

An economic analysis comparing average cost of screening patients using remedy social platform versus popular preventive health check-up programs

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Abstract

Background: Preventive health care is a revolutionary step in the field of health care, which can help people diagnose disease at an early stage. And given the health setup in our country, one has to go through a series of tests some of which are not required at all. This ultimately leads to unnecessary expenditure and loss of time.

Objective: To evaluate disease risk prevailing in population and recommend a personalized diagnostic plan instead of a generic plan.

Materials and Methods: We conducted an analysis using data collected from 140 patients through an online health assessment questionnaire. All of the participants in study were screened for a risk of them having a particular disease and were assigned a personalized diagnostic plan based on their risk-profile using an algorithm.

Result: The average diagnostic cost came substantially lower than the tests recommended by usual health preventive checkup plans. This could result in highly judicious utilization of health-care resources, money, and participant time without creating any significant compromise in screening sensitivity.

Conclusion: Personalized diagnostic plans using effective screening methods could lead to saving of significant amount, up to 80% in some cases, of money and time for an individual.

KEY WORDS: Health economics, preventive health, screening, cost-impact analysis, preventive check-ups

Introduction

Health is a major concern for most of us. From elderly parents to newborn children, medication and hospitalization play a substantial role while ensuring the health of a family. While age-related ailments are almost inevitable, even the

young generation of today is also not immune from health issues, notably the lifestyle-related ailments. Government's spending on health care in India was an estimated 5% of gross domestic product in 2015 and is expected to remain at that level for few years ahead. This low spending on health care further complicates the situation thereby placing much of the burden on patients and their families, as evidenced by the country's out-of-pocket spending rate, one of the world's highest.^[1]

The answer to this problem partly lies with the evolution of preventive health care. The importance of early recognition and prevention of disease cannot be overemphasized because it detects the disease at the initial and curable stages thus preventing complications and it is cheaper and effective than treating a full blown disease at a later stage. As preventive care is very complex and one might have to navigate his/her

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way through a series of health-care providers without even having a disease, we decided to perform a study of the disease risks prevailing in the population, the pathology/lab tests required which could eventually help people save the two precious entities, time and money. In other words, a prospective patient, in general, has to pay a lot for tests, many of which are not required given his/her life stage and family history. Similarly, long queues and endless waits make any preventive health efforts difficult and painful. Hence this study, done using Remedy Social platform,^[2] is an effort to tackle the two problems more efficiently.

Materials and Methods

Data Collection

To start with the study, around 150 respondents were approached through two different mediums, personalized e-mails, and social media platform, Facebook.^[3] The survey was designed and managed with the help of online survey development tool—SurveyMonkey—a product of world's largest survey company that goes by the same name.^[4] The survey questionnaire mainly comprised baseline lifestyle, health complaints to family history-related questions. The gender distribution of the population who took the survey was 65% males and 35% females. The mean age of the population who took the survey was 27 years with population age ranging from 20 years to 60 years. The survey was taken by people from all parts of the country, so that the results are not biased and thus, present a true picture of the prevailing diseases and economic impact nationally.

Screening and Risks Identified

The screening of the collected data to identify the health risks associated with the population was the next major step. The health risks for participants were identified for 13 conditions for men with 5 additional conditions for women, using the Remedy Social algorithm for risk screening. The screening was done based on an algorithm that includes a combination of various screening criteria such as the one by America Heart Association,^[5] American Diabetes Association,^[6] and so on for their respective disorders combined into a single algorithm. The results around disease risks as determined by the algorithm can be seen in the Table 1. The highlighted values are the disease risks, which affect more than 25% of the population from the survey.

The top five risk areas affecting the entire population are depression, stress, obesity, hypertension, and allergy. Not surprisingly, all of top five comorbidity risks seem connected and might share some causal relationship. The results clearly show how obesity is emerging as a bigger problem in our nation with close to half of the Indian males affected by the disease. Unfortunately, obesity does not come alone and brings with itself a plethora of diseases such as hypertension and other cardiorelated problems. The proportion of females affected by depression and stress-related problems is astonishingly high. More than twice of the proportion of males,

females have shown the signs of the two major mood disorder-related problems, whereas opposite scenario was found in the case of thyroid-related problems where more than half of the male population is said to be suffering from the same. The comorbidities migraine and anemia are found to be affecting around one-third of the female population, whereas it is not so significant in the case of males.

Results

Based on the risks associated with the population as identified in Table 1, the Remedy Social algorithm came up with a personalized diagnostic plan for each individual based on his/her associated risks. This algorithm has been designed by a team of esteemed physicians^[7] on board at Remedy Social. Table 2 summarizes the tests suggested against each of the different medical conditions. The columns in the table are the different medical conditions and rows are the diagnostic tests conducted. A tick mark confirms whether a diagnostic test is required against a corresponding medical condition.

Against the common practice in most of the health setups where a lot of unnecessary tests are recommended for a patient with comorbidity, this algorithm suggests only the required lab test for that comorbidity. For example, only an individual with diabetes risk will receive urine test, an individual with hypertension symptoms will receive creatinine test, and so on.

Discussion

Table 3 gives the list of average costs associated with different diagnostic tests conducted in major diagnostic labs in India.^[8]

The diagnostic tests mentioned in Table 3 are the range of tests that are usually conducted in various preventive health checkup plans in India. The total cost of all the possible tests that are considered for the survey population came to be Rs.6,200/- (\$94 approx.) per participant. As most of the preventive health checkup programs in India with nearly similar coverage range between Rs.3,500/- and Rs.10,000/-, the costs^[9] considered for diagnostic tests in Table 3 makes a good generalization of the average costs involved across the country.

The average cost of diagnostic tests for the population, based on the diagnostic plan using Remedy Social platform as discussed in previous section came to be Rs.1,073.4/- per participant, that is, a staggering decrease of 83% in the total cost involved per participant. If we see the costs involved with respect to gender, females would save up to 80% of the usual health plan cost, whereas males would benefit further by saving up to 84%, as the average costs involved based on the newly devised diagnostic plan were Rs.1,200.8/- and Rs.1,004.8/- for females and males, respectively.

A similar study^[10] conducted to analyze the effectiveness of screening strategies in identifying pediatric diabetes mellitus confirmed that the cost per case is extremely high

Table 1: Risks identified using the Remedy Social algorithm

Comorbidity	Overall		Male		Female	
	n	%	n	%	n	%
Diabetes	13	9.3	12	13.2	1	2
Hypertension	43	30.7	34	37.4	9	18.4
Hypercholesterolemia	28	20	22	24.2	6	12.2
Obesity	47	33.6	40	44	7	14.3
Sleep disorders	16	11.4	9	9.9	7	14.3
GERD	7	5	7	7.7	0	0
Gastritis	15	10.7	8	8.8	7	14.3
Depression	52	37.1	25	27.5	27	55.1
Stress/anxiety	50	35.7	24	26.4	26	53.1
Allergy	36	25.7	20	22	16	32.7
Back/joint pain	24	17.1	14	15.4	10	20.4
Migraine	27	19.3	11	12.1	16	32.7
Thyroid	61	43.6	48	52.7	13	26.5
Anemia	-	-	-	-	19	38.8
Breast/ovarian cancer	-	-	-	-	5	10.2
Cervical cancer	-	-	-	-	0	0
Osteoporosis	-	-	-	-	7	14.3
Menstrual irregularity	-	-	-	-	7	14.3

Table 2: Tests suggested based on risks associated

Test Name	Diabetes	Hypertension	Hypercholesterolemia	Obesity	Sleep disorders	Depression	Stress/Anxiety	Thyroid	Anemia	Breast ovarian can	Osteoporosis	Menstrual irregularity
BP Msrmt.	✓	✓	✓	✓	✓	✓	✓	✓				
Sugar profile	✓	✓	✓	✓	✓	✓	✓					
Urine sugar		✓										
Lipid profile	✓	✓	✓	✓								
Thyroid fn.				✓				✓				
Creatinine			✓									
Blood count										✓		
Vitamin D3												✓
Chest X-ray	✓	✓	✓	✓								
Mammog.											✓	
Sleep study					✓							
Gynec. ref.												✓

Table 3: Average costs of diagnostic tests in India

Test name	Price (INR)
BP measurement	50
Sugar profile (FBS, HbA1c)	120
Urine sugar	60
Lipid profile (Chol, LDL, HDL, VLDL)	500
Thyroid function test (TSH, T3, T4)	450
Creatinine	150
Blood count	220
Vitamin D3	1200
Chest X-ray	350
Mammography	1200
Sleep study	1500
Gynec referral	400

because of the low prevalence of the disease in the pediatric population. Screening for diabetes could become more cost-effective if dysglycemia is explicitly considered as a screening outcome. In another study^[11] done for the babies born with a critical congenital heart defect, who appear to be healthy at first, who are at risk of having serious complications within the first few days or weeks of life and often require emergency care. Newborn screening can identify some of these babies so they can receive care and treatment that can help prevent disability or early death.

As evident from this study and few examples cited above, it can be seen that preventive screening provides a lot of value while saving evitable costs and avoiding serious complications, but when prevalence is low it might lead to a lot of tests and hence increased value. Thus, a mechanism to narrow down target audience for a particular test should be very helpful both from the provider's as well as patient's point of view.

Conclusion

India is the disease capital for a lot of chronic diseases. As a result, preventive testing becomes imperative for these

diseases. Diagnostic labs and hospitals provide comprehensive preventive health checkup packages very commonly to test people against these diseases. However, this inevitably leads to over-utilization. Therefore, using effective screening algorithms or frameworks can lead to saving significant costs (in this case around 80%) for various preventive health checkup programs. This could help significantly in terms of making such facilities available for wider audiences in a resource-constrained ecosystem such as India.

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