Author’s response to reviews

Title: Cost-utility analysis of bariatric surgery compared with conventional medical management in Germany: a decision analytic modeling

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Response to Reviewer’s comments for the manuscript #BSUR-D-17-00053 “Cost-utility analysis of bariatric surgery compared with optimized medical management in Germany: a decision analytic modeling”

Reviewer #2 (Ralph Peterli)

Comment 1: As a non-native English speaker, I have the impression that English needs to be improved

Response: We agree with the suggestion, upon introduction of all comments the manuscript was reviewed by native English speaking scientific editor.

Action: The manuscript has been proofread by native English speaking scientific editor.

Comment 2: Syntax error in the conclusion of the abstract (page 2, line 50: …..lifetime, (and) it may cause....)

Response: This is not a syntax error, but rather a non-optimal form of statement. We aimed to say that at short time horizon (10 years) bariatric surgery is cost effective alternative to conventional medical management, while at longer run (lifetime) it is a cost-saving approach compared to traditional methods. The statement was rephrased.
Action: The statement was rephrased: “Bariatric surgery is cost-effective at 10 years and may cause substantial reduction of financial burden on the healthcare system at lifetime horizon”.

Comment 3: Page 7, line 9: all data available from the SOS trial are intention to treat analysis. The stable weight of the conservative arm or even a weight loss at 20 years is due to a number of patients operated in that group. If per protocol analysis data were available weight development in the conservative arm of the SOS trial would be worse and thus, results of the present study be even more in favour of surgery. Maybe this can be included in the discussion

Response: Surgical mix in the SOS study does not match currently used technology mix (e.g. vertical banded gastroplasty is no longer actively used). There are other factors that might impact of effectiveness of today’s surgery. So, long-term data from SOS might not necessarily reflect long-term effectiveness of modern surgery. Due to many factors, potentially contributing to appropriateness of extrapolation of data from SOS study to modern surgical treatments (either in the way of increase or decrease of effectiveness), we found it difficult to implement this particular comment, as this area is associated with significant uncertainty.

Action: Not required

Comment 4: Resource utilization and cost data: (p7, l 35ff): follow-up visits after bariatric surgery by a medical specialist (surgeon or physician) in the German health care system are much less frequent compared to other countries, follow-up is much longer necessary and the health care system in general for outpatient treatment is very special and makes comparisons to other European countries difficult

Response: Resource use was based on the expert opinion from Dr Mann (University Medical Center Hamburg). Resource utilization has been already estimated from the perspective of German health care system.

Action: Not required

Comment 5: Cohort description (p8, l24): definitions of patient groups according to BMI levels uncommon: Why did you choose these the limits 33, 37, 52, 52?, isn't BMI below 33 moderate and up to 37 severe etc??

Response: We have followed WHO definitions of grades of obesity. However, to perform so-called “single-cohort analysis” we had to choose a certain point estimate on the scale for each obesity category. The point estimates were selected by analyst and represent an approximately a
middle point on the scale (e.g. BMI level of 33 kg/m(2) for moderately obese cohort (BMI range of 30 and 35 kg/m(2)).

Action: Not required.

Comment 6: Sensitivity analysis (p9, l6ff): difficult to understand

Response: We agree with the comment and will provide a more detailed explanation.

Action: The section was re-written in the following way: “The sensitivity of the model to change of input parameters was assessed with one-way sensitivity analysis over the lifetime horizon varying different variables within a predetermined range while the remaining parameters were unaltered. Analysis was performed for a single cohort of non-smoking diabetes-free 40.4-year male with BMI of 48.8 kg/m2. Specific conditions were applied to the binary input parameters (gender, smoking and diabetes status) For the “gender” parameter, “male gender” was considered as max input, “female” gender – as min input. For diabetes and smoking their presence was considered as max input, their lack – as min input.

A probabilistic sensitivity analysis also was performed with 10,000 Monte Carlo simulations to evaluate the uncertainty of all variables at the same time. In this analysis, all parameters were varied simultaneously; they randomly varied according to a pre-specified distribution. Beta distribution was used for probabilities, gamma distributions for the longitudinal data, and costs with available descriptive statistics and for utilities. A log-normal distribution was used for the relative risks.”

Comment 7: Model validation (p9, l 35): the number of fatal and non-fatal cardiovascular events are overestimated if compared to trials in the pre-statin-era (SOS, ASCOT etc). This may have to be more elucidated in the discussion.

Response: We agree with the argument and provided additional comment in the discussion section.

Action: The following was added to the discussion section: “Generally, model-based approach is a simplification of reality. Validation of our model revealed that it overestimates all-cause mortality and myocardial infarction, however, estimates from validation studies were within credible interval of model estimates. In addition, impact on cardiovascular events might be overestimated taking into account change of medical practice over last couple of decades (including wide introduction of statins).”
Comment 8:

Table 3: avoid abbreviations in the headings, easier to read if full text available

Response: Headings have been checked for abbreviations.
Action: Not required.

Comment 9: Discussion: three different types of bariatric operations were included (Bypass, Sleeve and banding) that differ very much in effectiveness and long-term costs (f.ex. reoperations following gastric banding). The present analysis does show separate results, add at least a comment in the discussion.

Response: Analysis of cost-effectiveness of different surgical methods was not included into the manuscript due to space limitations. A comment was made in the discussion section.
Action: The following was added to the discussion section: “As the types of surgery differ in the efficacy and consequent short and long-term costs, the resulting incremental costs, clinical gains and ICER are dependent to current treatment mix. Thus, GBP might be associated with the most beneficial economic outcomes, however, this was not specifically studied in the current analysis.”

Comment 10: P.14, l27: health insurance companies do not follow widely accepted international and German guidelines, there is great amount of arbitrariness.

Response: We agree with the comment. Policy environment and relative use of surgery vs other European countries have been already addressed in the discussion section.
Action: No required.

Reviewer #3 (Antonio Valezi)

Comment 1: I suggest you to make your methods and results shorter, to turn reading more pleasant and understandable.
Response: We aimed to maintain the balance between the volume of the report and clear description of the methodological aspect and results. The content of the manuscript has been proof read by original English language editor and we suggest that this makes the reader’s perception smooth and transparent.

Action: Not required.