Early warning tool for breast cancer prediction in southeast Asian women

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Credit: University of Nottingham

A researcher at The University of Nottingham Malaysia is collaborating with scientists at Cancer Research Malaysia, Singapore and the United Kingdom to develop a new early warning tool that could help to predict which women in South East Asia are most at risk of developing breast cancer.

The work of Dr. Weang Kee Ho in the University's Department of Applied Mathematics could help to find out whether it is possible to target expensive mammographic screening at women who are most likely to be affected, enabling doctors to detect the disease in its early stages when it is most treatable.

Dr. Ho, who is a collaborating scientist with Cancer Research Malaysia said: "In South East Asia we have a very low breast cancer survival rate at five years after diagnosis, which can simply be put down to late stage

presentation. However, breast cancer is a curable disease if detected early and this tool could potentially save lives through early detection by a more tailored approach to screening."

In Malaysia, around 1 in 19 women will develop breast cancer in their lifetime. In Asia, the incidence of breast cancer is expected to increase by up to 50 per cent between 2012 and 2025 and, because women are often diagnosed with advanced disease, the five-year survival in some Asian countries is just 49 per cent compared to 89 per cent in Western countries.

Screening and prevention

Screening is effective in catching the disease at an early stage but a lack of resources means that countries like Malaysia cannot afford to screen every woman. Currently, women over the age of 50 are encouraged to get a mammogram yet almost half of breast cancer patients in the region are below the age of 50 when diagnosed.

Such work is possible because it builds on research led by Professor Dr. Teo Soo-Hwang OBE of Cancer Research Malaysia, who has established the largest breast cancer study in Malaysia to determine the genetic and lifestyle determinants of breast cancer risk in Southeast Asian women.

"The search for a better way of screening and preventing breast cancer is only possible because of the contribution of a large team of doctors and scientists. We started this project many years ago in collaboration with experts in Malaysia, Singapore and the United Kingdom, and are delighted to extend the collaboration to include Dr. Ho, who has specialist biostatistical expertise to lead one part of this study," said Professor Dr. Teo Soo-Hwang.

Professor Teo has characterised the role of rare genetic mutations such

as the BRCA1 and BRCA2 gene mutations in Asian women. These genes are well known to increase the risk of breast cancer in affected women by up to 80 per cent. However, these rare mutations affect only a relatively small percentage of the population and her team is currently working on other rare variants which may be associated with elevated risk.

For the majority of breast cancer patients, it is believed that their cancer is caused by a combination of a number of smaller, much more common breast cancer genetic susceptibility variants, which go hand-in-hand with other environmental factors, such as lifestyle.

Genetic profile for risk

Dr. Ho said: "There are hundreds of these common breast cancer genetic susceptibility variants and we inherit these from our parents. Unlike the BRCA genes, having one of these common genetic variants won't really do any harm but inheriting a combination could cause a problem.

"The collaborative project, which brings together the Cancer Research Malaysia, University of Cambridge, University Malaya, National University of Singapore and University of Nottingham Malaysia is aiming to find out which of these tiny variations – and more specifically which combinations – could pose the most risk for some women."

Dr. Ho's expertise lies in statistics and she is taking the genetic data generated from the analysis to produce a complex computational model of the common mutated genes associated with breast cancer. This will build a genetic profile for women most likely to be affected.

She added: "Historically, we have had a low rate of breast cancer incidence compared to Caucasian women but with the move towards a more Westernised lifestyle and diet it is increasing at an alarming rate.

This research could help us to develop a much stronger strategy for tackling this incidence head on.

Professor Teo explained "Taken together, the collaborative research could produce a comprehensive model that can provide a score of breast cancer risk. It would motivate those women most at risk to ensure they have a mammogram and, equally as importantly, it would raise their awareness of the disease and encourage them to be breast aware and vigilant for changes in their breasts in between screening too."

Provided by University of Nottingham