

Screening and Follow Up Diabetes

Hashem Mohammed Malki^{1*}, Ahmed Abdullah Almeahmadi², Mohammed Ghali Alsubhi², Mohanid Fahd A Tirkistani², Ammar Adnan M Bin Yaseen², Braa Esam F Habeeb², Waleed Ibrahim N Alharbi², Dyaa Esam F Habeeb² and Ghaith Adel D Alhazmi²

¹Ministry of Health, AlKakia Primary Health Care Makkah, Saudi Arabia

²Umm-Alqura university, Mecca, Saudi Arabia

***Corresponding Author:** Hashem Mohammed Malki, Ministry of Health, AlKakia Primary Health Care Makkah, Saudi Arabia.

Received: April 26, 2019; **Published:** May 31, 2019

Abstract

Introduction: Screening for diabetes is an important topic it is conducted by checking for diabetes in people who are without symptoms. Screening can detect patients at risk for the disease or people with less severe states of dysglycemia. Screening techniques could be based on the type of diabetes as well as the progress of prediabetes to diabetes or decrease the risk of complications linked with diabetes. A big study meta-analysis recommended that screening in people classified through screening as having prediabetes have some efficacy in preventing the onset of type 2 diabetes.

Aim of Work: In this review, we will discuss Screening for diabetes.

Methodology: We did a systematic search for Screening for diabetes using PubMed search engine (<http://www.ncbi.nlm.nih.gov/>) and Google Scholar search engine (<https://scholar.google.com>). All relevant studies were retrieved and discussed. We only included full articles.

Conclusions: The USPSTF proposes screening for abnormal blood glucose as part of cardiovascular risk assessment in adults aged forty to seventy years who are overweight or obese. Doctors should ask patients with abnormal blood glucose to intensive interventions to advise a healthy diet and physical activity.

Keywords: Screening; Diabetes; Family Medicine; Adults

Introduction

Screening for diabetes is an important topic it is conducted by checking for diabetes in people who are without symptoms. Screening can detect patients at risk for the disease or people with less severe states of dysglycemia. Screening techniques could be based on the type of diabetes as well as the progress of prediabetes to diabetes or decrease the risk of complications linked with diabetes. A big study meta-analysis recommended that screening in people classified through screening as having prediabetes have some efficacy in preventing the onset of type 2 diabetes [1]. Contrary to other diseases, there is no distinction between screening and diagnostic testing. In order to detect diabetes and prediabetes, the same investigations could be implied for diagnosis of both medical conditions.

In this review, we will discuss the most recent evidence regarding Screening for diabetes.

Methodology

We did a systematic search for Screening for diabetes using PubMed search engine (<http://www.ncbi.nlm.nih.gov/>) and Google Scholar search engine (<https://scholar.google.com>). All relevant studies were retrieved and discussed. We only included full articles.

The terms used in the search were: Screening, diabetes, family medicine, adults.

Rationale

Importance

Cardiovascular disease (CVD) is the main cause of death in the US and is responsible for about 1/4 of deaths caused by CVD are preventable. There are modifiable and unmodifiable risk factors, cardiovascular risk factors such as abnormal blood glucose, hypertension, hyperlipidemia or dyslipidemia. Type 2 diabetes progresses from normal blood glucose to glucose abnormalities slowly that meet accepted criteria for diabetes could take a decade or longer.

Based on the national data estimates from 2012, about 86 million Americans aged 20 years or older have IFG or IGT.¹ About thirty percent of these persons will develop type 2 diabetes within five years if they do not follow a healthy lifestyle changes to improve their health [2].

Modifiable risk factors for abnormal glucose metabolism (manifested as either diabetes or abnormal glucose levels below the threshold for diabetes) include overweight and obesity or a high percentage of abdominal fat, physical inactivity, and smoking.

Given the high prevalence of abnormal glucose metabolism in the United states population, the USPSTF sought to examine the advantages and disadvantages of screening.

Advantages of screening

The USPSTF concluded that there is insufficient data that measuring blood glucose leads to enhancements in mortality or cardiovascular morbidity. The USPSTF previously found adequate evidence that intensive behavioral counseling interventions for persons at higher risk for CVD have moderate benefits in lowering CVD risk. Populations in which these advantages have been found to include persons who are obese. Advantages of behavioral interventions involve decrease in blood pressure, glucose and lipid levels, and obesity and an increase in physical activity. Studies that examined people who have IFG or IGT with intensive lifestyle interventions to prevent the development of diabetes. Lifestyle modifications have better effects on reducing progression to diabetes than metformin or other medications.

Disadvantages of early detection and treatment

The USPSTF found that measuring blood glucose is linked with short-term anxiety but not long-term psychological harms. The USPSTF found enough data that the harms of lifestyle modifications to lower the incidence of diabetes are small to none.

Clinical Considerations

Patient population under consideration

This recommendation should be applied to adults aged forty to seventy years seen in primary care settings who do not have symptoms of diabetes and are overweight or obese. The patients were most likely to have glucose abnormalities that are linked with higher CVD risk and can be expected to advantages from primary prevention of CVD through risk factor modification. Persons who have a family history of diabetes, have a history of gestational diabetes or polycystic ovarian syndrome, or are members of certain racial/ethnic groups may be at higher risk for diabetes at a younger age or at a lower body mass index.

Screening tools

Glucose abnormalities could be detected by measuring HbA1C or fasting plasma glucose or with an oral glucose tolerance test. HbA1C can be used as a tool of long-term blood glucose concentration and is not influenced by acute changes in glucose levels due to stress or illness. The oral glucose tolerance test is performed in the morning in a fasting state.

The diagnosis of IFG, IGT, or type 2 diabetes must be confirmed; repeated testing with the same test on a different day is the preferred method of confirmation.

Screening for type 1 diabetes

Type 1 diabetes mellitus is mainly a result of pancreatic beta cell damage due to an immune-mediated process. A person risk of developing type 1 diabetes can be estimated by taking into consideration family history of type 1 diabetes [4].

Screening for type 2 diabetes in adults

A population based study showed that a significant number of Canadians are living with diabetes that has not yet been diagnosed. The calculated prevalence of undiagnosed type 2 diabetes in the general population is more than one percent by fasting plasma glucose (FPG) levels and three percent by glycated hemoglobin (A1C) criterion, contributing to twenty to forty percent of total diabetes cases [6]. Based on retinopathy data, it is calculated that the onset of type 2 diabetes happens four to seven years before its clinical diagnosis [7,8].

To be effective, screening would have to be wide coverage and would have the goal of early recognizing. Using different multi-staged screening strategies, the ADDITION Europe study found that about twenty percent of eligible people in primary care practices attended the first blood glucose test of the screening process, and diabetes was found in one percent of the target populations, which was less than expected [9,10].

Another population screening study for type 2 diabetes was not linked with a decrease in all-cause, CV or diabetes-related mortality. But, the low rate of type 2 diabetes in the screened population (three percent) was likely too small to affect overall population mortality [11]. However, there is currently insufficient evidence of clinical benefit to support a strategy of population-based screening for type 2 diabetes.

The States Preventive Services Task Force (USPSTF) suggested targeted screening for abnormal blood glucose (BG) in adults aged forty to seventy years with overweight or obesity [12,13]. In spite of the low prevalence of diabetes in the general population makes it unlikely that mass screening will be cost effective, testing for diabetes in people with risk factors for type 2 diabetes, or with diabetes-associated conditions [14]. Screening people early has proven to be useful in checking unrecognized diabetes [15].

People with prediabetes, not only are at increased risk of developing type 2 diabetes, but also have a higher risk of CV complications, especially in the context of the metabolic syndrome [16].

Members of high-risk ethnic individuals should be screened for prediabetes and type 2 diabetes using the suggested screening tests. But, the prevalence of hemoglobinopathies in these populations could considerably decrease the accuracy of A1C as a reliable screening tool.

Threshold for interventions

Many studies evaluated intensive behavioral interventions for persons at increased CVD risk. Studies on persons with multiple risk factors, and CVD risk increases with the number of risk factors and glucose level. Because the average reduction in glucose levels resulting from intensive behavioral interventions is modest, individuals with higher glucose levels may be more likely to advantage and avoid a diabetes diagnosis than those whose glucose levels are closer to normal.

Screening intervals

Data on the optimal rescreening interval for adults with an initial normal glucose test result is limited. Cohort and modeling studies suggest that rescreening every 3 years could be a reasonable approach for adults with normal blood glucose levels.

Other approaches to prevention

Because of the overweight and obesity, physical inactivity, abnormal lipid levels, high blood pressure, and smoking are all modifiable risk factors for cardiovascular events, the USPSTF suggests screening and reliable interventions for these conditions.

The USPSTF suggests screening for obesity in adults and offering or referring those with a body mass index of 30 kg/m² or greater to intensive, multicomponent behavioral interventions. Though intensive interventions could not be practical in many primary care settings, patients can be referred from primary care to community-based programs for these interventions. The USPSTF suggests offering or referring adults who are overweight (body mass index > 25 kg/m²) and have in addition cardiovascular risk factors to intensive behavioral counseling interventions to promote a healthful diet and physical activity for CVD prevention.

The USPSTF suggests screening for lipid disorders in men aged thirty five years or older and women aged forty five years or older who are at increased risk for coronary heart disease. The USPSTF also recommends screening for hypertension in adults aged 18 years or older and that clinicians ask all adults about tobacco use and provide smoking cessation therapy to those who use tobacco products.

Conclusions

The USPSTF proposes screening for abnormal blood glucose as part of cardio vascular risk assessment in adults aged forty to seventy years who are overweight or obese. Doctors should offer or refer patients with abnormal blood glucose to intensive behavioral counseling interventions to advocate a healthy diet and physical activity.

Bibliography

1. Division of Diabetes Translation, National Center for Chronic Disease Prevention and Health Promotion. "National Diabetes Statistics Report, 2014". Atlanta, Ga.: Centers for Disease Control and Prevention (2014).
2. Selph S., *et al.* "Screening for type 2 diabetes mellitus: a systematic review to update the 2008 U.S". Preventive Services Task Force recommendation. Evidence synthesis no. 117. AHRQ publication no. 13-05190-EF-1 (2015).
3. Harjutsalo V., *et al.* "Differential transmission of type 1 diabetes from diabetic fathers and mothers to their offspring". *Diabetes* 55.5 (2006): 1517-1524.
4. Decochez K., *et al.* "Combined positivity for HLA DQ2/ DQ8 and IA-2 antibodies defines population at high risk of developing type 1 diabetes". *Diabetologia* 48.4 (2005): 687-694.
5. Bingley PJ. "Interactions of age, islet cell antibodies, insulin autoantibodies, and first-phase insulin response in predicting risk of progression to IDDM in ICA+ relatives: The ICARUS data set. Islet Cell Antibody Register Users Study". *Diabetes* 45.12 (1996): 1720-1728.
6. Rosella LC., *et al.* "Prevalence of prediabetes and undiagnosed diabetes in Canada (2007-2011) according to fasting plasma glucose and HbA1c screening criteria". *Diabetes Care* 38.7 (2015): 1299-1305.
7. Harris MI., *et al.* "Onset of NIDDM occurs at Least 4-7 yr before clinical diagnosis". *Diabetes Care* 15.7 (1992): 815-819.
8. Cowie CC., *et al.* "Prevalence of diabetes and impaired fasting glucose in adults in the U.S. population: National Health And Nutrition Examination Survey 1999-2002". *Diabetes Care* 29.6 (2006): 1263-1268.
9. Van den Donk M., *et al.* "Screening for type 2 diabetes. Lessons from the ADDITION-Europe study". *Diabetic Medicine* 28.11 (2011): 1416-1424.

10. Herman WH., *et al.* "Early detection and treatment of type 2 diabetes reduce cardiovascular morbidity and mortality: A simulation of the results of the Anglo-Danish-Dutch Study of Intensive Treatment in people with screen detected diabetes in Primary Care (ADDITION-Europe)". *Diabetes Care* 38.8 (2015): 1449-1455.
11. Simmons RK., *et al.* "Screening for type 2 diabetes and population mortality over 10 years (ADDITION-Cambridge): A cluster-randomised controlled trial". *Lancet* 380.9855 (2012): 1741-1748.
12. Siu AL. "Screening for abnormal blood glucose and type 2 diabetes mellitus: U.S. Preventive Services Task Force recommendation statement". *Annals of Internal Medicine* 163.11 (2015): 861-868.
13. O'Brien MJ., *et al.* "Detecting dysglycemia using the 2015 United States Preventive Services Task Force screening criteria: A cohort analysis of community health center patients". *PLOS Medicine* 13.7 (2016): e1002074.
14. Knowler WC. "Screening for NIDDM: Opportunities for detection, treatment, and prevention". *Diabetes Care* 17.5 (1994): 445-450.
15. Leiter LA., *et al.* "Diabetes Screening in Canada (DIASCAN) study: Prevalence of undiagnosed diabetes and glucose intolerance in family physician offices". *Diabetes Care* 24.6 (2001): 1038-1043.
16. Hu G., *et al.* "Prevalence of the metabolic syndrome and its relation to all-cause and cardiovascular mortality in nondiabetic European men and women". *Annals of Internal Medicine* 141.10 (2004): 1066-1076.

Volume 15 Issue 6 June 2019

©All rights reserved by Hashem Mohammed Malki., *et al.*