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Concerns on the Use of Chromium in Type 2 Diabetes Mellitus; Needs to Conduct Major Meta-analysis

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Diabetes Mellitus (DM) is a serious and costly metabolic disorder of the new world (Azimi-Nezhad et al., 2008) which is expected to rise to 552 million people by 2030. The incidence of DM in Iran is estimated between 1.3-14.5% (Azimi-Nezhad et al., 2008). In Iran, almost 2.43 million people suffer from type 2 DM (Javanbakht et al., 2011) that seems growing, regarding environmental pollution that has been newly considered as a cause of diabetes in whole world (Mostafalou and Abdollahi, 2012). In a cost analysis study in Iran, Javanbakht et al. (2011) estimated that total annual costs of type 2 DM is about 3.78 (2.04 direct and 1.73 indirect) billion USA dollars. They calculated that 842 USD direct and 864 USD indirect costs per capita including complications (49%) and drugs (24%) as the main parts of direct costs. The best strategies to control diabetes are pharmacotherapy, proper diets, supplement adjuvants and lifestyle modifying (Psaltopoulou et al., 2010). Considering the growing trend of DM and cost of current therapies and also the mechanisms of DM (Rahimi et al., 2005), use of antioxidant supplementary to pharmacological regimens could help reduce cost and increase efficacy (Hosseini and Abdollahi, 2012). Among supplements for diabetes therapy, chromium is known to increase insulin sensitivity (Ali et al., 2011). Chromium may increase insulin receptors, stimulate the liver enzyme glucokinase and increase pancreatic B islets (Fuhr et al., 2005). The oligopeptide apocromodulin (also known as apo-low-molecular-weight chromium-binding substance) is important for the activation of the insulin receptor. The degree of activation of the insulin receptor depends on the number of chromium ions bound to this peptide (with a minimum of 0 and a maximum of 4 ions) and this may lead to an 8-fold difference in insulin receptor activation (Davis and Vincent, 1997). Chromium III is the most stable, safe and proper form for lipid and carbohydrate metabolism in people with DM (Sharma et al., 2011). Many studies indicated the benefit of chromium picolinate in DM (Wang et al., 2010). Increased chromium intake seems effective in diabetes by increasing insulin sensitivity (Martin et al., 2006), enhancing muscle strength (Hao et al., 2011), losing weight and fat (Martin et al., 2006), delaying ageing (Janson, 2006) and powering body antioxidant capacity (Cheng et al., 2004), these all are good for diabetic patients (Sharma et al., 2011). In addition, chromium could modify serum lipid profile (Janson, 2006) by reducing triglyceride and total cholesterol and increasing HDL-cholesterol. Clinical trials in DM have demonstrated that adding chromium to diet could result in reduction of blood sugar, insulin sensitivity and glucose tolerance (Sharma et al., 2011). In a double-blind, placebo controlled, randomized clinical trial, Cefalu et al. (2010) reported that chromium have a novel mechanism of action in lipid metabolism. Evidences on chromium efficacy are controversial and benefits are significant only in participants with poor serum chromium (Vincent, 2000). A systematic review in 2007 indicated that chromium can decrease hemoglobin A1c (HbA1c) by 0.6%. The positive effect found in that systematic review was predominantly obtained by inclusion of the study of poor methodological quality in the Chinese patients (Balk et al., 2007). As part of the investigation, the Food and Drug Administration (FDA) commissioned a meta-analysis of studies on the effects of chromium on subjects with type 2 DM and reported that chromium supplementation statistically improves glycemic control (FDA, 2005). Some articles have discussed safety of chromium. Chromium III is the usual form of chromium in foods and nutrients known as low toxic minerals

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element rather than availability or access because some people cannot pay for expensive antidotes even in overdose of their close relatives (Nikfar et al., 2011). Therefore comparing every new medication with existing ones can provide more clues about the real benefit of paying extra budget for new drugs. There are few articles which discuss cost and benefits of chromium consumption in diabetic patients that do not convince us to conclude use of chromium id type 2 DM is cost-benefit especially when high price of chromium is considered. Therefore, more clinical trials and economic evaluation studies based on a major meta-analysis is very much necessary to clarify place of this supplement in management of DM.

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REFERENCES


