Received: 13 June 2020 | Revised: 14 October 2020 | Accepted: 14 October 2020

DOI: 10.1111/cen.14354

ORIGINAL ARTICLE

WILEY

Older age does not influence the success of weight loss through the implementation of lifestyle modification

Eimear Leyden[1,2] | Petra Hanson[1,2] | Louise Halder[2] | Lucy Rout[2] | Ishbel Cherry[2] | Emma Shuttlewood[2] | Donna Poole[2] | Mark Loveder[2] | Jenny Abraham[2] | Ioannis Kyrou[1,2,3] | Harpal S. Randeva[1,2] | FT Lam[2] | Vinod Menon[1,2] | Thomas M. Barber[1,2]

[1]Division of Biomedical Sciences, Warwick Medical School, Clinical Sciences Research Laboratories, University Hospitals Coventry and Warwickshire, Coventry, UK

[2]Warwickshire Institute for the Study of Diabetes, Endocrinology and Metabolism, University Hospitals Coventry and Warwickshire, Coventry, UK

[3]Aston Medical Research Institute, Aston Medical School, Aston University, Birmingham, UK

Correspondence
Thomas M. Barber, Division of Biomedical Sciences, Warwick Medical School, Clinical Sciences Research Laboratories, University Hospitals Coventry and Warwickshire, Clifford Bridge Road, Coventry, CV2 2DX, UK.
Email: T.Barber@warwick.ac.uk

Abstract

Objective: Age is sometimes a barrier for acceptance of patients into a hospital-based obesity service. Our aim was to explore the effect of age on the ability to lose weight through lifestyle interventions, implemented within a hospital-based obesity service.

Design: Retrospective study.

Patients: We included a cohort of randomly selected patients with morbid obesity (n = 242), who attended our hospital-based obesity service during 2005-2016 and received only lifestyle weight loss interventions.

Measurements: Primary outcome measures were percentage weight loss (%WL) and percentage reduction in body mass index (%rBMI) following implemented lifestyle interventions. Data were stratified according to patient age at referral: group 1 (age < 60 years, n = 167) and group 2 (age ≥ 60 years, n = 75). Weight loss was compared between groups, and correlations with age at referral were explored.

Results: The duration of hospital-based weight loss interventions ranged between 1 and 143 months (mean: 38.9 months; SD: 32.3). Baseline BMI at referral differed significantly between groups 1 and 2 (49.7 kgm^{-2} [SD: 8.7] vs 46.9 kgm^{-2} [SD: 6.1], respectively; P < .05). Following implemented lifestyle interventions, between groups 1 and 2 there were no differences in %WL (6.9% [SD: 16.7] vs 7.3% [SD: 11.60], respectively; P = NS) or %rBMI (8.1% [SD: 14.9] vs 7.8% [SD: 11.7], respectively; p = NS). Overall, there was no significant correlation between patient age at referral and %WL (r = −.13, p = NS).

Conclusions: Older age does not influence the success of weight loss through the implementation of lifestyle modification within a hospital-based obesity service. Therefore, age *per se* should not influence clinical decisions regarding acceptance of patients to hospital-based obesity services.

KEYWORDS
age, lifestyle, obesity, weight loss

1 | INTRODUCTION

Obesity is a major contributor to ill health globally. There are >50 obesity-related co-morbidities that mediate this global burden of obesity [1-3] and manifest in many ways. These include metabolic disturbances (such as type 2 diabetes mellitus [T2D]), mechanical problems (osteoarthritis in weight-bearing joints, nerve entrapments and physical effort of breathing and moving), malignancies, emotional distress, psycho-social problems and economic hardship.[4] Indeed, expenditure on management strategies for obesity and obesity-related co-morbidities accounts for substantial healthcare costs globally.[5,6] Importantly, obesity also associates with psychiatric conditions, such as depression and anxiety, and contributes towards low self-esteem and poor quality of life.[7,8] Many of the co-morbidities associated with obesity develop over time, with occurrence of obesity-related metabolic disturbances being less likely in younger patients.[9] Pathologies that underlie obesity-related co-morbidities (such as osteoarthritis and atherosclerosis) usually develop over decades as a slow process, thereby accumulating detrimental cellular and tissue effects in older age. This provides a probable explanation for a temporal impact of obesity-related co-morbidities. Furthermore, the ageing process dually and independently influences most obesity-related co-morbidities, including vascular-related co-morbidities.[10,11] Indeed, in one sense obesity accelerates the normal ageing process at a faster rate than in similarly aged lean counterparts. Therefore, older patients with obesity are likely to suffer a 'double-whammy' of co-morbidity, dually influenced by both obesity and ageing.

No one is immune from obesity. Patients of any age, socio-economic background, sex, income, educational level and ethnicity are affected.[12] It is important that as healthcare professionals, we maintain compassion, insight and understanding regarding obesity as a great 'leveller' within society. Furthermore, we need to adopt a malleable and protean approach to obesity management that morphs according to each individual patient with unique clinical needs. In this regard, obese patients of older age (defined here as age ≥60 years) should be considered as a group that requires special attention. Management of obesity in patients of older age can be particularly challenging for numerous reasons. As alluded to earlier, obesity- and age-related co-morbidities (including psychiatric disorders like depression) are more likely to manifest in patients of older age, whilst therapeutic options are limited due to both licensing restrictions and/or underlying co-morbidities. Furthermore, although not stated in guidelines from relevant scientific societies, there is a general reluctance to pursue more invasive weight loss interventions (eg bariatric surgery) in patients >75 years, with only a minority of bariatric procedures performed in this age group.[13] There may also be a reluctance to refer patients of older age for obesity management for a variety of reasons that may originate from the patient and/or referring healthcare professional.

Implementation of effective obesity management is important for all age groups. However, despite all the problems outlined here, it is particularly important to implement effective management strategies against obesity in the older population. Over recent years, our modern-day healthcare culture has placed more emphasis on maintenance of health and well being, as well as healthy ageing.[14] This change in health culture, combined with a growing ageing population in recent decades,[15] highlights even more the need to optimize obesity management in older patients. In this context, lifestyle modification for weight loss (an umbrella term that encapsulates a variety of behaviours, applied within various settings) constitutes the cornerstone of effective obesity management in older individuals. It is important, therefore, to explore the clinical utility of current lifestyle management strategies in older patients with obesity.

The aim of the present study was to assess the effect of age on the ability to lose weight through lifestyle interventions, implemented within our hospital-based obesity service.

2 | MATERIALS AND METHODS

2.1 | Subjects

In the UK, hospital-based obesity management often focuses on lifestyle modification. This ideally includes focused dietary support, combined with both medical and psychological input. For inclusion in the study, there was random selection of patients who attended our hospital-based obesity service at the Warwickshire Institute for the Study of Diabetes, Endocrinology and Metabolism (WISDEM) centre, University Hospitals Coventry and Warwickshire (UHCW) between 2005 and 2016. All patients included in the study had conservative management provided within our hospital-based obesity service through lifestyle interventions (including dietary and psychological support). There was retrospective collection of all relevant clinical details for each patient from the UHCW reporting system. We acquired institutional ethical approval for this study.

2.2 | Study primary outcomes and groups

The primary outcome measures were percentage weight loss (%WL) and percentage reduction in body mass index (% rBMI) following implemented lifestyle interventions. To ascertain the effect of patient age on %WL and %rBMI, data were stratified according to patient age at referral: group 1 (age < 60 years) and group 2 (age ≥ 60 years).

2.3 | Statistical analyses

We performed all statistical analyses using IBM SPSS Statistics version 26. Independent-sample t tests were used to compare %WL following implemented lifestyle interventions between groups 1 and 2. Pearson correlations were used to compare age at referral with %WL. We report results as mean and standard deviation (SD). A p-value of <.05 was considered statistically significant.

3 | RESULTS

3.1 | Descriptive statistics

Based on age at referral to our hospital-based obesity service, the study cohort (n = 242) was divided into groups 1 and 2 (n = 167 and n = 75, respectively). The age range of these patients at the time of referral was 18-78 years. Reflective of the sex distribution of the patients within our hospital-based obesity service as a whole, the majority of the study cohort (n = 171; 70.7%) were female. Furthermore, each study group contained a majority of female patients (group 1: n = 126, 75.4%; group 2: n = 45, 60%). Overall, the duration of hospital-based weight loss lifestyle interventions in this cohort ranged between 1 and 143 months. The explanation for the broad range of duration of lifestyle intervention is that the two participants at the extreme ends (1- and 143-months) were outliers. The overall mean duration of lifestyle implementation was 38.9 months (SD: 32.3). Furthermore, the duration of lifestyle implementation was similar for both group 1 (mean duration 41.5 months; SD 33.1) and group 2 (mean duration 33.6 months; SD 30.1). Baseline BMI at referral differed significantly between groups 1 and 2 (49.7kgm^{-2} [SD 8.7] vs 46.9kgm^{-2} [SD 6.1], respectively; p < .05). A substantial proportion of the study cohort (n = 106; 43.8%) had a confirmed diagnosis of diabetes mellitus (DM), with the vast majority having T2D (n = 103) and only a few (n = 3) type 1 diabetes mellitus (T1D). DM was present in 35.3% of group 1 (n = 59; T2D: n = 56; T1D: n = 3) and 62.7% of group 2 (n = 47; all T2D) (Table 1).

3.2 | Change in %WL and %rBMI following implemented lifestyle interventions

Following implemented lifestyle interventions, there were no differences between groups 1 and 2 in %WL (6.9% [SD: 16.7] vs 7.3% [SD: 11.60], respectively; p = NS) or %rBMI (8.1% [SD: 14.9] vs 7.8% [SD: 11.7], respectively; p = NS). For the whole cohort, there was no significant correlation between age at referral to our hospital-based obesity service and %WL (correlation coefficient = −.13; P = NS). Data are shown in Table 1. A scatterplot of age at referral versus %rBMI is shown in Figure 1.

TABLE 1 Selected compared characteristics between patients with morbid obesity for group 1 (age < 60 years) and group 2 (age ≥ 60 years)

	Study Group 1 (n = 167)	Study Group 2 (n = 75)
Age range	18-60 years	≥60 years*
BMI at baseline	49.7 kgm^{-2} (SD: 8.7)	46.9 kgm^{-2} (SD: 6.1)*
Confirmed DM, n (%)	59 (35.3%)	47 (62.7%)
%WL with lifestyle	6.9% (SD: 16.7)	7.3% (SD: 11.60)

Note: All patients attended our hospital-based obesity service and received only lifestyle weight loss interventions (including dietary and psychological support).

Abbreviations: %WL, percentage weight loss; BMI, body mass index; DM, diabetes mellitus; SD, standard deviation.

*p < .05 (comparison between data for groups 1 and 2).

4 | DISCUSSION

The present study demonstrates that amongst patients with morbid obesity referred to a hospital-based obesity service, the effectiveness of lifestyle weight loss interventions on %WL and %rBMI is not influenced by age of the patient at the time of referral. Indeed, comparisons between those patients <60 years and ≥60 years old at the time of referral to our service showed no significant differences in weight loss between these two groups.

There are many potential barriers to effective obesity management in a hospital-based service for patients of older age. Moreover, there may be some inertia to referral of older patients from primary care or other specialist healthcare professionals in secondary care.[16] Misconceptions about the utility and effectiveness of weight management in older patients may drive such attitudes. As such, there may be reluctance of older patients to have referrals for obesity management, particularly in the context of other age-related co-morbidities that diminish quality of life. Health economic barriers may also exist that restrict available resources for obesity management in older patients with morbid obesity, due to the relative future benefits of effective weight loss. Finally, there may be misconceptions about the motivation and ability of older patients to comply effectively with a structured weight loss programme, especially when frailty, physical and mental impairments and multiple other co-morbidities also co-exist.

To optimize weight loss services offered to older patients with obesity, we need to appreciate the differences between ageist preconceptions and stereotypes, and evidence-based best practice. Contrary to the misconceptions outlined above, the present study demonstrates that older age does not associate with diminished ability of patients to lose appreciable weight through a structured hospital- and lifestyle-based weight loss programme. Consistent with our data, an excellent systematic review by Burgess and colleagues, exploring barriers to behavioural change and predictors of adherence to lifestyle intervention programmes for adults with obesity, showed that older age was a key predictor of adherence to such programmes.[17] In this study, other predictors of adherence included better baseline mood, being male, lower baseline BMI and early weight loss success.[17] Moreover, another study in a cohort of older patients (aged 55-75 years) with BMI above the normal range and metabolic syndrome showed that optimized diet (including adherence to a Mediterranean diet) and physical activity inversely associated with the hepatic steatosis index (a marker of non-alcoholic fatty liver disease). This suggests potential benefits not only for weight loss but also for obesity-related co-morbidities in this age group.[18] Of note, a study by Batsis and colleagues on older patients (≥65 years) with obesity in rural areas with reduced access

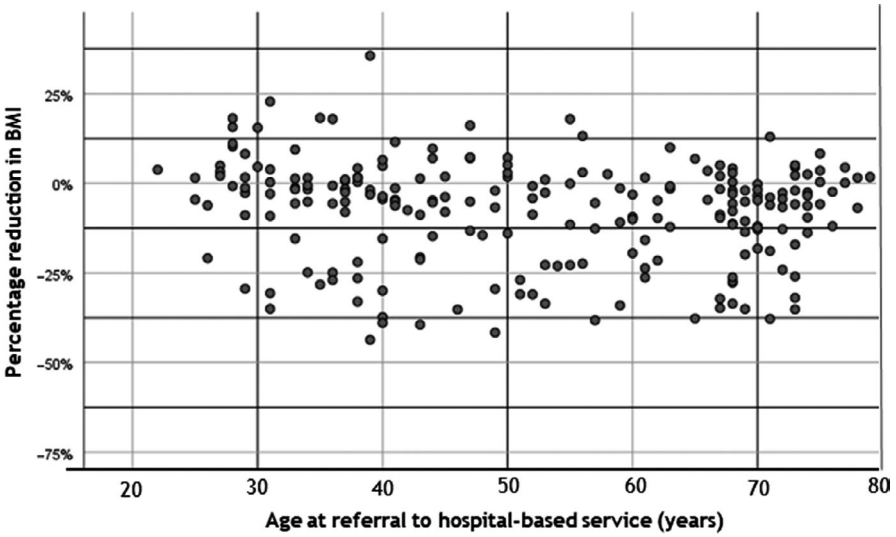

FIGURE 1 Scatterplot showing relationship between age at referral to hospital-based obesity service and percentage change in BMI following lifestyle implementation

to obesity management services explored a multi-component intervention programme including a wearable device, dietary input and aerobic activity.[19] This study confirmed feasibility and acceptability of this weight loss programme, with good weight loss (mean: 4.6Kg), and improved objective measures of physical functioning.[19] Taken together, such data and the findings of the present study indicate that older age *per se* does not impede successful implementation of lifestyle measures against obesity. On the contrary, some studies even show that older age is a predictor for compliance with lifestyle programmes for obesity and achievement of successful weight loss. Although there are relatively few reported studies on the cost-effectiveness of lifestyle-based weight loss interventions in the older patient, in one study by Zomer and colleagues, a Markov model was employed to explore the cost-effectiveness of weight loss interventions in the prevention of cardiovascular disease (CVD), in overweight and obese individuals between the ages of 30 and 74 years.[20] Overall, the expenditure on weight loss interventions was relatively low and cost-effective, with the prevention of 4 CVD events, and the saving of 17 quality-adjusted life-years over 10-years per 1000 individuals.[20]

Quality of life (QOL) is an important contributor to overall health and well being. Zabelina and colleagues demonstrated that aspects of QOL (eg physical functioning) generally worsen with age in patients with increased BMI.[21] Interestingly, in the same study other aspects of QOL, such as self-esteem and distress associated with being in public, actually improved with age.[21] Furthermore, in a nationwide study from New Zealand on older adults (aged 55-70 years), obesity was a predictor for poorer QOL, with other predictors including chronic conditions, lower annual income, sight and sleep problems, greater age and fewer years of education.[22] Our own group has also previously reported a correlation between increasing age and worsening physical and sexual functioning in patients with morbid obesity identified for bariatric surgery in our hospital-based obesity service.[23] Notably, an interesting study by Moh and colleagues on older patients (≥60 years) with T2D showed that visceral fat area associated with overall cognitive performance, suggesting that management of visceral adiposity could prevent cognitive decline in older people with T2D and reduce the global burden of dementia in ageing populations.[24] Furthermore, one cross-sectional study reported by Ozturk and colleagues on >400 individuals aged 65 years or older showed an inverse association between BMI and health-related QOL.[25] Those with sarcopenic obesity also had an increased risk of falls.[25] With an increased emphasis on maintenance of well being in older age and healthy ageing, it is now even more important that we strive to maintain QOL in patients with morbid obesity, particularly those of older age. Therefore, rather than placing multiple barriers (including mental, emotional, political and health economic) between older patients and their access to obesity management programmes and services, current evidence supports that we should be proactively promoting, encouraging and facilitating obesity management strategies for this vulnerable patient population.

Our study does have certain limitations. There was random selection of patients from the entire patient population who attend our hospital-based obesity service at WISDEM Centre, UHCW. As such, it is possible that with a larger cohort of patients and improved power, differences in %WL according to age at the time of referral may pertain. Furthermore, our study was retrospective. A prospective design would have facilitated improved statistical power. However, with inclusion of 242 patients, our randomly selected sample size was sufficient to document that age is not a major contributor to weight loss outcomes following implementation of lifestyle weight loss interventions within our hospital-based obesity setting. A further limitation is that the upper age for those patients included in our study was 78 years. Therefore, it is not possible to extrapolate possible

effects of age on lifestyle-induced weight loss for older patients (>78 years). There was a significant difference in baseline BMI between the two groups. However, the use of %WL (based on baseline body weight for each individual) would have helped to account for this potential confounder. Within group 2, the proportion of patients with DM was almost double that of group 1, which likely reflects the increasing T2D prevalence with age, particularly in the context of obesity. Finally, we were not able to report on data from the 2 groups at subsequent time-points following the conclusion of lifestyle intervention. Future studies should address any possible age-related influence on ability to adhere to lifestyle changes in the longer term, following its initial implementation.

In conclusion, we present novel data from a relatively large retrospective study showing that older age does not influence the success of weight loss through the implementation of lifestyle modification within a hospital-based obesity service. As obesity-related co-morbidities tend to worsen with ageing, older patients with obesity require additional attention and a careful and compassionate approach from a multi-disciplinary obesity team, which will address barriers based on misconceptions. To that aim, our data support the notion that age *per se* should not influence clinical decisions regarding acceptance of patients to hospital-based obesity services and the provision of hospital-based lifestyle management strategies. As existing evidence also suggests that older patients (≥60 years) respond very well to hospital-based lifestyle interventions and given the importance of healthy ageing, appropriate referral and acceptance of older patients to hospital-based obesity services should be encouraged and facilitated, overcoming the numerous barriers that currently impede this process.

ACKNOWLEDGEMENTS

We acknowledge all of the patients and healthcare professionals who contributed towards the clinical aspects of this study.

CONFLICT OF INTEREST

The authors state that there are no conflicts of interest and no relevant financial disclosures.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ORCID

Thomas M. Barber https://orcid.org/0000-0003-0689-9195

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How to cite this article: Leyden E, Hanson P, Halder L, et al. Older age does not influence the success of weight loss through the implementation of lifestyle modification. *Clin Endocrinol (Oxf)*. 2020;00:1–6. https://doi.org/10.1111/cen.14354