

The Effects of Early Dietary Modification on Type 2 Diabetes

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BACKGROUND/SIGNIFICANCE

Diabetes is one of the largest global public health problems with a prevalence estimated to increase from 425 million people to 629 million by 2045, with linked health, social, and economic costs (Forouhi et al., 2018). Although most diabetes guidelines recommend starting pharmacotherapy only after first making nutritional and physical activity lifestyle changes, this is not always followed in practice. Most healthcare providers are not trained in nutrition interventions and this is an impediment to counselling patients. According to Evert et al. (2019) nutrition therapy that includes the development of an eating plan designed to optimize blood glucose trends, blood pressure, and lipid profiles is important in the management of diabetes and can lower the risk of cardiovascular disease, coronary heart disease, and stroke.

PICO Question: In newly diagnosed type-2 diabetic patients, what is the effect of early referral to a dietician in conjunction with frequent follow-up care on the patient's glycemic control or hemoglobin A1C levels?

METHODS

Search Terms: This review examined the effects of early dietary referral and frequent follow up care in the management of type 2 diabetes. Research terms included type 2 diabetes, dietician or nutritionist, glycemic control or hemoglobin A1C, early intervention, nutrition therapy in diabetes, type 2 diabetes AND medical nutrition therapy, utilizing the CINAHL database through CU Vise Library. Five peer-reviewed articles from academic journals, written in English and published within the past 5 years, were found to be appropriate to answer this proposed PICO question.

Theory: Dorothea Orem's conceptual model of the patient's self-care capacities was used for this literature review. This model assumes the patient wants to care for themselves to the best of their abilities and that the nurse has the responsibility to help the patient with their self-care capacities (Black, 2020). By using Orem's Self-Care Model and applying it to patients newly diagnosed with type 2 diabetes, early dietary consultation and frequent follow-up care will enable these patients to meet their self-care capacities and have better glycemic control.



RESULTS

- In a case study by van Wyk and Daniels (2016), 11 patients were placed on a very low-calorie diet (VLCD, <800 kcal) for two weeks, consisting of only meal-replacement shakes and non-starchy vegetables and then, for another two weeks, allowing a solid meal once per day. The data revealed treating the cause of type 2 diabetes, ectopic fat of the liver and pancreas, by use of strict diet modification was an effective approach to rapidly reduce blood glucose levels, and secondarily, reduce or eliminate the use of medication. The study revealed that fasting blood glucose, pre-lunch, and pre-dinner readings decreased by -3.07, -3.65 and -2.9 mmol/l.
- In a quasi-experimental study by Steven et al. (2016) 30 patients with type 2 diabetes, including those with a short-term and long-term duration of disease, stopped all medications and were placed on a VLCD for 8 weeks, then, an isocaloric diet, and finally an individualized weight management program for 6 months with frequent follow up with strict individualized follow up care. The authors found improved glycemic control and decreased need for hypoglycemic agents. There was a negative correlation between the success of this intervention and the duration of having type 2 diabetes. The shorter the duration, the more effective the intervention will be and vice versa.
- Mottalib and colleagues (2018) in a RCT examined 108 participants over 16 weeks and compared the effects of two different dietary plans. A registered dietician provided structured nutrition therapy which included a macronutrient composition that was higher in protein and lower in saturated fat within a pre-specified level of energy intake, in addition to the use of menus, snack lists, a diabetes-specific forumate and keeping a daily food record was found to lower hemoglobin A1C, body fat percentage, and waist circumference. The results also found that those who followed a well-defined structured dietary plan experienced a significant reduction in their hemoglobin A1C levels ($p < 0.001$). Limitations of this study included only overweight and obese subjects were included and did not include patients who were being treated with insulin.
 - Evert et al. (2019) conducted a narrative literature review and concluded the effectiveness of medical nutrition therapy (MNT) interventions provided by RDNs for improving A1C, with absolute decreases up to 2.0% in A1C levels at 3 to 6 months.
 - Moller, Andersen, and Snorgaard (2017), conducted a systematic review and meta-analysis of 912 participants total over 5 RCTs and compared nutrition therapy to dietary advice from a medical professional. The review found that MNT provided by a dietician warranted a greater effect on patient's A1C, weight, and LDL cholesterol. Further randomized studied are needed.

PRACTICE IMPLICATIONS

The nursing implications of this literature review include advocating for early dietary consultation for newly-diagnosed type 2 diabetic patients in order to provide personalized care for glycemic control and HgA1C. Based on this review, these early referrals help ensure the best possible outcome for their individual disease process. Nurses can also help by providing printed resources and educational documents based on current evidence for patients related to individual care.

CONCLUSIONS

This review of literature overwhelmingly supported that early interventions with an MNT improves outcomes in diabetes control. As stated by Evert et al.(2019) in providing support by a MNT there was a decrease of up to 2.0% in the hemoglobin A1C. Dorothea Orem's self-care deficit model and interventions with a dietician while also educating the patient on providing care for themselves to the best of their abilities will help to improve and maintain their glycemic control and decrease the need for medical interventions preventing devastating and costly long-term complications. Ongoing research is needed to further evaluate dietary control on the long-term impact.

REFERENCES

- Black, B. P. (2020). *Professional nursing: Concepts and challenges* (9th ed.). Elsevier Inc.
- Early, K. B., & Stanley, K. (2018). Position of the Academy of Nutrition and Dietetics: The role of medical nutrition therapy and registered dietitian nutritionists in the prevention and treatment of prediabetes and type 2 diabetes. *Journal of the Academy of Nutrition and Dietetics*, 118(2), 343-353.
- Evert, A. B., Dennison, M., Gardner, C. D., Garvey, W. T., Lau, K. H. K., Macleod, J., Mitri, J., Pereira, R. F., Rawlings, K., Robinson, S., Saslow, S., Uelmen, S., Urbanski, P. B., & Yancy, W. S. (2019). Nutrition therapy for adults with diabetes or prediabetes: A consensus report. *Diabetes Care*, 42(5), 731-754.
- Forouhi, N. G., Misra, A., Mohan, V., Taylor, R., & Yancy, W. (2018). Dietary and nutritional approaches for prevention and management of type 2 diabetes. *BMJ*, 36(1), 2234.
- Moller, G., Andersen, H., Snorgaard, O. (2018). A systematic review and meta-analysis of nutrition therapy compared with dietary advice in patients with type 2 diabetes. *The American Journal of Clinical Nutrition*, 106(6), 1394-1400.
- Mottalib, A., Salsberg, V., Mohd-Yusof, B.-N., Mohamed, W., Carolan, P., Pober, D. M., ... Hamdy, O. (2018). Effects of nutrition therapy on HbA1c and cardiovascular disease risk factors in overweight and obese patients with type 2 diabetes. *Nutrition Journal*, 17(1), 42.
- Steven, S., Hollingsworth, K. G., Al-Mrabeh, A., Avery, L., Aribisala, B., Caslake, M., & Taylor, R. (2016). Very low-calorie diet and 6 months of weight stability in type 2 diabetes: Pathophysiological changes in responders and nonresponders. *Diabetes Care*, 39(5), 808-815
- Van Wyk, H., & Daniels, M. (2016). Case discussion: The use of very low-calorie diets in the management of type 2 diabetes mellitus. *South African Journal of Clinical Nutrition*, 29(2), 96-102.