ramadan was arranged 2 weeks after the end of the month of Ramadan (29 June–13 July, 2024). A short version of the IPAQ was used to gauge the participants' level of physical activity at the beginning of Ramadan and at the start of the interview.[11] The semi-structured interviews were conducted face-to-face and lasted 30 minutes on average. All interviews were conducted in Arabic and recorded using a digital voice recorder in a private room within the Polyclinic. The nine interviews were completed, and no more were conducted due to data saturation.[12] The interview transcripts in Arabic were translated into English by NK and double-checked with the research team authors to ensure translation validity.

Additionally, a framework analysis and thematic narrative approach were developed based on the codes identified. The researcher coded all the transcripts, and the supervisor observed to ensure that the themes found were consistent and any differences were addressed and resolved. Transcripts of interviews were arranged and maintained by hand-coding.[13] The author and project supervisor independently coded and interpreted the data to ensure their credibility. This served as a basis for thoughtful discussions that improved the data reliability and provided a more thorough understanding. Disagreements over coding were settled to guarantee consistency in the interview technique, and independent coding and second readings of the transcripts were conducted.[14] The study was conducted according to the guidelines provided by the Consolidated Criteria for Reporting Qualitative Research (COREQ) (Appendix 1).[15]

Data Collection and Measurements

Demographic Data

Demographic data were collected using a self-report questionnaire during the first interview. Demographic data included age, gender, marital status, employment status, and duration of taking weight reduction agents.

Physical and Laboratory Measurements

During each period, participants' heights and weights were measured. The body mass index (BMI) was calculated for each participant using the ratio of weight (in kilograms) to height (in metres) squared.

Physical Activity

The self-report questionnaire was supplemented using the Arabic version of the short form of the IPAQ. Physical activity levels were categorized into low, moderate, or high based on the IPAQ Scoring Protocol (Short Form), which interprets the activity data into these distinct classifications.[1]

Data Analysis

Statistical analysis was performed using SPSS software version 25 (IBM Corporation, Armonk, NY, USA). Descriptive statistical analysis was applied for outcomes, where the mean ± standard deviation (SD) was used for normally distributed continuous variables, the median and interquartile range were used for non-normally distributed continuous variables, and counts and percentages were used for categorical variables. The normality of each continuous variable was assessed. For the normally distributed variable, a paired *t*-test was applied to compare two variables between the two periods, and a one-way ANOVA was used to detect variances between groups. A chi-square test was used to compare the variance in the proportion between categorical variables. If any cell of the chi-square test was less than 5, Fisher's exact test was conducted. The statistical significance level for all two-tailed tests was set at $p < 0.05$.

Results

A total of 14 responses were collected, with 10 meeting the criteria for inclusion in the study. These participants were aged 18–59 years. As detailed in Table 1, smoking was reported by four male participants, with no female participants indicating they smoked. Five participants had diabetes mellitus: three males and two females. Chronic disease prevalence within the group varied: two had hypertension, three were obese, one had hyperlipidaemia, and one had hypothyroidism. Five of the participants were using semaglutide (Ozempic), four were using tirzepatide (Mounjaro), and one participant was on both medications. The reasons for using these medications included blood glucose regulation, weight reduction, and both. Table 2 outlines the IPAQ scores, weights before fasting, and weights after the interview (post-fasting during Ramadan), along with the results of a paired *t*-test for all 10 participants. The average BMI decreased from 35.246 before

Table 1 Participants' Demographic Data

Participant	Age	Smoking	Do You Have Diabetes?	Chronic Disease	Medications Used	Reasons for Using the Medication
1	36–45	Yes	Yes	Other	Semaglutide (Ozempic)	To regulate glucose level
2	46–55	Yes	Yes	None	Semaglutide (Ozempic)	To regulate glucose levels and reduce weight
3	26–35	Yes	Yes	Obesity	Tirzepatide (Mounjaro)	To regulate glucose levels and reduce weight
4	46–55	No	No	Other	Semaglutide (Ozempic)	To reduce weight
5	36–45	No	No	None	Tirzepatide (Mounjaro)	To reduce weight
6	46–55	No	Yes	Hypothyroidism	Tirzepatide (Mounjaro) / semaglutide (Ozempic)	To regulate glucose level and reduce weight
7	18–25	No	No	Hypertension	Semaglutide (Ozempic)	To reduce weight
8	55+	No	No	Hyperlipidaemia	Tirzepatide (Mounjaro)	To reduce weight
9	36–45	Yes	Yes	Hypertension	Tirzepatide (Mounjaro)	To regulate glucose levels and reduce weight
10	18–25	No	No	None	Semaglutide (Ozempic)	To reduce weight

Table 2 Details of BMI and IPAQ Score the Study Participants

Participant	IPAQ Score Before	IPAQ Score After	BMI Before Interviewing	BMI After Interviewing
1	Low	Low	29.38	32.25
2	Low	High	32.01	28.96
3	Low	Low	39.31	38.31
4	Moderate	Moderate	35.75	31.64
5	Low	Low	36.89	35.57
6	Low	Low	36.45	35.25
7	High	Low	38.99	36.42
8	High	High	26.99	27.69
9	Low	Low	45.06	44.41
10	Moderate	Moderate	31.63	31.05

the interview to 34.155 afterwards. A paired *t*-test result of 0.119 indicated that the difference in BMI before and after Ramadan was not statistically significant, suggesting that fasting did not significantly impact the participants' BMI.

Through the process of conducting a thematic analysis, a total of five refined themes and 19 sub-themes were discovered (Table 3). Interviews were transcribed and coded for analysis into four themes: "Clinical benefits of use of GLP-1", which included the following sub-themes: "Effect of GLP-1 use on HgA1c" describing the effect of injection on HbA1C; "GLP-1's effect on appetite during fasting" observing the change in satiety during the two stages; "Additional health benefits of GLP-1 use" showing other advantages of use; "Adverse effects of using GLP-1" relating to unpleasant

Table 3 Refined Themes and Sub-Themes

Refined Themes	Sub-Themes
1. Clinical benefits of use of GLP-1	1.1. Effect of GLP-1 use on HgA1c
	1.2. GLP-1's effect on appetite during fasting
	1.3. Additional health benefits of GLP 1 use
2. Adverse effects of using GLP-1	
3. Variations in physical activity levels during Ramadan and after Ramadan	
4. General advice from GLP-1 users	

consequences of GLP-1; "Variations in physical activity levels during Ramadan and after Ramadan" showing the rate of exercise variance during Ramadan; and "General advice from GLP-1 users" reflecting participants' recommendations and reviews on use. These themes are discussed in order according to participants' consensus.

Clinical Benefits of Use of GLP-1

Effect of GLP-1 Use on HgA1c

This theme describes the glycaemic control changes caused by GLP-1. Participants 1, 2, 3, 4, 6, and 9 were diagnosed with diabetes and used GLP-1 medications to regulate their HgA1c levels and manage their diabetic condition. Conversely, participants 5, 7, and 8 used GLP-1 to treat obesity, aiming to facilitate weight loss.

Participants 1 and 3 reported that the primary benefit of GLP-1 use was diabetes management, assuming that their HgA1c readings remained stable during fasting periods. Conversely, P4 articulated that diabetes control was the principal benefit, supplemented by additional health advantages such as pain reduction. Participants 6 and P9 highlighted the alleviation of diabetic symptoms, including numbness and blurry vision: "my weight became stable, but I noticed symptoms of diabetes were reduced significantly and I am even no longer using my glasses". P2 and P6 mentioned that they were no longer diabetic: "thank God. I am relieved from diabetes, which is great". Thus, they demonstrated that GLP-1 administration improved their quality of life and helped diabetic individuals manage their HgA1c.

GLP-1's Effect on Appetite During Fasting

This theme focused on how fasting affects appetite and, in turn, causes weight reduction. P3 and P6 from the diabetic group clarified that their hunger did not alter during fasting and stated that they observed no distinction between using the injections during Ramadan and on ordinary days, as P6 said, "There is no difference between using the injections during Ramadan or on regular days". However, P1, P2, P4, and P9 noted a significant difference during food abstinence and said that prolonged fasting aided GLP-1, resulting in better and quicker effects in lowering their HgA1c: "With fasting, its effect starts quickly because you will fast for at least 12 hours, and at night your appetite will not be open". Furthermore, according to P9, this was more efficient than using it on a typical day. Consequently, compared to administering GLP-1 during non-fasting times, fasting increased GLP-1 efficacy and aided most individuals in reaching their HgA1c goal. Only P and P10, who used it to lose weight, reported that fasting increased their ability to reduce appetite, whereas P5 and P7 confirmed that no difference existed in GLP-1 consumption during fasting: "Appetite control stayed the same, and fasting did not affect it". Still, by extending satiety and promoting food abstention, fasting generally contributed to positive GLP-1 outcomes.

Additional Health Benefits of GLP-1 Use

Generally, participants predominantly used GLP-1 therapy to decrease their HgA1c levels and achieve weight loss; however, unexpected benefits were also noted during treatment. P3 remarked that emotional eating, rather than hunger satisfaction, significantly diminished due to the therapy. Moreover, P3, P6, and P10 exhibited indications of pain relief. P6 further elaborated that beyond pain management, the intervention had a notably beneficial effect on sleep quality, with

notable enhancements also observed during Ramadan fasting: "Mounjaro, which was milder with only light pain and no vomiting, and my sleep quality was not affected; Ramadan was better". Remarkably, P5 observed that GLP-1 might alleviate her colon spasms and cramping: "I do not know, maybe an improvement in the stomach". GLP-1 may thereby improve quality of life and lessen pain perception for IBD patients.

P9 and P10 noticed a dermatological improvement in their skin while receiving GLP-1 injections: "It also improved my skin's appearance, which my colleagues at work noticed". Additionally, P9 stated that GLP 1 enhanced his level of physical activity, saying, "Mounjaro helped increase my physical fitness and mobility". Better eating habits during Ramadan with GLP-1 use and appetite reduction may be linked to improvements in skin and physical activity. An additional advantage observed in P8 and P9 was a reduction in cholesterol levels: "The most important benefit for me was the drop in cholesterol levels". P6 explained that GLP-1 is a drug that changes lives, and she felt happier and more psychologically content: "My life has altered in many ways, and I feel much better. Since I began building a house, my mental health has significantly improved". Surprisingly, P10 reported that GLP-1 also assisted in controlling her menstrual cycle: "I noticed a particular benefit in regulating my menstrual cycle". P1, P2, P3, and P7 all affirmed that using GLP-1 provided no further benefits. In summary, GLP-1 may also improve mood, lower cholesterol, increase physical activity, and provide other health benefits.

Adverse Effects of Using GLP-1

This theme explored the potential adverse effects of GLP-1 use, including stomach pain, nausea, vomiting, and hair loss. P4 experienced hair loss and suffered from low iron and vitamin D deficiency: "The first drawback is hair loss. My hair has fallen out significantly, especially since I have low iron and vitamin D levels". The hair loss could be due to low iron or vitamin D deficiency, not GLP-1. Stomach pain was noted as a side effect by P4, P6, and P10: "I felt some pain, but I do not know if it was due to the treatment or not". P5 and P6 reported nausea. Additionally, P9 reported experiencing constipation and mood swings, which could be due to the lack of food intake. Conversely, participants P1, P2, P3, P7, and P8 reported no adverse effects and expressed satisfaction with their treatment. Although some participants experienced side effects, they found them tolerable and were satisfied with the results.

Variations in Physical Activity Levels During Ramadan and After Ramadan

This theme examined the differences in physical activity during compared to after Ramadan. Several participants, including P3, P4, P7 and P10, reported a decrease in physical activity during Ramadan. P4 stated, "Honestly, no. Ramadan's schedule was busy, and I did not find time to walk". Ramadan's schedule follows a different routine than other months, and people often fill their time with worship, struggling to manage their time. P7 said,

> Not really, because I do not exercise on the days I am fasting. Fasting does not affect physical activity much; the physical activity continues but decreases slightly.

Physical activities require energy, and people often feel more fatigued and lethargic during Ramadan than on other days due to the type of food they eat and the habits they adopt during this month. Conversely, P2 and P8 noted an increase in their exercise routines. P6 remarked, "No, but fasting in Ramadan increased my physical activity, and I did not feel any fatigue from it". This was because this participant adopted suitable food and habits during Ramadan, which helped him maintain better energy levels. P3 observed no change in physical activity levels between Ramadan and regular days. Finally, P1, P5, and P9 did not engage in exercise. Physical activity during Ramadan varies depending on individual habits and people's motivation to exercise regularly.

General Advice from GLP-1 Users

Currently, the use of GLP-1 for weight loss has gained considerable popularity in society. P6 stated, "I recommend it to anyone who needs to lose weight because it gives noticeable results, but the duration should not exceed 1 or 2 years to avoid other potential health issues. It's effective but not for long-term use, and I advise against continuous use to avoid side effects", cautioning that it is advisable to limit the use of GLP 1 to short durations due to potential side effects. P2

posited that those who have the time to exercise and do not have diabetes should refrain from using these injections, instead focusing on physical activity. GLP-1 is recognized as a primary method for managing diabetes. P3 stated,

> Yes, I recommend it as a treatment because it has benefited me a lot in terms of blood sugar. As for other aspects, I did not notice a significant difference, and I would like to emphasize the importance of monitoring blood sugar levels, as my latest reading was 6.1 while it was previously 6.8. A person may notice more benefits with exercise, but I do not recommend relying solely on the needle.

P3 endorsed the injections for blood sugar regulation, observing a reduction in A1c levels over time, although no significant impact on weight was noted. P4 advised that individuals should consult with a specialized physician when considering this treatment rather than purchasing it over the counter, stating,

> The most important thing is to follow up with a doctor and pay attention to one's overall health. It should not be taken just from the pharmacy without medical supervision.

This was essential to reduce the risk of potential side effects. P8 recommended combining the injections with fasting and exercise to enhance weight loss and improve overall mood, suggesting that this approach helped patients gain more benefits from the treatment. Individuals such as P1, P5, P6, P7, P9, and P10 advocated for using these injections for weight reduction, noting their efficacy in accelerating weight loss.

In conclusion, the study highlights the multifaceted benefits of GLP-1 use beyond its primary purpose of glycaemic control. Participants reported significant improvements in physical and mental health, enhanced quality of life, and better management of diabetic symptoms and weight loss, particularly during fasting periods such as Ramadan. However, users may experience varying adverse effects, including stomach pain, nausea, vomiting, hair loss, constipation, and mood swings, although many found these side effects tolerable. Physical activity during Ramadan varied among participants, influenced by individual habits and routines, with some maintaining or increasing their exercise levels.

These findings suggest that GLP-1 injections not only help manage diabetes but also provide various ancillary health benefits, enhancing overall well-being. Users recommend cautious and supervised use of GLP-1, highlighting its effectiveness for short-term treatment and advising a combination of medication, exercise, and medical consultation for optimal results.

Discussion

This study examined the combined effects of physical activity and GLP-1 agonists on weight loss in individuals observing Ramadan. The findings suggest that these interventions work synergistically to enhance weight reduction during fasting.

Prior research has demonstrated that GLP-1 agonists are effective in promoting weight loss and improving glycaemic control in individuals with obesity and type 2 diabetes mellitus.[16] The unique dietary restrictions and fasting patterns during Ramadan might influence the pharmacokinetics and pharmacodynamics of GLP-1 agonists.

Physical activity is a critical component of weight management and overall health. This study supports Shephard's[17] findings that regular exercise contributes to significant weight loss and improves metabolic health during fasting. Some of participants in our study indicated that they experienced a modest increase in motivation to engage in physical activity as a result of Ramadan's structured fasting schedule, similar to previous research on behavioural adaptations during this period.[18]

During fasting, a significant hormonal change is the fluctuation of appetite-regulating hormones, including ghrelin and leptin. Ghrelin, referred to as the "hunger hormone", generally rises during fasting, promoting appetite, whereas leptin, known as the "satiety hormone", declines, indicating the body to conserve energy.[19,20] Research demonstrates that Ramadan leads to a disruption in the circadian rhythm of hormones, attributable to altered eating patterns that concentrate food intake during nighttime hours. This disruption may result in modified metabolic responses, such as alterations in glucose tolerance and energy expenditure.[19,20] A study indicated that circadian misalignment significantly affected ghrelin levels, resulting in heightened hunger during fasting periods.[21]

The American Diabetes Association and European Association for the Study of Diabetes guidelines emphasize the importance of personalized care plans during Ramadan, including adjustments to physical activity and medication to ensure safety and efficacy.[22] This is particularly relevant for patients using GLP-1 agonists, as individualized adjustments can optimize weight loss and glycaemic control during fasting.[22]

Research on the impact of fasting on GLP-1 levels and lipid profiles indicates significant effects on these parameters. Haghighi et al[23] found that fasting affects GLP-1 hormone levels and lipid profile indices in obese and thin women, highlighting the complex relationship between fasting, hormonal regulation, and metabolic health. This supports the concept that combining Ramadan fasting with GLP-1 agonists can enhance weight loss and metabolic benefits.

The combination of GLP-1 agonists and physical activity appears to produce an additive effect on weight loss. This finding aligns with the hypothesis that GLP-1 agonists increase satiety, reduce appetite, complementing the calorie deficit induced by fasting, and exercise.[24] This dual approach may be more effective for weight management during Ramadan, as suggested by our participants' enhanced weight loss outcomes.

Participants also reported improved overall well-being and high satisfaction with the combined intervention. These subjective outcomes are crucial, as they indicate higher adherence rates and positive psychological impacts, essential for long-term weight management success.[25] Culturally tailored interventions, such as those adapted for Ramadan fasting, are vital for ensuring adherence and optimizing health outcomes in diverse populations.[26]

Limitations and Strengths

Despite these promising findings, this study has limitations. One limitation is the use of self-reported data, which can introduce bias or inaccuracies because participants may not always provide completely accurate or objective responses. Another limitation is the short study period, which may not allow for the detection of long-term effects or trends. While a small sample size is usually a limitation in many studies, this is not the case in qualitative research, where the goal is to achieve data saturation rather than a large sample size. Future research should include larger randomized controlled trials to confirm these findings and further explore the underlying mechanisms.

Conclusions

The study found that the use of GLP-1 agonists along with physical activity impacted weight loss during fasting in Ramadan among participants. These findings suggest that combining these medications with increased physical activity and fasting can effectively reduce BMI and improve overall health outcomes for individuals managing weight and chronic diseases.

Data Sharing Statement

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Ethics Approval

The study protocol was evaluated and approved by the Institutional Review Board at King Faisal University, Al-Ahsa, Saudi Arabia (Ethics Consent No. KFU-REC-2024-MAR-ETHICS2146) as well as study complies with the Declaration of Helsinki.

Consent to Participate and for Data Publication

Informed consent was obtained from each participant before enrollment in the study, including permission to publish anonymized responses and direct quotes.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in draughting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare no conflicts of interest.

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