The Straits Times, page A14, Saturday 25 Jan 2025

Lung disease patients may in future receive alerts on poor air quality

Such a system is among five areas being studied in a research programme on respiratory health

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Respiratory disease patients could in the future receive text messages alerting them to periods of poor air quality, such as during a haze or other extreme weather conditions that could trigger allergic reactions or respiratory attacks.

Coming as climate change contributes to more extreme weather patterns, these text messages would be part of a nationwide forecasting tool for asthma and chronic obstructive pulmonary disease (COPD), based on weather changes that could trigger reactions in such patients.

"With the tool and alert system, patients and their caregivers can take necessary proactive measures to reduce exposure, thereby reducing unnecessary hospital utilisation," said principal investigator John Abisheganaden, a senior consultant in respiratory and critical care medicine at Tan Tock Seng Hospital.

Such a system is one of five areas being studied in a new research programme on respiratory health here, led by a research centre at Nanyang Technological University's Lee Kong Chian School of Medicine (LKCMedicine).

The programme – spearheaded by The Academic Respiratory Initiative for Pulmonary Health (Tariph) Centre under LKCMedicine – will bring together researchers from nine organisations to conduct lung health research, focusing on factors unique to Asia.

The aim is to develop personalised treatments for Asian patients with chronic lung disease, and augment the development of national and regional strategies to improve lung health, particularly for those with chronic conditions such as COPD and asthma.

In May 2024, the five-year programme was awarded a $10 million Open Fund-Large Collaborative Grant by the National Research Foundation. This is Singapore's first national research grant for respiratory health.

LKCMedicine vice-dean of research Sanjay Chotirmall said there is a "significant knowledge gap" in understanding respiratory disease in Asia, with few clinical studies focused on Asian patients.

"This leaves us with many unanswered questions: Is the disease the same in Asians? Do Asians respond the same way to medications? What are the effects of ethnicity, diet and climate?" said Associate Professor Chotirmall, who is also the grant's corresponding principal investigator.

Venerable You Guang, abbot of the Samantabhadra Vihara monastery in Novena, is a patient partner in the research programme led by the Tariph Centre at NTU's Lee Kong Chian School of Medicine. He has been living with severe asthma for over two decades, and will be part of a group that will help to design a study on the impact of a stay in an intensive care unit on lung disease patients. ST PHOTO: NG SOR LUAN

Researchers involved in the research programme include those from the National University of Singapore (NUS), Singapore General Hospital and National University Hospital.

They will also examine the role of environmental and climate change on respiratory diseases.

Drawing on three established local cohort studies and databases, a team will study how climate and environmental factors can influence the development of respiratory allergies and diseases in people here throughout their lives, even before birth.

"We aim to assess the role of gene-environment interactions with a focus on environmental exposures such as allergens and the microbiome, as well as dietary and lifestyle factors that determine sensitisation, disease development and exacerbation," said Associate Professor Chew Fook Tim from the biological sciences department at the NUS Faculty of Science.

Also being studied is the development of a repository of "mini-lung" cell models that can be used for lung disease research and the testing of new treatments.

This would see the creation of organoids – artificially grown masses of cells or tissue resembling organs which are derived from stem cells – which would mimic how natural lungs function, as well as precision-cut lung slices, thin pieces of human lung tissue, kept alive in a laboratory.

These models will be made available internationally, and can be quickly deployed to test against new diseases in the event of a potential pandemic.

Another focus area is the early detection and management of respiratory diseases, with one study focused on patients in the early stages of COPD.

Incorporating the main ethnicities in Singapore – Chinese, Malay and Indian – the study aims to assess how the disease starts and develops in Asians, and the differences between these ethnic groups.

To better understand their needs, the programme is taking the unique approach of including patients as partners, and not just participants, in the studies, with their views taken into account and incorporated in the design, execution and reporting of research.

Among those currently involved in the programme is Venerable You Guang, abbot of the Samantabhadra Vihara monastery in Novena, who has been living with severe asthma for over two decades.

The 44-year-old will be part of a group that will help to design a study on the impact of a stay in an intensive care unit on lung disease patients. They will also give their input on how best to engage patients and caregivers for the study.

Participating in the research programme will allow researchers to draw on his lived experience, said Ven You Guang.

"My motivation, like many patient advocates – whether patients or the caregivers for patients – is to pay it forward," he said.

It is important to include the perspective of patients, said Prof Chotirmall. "Their voice matters, their opinion matters. After all it should, because, ultimately, research exists for patients, right?"

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