

PREVALENCE OF NON-COMMUNICABLE DISEASE RISK FACTORS IN ERITREA

Objective: To establish the baseline prevalence rates for non-communicable disease risk factors in Eritrea.

Study Design: A cross-sectional survey was conducted among all the ethnic groups in Eritrea with the WHO STEPwise approach. Hypertension was defined as blood pressure $\geq 140/90$ mm Hg or a person on medication for hypertension, while diabetes based on medical history of the disease. Of the targeted sample size of 2460, 2352 responded. Respondents were distributed among the six regions of the country proportional to population size. A multistage cluster sampling technique was used. Males and females from 15 to 64 years of age were studied.

Main Outcome Measures: Prevalence rates of hypertension, diabetes mellitus, obesity, smoking, alcohol consumption, physical inactivity, and low vegetable and low fruit consumption.

Results: Prevalence rate of daily smoking of 7.2% with variations among age, sex, religion and regions. A high prevalence of low fruit and low vegetable intake was observed at 84.7% and 50.6% respectively. Alcohol drinking was 39.6%. Level of physical activity was high (90%). The prevalence of obesity was low at 3.3%. The prevalence of hypertension in the general population was 16%, while 2.2% were known diabetic patients. More than 80% of the hypertensive persons were not aware of their condition. No significant rural/urban or sex difference was seen in hypertension prevalence.

Conclusion: The baseline data are useful for developing interventions designed to prevent and control NCDs in Eritrea. (*Ethn Dis.* 2006;16:542–546)

Key Words: Africa, Eritrea, NCD Prevalence

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INTRODUCTION

The rapid rise of non-communicable diseases (NCDs) represents one of the major health challenges to global development. According to World Health Report 2002, for instance, cardiovascular diseases are responsible for approximately one third of global deaths annually.¹

Eritrea is already experiencing a shift in the pattern of diseases. The efforts made in the control of communicable diseases and the changes in the living standards and lifestyles of Eritrean people as well as environmental factors are leading to an epidemiologic shift from communicable to non-communicable diseases. Mortality data from hospitals and health centers in Eritrea² show that, in the population older than five years, hypertension, heart failure, diabetes mellitus, and liver diseases were among the 10 leading causes of deaths in 2003. These diseases combined were responsible for 35.5% of all hospital deaths. Just five years earlier in 1999, they were responsible for only 17% of all hospital deaths. In addition, hypertension, heart failure, and diabetes mellitus each ranked above malaria as a cause of death in 2003.

The modifiable risk factors of smoking, unhealthy diet, and physical inactivity are expressed as hypertension, diabetes, obesity, and high blood lipid levels. Together they contribute to the total cardiovascular risk and are the root

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causes of the global cardiovascular disease (CVD) epidemic.³

Measuring risk factors for NCDs is an attempt to predict the future distribution of NCDs in a population and is vital to promoting disease prevention and control programs.⁴ This study is aimed at providing baseline data on the major NCD risk factors in Eritrea to be used for the establishment and evaluation of a control program.

METHODS

The study was a cross-sectional survey that ran from August to November 2004. All six (zobas) zones of the country and all nine ethnic groups were included.

The sample size was calculated by using the formula:

$$N = Z^2 pq \text{ divided by } E^2$$

Where Z is the Z score, p is the proportion of the factor under investi-

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gation, $q = 1 - p$, and E is the maximum error allowed.

The sample size (N) calculated was 2304 subjects, which was rounded up to 2460 in order to interview 20 subjects in each of the 123 clusters. A total of 2352 eventually responded from the six zones.

A two-stage stratified cluster sampling procedure was used; the primary sampling unit (PSU) was clusters selected from all six zones. The PSU (cluster) was selected with probability proportional to size of the village (PPS) in terms of households. A cluster could correspond to a village or cut across villages. In some instances, a village could contain more than one cluster.

One hundred and twenty-three clusters were selected from the six zones (Table 2) and 20 individuals (subjects) age 15–64 years were targeted from each cluster for interview. A total of 20×123 (2460) were thus targeted. (WHO recommends a minimum of 400 subjects per age group, ie, 200 male and 200 female, thus, 2000 for the five 10-year age groups).

Systematic random sampling of households was done by using the given sampling interval for that village. All eligible subjects per household (15–64 years of age) were enlisted, and one was randomly selected per age group.

The data collection and anthropologic measurements procedure were as described in the STEPS manual guidelines for field staff.⁵ Data collection tools were adopted to suit the Eritrean situation, and research assistants were trained accordingly.

Information was collected on the major risk factors (tobacco use [smoked and smokeless], alcohol use, diet and physical activity, history of diabetes and hypertension, height, weight, blood pressure, and waist circumference measurements). Ethical clearance for the study was obtained from the Ministry of Health, while informed consent was obtained from all subjects. The collected information was entered into EpiInfo

Table 1. Distribution of respondents by age group and sex

Age Group (Years)	Sex					
	Male		Female		Total	
	<i>n</i>	%	<i>n</i>	%	<i>N</i>	%
15–24	246	50.2	244	49.8	490	20.9
25–34	221	46.9	250	53.1	471	20.1
35–44	244	51.6	229	48.4	473	20.2
45–54	223	48.3	239	51.7	462	19.7
55–64	226	50.7	220	49.3	446	19.0
Total	1160	49.5	1182	50.5	2342	100

2000 (Centers for Disease Control and Prevention, Atlanta, Ga) and EpiData (The EpiData Association, Odense, Denmark) software, validated and analyzed with EpiInfo 2000 and SPSS software (SPSS Inc, Chicago, Ill).

New variables were defined according to STEPS guidelines. The definitions used for this study are: smoker defined as daily smoker; drinker is a person who consumed alcohol in the last 12 months; low fruit consumption is defined as consumption of less than two servings of fruit per day (a serving of fruit is one medium-size apple, banana, or orange or $\frac{1}{2}$ cup of chopped, cooked, or canned fruit or $\frac{1}{2}$ cup of fruit juice); low vegetable consumption is defined as consumption of less than two servings of vegetable per day (a serving of vegetable is one cup of raw vegetables [spinach, salad], $\frac{1}{2}$ cup of cooked or chopped vegetables [tomato, carrot, pumpkin, corn, Chinese cabbage, fresh beans], or $\frac{1}{2}$ cup of vegetable juice); physical inactivity is work mostly sitting, transport not

walking or using bicycle, and rest and leisure involves mostly sitting; obesity is body mass index (BMI) ≥ 30 kg/m²; overweight is BMI 25–29.9 kg/m²; high blood pressure is systolic blood pressure >140 mm Hg and/or diastolic blood pressure >90 mm Hg and/or being on medication for hypertension.

Statistics

Results are presented as prevalence rates calculated by dividing the cases by the appropriate sample size and multiplying by 100 to get percentages. Some values are presented as means with variance and standard deviations.

RESULTS

At the onset of the survey, 2460 respondents were targeted in 123 clusters of 20 individuals per cluster. Altogether, 2352 respondents participated in the study, for a response rate of 95.6%.

The distribution of respondents by age and sex is presented in Table 1 from

Table 2. Distribution of respondents by ethnic group and zoba

Zoba	<i>n</i>	Ethnic Groups (%)				
		Afar	Saho	Tigre	Tigrinya	Others
Anseba	400	.8	.8	32.5	30.0	27.0
Debab	620	.3	13.7	1.8	83.9	.3
Gash Barka	475	.2	6.1	16.0	51.4	26.3
Maekel	480	.8	.6	1.7	96.7	1.0
NRS	256	8.6	6.3	61.7	19.1	.2
SRS	120	47.5	3.3	1.7	39.2	4.3
Total	2351	3.8	6.0	16.4	63.0	8.3

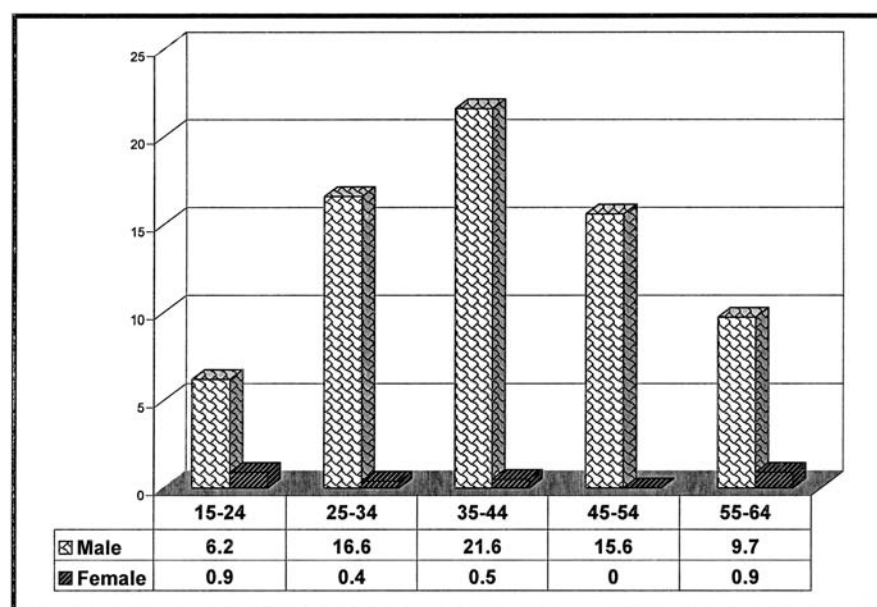


Fig 1. Prevalence of current daily tobacco smoking by sex and age group

all the nine ethnic groups and regions (Table 2).

Tobacco Smoking

The national prevalence of daily smokers was 7.2%; .9% were non-daily smokers. The prevalence of daily smoking was 15–20 times higher in men than

in women. The rate of tobacco smoking rose with age up to the 35- to 44-year-old age group, with a gentle drop thereafter (Fig 1).

Prevalence of daily smoking differed significantly among different religious groups. The prevalence was highest among Muslims (9.7%). This finding

is higher than the national average (7.0%) and higher than among Protestants (8.0%) and Catholics (6.5%). The prevalence was lowest among Orthodox Christians (5.1%). National prevalence of current use of smokeless tobacco was 2.9%.

Alcohol Consumption

The prevalence of drinker (a person who consumed alcohol in the last 12 months) was high; every two out of five people were drinkers (39.6%). The prevalence was slightly higher in males than in females (Figure 2) and increased with age up to the 45- to 54-year age group.

Diet (Fruit and Vegetable Consumption)

Prevalence of low fruit consumption was high (84.7%) in the general population. Farmers consumed less fruit than civil servants; they had a low fruit diet prevalence of 90% compared to 79.6% among civil servants. Prevalence of low vegetable consumption was high in the general population (50.6%). The prevalence of a low vegetable diet was as high among farmers (50.8%) as other professional groups.

Physical Inactivity

The prevalence of physical inactivity was low; most of the population (90%) practiced some form of physical activity. However, prevalence of sedentary work was high (60.6%), while sedentary leisure was even higher (91.5%). Most of the physical activity is therefore transportation related (85% active). No sex or age group difference was seen in the prevalence of inactivity.

The STEP 2 risk factors measured were BMI (determined from height and weight), waist circumference, and blood pressure. The mean values of the various measurements are presented in Table 3.

Body Mass Index

Prevalence of obesity defined as $BMI \geq 30 \text{ kg/m}^2$ was 3.3% in the gen-

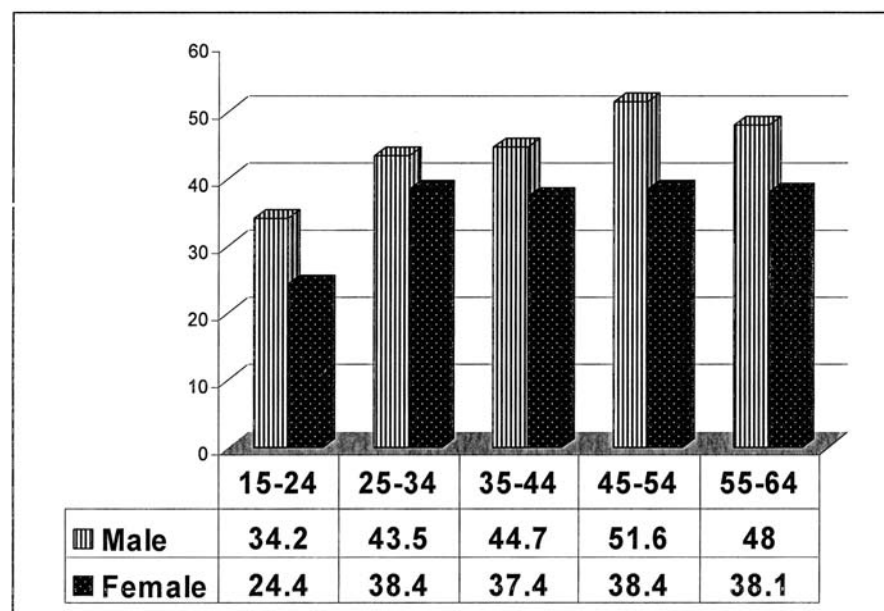


Fig 2. Prevalence of alcohol drinking by sex and age group

Table 3. Mean values anthropometric measurements

Measure	Height (cm)	Weight (kg)	BMI (kg/m ²)	Waist Circumference	Systolic Blood Pressure	Diastolic Blood Pressure
N	2223	2341	2323	2251	2348	2348
Mean	162.29	55.23	21.01	76.21	119.15	77.12
SD	11.37	11.31	4.90	11.41	18.48	13.72
Variance	129.2	128.02	24.00	130.29	341.6	118.12

BMI=body mass index; SD=standard deviation.

eral population. The prevalence of overweight (BMI 25–29.9 kg/m²) was 10.4%. The prevalence of high BMI (obesity and overweight) was higher in females than in males.

Waist Circumference

The mean waist circumference (WC) in the general population was 76.21 cm. The percentage of respondents with WC≥80 cm was 31.5%. Approximately 25%–30% of women had WC≥80 cm (mean value for female), and ≈2% of the men had WC≥100 cm (mean value 94 cm for men).

Blood Pressure

The prevalence of hypertension (SBP≥140 mm Hg and or DBP≥90 mm Hg) in the general population was 16%. Eighty percent of the hypertensive cases were newly diagnosed, ie, they had never known that they had high blood pressure.

History of Diabetes

A few respondents (2.2%) admitted being diagnosed as diabetic by health personnel. The prevalence of known diabetics among those with high blood pressure was 5.4%.

DISCUSSION

The World Health Organization (WHO) is promoting the use of the STEPwise approach to enable countries to set up surveillance systems for NCD risk factors.⁴ The STEPwise approach provides a framework for surveillance of

NCD risk factors and NCD-specific morbidity and mortality. A risk factor is defined as any attribute, characteristic, or exposure of an individual that increases the likelihood of developing a non-communicable disease.⁵ The STEPS approach is based on the concept that surveillance systems require standardized data collection to ensure comparability over time and across locations. It is also sufficiently flexible to be appropriately adaptable in a variety of country situations and settings.⁴

The sample size, coverage of various geographic and sociocultural groups, and response rate satisfies the STEPS requirements⁵ and therefore justifies the generalization of the results to Eritrea. The instruments, procedures, and definitions used were as described in the STEPS guidelines and manuals, and therefore the results can be compared to those from other countries.

The survey has revealed a high prevalence of cardiovascular risk factors in the country. A prevalence rate of daily smoking of 7.2% is high, even though it is lower than the prevalence in other countries, such as Singapore with 26.5%⁶ or Kuwait with 17%.⁷ The findings were, however, similar to findings from both these countries in terms of sex differences, in which smoking prevalence is higher in males than females.

Alcohol consumption and poor diet are also known risk factors for non-communicable diseases.³ Our results show alcohol consumption is high and is combined with a diet low in fruits and vegetables. Physical inactivity is another known risk factor. The level of physical

The prevalence of hypertension at 16% is higher than that reported among the neighboring Saudis (11.1%)¹² but still lower than rates reported in other African-based studies in northern¹³ and eastern Africa . . . ¹⁴

inactivity is low compared to that reported in neighboring countries such as Egypt, where sedentary life is as high as 52%–73%,⁸ or in Saudi Arabia, where more than two thirds of respondents were sedentary.⁹ Obesity is a risk factor for diabetes.¹⁰ The results of our study show that the prevalence of obesity is low. The prevalence is lower than has been previously reported, for example, in Kuwait (23.5%)¹¹ or Saudi Arabia (16% among males and 24% among females).⁹

The prevalence of hypertension at 16% is higher than that reported among the neighboring Saudis (11.1%)¹² but still lower than rates reported in other African-based studies in northern¹³ and eastern Africa,¹⁴ for example. In addition, a significant proportion of those diagnosed as hypertensive were not aware of their hypertensive status, as has been found in other studies.¹⁵

The prevalence of diabetes was assessed only historically and gave a prevalence of 2.2% among the general population and 5.4% among the hypertensive respondents. If most diabetic persons are not aware of their condition, then the figure could be higher than reported and can only be established by conducting a STEP 3 study. The coexistence of diabetes and hypertension has a poor prognosis and warrants close monitoring.¹⁴

Even though the prevalence rates for some of the risk factors are not as high as found in neighboring Middle Eastern countries because of differences in socioeconomic characteristics, these rates, as shown by prevalence of hypertension and historical prevalence of diabetes, pose a present and potential danger. A control program at this stage could improve NCD morbidity and mortality in the future. The control program should address behavioral changes, especially those that reduce smoking and alcohol consumption; improve dietary habits, manage diabetes and cardiovascular diseases, and conduct continuous surveillance. A STEP 3 study should also be conducted.

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