

Profile of Diabetes Mellitus in Eritrea

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Abstract

Diabetes Mellitus (DM) is defined as chronic and complex non-communicable metabolic syndrome. Diabetes is divided in to three types namely Insulin Dependent Diabetes Mellitus (IDDM), Non-Insulin Dependent Diabetes Mellitus (NIDDM) as well as pregnancy-induced diabetes which is Gestational Diabetes Mellitus (GDM) in Eritrea. Despite its global burden and epidemiology, scarce of information is existing in Eritrea. Thus, profiles of current data on risk factors, morbidity or diseases and mortality or deaths and also capacity of the country to control and prevent diabetes are significant and important. The present study is based on secondary source data published during 2007-2015 reviewed concerning diabetes in Eritrea. All the published papers stated that long-path of controlling and preventing programs on diabetes are needed across the committed young country, Eritrea. The number has full-grown from 2000 cases in 2007 to 7000 cases in 2015 in Eritrea. Moreover, above 74,000 cases seeking management in hospitals of the country in 2015. In 2016, the proportional mortality of DM in all ages were 440 (male patients) and 380 (female patients). In Eritrea, the prevalence of diabetes in 2014 was 4.89%. Although IDDM had poorer control (42.9%) than NIDDM (29.9%), some of the risk factors of NIDDM versus IDDM includes such as hypertension (55.2 vs. 12.7%), triglyceride (23.4 vs. 12.8%) and cholesterol (43.4 vs. 28.2%). Through regular screening, sensitization of communities, modification of lifestyles and prevention, the burden or impact of diabetes can be reversed. Solid motivation from policy makers in promoting a well healthy society by sensitizing with healthy lifestyle programs, nutrition education, quality of health facilities and treatments are required towards sustainable development since the healthy society can lead to prosperity. The present paper is an attempt to describe the diabetes-induced morbidity and mortality by assessing the profiles of epidemiological, physical, genetically and biochemical characteristic features of the population in Eritrea.

Keywords. *Diabetes Mellitus, Metabolic syndrome, Country profile, Morbidity, Mortality, Eritrea*

1. Introduction

Non-communicable diseases (NCDs) are diseases like diabetes, chronic respiratory

diseases, cancer and heart or cardiovascular diseases in which causes morbidity or diseases and mortality or deaths of millions of people

worldwide 1. Diabetes Mellitus (DM) is non-communicable, chronic and complex global public metabolic diseases which is characterized by hyperglycemia due to abnormal less secretion of insulin along its action or both defects. It is one of the major and most causes of morbidity and mortality across the world. Currently, there are 422 million patients diagnosed or having diabetes and around 5 million patients are dying each year worldwide. The morbidity or disease will rise to 366 million and 642 million by the year of 2030 and 2040 respectively¹⁻⁶. The mortality will raise up from 5 million to 18 million by the year of 2030⁷. High blood glucose, hyperlipidemia, insulin resistance, obesity and hypertension are Metabolic Syndrome (MetS). MetS affects the societies or population of the worldwide by 20 to 30%.⁸ China is a diabetic leading country in the world. Recent study revealed that, above 113.9 million Chinese diagnosed with DM (above 11%) and 493.4 million of the population (above 50%) are at higher risk to develop the disease. Moreover, the occurrence nowadays is higher in aged groups of population⁹. According to World Health Organization (WHO), the prevalence of DM was 3 and 2.5 times higher in Nepal and India respectively. And also the prevalence of the disease in Nepal is more prominent in cities and semi cities which is 4.1% and 12% respectively¹⁰. Africa adds around 7 million patients to the impact or burden of DM annually⁷. In Africa, many studies reveal that the occurrences of DM across the region is significantly increased in both cities and villages with equal effects on both women and men. About 50% of patients with

diabetes die secondary to stroke, heart and blood vessel diseases. Around 10% of the patients with diabetes develop chronic visual disorder after living with the disease for about 15 years. The people with high incidence of the disease are dying two times higher than those who are free from the disease. The region accounts around 78% of undiagnosed DM patients^{3,11}. Eritrea is by now facing a swing in the configuration of communicable to non-communicable diseases due to hard efforts done in lifestyles and living standards of the Eritrean population⁴. The Health Management Information System (HMIS) organized by health workers under the full guidance of the Ministry of Health (MOH), Government of Eritrea defined DM as a group of complex metabolic disorder. HMIS reported that the number of patients is increased from 2000 to 7000 in 2007 and 2015 respectively. In addition, above 74,000 diabetic patients were seeking management in hospitals of the country in 2015. In 2016, the proportional mortality of DM in all ages were 440 (male patients) and 380 (female patients)⁷. DM with heart diseases accounts for more than 10% of hospital deaths in Eritrea. The prevalence of DM in 2014 was 4.89%, however, the prevalence of DM was 2.2% in Eritrea based on the information from patients⁷. The prevalence of hyperglycemia was more than 2 times higher in the Tigrigna ethnic group than the other ethnic groups. This is related to urbanization, geographical and some genetic factors for those Tigrigna ethnic group living in the highlands of the country³. A study in Eritrea revealed that the levels of Triglycerides, Cholesterol and Lipid Density Lipoprotein (LDL) were lower in Insulin

Dependent Diabetes Mellitus (IDDM) than Non-Insulin Dependent Diabetes Mellitus (NIDDM). The cholesterol levels in IDDM and NIDDM were 23.4% and 43.3% respectively, whereas the LDL levels in IDDM was twice less than NIDDM^{7, 12}. In Eritrea, among the most modifiable risk for NIDDM are obesity and overweight with prevalence rates of 3.3% and 10.4% respectively. The complication of IDDM is much lower than NIDDM. Macrovascular complications include stroke, heart disease and foot ulcers whereas Microvascular complications includes retinopathy, nephropathy followed by neuropathy. There are many in number diabetic cases which is not diagnosed due to lack of awareness and not to access for routinely diagnoses in which allowing patients to develop complications and delay in the prognosis of already occurred macro and micro vascular complications. In addition to the socioeconomic burden, this is a challenge in the increase of the disease occurrences across the country². Sulphonyl urea (Glibenclamide) and Biquanides (Metformin) from oral hypoglycemic agents and insulin subcutaneous or intravenous are the only options in the management of DM in Eritrea¹³. Regardless the availability of drugs for diabetes, the side effects are significantly affected the patients. Presently, medicinal herbal plants are the most and safest to use for the treatment of DM. This is important in developing countries with less side effects and less cost expenses. A study in Eritrea showed that some of the medicinal plants such as Meriandra dianthera, Polyherb and Aloe camperi have powerful effects in the treatment of DM¹⁴.

DM is endorsed risk behaviors of changes in lifestyles due to urbanization connected with un-healthy diets and sedentary lifestyles. Nutritional education and counseling for patients with diabetes are still below the optimal due to shortage of time by physicians and less motivation of the patients to self-care managements¹⁵. Over nutrition can lead to obesity induced abnormalities such as metabolic and behavioral disorder due to energy and diet imbalance. Moderate losing of body weight may help to reduce metabolic and behavioral anomalies including cardio-metabolic disorder¹⁶. The consumption of fruits and vegetables are extremely low. Moreover, the effective management in delaying and preventing diabetes, such as physical exercises and eating much healthy foods are also less practiced in Eritrea. To decline the risk or disease of DM, it is better to keep health body weight with in the normal range of Body Mass Index (BMI), abdominal obesity should be avoided, and fat (saturated) intake should be below 7% of the total energy consumption^{7, 12}. However, integrated and coordinated multidisciplinary actions such as patient education, clinical management, and staff training and laboratory infrastructure should be improved to control, prevent and manage DM¹¹. The best and most applicable methods to monitor, control and diagnoses of diabetes is the HBA1C⁷. The present paper is an attempt to recommend appropriate measures to lessen the diabetes-induced morbidity and mortality by assessing the profiles of epidemiological, physical, genetically and biochemical characteristic features of the population. This will endorse and evolve the

proof-based diabetes control, prevention and its management.

2. Materials and method

Over the last 8 years, improved struggles at control and preventive sectors were performed in Eritrea. A descriptive study was conducted to assess diabetes by using secondary source data published during 2007-2015 in Eritrea. All the published papers are itemized with long-path of controlling and preventing of the disease throughout Eritrea.

3. Results and discussion

It is noticed that the distribution of DM out of 623 samples were 31.1% (IDDM) and 68.9% (NIDDM) in Eritrea. It is observed that the NIDDM is significantly common and prevalent than IDDM. The mean patient's age with IDDM was 25 ± 16.5 years, whereas the mean patient's age with NIDDM was 57.4 ± 11.8 years. This result appears to suggest that NIDDM is knowingly common in aged people than IDDM⁷. These findings are similar with the study done in China⁹. NIDDM patients had higher percentages in obesity, triglycerides, cholesterol and LDL comparing to IDDM. 9.1% and 34.8% of NIDDM patients were obese and overweight respectively, whereas 1% and 5.1% of IDDM patients were obese and overweight respectively. Moreover, only 23.4% of IDDM patients were having abnormal cholesterol compared to NIDDM with 43.3%. The percentage of LDL in IDDM was twice less than that of NIDDM. The complication rate in NIDDM (41.2%) was double compared to IDDM (19.5%). Metabolic

syndrome such as obesity, hypertension and dyslipidemia are commonly predominated in NIDDM than IDDM. It is commonly and universally accepted and anticipated NIDDM is with more complication than the IDDM. This is because of strong association between the complications and metabolic syndrome⁷. This study is comparable with the previous studies done in Africa^{3,11}.

Another study with the sample size of 6400 was conducted in Eritrea, males (8.3%) are at significantly raised fasting glucose level than females (4.3%). High fasting glucose level in males are double that of females. This is probability due to higher risk of males to other non-communicable health problems such as smoking cigarette, excessive alcohol use and less fruits and vegetables intake. The study also showed that the Tigrigna ethnic group with high incidence and prevalence of elevated fasting glucose level than the remaining ethnic groups. Genetic and urbanization among Tigrigna ethnic group contribute to higher risk and prevalence of hyperglycemia than other ethnic groups³. This finding is inconsistent with the study done in Nepal.

Ethnobotanical survey was conducted in Eritrea in which it showed that the medicinal plants such as Asteraceae, Lamiaceae, Fabaceae and Apiacea are used for diabetes, wound healing, skin problems, diarrhea, hypertension, malaria, anthelmintic, bronchitis, asthma and gastrointestinal problems². Another survey in Eritrea also identified three plants as medicinal herbs namely Meriandra dianthera, Aloe camperi and Poly-herb contain the properties of

anti-diabetic, which will be the foundation for the herbal drug development. Yet, further studies and experiments are required to estimate the bioactive values of the medicinal plants¹⁴. The usage of medicinal plants for the management of fungal and bacterial infection are very common among the population of Eritrea, however, the therapeutic usage and knowledge of medicinal plants for the management of diabetes and heart diseases are not entirely used. The government is still working on the pharmacological toxicity, validation and characterization of these medicinal plants². Green tea is famous type of drink in Asian countries, particularly in china. Those who drink green tea are at low risk to develop diabetes. Green tea comprises polyphenols and catechins bioactive compounds helps to prevent glucose metabolism and enhance insulin sensitivity¹⁷. Thus, medicinal herbal plants are very safe and less toxic used extensively all over the world for the management of diabetes, and also herbal plants should be tested and disseminated as drugs across the country to lessen the socio-economic burden of the population^{2,14}.

On the other hand, to consider and compare the pharmacologic interventions, there is a need to maximize the intervention of diabetes to reduce macrovascular and microvascular complications. Before selecting the drugs, attention should be taken in the contraindication, drug interactions, efficacy and side effects. Patients should be educated and trained to use different options of medication and to apply it practically. Insulin is mainly used for IDDM whereas oral hypoglycemic agents are used for

NIDDM¹⁸⁻²⁰.

4. Conclusion

It is crucial to perform physical, biological, genetically and epidemiology assessment in detecting, preventing and controlling diabetes among the populations. Thus, to reduce diabetic-related morbidity and mortality; regular screening, sensitization of society through health education, modification of lifestyles and prevention, the burden of diabetes can be reversed. Solid motivation from policy makers in promoting a well healthy society by conducting healthy lifestyle programs and nutrition education. And quality of health facilities and treatment are needed towards sustainable development. The medicinal herbal plants should be used widely after testing its safety and toxicity.

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