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Title: The longitudinal relationship between common comorbidities: Breathing disorders, back pain and incontinence

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Body: Respiratory disorders, back pain and incontinence commonly present together as comorbid conditions. Coexistence of these conditions complicates the clinical management of patients and highlights possible shared mechanisms for some of the presenting symptoms. However, causality is difficult to infer. This longitudinal study aimed to determine whether the presence or development of one disorder increases risk for the development of another. Women from the Australian Longitudinal Study on Women's Health were divided into subgroups; those with no back pain (n=7,259), no breathing problems (including allergy) (n=15,096), no incontinence (n=18,480), and no gastrointestinal symptoms (n=17,623). Each subgroup was analysed to determine the relationship between the development of the absent condition and the presence or development of the other conditions. Potential confounders were included in the analysis. Women with pre-existing and/or newly developed breathing problems (prevalence ratio (PR): 1.38 -2.11) or incontinence (PR: 1.26-2.12) had an increase risk for the development of back pain, and women with pre-existing and newly developed back pain were more likely to develop breathing problems and incontinence (PR: 1.53-2.62 and 1.18-2.44, respectively). Presence of gastrointestinal symptoms was also a risk factor for the development of these conditions. These longitudinal data show the presence of one symptom is associated with the greater prevalence of development of another. Common factors may contribute to the development of symptoms across this range of conditions and this may include the conflicting mechanical demands of these conditions on the trunk muscle system.