Supplemental information

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Characteristics |  | **Higher costs post-bariatric surgery** | | | | | | | **Lower costs post-bariatric surgery** | | |
| Present study | Maciejewisk (6) 2012 | Agren (7) 2002 | Klein (11) 2011 | Bheich (12) 2012 | McEwen (13) 2010 | Zingmond (14) 2005 | Weiner (15) 2013 | Crémieux (8) 2008 | Filkelstein (9) 2011 | Christou (10)2004 |
| N | 4006 | 846 | 466 surgical + 467 matched controls | 808 surgery + 808 matched controls | 6.376 | 221 | 60,092 | 29,820 surgery + 29,820 matched controls | 3651 surgery + 3651 control | 7,306 | 1035 surgery +5746 control group |
| Study design | Cohort before and after study | Cohort – before and after | Intervention study, SOS | 2 cohorts - surgical and matched controls | Cohort – before and after study | Cohort – before and after study | Retrospective cohort before and after study | Follow-up study with two cohorts | Observational - 2 cohort study | Surgical and propensity score-matching group | observational 2-cohort study |
| Follow-up time | 4 yrs | 3 yrs | 6 yrs (83%) | Up to 7 yrs | 6 yrs | 2 yrs | 3 yrs | Up to 6 yrs | Model on  the pooled population up to 4 yrs | Bootstrapped replications up to 4 yrs | 5.3 (3.8) |
| Age in yrs- Mean (SD) | 36.2 (10.3) | 49.5 (8.3) | 47.8 (5.8) | 51.5 (7.5) | 47.1(0.1) | 44 (10) | 42.2 (10.4) | 45.5(10.4) | 43.8 | 44.5 (12) | 45.1 (11.6) |
| BMI Kg/m² Mean (SD) | 42.8 (4.8) | 47.4 (7.8) | 41.9 (4.2) | - | - | 51 (8) |  | - | - | - | 50.0 (8.2) |
| Male sex (%) | 20 | 73.9 | - | 27.2 | 24.3 | 10 | 16.1 | 19.4 | 14 | 11.9 | 34.4 |
| Hypertension (%) | 38 | - | - | - | - | 47 | - | 54.7 | 37.0 | 41.5 | - |
| Diabetes (%) | 12.5 | 33.7 | - | 100 | 100 | 37 | - | 24.6 | 18.4 | 13.2 | - |
| Open surgery | 100 | 75.3% | 100 | 55.7 | 40.8 | 65 | - | 35 - 72 | 85.7 | 0 | 79.2 |

Table S1 – Baseline characteristics of a 4.006 patient cohort undergoing bariatric surgery between 2004 and 2010 and the characteristics of patients in other published studies.

Table S2. Emergency department visits rate per 1,000 patient-years, according to the ICD-10 code, before and after bariatric surgery.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ICD 10 group or description | 1st year | | | 2nd year | | | 3rd year | | | 4th year | | |
| Before | After | P value | Before | After | P value | Before | After | P value | Before | After | P value |
| Diseases of the musculoskeletal system and connective tissue | 84.75 | 45.17 | 0.002 | 21.51 | 17.75 | 0.034 | 20.82 | 21.75 | 0.508 | 55.56 | 64.87 | 0.328 |
| Diseases of the respiratory system | 79.46 | 45.95 | 0.002 | 22.10 | 18.12 | 0.013 | 20.97 | 21.09 | 0.929 | 49.77 | 53.78 | 0.480 |
| [Injury, poisoning and certain other consequences of external causes](http://apps.who.int/classifications/icd10/browse/2010/en#/XIX) | 51.16 | 39.55 | 0.023 | 15.50 | 14.79 | 0.530 | 13.54 | 16.18 | 0.075 | 12.24 | 46.69 | 0.347 |
| Diseases of the genitourinary system | 25.83 | 46.39 | 0.006 | 8.59 | 14.84 | 0.002 | 6.58 | 16.40 | 0.003 | 20.78 | 55.88 | 0.005 |
| [Certain infectious and parasitic diseases](http://apps.who.int/classifications/icd10/browse/2010/en#/I) | 25.48 | 17.39 | 0.015 | 7.33 | 8.49 | 0.131 | 6.06 | 8.96 | 0.022 | 13.03 | 21.64 | 0.016 |
| Diseases of the digestive system | 35.58 | 22.20 | 0.239 | 5.35 | 6.55 | 0.158 | 4.38 | 6.02 | 0.136 | 12.52 | 11.79 | 0.799 |
| Diseases of the circulatory system | 33.19 | 17.66 | 0.012 | 7.47 | 3.11 | 0.002 | 5.91 | 2.95 | 0.003 | 11.22 | 10.00 | 0.374 |
| Endocrine, nutritional and metabolic diseases | 57.35 | 20.87 | 0.026 | 1.23 | 2.07 | 0.062 | 1.32 | 2.02 | 0.110 | 2.53 | 4.72 | 0.131 |
| Diseases of the skin and subcutaneous tissue | 14.79 | 23.29 | 0.286 | 3.53 | 4.23 | 0.155 | 3.17 | 4.43 | 0.050 | 12.01 | 7.45 | 0.016 |
| Diseases of the nervous system | 12.69 | 5.97 | 0.004 | 4.42 | 3.88 | 0.374 | 4.01 | 3.77 | 0.767 | 10.63 | 8.12 | 0.248 |
| Mental and behavioral diseases | 16.93 | 6.84 | 0.050 | 3.24 | 3.63 | 0.433 | 3.53 | 4.39 | 0.308 | 11.08 | 13.88 | 0.374 |
| Diseases of blood and blood-forming organs and certain disorders involving the immune mechanism | 0.95 | 3.21 | 0.005 | 0.39 | 6.22 | 0.002 | 0.00 | 6.01 | 0.002 | 0.66 | 20.32 | 0.002 |
| Others | 191.61 | 227.17 | 0.754 | 46.60 | 64.32 | 0.002 | 39.89 | 60.41 | 0.003 | 102.29 | 155.33 | 0.002 |

In “others” are grouped: diseases of the eyes, ears, mastoid, neoplasias, congenital malformation, deformities, pregnancy, puerperium and perinatal diseases, external causes of morbidity and mortality, factors influencing health status and contact with health services and ICD not informed.

P value = Wilcoxon signed-rank test

Table S3. Average costs (in US$) per patient per year, before and after bariatric surgery, among 4006 patients who underwent bariatric operation, between 2004 and 2011.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Follow-up period | | | | | | | | | | | | | |
| Characteristics | 1st year# | | | | 2nd year | | | 3rd year | | | 4th year | | |
| Before | | After | P -value | Before | After | P -value | Before | After | P -value | Before | After | P –value |
| Average total costs per person per year US$ | 75.17 | | 119.01 | 0.028 | 74.51 | 122.47 | 0.002 | 72.08 | 131.10 | 0.002 | 58.81 | 81.93 | 0.006 |
|  |  | |  |  |  |  |  |  |  |  |  |  |  |
| Average total costs per person per year US$ \* | 72.31 | | 117.66 | 0.028 | 70.74 | 94.46 | 0.008 | 68.35 | 110.70 | 0.005 | 51.85 | 72.95 | 0.023 |
| Average total costs per patient characteristics | | | | |  |  |  |  |  |  |  |  |  |
| Male (n=805) | | 57.20 | 192.71 | 0.028 | 55.58 | 114.07 | 0.003 | 62.72 | 69.49 | 0.638 | 42.24 | 65.62 | 0.117 |
| Female (3201) | | 79.95 | 99.42 | 0.046 | 79.30 | 124.58 | 0.002 | 74.53 | 146.46 | 0.003 | 62.31 | 85.82 | 0.012 |
| BMI < 50 kg/m² (3623) | | 76.23 | 117.32 | 0.028 | 76.33 | 123.18 | 0.002 | 72.87 | 135.86 | 0.002 | 60.66 | 84.74 | 0.006 |
| BMI ≥50 kg/m² (n=383) | | 60.02 | 135.75 | 0.098 | 56.78 | 116.06 | 0.005 | 61.60 | 71.31 | 0.308 | 24.38 | 33.96 | 0.929 |
| Age <50 years (3478) | | 65.44 | 113.52 | 0.028 | 66.75 | 112.21 | 0.002 | 62.20 | 107.07 | 0.002 | 53.42 | 76.50 | 0.015 |
| Age ≥50 years (n=528) | | 133.66 | 151.80 | 0.463 | 116.02 | 177.80 | 0.012 | 119.57 | 244.08 | 0.071 | 84.32 | 105.02 | 0.388 |
| Average total costs per patients with comorbidities | | | | |  |  |  |  |  |  |  |  |  |
| Hypertension (n=1518) | | 86.18 | 150.54 | 0.028 | 84.74 | 136.23 | 0.005 | 94.63 | 186.77 | 0.003 | 70.99 | 82.24 | 0.209 |
| Diabetes (n=501) | | 117.22 | 147.24 | 0.249 | 116.64 | 151.06 | 0.050 | 151.40 | 131.39 | 0.158 | 75.06 | 79.78 | 0.695 |
| Hypertension and diabetes (n=329) | | 119.34 | 160.61 | 0.463 | 126.71 | 162.34 | 0.117 | 160.43 | 143.03 | 0.272 | 80.65 | 81.27 | 0.875 |
| Arthropaty (n=370) | | 106.72 | 136.22 | 0.600 | 108.26 | 134.38 | 0.034 | 66.72 | 111.36 | 0.002 | 72.68 | 168.96 | 0.041 |
| Sleep apnea (n=146) | | 114.81 | 163.54 | 0.075 | 124.44 | 159.24 | 0.182 | 117.42 | 81.25 | 0.530 | 138.01 | 87.12 | 0.799 |

P value = Wilcoxon signed-rank test