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Title: Relevance of respiratory muscle strength in chronic obstructive pulmonary disease

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Body: Backgrounds: Respiratory muscle strength is recognized to be impaired in patients with COPD, while its severity in Chinese COPD patients and the related factors remains unclear. Twitch mouth pressure (TwPM) responded to cervical magnetic stimulation is a non-volitional technique to measure respiratory muscle strength. Thus, the present study was aimed to quantify the severity of respiratory muscle weakness at different stages of COPD, and to investigate the potential factors related to TwPM in COPD. Methods: Seventy-five patients with COPD and sixty-three age-matched controls participated in the study. Pulmonary function was tested for each participant. Respiratory muscle strength was assessed with measurement of both TwPM and non-volitional static mouth pressures. A score of physical activity (PA score) was obtained using an adapted physical activity questionnaire for the elderly, and nutritional status was evaluated with a multiple-nutritional index. Multiple regression models were developed by stepwise method to determine factors independently contributing to TwPM in COPD. Results: TwPM (cmH_2O) was significantly lower in COPD patients [COPD II (12.42±2.19); COPD III (10.85±1.82); COPD IV (8.58±1.46) vs controls (13.95±3.28), $P<0.005$]. Regression correlation analysis showed that FEV_1% pred, PA score, malnutrition index and gender were the independent factors responsible for TwPM, with R^2 of 58% ($P<0.001$). Conclusion: We conclude that respiratory muscle strength decreases with increasing severity of COPD. Respiratory muscle strength in COPD is comprised by multiplex factors such as airflow limitation, physical inactivity and malnutrition, with airflow limitation being the most significant one.