Ethnic differences in weight loss and diabetes remission after bariatric surgery: a meta-analysis

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CRD summary
The review concluded that bariatric surgery was more effective in patients of Caucasian background than those of African background in terms of percentage of excess weight loss, regardless of the type of surgery. No statistically significant differences in remission of diabetes between these ethnic groups were found. Despite the lack of randomised studies, these conclusions are likely to be reliable.

Authors' objectives
To estimate the difference in percentage of excess weight loss after bariatric surgery in people of African or Caucasian ethnic background.

Searching
MEDLINE and EMBASE were searched from 1978 to November 2011 for studies reported in English. Reference lists of included studies were consulted to identify further studies. Search terms were reported.

Study selection
Studies that included patients of both African and Caucasian ethnic background and that reported on percentage of excess weight loss and/or diabetes remission after bariatric surgery were eligible. Studies that had a mean follow-up of between one and two years were included. Studies with children and adolescents or patients with a BMI of less than 35kg/m² were excluded. All study designs and all types of bariatric surgery were included. Any bariatric surgery that included a malabsortive component was classed as malabsortive; others were classed as restrictive. The definition of diabetes remission was reported.

Mean age ranged from 37 to 50 years and mean BMI ranged from 44.5 to 59.6kg/m². Two thirds of the patients were of Caucasian background and one third were of African background. Where reported, the large majority of patients were women. Criteria used to classify diabetes varied across the studies. Most patients underwent malabsortive bariatric surgery.

Two reviewers independently selected the records with resolutions reached by consensus.

Assessment of study quality
Study quality was assessed by two reviewers independently using Newcastle-Ottawa Scale and GRADE to evaluate internal validity, generalisability and heterogeneity.

Data extraction
Data were extracted to calculate percentages of excess weight loss and differences in diabetes remission between patients of African and Caucasian background. Study authors were contacted in case of missing data.

The authors did not state how many reviewers extracted the data.

Methods of synthesis
The data were pooled using in a meta-analysis (random-effects model) to calculate overall mean differences (MD) and odds ratios (OR) with 95% confidence intervals (CI). Heterogeneity was assessed using the $I^2$ statistic. Subgroup analyses were performed by type of surgery (malabsorptive and restrictive). Sensitivity analyses were conducted to explore the robustness of the data and the influence of follow-up duration, baseline differences in BMI and study quality on the pooled effects. Publication bias was explored using a funnel plot.

Results of the review
Fourteen observational studies (3,801 patients, range 36 to 1,025), were selected. Twelve studies scored 7 or more on
the nine-point Newcastle-Ottawa Scale. Four studies were classed as high quality, eight were medium quality and two were low quality.

Patients of Caucasian background had significantly greater percentage of excess weight loss (MD -8.36%, 95% CI -10.79 to -5.93; 13 studies). There was evidence of significant heterogeneity ($I^2=67\%$). Subgroup analyses by type of surgery showed similar results (MD -8.39%, 95% CI -11.38 to -5.40 in 10 studies for malabsorptive surgery and MD -8.46, 95% CI -12.95 to -3.97 in four studies for restrictive surgery).

Remission of diabetes was more frequent in African American than in Caucasian patients but the difference between the groups was not statistically significant (OR 1.41, 95% CI 0.56 to 3.52; three studies). There was evidence of significant heterogeneity ($I^2=59\%$).

Results of sensitivity analyses were reported. Some evidence of publication bias was found but sensitivity analyses suggested that this did not significantly affect the pooled estimates.

**Authors’ conclusions**

Bariatric surgery was more effective in patients of Caucasian background than in patients of African background in terms of percentage of excess weight loss, regardless of the type of surgery. No statistically significant differences in remission of diabetes between these ethnic groups were found but this finding was based on limited data.

**CRD commentary**

The review question and inclusion criteria were clear. Searches were for studies in English so studies in other languages may have been missed. There were attempts to minimise error and bias during study selection and quality assessment but not during data extraction.

Overall quality scores of the studies were reported. None of the studies were randomised so the evidence may have been at risk of selection bias. Methods of synthesis appeared appropriate. Heterogeneity was assessed using appropriate tools. There was evidence of heterogeneity for all reported analyses. However, the direction of effect appeared relatively consistent across the studies and sensitivity analyses suggested that the main findings were robust for percentage of excess weight loss.

Conclusions about diabetes remission were appropriately cautious due to the limited number of studies that reported on this outcome. Overall, the conclusions of the review are likely to be reliable.

**Implications of the review for practice and research**

**Practice:** The authors stated that despite ethnic differences, bariatric surgery should be considered as a long-lasting and effective treatment for morbidly obese individuals of African and Caucasian backgrounds.

**Research:** The authors stated that further prospective studies were needed to determine ethnic differences in remission of comorbidities after bariatric surgery and to investigate the exact mechanism behind these ethnic disparities.

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