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EFFECT OF A 90-DAY SATIETY-BASED BEHAVIORAL LIFESTYLE INTERVENTION ON WAIST CIRCUMFERENCE: A PROSPECTIVE LONGITUDINAL OBSERVATIONAL ANALYSIS

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ABSTRACT

Introduction

Central adiposity, assessed using waist circumference, is associated with increased metabolic and cardiovascular risks. Behavioral dietary interventions that promote satiety without strict caloric restriction may offer a sustainable approach to improving anthropometric outcomes in the long term.

Objective

To evaluate changes in waist circumference following participation in a structured 90-day satiety-based behavioral lifestyle intervention program among adult women over the course of the intervention period.

Methods

This study was conducted as a prospective longitudinal observational study during a structured 90-day behavioral lifestyle intervention program. The study included 120 adult female participants (aged ≥18 years) who completed the intervention program. A subset of 69 participants provided complete weekly waist circumference records for longitudinal trend analysis.

The intervention emphasized a satiety-based eating approach defined as a non-restrictive dietary pattern encouraging food intake until comfortable fullness without calorie counting or strict portion restriction. Waist circumference measurements were collected prospectively at baseline, weekly intervals throughout the intervention period, and at post- intervention assessment. Statistical analysis was performed using paired t-test, with statistical significance set at $p<0.05$.

Results

The satiety-based behavioral intervention demonstrated a significant reduction in waist circumference, decreasing from 40.43 ± 4.28 inches at baseline to 37.29 ± 4.61 inches at Day 91. The mean reduction in waist circumference was 3.14±2.77 inches, with a maximum observed reduction of 11.0 inches.

Longitudinal trend analysis demonstrated progressive reduction in waist circumference over the intervention duration. Paired t-test analysis confirmed statistically significant reduction in waist circumference following participation in the intervention program ($t(119) = 12.41$, $p < 0.001$).

Conclusion

This prospective longitudinal observational study demonstrated significant reduction in waist circumference following participation in a structured satiety-based behavioral lifestyle intervention program. Further controlled studies are warranted to validate and extend these findings.

Keywords: *waist circumference; central adiposity; satiety; behavioral intervention; longitudinal study; obesity*

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INTRODUCTION

Waist circumference is a reliable anthropometric measure for assessing central fat accumulation, a factor associated with a higher risk of metabolic and cardiovascular conditions [1-4]. Compared to BMI, waist circumference provides a more precise measure of abdominal fat distribution and is a key marker of overall health [1,2]. An increased waist circumference is consistently associated with elevated cardiometabolic risk [2,4].

Waist circumference is usually measured with a non-elastic measuring tape placed around the abdomen at the level of the umbilicus, with the individual standing upright. This approach is simple, non-invasive, cost-effective, and independent of height, and has been widely recommended for clinical and population-level assessment [3]. It is strongly correlated with Body Mass Index (BMI) and Waist-to-Hip Ratio (WHR), which makes it broadly useful in both clinical and community settings [1,3].

Lifestyle habits, particularly dietary patterns, play a significant role in influencing body composition and fat distribution. Traditional dietary interventions often rely on calorie restriction, fasting, or rigid control of food intake [5,6]. However, in real-world settings, adherence to such restrictive approaches is frequently limited, especially over longer durations [5]. This highlights the need for more flexible and sustainable strategies that can be integrated into daily life without causing significant disruption [5,7]. Behavioral interventions focusing on modifying eating habits have therefore gained increasing attention as effective long-term approaches for improving anthropometric outcomes and reducing health risks [5,7].

In recent years, advancements in digital technology have enabled the delivery of structured behavioral interventions through online platforms. These platforms facilitate continuous engagement, real-time monitoring, and personalized guidance, thereby improving adherence to lifestyle modifications [8]. The ability to maintain ongoing interaction and support may play a critical role in sustaining behavioral changes over extended periods [8].

Within this context, the present intervention utilized a satiety-based eating approach as an alternative to conventional restrictive dietary methods. Unlike traditional approaches, this method was designed to encourage participants to consume food until comfortable fullness while maintaining structured meal timing, without calorie counting or portion restriction. The concept of satiety, defined as the physiological sensation of fullness that signals the termination of eating, was applied as a practical behavioral strategy to improve adherence and sustainability [6,7]. By aligning eating behavior with internal hunger and fullness cues, this approach aimed to promote long-term consistency in dietary habits. Well-organized nutrition programs focusing on consistent meal schedules and allowing individuals to include their preferred or favorite meals can enhance sustainability by helping people incorporate healthy eating habits into their everyday lives with minimal disruption [5,7]. Previous research has predominantly focused on weight loss and body mass index (BMI) as primary outcomes; however, fewer studies have looked at how waist circumference changes over time in actual behavioral interventions [9-11]. Because central adiposity has clinical significance, assessing these changes is crucial [1,2,4].

The present prospective longitudinal observational study evaluated participant outcomes from the UnLOAD 90 Day Weight Loss Challenge, a structured behavioral lifestyle program designed exclusively for women to promote organized eating habits and consistent daily practices. The study evaluated changes in waist circumference among participants throughout the intervention period using prospectively collected participant data.

The objective of this study was to assess changes in waist circumference following participation in the 90-day behavioral lifestyle intervention program.

METHODS

Intervention (Program Structure)

Adult female participants from diverse global locations voluntarily enrolled in the UnLOAD 90-day structured behavioral lifestyle intervention program through online registration conducted via digital platforms and social media channels following payment of the predefined program enrollment fee.

The intervention program focused on promoting healthy eating behaviors, satiety-based dietary practices, meal regularity, and sustainable lifestyle modifications [5,7]. Participants received structured behavioral coaching and digital lifestyle support throughout the intervention period.

The intervention commenced with an orientation session conducted via the video conferencing platform Zoom, during which participants were informed about the program structure, behavioral expectations, and procedures for recording anthropometric data.

Continuous communication, participant monitoring, and behavioral support were provided prospectively throughout the intervention period through digital communication platforms including WhatsApp and telephone-based interactions. Participants received structured guidance regarding meal timing, eating behavior, and adherence to the intervention protocol during the 90-day intervention duration [8].

Participants followed a structured eating plan consisting of five daily meals, including breakfast, lunch, dinner, and two mid-meals. The dietary approach emphasized inclusion of participants preferred or familiar foods prepared according to their own taste preferences without enforced recipes, thereby reflecting habitual dietary practices while maintaining consistency within the structured intervention framework. Meals included a wide variety of commonly consumed foods such as mixed dishes, rice-based preparations, flatbread-based meals (e.g., paratha), pasta, sandwiches, hakka noodles, golgappa, and traditional foods such as idli and sambhar. This adaptable and non-restrictive dietary approach allowed participants to continue their usual dietary habits while adhering to a structured meal schedule, thereby supporting participant compliance and long-term sustainability [5,7].

The intervention program did not include restrictive dietary approaches such as intermittent fasting, calorie tracking, elimination diets, mandatory supplement use, herbal remedies, or specific alternative grain requirements (e.g., millets such as bajra, jowar, or ragi). Instead, participants continued their habitual dietary practices within a structured behavioral framework emphasizing staple foods, particularly wheat-based and white rice preparations. Additionally, no mandatory structured exercise program was prescribed, allowing participants to maintain their usual physical activity patterns. The intervention primarily emphasized structured meal timing, satiety-based eating behavior, behavioral consistency, and continuous digital lifestyle support delivered through online platforms [6,7,10,11]. Participant engagement and adherence were further supported through maintenance of
data confidentiality and secure handling of participant information, thereby encouraging accurate and consistent self-reporting throughout the intervention period.

STUDY DESIGN AND PARTICIPANTS

This present study was conducted as a prospective longitudinal observational study during five consecutive cycles (e33–e37) of the UnLOAD structured 90-day satiety-based behavioral lifestyle intervention program conducted between January 2025 and May 2025. These Program cycles (e33–e37) represented sequential intervention cohorts implementing the same standardized intervention framework, behavioral guidance principles, digital support structure, anthropometric measurement procedures, and follow-up duration. No major differences in intervention design, dietary guidance, participant monitoring procedures, or outcome assessment methods existed between the individual program cycles. Each Program followed same structured program, with each cycle implementing an identical satiety-based behavioral intervention model, standardized dietary guidance, participant support system, and uniform data collection methodology. Participants voluntarily enrolled in the UnLOAD behavioral intervention program through online registration following payment of the predefined program enrollment fee. Prior to enrollment, participants were provided with detailed information regarding the structure of the intervention, behavioral expectations, dietary guidance approach, and data recording procedures. Participation was entirely voluntary, and enrollment was based on participant willingness and interest in joining the structured lifestyle intervention program.

Across all five program cycles, a total of 667 participants enrolled in the intervention program. Of these, 120 adult female participants (aged ≥18 years) with complete baseline (Day 1) and post-intervention (Day 91) waist circumference data were included in the final analysis. Table 1 summarizes participant enrollment, availability of baseline and post-intervention data, and inclusion across the five consecutive program cycles.

Table 1: Enrollment and Data Availability Across Consecutive UnLOAD Program Cycles (e33-e37)

Program Cycle	Start Date	Total enrolled	Baseline Data (Day 1)	Final Data (Day 91)	Complete Data (Day 1 and Day 91)	Excluded Data	Included Data	All 12 Week Data
e33	02-Jan-2025	93	76	17	17	76	17	13
e34	01-Feb-2025	52	44	13	13	39	13	9
e35	01-Mar-2025	70	48	15	15	55	15	8
e36	01-Apr-2025	72	60	13	13	59	13	9
e37	01-May-2025	380	281	62	62	318	62	30
TOTAL		**667**	**509**	**120**	**120**	**547**	**120**	**69**

The baseline characteristics of the included participants comprised age, height, BMI, and waist circumference (inches). These details were recorded to describe the study population and to assess changes over time.

Inclusion and Exclusion Criteria

Adult female participants aged 18 years and older who were enrolled in one of the five consecutive 90-day intervention program cycles were considered eligible for inclusion in the present analysis. Inclusion additionally required availability of complete waist circumference data, including both baseline (Day 1) and final post-intervention (Day 91) measurements. Participants were also required to have complete baseline demographic and anthropometric information, including age, height, and Body Mass Index (BMI).

Participants were excluded from the analysis if they had incomplete or missing waist circumference measurements, particularly absence of either baseline or post-intervention data required for paired statistical analysis. Participants who discontinued participation before completion of the 90-day intervention period were additionally excluded from the final analysis. Pregnant women were also excluded because pregnancy-related physiological changes may independently influence anthropometric measurements and body composition outcomes.

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Data Collection and Measurements

Participants self-reported their waist circumference using a non-elastic measuring (tailor's) tape. To ensure measurement consistency, participants were provided with a standardized instructional video demonstrating the correct procedure for waist circumference assessment. Measurements were obtained at the level of the umbilicus while participants maintained a standardized standing posture. The measuring tape was positioned horizontally around the abdomen without compressing the skin. Participants recorded and submitted videos of their measurements through online forms throughout the intervention period, and these submissions were reviewed to verify adherence to the standardized measurement protocol. All measurements were recorded in inches.

Participant data were collected prospectively at baseline (Day 1), weekly intervals throughout the intervention period (Weeks 1–12), and at post-intervention assessment (Day 91).

The previously recorded participant dataset available for prospective analysis included weekly waist circumference measurements recorded in inches, along with baseline demographic and anthropometric variables including age and height. In addition, self-reported daily dietary intake records collected during routine program participation were available for analysis.

To improve consistency and reliability of anthropometric measurements, participants had been provided with standardized measurement instructions during routine participation in the intervention program. Participants were advised to perform waist circumference measurements under fasting conditions (empty stomach), preferably using consistent measurement techniques and time intervals, in order to minimize measurement variability and improve overall data consistency.

Outcome Measures

The primary outcome of the study was the change in waist circumference from baseline (Day 1) to the end of the intervention period (Day 91).

Changes in waist circumference were calculated using the following formula:

Waist Reduction = Initial Waist − Final Waist

Secondary observations included evaluation of weekly waist circumference trends, variability in individual participant responses, and distribution patterns of waist circumference reduction across the study population.

Statistical Analysis

Data were analyzed using Microsoft Excel software. Continuous variables were summarized using descriptive statistical measures including mean, standard deviation (SD), median, range, percentage reduction, and 95% confidence intervals (CI).

The change in waist circumference from baseline (Day 1) to Day 91 was calculated for each participant. The mean difference between baseline and post-intervention measurements was assessed using a paired t-test, which is appropriate for comparing two related measurements obtained from the same participants over time.

Paired t-test analysis was performed to compare baseline and post-intervention waist circumference measurements. The analysis demonstrated statistically significant reduction in waist circumference following participation in the intervention program (mean reduction = 3.14 inches, $t(119) = 12.41$, $p<0.001$).

Additional inferential statistical analyses included the following:

1.Analysis of Variance (ANOVA): ANOVA analysis was performed to further evaluate differences between baseline and post-intervention waist circumference measurements. The analysis demonstrated statistically significant variation between measurements obtained during the intervention period ($F = 29.78$, $p< 0.001$).

2.Wilcoxon Signed-Rank Test: Wilcoxon signed-rank testing was additionally performed as a non-parametric alternative to validate findings under non-normal distribution assumptions. The analysis confirmed statistically significant reduction in waist circumference following participation in the intervention program ($W=416$, $p<0.001$).

3.Effect size estimation (Cohen's d): Effect size estimation using Cohen's d demonstrated a large practical effect of the intervention on waist circumference reduction (Cohen's $d=1.13$).

4.Statistical significance threshold: Statistical significance was set at $p < 0.05$ for all analyses.

Descriptive analyses were performed to evaluate the following:

1. Weekly trends in waist circumference
2. Distribution of reduction across different ranges

The following calculations were used to quantify the changes in waist circumference:

1.Mean Reduction = Mean Initial Waist − Mean Final Waist

= 40.43 - 37.29 = 3.14 inches

2. Percentage Reduction = $\left(\frac{\text{Initial} - \text{Final}}{\text{Initial}}\right) \times 100$

$$= \left(\frac{40.43 - 37.29}{40.43}\right) \times 100 = 7.70\%$$

3.A paired t-test was used to determine whether the mean reduction significantly differed from zero.

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RESULTS

Participant Characteristics and Data Inclusion

A total of 667 participants enrolled across five consecutive program cycles (e33–e37) of the UnLOAD behavioral intervention program. Following exclusion of incomplete and incorrect records, 120 participants with complete baseline (Day 1) and post-intervention (Day 91) waist circumference measurements were included in the final analysis.

For weekly longitudinal trend analysis, a subset of 69 participants who provided complete weekly waist circumference measurements throughout the 12-week intervention period was included. Participants with incomplete intermediate weekly records were excluded from weekly trend evaluation but remained eligible for the primary baseline-to-Day 91 analysis.

The overall flow of participants through enrollment, data availability, exclusions, and final inclusion across the study is presented in Figure 1

Figure 1: Participant flow through the study

Participant Characteristics

The baseline and post-intervention anthropometric characteristics of the study population are presented in Table 2. The mean participant age was 48.56 ± 12.53 years. Mean Body Mass Index (BMI) decreased from 32.49 ± 5.58 kg/m² at baseline to 30.96 ± 5.53 kg/m² at Day 91. Mean waist circumference decreased from 40.43 ± 4.28 inches at baseline to 37.29 ± 4.61 inches at post-intervention assessment. Similarly, mean body weight decreased from 81.60 ± 13.00 kg at baseline to 77.73 ± 12.57 kg at Day 91.

Table 2: Characteristics of Participants (n = 120)

Variable	Mean ± SD	
	Baseline	Final
Age (years)	48.56 ± 12.53	-
BMI (kg/m²)	32.49 ± 5.58	30.96 ± 5.53
Waist Circumference (inches)	40.43 ± 4.28	37.29 ± 4.61
Weight (kg)	81.60 ± 13.00	77.73 ± 12.57

Change in Waist Circumference Following the Intervention

All participants demonstrated an overall reduction in waist circumference during the 90-day intervention period. The mean waist circumference reduction observed between baseline and Day 91 was 3.14 ± 2.77 inches, with a 95% confidence interval ranging from 2.64 to 3.64 inches. The maximum reduction observed was 11.00 inches, while the minimum recorded change was -4.55 inches, indicating variability in individual participant responses.

Comparison of baseline and post-intervention waist circumference measurements using paired samples t-test analysis demonstrated statistically significant reduction following participation in the intervention program (baseline: 40.43 ± 4.28 inches vs Day 91: 37.29 ± 4.61 inches; $t(119) = 12.41$, $p < 0.001$). Effect size estimation demonstrated a large practical effect of the intervention on waist circumference reduction (Cohen's $d = 1.13$).

Supplementary non-parametric analysis using Wilcoxon signed-rank testing additionally confirmed statistically significant reduction in waist circumference between baseline and Day 91 measurements ($W = 416$, $p < 0.001$).

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Additional ANOVA analysis comparing baseline and post-intervention waist circumference measurements also demonstrated statistically significant variation across measurement periods ($F = 29.78$, $p < 0.001$).
The average weight loss among participants was 3.88 ± 3.38 kg, with values ranging from a minimum of -5 kg to a maximum of 15.60 kg. The mean percentage reduction in body weight was 7.70 ± 6.46%. The percentage reduction in waist circumference ranged from -10.26% to 23.91%, reflecting variability in individual participant responses to the intervention program.
Participants additionally demonstrated a mean body weight reduction of 3.88 ± 3.38 kg during the intervention period, with values ranging from -5.00 kg to 15.60 kg. The mean percentage reduction in waist circumference was 7.70 ± 6.46%, with individual percentage reductions ranging from -10.26% to 23.91%.
Table 3 summarizes the anthropometric changes observed following the intervention program.

Table 3: Summary of Changes in Anthropometric Parameters Following the 90-Day Intervention Program (n = 120)

Parameter	Value
Mean Reduction in Waist Circumference (inches)	3.14 ± 2.77
95% Confidence Interval for Mean Waist Reduction (inches)	2.64 – 3.64
Maximum reduction in Waist Circumference (inches)	11.00
Minimum reduction in Waist Circumference (inches)	-4.55
Mean Weight Loss (kg)	3.880 ± 3.380
Minimum Weight Loss (kg)	-5.000
Maximum Weight Loss (kg)	15.600
Mean Percentage Waist Reduction (%)	7.70 ± 6.46
Minimum Percentage Waist Reduction (%)	-10.26
Maximum Percentage Waist Reduction (%)	23.91

Weekly Trend in Waist Circumference
Weekly longitudinal trend analysis was performed using data from 69 participants who provided complete weekly waist circumference measurements throughout the intervention duration.
Participants with incomplete weekly data were included in the primary baseline-to-Day 91 analysis (n = 120) but were excluded from weekly trend evaluation to ensure consistency of longitudinal data analysis.
Prospective analysis of weekly measurements demonstrated a gradual and progressive reduction in waist circumference across the 12-week intervention period, indicating steady improvement over time rather than abrupt short-term changes.
Figure 2 illustrates the weekly trend in waist circumference reduction observed from baseline through Week 12 of the intervention program.

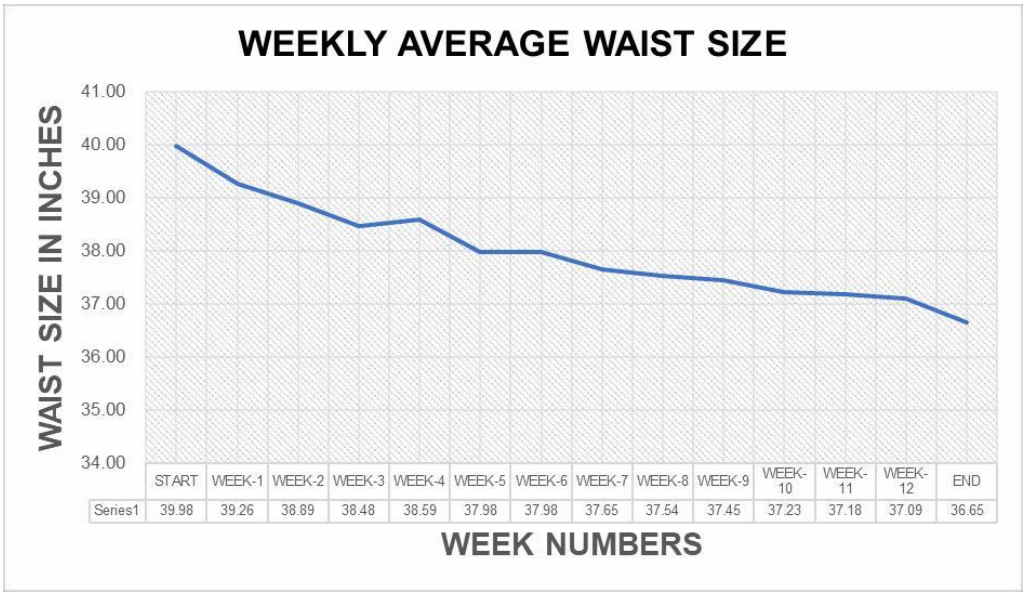

Figure 2. Weekly trend in waist circumference over the 12-week (baseline to Week 12) satiety-based behavioral intervention among participants (n = 69).

Distribution of Waist Circumference Reduction
The distribution of waist circumference change demonstrated variability in individual participant responses following the 90-day intervention program.
Eleven participants (9.2%) demonstrated no reduction or an increase in waist circumference (≤0 inches). Thirty-one

participants (25.8%) experienced reductions between >0 and ≤2 inches, while the majority of participants (46.7%) demonstrated reductions between >2 and ≤5 inches. Additionally, 21 participants (17.5%) achieved reductions between >5 and ≤10 inches, and one participant demonstrated a reduction greater than 10 inches.

Overall, 77 participants (64.2%) achieved reductions greater than 2 inches in waist circumference following completion of the 90-day intervention program.

Table 4 summarizes the distribution of waist circumference reduction across the study population.

Table 4: Distribution of Waist Circumference Reduction

Reduction range (inches)	Number of Participants (n)
≤ 0	11
> 0 to ≤ 2	31
> 2 to ≤ 5	56
> 5 to ≤ 10	21
>10	1

DISCUSSION

The present study demonstrated that a 90-day structured behavioral intervention focusing on satiety-based eating patterns and consistent meal timing was associated with significant reduction in waist circumference among participants. A mean reduction of 3.14 ± 2.77 inches was observed, indicating clinically relevant improvement given the established association between central adiposity and cardiometabolic risk [1-4]. Previous research has consistently shown that even modest reductions in waist circumference are associated with improvements in metabolic health and reduction in chronic disease risk [1,2,4].

Longitudinal analysis of participants with complete weekly follow-up data (n = 69) demonstrated progressive decline in waist circumference throughout the 12-week intervention period. This gradual reduction suggests sustained physiological and behavioral adaptation rather than an acute or transient effect, highlighting the importance of long-term adherence to structured lifestyle modifications. A major component of the intervention was the emphasis on satiety- based eating within a structured meal schedule. Unlike conventional restrictive dietary approaches relying on calorie counting or food exclusion, the present intervention emphasized internal hunger and fullness cues while maintaining regular meal timing. Similar flexible dietary strategies have previously been associated with improved adherence and long-term sustainability in behavioral weight management programs [5-7,10,11].

The intervention was delivered within a digitally supported behavioral framework that encouraged regular self-monitoring and participant engagement throughout the intervention period. Participants demonstrating greater consistency in program adherence appeared to experience more stable reductions in waist circumference, suggesting that behavioral compliance may substantially influence intervention outcomes. Self-monitoring and structured feedback mechanisms are recognized behavioral components that support accountability and long-term lifestyle modification [5,8]. Inter-individual variability in waist circumference reduction was observed across participants, which may be attributable to differences in baseline anthropometric characteristics, metabolic factors, lifestyle behaviors, and adherence levels. Despite this variability, the overall downward trend observed across the study cohort supports the effectiveness of the intervention at the population level [9].

The findings additionally reinforce the clinical relevance of waist circumference as an important anthropometric outcome measure because of its strong association with visceral adiposity and cardiometabolic risk [1-4]. Inclusion of multiple consecutive program cycles further supports the real-world applicability of the intervention approach. A major strength of the present study was its implementation within a real-world behavioral program setting, reflecting practical applicability outside controlled clinical environments. However, the absence of a control group limits causal inference, and reliance on self-reported or remotely monitored measurements may introduce measurement variability. Further controlled prospective studies are warranted to validate these findings and establish causal relationships.

LIMITATIONS

For the primary analysis, only participants with complete baseline (Day 1) and post-intervention (Day 91) measurements were included. Of the 667 enrolled participants, only 120 provided complete paired data suitable for analysis. This may introduce completion bias and limit generalizability of the findings to the broader enrolled population.

Additionally, only 69 participants provided complete weekly waist circumference records throughout the intervention duration and were therefore included in the longitudinal weekly trend analysis. Participants with incomplete intermediate weekly records were included in the primary baseline-to-post-intervention analysis but excluded from weekly trend evaluation, which may introduce reporting bias. Furthermore, reliance on self-reported anthropometric measurements may have introduced measurement variability despite the use of standardized measurement instructions. The absence of a control group limits the ability to attribute the observed changes exclusively to the intervention. Selection bias may also be present, as participants who completed the program and provided complete follow-up data may differ systematically from those who did not complete the intervention.

Future controlled prospective studies incorporating standardized objective measurement protocols, larger sample sizes, and more comprehensive follow-up procedures are warranted to further validate and extend the present findings.

CONCLUSION

The present study demonstrated that participation in a structured 90-day satiety-based behavioral lifestyle intervention was associated with statistically significant reduction in waist circumference among adult female participants. The intervention additionally resulted in improvements in body weight and Body Mass Index (BMI), suggesting favorable anthropometric changes following the program. These findings support the potential effectiveness of digitally delivered behavioral lifestyle interventions focused on satiety-based eating behaviors and structured meal regularity for improving central adiposity and related anthropometric outcomes in real-world settings. Further controlled prospective studies with standardized objective measurement protocols are warranted to validate and extend these findings.

Conflict of Interest

The behavioral lifestyle intervention program evaluated in this study was conducted under the UnLOAD platform. Some authors are professionally associated with the UnLOAD program through operational and/or administrative roles. These affiliations have been disclosed in the author information section. The authors declare that no external commercial funding was received specifically for conducting this research study and for the preparation of this manuscript. The authors declare that all analyses were performed using anonymized participant data collected during routine program operations. UnLOAD is a revenue-generating behavioral lifestyle and wellness program, of 90 Days duration, through which participants enrolled voluntarily following payment of a predefined program enrollment fee. The study was conducted as a prospective longitudinal observational analysis of participant data collected during routine program operations.

Ethical Considerations

This study was conducted as a prospective longitudinal observational analysis of data collected at predefined time intervals throughout the intervention program. Participation in the behavioral intervention program was voluntary, and adult participants enrolled through online registration as part of routine program participation. During the enrollment process, participants provided informed consent permitting the use of de-identified and aggregated program data for research, analysis, and publication purposes. Participant confidentiality and data privacy were maintained throughout the study, and no personally identifiable information were disclosed.

Author Contributions

The author was responsible for study conceptualization, data collection, statistical analysis, interpretation of findings, and manuscript preparation.

REFERENCES

1. Després JP. Body fat distribution and risk of cardiovascular disease: an update. Circulation. 2012;126(10):1301-1313. https://doi.org/10.1161/CIRCULATIONAHA.111.067264
2. Klein S, Allison DB, Heymsfield SB, et al. Waist circumference and cardiometabolic risk: a consensus statement from shaping America's health. Diabetes Care. 2007;30(6):1647-1652. https://doi.org/10.2337/dc07-9921
3. World Health Organization. Waist Circumference and Waist-Hip Ratio: Report of a WHO Expert Consultation. Geneva: World Health Organization; 2011.
4. https://apps.who.int/iris/handle/10665/44583
5. Ross R, Neeland IJ, Yamashita S, et al. Waist circumference as a vital sign in clinical practice: a consensus statement from the IAS and ICCR Working Group on Visceral Obesity. Nat Rev Endocrinol. 2020;16(3):177-189.
6. https://doi.org/10.1038/s41574-019-0310-7
7. Teixeira PJ, Carraça EV, Marques MM, et al. Successful behavior change in obesity interventions in adults: a systematic review of self-regulation mediators. Int J Behav Nutr Phys Act. 2015;12:84. https://doi.org/10.1186/s12966-015-0254-9
8. Bray GA, Heisel WE, Afshin A, et al. The science of obesity management: an endocrine society scientific statement. Endocr Rev. 2018;39(2):79-132. https://doi.org/10.1210/er.2017-00253
9. Garaulet M, Gómez-Abellán P, Alburquerque-Béjar JJ, et al. Timing of food intake predicts weight loss effectiveness. Int J Obes (Lond). 2013;37(4):604-611. https://doi.org/10.1038/ijo.2012.229
10. Carter MC, Burley VJ, Nykjaer C, Cade JE. Adherence to a smartphone application for weight loss compared to website and paper diary: pilot randomized controlled trial. J Med Internet Res. 2013;15(4):e32. https://doi.org/10.2196/jmir.2283
11. Beccuti G, Monagheddu C, Evangelista A, et al. Timing of food intake: sounding the alarm about metabolic impairments? A systematic review. Pharmacol Res. 2017;125(Pt B):132-141. https://doi.org/10.1016/j.phrs.2017.09.005
12. Davis R, Rogers M, Coates AM, Leung GKW, Bonham MP. The impact of meal timing on risk of weight gain and development of obesity: a review of the current evidence and opportunities for dietary intervention. Curr Diab Rep. 2022;22(4):147-155.
13. https://doi.org/10.1007/s11892-022-01457-0
14. Liu HY, Eso AA, Cook N, O'Neill HM, Albarqouni L. Meal timing and anthropometric and metabolic outcomes: a systematic review and meta-analysis. JAMA Netw Open. 2024;7(11): e2442163.https://doi.org/10.1001/jamanetworkopen.2024.42163