Do different body positions affect peak cough flow in healthy adults?
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Introduction
Coughing is a vital mechanism to clear irritants in the airway and prevent respiratory failure. Studies have shown that peak flow, lung volumes and respiratory muscle activities change with body positions; and upright positions are better than lying positions. In daily life, some people adopt a forward leaning posture naturally during coughing. However, it is unknown whether this posture can really help to produce a more effective cough.

Objectives
(1) To compare peak cough flow (PCF) in different body positions; (2) to investigate whether a static or moving forward bend will augment PCF; (3) to explore the relationship between PCF and inspiratory volume; and (4) to determine the best position for an effective cough.

Methodology
A cross-sectional study was designed to investigate the effect of eight positions (standing, standing with a static 45-degree forward bend, standing with a forward bending movement during coughing, sitting, sitting with a static 45-degree forward bend, sitting with a forward bending movement during coughing, right side-lying and supine) on PCF in healthy young adults. The participants were asked to take the deepest inhalation and cough as forcefully as possible within a face mask, which was connected to a flow sensor and peak flow meter. Three trials were performed in each position and the highest PCF value was taken for analysis. Inspiratory volume was also calculated. Repeated measures analysis of variance (ANOVA), followed by post-hoc analysis with Bonferroni correction, were used to compare the PCF values across different positions. Pearson’s r was used to explore the relationship between PCF and inspiratory volume in each position.
**Result**

Thirty-nine participants (age 22 to 37 years) were successfully recruited. An overall significant difference in PCF in the eight positions [F (7, 266)=8.554 (p<0.001)] was found. The PCF values in side-lying and supine were significantly lower than other positions by an average of -17.3L/min for the side-lying position (95%CI -24.2 to -10.4 L/min, p<0.0001) and -18.8L/min for supine position (95%CI -25.3 to -12.3 L/min, p<0.0001). There was no strong correlation between PCF and inspiratory volume in any of the positions. This study reinforced previous research findings that upright positions in sitting and standing could generate a higher PCF than lying positions (side-lying and supine). No additional benefits of a static or moving forward bend during coughing were found. Therefore, it is essential for healthcare professionals to position or educate their patients to cough in the upright positions for better airway clearance.