

Public Health Education in Pre-Diabetes and Diabetes Control



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Abstract

There has been an increase in the proportions of adults with pre-diabetes. Pre-diabetes contains impaired fasting glucose and/or impaired glucose tolerance and it is a state that can transfer to type 2 diabetes. In absence of intensive and effective efforts to reduce risk of diabetes, the incidence rate of diabetes will likely to increase suddenly in the few coming years. Studies have shown that obesity is usually a key factor of pre-diabetes. Thus, overweight, obesity, age, smoking and hypertension are considering the major risk factors associated with pre-diabetes. Public health education to improve awareness of people with pre-diabetes is urgently vital, if not the prevalence of diabetes will sharply raise.

Public health action is also needed without any delay by all means of communications as TV, radio, news paper, internet, notices in public places, cultural meetings, etc.. Individuals should be well-informed that diabetes is an avoidable even if a person is already pre-diabetic. Efficacy of health education for promoting a better healthy lifestyle (reduce obesity, physical activity and healthy food) for reversing the pre-diabetic stage to diabetic. This could be more effective if they are not focus only in health care centers.

Keywords: Public health; Public Health Education; Diabetes; Pre-Diabetes; Risk Factor; Obesity; Physical Inactivity; Libya

Abbreviations: DM: diabetes mellitus; T2DM: Type 2 Diabetes Mellitus; GDM: Gestational Diabetes Mellitus

Mini Review

In all countries, diabetes mellitus (DM) is a prevalent disease and it is a leading cause of mortality and morbidity [1]. It is a major public health problem and for healthcare facilities. DM is a medical condition diagnosed by hyperglycemia due to absent or low levels of insulin. DM is characterized by chronic metabolic disorders that leads to complications harming body systems. DM occurs world-wide and its incidence is continuously rising which is expected to double by 2040 [2]. WHO reports that DM will be the 7th leading cause of death in 15 years. The global adult prevalence of DM has recently much increased in three years (8.5%) with more incidences in low and middle income countries [1-3]. Nevertheless, several authorities and public health planners remain ignorant of the present prevalence of diabetes and pre-diabetes (see below). Nevertheless, there is still much more to be known about pre-diabetes. The increasing rate of pre-diabetes presents a global alarm as it holds a large scale of implications towards the near future burden on healthcare systems.

Classification and control of diabetes mellitus

Diabetes mellitus is classified into two major types: type 1 diabetes (beta cell destruction, usually leading to absolute

insulin deficiency) and type 2 diabetes (T2DM, range from predominantly insulin resistance to insulin secretor defect with insulin resistance). Another well-known type is gestational diabetes mellitus (GDM) occurs in pregnant woman. Following diagnosis with type 1, a daily management schedule is recommended which contains a regular plan of insulin injecting, blood glucose monitoring and awareness to food eating. As well as full education, diabetes self-management training (self-care practice), regular follow-up and social support should be provided by healthcare professionals. On the other hand, the problem of living with DM is often ignored. Sometimes, a high or low dose of insulin might induce complications with or without inadequate food that leads to hypoglycemia.

Chronic hyperglycemia (insufficient insulin) results in some diseases as eye, kidney, cardiovascular and nerve damage which appear after some years of diagnosis with DM [1,3]. After diagnosis with type 2, a daily management schedule which contains balanced food (carbohydrates, fats, total energy intake), physical exercise, blood glucose monitoring and also medication use is needed. All these may add some sort of stress to people with DM and family. Certainly, families have to receive a complete education about diabetes and lifestyle changes as

diabetes self-management training, regular follow-up and social support. Acute consequences will depend on anti-diabetic drugs use as risk for hypoglycemia [1,3].

Modifiable risk factors and diabetes

Diet is a basic part of management in every case with DM. Treatment cannot be effective unless adequate attention is taken into consideration to ensure appropriate nutrition, good weight control, nutritional requirements in some cases (children and pregnancy), glycaemic control, correcting blood lipid abnormalities, consistency and compatibility with other drugs if used (avoiding drug interactions). Dietary fat content should provide about 25% of the total intake of calories and the saturated fat should not be more than 10% of the total energy. Cholesterol should be limited or restricted. Animal or vegetable protein should be around 10% of the total energy. Carbohydrates provide 50-60% of total caloric content of the diet. The same safety measures concerning alcohol use that related to the non-diabetic also apply DM individuals [4]. Alcohol tends to enhance hypoglycemia risk in cases using anti-diabetic drugs [4]. As a part of initial management, evaluation of dietary intake and individual requirements of persons with DM should be carried out. This is the responsibility of dietician and physician. Food eating should be planned in relation to the economic factors and the local status concerning availability and cultural standards. Dietary counseling should be continuing process by all members of the healthcare team. Meals, food timing and energy use (day by day) should be stressed mainly for insulin users. Physical activity promotes weight reduction and lowering blood glucose and improves insulin sensitivity. Thus, a plan of regular daily physical activity with dietary management should be considered for every person. Such a plan must be modified to the individual's health condition [5,6]. Individuals should, on the other hand, be educated for a potential risk of low blood glucose levels.

Definition and diagnosis of pre-diabetes

Pre-diabetes is also named as impaired glucose regulation (IGR) which includes impaired fasting glucose (IFG) and impaired glucose tolerance (IGT). Pre-diabetes indicates that blood glucose level is higher than normal but not sufficient to be DM [5,7]. An evidence indicates a correlation between pre-diabetes and complications of DM as early nephropathy, retinopathy, fiber neuropathy and threat of macro-vascular disease. Pre-diabetes increases the risk of developing DM and atherosclerotic cardiovascular disease [8]. Pre-diabetes does not have to be T2DM if the modifiable risk factors (as lifestyle changes) are dealt with. Pre-diabetes is a transferable state between no DM and T2DM.

Thus, it is a reversible condition. An increase in the prevalence of pre-diabetes has globally been reported by several international organizations as WHO IDF and ADA. In USA, every 1 in 3 adults have pre-diabetes and 90% of them do not know they have pre-diabetes [8]. In UK, the pre-diabetes prevalence alone is tripled (every 1 in 3 adults have pre-diabetes) [9].

About 75% of the people with pre-diabetes live in low- or middle-income countries (LMICs) [10]. The prevalence of pre-diabetes mainly increased with increasing age and obesity [11]. 35% of pre-diabetes will have T2DM over the next few years. Accordingly, knowledge of the prevalence of diabetes and pre-diabetes and associated risk factors could raise awareness of the disease and lead to new policies and strategies for prevention and management of DM by health policymakers.

Some cases with pre-diabetes have no symptoms while others have. May a case has pre-diabetes and/or DM for several years and not know it. However, about 20% have complications at the diagnosis time. A reverse pre-diabetes can be obtained before it turns into T2DM. Thus, with pre-diabetes, a body may be producing less insulin and the insulin sensitivity may decrease. Pre-diabetes is diagnosed with one of following tests: fasting plasma glucose: 100-125 mg/dl, Glucose tolerance: 140-199 mg/dl and/or HbA1C: 5.7-6.4% [12]. Thus, high blood glucose puts a person at high risk for developing some chronic effects associated with DM as blindness, damage to nerves and kidneys and risk of heart disease. An early screening of pre-diabetes is an importance for early detection and reducing the incidence of T2DM. People who are overweight, obese or hypertension or dyslipidemia should be the focus of diabetes prevention. Individuals with pre-diabetes develop more diabetes over time. A study indicated that cases with pre-diabetes could prevent the onset of T2DM by about 50% by losing 5% of body weight and doing physical activity daily [5,10]. Individuals with pre-diabetes are at a risk for T2DM when they are overweight, ≥ 40 years old, physically inactive, family history of T2DM, smoking, hypertension, dyslipidemia or had gestational diabetes.

Lifestyle changes and pre-diabetes

With regard to diabetes prevention, a relative risk reduction of 50% in adults with pre-diabetes as a result of lifestyle interventions. Thus, there is a great need of early intervention for preventing pre-diabetes to transit to T2DM. Losing weight is the best way to avoid developing diabetes in excessive bodyweight. So far, there are no drugs approved by FDA to treat pre-diabetes. But several drugs are prescribed and used as anti-diabetic (biguanides, thiazolidinediones, α -glucosidase inhibitors and GLP-1 analogies), non-anti-diabetic drugs and therapies as anti-obesity agents and bariatric surgery are also used in pre-diabetes [13]. If a person is pre-diabetic, the blood sugar should be checked for T2DM every year. Pre-diabetes does not automatically turn into T2DM. Thus, 30 minutes of physical activity every day. Losing some weight over several months by 5%, eating healthy food and substitute saturated fat with healthier as fruit and vegetables, quit smoking are of great help to avoid T2DM and complications. Even with little or some changes in lifestyle, will lower the risk for developing T2DM. Health education about modifiable risk factors can significantly prevent or delay diabetes and other serious conditions from developing [5].

Research shows about 70% of the people with pre-diabetes will develop T2 DM over time. Thus, a routine screening of blood glucose and early diagnosis of pre-diabetes are of a great benefit to reduce the risk of DM and its complications. This alarms that world is facing high prevalence of DM in the near future (8, 9 and see also above). This will create a tall economic load on healthcare systems. Therefore, an early detection and intervention of the cases with pre-diabetes is highly recommended to reduce and/or delay onset of DM and its complications. The first initiative to limit the rise of DM is to identify the modifiable risk factors and to control pre-diabetes in order to limit the rise of diabetes. Effective public health education and promotion by all means of communications is really needed to promote people for a better and healthy lifestyle (healthy diet, daily physical activity, less weight). However, if this is not considered, the prevalence of DM will much be elevated soon.

In conclusion, all data show a high incidence of pre-diabetes among the studied population. Thus, public health education and action should be strengthened to encourage people to a better healthy lifestyle, early screening and diagnosis of pre-diabetes to reduce the occurrence of new cases of diabetes and to delay the onset of diabetes and by controlling pre-diabetes.

Conflict of interest

The authors declare that the research was conducted in the absence of any financial affairs that could be taken as a conflict of interest.

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