Educational Points for Prevention of Type 1 Diabetes and its Complications: A Systematic Review

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Abstract

Background/Objectives: Type 1 diabetes is perceived as a chronic immune-mediated disease with a subclinical prodromal period characterized by selective loss of insulin-producing cells in the pancreatic islets in genetically susceptible subjects. To systematically review the evidence for the prevention of type 1 diabetes and its complications by vitamin D and E supplementation, diet and exercise and educational interventions are required.

Methods: This was a systematic review –from 1996 to 2012 using Medline, EMBASE, CINHAL, Cochrane Central Register of Controlled Trials and reference lists of retrieved articles. The main outcome measure was development of type 1 diabetes and controlled trials and observational studies that had assessed the effect of vitamin D and E supplementation on risk of developing type 1 diabetes, diet and exercise on prevention of complications were included in the analysis.

Results: 35 controlled trials and cohort studies and 7 systematic reviews that addressed education and prevention of type 1 diabetes and its complication were used. There was a suggestion that the timing of supplementations might be important for the subsequent development of type 1 diabetes. Also educational intervention for breast feeding, healthy diet and, controlled exercise can prevent type 1 diabetes and its complication.

Conclusions: With regard to the content above, educational intervention for diet, importance of breast feeding, obesity, exercise and role of vitamin E and D can prevent the incidence of type 1 diabetes or its complications in high risk clients and patients with type 1 diabetes. Therefore these factors should be considered in educational plan of clients with type 1 diabetes.

Keywords: Type 1 diabetes; Education; Prevention

Introduction

Diabetes mellitus is the general name for a group of chronic metabolic diseases characterized by high blood glucose levels that result from defects in insulin secretion and/or action. The two main forms of diabetes are type 1 diabetes and type 2 diabetes [1]. Type 1 diabetes occurs when the beta cells of the pancreatic islets of langerhans, which are responsible for insulin production, are progressively destroyed by the immune system. The body’s ability to produce insulin becomes progressively impaired until eventually no insulin is produced [2]. Considering the risk of maternally acquired positives in the first year of life and in light of the rarity of presentation of clinical disease in infancy [3].

Type 1 diabetes is the third most common chronic condition in children and adolescents in the United States [4]. This condition affects 1 in every 400 to 600 children, and more than 13,000 children are newly diagnosed each year [5,6]. Type 1 diabetes and its treatment have two major acute complications: DKA and Hypoglycemia [7]. Chronic complications associated with type 1 diabetes include micro-vascular complications such as retinopathy, nephropathy, and neuropathy, and macro-vascular complications [2]. Patients with type 1 diabetes and their families should have knowledge about control of diabetes and prevention of its complications. Some studies show that education program alone improves glycemic control [8,9] and can help to prevent complication of type 1 diabetes. Educational interventions can take many forms. Didactic education, computer games, board games, cognitive behavioral therapy, and telephone calls are some of the possible methods of delivery. The education may be directed at the patient alone, the whole family and even peers [10]. The aim of the educational interventions may be, among other things, to improve metabolic control, reduce complications, gain skills in self-management, improve quality of life [9,11]. Thus, this study has been done for providing points that must be educated to clients with type 1 diabetes and their families for prevention of diabetes and its complications. Then we have done conducting systematic reviews by looking in several valid sources and variety of articles. The studies show that a controlled diet, supplements such as vitamin E and D and exercise can play an important role for prevention of type 1 diabetes and its complications. In the following, each of them will be pointed out briefly.

Materials and Methods

This was a systematic review– from 1996 to 2012 using Medline, EMBASE, CINHAL, Cochrane Central Register of Controlled Trials and reference lists of retrieved articles. The main outcome measure was...
development of type 1 diabetes and controlled trials and observational studies that had assessed the effect of vitamin D and E supplementation on risk of developing type 1 diabetes, diet and exercise on prevention of complications were included in the analysis (Figure 1).

Results

We searched 771 articles and obtained 42 related articles (35 controlled trials and cohort studies and 7 systematic reviews that addressed education, role of vitamin D and E and interventions to prevention of type 1 diabetes and its complication). In the following, summary of them have been presented.

Assesses diet

Nutritional therapy is fundamental for the effective management of diabetes and plays a vital role in helping people with diabetes achieve and maintain optimal glycemic control and reduce the risk of long-term tissue damage [12,13]. Although it is recommended that a registered dietitian with specialist knowledge should take the lead in delivering nutritional care, it is important that all members of the multidisciplinary team can deliver and implement evidence based nutritional advice. Achieving nutritional goals requires a coordinated approach, with the person with diabetes at the center of the decision-making process. All advice should be based upon scientific evidence and tailored for the individual, taking into account personal and cultural preferences, beliefs, lifestyle and willingness and ability to change [2]. Increased weight gain in infancy has been consistently associated with an enhanced risk of type 1 diabetes [14-16]. 4 case-control studies have provided evidence for a relation between diet after infancy and the development of type 1 diabetes. All of the studies focused on the diet before symptoms of diabetes occurred [9]. Infant milk and food introduction may be linked to type 1 diabetes risk in high incidence populations. An approximately one and a half-fold increased risk of type 1 diabetes was associated with decreased breast feeding duration and use of cow’s milk or other milk substitutes before three months. The age of dietary introduction to potential beta cell-specific auto-

Figure 1: Flow chart of studies through the review process.
Conclusions

In summary, educational intervention for diet, importance of breast feeding, obesity, exercise and role of vitamin E and D can prevent the incidence of type 1 diabetes or its complications in high risk clients and patients with type 1 diabetes. Therefore these factors should be considered in educational plan of clients with type 1 diabetes.

References


