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**Supplement 1: Electronic Literature Search (PubMed)**

The following 2 searches were done in PUBMED and exported to EndNote X7.3 and duplicate citations removed.

(Obesity[MH] OR Obesity Hypoventilation Syndrome[MH] OR Obesity, Abdominal[MH] OR Obesity, Morbid[MH] OR Diabetic Obesity[MH] OR Metabolic Syndrome X[MH] OR OR Body mass index[MH]) AND (Heart Failure [Tiab] OR Cardio-Renal Syndrome [MH] OR Cardio-Renal Syndrome [Tiab] OR Cardiorenal Syndrome [Tiab] OR Heart failure with preserved ejection fraction[Tiab] OR Diastolic dysfunction[Tiab] OR Heart ventricle failure[Tiab])

((Obesity[MH] OR Obesity Hypoventilation Syndrome[MeSH] OR Obesity, Morbid[MH] OR Diabetic Obesity[MH] OR Metabolic Syndrome X[MH] OR Body mass index[MH]) AND ((Left Ventricular Hypertrophy[MeSH] OR natriuretic peptide OR BNP OR NT-BNP) AND (weight loss[Tiab] OR bariatric surgery [Tiab]))

A similar search was undertaken in Embase and Web of science between the period 1st January1950 to 3rd April 2018. The studies were then exported to EndNote X7.3 and duplicate citations removed.

**Supplement 2:** Baseline characteristics of patients in studies assessing the incidence of heart failure with obesity

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Type of Study** | **Follow-Up (Yrs)** | **Gender (% Male)** | **Age (years)** | **Previous MI (%)** | **History of AF (%)** | **HTN (%)** | **DM (%)** |
| **Glogner et al** | Population cohort (Diabetes – type II) | 7.2 | 55.3 | 65.8±12 | 8.5% | 2.6% | 80% | 100% |
| **Joshy et al** | Population cohort | 3.4 | 44 | 58±14 | 0 | NR | 18% | 5.8 |
| **Kenchaiah et al 2002** | Population cohort | 14 | 46 | N: 54±14  OW: 55±13  OB: 53±12 | N: 4.7%  OW: 5.1%  OB: 5.5% | NR | N: 30.3%  OW: 39.6%  OB: 53.0% | N: 10.2%  OW: 14.2%  OB: 15.5% |
| **Kenchaiah et al 2009** | Population cohort | 20.5±5.4 | 100 | N: 52.9±9.7  OW:53.6±9.1  OB: 52.8±8.8 | N: 9%  OW: 9.6%  OB: 10.5% | NR | N: 18.9%  OW: 28.8%  OB: 42.4% | N: 2.2%  OW: 3.2%  OB: 6.7% |
| **Morkedal et al** | Population cohort | 12.3 | 46 | N: 60.1±16.9  OW: 56.7±16.0  OB: 55.2±15.9 | NR | NR | N: 16%  OW:18%  OB: 25% | N: 7%  OW: 6%  OB: 9% |
| **Murphy et al** | Population cohort | 20 | N: 42%  OW: 53%  OB: 37% | N: 54±6  OW: 54±6  OB: 55±6 | NR | N: 1%  OW: 1%  OB: 1% | NR | N: 1%  OW: 1%  OB: 2% |
| **Thrainsdottir et al** | Population cohort | 13±8 | 55% | 59.5 | NR | NR | NR | NR |
| **Vestberg et al** | Population cohort (Diabetes – type I) | 9.1 | UW: 43.5%  N: 54.6%  OW: 59.7%  OB: 47.9%  MOB: 28.7 | UW: 37.7±14,7  N: 38.0±13.4  OW: 39.5±12.5  OB: 39.7±13.0  MOB: 38.4±12.3 | UW: 4.4%  N: 4.7%  OW: 6.3%  OB: 7.5%  MOB: 4.4% | UW: 0.5%  N: 1%  OW: 1.3%  OB: 1.4%  MOB: 0.9% | UW:39.9%  N: 43.9%  OW: 53.5%  OB: 62.3%  MOB: 65.7% | 100% |
| **Li et al** | Population cohort (Diabetes – type II) | 7.8 | OW: 44.4%  OB: 39.6%  MOB: 31.8% | N:  OW: 53.8  OB: 52.5  MOB: 51.0 | NR | NR | OW: 70.6%  OB: 74.2%  MOB: 75.9 | 100% |

UW: underweight, N: normal BMI; OW: overweight, OB: obese, MOB: morbid obesity,NR: Not reported

**Supplement 3A:** Study quality assessed by modified Newcastle Ottawa Scale (NOS) **:** Obesity and incidence of heart failure

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Source population representative** | **Performance bias** | | **Detection bias** | | **Information bias** | |
|  |  | **Sample size adequate** | **Adjustment for Other factors** | **Statistical methods appropriate** | **Missing data** | **Methodology of outcome- explicit** | **Objective assessment** |
| **Glogner, 2014** | 2 | 3 | 2 | 3 | 3 | 3 | 3 |
| **Joshy, 2014** | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| **Kenchaiah, 2002** | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| **Kenchaiah, 2009** | 3 | 3 | 3 | 2 | 3 | 2 | 2 |
| **Morkedal, 2014** | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| **Murphy, 2006** | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| **Thrainsdottir, 2007** | 2 | 3 | 2 | 3 | 3 | 3 | 3 |
| **Vestberg, 2013** | 2 | 3 | 3 | 2 | 3 | 3 | 3 |
| **Li, 2015** | 2 | 3 | 3 | 3 | 3 | 3 | 3 |

Modified NOS Score: 0 = Definitely no (high risk of bias); 1 = Mostly no; 2 = Mostly yes; 3 = Definitely yes (low risk of bias)

**Supplement 3B:** Study quality assessed by modified Newcastle Ottawa Scale (NOS): Prognosis of obesity in heart failure

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Source population representative** | **Performance bias** | | **Detection bias** | | **Information bias** | |
|  |  | **Sample size adequate** | **Adjustment for Other factors** | **Statistical methods appropriate** | **Missing data** | **Methodology of outcome- explicit** | **Objective assessment** |
| **Curtis, 2005** | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| **Frankenstein, 2009** | 3 | 2 | 2 | 3 | 3 | 3 | 3 |
| **Gastelurrutia, 2011** | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| **Gustafsson, 2005** | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| **Kapoor, 2010** | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| **Kenchaiah, 2007** | 2 | 3 | 3 | 3 | 3 | 3 | 3 |
| **Khalid, 2014** | 2 | 3 | 3 | 3 | 3 | 3 | 3 |
| **Nochioka, 2010** | 3 | 2 | 3 | 3 | 2 | 3 | 3 |
| **Vest, 2015** | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| **Wannamethee, 2014** | 2 | 3 | 2 | 3 | 3 | 3 | 3 |
| **Wu, 2010** | 2 | 3 | 3 | 3 | 3 | 3 | 3 |

Modified NOS Score: 0 = Definitely no (high risk of bias); 1 = Mostly no; 2 = Mostly yes; 3 = Definitely yes (low risk of bias)

**Supplement 3C:** Study quality assessed by modified Newcastle Ottawa Scale (NOS): Weight loss & cardiac function studies

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Source population representative** | **Performance bias** | | **Detection bias** | | **Information bias** | |
|  |  | **Sample size adequate** | **Adjustment for Other factors** | **Statistical methods appropriate** | **Missing data** | **Methodology of outcome- explicit** | **Objective assessment** |
| **Garza, 2010** | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| **Graziani, 2013** | 3 | 2 | 3 | 3 | 3 | 3 | 3 |
| **Hsuan, 2010** | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| **Ikonomidis, 2007** | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| **Kaier, 2014** | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| **Kemaloglu, Oz, 2016** | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| **Kurnicka, 2017** | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| **Martin, 2013** | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| **Owan, 2011** | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

Modified NOS Score: 0 = Definitely no (high risk of bias); 1 = Mostly no; 2 = Mostly yes; 3 = Definitely yes (low risk of bias)