

**PREVALENCE OF WEIGHT LOSS MAINTENANCE SUCCESS IN  
PREVIOUS PARTICIPANTS OF A COMMERCIAL WEIGHT LOSS  
PROGRAMME IN ACCRA, GHANA**

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## ABSTRACT

Overweight and obesity are major risk factors for a number of non-communicable diseases such as type 2 diabetes, hypertension, stroke, heart attack and others. Intentional weight loss has been widely documented as an effective way of reducing the risk of such chronic diseases. As a result of the positive health consequences of weight reduction, many people all over the world are attempting weight loss to reap these health benefits. Common methods being used to achieve weight loss include self-help measures and structured programmes such as commercial weight loss programmes. Although commercial weight loss programmes are increasingly being patronised, little is known about the long-term outcomes of such programmes. The purpose of this study was to ascertain the prevalence of weight loss maintenance success in previous participants of a commercial weight loss programme in Accra, Ghana, who had been out of the weight loss programme for a median period of 4.75 years. A cross-section of 230 participants were randomly selected for this study. Baseline and end-line anthropometric data, length of stay in the programme and post treatment time were extracted from the programme's database. Weight measurements taken at follow up were used in calculating the percent weight loss at follow up. Successful weight loss maintenance was defined as achieving at least five percent weight loss below baseline weight at follow up otherwise unsuccessful. Comparisons of successful weight loss maintainers (SWLM) and unsuccessful weight loss maintainers (UWLM) were conducted using Analysis of covariance (ANCOVA) for continuous variables and Pearson chi-square for categorical variables. The mean baseline weight, height, Body Mass Index (BMI) and age for the cohort were  $96.5 \pm 16.3$ kg,  $1.65 \pm 0.08$ m,  $35.4 \pm 5.4$ kg/m<sup>2</sup>, and  $39.7 \pm 9.2$  yrs, respectively. The prevalence of weight loss maintenance success was 23.9%. More than half (52.2%) of the study cohort either returned to baseline weight or further re-gained some weight beyond baseline weight at follow up. Seventeen percent of the study cohort retained at least 95% of losses previously attained during the weight loss programme. Long-term maintenance of lost weight is achievable in a substantial proportion of weight losers and must be actively promoted by health professionals. The results can be generalised to majority of those who enter this commercial weight loss programme and not only the successful ones.

**Key words:** Commercial, intentional weight loss, weight loss maintenance, prevalence, Ghanaians



## INTRODUCTION

Obesity is a global public health challenge affecting both developed and developing countries [1,2]. The rapid rise in the prevalence of overweight/obesity in developing countries in the past three decades is partly due to improved economic development, globalization and urbanization [3,4]. In Ghana, there has been consistent increases in the prevalence of overweight/obesity over the years with the current adult prevalence estimated at 43% [5]. With increased awareness on the health consequences of obesity and the resultant health benefits of intentional weight loss, Ghanaians are increasingly desiring to lose weight to improve their health [6]. In a study by Ayisi Addo and colleagues, 66% of new enrollees of a commercial weight loss programme in Accra, had previously tried other weight loss strategies (either structured or personal methods) confirming that more people were generally attempting weight loss [7]. The use of commercial programmes for weight loss is becoming popular worldwide [8,9]. Commercial weight loss programmes were among the top three commonly used weight loss methods in newly enrolling participants of a weight loss programme in Accra [7]. Although commercial weight loss programme use is increasingly becoming common, little is known about the long-term outcomes of such programmes. Available literature on commercial weight loss programmes are mostly focused on their short-term efficacy while a few are follow-up studies limited to 1-2 years duration [10]. Long-term maintenance of lost weight is important for the preservation of the health benefits achieved from intentional weight loss. Commercial weight loss programmes can contribute significantly to the fight against obesity if these facilities are able to churn out individuals who are successful at weight loss maintenance in the long-term.

The paper, therefore, ascertained the prevalence of weight loss maintenance success in previous participants of a commercial weight loss programme in Accra, Ghana, who had been out of a weight loss programme for a period ranging from 6 months to 9 years, the median of which is 4.75 years.

## MATERIALS AND METHODS

### **The setting: The “Nutriline Weight loss Programme” (NWLP)**

The NWLP is a fee-paying commercial weight loss programme that is supervised by nutritionists. It uses structured meal plans and behavioural therapy to help its clients achieve their desired weight goals. Available weight loss programmes range between two months to six months duration and are chosen based on advice from the consultant nutritionist. Weight loss targets range from 0.5kg to 1kg per week and are personalized for each client. With each weekly client review, nutritionists are available to discuss challenges with weight loss advice on helpful coping strategies. Participants are eligible for programme renewal until desired weight goal is achieved. Weight maintenance meal plans are also available.

### **Study participants**

A thousand and one hundred and sixty four (1164) NWLP participants who enrolled in the period January 2008 to December 2016 were considered for study eligibility. Participants were included in the study if they: were within a BMI  $\geq 25$  at the time of



enrolment, could walk for exercise (self-reported), and were medically fit (self-reported). Of the 1164 participants, 262 were excluded for various reasons [having diabetes (n=60), being pregnant during or after initial weight loss bout (n=87), deceased (n=4), major organ disease (n=6), below 18 years of age (n=10), living outside Accra or Ghana (n=41), being less than six months out of weight loss treatment (n=24), not having completed first weight loss bout (n=7), never showed up for review after initial enrolment into weight loss programme (n=14), no phone number and no e-mail address (n=9)]. Ten participants were randomly selected for questionnaire pretesting and thirty two for pilot study on the prevalence of weight loss maintenance, leaving 860 participants. Of these, 505 were randomly selected and invited to take part in the study, of which 230 partook. Randomisation was based on stratification by year of enrolment which was correlated with time out of weight loss treatment, a variable that predicts weight loss maintenance success [11].

### Recruitment:

Participants were initially informed via e-mail or phone text message (where email address was invalid) about the study intent (a survey to evaluate NWLP programme and health behaviour post weight loss). Verbal consent seeking and appointment dates were done via phone calls, a week after study intent was announced. All those who were not reachable on phone for verbal consent seeking were followed up daily for up to seven days until this was done. Those who had incorrect phone numbers as well as those who were not reached in the seven days were sent emails requesting an alternative phone number. In the initial consent seeking, participants were informed that the study was voluntary and they had the option of opting out without any dire consequences should they access NWLP services in the future. A day to the set appointment date, participants were called on phone to confirm their availability. Those who were unlikely to be available for their appointments were re-scheduled for another date that was more suitable to them. Participants were visited in their homes or offices to have them sign consent form.

### Data collection

The Nutriline weight loss programme has an electronic database with records of participants' baseline weight and height measurements and subsequent weekly weight measurements until their programme ends or are lost to follow up. Anthropometric measurements at follow up were also taken when participants were visited in their homes or offices. Computations of BMI, percentage weight loss at end of programme and at follow up, and categorization of weight loss at end of programme and at follow up as being clinically significant ( $\geq 5\%$  below baseline weight) or not were recorded in the database. Participants' programme start and last visit dates were retrieved from the NWLP database and used to compute post treatment time and length of stay in programme.

A calibrated Camry digital weighing scale (Camry Electronic Limited, 4 Kang Le Road S., Zhaoqing, Guangdong, China, Model EF954, ISO 9001 certified) was used for weight measurements. Standing height was measured using a Healthometer stadiometer (Health O Meter, 11800 South Austin Avenue Unit B, Alsip, IL 60803, United States of America). Weights were measured in kilograms to the nearest 0.1kg and height in



centimetres to the nearest 0.1cm. BMI was derived from the formula: weight in kilograms divided by the square of height in metres. Participants were weighed in light clothing and had no shoes on. Any objects in the pockets of participants were removed prior to weighing.

**Ethical consideration:** Ethical approval was granted by the Institutional Review Board of the Noguchi Memorial Institute for Medical Research (NMIMR), University of Ghana, Accra, Ghana.

### Primary outcome measure

The primary outcome measure was the prevalence of weight loss maintenance success. Weight loss maintenance success was defined as achieving greater than or equal to five percent weight loss below baseline weight for at least six months post weight loss intervention. A five percent weight loss criterion is known in literature to be associated with significant health benefits [12–14].

### Secondary outcome measures:

**Post weight loss treatment time:** This is the time lapse (in months) from the date on a participant's weight loss file marking their last review visit for the weight loss intervention to the date that survey was conducted for each participant.

**Percent weight loss at the end of the programme:** This was calculated by dividing weight loss achieved at the end of the weight loss programme by the baseline weight and multiplying by 100. A negative percent weight loss indicates weight loss at the end of the programme while a positive percent weight loss indicates weight gain at the end of the weight loss programme.

**Length of stay in weight loss programme:** This is the duration in weeks from the date of enrolment into NWLP till the date of last weight loss review visit.

### Statistical analyses

Statistical analyses were conducted using IBM SPSS Statistics for Windows, version 20, Armonk, NY: IBM Corp. Normality of data was assessed using histograms and Shapiro-Wilk's test, where  $P > 0.05$  confirmed normality of data. Descriptive statistics [mean (SD)] was used to describe continuous variables that were normally distributed and frequencies and percentages were used for categorical variables. Comparison of successful weight loss maintainers (SWLM) and unsuccessful weight loss maintainers (UWLM) was done using Analysis of Co-variance (ANCOVA) for normally distributed continuous variables and Chi-square test for categorical variables.

## RESULTS AND DISCUSSION

The minority (18.7%) of the study participants were males, 7% did not have tertiary education and 28.7% were not married. The mean baseline weight, height, BMI and age for the cohort were  $96.5 \pm 16.3$ kg,  $1.65 \pm 0.08$ m,  $35.4 \pm 5.4$ kg/m<sup>2</sup>, and  $39.7 \pm 9.2$ yrs, respectively. Successful weight loss maintainers and unsuccessful weight loss maintainers did not differ in baseline anthropometric and demographic characteristics



(Table 1). The analyses proceeded without separating results for male and female, since sex was not significantly associated with weight loss maintenance success as shown in Table 1. A greater proportion of the cohort (63%) had  $\geq$  five percent weight loss while only about 38.3% of them completed their weight loss programme. The prevalence of weight loss maintenance success was 23.9% (n=55) and this included both achievers and non-achievers of clinically significant weight loss ( $\geq$  5% weight loss) at the end of the weight loss programme (Table 2). More than half (52.2%) of the study cohort had either returned to baseline weight or had further re-gained some weight beyond baseline weight at follow up. Seventeen percent of the study cohort retained at least 95% of losses previously attained during the weight loss programme.

The results of this study demonstrated that although weight loss maintenance continues to be a challenging task, more than one out of every five participants was successful at maintaining  $\geq$  five percent weight loss below baseline weight. This feat happened during a period where the prevalence of overweight and obesity in Ghana was steadily increasing [15,16]. This success may have been made possible in part due to the heightened awareness of the health risks and the health benefits associated with excess weight and intentional weight loss, respectively. The Women's Health Survey in Accra, Ghana revealed that majority (92.2%) of participants were aware of the health implications of being overweight or obese and a greater proportion of them were willing to lead healthier lifestyles [6]. The prevalence of weight loss maintenance success recorded in this study was lower than that reported by Befort and colleagues [11] as well as by Lowe and others [17]. Befort and others, had 76.5% of participants being successful at weight loss maintenance and 42% retaining at least 95% of their weight loss achieved during the weight loss programme [11]. Lowe and others reported weight loss maintenance success of 50% at five years post weight loss [17].

The higher prevalence of weight loss maintenance success reported by these studies [11,17] might have been made possible by the fact that all participants in both studies had a weight loss maintenance programme, which might have enhanced their capability of keeping the lost weight. Additionally, the weight loss programmes in both studies had incentives and/or regulations that promoted a longer stay in treatment and therefore increased attendance to review sessions. Wadden and colleagues confirmed that a longer stay in treatment improved weight loss and weight loss maintenance outcomes [18], while Byrne and others reported that increased attendance to review sessions improved weight loss and weight loss maintenance success [19]. Further, these studies either had a higher (68%) proportion of programme completers [11] or used lifetime members who represented the most successful weight loss participants [17]. These are groups that are highly motivated to lose weight and maintain their weight loss. In addition to the above factors, Befort and others dominantly used very low calorie diets (VLCD) and pre-packed foods in both the weight loss and weight maintenance phases of the programme as well as self-reported weights [11]. Pre-packed foods and VLCDs are known to promote higher weight losses and have the potential of increasing the odds of successful weight loss maintenance [20,21]. Self-reported weights are often under-reported and may have led to inflated weight loss at follow up [17]. Befort and others also evaluated weight loss maintenance success over a shorter post treatment time (14 months) compared to that of this study (4.5 years). A longer post treatment time was found to decrease the odds of

weight loss maintenance success [11]. The prevalence of weight loss maintenance success observed in this study was comparable to that of Gosselin and Cote [22], who reported a prevalence of 24%, four years post weight loss treatment, and 50% of participants returning to baseline weight or higher [22]. The similarity in weight loss maintenance success results for this study and that of Gosselin and Cote may have been partly due to the inclusion of participants with very brief stay in treatment. Gosselin and Cote included participants who had only stayed in treatment for one month and made up the majority of participants [22]. In this study, we included participants who had had only one review visit post enrolment into the programme, the majority of participants did not complete their weight loss treatment and the average stay in treatment was short (approximately 12 weeks). The role of aging on weight re-gain must be recognised as aging is known to decrease the basal metabolic rate, thus making it more difficult to maintain lost weight [23]. A significant proportion (46.5%) of this study's cohort had been out of weight loss treatment for five years or longer and this could have negatively impacted their ability to maintain lost weight due to reduced basal metabolic rate. It is possible that the magnitude of weight gain in such individuals might have been higher had they not participated in the weight loss programme.

The high numbers of participants who were unsuccessful at weight loss maintenance may also be explained by factors such as lack of social support, cultural norms, sedentary lifestyle and psychosocial issues. In a study by Wang and others [24], friend and co-worker support for healthy eating as well as family support for physical activity predicted weight loss while family social undermining for healthy eating predicted weight gain. Despite the increasing awareness of the link between obesity and ill health, several communities in Ghana continue to have some admiration for body fatness [25, 26]. The existing cultural acceptance of body fatness may have discouraged majority of this study's participants from exhibiting the vigilance needed to sustain their lost weight when they were no longer enrolled in the weight loss programme. In one study conducted among Ghanaian women, close to a third of the population were engaged in low levels of physical activity [25], while another study found Ghanaian female youth to be more sedentary compared to their male counterparts [27]. Participants of this study being mostly women may likely follow this observed trend of sedentary lifestyle in Ghanaian women. High levels of physical activity are needed to prevent weight gain [28] and, therefore, a sedentary lifestyle may impact negatively on weight loss maintenance. Psychosocial factors such as satisfaction with weight loss results and self-efficacy for weight management behaviours are other important factors that might have influenced participants' abilities to maintain lost weight in this study. A study by Calugi and others [29] showed that weight loss satisfaction independently predicted weight loss maintenance success in severely obese individuals. In another study [30], individuals exhibiting lower levels of self-efficacy in resisting social pressure and coping with high risk family meal times were less successful at weight loss maintenance.

To the best of our knowledge, this is the first study investigating the prevalence of weight loss maintenance success in Ghana. This study was carried out among participants who were free living and uncontrolled and thus the results may be more typical of what happens in the real world compared to those of randomised controlled studies. The results on weight loss maintenance prevalence presented in this study included those of

participants who did not complete their programme and these constituted the majority of participants. Thus, the results can be generalised to include most people who enter this commercial weight loss programme and not only the successful ones. Generalisation may also extend to populations similar to that of this study. This study may also have implications for behaviour change policies and programmes.

## CONCLUSIONS

Although the desire was to have a higher prevalence of weight loss maintenance success, the results of this study show that maintenance of lost weight is achievable in an appreciable proportion of weight losers. Given the scarcity of long-term data on commercial weight loss programmes [10], this study adds on new valuable information on long-term weight loss outcomes. The impact of psychosocial factors, perceptions about existing obesity cultural norms and post weight loss factors (physical activity, weight control methods, and dietary intake) on weight loss maintenance success must be investigated in this cohort.

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**Table 1: Baseline anthropometric and demographic characteristics of successful and unsuccessful weight loss maintainers**

Variable	SWLM (N = 55)	UWLM (N = 175)	P-value
Age (Mean ± SD)	39.9 ± 10.4	39.7 ± 8.9	0.848¶
Baseline weight (Mean ± SD)	100.1 ± 17.2	95.3 ± 15.9	0.084¶
Baseline Height (Mean ± SD)	1.66 ± 0.09	1.65 ± 0.07	0.530¶
Baseline BMI (Mean ± SD)	36.5 ± 5.7	35.0 ± 5.3	0.106¶
<b>Gender, n (%)</b>			
Male	10 (18.2)	33 (18.9)	0.911‡
<b>Marital status, n (%)</b>			
Not married	13 (23.6)	53 (30.3)	0.342‡
Married	42 (76.4)	122 (69.7)	
<b>Educational status, n (%)</b>			
Below tertiary	1 (1.8)	15 (8.6)	0.086λ
Tertiary and above	54 (98.2)	160 (91.4)	

SWLM = Successful weight loss maintainers, UWLM = Unsuccessful weight loss maintainers  
NS- Not significant

¶ Comparison of successful and unsuccessful weight loss maintainers based on ANCOVA with the model adjusted for total percent weight loss at end of weight loss treatment and post weight loss treatment time

‡ Comparison of successful and unsuccessful weight loss maintainers based on Chi-square test

λ Comparison of successful and unsuccessful weight loss maintainers based on Fishers exact test (when expected count was less than 5)

**Table 2: Weight loss and weight loss maintenance outcomes of the cohort**

Variable	%
Proportion completing weight loss programme	38.3
Proportion achieving ≥ 5% weight loss at the end of programme	63.0
Proportion achieving ≥ 5% weight loss at follow-up	23.9
	<b>mean±SD</b>
Mean percent weight loss at the end of programme	7.4±5.7
Mean length of stay in weight loss programme (weeks)	11.9±7.4



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