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Prolonged exposure to polluted air affects productivity: Study

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Living and working in a polluted environment is not just bad for health, but also bad for productivity, a new study has found.

"We typically think that firms benefit from lax pollution regulations by saving on emission control equipment and the like. Here, we document an adverse effect on the productivity of their workforce," said Associate Professor Alberto Salvo, one of the three economists who did the study.

Daily output falls by 1 per cent when there is a rise in PM2.5 levels by 10 micrograms per cubic m (mcg/m3) sustained over 25 days, said the researchers from the National University of Singapore (NUS) economics department.

PM2.5 readings measure the concentration of tiny particles less than 2.5 micrometres in diameter – or about one-thirtieth the diameter of a human hair – in the air.

Long-term exposure to them on a regular basis has been linked to increased risk of death from complications such as cancer or heart disease. But research on how it affects productivity is very limited, partly owing to worker output being difficult to quanitfy, said an NUS statement yesterday.

To study the issue, Prof Salvo, Associate Professor Liu Haoming and Dr He Jiaxiu interviewed managers at 12 companies and gathered data from two textile mills in China from January 2014 to May 2015. The trio compared the number of pieces of fabric each worker made each day against the level of air pollution the worker was exposed to over time.

They found that unlike in previous literature, workers' productivity was not immediately affected by daily fluctuations in pollution. But prolonged exposure of up to 30 days caused output levels to drop.

On possible reasons for the decline, Prof Liu said that besides the physiological impact of pollution, there could also be a psychological element to it. "Working in a highly polluted setting for long periods could affect your mood or disposition to work," he said.

The results of the study, which was controlled for factors like regional economic activity, were published in the American Economic Journal: Applied Economics yesterday.

Prof Liu said the team chose China for the study as they needed a larger variation of air pollution levels to probe the impact on workers.

The results also apply in Singapore, where pollution levels are generally lower, he added.

Prof Salvo said that although very high levels of PM2.5 in Singapore, caused by transboundary haze, have not been frequent, the findings suggest that productivity could be hurt.

Even during normal periods, it could fall by 1 per cent if the particle levels were raised over a fortnight or month owing to the air being more still, even if the change was only from 15 to 25 mcg/m3, he said.

As at 7pm yesterday, a regular, non-hazy day, the PM2.5 concentration ranged from 14 to 19 mcg/m3 in different parts of the island.

Given the findings, companies in Singapore can ask workers to reduce their exposure to the outdoor air if pollution levels rise, said Prof Liu. "They could encourage workers to work indoors or close the windows when they are at home."

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Researchers found that productivity was not immediately affected by daily fluctuations in pollution. But exposure of up to 30 days caused output levels to drop. PHOTO: AGENCE FRANCE-PRESSE