

## Effect of Air Quality on Cardio-Respiratory Systems in Northern Thailand (Chiang Mai, Chiang Rai and Nan Province)

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### ABSTRACT

*Poor air quality is an important problem in several countries, especially in northern Thailand. Several studies have reported the association between these problems and risks of human health. However, little is known regarding the effects of the air quality on cardio-respiratory systems among people of different ages. The aim of this study is to compare the effects of air quality on pulmonary function and cardiovascular endurance before high PM<sub>10</sub>, high PM<sub>10</sub>, and after high PM<sub>10</sub> periods in children, adults and elderly groups in the north of Thailand. A prospective cohort study with three different periods was designed. A sample of 450 participants (i.e., children, adults, and elderly people) was random, and were recruited in Chiang Rai, Chiang Mai, and Nan. Pulmonary function tests and cardiovascular endurance were measured by spirometer and six-minute walk distance (6MWD), respectively. A total of 335 participants were recruited; 96 children, 119 adults and 120 elderly people. For pulmonary function, force expiratory volume in first second/Force vital capacity (FEV<sub>1</sub>/FVC) in the children's group found significant differences when compared before high PM<sub>10</sub> - high PM<sub>10</sub> period ( $\Delta$  2.289%) and before high PM<sub>10</sub> - after high PM<sub>10</sub> period ( $\Delta$  2.324%). Also, 6MWD found significant differences in children, adults, and elderly groups when compared before high PM<sub>10</sub> - high PM<sub>10</sub> period ( $\Delta$  80.480,  $\Delta$  36.640, and  $\Delta$  25.511 meter, respectively) and before high PM<sub>10</sub> - after high PM<sub>10</sub> period ( $\Delta$  70.488,  $\Delta$  22.874, and  $\Delta$  16.374 meter, respectively). Therefore, air quality had a negative effect on the cardiorespiratory system.*

**Keywords:** Air pollution, PM<sub>10</sub>, Climate change, Health risk assessment