

Metabolic risk factors detected among the attendees to free health camps conducted in Western province of Sri Lanka

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Abstract

Introduction: Non communicable diseases, mainly cardiovascular diseases and diabetes have a large but unappreciated negative impact on individuals, families and countries and as such a major barrier to human development. Early diagnosis of these hidden illnesses and achievement of treatment goals are essential in order to prevent complications.

Materials and methods: Population of 495 people above the age of 18 years who attended free health camps in Western province of Sri Lanka were screened for overweight, obesity, pre-diabetes, diabetes, hypertension and hyperlipidemia. Prevalence of above conditions was estimated. Treatment target achievement was assessed among patients with hypertension, diabetes mellitus and hyperlipidemia.

Results: The mean BMI was 23.41 (SD 3.96) in men. It was lower than that in women, 24.45 (SD 4.34). Prevalence of obesity was 35.3% in men and 43.7% in women and prevalence of overweight was 13.7% in men and 18.5% in women. The prevalence of diabetes was 28.0% for men and 13.5% for women and 16.5% of new patients with diabetes were identified by this screening. The prevalence of pre-diabetes was 51.3% for men and 44.2% for women. The prevalence of hypertension was 42.3% and out of that 37.9% were newly diagnosed by screening. Prevalence of hyperlipidemia was 52.2% and 48.5% of them were diagnosed by the screening. Treatment targets were achieved by only 15% of diabetics and 55% of patients with hypertension. Only 38% of previously diagnosed patients with hyperlipidemia achieved total cholesterol (TC) target and only 16.5% achieved low density lipoproteins (LDL) target.

Conclusion: The prevalence of major metabolic risk factors is high in the studied population and is higher than the previously reported prevalence. There is also a reasonably high percentage of undiagnosed patients with cardio-metabolic risk factors. Many patients with CVD risk factors are treated but remained inadequately controlled.

Introduction

Non communicable diseases (NCD) kill 38 million people worldwide each year (1). Almost three quarters of NCD deaths occur in low and middle income countries (1, 2, 3 and 4). Cardiovascular diseases (CVD) account for most NCD deaths (1). Raised blood pressure (BP), increased blood glucose, elevated blood lipids and obesity are the major risk factors which can lead to CVD.

Evidence shows that both the incidence and prevalence of type 2 diabetes mellitus has been rising in adults, children and adolescents in the developed countries such as United Kingdom (5). There is evidence showing both the incidence and prevalence of non-communicable diseases are on the rise in Sri Lankan population as well (6, 7).

The rapid rise in NCD is predicted to impede poverty reduction initiatives in low income countries. To lessen

the impact on individuals, families and the society, a comprehensive approach is needed to manage these NCDs. It is necessary to work together to diagnose these NCDs early and to treat properly in order to reduce the associated CVD risks as well as to promote the interventions to prevent these NCDs in the community. We believe that our study will fulfill this task to some extent. The objectives of our study were to determine the prevalence of metabolic risk factors; obesity, overweight, diabetes, pre-diabetes, hypertension and hyperlipidemia among people attended free health camps in the western province of Sri Lanka, to identify the percentage of these risk factors detected by screening and to assess the adequacy of the control of diabetes, hypertension and hyperlipidemia in treated patients.

Method

This is a cross sectional descriptive study done with the patients participated in free health camps that we conducted in three districts of Western province in Sri

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Lanka, namely Colombo, Gampaha and Kalutara. The Study was conducted following the approval obtained from the ethical committee of the Sri Jayewardenepura general hospital. Health camps were conducted in temples and government schools after obtaining permission from relevant authorities. People were informed by distributing leaflets and on some occasions by announcing by loudspeakers. They were asked to come early morning after 12 hours of fast. All the participants of these health camps were recruited for the study. Pregnant women and individuals with physical and mental disabilities were excluded. A total number of 495 people attended free health camps in years 2013 and 2014 were analyzed.

Measurements

Height and weight were measured and BMI were calculated. Over weight (BMI 23-24.9) and obesity (BMI 25 or more) were determined. Blood pressure was measured. FBS, PPBS and lipid profile were done. Treatment goals were evaluated in accordance with the 2007 European guidelines on CVD prevention (8). Hypertension (systolic blood pressure 140 mmHg or more and/or diastolic blood pressure 90 mmHg or more and/or use of antihypertensive medications) diabetes mellitus (FBS 126mg/dl or more, PPBS 200mg/dl or more) and pre-diabetes (FBS 100 mg/dl-125mg/dl, PPBS 140mg/dl-199mg/dl), hyperlipidemia (TC more than 200mg/dl, LDL 160 mg/dl or more and TG 150 mg/dl or more) were determined.

All data collectors underwent training for the specific tasks required for this study. They were trained to ensure standardization of measurement techniques, interviewing, sample collection and labeling.

The data were collected using pre-tested questionnaire, which consisted of four sections. First section included demographic data. Section two included previous diagnoses and risk factor analysis for non-communicable diseases. The third section was to document height, weight, BMI, blood pressure and biochemical results. The fourth section was to document the follow up plan for new diagnoses detected.

Anthropometry

Height was measured using a stadiometer and recorded to the nearest 10th of the centimeter with the subject looking straight ahead and with the back against the vertical support of the instrument. Weight was measured without shoes or slippers on a digital scale.

Blood pressure

Blood pressure was measured in the seated position after the participants had rested for at least 5 minutes. The measurement was taken using the supported left arm at the heart level, using mercury column sphygmomanometer, whose measuring accuracy had been validated and it met the criteria of the British Hypertension Society. Two

recordings were taken and the mean was used for analysis. In the event of variation of over 20 mmHg between recordings, a third reading was done and the mean of the last two recordings was used.

Collection of blood samples

From individuals, after 12 hours of fast, 5ml of venous blood was drawn and collected to a sugar bottle for FBS estimation (2ml) and a plain bottle for lipid profile estimation (3ml). Thereafter, they were given a standard Sri Lankan breakfast and 2ml of venous blood was drawn after 2 hours to a sugar bottle for PPBS estimation. Qualified government medical laboratory technicians carried out biochemical analysis at the site. Results were delivered the same day and patients were then seen by medical officers.

Patient education and referral for follow up

All the participants were educated by using audiovisual presentations with regards to life style modification, including healthy eating, exercise and stress reduction, while they were waiting for blood results.

Newly diagnosed patients were referred to the dietitian who attended the health camps. Referral letters were given to attend local clinics for regular follow up.

Trained nurses educated the patients with overweight and obesity to reduce their weight. They were educated about the ideal body weight that they should achieve and maintain verbally as well as with written information leaflets.

Patients with pre-diabetes were advised about intensive life style modification with the aim of prevention or delaying the development of diabetes among them. They were advised regarding the need for yearly screening. People with more than 2 risk factors for developing diabetes were also advised about life style modification and they were advised to have 3 yearly screening as per guidelines.

Results

There were 102 men and 393 women in the sample and the male to female ratio was 1: 3.8. The mean age of men was 53.7 years (SD 14.3) and that of women was 52.9 years. (SD 12.5). The mean BMI was 23.41 kg/m² (SD 3.96) in men. It was lower than that in women, 24.45 kg/m² (SD 4.34). Prevalence of obesity was 35.3% in men and 43.7% in women and prevalence of overweight was 13.7% in men and 18.5% in women.

The prevalence of diabetes was 28.0% for men and 13.5% for women, and 16.5% of diabetic patients were identified by screening. The prevalence of pre-diabetes was 51.3% for men and 44.2% for women. Out of that 16.4% had both impaired fasting glucose (IFG) and impaired glucose tolerance (IGT) (Table 2). The prevalence

of hypertension was 42.3% and out of that 37.9% were newly diagnosed by screening (Table 2). Prevalence of hyperlipidaemia was 52.2% and 48.5% was diagnosed by screening. Out of which 18.7% had combined hyperlipidaemia and 55.2% had isolated LDL elevation and 26.5% had isolated hypertriglyceridaemia.

Treatment target were achieved by only 15% of the patients with diabetes and 55% of patients with hypertension. Only 38% of previously diagnosed patients with hyperlipidaemia achieved TC target and only 16.5% achieved LDL target.

Table 1. Mean values of BMI, FBS, PPBS, blood pressure and lipid profile

Mean values	Total	
	Male	Female
BMI (Kg/m ²)	23.4	24.4
FBS (mg/dl)	109.5	108.1
PPBS (mg/dl)	138.2	130.1
SBP (mmHg)	131.8	127.5
DBP (mmHg)	82.4	78.3
TC mg/dl	200.7	215.7
LDL mg/dl	134.6	150.1
TG mg/dl	126.2	114.1

Table 2. Cardiovascular risk factors

	Total	
	Male	Female
Underweight	19.8	5.6
Normal	41.2	31.7
Overweight	13.7	18.9
Obesity	35.3	43.7
Pre-diabetes	51.3	44.2
Diabetes	36.2	26.2
Hypertension	44.2	41.8
Total cholesterol	44.7	59.9
Triglyceride	28.4	19.8
LDL	25.5	38.7
Hyperlipidemia	44.2	49.6

Discussion

Our health camps were mainly attended by the females and the male representation was comparatively less. Cut off values for overweight and obesity were taken according to Asian classification (9). Diabetes and pre-diabetes were identified according to American Diabetes Association (ADA) guidelines issued in 2014 (10). Hypertension was

diagnosed according to JNC 8 (11). Hyperlipidemia was classified according to ATP 111 guidelines (12).

The prevalence of obesity, diabetes and hypertension among both males and females has increased compared to 2005 data (13). A study done in 1997 has shown that the mean BMI of men were 20.5kg/m² and 20.9kg/m² for woman among 30-65 year old healthy adults (14). The mean BMI was 21.5kg/m² for men and 23.3kg/m² for women according to the study done in 2005 (13). Our study showed mean BMI of 23.41 and 24.45 for men and women respectively. Prevalence of obesity and overweight were 35.3% and 13.7% for men and 43.7% and 18.9% for women respectively. A comprehensive assessment of trends in BMI in 199 countries showed mean BMI and prevalence of overweight has increased since 1980 (15) and our data also shows the same trend.

Studies conducted among general population of Sri Lanka in the past has shown a low prevalence of hypertension and the prevalence of hypertension among adults of 25-64 years in the Matale district was found to be about 8% (16). A study done in four provinces of Sri Lanka in the age group of 30-65 years showed a hypertension prevalence of 18.8% for men and 19.3% for women (13). This study showed a moderately high overall prevalence of hypertension of 42.3% as defined by either systolic blood pressure more than 140mmHg or diastolic blood pressure more than 90mmHg.

Data for the prevalence of pre-diabetes is limited. A cross sectional study done in 288 young Mexican adults (18-30 years) in 2005 showed 14.6% of prevalence of pre-diabetes (17). A study done in 2006 has shown an overall prevalence of pre-diabetes as 11.5 (10.5-12.5%) among the Sri Lankan adult population (18). Our study showed 51.3% prevalence in men and 44.2% in women. We diagnosed 16.5% of people with DM, 37.9% of people with hypertension, and 48.5% people with hyperlipidemia by screening, in this study.

Control of diabetes, hypertension and hyperlipidemia among patients diagnosed in the past was highly unsatisfactory. A study done in US population among known diabetics above the age of 20 years showed only 37% had HbA1c less than 7.0, only 35.8% had blood pressure less than 130/80mmHg, only 50% had total cholesterol less than 200mg/dl (19). Another study done in Italy from June to December in 2000 showed that 48% of patients with diabetes had HbA1c level of 7.5 or more, and 77% had blood pressure above target values (that is above 140/90 mmHg in non-diabetics and above 130/80mmHg in diabetics) and 85% had total cholesterol level above 190mg/dl (20). According to a study in 12 European countries in 2009 among patient with diabetes aged 50 years and more, only 36.7% has achieved the less than 6.5% HbA1c target. Only 38.8% has achieved the blood pressure target of less than 140/90mmHg. Only 41.2% has

attained both the total and LDL cholesterol target of less than 5mmol/l and less than 3mmol/l (21). In our study, 84.9% of patients with known diabetes had FBS more than 100mg/dl and 74.6% had PPBS more than 140mg/dl. Blood pressure control was satisfactory only in 55.8%. Only 39.8% of the previously diagnosed patients with hyperlipidemia had TC less than 200mg/dl and 73.2% had TG less than 150mg/dl. Only 15.9% had LDL value less than 100mg/dl.

The EUROACTION study has shown that a nurse-led, multi-disciplinary team approach can yield significant lifestyle improvements and risk factor reductions (22). Multifactorial treatment considering life style interventions and pharmacotherapy is the way forward in managing these NCDs.

Conclusions

These data showed that the prevalence of non-communicable diseases is on the rise. A significant percentage of these diseases are undiagnosed. The high prevalence of prediabetes gives us a warning that we should intensify diabetes prevention programs, and this also gives us a prediction of the future of current diabetic epidemic. Achievement of targets among already diagnosed patients with above disease conditions is not satisfactory. Early detection and treatment of these conditions are cost effective and reduce the need for expensive interventions. There is a need for strengthening the primary care structure for early detection and timely treatment of these illnesses.

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