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Title: The combined association of anxiety or depression symptoms and obesity with incident asthma: The HUNT study

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Body: Anxiety and depression may increase the risk of developing asthma. We conducted a prospective study to test this hypothesis and additionally investigate the potential joint effect of these symptoms and obesity. We studied 23,199 adults who were 19-55 years old at baseline in the Norwegian Nord-Trøndelag Health Study (HUNT). The participants were followed for 11 years. The Hospital Anxiety and Depression Scale (HADS) was used to measure anxiety (HADS-A ≥ 8 , range 0-21) and depression (HADS-D ≥ 8 , range 0-21) symptoms. Obesity was classified as having a body mass index of ≥ 30.0 kg/m². Incident asthma was self-reported. Odds ratios (ORs) for incident asthma associated with anxiety or depression were calculated using logistic regression models. To test the joint effect of anxiety or depression and obesity we calculated the relative excess risk due to interaction (RERI). At baseline 4,151 participants (17.9%) had anxiety or depression symptoms. There was a significant association of anxiety or depression with incident asthma (OR 1.36, 95% confidence interval (CI) 1.15-1.60). Compared to non-obese without anxiety or depression, non-obese with anxiety or depression (OR 1.23, 95% CI 1.02-1.49) and obese subjects without anxiety or depression (OR 1.51, 95% CI 1.21-1.88), subjects with both obesity and anxiety or depression had a significantly higher risk of incident asthma (OR 2.82, 95% CI 2.08-3.81). The RERI for incident asthma with anxiety or depression and obesity was 1.08 (95% CI 0.20-1.95). This study suggests that anxiety and depression symptoms contribute to incident asthma in adults. Obesity may interact with anxiety and depression symptoms in increasing the risk of asthma.