Assessment of the associations between obesity and obesity related comorbidities

EPH104

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Obesity-related comorbidities can predict obesity. but associations vary with age. Identifying common combinations of comorbidities within age-specific subgroups can inform targeted public health strategies.

Introduction

- Estimates of obesity prevalence (body mass index (BMI) $\geq$ 30 kg/m²) in Germany vary across studies [1,2] and are likely underestimated when based solely on diagnosis rates [3].
- Statistical models based on obesity-related comorbidities can be used to identify patients with high probability of obesity. As most of these comorbidities are associated with older age, the association may diminish with age.
- There is limited evidence on comorbidity prevalence in people with obesity (PwO), particularly in relation to age and sex.
- *Aim*: To evaluate age-dependent associations between obesity and comorbidities using large German and UK cohorts, and to assess the comparability of comorbidity patterns and their dependence on age.

Methods

- *Study design*: cross-sectional, observational study of routinely collected claims data of the statutory health insurance (SHI) system in Germany.
- *Eligibility*: Individuals (1) $\geq$ 18 years, (2) living with obesity (ICD-10-GM E66) in 2021, (3) continuously insured in 2021, (4) no pregnancy in the nine months before/after E66 diagnosis.
- *Comparison group*: no encoding of obesity in observation year.
- *Age-stratified statistical modelling*: Descriptive statistics and logistic regression to analyze the association between obesity and different obesity related conditions* stratified by age.
- Estimation of association between obesity-related comorbidities and obesity for each age-subgroup on German claims data and the data of the UK Biobank.

Key results

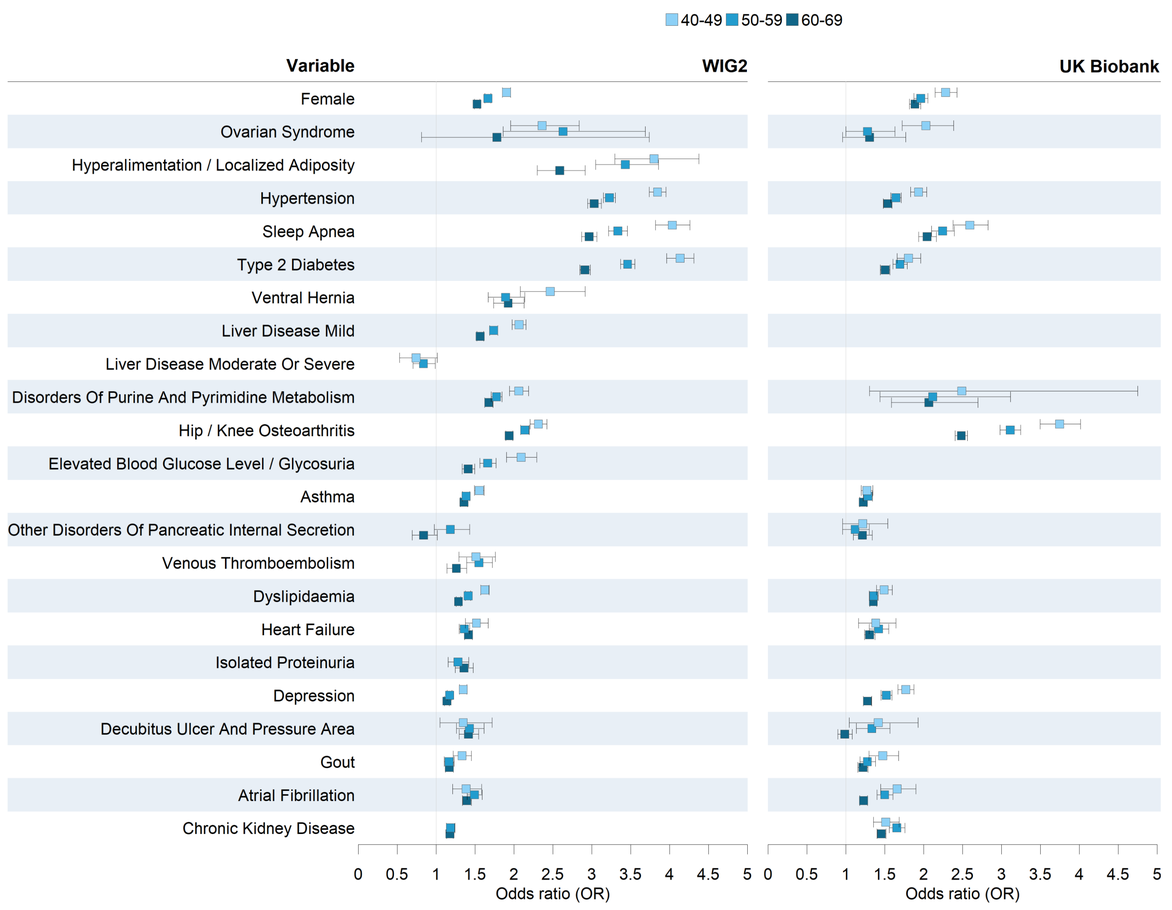
Population characteristics:

- Of 3,227,677 individuals in the WIG2 Benchmark database (2021), 283,079 (8.8%) were identified as adult PwO, based on at least one claim with ICD-10 diagnosis of obesity. Of 502,384 individuals in the UK Biobank, 48,847 (9.7%) had a diagnosis of obesity and 122,223 (24.3 %) had a BMI $\geq$ 30 kg/m².
- Obesity-related comorbidities were more frequent for higher ages (Table 1).
- Strong associations to diagnosed obesity were observed for the age groups 40-49, 50-59 and 60-69 for sleep apnea, T2DM and hip/knee osteoarthritis (Figure 1).
- In both databases, ORs for obesity-related comorbidities decreased with age, suggesting a robust association. Most obesity-related comorbidities are more strongly associated with (documented) obesity at younger age. Obesity is associated with being female in persons between 40-70.

Table 1: Characteristics of patients from the WIG2 obesity cohort stratified by age group for observation year 2021

	18-29	30-39	40-49	50-59	60-69	70+
N (%*)	12,617 (3.7)	20,200 (5.7)	38,761 (9.3)	63,750 (12.5)	65,523 (16.3)	74,818 (15.8)
% Female	56.0	54.6	51.3	48.1	49.5	54.1
% AF	0.2	0.6	1.5	4.3	10.3	26.5
% Depression	17.4	18.6	20.3	22.9	22.9	19.9
% Dyslipidemia	8.3	16.1	29.9	44.8	57.2	66.1
% Heart failure	0.5	1.5	3.4	7.5	15.1	30.6
% Hypertension	21.4	37.4	55.4	74.4	86.9	93.8
% Sleep Apnea	2.6	6.7	11.8	16.4	19.1	16.2
% T2DM	4.4	11.4	21.0	33.2	46.4	55.0

Figure 1: Odds ratios of selected comorbidities derived from age-stratified models for the WIG2 obesity cohort (2021) and the UK Biobank (obesity defined by diagnosis)



Discussion

- *Limitations*: In Germany, health insurance data does not contain BMI measurements and physician coding via ICD-10-GM may be inconsistent and incomplete. Availability of young/very old patients in the UK Biobank is limited.
- *Future research*: Explore further factors influencing obesity-associated multimorbidity, such as ethnic differences. Assess the specific needs of particular groups and identify effective health interventions for managing multimorbidity in different age groups.

Conclusion

- Since the associations between obesity and obesity-related conditions vary by age, statistical models to estimate the presence of obesity should consider age-dependent assessment of these conditions.
- Identifying common combinations of multimorbidity within age groups helps to tailor public health strategies and interventions to specific needs.

*Ovarian syndrome; Hyperalimentation; Hypertension; Sleep apnea; Type 2 diabetes mellitus; Liver diseases; Hip / Knee osteoarthrosis; Asthma; Venous thromboembolism; Dyslipideamia; Heart failure; Depression; Atrial fibrillation; Chronic kidney disease

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