

Supplementary information to:

Letter to the editor:

**COVID-19 AND OBESITY:
A SYSTEMATIC REVIEW AND META-ANALYSIS ON THE
PRE-EXISTING CLINICAL CONDITIONS, COVID-19 SYMPTOMS,
LABORATORY FINDINGS AND CLINICAL OUTCOMES**

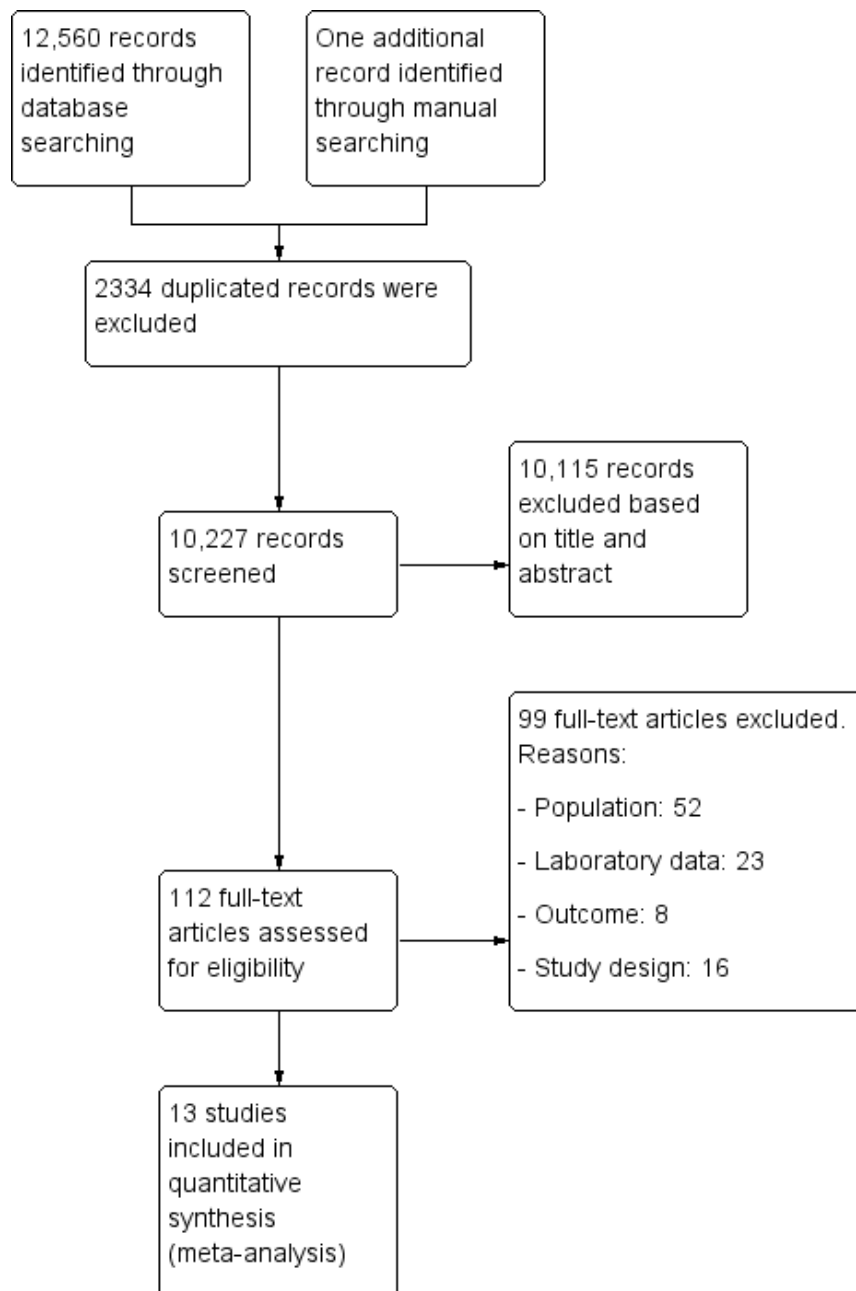
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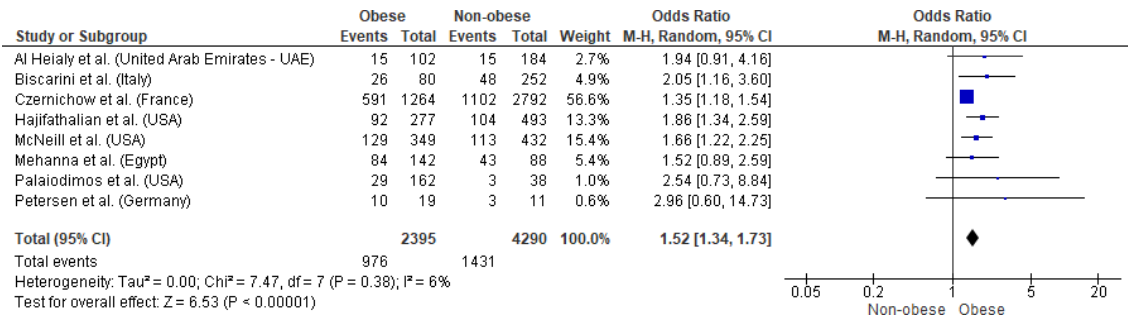
<https://dx.doi.org/10.17179/excli2021-4226>

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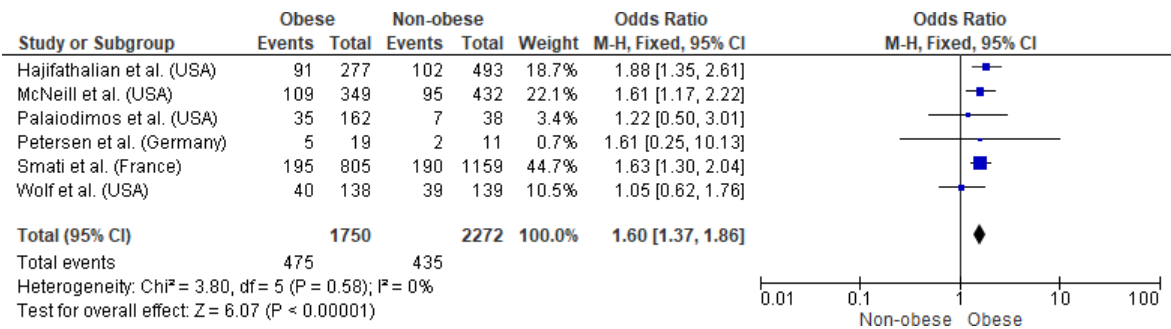


Supplementary Figure 1: Literature search flow diagram

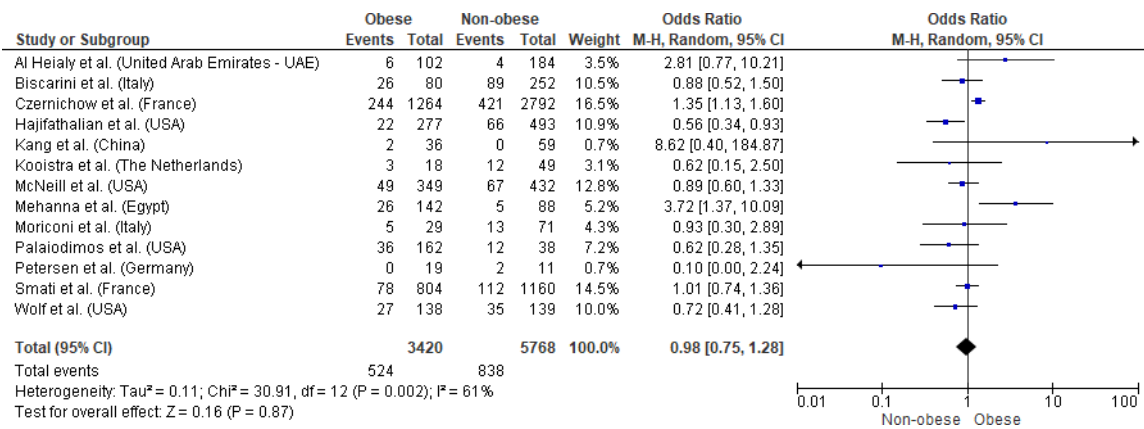
(A)



(B)



(C)



Supplementary Figure 2: Meta-analysis of association between obesity and ICU admission (A), orotracheal intubation (B), and death (C) for COVID-19 patients.

Supplementary Table 1: Characteristics of the included studies

1 st Author (country)	Year	Obesity	<i>n</i>	Male (%)	Age ^a	Non-obese (<i>n</i>)	Obese (<i>n</i>)	Outcome
Al Heialy et al. (UAE)	2021	BMI ≥ 30 kg/m ²	286	73%	46.9	184	102	ICU admission and death
Biscarini et al. (Italy)	2020	BMI ≥ 30 kg/m ²	332	69%	67	252	80	ICU admission and death
Czernichow et al. (France)	2020	BMI ≥ 30 kg/m ²	4056	66%	59.8	2792	1264	ICU admission and death
Hajifathalian et al. (USA)	2020	BMI ≥ 30 kg/m ²	770	60.8%	64	493	277	ICU admission, intubation, and death
Kang et al. (China)	2020	BMI ≥ 25 kg/m ²	95	41%	53	59	36	Death
Kooistra et al. (The Netherlands)	2021	BMI ≥ 30 kg/m ²	67	75%	NR	49	18	Death
McNeill et al. (USA)	2021	BMI ≥ 30 kg/m ²	781	58%	61	432	349	ICU admission, intubation, and death
Mehanna et al. (Egypt)	2021	BMI ≥ 30 kg/m ²	230	55%	46.5	88	142	ICU admission and death
Moriconi et al. (Italy)	2020	BMI ≥ 30 kg/m ²	100	52%	69.3	71	29	Death
Palaiodimos et al. (USA)	2020	BMI ≥ 25 kg/m ²	200	49%	64	38	162	ICU admission, intubation, and death
Petersen et al. (Germany)	2020	BMI ≥ 25 kg/m ²	30	60%	65.6	11	19	ICU admission, intubation, and death
Smati et al. (France)	2020	BMI ≥ 30 kg/m ²	1965	64.5%	70.1	1160	805	Intubation and death
Wolf et al. (USA)	2021	BMI ≥ 30 kg/m ²	277	63%	60	139	138	Intubation and death

BMI, Body mass index; *n*, N^o of patients; ICU, Intensive care unit; NR, not reported

^a Mean or median

Supplementary Table 2: Pre-existing medical conditions and symptoms among patients with COVID-19

Variables	Obese vs. non-obese	OR (95 % CI)	p-value	η^2
Pre-existing medical conditions				
Hypertension	65.2% vs. 57.7%	1.41 (1.17 – 1.70)	< 0.001	58%
Diabetes	58.0% vs. 50.2%	1.47 (1.32 – 1.63)	< 0.001	0%
Pulmonary disease	17.8% vs. 11.8%	1.57 (1.32 – 1.87)	< 0.001	0%
Heart disease	11.3% vs. 11.9%	0.84 (0.66 – 1.08)	0.17	51%
Cerebrovascular disease	7.1% vs. 10.3%	0.41 (0.10 – 1.72)	0.22	28%
Neoplasia	8.2% vs. 13.9%	0.64 (0.47 – 0.87)	0.005	45%
Kidney disease	11.4% vs. 13.9%	0.69 (0.59 – 0.82)	< 0.001	0%
Liver disease	7.2% vs. 5.4%	1.24 (0.72 – 2.13)	0.44	59%
COVID-19 symptoms				
Fever	77.1% vs. 72.9%	1.24 (1.00 – 1.54)	0.05	24%
Cough	68.0% vs. 61.6%	1.16 (0.88 – 1.53)	0.29	56%
Dyspnea	66.5% vs. 52.0%	1.86 (1.27 – 2.72)	0.001	75%
Nausea/vomiting	13.0% vs. 5.7%	1.51 (0.76 – 3.01)	0.24	0%
Myalgia/fatigue	46.5% vs. 42.4%	1.38 (0.94 – 2.02)	0.11	73%
Diarrhea	20.5% vs. 7.4%	1.96 (1.03 – 3.73)	0.04	44%

OR, odds ratio; CI, confidence interval

Supplementary Table 3: Comparison of laboratory findings between obese and non-obese patients with COVID-19

Parameter	SMD (95% CI) between obese and non-obese individuals	p-value	I ²
Hematological			
WBC	-0.04 (-0.17 to 0.08)	0.51	51%
Neutrophils	0.13 (-0.12 to 0.38)	0.29	66%
Lymphocytes	0.05 (-0.07 to 0.18)	0.40	47%
Platelet count	-0.05 (-0.16 to 0.06)	0.39	37%
Biochemical			
ALT	0.14 (-0.06 to 0.35)	0.17	54%
AST	0.04 (-0.14 to 0.23)	0.66	41%
Albumin	0.11 (-0.09 to 0.31)	0.27	47%
Blood urea nitrogen	-0.03 (-0.27 to 0.21)	0.83	-
Creatinine	0.04 (-0.39 to 0.46)	0.87	80%
LDH	0.74 (-0.06 to 1.54)	0.07	98%
Infection-related indices			
CRP	0.55 (0.22 to 0.88)	< 0.01	98%
IL-6	0.17 (-0.15 to 0.49)	0.29	90%
Serum ferritin	1.42 (0.61 to 2.22)	< 0.01	99%
Procalcitonin	0.13 (-0.19 to 0.46)	0.43	87%
Coagulation function			
D-dimer	1.10 (0.50 to 1.69)	< 0.01	98%

SMD, standardized mean difference; CI, confidence interval; WBC, white blood cells; ALT, alanine transaminase; AST, aspartate transaminase; LDH, lactate dehydrogenase; CRP, C-reactive protein. Positive results for SMD indicate increased levels of laboratory parameters in obese patients with COVID-19.