# The role of Healthy Life Centres in delivering weight management: a retrospective study


## Abstract

### Introduction

Healthy Life Centres (HLCs) in Turkey were established as primary health services to promote healthier lifestyle behaviours, aiming to reduce obesity and diseases linked to physical inactivity. This study aimed to investigate the weight management programme delivered by one HLC and to track the participants' progress in terms of weight loss and adherence to the program.

### Methods

This is a retrospective study. Participants consisted of adults aged ≥18 who attended the HLC for weight management from Sept 2017-June 2020. Data including attendance, age, gender, height and body weight were collected and analysed at 3, 6, 12-month time-points. Missing data was interpreted using last observed weight carried forward analysis (LOCF).

### Results

Over a two-year period 2652 adults (88% female) consulted the nutrition counselling service, of whom, 43% attended once. Mean age of those attending once was 40.2 (12.35) years and age increased significantly with adherence. Baseline body mass index (BMI) was 31.4 (6.32) kg/m$^2$. For those attending at the different time-points, weight loss was 4.4% of initial body weight at 3-months (n=841), 8.6% of initial body weight at 6-month (n=237), and 11.8% initial body weight at 12-month follow-up (n=56). LOCF analysis revealed a significant time effect for change in percentage body weight for the data collected at 6 and 12 months.

### Conclusion

This programme was successful in reaching clinically meaningful weight loss at 3, 6, 12-month for the participants who committed to the weight management programme. However, there was a substantial decline in participant engagement, with only a 2% attendance rate at 12 months. Furthermore, it's noteworthy that nearly half of the clients attended only one session during the study period. The findings of the current study can be used to inform policy makers about the strengths and weaknesses of HLCs.



### Key words

Healthy life centres, nutritional counselling, weight management, public health

**Abbreviation List**

BMI: Body Mass Index

HLC: Healthy Life Centre

LOCF: Last Observed Carried Forward

NCD: Non-Communicable Diseases

WHO: World Health Organisation

UK: United Kingdom

# 1. Introduction

Obesity and physical inactivity are key preventable risk factors of non-communicable diseases (NCDs) such as cardiovascular diseases, chronic respiratory disease, type 2 diabetes, liver disease and cancer [1,2] which collectively remain the most common cause of mortality and morbidity [3]. Despite this, there is an increasing global trend of obesity and sedentary life [4,5]. According to a national survey in Turkey, 43.6% of the respondents in Turkey did not meet the World Health Organisation (WHO)'s minimal health recommendations for physical activity [6,7] and many are classified as overweight (64.4%) or living with obesity (28.8%) based on the Body Mass Index (BMI) classification [8].

Primary health care services have an important role in promoting healthy lifestyle behaviours for overcoming obesity and physical inactivity [9–11]. For example, in the UK the "Let's Get Moving" initiative was developed for promoting physical activity in a primary care setting [12], and in Norway "Healthy Life Centres" were established as a primary healthcare service covering half of the country for promoting a physically active life and healthier eating [13].

In Turkey, Healthy Life Centres (HLCs) were established to (I) strengthen primary healthcare services offered by family medical centres and community health centres, (II) promote a healthier lifestyle and (III) protect the individual and society from health risks. The concept of HLCs was further defined by the Turkey Ministry of Health as 'Investing in Health, not in Disease' [14]. These HLCs were initially piloted in one city (Erzurum) in 2005 before roll-out across the country. From September 2015, HLCs were supported by the World Bank as part of the Health System Strengthening and Support Project (Project ID: P152799), which ended on 31st December 2021. As of March 2020, the number of HLCs across 76 cities in Turkey is 209.

The weight management services at HLCs are provided free of cost by a registered dietitian with the support of a registered physiotherapist. The individuals can be referred by their general practitioner or self-refer. The length of time a person can continue on the programme is based on the individuals' needs and decided by the professionals. Due to being relatively newly established, there are very few published studies that have evaluated the efficacy of the weight management programs provided by these centres. Ören et al. [15] initially investigated the services provided during 2018 in five HLCs in

one city representing a population of around 760,000. The findings showed that in total, 2400 adults attended these centres for diet or physical activity counselling with 382 receiving combined advice. Over half (53%) of the applicants were classified as obese (BMI 30-34.9) and 11% severely obese (BMI >35). However, around half of the clients (53%, n=1271) attended the sessions only once. The authors suggested that HLCs may influence the promotion of a healthier lifestyle and may prevent risk factors of non-communicable diseases.

Amasya is a city in the north of Turkey with a population of 335,331 as recorded at the end of 2021 by the Turkish Statistical Institute [16], with one HLC established in 2017. Therefore, the aim of this study was to investigate the impact of the weight management program offered by the HLC in Amasya and to examine the attrition rate among its participants. This study will provide valuable insights into the impacts of the weight management program at the HLC and provide recommendations for improving its program to better meet the needs of the community.

## 2. Methods

This is a retrospective study of participants who attended the weight management programme and received nutrition and/or physical activity counselling between September 2017 and June 2020 in Amasya HLC.

Participants consisted of adults aged 18 years and over who attended the HLC for weight management either referred or self-referred. Pregnant women were excluded from the study. This centre employed one dietitian who has provided consultancy service since September 2017 until the present day (September 2020) and one physiotherapist who provided consultancy service for eight months during this period.

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the Amasya University Ethics Committee (Ethics number: 15386878-044). After required approvals were obtained from the institutions, the records of programme attendees were received from the Amasya HLC weight management program records. Prior to the start of the weight management program, participants provided informed consent for the use of their anonymized data for research purposes. Routinely collected data included attendance, age, gender, height and body weight measured by the dietitian using a bioelectrical impedance analysis instrument (Tanita BC-418). Data of clients who were overweight/obese (BMI≥25 kg/m2) were included in this study whilst adults who attended dietary counselling with BMI<25 kg/m2 were excluded. Three, six and 12 months were considered for the evaluation of weight management. The number of the participants who attended at each follow-up weight point was recorded. A flow diagram of participant selection is demonstrated in Figure 1.

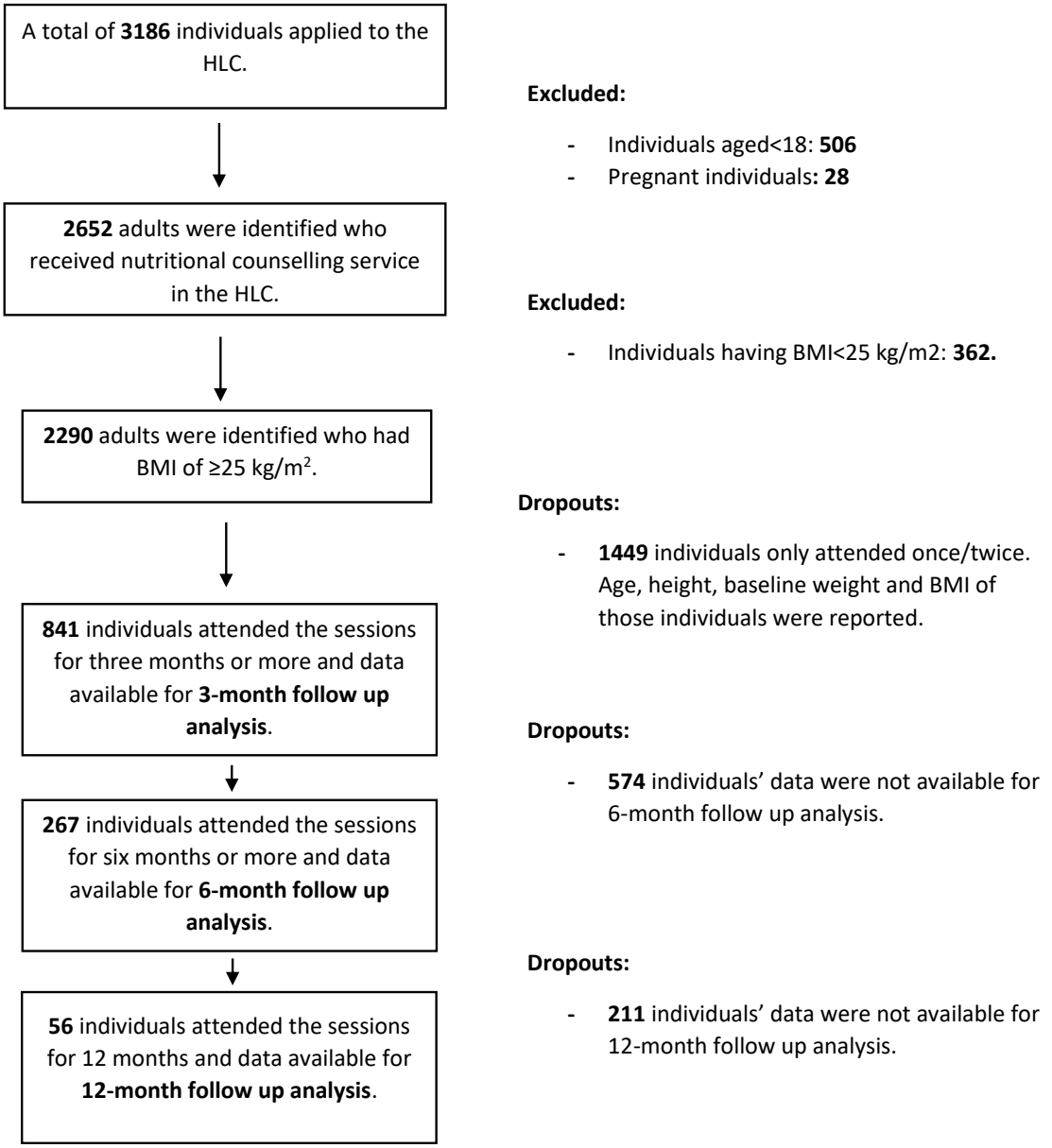



**Figure 1: A flow diagram demonstrating the participant selection.**

## 2.1. Weight management programme

In nutrition counselling sessions, healthier eating was promoted for the participants with BMI < 25 kg/m$^2$. For the participants with BMI ≥ 25 kg/m$^2$, an individualised energy restricted diet programme was planned, and monthly nutrition counselling sessions were arranged for each participant. An energy restriction of 500-1000 kcal/day below the amount required for weight maintenance was applied to obtain a loss 0.5-1 kg of body mass/ week [17]. The macronutrient distribution of the energy restricted diet programme was 15-25% of calories from protein, <30% calories from fat (<7% saturated fat), and the remaining calories from carbohydrate [18]. During the eight months, when a physiotherapist was assigned to the centre, the participants were referred for physical activity consultation. Physical activity counselling sessions included group or individualised exercise

programmes which were planned after a physical assessment of the participant by the physiotherapist. The sessions included stretching, strengthening, endurance and/or balance exercises, had a duration of 45 minutes each Then, the most suitable exercises for each individual were taught and performed in the sessions. All participants were encouraged to engage in physical activity with nutrition counselling.

### 2.2. Statistical analysis

Statistical analyses were performed using SPSS statistical software, version 25. Descriptive analyses were applied to identify characteristics (e.g., age, gender, height, weight, BMI) of those who attended dietary counselling since the establishment of this centre. Further statistical analyses were performed to examine the changes in percentage weight change and BMI across the 3-month, 6-month and 12-month follow up period. Paired sample t-test and one-way repeated measures ANOVA were performed with the participants who attended monthly dietary counselling sessions during three, six or 12 months and provided at least baseline and last session outcome data. Participants who had missed their one or two consecutive monthly sessions within these periods but those who provided baseline and last session outcome data were also included. Participants who were included in the 12-month follow up group were also included in the 3- and 6-month follow up groups. Similarly, participants in the 6-month follow up group were included in the 3-month follow up group. Despite the potential bias that could increase the likelihood of type I errors, Last Observed Carried Forward (LCOF) analysis was carried for the imputation of missing items. The same statistical analysis defined above was conducted with the imputed data and reported as LOCF in the tables.

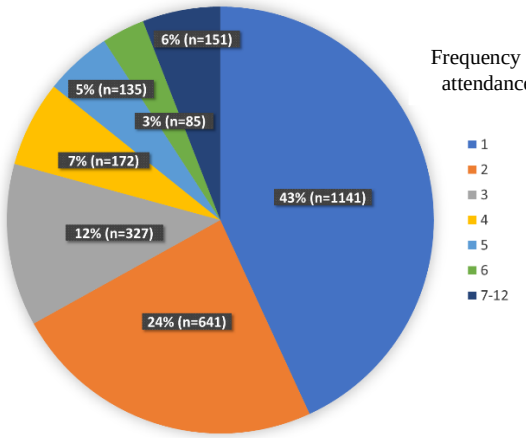
Statistical significance was considered at 0.05 alpha level.

## 3. Results

A total of 2652 adults sought guidance from the nutrition/physical activity counselling service at the HLC, as detailed in the methods section. Of those, only 156 participants attended the physical activity counselling, of whom 20 attended group sessions and the remaining received counselling for individualised exercises.

The majority of the study sample was female (87.7%). Mean age of all attendants was 40.2 (12.35) years. The initial mean BMI of the participants was 31.4 (6.32) $kg/m^2$. Approximately half of those clients (43%) attended the sessions only once during the study period (Figure 2). Nearly a quarter of the attendees (24%) did not join the sessions more than twice.

**Figure 2: Frequency of attendance at weight management counselling (n=2652)**




n: number of attendees

Female: 87.7% (n=2327), male: 12.3% (n=325); Mean age (SD): 40.2 (12.35); Mean BMI (SD): 31.4 (6.32) Initial BMI≥25 kg/m$^2$: 86.3% (n=2290).

362 participants identified as having BMI<25 kg/m$^2$ were excluded from further analysis. The characteristics of the participants who had an initial BMI of ≥25 kg/m$^2$ are presented in Table 1. Since literature suggested that clinically effective results in weight management can be detected after 3-months [19,20], the characteristics of those attended only once (n=934), at least 3 times (n=841), at least 6 times (n=267) and 12 times (n=56) since the establishment of the centre were reported in the table. The majority of both groups were female with mean age increasing with level of adherence. The initial mean BMI of both groups was in the obese class 1 (30-34.9 kg/m$^2$) based on BMI classification of WHO[8] (Table 1).

**Table 1: Characteristics of those attending nutrition counselling (BMI≥25 kg/m$^2$)**

| | Only once (n=934) | | 3 times (n=841) | | 6 times (n=267) | | 12 times (n=56) | | p value* |
|---|---|---|---|---|---|---|---|---|---|
| | Mean ± S.D. | Range | Mean ± S.D. | Range | Mean ± S.D. | Range | Mean ± S.D. | Range | |
| **Age (years)** | 40.5 ± 12.32 | 18-85 | 43.1 ± 12.01 | 18-74 | 44.4 ± 11.17 | 18-71 | 45.4 ± 12.21 | 18-71 | <0.001 |
| **Height (cm)** | 161.3 ± 8.12 | 141-189 | 159.8 ± 7.44 | 141-186 | 159.7 ± 7.63 | 141-186 | 158 ± 7.94 | 141-175 | 0.5 |
| **Baseline Weight (kg)** | 84.8 ± 14.68 | 56-144 | 84.7 ± 14.05 | 55-139 | 85.9 ± 15.17 | 59-135 | 90.4 ± 17.08 | 64-135 | <0.001 |
| **Baseline BMI (kg/m$^2$)** | 32.6 ± 5.58 | 25-58.9 | 33.2 ± 5.51 | 25-55 | 33.7 ± 5.82 | 25-55 | 36.2 ± 6.34 | 25-55 | <0.001 |

* Two-way repeated measures ANOVA

An independent samples t-test revealed that there were statistically significant differences between the mean ages of the attendees who attended only once and 3 times (p<0.0001), only once and 6 times (p<0.0001). However, no significant differences were found between only once and 12 times (p=0.56).

The baseline BMI of those who attended 12 times was the highest compared to those who attended only once, 3 times or 6 times.

Weight loss exploration analyses were conducted with the individuals who attended more than three times (n=841). Of those, 841 individuals attended the sessions for three months, 267 individuals for six months, and finally 56 individuals had BMI 25 kg/m2 followed for 12 months.

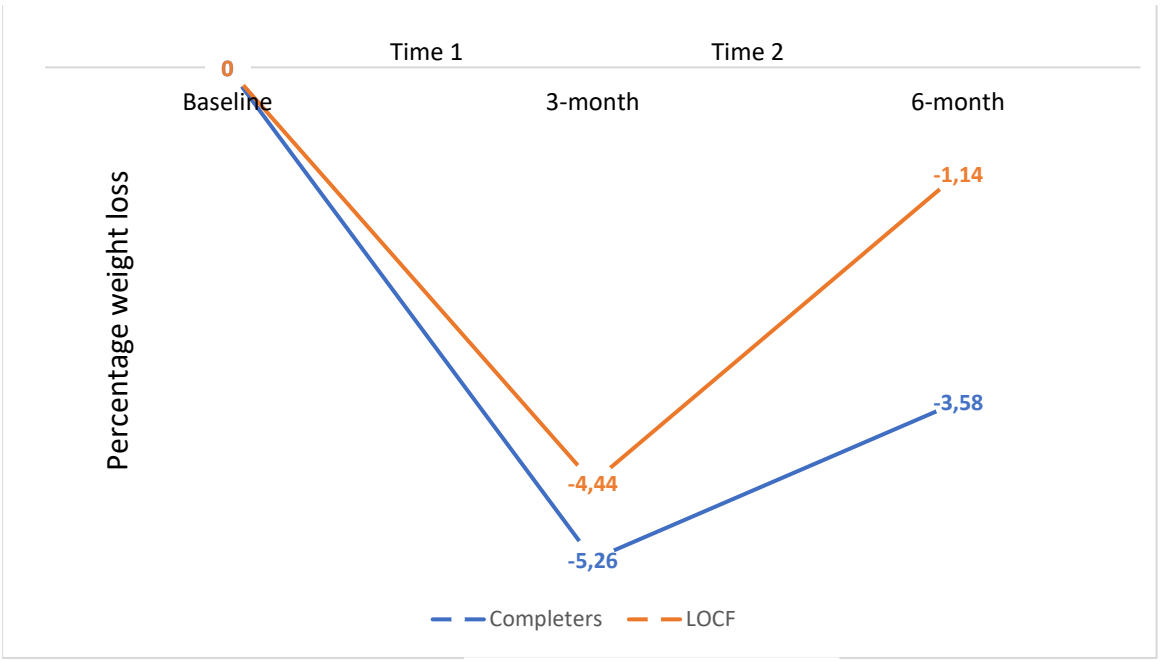
### 3.1. 3-month follow up

Participants' mean weight loss for the three-month period (n=841) was 3.8 (±3.8) kg (4.4% [±4.2%] of initial body weight). The mean BMI scores were 33.2 (±5.51) kg/m$^2$ at baseline and 31.7 (±5.21) kg/m$^2$ at 3-month follow up. There was a significant time effect ($p<0.001$) for change in BMI.

### 3.2. 6-month follow up

Mean weight loss of participants who continued nutrition counselling for six months (n=237) was 7.6 (±5.6) kg (8,6% [±6.1%] of initial body weight). Percentage weight loss change is shown in Figure 3. Paired sample t-test provided a significant time effect for change in percentage body weight for both completers ($p<0.001$) and LOCF ($p<0.001$).

**Figure 3: Percentage weight loss of initial body weight of completers (n=267) versus LOCF (n=841) at 6-month**




A one-way repeated measures ANOVA was conducted to compare scores on the BMI at baseline, 3-month and 6-month. The means and standard deviations are presented in Table 2. There was a significant effect for time, Wilks' Lambda = .34, F (2, 265) = 254,32 p< .001, multivariate partial eta squared = .66. for completers and for LOCF (Wilks' Lambda = .49, F (2, 839) = 422,65 p< .001, multivariate partial eta squared = .50.)

**Table 2: Mean BMI (kg/m$^2$) in 3-month intervals of those who attended nutrition counselling for completers (n=267) versus LOCF (n=841) during 6 months follow up**

| | Completers (n=267) | LOCF (n=841) |
|---|---|---|
| **Time period** | **Mean ± SD** | **Mean ± SD** |
| At baseline | 33.7 ± 5.82 | 33.2 ± 5.51 |
| At 3-month | 31.9 ± 5.38 | 33.7 ± 5.21 |
| At 6-month | 30.7 ± 5.22 | 31.3 ± 5.27 |

## 3.3. 12-month follow up

Weight loss was 11.3 (±9.4) kg (11.8% [±10%] of initial body weight) at 12-month follow up. Figure 4 presents the percentage weight loss change in 3-month intervals. This change over baseline Time 1 (0-3 month), Time 2 (3-6 month), Time 3 (6-12 month) had a significant effect for completers (Wilks' Lambda = .45, F (3, 53) = 21.32, p < .001, multivariate partial eta squared = .55.) and for LOCF (Wilks' Lambda = .86, F (2, 839) = 69.32, p < .001, multivariate partial eta squared = .14.)

**Figure 4: Percentage weight loss of initial body weight of the completers (n=56) versus LOCF (n=841) at 12-month**


The mean BMI scores at baseline, 3-month, 6-month and 12-month are presented in Table 3. Comparison of these scores using one-way repeated measures ANOVA test showed a significant effect for time, Wilks' Lambda = .3, F (4, 52) = 30,28 p< .001, multivariate partial eta squared = .70 for

completers and LOCF (Wilks' Lambda = .5, F (3, 838) = 281,49 p< .001, multivariate partial eta squared = .50).

**Table 3: Mean BMI (kg/m$^2$) in 3-month intervals of those attending nutrition counselling for completers (n=56) versus LOCF (n=841) during 12 months follow ups**

| | Completers (n=56) | LOCF (n=841) |
|---|---|---|
| Time period | Mean ± SD | Mean ± SD |
| At baseline | 36.1 ± 6.35 | 33.2 ± 5.51 |
| At 3-month | 34.0 ± 5.69 | 31.7 ± 5.21 |
| At 6-month | 32.3 ± 5.49 | 31.3 ± 5.27 |
| At 12-month | 31.6 ± 5.47 | 31.2 ± 5.26 |

## 4. Discussion

The present study was designed to evaluate the weight management programme and track the participants progress in terms of weight loss and adherence to the program in HLC Amasya. The results of this study showed that 43% of the clients attended nutrition counselling only once and that the majority of the attendees were female. The percentage weight loss was 4.4 % of initial body weight at 3 months, 8.6% at 6 months, and it was more than 10% at the end of the 12 months for those who were still attending. The majority of weight loss was achieved within three months for each follow-up group (3, 6 and 12 months).

Almost half of the clients (43%) attended nutrition counselling sessions only once. This finding is consistent with that of Ören et al. [15] who reported 53% (n=1271) of the clients attended HLC for only one nutrition counselling session in another city (Erzurum, Turkey). The reasons for one-session attendance may be explained by lack of motivation, health and physical limitations, and negative thoughts/moods [21]. When people who are overweight refuse to fully engage in a free weight management programme in a primary care centre, it is recommended not to try to persuade them due to possible negative consequences [22].

This study suggests that it tends to be older people who are likely to commit for longer in the weight management programme. This may be attributed to a number of factors. Firstly, the increased health risks associated with obesity as one gets older [23] and a greater understanding of the importance of a healthy lifestyle might motivate them to engage in weight management programme. Secondly, fewer competing demands on older peoples' time and resources may allow them to devote more time and energy to prioritize their weight management.

It is worth noting that while a notable proportion (86.3%) of those who attended just one session had a BMI over 25 kg/m2, indicating the necessity for NCD prevention [7], a considerable number of participants dropped out after the initial session. Batterham et al. [24] explored the predictors of drop

outs from dietary programmes. They found that weight loss success at one month was highly related to drop out. People who lose ≤2% of their weight at one month were five times more likely to drop out than those achieving a weight loss of >2% in the same period. Therefore, the motivation of attendance may mostly depend on the amount of weight loss in the first month. The number of participants in this study dropped off at each follow up time-point, by 63%, 88% and 97% respectively. Therefore, there was a total of 98% drop off at the end of the study, with only 56 participants who attended for 12 months. One of the reasons of dropouts might be because the individuals reached their target weight and left the programme. An alternative explanation for this might be that they believed they had obtained adequate guidance and could manage their weight independently using the advice they had already received, which included suggestions for food substitutions for each food group. Another possibility might be that only the most motivated participants remained at the end of the study. A further motivation of attendance could be baseline BMI values, as the 12-month follow up group had the highest mean baseline BMI of 36.1 $kg/m^2$.

One of the obvious findings to emerge from this study was that the majority of the attendees were female. This result may be explained by the fact that dietary counselling sessions have been run by a female dietitian. It has also previously been observed that commercial weight loss organisations are usually managed by and attended by females [23,25–27]. This may be explained by the view that cooking and dieting are considered as feminine [27]. Another possible explanation for this is that there is an increasing prevalence of obesity amongst the general population and the percentage of women who are obese continues to be more than men [28]. There are similarities between the global trends in obesity and those presented for Turkey. Satman [29] reported that the prevalence of obesity was 36% in Turkey with 44.2% among women and 27.3% among men.

The percentage weight loss was 4.4 % of initial body weight at 3-month follow up (for those attending at this time-point), which was very close to a 'clinically meaningful' amount of weight loss (5% weight loss of initial body weight) [30]. This amount of weight loss has been reported as associated with improvements in polycystic ovarian syndrome, menstrual irregulates and fertility [30]. Furthermore, in the current study, the 6-month follow up group achieved an 8.6% of weight loss which was defined as 'moderate weight loss' and related to the reduced risk of type 2 diabetes, high blood pressure, sexual dysfunction, non-alcoholic steatotic hepatitis, depression and poor quality of life [30]. Moderate weight loss (5-10% of initial body weight) has been claimed to decrease overall health care costs [31,32]. Clearly, more weight loss would prevent more risk, so more than 10% weight loss could be associated with reduced mortality [30]. 11.8% weight loss of initial body weight at 12-months for the limited number still attending is likely to offer considerable physical and mental health benefits.

The mean BMI reduction of the participants who attended 12-month follow up group was 4.5 $kg/m^2$ (from 36.1 to 31.6). However, in the current study weight loss resistance was observed after the ninth

month and this may be attributed to a diet-only weight loss programme. Short-term weight loss tends to be similar between diet-only and combined behavioural weight management programs. However, in the long-term, combining a healthy diet with physical activity can result in greater weight loss [33]. This result further supports the idea that the most effective strategy for weight management in the long term is a combination of diet, physical activity and behavioural changes [33].

Before this study, effectiveness of the weight management programme delivered by HLCs was purely anecdotal. The present study appears to be the first study to go some way towards enhancing our understanding of nutrition and physical activity counselling services provided in HLCs. This study has also highlighted the health promotion activities organised for a non-English speaking society in an international platform. However, the generalisability of these results is subject to certain limitations. The data was collected from only one centre among over 200 centres in Turkey. Future research in more diverse settings with more service users is needed to assess and refine transferability of the outcomes of this program evaluation to other centres. The major limitation of this study is the high level of drop out of participants, specifically at 12-month follow up.

This study included data on general characteristics such as age, height, and baseline weight for both those who remained in the program and those who withdrew. However, future studies may include data on participant sociodemographic and lifestyle traits that could have impacted weight management outcomes including education level, marital status, nutritional behaviours, underlying health conditions and other potential confounding factors. This study also did not have follow up measurements for weight maintenance of those who reached their target weight which was set as a BMI of less than 25.0 $kg/m^2$ at the first session or lost at least 10% of initial body weight in order to evidence long term success of weight management. Another limitation of this study is that the number of the individuals who received physical activity counselling was very low. This resulted in not evaluating the contribution of physical activity to weight management. Further research might include only the participants who both attended nutrition and physical activity counselling at these centres. A further study could assess the long-term effects of the services through evaluating motivation and behaviour change which could be a way of promoting sustainability.

## 5. Conclusion

This study evaluated the efficacy of the weight management programme provided at the HLC in Amasya. The results have shown that this programme is generally successful in reaching a clinically meaningful percentage weight loss at the end of 3 months (4.4%), 6 months (8.6%) and 12 months (11.8%) among participants engaging in the program at these time-points. This study increased the depth of information available regarding nutrition and physical activity counselling services provided in HLCs in Amasya. The findings will inform policy makers about the strength and weaknesses of HLCs, which can help improve the quality of services. A reasonable approach to enable more

individualised and prioritised health promotion programmes in HLCs could reduce obesity and obesity related NCDs, intensity of hospital services and economic burden, and improve the national health care system. A multifaceted approach that incorporates strategies to address motivation with some motivational techniques, such as motivational interviewing and cognitive-behavioural therapy, education about nutrition, physical activity, and other lifestyle factors, social support from friends, family, or community groups, and ongoing feedback. Strategies should be developed to improve levels of engagement and reduce drop-out. Greater efforts are needed by national health services for a comprehensive monitoring and reporting of the services provided in HLCs across the country in order to identify the necessities for providing an immediate action plan such as providing reserve healthcare professionals when required. Additionally, this study highlights the value of HLCs in addressing the obesity epidemic. For future research, qualitative data could provide insights into participants' experiences and factors influencing program adherence, informing the development of more tailored and effective interventions. Additionally, prospective studies could further investigate the HLC's long-term effects and impact on reducing obesity-related comorbidities.

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## Data availability

The data used to support the findings of this study are included in the article and supplementary materials.

## Research Data

Research data for this article is available at Okuyucu, Kubra (2024), "HLC study ", Mendeley Data, V1, doi: 10.17632/wbnpzc8c95.1

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# Figures & Tables Legends

Figure 1: A flow diagram demonstrating the participant selection.

Figure 2: Frequency of attendance at weight management counselling (n=2652)

Figure 3: Percentage weight loss of initial body weight of completers (n=267) versus LOCF (n=841) at 6-month

Figure 4: Percentage weight loss of initial body weight of the completers (n=56) versus LOCF (n=841) at 12-month

Table 1: Characteristics of those attending nutrition counselling (BMI≥25 kg/$m^2$)

Table 2: Mean BMI kg/m2 in 3-month intervals of those who attended nutrition counselling for completers (n=267) versus LOCF (n=841) during 6 months

Table 3: Mean BMI kg/m2 in 3-month intervals of those attending nutrition counselling for completers (n=56) versus LOCF (n=841) during 12 months