TPM Vol. 32, No. S5, 2025
ISSN: 1972-6325
https://www.tpmap.org/

A RETROSPECTIVE EVALUATION OF AN ONLINE WEIGHT LOSS PROGRAM COMBINING TRADITIONAL LIFESTYLE PRACTICES WITH EVIDENCE-BASED STRATEGIES

NISHADEVI BALAKANKATHARA THILAGAR[1,2]
[1]DEPARTMENT OF NUTRITION AND DIETETICS, MEENAKSHI ACADEMY OF HIGHER EDUCATION AND RESEARCH, CHENNAI, TAMIL NADU, INDIA,
[2]ERBA NUTRITION AND WELLNESS, CHENNAI, TAMIL NADU, INDIA.

SUREKA VARALAKSHMI[3*]
[3]DEPARTMENT OF RESEARCH, MEENAKSHI ACADEMY OF HIGHER EDUCATION AND RESEARCH, CHENNAI, TAMIL NADU, INDIA,

NIRAIMATHI KESAVAN[4]
[4]EVIDENTIA RESEARCH SOLUTIONS, CHENNAI, TAMIL NADU, INDIA.

VIDHUBALA ELANGOVAN[5]
[5]UVAKAI RESEARCH FOUNDATION, TIRUNELVELI, TAMIL NADU, INDIA.

Abstract:
Aim:Obesity is caused by many factors like dietary habits, reduced physical exertion, erratic sleep pattern, and stress. These are known to cause many chronic diseases and ailments. A multidimensional approach to weight loss that focuses on all the above factors is needed for weight loss. The present study aims to find the effect of an online weight loss program for women, that combines traditional lifestyle practices with evidence based strategies.
Methods: This is a retrospective study, using the data from a 13-week online holistic weight loss program conducted in the year 2023. The protocol focuses on improving the sleep pattern, eating pattern, wake up timing with caloric restriction, breathing exercises, resistance training and stress management, in addition to online yoga sessions thrice a week.
Results:Of the 45 women who participated in the program, data of 22 women was available for analysis. Statistically significant reduction in weight, body mass index, waist circumference, hip circumference and abdominal circumference was noted. All participants lost more than 5% of body weight within the 3-month period. The intensity of ailments and the number of ailments also reduced significantly during this period.
Conclusion:Online holistic lifestyle integrated weight loss programs can significantly improve the weight, girth and overall health of obese and overweight women.

Keywords: weight loss, online weight loss program, lifestyle intervention, obesity, holistic lifestyle.

INTRODUCTION:

Obesity, characterized by an abnormal accumulation of adipose tissue (1), is associated to many chronic disorders including chronic kidney disease (2), cardiovascular diseases (3), non-alcoholic fatty liver disease (4), type 2 diabetes (5), cancers (6), musculoskeletal diseases (7,8) and psychiatric disorders (9) which negatively affects subjects' quality of life and increases healthcare costs (10,11). Effects of obesity are greater among women compared to men, due to their smaller size and weight gain during pregnancy (12). It has been predicted that more than half of the population in the world (51% or more than 4 billion people) will be obese or overweight by 2035 if no significant action is taken to prevent and treat obesity. It is also predicted that prevalence of adult obesity with body mass index (BMI) >30 kg/m2) in India will grow at a growth rate of 5.2% between 2020 - 2035 (13).

Traditional weight management strategies often focus solely on reducing BMI and waist circumference, neglecting the holistic nature of individual well-being. Invasive techniques like bariatric surgeries and long-term usage of anti-obesity drug therapy are expensive, extremely challenging and are known to cause nutritional deficiencies, gastrointestinal side-effects (14) and long-term side effects, like cardiovascular-related issues like myocardial infarction, stroke and cancer (15,16).

The objective of maintaining a healthy weight and BMI must not happen at the expense of health. Health is more about leading a good quality of life, with the absence of aches and ailments. As the cause of obesity is multidimensional, a single dimensional approach to weight loss and reversing obesity is not desirable. Thus, a more cost-effective, non-invasive and long-term approach for the weight management of obese individuals, using a multifaceted intervention that is easy to follow, sustainable and have long term benefits with minimal or no side effects is highly recommended.

However, there are only few studies that have researched the effect of an integrated multifaceted approach on obesity. The National Weight Control Registry (17) has found that any weight loss that was achieved by sensible dieting, exercise, sensible dieting, low fat intake, and personal behavior changes could be maintained for prolonged periods of time. Previous research has highlighted the potential benefits of such holistic interventions in promoting sustainable weight loss and improving mental health outcomes (18,19).

In this study, we aimed at examining the comprehensive effectiveness of a 13 week online weight loss program combining ancient lifestyle wisdom and modern research to promote natural and effective weight loss among overweight and obese women. The present study focuses on assessing the applicability and effectiveness of a multidisciplinary strategy for weight loss.

MATERIALS AND METHODS

Study Design and Setting

This is a record-review intervention study of the data collected from a Nutritionist-led 3-month group-based online weight loss program (ERBA Wonder Women), conducted by ERBA Nutrition and Wellness, a Chennai, Tamil Nadu, India based Online Wellness Clinic, in the year 2023.

Holistic Lifestyle Intervention

The ERBA Wonder Women online weight loss program is a holistic weight loss program conducted exclusively for women. The primary objective of the program was to reduce the weight of the registered women in a healthy way, using a holistic multi-approach, without going to the gym and with minimal or no side effects. It focused on a holistic transformation, rather than just weight and girth measurements. The protocol of the program comprised of a 13-week module of Holistic Lifestyle - Integrated (HOLI) Intervention. The program was curated with guidance and approval from a team of experts in the fields of Ayurveda, Siddha, Yoga, Naturopathy, Nutrition, Physiotherapy and Psychology. The intervention's multi-faceted components, ranging from dietary adjustments to mindfulness practices such as yoga and breathing techniques, are designed to not only facilitate weight reduction but also to enhance overall health and well-being. The participants had access to live yoga sessions thrice a week by a certified yoga therapist. A detailed outline of the nutritionist-led HOLI Intervention protocol is presented in Table 1. Research findings related to the traditional practices used in the study are provided as Supplementary Material 1.

Table 1: 13-week Guidelines for diet, yoga and physical activity.

WEEK	Dietary Guidelines *	Physical Activity (online session)	PHYSICAL ACTIVITY (offline) **	Lifestyle Practices from traditional wisdom
Week 1	Detox with neem leaves and turmeric powder Usual vegetarian family meal for the rest of the day) Fruit Dinner	Seated joint loosening exercises	Hand lift with DB	Rub gums after brushing teeth Chew 32/64[a] times. Sit, stand Erect Deep Abdominal Breathing[d]
Week 2	Regular Breakfast and Lunch + Fruit Dinner	Standing joint loosening exercises	Standing - Leg - Side Lift (Right and Left)	Oil Pulling[c] on waking Deep Abdominal Breathing[d]
Week 3	Rice flakes + coconut and legumes BF Family Lunch Fruit, legumes, coconut Dinner	Lying – prone and supine joint loosening exercises	Seated Foot Raise + Palm Raise	Walking in Sunlight for 10mins Netra Shuddhi[b] (Eye wash with eye exercises using water in a bowl)

Week 4	Reduce carbohydrate foods by 1/3rd portion, and increase quantity of low carbohydrate fruits or vegetables for satiation. Have a protein rich food in every meal at minimum about 50% of protein needs (at 1 – 1.5 g/kg body weight).	Low intensity standing aerobic workout Relaxation	Half squat with foot apart and toes pointed out	Detox Water[e] Foot Massage with coconut oil before sleep[f]
Week 5	Same as week 4	Core Training Relaxation	Standing - Legs wide, hands back on hip, forward and backward bend x 10 rep	Nadi Shuddhi Pranayama[g]
Week 6	Same as Week 4	Standing Strength Training exercises with Dumbells Relaxation	Plank with elbows bent and on toes	Oil bath 2x a week Step Climbing 1 floor (minimum 18 steps) up and down 10x
Week 7	Whole fruits and vegetables and juices along with nuts (completely raw food week)	Whole body strength training Relaxation	Toe jump or Heel Raise with hands up in Tadasana posture	Online Therapy sessions for healing the inner child and the deepest wounds, forgiving oneself and others, incorporated with yoga session.
Week 8	Same as week 4 Weekly once Fruit Fasting	Breathwork and pranayama	Thoppukaranam aka Super Brain Yoga	Tripala Chooran ¼ tsp. with warm water before sleep.
Week 9	Same as week 4 One day Water Fasting	Seated Asanas Relaxation	Spot Jogging	Massage of fingers and palm
Week 10	Intermittent Fasting with 8 hour eating window	Standing Asanas Relaxation + Meditation	Side bending with DB	Face and ear massage
Week 11	Intermittent Fasting with an 8 hour eating window and weekly once fruit fasting	Prone and Supine lying asanas Relaxation	Cobra pose to mountain pose	Repeat previous practices
Week 12	Intermittent Fasting with 8 hour eating window and weekly once fruit fasting	Breathwork and Pranayama Relaxation	Surya Namaskaram / Sun Salutation	Repeat previous practices
Week 13	Intermittent Fasting with 8 hour eating window and weekly once fruit fasting	Breathwork and Pranayama Relaxation	All 12 practices	Repeat previous practices

Note:
* Quantity of intake was not mentioned in any of the diets and the participants were asked to stop eating according to their body's signal of satiety.
** All practices were started with 10 repetitions at a slower pace and the participants were guided by the researcher to increase repetitions to 50 by the end of the 3 months (25 repetitions and 2 sets) based on their comfort level. A new exercise was given every week and the participant must follow that exercise along with the ones given the previous week(s).

The participants were added to two groups – a main group to send the details of the plan (admin control) and another group for discussion and doubt clarification. The dietary plan for the upcoming week was shared at the end of the previous week, to facilitate purchase of groceries needed for the upcoming week. Daily motivation and guidance was given to the participants via social media group (WhatsApp) and the participants were motivated to share images of their food plates daily. In situations when the participant plate image was missing or some changes needed to be made in their dietary intake, the program coordinator informed the participant via text messages or phone calls. Good rapport was built within the participants and with the coordinator during the program, and the participants

reached out when they felt low or needed emotional support and motivation to follow the plan. Continuous reminders to do various activities of the plan were also sent as text messages in the main group every day.

All participant data collected in the year 2023 from two batches of the weight loss program was used and the participants with missing data were excluded in the final analysis (Figure 1). Of the 45 women who participated in the program in that year, 40 women (88.9%) completed the entire program. However, complete data of only 22 women (48.9%) was available for analysis. The reason for lack of data from almost half of the participants (18 incomplete data of 40 participants) who completed the program was due to negligence in updating their results.

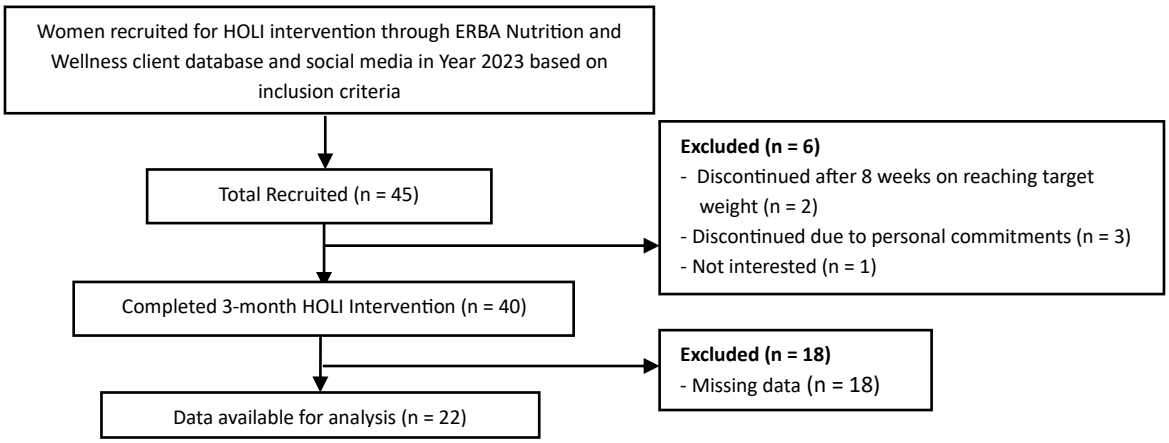

Figure1: Data Collected for analysis from the ERBA Wonder Women Weight Loss Program with HOLI Intervention Program

The objective of the program was to help overweight and obese women reduce weight and inches using the food they regularly consume, with some alterations and carbohydrate restrictions, along with lifestyle modifications, without the use of drugs and or surgery. The weight and girth measurements were measured by the participants themselves using their personal weighing scale and inch tape with online guidance from the nutritionist. The participants were provided with a list of ailments (including physical pain and minor symptoms) (Annexure 3) and were asked to enter the total number of ailments that they had at baseline and after 3 months of completing the program. A score of '1' was given for presence of any pain/ailment/symptom, without signifying the intensity of the pain/problem and a score of "0" for absence of pain or ailment. The total number of health issues present was given as the ailment score.

Statistical Analysis

Statistical analyses were performed using SPSS Version 25 for Windows. Data is expressed as mean ± standard deviation, values and percentages, as appropriate. Repeated measures of ANOVA was employed to assess the overall significance (at $p < 0.01$ level) of the effect of the HOLI Intervention weight loss program on the body weight, girth measurements and health risks of the participants. Student's 't' test was used to compare the changes before and after the intervention.

RESULTS AND DISCUSSION

In this record review study to understand the effect of a nutritionist-led 13-week online group weight loss program with holistic lifestyle integrated intervention, significant reduction in weight and girth measurements of the overweight and obese women was noted among those who completed the program. The selected cohort was not divided into groups for comparison due to irregularities in participant size.

a. Socio-Demographic Characteristics

Demographic characteristics of the participants are given in Table 1. The participants had an average age of 38.3 years ± 4.08years. The mean height of the participants was 157.4 ± 3.63 centimeter. A significant proportion of participants (59.1%) have obtained a professional degree, indicating a high level of education among the cohort. Smaller percentages of participants hold undergraduate (27.3%) or postgraduate (13.6%) degrees. About 63.6 % of the participants were employed and the rest (36.4%) were unemployed and full-time homemakers. All participants were married women, South Indians by origin, and lived in India (19 participants) or other countries (3 participants). More than three-quarters (81.8%) of the participants were non-vegetarians and 18.2% (4 participants) were vegetarians.

The distribution of participants according to age suggests that the weight-loss program attracted women predominantly in their late 30s and early 40s. The results show that married women with high level of education and working profile were following a lifestyle which caused weight gain, but however, they were interested in weight reduction. The absence of alcohol consumption and smoking among the participants shows that the health risk factor from these lifestyle practices is not present.

Table 1: Socio-demographic characteristics of women participating in the Holistic Lifestyle (HOLI) Intervention of ERBA Wonder Women - an Online Weight loss program conducted in the year 2023.

Characteristics	N	%	Mean ± SD
Total	22	100	-
Socio – demographic characteristics			
Age Group (years)			
31 – 35	6	27.3	38.3 ± 4.08
36 – 40	12	54.5	
41 - 45	3	13.6	
46 - 50	1	4.5	
Height (cm)			
	NA	NA	157.4 ± 3.63
Education			
Undergraduate	6	27.3	NA
Postgraduate	3	13.6	
Professional Degree	13	59.1	
Occupation			
Working	14	63.6	NA
Non-Working	8	36.4	
Marital Status			
Married	22	100	NA
Un-married	0	0	
Parity			
No children	3	13.6	NA
1 child	4	18.2	
2 children	15	68.2	
Dietary Preference			
Vegetarian	4	18.2	NA
Non-vegetarian	18	81.8	
Country of Residence			
India	19	86.4	NA
Other Countries	3	13.6	

NA – Not Applicable

b. Lifestyle Characteristics

The lifestyle characteristics of the participants are shown in Table 2. None of the participants reported consuming alcohol or smoking, indicating a predominantly non-alcoholic and non-smoking population enrolled in the program. A majority of the participants (72.7%) slept for 7 to 8 hours daily and about 50% mentioned disturbed sleep. Sunlight exposure was almost absent for a major percentage of participants (59.1%).

Table 2: Lifestyle characteristics of women participating in the Holistic Lifestyle (HOLI) Intervention of ERBA Wonder Women - an Online Weight management program conducted in the year 2023.

Characteristics	N	%
Total	22	100
Lifestyle characteristics		
Sleep (hours per day)		
5 - 6 hours	5	22.7
7 - 8 hours	16	72.7
> 8 hours	1	4.5
Sleep Quality		
Excellent	3	13.6

Good	7	31.8
Occasionally disturbed	10	45.6
Disturbed	2	9.1
Sunlight Exposure		
30 minutes/day	7	31.8
Only during weekends	2	9.1
Almost NIL	13	59.1
Alcohol		
Yes	0	0
No	22	100
Smoking		
Yes	0	0
No	22	100
Physical Exercise		
3 – 5 hours/week	6	27.3
Walking for 30min – 4x/week	1	4.5
No exercise	15	68.2
Personal Recreation Time		
1 hour/day	9	40.9
1 hour/week	1	4.5
3 – 5 hours/week	3	13.6
Few hours / year	6	27.3
None	3	13.6
Stress (0 – 10 VAS scale)		
0	2	9.1
1 - 4	3	13.6
5 - 7	14	63.6
8 – 10	3	13.6
Bowel Movement		
Perfect within 10 minutes of waking	8	36.4
Every day, timing differs	11	50
Constipated	2	9.1
Frequent diarrhoea	1	4.5

c. Diet Characteristics

The dietary characteristics of the participants are given in Table 3. A majority of the participants (81.8%) consumed a non-vegetarian diet and 27.3% reported to chew their food well before swallowing. Almost three-fourths (72.7%) of the women reported to not eat mindfully and 13.6% mentioned to consume food when they were hungry.

Table 3: Diet Characteristics of women participating in the Holistic Lifestyle-Integrated (HOLI) Intervention of ERBA Wonder Women - an Online Weight management program conducted in the year 2023.

Diet Preference		
Vegetarian	4	18.2
Non-vegetarian	18	81.8
Chewing Level		
Low	14	63.6
Moderate	2	9.1
High	6	27.3
Time taken to complete a meal		
2 – 5 minutes	2	9.1
5 to 10 minutes	7	31.8
10 – 15 minutes	7	31.8
15 – 20 minutes	6	27.3
Mindful eating		
Yes	6	27.3
No	16	72.7
Time of food intake		
When hungry	3	13.6
At meal time	10	45.5
Whenever felt like eating	9	40.9

Binge eating			
	Yes	19	86.4
	No	3	13.6
Frequency of eat outs			
	few times a week	8	36.3
	Many times, in a week	10	45.5
	Rare	4	18.2
Sweet cravings			
	Yes	9	40.9
	Occasionally	10	45.5
	No	3	13.6
Fruit Intake			
	Daily	5	22.7
	Few times a week	10	45.5
	Occasionally	7	31.8
Water Intake			
	< 1 litre	2	9.1
	1 – 2 litre	5	22.7
	2 – 3 litre	14	63.6
	4 litre	1	4.5

d. Weight Transformation

The weight and girth measurements of the participants (Table 4) were checked at baseline and at the end of the 1st, 2nd and 3rd month of the program. The baseline weight 78.10 ± 10.85 kg reduced to 74.52 ± 10.72 in the 1st month, which further reduced to 71.91 ± 10.89 kg in the 2nd month and was 69.61 ± 10.41 kg in the 3rd month. All the participants lost more than 5% of their baseline body weight in 3 months. About 40.9 % of the participants reduced 5 -10% of their body weight, 50% of the participants reduced 10 – 15% of their weight, and 9.1 % of the participants have lost > 15% of their baseline weight at the end of 3-months. Repeated measures of ANOVA showed a significant reduction ($F=120.257$, $p<0.01$) in the total body weight of all the participants over the 3-month period (Figure 2). The BMI was 31.45 kg/m^2 (SD, 3.63) at baseline which then reduced to 30.01 kg/m^2 (SD, 3.60) by the end of 1st month, to 28.95 kg/m^2 (SD, 3.65) by the end of the 2nd month and further decreased to 28.01 kg/m^2 (SD, 3.45) by the 3rd month of the weight loss program. The mean change in BMI over the 3 months of the intervention was 3.42 kg/m^2 (SD, ± 0.88) which was significant ($F= 108.419$; $p < 0.01$) (Figure 3).

Table 4: Changes in body composition over 3 months in women participated in Holistic Lifestyle Intervention (HOLI) of ERBA Wonder Women - an Online Weight management program conducted in the year 2023.

Body Composition	Time Period	Mean ± SD		Change in 3 months (Mean ± SD)		F/t Value
Weight						
	Baseline	78.10	± 10.85	8.48	± 2.07	F= 120.257*
	In 1 month	74.52	± 10.72			
	In 2 months	71.91	± 10.89			
	In 3 months	69.61	± 10.41			
BMI[a]						
	Baseline	31.45	± 3.63	3.42	± 0.88	F= 108.419*
	In 1 month	30.01	± 3.60			
	In 2 months	28.95	± 3.65			
	In 3 months	28.01	± 3.45			
Waist Circumference						
	Baseline	94.63	± 10.17	9.84	± 3.31	F= 77.323*
	In 1 month	89.72	± 9.20			
	In 2 months	86.82	± 9.35			
	In 3 months	84.79	± 9.29			
WHR[b]						
	Baseline	0.79	± 0.06	0.001	± 0.03	F= 1.052**
	In 1 month	0.79	± 0.07			
	In 2 months	0.80	± 0.07			
	In 3 months	0.79	± 0.07			

WHtR[c]					
	Baseline	0.60	± 0.06		
	In 1 month	0.57	± 0.05	0.06	± 0.02	F= 73.363*
	In 2 months	0.55	± 0.05		
	In 3 months	0.54	± 0.05		
Abdominal Circumference					
	Baseline	101.87	± 12.22		
	In 1 month	95.89	± 10.99	11.93	± 4.02	F= 66.926*
	In 2 months	92.51	± 11.26		
	In 3 months	89.92	± 11.54		
Chest Circumference					
	Baseline	99.71	± 9.26		
	In 1 month	97.16	± 8.81	7.05	± 3.59	F= 37.921*
	In 2 months	94.75	± 8.79		
	In 3 months	92.66	± 8.67		
Hip Circumference					
	Baseline	110.41	± 7.73		
	In 1 month	105.89	± 8.01	9.58	± 3.30	F= 62.656*
	In 2 months	102.09	± 7.83		
	In 3 months	100.84	± 7.02		
Mid-Thigh Circumference					
	Baseline	57.34	± 5.68		
	In 1 month	54.46	± 5.48	6.52	± 3.04	F= 35.270*
	In 2 months	52.16	± 5.34		
	In 3 months	50.82	± 5.46		
Mid-Calf Circumference					
	Baseline	39.51	± 5.36		
	In 1 month	37.67	± 5.39	4.42	± 2.37	F= 24.644*
	In 2 months	35.98	± 4.93		
	In 3 months	35.09	± 5.46		
MUAC[d]					
	Baseline	32.94	± 3.43		
	In 1 month	31.24	± 3.25	3.45	± 1.89	F= 24.250*
	In 2 months	30.02	± 2.74		
	In 3 months	29.47	± 2.92		
Ailment Score					
	Baseline	15.59	± 9.184	9.64	± 7.23	t = 6.248*
	In 3 months	5.95	± 4.370		

[a] Body Mass Index
[b] Waist – Hip Ratio
[c] Waist – Height Ratio
[d] Mid – Upper Arm Circumference
* $p < 0.01$
** $p < 0.05$

e. Changes in Girth Measurements

Significant reduction in girth measurements were found in all participants over the 3-month period of the program (Table 4; Figures 4-12). WC reduced from a mean of 94.63 cm (SD, 10.17) at baseline to 84.79 cm (SD, 9.29) by the end of 3-months with an average overall reduction of 9.83 cm (SD, 3.31). Using the repeated measures of ANOVA, it was seen that these changes were significant at $p < 0.01$ ($F = 77.323$). The mean AbC of the subjects was 101.87 cm (SD, 4.02) at baseline, which reduced to 95.89cm by the 1st month, 92.51 cm by the end of the 2nd month and further reduced to 88.92cm by the end of the program. Repeated measures of ANOVA showed significance at $p < 0.01$ ($F = 66.926$).

The participants had reduced on an average 9.58cm in HC in 3-months which was significant at $p < 0.01$ ($F = 62.656$). Around 7.05cm of chest circumference (SD, 3.59) was reduced from baseline in the 3 months of intervention and the results were significant at $p < 0.01$ level ($F = 37.921$). On an average, the participants reduced 6.52cm (SD, 3.04) at the mid-thigh circumference, 4.42cm at the mid-calf circumference and 3.45cm (SD, 1.89) at the mid-upper arm circumference, which were all shown to be significant at $p < 0.01$ level, using repeated measures of ANOVA ($F = 35.270, 24.644,$

24.250 respectively for the Mid-thigh, Mid-calf and mid-upper arm circumference). WHR and WHtR which are measures of central adiposity, also showed significant improvements at $p < 0.01$.

f. Changes in Health-related Risks

Based on the WHO classification of obesity, at baseline, 36.4% of the participants were in the overweight category, 54.5% in Obese Class I, 4.5 % in Obese class II and 4.5% in Obese class III. Table 5 shows the shift among the participants' level of obesity at the end of the 3rd month. A few participants (4.5 %) moved from Obesity Class III to Obesity Class II, 4.5% moved from Obesity Class II to Obesity Class I category, and 18.2 % reached the normal weight category from the Overweight category. The percentage of participants in Obese Class I category at baseline was 54.5 % which was then reduced to 13.6% at the end of the 3 months, of which 4.5 % of the participants had come from the obese class II category.

At baseline, about 68.2% of the participants had a WC of 90 – 109cm which was at high-risk category and reduced gradually to 40.9% in 1st month, 36.4% in the 2nd month and 9.1% at the end of the 3rd month. The shift was from the high-risk category to the low-risk category. Participants who fell in the at-risk category with WHR ≥ 0.86 were 22.7% at baseline and it reduced to 13.6% at the end of the 3rd month. With regard to waist-height ratio, 100% of the participants were in the high-risk category at baseline, with no participants in the low-risk category. At the end of the 3rd month, 18.2% of the participants were in the low-risk category, while the others (81.8%) were in the high-risk category.

g. Changes in ailment score

The number of ailments present in the study participants ranged from 0 to 31 at baseline. The mean ailment score that describes the number of chronic pain areas and ailments present in an individual, was 15.59 ± 9.18 at baseline. It further reduced to 5.95 ± 4.37 ($p<0.01$) in the 3 month period (Figure 2).

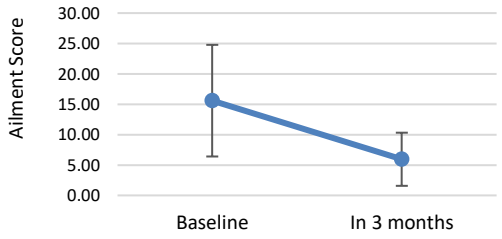

Figure 2: Rate of change in mean Ailment Score present over a 3-month period of Holistic Lifestyle Intervention in ERBA Wonder Women - an online weight management program conducted in the year 2023.
Note: Repeated measures ANOVA F= 108.419 ; $p < 0.01$

h. Other changes

Apart from 2 women, all other participants mentioned improvement in their skin tone ranging from good to very good improvements. In addition feedbacks like feeling calmer, feeling more positive and gained confidence was also received.

i. Attendance for online program

Almost 86.4 % of the participants regularly attended the online yoga sessions or practiced using the live recordings. About 9% of the women attended about 50% of the sessions. Only 4.5% couldn't practice most of the sessions.

j. Discomforts, allergies and food cravings during the program

About 59.1% of the women did not experience any discomfort during the program, however, a few participants mentioned occasional low energy levels, feeling sleepy or tired in the 1st week, did not like eating raw vegetables and difficulty in preparing the mind for the program. One person had mentioned to have difficulty following the one-day water fast in Week 9. Approximately 95.4% of the women participants did not have any allergic reaction. One participant mentioned to have severe common cold. While concerning food cravings. 4 participants mentioned craving for carbohydrate rich diet, 2 participants for hot coffee or tea, while a major number of 16 women stated that they did not have any food craving throughout the 3 months.

To the best of our knowledge, this is the first study to demonstrate an online weight loss program that evaluated the changes in the participant's health risks and girth measurements from seven various parts of the body. The changes in weight and other girth measurements have been significant; however, whether loss in weight was due to loss of muscle mass or fat was not known. Although muscle strength was not measured, it must be noted that weight loss has occurred along with considerable inch loss which shows that muscle loss could not have occurred as strength training was part of the protocol; however, no test was done to check muscle mass and muscle strength before and after the 3-month period. As the data collected was from an online weight loss program, focus was more on weight and inch loss and the muscle mass and muscle strength were not checked. In addition, follow-up data after completion of the program are not available.

In accordance with our results, participants in the Growing Old Together Study (20) significantly reduced abdominal mass by reducing caloric intake by 12.5% and a 12.5% increase in energy expenditure with exercise in 13 weeks, which was associated with an increase in HDL diameter and decreased concentration of circulating glycerol (21). All the participants in the present study lost >5% of their baseline bodyweight. These findings may be due to the continued support and regular online sessions provided as a part of the weight loss program, studied here. It is estimated that moderate weight loss of 5–10% is sufficient for health improvement (22). Waist circumference significantly decreased over the 3-month period, indicating reductions in abdominal fat deposition. However, the waist-to-hip ratio (WHR) remained relatively stable throughout the intervention, suggesting that changes in waist circumference were proportionate to changes in hip circumference. Waist-to-height ratio (WHtR) significantly decreased over the intervention period, indicating reductions in central adiposity relative to height. Abdominal circumference also showed significant decreases, further supporting the reduction in abdominal fat deposition among participants.
The level of weight loss in our study were higher compared to women participants of another lifestyle intervention (23) with about 3.8 ± 1.4kg loss in baseline weight, −2.7 ± 6 cm reduction in waist-circumference and −1.7 ± 0.6/m2 reduction in BMI.
This study has brought to light that a holistic lifestyle intervention in addition to reducing weight and girth measurements brings about a significant reduction in minor ailments, symptoms, aches and pains. The significant improvements in body composition parameters indicate the potential of online weight loss programs to facilitate meaningful changes in health outcomes among women participants.

Limitations:
Since only participants with complete data were included in this study, it was not possible to determine the overall adherence rate to the online program. Data of muscle strength of the participants before and after was not taken. Level of specific ailments that reduced or the level of reduction in pain or the ailment during the intervention period was not available. The sample size of 22 may be relatively small, limiting the generalizability of findings to larger populations. The data is self-reported and may be subject to biases or inaccuracies.

Future Research:
Future research endeavors could explore the long-term sustainability of these improvements, identify factors influencing program retention and engagement and evaluate the scalability of the intervention in diverse populations. The effect of the intervention on adult men and their sustainability can also be studied. Muscle strength and mass can also be measured. More standardized scale to measure pain and ailments can be used. Relationship between socio-demographic factors and program outcomes, such as weight loss success, adherence to dietary guidelines, and lifestyle changes can also be explored. Healthcare practitioners and policymakers can draw insights from these findings to develop tailored interventions aimed at addressing obesity and promoting holistic approaches to weight management and for the prevention of non-communicable diseases.

CONCLUSION

In conclusion, the study highlights the transformative impact of the HOLI Intervention in alleviating obesity-related health risks among women, emphasizing the importance of comprehensive lifestyle interventions that combine traditional practices with evidence based strategies in promoting long-term health and well-being. These findings have implications for research, practice, and policy aimed at combating the global obesity epidemic and improving population health outcomes.

Author Contributions
NBT: Principal investigator and corresponding author, conception / design of the protocol, intervention head, acquisition of data, data analysis / interpretation, drafting / critically reviewing the paper, giving approval for the final version to be published.
SV, NK, EV: role of mentor, data analysis, interpretation of data, drafting / critically reviewing the paper, giving approval for the final version to be published.

Acknowledgements:
The authors extend their sincere thanks to all women who participated in the weight loss program.

Declaration of Conflicting Interests:
The principal investigator is the provider of the paid program from which data were collected. The women participated in the program voluntarily, and their consent was obtained prior to registration for the use of anonymized data in this research. The article is an original work and none of the authors have any conflicts of interest to disclose concerning this study. This work was previously presented as a poster at the 4th International Electronic Conference on Nutrients (IECN 2024), 16 – 18 October 2024 (24) .

Funding: The author(s) received no financial support for the research, authorship, and/or publication of this article.

REFERENCES

1. Yang M, Liu S, Zhang C. The Related Metabolic Diseases and Treatments of Obesity. Healthcare [Internet]. 2022;10(9). Available from: https://www.mdpi.com/2227-9032/10/9/1616
2. Stasi A, Cosola C, Caggiano G, Cimmarusti MT, Palieri R, Acquaviva PM, et al. Obesity-Related Chronic Kidney Disease: Principal Mechanisms and New Approaches in Nutritional Management. Front Nutr. 2022;9:925619.
3. Powell-Wiley TM, Poirier P, Burke LE, Després JP, Gordon-Larsen P, Lavie CJ, et al. Obesity and Cardiovascular Disease: A Scientific Statement From the American Heart Association. Circulation. 2021 May 25;143(21):e984–1010.
4. Godoy-Matos AF, Silva Júnior WS, Valerio CM. NAFLD as a continuum: from obesity to metabolic syndrome and diabetes. Diabetol Metab Syndr. 2020;12:60.
5. Saisho Y. β-cell dysfunction: Its critical role in prevention and management of type 2 diabetes. World J Diabetes. 2015 Feb 15;6(1):109–24.
6. Zhang C, Liu S, Yang M. Hepatocellular Carcinoma and Obesity, Type 2 Diabetes Mellitus, Cardiovascular Disease: Causing Factors, Molecular Links, and Treatment Options. Front Endocrinol. 2021;12:808526.
7. Higgins DM, Buta E, Heapy AA, Driscoll MA, Kerns RD, Masheb R, et al. The Relationship Between Body Mass Index and Pain Intensity Among Veterans with Musculoskeletal Disorders: Findings from the MSD Cohort Study. Pain Med Malden Mass. 2020 Oct 1;21(10):2563–72.
8. Walsh TP, Arnold JB, Evans AM, Yaxley A, Damarell RA, Shanahan EM. The association between body fat and musculoskeletal pain: a systematic review and meta-analysis. BMC Musculoskelet Disord. 2018 Jul 18;19(1):233.
9. Perry C, Guillory TS, Dilks SS. Obesity and Psychiatric Disorders. Nurs Clin North Am. 2021 Dec;56(4):553–63.
10. Morosanu A, Morosanu M. Relations between food intake, weight status and cardio-metabolic disturbances in area representative group. Metab - Clin Exp [Internet]. 2022 Mar 1 [cited 2024 Dec 10];128. Available from: https://doi.org/10.1016/j.metabol.2021.155022
11. Vityala Y, Tagaev T, Zhumabekova A, Mamatov S. Evaluation of metabolic syndrome, insulin secretion and insulin resistance in adolescents with overweight and obesity. Metab - Clin Exp [Internet]. 2022 Mar 1 [cited 2024 Dec 10];128. Available from: https://doi.org/10.1016/j.metabol.2021.155011
12. Meldrum DR. Introduction: Obesity and reproduction. Fertil Steril. 2017 Apr;107(4):831–2.
13. World Obesity Federation. World Obesity Atlas 2023 [Internet]. 2023. Available from: https://data.worldobesity.org/publications/?cat=19
14. Hasan NA, Freije A, Abualsel A, Al-Saati H, Perna S. Effect of Bariatric Surgery on Weight Loss, Nutritional Deficiencies, Postoperative Complications and Adherence to Dietary and Lifestyle Recommendations: A retrospective cohort study from Bahrain. Sultan Qaboos Univ Med J. 2020 Aug;20(3):e344–51.
15. Zhang Y, Yu J, Qiang L, Gu Z. Nanomedicine for obesity treatment. Sci China Life Sci. 2018 Apr;61(4):373–9.
16. Coulter AA, Rebello CJ, Greenway FL. Centrally Acting Agents for Obesity: Past, Present, and Future. Drugs. 2018 Jul;78(11):1113–32.
17. Thomas J, Bond D, Hill J, Wing R. The national weight control registry: A study of "successful losers." ACSMs Health Fit J. 2011 Mar;15:8–12.
18. Daubenmier J, Lin J, Blackburn E, Hecht FM, Kristeller J, Maninger N, et al. Changes in stress, eating, and metabolic factors are related to changes in telomerase activity in a randomized mindfulness intervention pilot study. Psychoneuroendocrinology. 2012 Jul;37(7):917–28.
19. Miller CK, Kristeller JL, Headings A, Nagaraja H, Miser WF. Comparative effectiveness of a mindful eating intervention to a diabetes self-management intervention among adults with type 2 diabetes: a pilot study. J Acad Nutr Diet. 2012;112 11:1835–42.
20. van de Rest O, Schutte BAM, Deelen J, Stassen SAM, van den Akker EB, van Heemst D, et al. Metabolic effects of a 13-weeks lifestyle intervention in older adults: The Growing Old Together Study. Aging. 2016 Jan;8(1):111–26.
21. Beekman M, Schutte BAM, Akker EB van den, Noordam R, Dibbets-Schneider P, de Geus-Oei LF, et al. Lifestyle-Intervention-Induced Reduction of Abdominal Fat Is Reflected by a Decreased Circulating Glycerol Level and an Increased HDL Diameter. Mol Nutr Food Res. 2020 May;64(10):e1900818.
22. Zomer E, Gurusamy K, Leach R, Trimmer C, Lobstein T, Morris S, et al. Interventions that cause weight loss and the impact on cardiovascular risk factors: a systematic review and meta-analysis. Obes Rev Off J Int Assoc Study Obes. 2016 Oct;17(10):1001–11.
23. Zhou M, Zhang N, Zhang Y, Yan X, Li M, Guo W, et al. Effect of mobile-based lifestyle intervention on weight loss among the overweight and obese elderly population in China: a randomized controlled trial. Int J Environ Res Public Health. 2021;18(16):8825.