

For Diabetics, Exercise Is Medicine

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This research was supported (in whole or in part) by HCA Healthcare and/or an HCA Healthcare affiliated entity. The views expressed in this publication represent those of the author(s) and do not necessarily represent the official views of HCA Healthcare or any of its affiliated entities.

An estimated 9.4% of the United States (U.S.) population has diabetes and 33.9% of U.S. adults 18 years and older have prediabetes (Center for Disease Control, 2017). A missed or underutilized opportunity for treatment in this population is education and motivation to part take in physical activity and to do so effectively. Being overweight and having a sedentary lifestyle are two modifiable risk factors for diabetes which can be reversed with proper lifestyle modifications including exercise. However, turning office visit education into effective motivation for change can be challenging. A lot of patients would rather take a pill than spend time exercising. Subsequently, when patients do decide to exercise, they commonly stick to low intensity aerobic exercises such as walking leisurely which may not be as effective to achieve desired goals. This preventative wellness post is intended to review the recommended exercise requirements and benefits of exercise, review recent journal article findings related to exercise in prediabetes and diabetes, and hopefully be an inspiration to diabetic patients to incorporate an effective exercise regimen into their treatment plan and lifestyle.

The second edition of the Physical Activity Guidelines for Americans which was released in 2018 is a great resource. The overall minimum physical activity goals for all different age groups are available. For adults, the guidelines include a minimum of 150-300 minutes a week of moderate intensity aerobic activity (Piercy, 2018). Two days per week should include muscle strengthening of moderate intensity involving all major muscle groups (Piercy, 2018). Additional benefits are also seen beyond the minimum requirements and extend beyond just glucose control and diabetes management. A brief list of other proven benefits of exercise include lower risk of all-cause mortality, falls, hypertension, and eight cancer types, and improved cognition, sleep and bone health among many others (Piercy, 2018). Within the Physical Activity Guidelines it states, "Adults who regularly engage in aerobic activity of at least moderate intensity have significant lower risk of developing type 2 diabetes than do inactive adults" (Piercy, 2018). Additionally, "Insulin sensitivity can be improved with just a single bout of physical activity. In addition, physical activity helps control blood glucose in people who already have type 2 diabetes" (Piercy, 2018). Showing exercise has both preventative and treatment potential for this population. The key of moderate intensity was mentioned. This is defined as expenditure of at least three metabolic equivalents of task (METs). The Compendium of Physical Activities lists aerobic activities and approximated MET expenditure (Ainsworth BE, et al.). Of note, walking leisurely less than two miles per hour is light intensity while brisk walking is moderate intensity.

This is why it is important to educate patients on the proper aerobic exercise and also stressing not to neglect the muscle strengthening component mentioned in the guidelines.

Scientifically, numerous journal articles have evaluated exercise in prediabetes and diabetes and the findings can be incorporated into patient education. The New England Journal of Medicine published an article by the Diabetes Prevention Program Research Group (Knowler, 2002). This article evaluated the incidence of diabetes in prediabetes incorporated into a placebo group versus medication group versus lifestyle intervention group. The lifestyle intervention group reduced the incidence of diabetes at three year follow up by 58% compared to placebo and compared to 31% reduction in medication group (Knowler, 2002). They determined, “To prevent one case of diabetes during a period of three years, 6.9 persons would have to participate in the lifestyle intervention program and 13.9 would have to receive metformin.” The lifestyle interventions included achieving and maintaining weight loss of seven percent initial body weight through dietary changes and participation in 150 minutes moderate physical activity weekly. Another study evaluating prediabetes was in the Medicine & Science in Sports & Exercise journal (Shiroma, 2017). This study showed that muscle strengthening exercises reduced risk of type 2 diabetes 30% compared to no strength training, and participation in both showed aerobic and strength training had additional risk reductions (Shiroma, 2017). Finally, an article in The Journal of the American Medical Association in 2010 looked at the effects of aerobic and resistance training on hemoglobin A1c in type 2 diabetics (Church, 2010). This study showed that only the combination of aerobic and resistance muscle strengthening compared with non-exercise control group improved hemoglobin A1c. This was important because neither aerobic or muscle strengthening alone did so.

Incorporating effective exercise should both help prevent and treat diabetes and the public health burden of the disease. So how do we incorporate this evidence into practice? Several proposed concepts focus on improved verbal patient education and educational handouts. Incorporating the teach back method where the patient explains back to the physician what concept was reviewed to gain an appreciation of the patient’s understanding is effective. Developing handouts listing the exercise recommendations and a list of aerobic exercises and MET expenditure as well as muscle strengthening exercises helps the patients utilize a variety of exercises and activities that meet minimal requirements. Also, promoting a list of local parks, hiking trails, gyms, races, etc. to help provide the patient with opportunities to be active. Writing a physical “exercise prescription” for the patient to hold on to, in order to provide the constant reminder exercising is the physician’s order. Asking the patient to keep an exercise log similar to a log they would keep for blood pressures, food or blood glucose. Including the type of aerobic or muscle strengthening exercises and total time and review the log with the patient at follow up visits. This log can keep the patient accountable and help identify areas of potential improvement. Overall improving exercise compliance will help prevent burden of disease in diabetes and prediabetes and help promote a healthy lifestyle with many other physical, mental, and spiritual benefits.

Resources:

- Ainsworth BE, Haskell WL, Herrmann SD, Meckes N, Bassett Jr DR, Tudor-Locke C, Greer JL, Vezina J, Whitt-Glover MC, Leon AS. *The Compendium of Physical Activities Tracking Guide*. Healthy Lifestyles Research Center, College of Nursing & Health Innovation, Arizona State University. Retrieved 23 Sept. 2019 from the World Wide Web. <https://sites.google.com/site/compendiumofphysicalactivities/>
- Center for Disease Control - National Center for Chronic Disease Prevention and Health Promotion. *National Diabetes Statistics Report, 2017 Estimates of Diabetes and Its Burden in the United States*. 2017.
- Church, Timothy S, et al. *Effects of Aerobic and Resistance Training on Hemoglobin A1c Levels in Patients with Type 2 Diabetes: A Randomized Controlled Trial*. *JAMA*, vol. 304, no. 20, 2010, pp. 2253–62, www.ncbi.nlm.nih.gov/pubmed/21098771, 10.1001/jama.2010.1710. Accessed 23 Sept. 2019.
- Knowler, William C, et al. *Reduction in the Incidence of Type 2 Diabetes with Lifestyle Intervention or Metformin*. *The New England Journal of Medicine*, vol. 346, no. 6, 2002, pp. 393–403, www.ncbi.nlm.nih.gov/pubmed/11832527, 10.1056/NEJMoa012512. Accessed 23 Sept. 2019.
- Piercy, Katrina L., et al. The Physical Activity Guidelines for Americans. *JAMA*, vol. 320, no. 19, 20 Nov. 2018, p. 2020, 10.1001/jama.2018.14854. Accessed 23 Sept. 2019.
- Shiroma, Eric J., et al. *Strength Training and the Risk of Type 2 Diabetes and Cardiovascular Disease*. *Medicine & Science in Sports & Exercise*, vol. 49, no. 1, Jan. 2017, pp. 40–46, 10.1249/mss.0000000000001063. Accessed 23 Sept. 2019.