Research Article

A study on the utility of preventive health check-up in early detection of disease states

Ramesh R.[1]*, Yuri Gagarin P.[1], Senthil Murugan R.[1], Rizwan S. A.[2], Virgin Joena M.[1], Aravind A.[1]

[1]Department of General Medicine, [2]Department of Community Medicine, Velammal Medical College Hospital and Research Institute, Madurai, Tamil Nadu, India

ABSTRACT

Background: Because of the current lifestyle and food habits, people are becoming more vulnerable to many diseases like diabetes, hypertension, dyslipidemia and coronary artery disease. Early detection of disease in its latent phase helps in timely therapeutic interventions, thereby significantly reducing the morbidity and mortality. Preventive health check-up is widely adopted by many hospitals towards this goal. The aim of the study was to analyze the utility of master health check-up in early detection of disease states.

Methods: Retrospective study of 262 asymptomatic individuals attending Master Health Checkup section was done. Patients with significant symptoms were excluded. Descriptive analysis was used in the processing and analysis of data.

Results: In the study population, 12.8% had diabetic range of blood sugar values and 21.7% had BP in the hypertensive range. Dyslipidemia was detected in 89.2% of asymptomatic individuals. Thyroid function abnormalities were detected in 10.7% of the population. Among other newly detected diseases, detection rates were 40.9% for NAFLD, 4.2% for renal impairment and 26.7% for anemia.

Conclusions: The study results are encouraging to educate the society to utilize preventive health services, as significant number of disease states were newly detected in the preventive health check-up.

Keywords: Preventive health check-up, Diabetes, Hypertension, Dyslipidemia, NAFLD, NASH

INTRODUCTION

Health is commonly neglected. Also, because of the current life style, food habits, lack of exercise, and stress, people are becoming more vulnerable to many diseases like diabetes, hypertension, dyslipidemia, coronary artery disease and malignancies.[1-4] Early detection of disease in its latent phase helps in timely therapeutic interventions, thereby significantly reducing the morbidity, mortality and economic burden due to the disease.

Preventive health check-up is widely adopted by many hospitals towards this goal.[2] But the degree of its utility in early detection of disease states is speculative.[5,6] Hence, there is uncertainty among the public and health care professionals in utilizing these preventive health care services in a beneficial, judicious, as well as cost effective manner.[5,6] The aim of the study was to analyze the utility of preventive health check-up in early detection of disease states.

METHODS

The study was conducted as a retrospective study. Individuals attending the master health checkup section of the hospital fulfilling the inclusion and exclusion criteria were included in the study. The inclusion criteria were apparently healthy individuals and patients with

known medical conditions without significant symptoms. Exclusion criterion was patients presenting with specific symptoms. The sample size of the study population was 262. The data of the patients, their results, and their final reports were collected from the master health checkup section records. The procedure of master health checkup performed was as follows: after recording comprehensive medical history and performing thorough physical examination, the individuals were subjected to a set of investigations according to the package selected based on their age (child health checkup, senior citizen health checkup), pre-existing diseases (executive diabetic health checkup, cardiology health checkup) or their preference (primary health checkup, executive health checkup, whole body health checkup).

The packages included investigations out of the following: complete hemogram, urine analysis, urine microalbumin, stool routine, fasting and postprandial blood sugar, HbA1c, blood urea, serum creatinine, serum uric acid, lipid profile, liver profile, thyroid profile, chest X-ray, ECG, echocardiography, ultrasound abdomen, HBsAg, anti-HCV, HIV, VDRL, PSA (for men) and pap smear (for women). The study was approved by the ethical committee of Velammal Medical College Hospital and Research Institute. The data was analyzed using SPSS software. Descriptive analysis was used in the processing and analysis of data.

RESULTS

Patient characteristics (Table 1)

262 patients fulfilling the inclusion and exclusion criteria were included in the study. 168 (64.1%) were male and 94 (35.1%) were female. The number of patients by age wise distribution: 2 patients (0.8%) ≤20 years, 12 patients (4.6%) 21-30 years, 52 patients (19.8%) 31-40 years, 75patients (28.6%) 41- 50 years, 65 patients (24.8%) 51-60 years and 56 patients (21.4%) >60 years. 11 patients (4.2%) were underweight, 73 patients (28.2%) were normal weight, 107 patients (41.3%) were overweight (pre obese), 68 patients (26.3%) were obese.

197 (76.7%) were non-smokers, 29 (11.3%) were current smokers and 31 (12.1%) were ex-smokers. 179 (69.6%) were non-alcohol users, 45 (17.5%) were alcohol users, 33 (12.8%) consumed alcohol in the past. Out of 262 patients, 66 patients (25.2%) had prior diabetes, 56 patients had prior hypertension (21.4%), 12 patients (4.6%) had prior dyslipidemia, 8 patients (3.1%) had prior CAD, and 10 patients (3.8%) had prior hypothyroidism.

Newly detected disease states (Table 2)

Among 196 patients who had no prior history of diabetes, 51 patients (26.0%) had impaired fasting glucose (IFG) defined as FBS≥100 mg/dl and <126 mg/dl with 2-hours PPBS <140 mg/dl, 38 patients (19.4%) had impaired

glucose tolerance defined as PPBS ≥140 mg/dl and <200 mg/dl with FBS <126 mg/dl, 25 patients (12.8%) had diabetic range of blood sugar values with FBS ≥126 mg/dl or PPBS ≥ 200 mg/dl or both.

Table 1: Patient characteristics.

Characteristics	Category	N	N%
Age (n=262)	≤20 years	2	0.8%
	21-30 years	12	4.6%
	31-40 years	52	19.8%
	41-50 years	75	28.6%
	51-60 years	65	24.8%
	>60 years	56	21.4%
Gender (n=262)	Male	168	64.1%
	Female	94	35.9%
BMI (n=259)	Under weight	11	4.2%
	Normal	73	28.2%
	Pre obese	107	41.3%
	Obese	68	26.3%
Smoking (n=257)	Non-user	197	76.7%
	Current user	29	11.3%
	Ex-user	31	12.1%
Alcoholism (n=257)	Non-user	179	69.6%
	Current user	45	17.5%
	Ex-user	33	12.8%
Prior diabetes mellitus (n=262)		66	25.2%
Prior hypertension (n=262)		56	21.4%
Prior dyslipidemia (n=262)		12	4.6%
Prior CAD (n=262)		8	3.1%
Prior hypothyroidism (n=262)		10	3.8%

Blood pressure data was analyzed for 203 patients who had no prior history of hypertension. Among them, prehypertensive range of blood pressure (systolic BP between 120 and 139mmHg and/or diastolic BP 80-89mmHg) was detected in 63 patients (31%) and hypertensive range of BP (systolic BP≥140mmHg and/or diastolic BP ≥90mmHg) was found in 44 patients (21.7%).[7]

Dyslipidemia was newly found in 223 individuals (89.2%) out of 250 individuals tested. 97 (39.6%) out of 245 had elevated LDL (>130 mg/dl), 94 (37.6%) out of 250 had elevated TGL (>150 mg/dl) and 153 (61.2%) had low HDL (<40 mg/dl in men and <50 mg/dl in women).

Out of 149 asymptomatic individuals without past history of thyroid diseases, who were checked for thyroid function abnormalities, 16 patients (10.7%) had thyroid function abnormalities: 4 patients (2.7%) had hypothyroidism, 9 patients had subclinical hypothyroidism (6%) and 3 patients (2%) had hyperthyroidism.

Among 110 non-alcoholic patients who underwent USG abdomen, fatty liver was detected in 45 patients (40.9%). Out of 78 non-alcoholics who had LFT values, 9 patients

(11.5%) had elevated ALT levels along with fatty liver in absence of other obvious reasons suggesting probable NASH.

Table 2: Newly detected diseases.

Detected diseases	Category	N	N%
Hyperglycemia (n=196)	IGT	38	19.4%
	IFG	51	26.0%
	DM	25	12.8%
Elevated BP (n=203)	Prehypertension	63	31.0%
	Hypertension	44	21.7%
Dyslipidemia (n=250)		223	89.2%
Elevated LDL (n=245)		97	39.6%
Elevated TGL (n=250)		94	37.6%
Low HDL (n=250)		153	61.2%
Hyperthyroidism (n=149)		3	2.0%
Hypothyroidism (n=149)		4	2.7%
Subclinical hypothyroidism (n=149)		9	6.0%
NAFLD (n=110)		45	40.9%
NASH (n=78)		9	11.5%
Renal impairment (n=262)		11	4.2%
Anemia (n=262)		70	26.7%
Hepatitis B (n=137)		1	0.7%
Hepatitis C (n=137)		2	1.5%

Renal impairment (defined as eGFR <60ml/min/1.73m^2 by CKD-EPI formula) was identified in 11 (4.2%) out of 262 individuals. Anemia (defined as <12g in females and <13g in males) was detected in 70 (26.7%) out of 262 individuals. Hepatitis B was detected in 1 (0.7%) and Hepatitis C was detected in 2 (1.5%) out of 137 persons tested.

3 individuals had probable CAD by ECG changes amounting to 1.2% of study population. 2 individuals had thrombocytopenia which needed further evaluation. PCOS was detected in 2 individuals and pancytopenia and vesicular calculus was detected in 1 individual each.

No malignancies, syphilis or HIV seropositivity were detected in the population studied. Pap smear was negative in all the females tested. All the 262 asymptomatic individuals had at least one abnormality detected, predominantly driven by dyslipidemia.

DISCUSSION

In the study, among asymptomatic individuals undergoing preventive health checkup, diabetic range of blood sugar values was detected in 12.8% while 45.8% had blood sugar values in the prediabetic range.[1,2] 21.7% had hypertensive range and 31% had prehypertensive range of BP values. 89.2% of individuals had dyslipidemia.[2]

Thyroid function abnormalities were seen in 10.7% of individuals with 2.7% having hypothyroidism.[3-5] In non-

alcoholics, 40.9% had NAFLD and 11.5% had probable NASH. Renal impairment was seen in 4.2% of the individuals and 26.7% had anemia.[4]

Because of the changes in lifestyle of the society, many chronic diseases are on the rise.

Many illnesses remain largely undetected in the population until checked because they are silent till they cause complications. Significant number of disease states was newly detected in the asymptomatic individuals, implying the necessity of preventive health check-up in this era of lifestyle diseases.[5-7]

CONCLUSION

Based on the results it is evident that a significant number of disease states were newly identified by preventive health checkup. People can be encouraged to utilize preventive health services for early detection of disease states and adopt timely interventions in this era of increasing life style diseases.

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REFERENCES

1. Ford ES, Zhao G, Tsai J, Li C. Low-risk lifestyle behaviors and all-cause mortality: findings from the National Health and Nutrition Examination Survey III Mortality Study. Am J Public Health. 2011;101:1922-9.
2. Reeves MJ, Rafferty AP. Healthy lifestyle characteristics among adults in the United States, 2000. Arch Intern Med. 2005;165:854-7.
3. Danaei G, Ding EL, Mozaffarian D, Taylor B, Rehm J, Murray CJ, et al. The preventable causes of death in the United States: comparative risk assessment of dietary, lifestyle, and metabolic risk factors. PLoS Med. 2009;6(4): e1000058.
4. Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual Causes of Death in the United States, 2000. Journal of the American Medical Association. 2004;291(10):1238-45.
5. Maciosek MV, Coffield AB, Flottemesch TJ, Edwards NM, Solberg LI. Greater Use Of Preventive Services In U.S. Health Care Could Save Lives At Little Or No Cost. Health Aff (Millwood). 2010;29(9):1656-60.
6. Cohen JT, Neumann PJ, Weinstein MC. Does Preventive Care Save Money? Health Economics and

the Presidential Candidates. N Engl J Med. 2008;358(7):661-3.

7. John J, Muliyil J, Balraj V. Screening for hypertension and morbidity profile of patients – A primary care "high risk" approach. Indian J Community Med. 2010;35(1):67-9.