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Modeling the cost-effectiveness of using digital breast tomosynthesis in breast screening program

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Background: In Australia, breast cancer was the second most common cause of cancer death in 2011. Currently, all Australian women aged 50-69 years are invited to attend biennially in population-based breast screening program with Digital Mammography (2D). But 2D screening fails to detect at least 15-30% of breast cancers. However, with Digital Breast Tomosynthesis (3D), more cancers would be expected to be diagnosed earlier compared to 2D screening.

Objective: The study aims to compare the cost-effectiveness of biennial screening with 3D with biennial screening with 2D for women aged 50-69 years from the healthcare system perspective.

Method: A Markov model was constructed to capture the costs and effectiveness of screening and diagnostic pathway of both screening programs including the stage-specific treatment of breast cancer. All estimates for model input were derived from published articles. This model was created with a time horizon of 35 years and 2 weeks cycle length has been created. One-way and probabilistic sensitivity analysis was conducted.

Results: The base-case analysis estimated that the discounted incremental cost-effectiveness ratio is $40,923/QALY gained for 3D screening compared to 2D screening. 3D screening reduces the chance of biopsy and ultrasonography and increases the cancer detection at an early stage compared to 2D. Our analysis indicates that women spend comparatively more time in better health states with 3D screening compared to 2D. However, sensitivity analysis shows that considerable amount of uncertainty exists around these estimates.

Conclusion: Biennial 3D screening seems to be cost-effective compared to 2D screening for women aged 50-69 years. These results could be a strong basis to consider the implementation 3D screening in the population-based breast screening program. However, further research is warranted with better transition probability parameters of the effectiveness of 3D screening with clinical trials which would give more precise estimates of the cost-effectiveness analysis.

Biography

Naila Amin Nitu is a Bangladeshi Physician practising Gynaecology and Public Health. She has 14 years of experience in maternal health, community health services, clinical service delivery, training and research. She currently serves as the Deputy Director of the Health Economics Unit of Ministry of Health and Family Welfare of Bangladesh Government. She engages in conducting policy-oriented research on health economics and works for advancing the Universal Health Coverage for Bangladeshi population and maintains collaboration with the donor organizations. She has spent more than 10 years to work for the underprivileged women to ensure their better health. She has achieved Fellowship of College of Physicians and Surgeons in 2009 from Bangladesh and obtained an Australian Award Scholarship in 2015 to pursue Master of Public Health with specialisation in Health Economics and Economic Evaluation at the University of Melbourne where she graduated in 2016.

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