

The My Choice Weight Management Programme

A COMPARISON OF THE PROVISION OF THE MY CHOICE WEIGHT MANAGEMENT PROGRAMME VIA GENERAL PRACTITIONER PRACTICES AND COMMUNITY PHARMACIES IN THE UNITED KINGDOM

Running title: The My Choice Weight Management Programme

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WHAT IS ALREADY KNOWN ABOUT THIS SUBJECT

- Obesity has been highlighted as one of the major public health challenges facing the UK in the 21st Century.
- There is insufficient evidence to recommend the provision of structured weight management interventions via general practitioner practices or community pharmacies.

WHAT THIS STUDY ADDS

- The *My Choice Weight Management Programme*, delivered via general practitioner practices and community pharmacies in one city of the UK, produced modest reductions in weight.
- Such programmes alone are unlikely to be sufficient to combat the obesity epidemic.

ABSTRACT

Objective: To assess the effectiveness of a novel, community-based weight management programme delivered through general practitioner (GP) practices and community pharmacies in one city in the United Kingdom.

Design: Non-randomised, retrospective, observational comparison of clinical data collected by participating GP practices and community pharmacies.

Subjects: 451 overweight or obese men and women resident in areas of high socioeconomic deprivation (82% from black and minority ethnic groups, 86% female, mean age: 41.1 years, mean BMI: 34.5 kg/m²).

Measurements: Weight, waist circumference and BMI at baseline, after 12 weeks and after 9 months. Costs of delivery were also analysed.

Results: Sixty-four per cent of participants lost weight after the first twelve weeks of the *My Choice Weight Management Programme*. There was considerable drop-out. Mean percentage weight loss (last observation carried forward) was 1.9% at 12 weeks and 1.9% at final follow-up (9 months). There was no significant difference in weight loss between participants attending GP practices and those attending pharmacies at both twelve weeks and at final follow-up. Costs per participant were higher via community pharmacy which was attributable to better attendance at sessions amongst community pharmacy participants than amongst GP participants.

Conclusion: The *My Choice Weight Management Programme* produced modest reductions in weight at 12 weeks and 9 months. Such programmes may not be sufficient to tackle the obesity epidemic.

INTRODUCTION

Obesity is a significant health and social problem that has reached pandemic levels. Several prospective studies have demonstrated the relationship between obesity and premature death from coronary heart disease, cancers and other diseases as well as psychosocial problems, such as negative self-esteem, social withdrawal and discrimination.¹⁻⁵

Obesity now presents as one of the largest health problems facing the UK today and has been highlighted as one of the major public health challenges facing the UK in the 21st Century.⁶⁻⁸ In the 20 years to 2001, the prevalence of obesity tripled.⁹ Based on current trends, it is estimated that by 2050 over half of the UK adult population could be obese costing the NHS £9.7 billion and, when higher rates of sickness absence from work associated with being obese, and reduced productivity and overall costs to business are taken into account, £49.9 billion to society as a whole.¹⁰

There is a paucity of evidence on the effectiveness of both general practice (GP)-led and pharmacy-led weight management interventions. UK National Institute for Health and Care Excellence (NICE) guidance on obesity highlights that the identified evidence did not appear to suggest that the health professional who provides advice and support was important, the key issues being whether the health professional is motivational and the maintenance of support to the patient.¹¹

One randomised controlled trial of a nurse-led, general practice-based weight management programme for individuals with a BMI of ≥ 27 kg/m² reported that, at 12 weeks, 34% of participants in the intervention arms of the trial lost at least 5% of their initial weight compared to 19% in the usual care arms.¹² In the *Counterweight Project*, 31% and 32% of participants respectively had maintained a weight loss of at least 5% of initial weight at 12 and 24 months respectively while in a randomised controlled trial of a primary care-based

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weight management intervention, delivered by physicians and tailored to the needs of 144 obese, low-income, African-American women in the US, 13% of participants remaining in the intervention arm at six months lost 5% of their initial weight compared to 5% of participants remaining in the control arm.¹³⁻¹⁵ However, other GP-based interventions have proven less successful in reducing the weight of obese patients.¹⁶

Pharmacy involvement in tackling obesity in the UK has been limited to date but with the high priority now afforded to tackling the obesity epidemic, the community pharmacy-based provision of weight management services is likely to be given increasing consideration by commissioners of health services. Available data on the effectiveness of such services are largely absent but a service delivered by community pharmacies in Scotland produced weight loss amongst 458 participants of 1.3 kg at 12 weeks and 1.7 kg at one-year follow-up (using last observation carried forward). Ten per cent and 16% of participants achieved the target weight loss of 5% at 12 weeks and one year respectively.¹⁷

While community pharmacy-based provision of weight management services has been limited in the UK, a number of studies have been conducted elsewhere. In a randomised controlled open-label trial conducted in a single community pharmacy in the United States the efficacy of a meal replacement programme (*Slim-Fast*®) was compared to the efficacy of a conventional reduced calorie diet.¹⁸ Participants in both arms of the trial attended consultations with a pharmacist every two weeks where advice and counselling were provided. Statistically significant weight loss was observed in both arms of the trial at 10 sessions (mean weight loss was 4.9 kg in the intervention arm and 4.3 kg in the control arm) with no significant difference in weight loss between the two arms. In total forty-one per cent of participants lost at least 5% of their initial weight at 22 sessions. A further study conducted in a single, university campus pharmaceutical care centre in the USA assessing the effectiveness of pharmacist education and counselling (and in some cases counselling plus pharmacotherapy) produced mean weight loss of 3.6 kg.¹⁹ Interventions in Denmark and

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Switzerland have also demonstrated the effectiveness of community pharmacy based weight management interventions.^{20 21}

A 2011 article in the British Medical Journal assessed the effectiveness of the delivery of weight management programmes via various primary care- or community-based providers.²²

The *Lighten Up* randomised controlled trial compared commercial and primary care led weight reduction programmes. In total, 740 overweight or obese participants were randomly assigned to one of three commercial weight loss programmes (*Weight Watchers*®, *Slimming World*®, *Rosemary Conley*®), a group-based, dietetics-led programme delivered in the community, general practice led one-to-one counselling, pharmacy led one-to-one counselling, a choice of any of these six programmes or a comparator group which received 12 vouchers enabling free entrance to a local leisure centre. Mean weight loss at twelve weeks was 2.1 kg in the pharmacy arm and 1.4 kg in the GP arm. Among participants followed up at one year weight loss was marginally greater in GPs (0.8 kg) than in pharmacies (0.6 kg). Weight loss was greater in commercial organisations than in primary care providers, a phenomenon also observed in the trial reported by Jebb et al (2011).²³

The *Lighten Up* trial was a welcome addition to the evidence base concerning GP- and pharmacy-based weight management services as data comparing the effectiveness of providers in delivering such services is particularly lacking. In this manuscript an evaluation of a novel, community-based weight management programme (the *My Choice Weight Management Programme*) – delivered via GPs and community pharmacists in one city in the United Kingdom – is presented.

MATERIALS AND METHODS

While most primary care based weight management interventions have been delivered through a single type of care provider, the *My Choice Weight Management Programme* was

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designed to operate from both community pharmacies and the practices of GPs contracted to provide services by Heart of Birmingham teaching Primary Care Trust (HoBtPCT – at the time, the local National Health Service (NHS) primary care organisation responsible for the provision of primary care services to approximately 300,000 residents of central Birmingham). The programme was targeted at individuals who were ‘ready to change’ (analogous to the ‘preparation’ stage of the Transtheoretical Model of Health Behaviour Change) and enabled individuals to work with a trained health worker (for example, a health care assistant, practice nurse or pharmacy assistant) in an attempt to reduce weight via lifestyle modification.²⁴

Participants on the programme were helped to develop a care plan with the aim of a 5-10% reduction in body weight at completion of the programme. The *My Choice Weight Management Programme* also aimed to reduce adult obesity levels, improve access to overweight and obesity management services in primary care, improve diet and nutrition, promote healthy weight and increased levels of physical activity in overweight or obese patients, and support patients to make lifestyle changes to enable them to lose weight.

Twelve pharmacies and twelve GP practices were recruited to deliver the service, free-of-charge to participants, via service level agreements with HoBtPCT. Providers of the programme were responsible for the recruitment of participants over the course of the programme (up to a maximum of 30 participants per provider). Participants were recruited according to the following criteria:

- Aged 18 years or over and had a BMI:
 - Greater than 30 kg/m² (greater than 25 kg/m² in South Asians¹)

¹people with ancestral links to Bangladesh, India, Nepal, Pakistan or Sri Lanka

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- Greater than 28 kg/m² (greater than 23.5 kg/m² in South Asians^a) with one or more of the following co-morbidities (diabetes, hypertension, cardiovascular disease).

Each participant was scheduled to attend weekly following recruitment – an initial baseline consultation followed by eleven weekly consultations (the last of these weekly sessions is hereafter referred to as ‘session 12’). Participants were also offered up to three follow-up appointments, to take place every 2 months for up to 6 months after completion of session 12 (the last of these three follow-ups – taking place at approximately nine months post-recruitment is hereafter referred to as ‘session 15’).

The following data were collected by providers from participants at baseline:

- Date of consultation
- Sex
- Age (in years)
- Postcode
- Self-reported ethnicity
- Height (m)
- Weight (kg)
- Waist circumference.

The collection of participants’ height and weight allowed for the calculation of each participant’s body mass index (BMI). To provide an indication of the level of socioeconomic deprivation in the geographical area where the participant resided, the Indices of Multiple

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Deprivation (IMD) 2010 score² for the Lower Layer Super Output Area (LSOA)³

corresponding to the participants' postcodes were added to the dataset using data linking postcode to LSOA available in the UKBorders dataset.²⁵⁻²⁷

At all subsequent sessions, the following data were collected:

- Date of consultation
- Weight (kg)
- Waist circumference.

Data were recorded routinely at each appointment using pre-designed data collection forms.

The analysis is therefore dependent on the volume and accuracy of the collected data.

Payment to providers was based on the submission of completed data collection forms.

While non-submission of forms was a possibility, the financial incentive applied to their submission makes this unlikely.

In addition to this monitoring, in conjunction with a member of staff at their provider, participants were set 'realistic' weight loss targets (a weekly weight loss of 0.5-1 kg per session with the aim of losing 5-10% of original weight by session 12) and lifestyle, behaviour, diet and activity were also assessed. Participants were also encouraged to keep a food and exercise diary and to modify lifestyle, diet and physical activity appropriately. To meet these ends, a different topic was covered at each appointment with the participants being provided with supporting written material (in the form of leaflets etc.). Both the topics

² The IMD combine a number of indicators, chosen to cover a range of socioeconomic issues, into a single deprivation score for each Super Output Area (Lower Layer and Middle Layer) in England. The higher the IMD 2010 score, the more deprived an area is.

³ Super Output Areas (SOAs), are a geography designed for the collection and publication of small area statistics. There are currently two levels of SOA – Lower Layer SOAs (LSOAs) which divide England into 34,378 areas with a mean number of residents of 1,500 in each area and Middle Layer SOAs (MSOAs) which divide England into 7,193 areas with a mean number of residents of 7,200 in each.

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covered and the written materials were tailored towards meeting the needs of the local population (70% of the resident population of HoBtPCT were from black and minority ethnic groups).²⁸ The schedule for session 1 to 12 was as follows (further detail on the programme can be found in the accompanying appendix):

- Session 1: Assessment
- Session 2: Healthy eating
- Sessions 3-11 covered following topics. The topics could be covered in any order with the order they were covered in being decided by the provider in conjunction with the participant:
 - Being more active
 - Coping with slip-ups and setbacks
 - Drinks
 - Eating frequency and snacking
 - Hunger and emotional eating
 - Planning ahead
 - Portion Control
 - Special Occasions
 - Support and Rewards
 - Understanding food labels
- Session 12: Maintaining weight loss.

The primary outcome was weight loss at session 12. Secondary outcomes were weight loss at session 15, proportion of participants losing $\geq 5\%$ of body weight at sessions 12 and 15 and weight loss (or gain) between session 12 and session 15. Data on outcomes are presented both for 'completers' (i.e. participants attending session 12 and/or session 15) and, where these data were not available, on an intention-to-treat basis with missing values

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imputed via last observation carried forward (LOCF). Attendance rates and costs data are also reported. Microsoft Excel 2010® (Microsoft Corporation, Redmond, WA, USA) was used for data analysis with some additional analysis being undertaken in SPSS v16.0® (SPSS Inc., Chicago, IL, USA). Descriptive statistics are presented both for all participants and by provider type. To determine whether there were relationships between variables the following statistical tests were applied to the data:

- Where categorical data is detailed, the chi-squared test of association was used.
- When comparing the means of two samples, an unpaired- *t*-test was used.

RESULTS

A total of 451 individuals were recruited to the programme (i.e. attended at least one session). GP providers (n=268) recruited more participants than pharmacy providers (n=183). Overall, 86% of participants were female and the mean age of the cohort was 41 years.

There was no statistically significant difference between the IMD 2010 score of the LSOA corresponding to the participants' postcode between pharmacy participants and GP participants. However there were statistically significant differences between participants attending pharmacies and participants attending GPs with GP participants tending to be older than their pharmacy counterparts. Additionally, the ethnic composition of the two groups differed significantly (see Table 1).

Attendance

The mean number of sessions attended per participant in the programme was seven. Thirty seven per cent of participants attended the first twelve sessions and less than one-in-five

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participants attended all 15 available sessions. Attendance was uniformly better at pharmacy providers than at GP providers (see Table 2). There were no statistically significant differences between the demographic characteristics of participants at baseline and those completing session 12.

Weight and waist circumference data

At baseline, there was considerable heterogeneity in weight, BMI and waist circumference between participants recruited through pharmacies and those recruited through GP practices. Participants recruited at GP practices were heavier and had larger BMIs and waist circumferences. While 30% of participants recruited at pharmacies had a BMI of 35 or more, this proportion was almost 50% amongst participants recruited at GP practices (see Table 3).

At session 12, 64% (n=289/451) of enrolled participants had lost weight. This proportion increased to eighty-five per cent (n=141/166) amongst completers (participants who attended session 12). Mean percentage weight loss was 1.9% (3.3% amongst completers). Completers attending GP practices lost more weight during the first twelve sessions than those attending pharmacies (4.0% and 2.8% respectively; $p < 0.05$). Fourteen per cent (n=64/451) of participants achieved a reduction in weight of 5% or more with no significant difference between providers (see Table 4). There were no statistically significant relationships between sex, age, IMD quintile or ethnicity and percentage weight loss at session 12.

There was no significant difference in weight loss between providers at session 15 although weight loss was greater in participants attending pharmacies than in participants attending GPs (see Table 4). When considering weight loss between session 12 and session 15, it is apparent that GP participants failed to maintain their weight status achieved at session 12

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(recording a mean weight gain of 0.9%) whereas participants attending pharmacies continued to lose weight between session 12 and session 15 (a mean weight loss of 1.2%). This difference was statistically significant. However, the small numbers of participants attending session 15 (pharmacy n=60, GP n=23) should be noted.

Costs of providing the service

Table 5 shows the costs of delivering the programme. As the majority of payments were based on the number of sessions hosted and GP providers recruited more participants than pharmacy providers, total costs were higher for GP providers than for pharmacy providers. Costs per participant were higher through pharmacies than through GPs. This was true throughout the course of the programme but the gap in costs between pharmacy and GP providers narrowed as participants continued through the programme to the point where there was no statistically significant difference in costs between providers among participants attending session 15. Again, this is a result of the larger number of participants recruited by GPs (thus allowing for distribution of, for example, training costs across a larger pool of participants). However, when controlling for the number of sessions hosted (mean number of sessions attended by participants: pharmacy=7.9; GP=6.5) pharmacy provision cost less per participant than GP provision (£19.80 per session versus £20.30 per session).

Similarly costs per 1% of weight loss were £87.00 among pharmacy providers and £59.00 at GP providers (£74.30 combined) at session 12. Among participants attending session 15, the opposite pattern was observed with costs being lower among pharmacy providers than GP providers for both measures (although these differences were not statistically significant).

DISCUSSION

Four hundred and fifty one participants were recruited to the *My Choice Weight Management Programme*. GP providers recruited more participants than pharmacy providers. Females were over-represented in the cohort although this appears to be consistent with other community- or primary care-based services; particularly those delivered through community pharmacy.^{18 29 30} Eighty two per cent (GP 81%; pharmacy 87%) of participants were from black and minority ethnic groups, the mean age of participants was 41 years (GP 42.6 years; pharmacy 38.9 years) and participants predominantly resided in areas of high socioeconomic deprivation (mean IMD score=43.6: GP 43.8; pharmacy 43.3). While comparative data is hard to come by, the demographic characteristics of the participants in this programme may make this cohort unique and make direct comparison with results from other studies problematic. For example, in the GP and pharmacy arms of the *Lighten Up* trial, hosted in the neighbouring South Birmingham PCT, 10% and 13% of participants respectively were from black and minority ethnic groups, mean age was 50.5 years and 48.9 years respectively and mean IMD scores were 32.2 and 35.1 respectively.²²

GP participants were older, less likely to self-define their ethnicity as Asian, heavier and had higher BMIs at baseline than pharmacy participants. It has been reported that individuals with higher BMI categories are more likely to report large decreases in weight than individuals with lower BMI categories.^{31 32} The heterogeneity between GP and pharmacy participants should be noted when interpreting the results.

Almost two-thirds of participants enrolled on the *My Choice Weight Management Programme* lost weight at session 12. The reductions in weight seen in the programme at twelve weeks were broadly similar with those observed in the GP and pharmacy arms at the

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same stage of the *Lighten Up* trial.²² Weight loss and BMI reduction was higher among GP completers than pharmacy completers.

One of the principal targets for participants in the *My Choice Weight Management Programme* was to lose 5-10% of their initial weight. Fourteen per cent of participants achieved a reduction in weight of 5% or more with no difference in performance between providers. The proportion of participants on the programme achieving a weight loss of at least 5% by session 12 is lower than that observed in the GP and pharmacy arms of the *Lighten Up* trial while the proportion of pharmacy participants who achieved a reduction in weight of 5% or more was higher than that reported by Morrison et al.^{17 22} There were no statistically significant relationships between sex, age, IMD quintile or ethnicity and weight loss at session 12.

Completers attending the *My Choice Weight Management Programme* at pharmacies appeared to be more successful at maintaining weight loss after completion of session 12 than completers attending at GPs. At session 15, weight loss (both absolute and as a percentage value) and BMI reduction was higher among pharmacy completers than GP completers. Indeed, completers at GP practices tended to gain weight between sessions 12 and 15. Among participants attending both session 12 and 15, pharmacy participants continued to lose weight whereas GP participants gained weight.

The mean weight loss achieved by participants at session 15 (approximately 9 months) is of a similar quantum to that achieved in other programmes at one year.^{22 33} Mean weight loss in pharmacy participants at session 15 (2.0 kg) was similar to that reported by Morrison et al (LOCF) at one year (1.7 kg).¹⁷ The mean weight loss achieved among GP completers at session 15 (9% of participants, n=23/268; weight loss 2.3 kg) is slightly less than that seen at one year follow up in the Counterweight Project (34% of participants, n=642/1906; weight loss 3.0 kg).¹⁴

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Participant dropout was relatively common in the programme with less than half of recruited participants going on to complete the programme. High levels of participant dropout have been highlighted as a recurring feature of pharmacy-based weight management services and only 50% of pharmacy participants on the *My Choice Weight Management Programme* attended session 12.^{17-19 29} However, it should be noted that attendance rates on the programme were better at pharmacies than at GP providers. The demographic characteristics of participants had no discernible impact on completion rates.

The total cost of delivering the *My Choice Weight Management Programme* was £50,200. Total costs were higher among GP providers than among pharmacy providers. Costs per participant and per completing participant were higher through pharmacies than through GPs. This is a result of the larger number of participants recruited by GPs (thus allowing for distribution of, for example, training costs across a larger pool of participants) and the lower rates of attendance observed among GP participants. These costs are broadly similar for those reported for pharmacy and GP providers in the *Lighten Up* trial although it should be noted that the figures from *Lighten Up* do not include any training costs for providers, are calculated for a standard pool size of 70 participants and that recruitment in the trial was organised by a central call centre.²² When controlling for the number of sessions hosted, costs were broadly similar with pharmacy provision costing slightly less per participant than GP provision. Costs per 1% of weight loss during the programme were higher amongst pharmacy completers than amongst GP completers at session 12. At final-follow-up, costs per 1% weight loss were higher amongst GP completers than amongst pharmacy completers although this difference was not statistically significant.

The *My Choice Weight Management Programme* demonstrated similar levels of effectiveness to other primary care based weight management programmes. Reductions in weight loss at 12 weeks were modest but were maintained in a significant proportion of the

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cohort when assessed at final follow-up (approximately 9 months after recruitment in to the programme). Amongst participants attending the first 12 weeks of the programme, weight loss was greater among participants attending the programme at GP practices than among participants attending the programme at a community pharmacy. However, pharmacy completers were more likely than GP completers to maintain, and indeed increase weight loss between week 12 and final follow-up.

Given the modest levels of effectiveness observed, allied to weight gain in some participants between week 12 and final follow-up and the not inconsiderable costs incurred in provision of the programme, this study adds weight to the argument that individual-level, primary care interventions are unlikely to prove effective or cost-effective in combating the problems posed by obesity.³³ The difficulty in inducing weight loss amongst a cohort with unique demographic characteristics – *My Choice Weight Management Programme* participants were recruited from areas with high levels of socioeconomic deprivation and over four-fifths of participants were from Black and Minority Ethnic groups; populations which are traditionally underserved by healthcare interventions – suggests that population-level interventions, including changes to government policy, are likely to be necessary to tackle the obesity epidemic.

The case for further investigation of the *My Choice Weight Management Programme* is not compelling but may be desirable given the atypical (in the context of the wider UK population) nature of the cohort examined. Any future research should examine whether the intervention is replicable in a larger cohort, over a longer period of time and attempt to account for any possible sampling bias and reduce the possibility of confounding via randomisation of participants to distinct control and intervention arms. Given reports of weight gain between cessation of intensive intervention and follow-up sessions in community-based weight management interventions, future assessments of such

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interventions should consider greatly extending follow-up periods or even leaving follow-up periods open so that interventions have no pre-defined end point.^{14 16 22}

CONFLICT OF INTEREST

This research was funded by a grant from the commissioning organisation (NHS Heart of Birmingham teaching Primary Care Trust). This organisation, which no longer exists, was a public body which was responsible for the commissioning and provision of primary care NHS services to the population of central Birmingham.

The authors declare no personal conflicts of interest.

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JB and CL designed data collection instruments and analysed and interpreted the data. SM designed data collection instruments and collected the data. All authors were involved in writing the paper and had final approval of the submitted version.

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TABLES

Table 1: Characteristics of participants at baseline by provider type. Figures are numbers (percentages) unless otherwise stated.

Characteristics	Combined	GP	Pharmacy	p-value
Participants	451 (100.0)	268 (59.4)	183 (40.6)	-
Male sex	65 (14.4)	41 (15.3)	24 (13.1)	0.517
Mean (SD) age (years)	41.1 (12.4)	42.6 (11.8)	38.9 (13.0)	0.002
Mean (SD) IMD 2010	43.6 (15.0)	43.8 (15.8)	43.3 (13.8)	0.703
Ethnic group				
<i>Asian</i>	231 (51.2)	117 (43.7)	114 (62.3)	
<i>Black</i>	116 (25.7)	74 (27.6)	42 (23.0)	
<i>Mixed</i>	20 (4.4)	17 (6.3)	3 (1.6)	<0.001 ¹
<i>White</i>	77 (17.1)	53 (19.8)	24 (13.1)	
<i>Other</i>	3 (0.7)	3 (1.1)		
<i>Missing</i>	4 (0.9)	4 (1.5)		

¹'other' and 'missing' categories excluded

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Table 2: Attendance at sessions in the My Choice Programme by provider type. Figures are numbers (percentages) unless otherwise stated.

Attendance measure	Combined	GP	Pharmacy	p-value
Total number of sessions attended by all participants	3182 (58.8)	1735 (53.9)	1447 (65.9)	-
Mean number (SD) of sessions attended per participant	7.0 (4.4)	6.5 (4.2)	7.9 (4.5)	<0.001
Participants attending session 12 (% recruited participants)	167 (37.0)	75 (28)	92 (50)	<0.001
Participants attending session 15 (% recruited participants)	83 (18.4)	23 (9)	60 (33)	<0.001

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Table 3: Baseline measurement data by provider type. Figures are numbers (percentages) unless otherwise stated.

Measurement	Combined (n=451)	GP (n=268)	Pharmacy (n=186)	p-value	
Mean (SD) starting weight (kg)	91.9 (18.5)	95.8 (18.4)	86.1 (17.1)	<0.001	
Mean (SD) starting BMI (kg/m ²) ¹	34.5 (5.7)	35.6 (5.6)	33.0 (5.6)	<0.001	
Mean (SD) starting waist circumference (cm) ²	107.3 (13.9)	108.8 (14.1)	105.1 (13.4)	0.004	
Starting BMI (kg/m ²)					
	<30	79 (17.7)	27 (10.2)	52 (28.6)	<0.001
	30-34	182 (40.7)	107 (40.4)	75 (41.2)	
	35-39	105 (23.5)	76 (28.7)	29 (15.9)	
	≥40	81 (18.1)	55 (20.8)	26 (14.3)	

¹n=447 owing to missing/erroneous recording of participants' height

²n=444 owing to missing values

Table 4: Participant outcomes at session 12 and session 15 by provider type. Figures are numbers (percentages) unless otherwise stated.

Outcomes		Combined	GP	Pharmacy	p-value
Session 12					
Mean weight loss (95% CI) (kg)	Completers ¹	3.0 (±0.5)	3.8 (±0.8)	2.4 (±0.6)	0.007
	LOCF ²	1.7 (±0.3)	1.8 (±0.4)	1.6 (±0.4)	0.549
Mean percentage weight loss (95% CI)	Completers	3.3 (±0.5)	4.0 (±0.9)	2.8 (±0.7)	0.031
	LOCF	1.9 (±0.3)	1.8 (±0.4)	1.9 (±0.4)	0.875
Percentage weight loss					
<i>No change/ weight gain</i>	Completers	25 (15.1)	11 (14.7)	14 (15.4)	C ³ =0.328 L ⁴ =0.080
	LOCF	162 (35.9)	107 (39.9)	55 (30.1)	
0.1%-4.9%	Completers	95 (57.2)	39 (52.0)	56 (61.5)	
	LOCF	225 (49.9)	123 (45.9)	102 (55.7)	
≥5%	Completers	46 (27.7)	25 (33.3)	21 (23.1)	
	LOCF	64 (14.2)	38 (14.2)	26 (14.2)	
Mean reduction (95% CI) in BMI (kg/m ²)	Completers	1.1 (±0.2)	1.4 (±0.3)	0.9 (±0.2)	0.006
	LOCF	0.6 (±0.1)	0.6 (±0.1)	0.7 (±0.2)	0.586
Mean reduction (95% CI) in waist circumference (cm)	Completers	5.4 (±0.8)	6.0 (±1.3)	4.9 (±0.9)	0.186
	LOCF	3.9 (±0.9)	4.1 (±1.5)	3.6 (±0.7)	0.578
Session 15					
Mean weight loss (95% CI) (kg)	Completers ⁵	3.1 (±0.9)	2.3 (±1.9)	3.4 (±1.1)	0.324
	LOCF ²	1.9 (±0.3)	1.8 (±0.4)	2.0 (±0.5)	0.507
Mean percentage weight loss (95% CI)	Completers	3.5 (±1.1)	2.2 (±1.9)	4.0 (±1.3)	0.131
	LOCF	2.0 (±0.3)	1.8 (±0.4)	2.3 (±0.6)	0.161
Percentage weight loss					
<i>No change/ weight gain</i>	Completers	21 (25.6)	8 (36.4)	13 (21.7)	C=0.062 L=0.029
	LOCF	171 (37.9)	113 (42.2)	58 (31.7)	
0.1%-4.9%	Completers	29 (35.4)	10 (45.5)	19 (31.7)	
	LOCF	200 (44.3)	116 (43.3)	84 (45.9)	
≥5%	Completers	32 (39.0)	4 (18.2)	28 (46.7)	
	LOCF	80 (17.7)	39 (14.6)	41 (22.4)	
Mean reduction (95% CI) in BMI (kg/m ²)	Completers	1.2 (0.4)	0.8 (±0.7)	1.3 (±0.4)	0.279
	LOCF	0.7 (±0.1)	0.8 (±0.2)	0.7 (±0.2)	0.474
Mean reduction (95% CI) in waist circumference (cm)	Completers	6.1 (1.4)	4.9 (±2.6)	6.5 (±1.6)	0.332
	LOCF	3.7 (±0.7)	3.4 (±1.0)	4.2 (±0.8)	0.267
Between session 12 and session 15⁵					
Mean weight loss/gain (95% CI) (kg)		0.6 (±0.8)	-0.8 (±1.7)	1.2 (±0.9)	0.053
Mean percentage weight loss/gain (95% CI)		0.8 (±0.9)	-0.9 (±1.7)	1.4 (±1.1)	0.030

¹Among participants attending session 12 (combined n=166: GP n=75; pharmacy n=91). n=91 for pharmacy participants for weight loss, % weight loss and BMI owing to the erroneous recording of weight for one participant.

²Last Observation Carried Forward (combined n=451: GP n=268; pharmacy n=183). n=448 (GP n=266; pharmacy n=182) for BMI data and n=444 (GP n=261; pharmacy n=183) for waist circumference data owing to missing baseline values.

³C=Completers

⁴L=LOCF

⁵Among participants attending session 15 (combined n=82: GP n=22; pharmacy n=60). At session 15 n=22 for weight loss, % weight loss and BMI owing to the erroneous recording of weight and waist circumference for one participant.

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Table 5: Costs of the My Choice Programme by provider type. Figures are in pounds sterling (£).

Outcomes	Combined	GP	Pharmacy	p-value
Breakdown of costs				
<i>Training</i> ¹	6,600	3,300	3,300	
<i>Initial assessments</i> ²	13,530	8,040	5,490	-
<i>Subsequent appointments</i> ³	30,070	15,630	14,440	
Total costs	50,200	26,970	23,230	-
Costs per participant ⁴	111.3	100.6	126.9	<0.001
Cost per participant per session ⁴	20.1	20.3	19.8	0.631
Total costs per 1% of weight loss (where participants lost weight)				
<i>Among participants attending session 12</i> ⁵	74.3	59.0	87.0	0.042
<i>Among participants attending session 15</i> ⁶	59.1	81.7	52.3	0.171

¹Providers were reimbursed £300 for attending two days of training upon recruitment of 6 participants

²Providers were reimbursed £30 for the initial assessment of each participant

³Providers were reimbursed £10 for each consultation after the initial assessment

⁴Combined n=451: GP n=268; Pharmacy n=183

⁵Combined n=167: GP n=75; Pharmacy n=92

⁶Combined n=83: GP n=23; Pharmacy n=60

APPENDIX: The structure of the My Choice Weight Management Programme (NB: all verbal and written information provided during the programme is designed with the inclusion of advice, information and practical ideas specific to black and minority ethnic groups)

Session number	Topic	Handouts
0	<p>Screening Issue with weigh loss raised. Check eligibility (BMI) and assess motivation. Provide an explanation of My Choice and gain consent. Book first appointment.</p>	<ul style="list-style-type: none"> • My Choice leaflet • Detailed information sheet • Consent form • Appointment card
1	<p>Assessment Welcome patient. Listen to the client and attempt to establish a rapport. Enquire about patient beliefs and their understanding about obesity. Gather information to characterise the health risks for the client, gaining a picture of current lifestyle, habits and identifying potential difficulties and barriers to weight loss. Discuss expectations and agree the way forward. Explain the My Choice programme. Measure weight and waist circumference. Work through the assessment sheet and introduce the food & activity diary. Explore ambivalence and assess client's motivation. Assess readiness to change. Provide an introduction to SMART goal setting and identify first goals.</p>	<ul style="list-style-type: none"> • Patient record sheet (demographic and measurement details) for practitioners • My Choice Record Card for patients • Food and activity diary • Change plan (goal setting) and goal record card • Quality of Life Questionnaire
2	<p>Healthy Eating Review food & activity diary. Discuss key healthy eating messages and practical ideas for incorporating them into lifestyle. Discussion and support is tailored to each individual. Explain traffic light food guide and discuss alternatives for foods high in fat or sugar and how to reducing the fat in the participant's food. Discuss healthy eating on a budget. Take weight and waist measurements. Further goal setting.</p>	<ul style="list-style-type: none"> • My Choice Healthy Eating booklet • Eatwell plate diagram • How balanced is my diet sheet. • Tips for adapting cultural recipes information.
3-11	<p>The order in which sessions 3-11 are delivered is tailored to the patient after discussion between the patient and the provider. The order the sessions are delivered in is dependent on which topics are the most relevant to address at the time of the appointment.</p>	
	<p>Being More Active Recap on last session. Review of goals and goal setting. Take weight and waist measurements. Discuss physical activity recommendations, reasons to be more active, where to start being active, day-to-day activity, structured activity, walking programme and overcoming barriers to activity.</p>	<ul style="list-style-type: none"> • Being more active leaflet • Overcoming barriers worksheet • Relevant local activity opportunities information
	<p>Planning Ahead Recap on last session. Review of goals and goal setting. Take weight and waist measurements.</p>	<ul style="list-style-type: none"> • Planning ahead leaflet • Recipe ideas

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	<p>Provide shopping tips, cooking tips and meal ideas to support weight loss and maintenance of weight status.</p>	
	<p>Hunger and Emotional Eating Recap on last session. Review of goals and goal setting. Take weight and waist measurements.</p> <p>Describe how to use the hunger scale. Discuss lifelong habits, unnecessary eating, triggers (particularly emotional triggers) and behaviour change.</p>	<ul style="list-style-type: none"> • Hunger and emotional eating leaflet • Behaviour chain worksheet • Identifying triggers worksheet
	<p>Eating Frequency and Snacking Recap on last session. Review of goals and goal setting. Take weight and waist measurements.</p> <p>Identifying high risk situations, choosing low calorie snacks, difference between thirst and hunger.</p>	<ul style="list-style-type: none"> • Healthy snacking leaflet
	<p>Coping with Slip Ups and Setbacks Recap on last session. Review of goals and goal setting. Take weight and waist measurements.</p> <p>Highlight that slip ups and setbacks will happen. Discuss practical ways to overcome them, staying on track, what to do if they do happen and examples of slip ups and setbacks.</p>	<ul style="list-style-type: none"> • Coping with slip ups and setbacks leaflet • High risk situations and strategies worksheet
	<p>Portion Control Recap on last session. Review of goals and goal setting. Take weight and waist measurements.</p> <p>Provide information on recommended portion sizes. Assess knowledge of what a portion is, a standard portion size and how much the participant should eat daily.</p>	<ul style="list-style-type: none"> • Portion control leaflet
	<p>Special Occasions Recap on last session. Review of goals and goal setting. Take weight and waist measurements.</p> <p>Highlight 'damage limitation' strategies to cope with the excessive consumption of calories centred around special occasions. Discuss how to get back 'on track' and what can be done before an event to minimise any damage to weight loss targets. Consider the best choices for takeaways and eating out.</p>	<ul style="list-style-type: none"> • Special Occasions leaflet
	<p>Food Labelling Recap on last session. Review of goals and goal setting. Take weight and waist measurements.</p> <p>Provide information on food ingredients, nutritional information, daily amount guidance, traffic light labelling and food labelling claims.</p>	<ul style="list-style-type: none"> • Food labelling leaflet • Food labels card for shopping
	<p>Support and Rewards Recap on last session. Review of goals and goal setting. Take weight and waist measurements.</p>	<ul style="list-style-type: none"> • Support and Rewards Leaflet

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	Brief discussion of (the benefits of) social support, non-food rewards, friends, family and practitioner support.	
	<p>Drinks Recap on last session. Review of goals and goal setting. Take weight and waist measurements.</p> <p>Outline fluid facts, alcohol facts and information on the calorie content of drinks. Offer tips to stay more hydrated.</p>	<ul style="list-style-type: none"> • Drinks leaflet
12	<p>Maintaining Weight Loss Review progress to date. Monitor weight and waist circumference. Discuss weight maintenance. Identify any potential risk of relapse and identify successes. Develop plans for self-monitoring and support. Complete Appointment 12 Assessment Sheet. Discuss how to maintain any weight loss achieved and how to reshape negative thoughts. Outline useful strategies for maintaining weight loss including support from others, coping with difficult situations, behaviour change and maintaining a food and activity diary.</p>	<ul style="list-style-type: none"> • Quality of Life Questionnaire • Maintaining Weight Loss leaflet • Reshape Negative Thoughts worksheet
Follow up 1	<p>(Patients can attend up to 3 follow up appointments at 2 month intervals) Take weight and waist circumference. Discuss progress and refresh on any topics covered during the 12 week programme. Set goals to help patient get back on track/lose further weight.</p>	
Follow up 2		
Follow up 3		Quality of Life Questionnaire