ORIGINAL RESEARCH

Financial Prudence of Healthcare Screening Program in Urban Set-up

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ABSTRACT

Introduction: Health screening is one of the rapidly growing and accepted practice in healthcare setup across the globe. Public health screening programs are used to control epidemics of infectious disease and to target treatment for numerous chronic diseases.

Methods:

Duration of the study: The study was carried out from November 2018 to January 2019.

Study setting: The study was carried out at Meerut.

Study design: Traditional costing was done, and then a comparison was drawn to estimate the realistic costs incurred towards medical camp.

Results: The cost of screening during the camp was INR 616 per person. With this cost, a large number of disorders were detected in an early stage which has the potential to develop in full-blown disease which may cause more cost to society at large. Hence this study recommends such screening program for families should be carried out on the frequent interval at least annually.

Conclusion: Public health screening programs are used to control disease and to target treatment for acute or chronic diseases. Medical screening programs provide medical as well as socioeconomic benefits. Medical screening is a method for detecting disease or body dysfunction before an individual would normally seek medical care. The fundamental purpose of screening is early diagnosis and treatment of the individual and, thus, it has a clinical focus. Screening tests are generally administered to people who have not yet sought medical care, but at high risk for certain adverse health outcomes. This is a very cost-effective method of preventing the disease at an early stage. The study revealed the screening program is a very effective tool, as shown in this study.

Keywords: Cost-benefit evaluation, Cost-effectiveness, Healthcare, Screening program.

INTRODUCTION

Health screening is one of the rapidly growing and accepted practice in healthcare set-up across the globe.[1] Public health screening programs are used to control epidemics of infectious disease and to target treatment for numerous chronic diseases.[2] Proponents of screening programs stress that in addition to the potential of early disease detection, they also provide the opportunity for screening participants to change unhealthy lifestyles through the so-called lifestyle counseling.

Health screening tests have a great impact on public's health because they involve testing of asymptomatic populations for specific diseases or health conditions.[3] Medical screening is conducted by the examination of individuals with no signs for the disease to detect those at higher risk of having or developing a disease. Its result in identifying the disease early for better interventions and management of the disease. It divides the people into two categories who are likely to develop and those who are unlikely to develop the disease.

A cost-effectiveness analysis is used when a cost-benefit analysis is not a viable analysis option because you can't place value on the outcome. This method is most commonly used in healthcare when evaluating various treatment plans, health screening program, etc. Providers can assess the cost of a given course of action/program such as physical therapy versus surgery or medical camp. However, it is difficult to predict and value outcomes because patient success and obstacles are all unique and different.

METHODS

Duration of the Study

The study was carried out from November 2018 to January 2019.

Study Setting

The study was carried out at Meerut.

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Study Design

Traditional costing was done using the existing information, and then a comparison was drawn to estimate the realistic costs incurred towards medical camp.

P1 Cases
Focal reversible pulpitis
Acute palpitis
Chronic pulpitis
Chronic hypoplastic pulpitis
Periapical abscess
Periapical cyst
Periapical granuloma
Cellulitis
Acute necrotizing ulcerative gingivitis
Chronic herpetic gingivostomatitis
chronic marginal gingivitis
Pericoronitis
All root stumps/extraction
all denture cases
P2 Cases
Periodontal pocket
Tooth attrition abrasion erosion
Smooth surface caries
Cervical caries
P3 Cases
Grade 1 calculus
Tarter
Stains
Deposit cases without marked gingivitis and pinpoint cavities

Data Collection, Tabulation, and Computation

The cost information was collected from each department and facilities involved in the medical camp. The health screening was conducted for families (women > 25 years of age) to ruled out any impending healthcare problem. The following examination was conducted by a doctor and dental officers to check.

- Checking of vital parameters: pulse, BP, temperature, respiratory rate, weight, a sign of anemia
- Any skin disorder, eye checkup, sign for any thyroid disorders
- Dental checkup for all 3 categories (P1, P2, and P3)

After screening medical and, dental examination following lab test was conducted:

- Biochemistry (Include)
- Hematology (TLC, DLC)
- Urine RE
- Cholesterol
- Triglyceride
- Uric acid
- *Sugar:* Fasting and postprandial
- Hemoglobin

After lab result were obtained the data were analyzed using appropriate statistical data and Excel. The cost of manpower, vehicle, lab reagent was calculated as under in Table 1.

The cost of lab reagent taken for medical camp for lab investigation as shown in Table 2.

The total cost is calculated as under Table 3.

The lab results were analyzed as shown in Table 4.

Out of 232 female respondents, following medical abnormalities were detected as shown in Table 5. The results of the screening program were overwhelming. The female population screened were suffering from overweight (19 %), out of which 4 were required under attention to reduce their weight (> 30%) overweight. These patients were advised diet as well as moderate exercise to start with and follow-up. The skin disorders were mostly related to environment related like dry/cracked skin, eczema, psoriasis, acne, rosacea, ichthyosis, vitiligo, hives, and seborrheic dermatitis.

The female respondents showed clinical features of thyroid disorder while screening was dry, itchy skin, dry, coarse hair, hair loss, weight loss, despite normal eating habits, enlargement of the thyroid gland (goiter), change in menstrual cycles and bulging eyes.

All these patients were referred to a concerned specialist for future treatment. The eye problems were also detected during screening mostly near, and distant vision all of them sent to an ophthalmologist for an opinion.

Out of 232 female respondents, following dental abnormalities were detected as shown in Table 6. The dental abnormalities are common in all ages because of poor dental hygiene and not using appropriate dental products.[4]

A large number of respondent were not aware of their blood group. The blood grouping was conducted in the camp. The results are shown in Table 7.

Table 1: Cost of manpower, vehicle per day

Manpower	Per day salary	Total
Medical officer–01	4000	4000.00
Dental officer–01	4000	4000.00
Health JCO–01 (paramedic)	1800	1800.00
Health NCO-01 (paramedic)	1100	1100.00
Dental JCO–01 (paramedic)	1800	1800.00
Dental NCO–01 (Paramedic)	1600	1600.00
LAB NCO–02 (Paramedic)	1650 + 1650	3300.00
BTA NCO–01(Paramedic)	1600	1600.00
Nursing Assistant–01 (paramedic)	1300	1300.00
Ambulance Asst - 03 (paramedic)	1066 + 1066 +1066	3200.00
Housekeeper–02	1300+1300	2600.00
Driver–01	1100	1100.00
LS Vehicle–01	14 + 3 +14 = 31 km 4 km/ltr = 7.75 × 72.00	558.00
		27958.00

Table 2: Cost of lab reagent per day

S. No.	Nomenclature	A/U	Qty	Supply rate	Qty reqd	Qty/01	Qty /100	Day 1 (72)	Day 2 (71)	Day 3 (99)
1.	Glucose kit of 400 mL	Kit	1	370.00	2	1.95	194.74	140.2105	138.2632	192.7895
2.	Urea kit of 100 mL	Kit	1	1160.00	1	12.89	1288.89	928	915.1111	1276
3.	Creatnine kit of 100 mL	Kit	1	1060.00	1	11.78	1177.78	848	836.2222	1166
4.	Uric acid kit of 100 mL	Kit	1	1458.00	1	16.20	1620.00	1166.4	1150.2	1603.8
5.	Cholesterol kit of 100 mL	Kit	1	1044.00	1	11.60	1160.00	835.2	823.6	1148.4
6.	Triglyceride kit of 100 mL	Kit	1	2310.00	1	25.67	2566.67	1848	1822.333	2541
7.	HDL cholesterol kit 100 mL	Kit	1	1230.00	1	13.67	1366.67	984	970.3333	1353
8.	LDL cholesterol kit 100 mL	Kit	1	1230.00	1	13.67	1366.67	984	970.3333	1353
9.	Bilirubin kit of 100 mL	Kit	1	925.00	1	10.28	1027.78	740	729.7222	1017.5
10.	Total protein kit of 100 mL	Kit	1	470.00	1	5.22	522.22	376	370.7778	517
11.	Albumin kit of 100 mL	Kit	1	725.00	1	8.06	805.56	580	571.9444	797.5
12.	SGOT kit of 100 mL	Kit	1	1210.00	1	13.44	1344.44	968	954.5556	1331
13.	SGPT kit of 100 mL	Kit	1	1325.00	1	14.72	1472.22	1060	1045.278	1457.5
14.	Drabkin's solution.	Ltr	1	210.00	5	1.05	105.00	75.6	74.55	103.95
15.	Leshmen stain bott of 500 mL	Bott	1	380.00	1	0.76	76.00	54.72	53.96	75.24
16.	Glass slide pkt of 50	Pkt	1	80.00	2	1.25	125.00	90	88.75	123.75
17.	Anti sera A 10 mL/100 test	Ml	1	87.00	0.1	0.87	87.00	62.64	61.77	86.13
18.	Anti sera B 10 mL/100 test	Ml	1	87.00	0.1	0.87	87.00	62.64	61.77	86.13
19.	Anti sera O 10 mL/100 test	Ml	1	87.00	0.1	0.87	87.00	62.64	61.77	86.13
20.	Anti sera AB 10 mL/100 test	Ml	1	87.00	0.1	0.87	87.00	62.64	61.77	86.13
21.	Anti sera D 10 mL/100 test	Ml	1	87.00	0.1	0.87	87.00	62.64	61.77	86.13
22.	Urostrippkt of 100	Pkt	1	440.00	1	4.40	440.00	316.8	312.4	435.6
23.	Urine cotainerpkt of 100	No	1	7.00	1	7.00	700.00	504	497	693
24.	Vaccutainer Sterile	No	1	4.80	1	4.80	480.00	345.6	340.8	475.2
25.	Vaccutainer EDTA	No	1	4.80	1	4.80	480.00	345.6	340.8	475.2
26.	Vaccutainer sodium fluoride	No	1	4.80	2	4.80	480.00	345.6	340.8	475.2
27.	Microtips 200–1000 yl pkt of 500	No	1	200.00	1	0.40	40.00	28.8	28.4	39.6
28.	Microtips 0.5–200 yl pkt of 1000	No	1	200.00	1	0.20	20.00	14.4	14.2	19.8
29.	Syringe 5 mL pkt of 100	No	1	3.90	2	7.80	780.00	561.6	553.8	772.2
30.	Sterilium	No	1	390.00	1	390.00	390.00	390.00	390.00	390.00
31.	Cotton 50 g	Roll	1	25.00	1	25.00	25.00	25.00	25.00	25.00
32.	Gloves pkt of 25	No	1	362.50	1	14.50	14.50	14.50	14.50	14.50
33.	BMW polythin	No	1	9.00	3	10.00	30.00	30.00	30.00	30.00

Table 3: Total cost of screening camp

S. No.	Cost Head	Per day cost	Total
1.	Manpower + veh	27958.00 x 3	83875
2.	Lab reagent cost (N = 232)	14913 +14712 + 20333	59058
			1,42,932
	Total screening cost per patient (N = 232)		1,42,932/232 = 616.08 inr

Table 4: Lab investigation

Test	Total Number of tests	Abnormal Test	% abnormal	% normal	Remark
Biochemistry	3952	67	1.69	98.31	
Hematology	964	33	3.42	96.58	
Urine	1046	26	2.48	97.51	Abnormal urine RE
Cholesterol	232	43	18.53	81.46	High cholesterol (> 200 mg %)
Triglyceride	232	8	3.44	96.55	High triglyceride (> 150 mg %)
Uric acid	232	8	3.44	96.55	High uric acid (> 7 mg)
Blood sugar	232	12	5.17	84.82	High blood sugar (F: > 110 mg /dL. PP > 140 mg/dL)
Low Hemoglobin	232	33	14.22	85.77	Anemia (Hb < 9 gm %)
Bilirubin	232	2	0.86	99.13	High Bilirubin (Icterus ++)

Table 5: Medical abnormalities detected

Disease/abnormality detected	Number of cases
Skin disorders	08
Sign of thyroids disorders	04
Low vision (distant/near)	26
Overweight (> 10 %)	46
Anemia (< 9 gm % Hb)	33
High Blood sugar (F : > 110 mg /dL PP > 140 mg /dL)	12
Jaundice high bilirubin (Icterus ++)	2
High uric acid (> 7 mg)	8
High cholesterol (> 200 mg %)	43
High triglyceride (> 50 mg %)	8
UTI	4

Table 7: Blood grouping result

Blood group	Positive	Negative	Total
A	57	03	60
B	73	03	76
AB	19	02	21
O	72	03	75
Total	221	11	232

The cost of screening during the camp was INR 616 per person. With this cost, a large number of disorders were detected in an early stage which may develop in full-blown disease which may cause more cost to society at large. Hence this study recommends such a screening program for families should be carried out on the frequent interval at least annually.

DISCUSSION

Screening is commonly used for case finding—identifying a previously unknown or unrecognized clinical condition in apparently healthy or asymptomatic persons and offering treatment to those individuals. Screening might be defined as the active search for a disease (or a pre-disease condition) in patients who are presumed and presume themselves to be healthy. In such a setting, screening is, in general, not able to reduce the likelihood of a certain disease; however, it may reduce its negative consequences. Therefore, screening is a form of secondary prevention.

The cost-benefit evaluation and the cost-effectiveness evaluation are two different tools that we choose to use evaluate business decisions. Both methods are used to comparing the future or impending purchase of new equipment or programs based on their cost and their expected benefits to the company, but one may be more suitable for certain circumstances than the other.

The cost-effectiveness methods are a more appropriate method for any health screening prog. A cost-effectiveness evaluation use to compare is more complex than the cost-benefit method because it involves more components.

Table 6: Dental abnormalities found during medical screening CAMPB 4

Cases	Number of cases detected
P1 cases	50
Focal reversible pulpitis	5
Acute palpitis	4
Chronic pulpitis	6
Chronic hypoplastic pulpitis	2
Periapical abscess	12
Periapical cyst	2
Periapical granuloma	1
Cellulitis	2
Acute necrotizing ulcerative gingivitis	3
Chronic herpetic gingivostomatitis	2
Chronic marginal gingivitis	1
Pericoronitis	6
All root stumps/extraction	4
All denture cases	NIL
P2 cases	51
Periodontal pocket	10
Tooth attrition abrasion erosion	6
Smooth surface caries	28
Cervical caries	6
P3 cases	77 (Overlap of diseases)
Grade 1 calculus	28
Tarter	22
Stains	22
Deposit cases without marked gingivitis and pinpoint cavities	61
Fit cases	54

A cost-effective analysis provides more insights into potential success.

Criteria for an effective screening test.[5] The following criteria need to be met to have an effective screening program:
- Significant societal burden
- Detectable asymptomatic phase
- Accurate screening test
- Acceptable and feasible test
- Effective intervention for those screened positive
- Effective prognostication of those screened positive.
- Cost-effectiveness of the screening program and its availability on a continuing basis
- Presence of safeguards to ensure informed consent and patient confidentiality

Criteria of Wilson and Jungner (Bull World Health Organ, 1968)

- The conditions sought should be an important health problem.
- There should be an accepted treatment for patients with recognized disease.
- Facilities for diagnosis and treatment should be available.

- There should be a recognizable latent or early symptomatic stage.
- There should be a suitable test or examination.
- The test should be acceptable to the population.
- The natural history of the condition, including development from latent to declared disease, should be adequately understood.
- There should be an agreed policy on whom to treat as patients.
- The cost of case-findings (including diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care as whole.
- Case-finding should be a continuing process and not a "once and for all" project.

Cost-effectiveness analysis (CEA) is the best decision-making tool. It identifies the economically most efficient way to fulfill an objective. CEA of screening prog is used to determine whether a screening intervention is economically efficient, by comparing its costs and effects with costs and effects of all alternatives including doing nothing.

Over-diagnosis and overtreatment is a main concern for many screening tests particularly when evidence either points to net harm or it is insufficient, conflicting or supports only a few magnitudes of net benefit.[6]

Gender bias results in the neglect of female children and selective abortion and excess female mortality in China, India, and other South Asian countries, explaining the "missing" women in population counts. The global burden of disease for 2001 proportionally affects males slightly more than females.

Good maternal health services are one of the keys to strengthen the entire health system. A healthcare facility that is well equipped to provide the most essential obstetric care can also treat accidents, trauma, and other medical emergencies.[7]

Recently, in one of the reports of World Bank (2006) has also reported that chronic and noncommunicable diseases are now main leading causes of death across the globe, amounting for about 60% of all deaths.[8]

Another recent study conducted in Andhra Pradesh by Joshi et al.[9] points to similar evidence with regard to the majority of deaths occurring due to non-communicable diseases and injuries. Nevertheless, India is known for gender discrimination in terms of healthcare utilization, food allocation, etc. Studies conducted during the 19th-century point out females being restricted from seeking healthcare leads to poorer health status.[10] The India GBD Collaborators[11] reported that leading cardiovascular diseases—ischaemic heart disease and stroke—are one of the largest contributions to the total mortality in India in 2016, at 28·1%.

National program in India is running in a focal manner where more emphasis on providing secondary care. Screening program is running without the provision of lab reagent due to lack of fund.

CONCLUSION

Public health screening programs use to control disease and to target treatment for acute or chronic diseases. Medical screening programs provide medical as well as socioeconomic benefits. Medical screening is a method for detecting disease or body dysfunction before an individual would normally seek medical care. If medical screening programs are poorly conceived, organized, or implemented, they may lead to interventions of questionable merit and result may be biased. The fundamental purpose of screening is early diagnosis and treatment of the individual and, thus, it has a clinical focus. Screening tests are generally administered to people who have not yet sought medical care, but at high risk for certain adverse health outcomes. This is a very cost-effective method of preventing the disease at an early stage. The study revealed the screening program is a very effective tool, as shown in this study.

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