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Genetic tests to bring down spiraling healthcare costs

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When it comes to disease susceptibility, experts claim that knowledge eventually leads to prevention. The debate revolving around gene patenting has garnered global attention from life science industry and has also raised the question - Is gene testing a form of preventive healthcare that will bring down the ever increasing healthcare costs in the long run?

A comparative analysis of the costs involved in getting genetic testing done, specifically for standard diseases like Breast Cancer (BRCA), diabetes, and cardiovascular ailments among others reveals shocking figures. The average cost of getting BRCA gene tested anywhere in the world ranges between $1,000-to- $3,000.

In Asia, even though the test has been available through several companies since the early 1990's, newer companies are coming up with more technologically advanced methods of genetic testing, in the melee, bringing down the costs considerably. However, medical experts have highlighted that the cost for BRCA testing is not even one-fourth of the total cost of treatment of breast cancer, when detected in later stages.

A standard BRCA gene test costs a little more than $3,000 in the US and so far only one company has held the official patent to test for BRCA1 and BRCA2 gene presence. Comparing this to other Asian countries reveals a cost variation that is considerably huge.

While one-in-eight women in the US have a chance of developing breast cancer, in India around one-in-30 women carry this risk. In India a genetic test for BRCA would cost a patient anywhere between $1,000 (Rs 57,000) and $2,000 (Rs 1,00,000).

S.NO	COUNTRY	INCIDENCE	COST OF GENETIC TEST
1	United States	1 in 36	$3,000 ro $4,000
2	United Kingdom	1 in 10	$3,000 to $6,000
3	India	1 in 30	$1,000 to $2,000
4	China	1 in 40	$2,300 to $4,500
5	Japan	1 in 40	$1,000 to $4,000
6	Singapore	1 in 3	$2,500 to $6,000
7	Australia	1 in 8	$2,000 to $4,000
8	New Zealand	1 in 8	$2,000 to $4,000

*Source: WHO, National Health Ministry's of respective countries

The first genetic mapping of an Indian took place in 2009, in the country's capital New Delhi by scientists at the Institute of Genomics and Integrative Biology. In the years since then, many private laboratories across the country's geography have emerged that offer personalized and individual DNA readings.

Director of the National Institute of Biomedical Genomics (NIBG), Professor Partha P Majumder believes that in spite of the high costs involved, it is a must for those in the high risk group to take the test. Speaking to BioSpectrum Asia, he said, "For any woman in the high risk group, with a family history of either a mother or a sister who have battled Breast Cancer, undergoing the BRCA1 and BRCA2 genetic tests is a must. There are treatment regimes to overcome the disease once the tests are done. The prices are artificially jacked up because of the patenting issues."

In Australia on the other hand, about five percent of the population carries the BRCA1 and BRCA2 genes, which increases their risk of developing breast cancer between 40-to-85 percent. Clinical geneticist at Brisbane Genetics, Dr Michael Gattas, has said that the availability of the procedure varies across Australia. "BRCA1 and BRCA2 testing is not subsidized by Medicare, so much of this testing is done through the public hospital system, which means it's funded through state health departments," he said. The test that is done privately here costs about $1,650. Interestingly, here the test is offered for free in familial cancer centers, if a person meets all the suitable criteria for testing. Further, once a mutation has been identified in a family member, other members can be testing for much cheaper costs.

Explaining further, Professor Geoff Lindeman, head, Medical Oncology, RMH Familial Cancer Center and joint head, Breast Cancer Laboratory, Walter and Eliza Hall Institute, said on his website that about five percent of all breast cancers are hereditary, and can involve the BRCA1 or BRCA2 gene. "That is why it is important to look for special features that suggest risk. In our community the risk of carrying a gene is relatively rare at about 1:800 for each of the mutations," he added.

The National University Cancer Institute, Singapore, on the other hand claims that the test there costs from $2,500-to-$5,000. At this institute, the cost of the test is about $2,000-to-$3,500, depending on the overseas laboratory used. "The results take about three months to get back from laboratories in Australia or US. There are no labs here patented to do the gene testing," the officials explained on their website.

The Cancer Genetics Service, which was started at the National Cancer Center Singapore (NCCS) about 10 years ago, evaluates about 100-to-120 people a year. Dr Lee Soo Chin, a senior consultant oncologist at the National University Cancer Institute, Singapore (NCIS), noted a similar increase over the last two years at the institute's cancer genetics clinic. The clinic that started in 2001 currently sees 60-to-80 new patients a year for genetic risk evaluation. Doctors here offer genetic testing only if the estimated risk of finding a mutation is at least 10 percent.

The cost of the test is by far the same in countries like China, Japan and South Korea. In these Asian demographics, testing the first family member costs $2,320 (HK$ 18,000) and the entire gene is first mapped out. Like in many other places, testing for other family members here too costs lesser, ranging from $773 (HK$6,000)-to-$1,160(HK$9,000). In addition, underprivileged women can avail the test at subsidized costs at certain clinics.

There are many companies worldwide that provide the option of direct-to-customer gene screening. Either through television, radio or internet advertisements, these companies urge people to order a at-home genetic testing kit. An individual in this

case has to merely collect a tissue and swab it inside their cheek to get their DNA sample that is then to be mailed back. The rests are expected anywhere between three weeks and three months. Since this test involves neither a doctor nor a genetic counselor, the credibility of these tests is debatable. However, since the cost of these tests is quite low, a majority of women test themselves in-house through this service.

One main problem that genealogist argue about when it comes to gene testing is that the customers might receive clinically significant test results without any appropriate counseling from a healthcare professional and are expected to interpret complex results on their own. This might lead to a lot of psychological stress and trauma in fear of impending doom.

"With the present state of knowledge, these tests seem very less credible. This is because it might be easy to understand the susceptibility of a person towards a disease caused by a single gene, but when it comes to specific genetic alterations, it is a long and winding process to analyze data and come up with conclusive and credible results," added Professor Majumder.

Nevertheless, with more and more companies coming up with clinical tests, the costs of such tests are only dubbed to decrease.