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SINGAPORE'S YOUNG WOMEN SHOW "SKINNY-FAT" RISKS TYPICALLY SEEN IN OLDER AGE
*A*STAR study finds 1 in 4 normal-weight women in their 20s-30s already have bone health problems*

Caption: *Study reveals how body composition screening beyond BMI could identify hidden health risks in young women (Photo credit: Freepik)*

SINGAPORE — A comprehensive study led by researchers from the A*STAR Institute for Human Development and Potential (A*STAR IHDP) has found that more than one in four healthy-weight Chinese women in their 20s and 30s already have low muscle mass and weaker bones — hidden risks for fractures and metabolic diseases that standard BMI measurements cannot identify.

The study, part of the Singapore Preconception Study of Long-Term Maternal and Child Outcomes (S-PRESTO), followed 191 Singaporean women aged 18-45 years and revealed important findings about body composition in young Asian women. Published in *JBMR Plus*, the research found that 26% of normal-weight Chinese women had low muscle mass combined with high body fat — a "thin outside, fat inside" phenotype.

Ethnic Differences Reveal Important Patterns

The research uncovered significant ethnic variations in bone health among young Singaporean women. Chinese women showed the lowest bone density despite appearing healthiest by BMI standards, while other ethnic groups in Singapore demonstrated markedly stronger bones. Only one in three young Chinese women had healthy muscle and body fat composition, with key differentiating factors including physical activity levels and dairy consumption patterns.

These findings are particularly concerning given that Singapore ranks among the top countries worldwide for hip fracture rates, with Chinese women — who comprise 74% of the population — bearing a disproportionate burden of fractures compared to men and other ethnic groups.

"Most research targets bone health after mid-life, but our study focuses on young adulthood when prevention strategies can be most beneficial," said lead author Dr Mya Thway Tint, Principal Investigator from A*STAR IHDP. "We found that women with low muscle mass had significantly lower bone density at all measured sites, regardless of their body fat levels."

Prevention and Screening Strategies

While BMI remains a useful screening tool for population health, it has limitations in identifying specific body composition risks. The study demonstrates that muscle mass, not just weight, plays a crucial role in predicting fracture risk long before menopause occurs.

Senior author Prof Johan Eriksson, Executive Director at A*STAR IHDP, emphasised the clinical implications: "These findings highlight that 'healthy BMI' is insufficient to identify chronic disease risk among Asian women. Body composition screening could identify at-risk individuals who might otherwise be overlooked due to their seemingly healthy appearance. By identifying these risks early, we can implement targeted interventions to prevent serious health complications later in life."

The study suggests that vigorous physical activity and adequate dairy consumption are key prevention strategies, with early intervention during peak bone-building years being most effective. For identifying at-risk individuals, screening approaches include DXA scans, bioelectrical impedance analysis used in national health programs, and simple handgrip strength tests.

The findings underscore the need for healthcare approaches that consider body composition beyond simple weight measurements, especially for young Asian women who may carry higher metabolic risks at similar BMI levels compared to Western populations.

The study was conducted by researchers from A*STAR IHDP, NUS Yong Loo Lin School of Medicine, National University Health System (NUHS), KK Women's and Children's Hospital (KKH), and international collaborators from the University of Southampton and University of Helsinki.

Study citation: Tint, M.T., Cremaschi, A., Leow, M.K.S. et al. Differential contributions of lean and fat mass on bone mineral density in Asian women of reproductive age: the Singapore Preconception Study of Long-Term Maternal and Child Outcomes study. JBMR Plus 9, ziaf054 (2025). https://doi.org/10.1093/jbmrpl/ziaf054

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The A*STAR Institute for Human Development and Potential (A*STAR IHDP) is host to a range of research activities that emphasise human potential and opportunities to improve health and well-being across the life course. We enable this through our research, as well as the support and participation of multiple ecosystem partners within and beyond A*STAR.

Through our work, we hope to enable communities and societies to be better versions of themselves, through opportunities to understand and access ladders for improved health and well-being. These include observational studies, pilot interventions, and evidence recommendations to practitioners and policy makers.

Our aim is to be a lead institute contributing to Singapore's vision to build human capital and potential, as part of the Human Health and Potential domain in RIE2025. Our strong foundational capabilities in translational research, renewed focus areas and commitment to supporting Singapore's needs in population health will help advance human potential, health and well-being. Find out more at www.a-star.edu.sg/ihdp.

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