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Review article

Behavioral strategies in diabetes prevention programs: A systematic review of randomized controlled trials

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ABSTRACT

The worldwide epidemic of type 2 diabetes (T2D) emphasizes the need for guidelines regarding community implementation of lifestyle modification prevention programs. An understanding of effective behavioral strategies is needed if evidence translation is to be realized. The aim of this paper is to systematically review the behavioral change strategies for lifestyle T2D prevention programs.

Methods: Randomized controlled trials (RCTs) of lifestyle interventions for the prevention of T2D were reviewed with a systematic literature search. Data relating to the behavioral strategies and trial outcomes were extracted.

Results: Overall, lifestyle interventions were successful in reducing the incidence of T2D. The behavioral strategies utilized in these interventions were drawn from a variety of theoretical backgrounds. All RCTs utilized intensive modes of delivery and were associated with low dropout rates of 5.5–13.4%.

Conclusions: The available evidence shows that a robust behavioral change strategy is an essential part of an effective lifestyle modification program, as the absence of intensive individualized advice or "information only" more closely resembles the control group interventions used in these RCTs.

Contents

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The number of people developing type 2 diabetes (T2D) is rising dramatically worldwide, and is expected to more than double between 2000 and 2030 [1]. Depending on the cohort surveyed and definition of T2D employed, between 20 and 50% of T2D is undiagnosed [2]. Direct health care costs of T2D in the USA in 2007 were estimated at $116 billion [3].

Epidemiological studies have repeatedly demonstrated that low levels of physical activity, low levels of physical fitness and obesity are prominent, independent and modifiable risk factors for the development of insulin resistance, metabolic syndrome, and T2D [4,5], adding to genetic predisposition and other environmental or acquired risk factors. This robust and consistent observational evidence has given rise to large-scale randomized controlled trials (RCTs) that have used a lifestyle intervention (including behavioral strategies for reinforcement of prescribed changes in nutritional intake, physical activity, or both) in populations at high risk of developing T2D. The aim of these trials was to reduce the rate of incident diabetes, as well as ameliorate risk factor profiles associated with both T2D and cardiovascular morbidity and mortality. The optimum strategy for the delivery of lifestyle programs in order to maintain adherence and compliance in this population remains unclear. Although excellent reviews of diabetes prevention trials have been published [6,7], none of these reviews have systematically extracted and compared the details of the behavioral components and goals of the intervention groups in these trials, which differ markedly between trials. Thus, the purpose of this paper was to systematically review the behavioral change strategies for lifestyle modification in adults with impaired glucose tolerance (IGT) and to assess adherence and compliance to these interventions within these published RCTs. This critical appraisal of the interventions is necessary to inform the translation of this evidence base into guidelines for community-based programs and public health policy.

1. Methods

1.1. *Criteria for study inclusion/exclusion*

1.1.1. Design

Randomized controlled trials, published in full in English were considered.

1.1.2. Subjects

Studies that involved adults at-risk of T2D were included, defined as being dysmetabolic or having IGT according to World Health Organization (WHO) criteria, at the time of the trial. Studies with participants already diagnosed with T2D were not included.

1.1.3. Interventions

Studies were included if they incorporated exercise training/physical activity and/or nutritional intervention as a means of diabetes prevention.