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Protection from Covid-19 vaccines wanes faster among elderly: NUS study

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Senior citizens should consider receiving booster doses of the updated Covid-19 vaccine regularly, according to a recently published study by local researchers.

This is because in people over 65, protection from the first two doses wanes faster as they have a lower immune cell count.

The study was led by Dr Vanda Ho, a PhD student at NUS Yong Loo Lin School of Medicine.

It involved 29 participants, 14 of whom were aged between 66 and 82, and the rest being younger adults between 25 and 39 years old. They all received two doses of Pfizer's mRNA Covid-19 vaccine.

The findings of the study were published in the peer-reviewed journal Ageing Cell in February.

"Older adults had a significant increase in neutralisation after the second dose, but this was still lower than the younger adults, despite the former being robust," said Dr Ho.

So, it is important for older adults to go for booster vaccinations regularly to protect themselves, she noted.

The immune system can be triggered by a vaccine to produce neutralising antibodies in response to the virus or bacteria in the vaccine, resulting in the system recognising and fighting the infection naturally when exposed to the disease later.

As a geriatrician at the National University Hospital, Dr Ho often sees older adults come into the wards with infections for the first time.

"Unfortunately, after that first infection, they tend to be re-admitted for further infections. I saw the same patients decline functionally and cognitively because of the initial infection.

"That really triggered my interest – that maybe we can prevent the infection, or at least reduce the side effects, then we can help to increase their health span," she told The Straits Times.

She added that just as she was thinking of conducting research on the topic as part of her doctoral studies, "the Covid-19 pandemic hit, and it turned out to be a blessing in disguise".

"It was really a great opportunity to capitalise on," she said.

"Everyone in the world was getting the same immune stimulus: the Covid-19 vaccination. Prior to that, older and younger adults went through different vaccination regimens. The pandemic presented us with the best opportunity to study if pre- and post-vaccinated older and younger adults respond the same way.

"It was naturalistic, because the subjects were going around in their usual activities," Dr Ho said.

Singapore received its first batch of the Pfizer-BioNTech Covid-19 vaccine on Dec 21, 2020, with the nationwide vaccination programme kicking off soon after.

Dr Ho said that immune cells play a key role in helping to produce antibodies that neutralise potential viral infection, but the immune cell count is lower in older adults.

"From our study in the Covid-19 mRNA vaccination... with fewer immune cells, older adults have a smaller vaccination response (compared with) younger adults," she said.

"As we have seen from epidemiological studies, the vaccine is still effective in older adults in conferring a high degree of protection to severe forms of Covid-19 infection; (it is) less so with milder breakthrough infections," she added.

"From my study, older adults have a relative deficiency in a specific immune T cell type, and this correlates with the smaller neutralisation activity in older adults when the cells are exposed to the virus parts in the lab.

"The two doses (of the Covid-19 vaccine) were the first finding we had, and we are currently looking into booster vaccination and hybrid immunity data. We are currently recruiting people who are planning for their fourth or further booster vaccination of any type."

The relative deficiency in the T cell subset in older adults may explain their susceptibility to intracellular infections such as influenza, shingles and tuberculosis (TB), and lower response to vaccinations for these infections, Dr Ho said.

Citing latent TB as an example, she said the T cell type is a "major player in the body's defences against TB".

"We postulate that the reason for more older adults suffering from TB is the relative lack of this immune cell type. This is even more pertinent in Singapore, where TB is endemic. The aim is to develop immunotherapeutics that can target production or stimulation of these immune cell types when they are needed, to improve health span in older adults," Dr Ho said.

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