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Cancer genetics and treatment rift: Perspectives for coping challenges in low and middle-income countries

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Dear Editor,

Molecular medicine has revamped the medicinal practice in modern times. Incorporation of genetic indicators into treatment plans has become a game-changing paradigm in the cancer fight. Precision medicine has made significant strides in treating cancer, a disease that affects many people. Genomic indicators are essential for individualized treatment planning. However, there are obstacles to the widespread clinical practice of genetic testing, particularly concerning cost, in nations with low and middle-income countries (LMIC), especially with different economies.

Cost-effectiveness of genetic biomarkers in cancer therapy remains a challenge, and it is imperative to consider the affordable accessibility of these technologies in the light of the noteworthy breakthroughs in pharmacogenomics and its potential to transform the treatment of cancer at the grassroots.

While genomic biomarkers hold great promise in tailoring cancer treatments to individual patients, their implementation in routine clinical practice faces multifaceted challenges i) the inadequacies in infrastructure amplifying the difficulties in making genomic biomarkers widely accessible. The biggest hurdle faced by the medical and research community in India is the lack of genotype-phenotype correlations for Indians at a population wide and an individual level. This leads to inefficient translation of genomic information during clinical decision making.[1] A small proportion of patients undergo comprehensive genetic biomarker tests.[2] The total lifetime biomarker costs for patients ranges from a median of $128 for consumer-driven health plans to $477.[3,4] Challenges in implementing Precision Oncology (PO) in LMIC include the use of broader panel next-generation sequencing (NGS) in patients with advanced cancers, often revealing multiple genomic alterations. However, these are time dependent and ideally should meander through the decision making of the regimes for success and minimal resistance. Moreover, the access to whole exome and whole genome NGS poses logistical and financial challenges for patients and oncologists in LMICs. The cost of these tests 'ranges from Rs.40000 to Rs 250,000-500,000 which many a times overrides the price of the patient's clinical regime journey and or surgery, reflecting the intricacies of minimizing the chances and likelihood of a genetic exploration.[3,4] In LMICs, a significant proportion of patients- self-fund their treatments, and the affordability of targetable drugs is always influenced by the availability of generic options. Likewise, affordable generic testing options are the pressing need and addressing this challenge foremost is crucial for enhancing the effective implementation of PO in LMICs.[3] Another façade to this would be exploring the genetic landscape of cancers for revealing key genes such as EGFR, KRAS, MET, LKB1, BRAF, PIK3CA, ALK, RET, ROS1 in lung cancer, including novel alterations like KIF5B-RET fusions. Non-small cell lung cancer presents mutations in TP53, KRAS, EGFR, ALK, MET, METex14, PIK3CA, BRAF (including

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