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Original research

Using a public health station for screening of undiagnosed dysglycemia and hypertension

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ABSTRACT

Aim: Dysglycemia, diabetes and abnormal blood pressure screening can be conducted by trained volunteers and may identify unknown cases. The aim of the study was to examine the feasibility and effectiveness of operating a screening station in pubic setting supervised by diabetes unit.

Methods: A cross-sectional analysis of a program offering free screening services to non-hospitalized subjects. From 1.1.2011 through 31.12.2013 trained volunteers measured height, weight, blood glucose and blood pressure at the main entrance of the hospital. Subjects were asked whether they had diabetes or hypertension. Dysglycemia was defined as blood glucose 141–199 mg/dL and probable newly-identified diabetes as ≥200 mg/dL.

Results: 13,112 adults underwent screening. Among the screened individuals (age 55.3 ± 14.9 years) 2215 (16.9%) reported diabetes and 3037 (23.2%) hypertension. Among subjects without known hypertension, 9.6% had blood pressure ≥140/90. Among the subjects without known diabetes, 5012 (46%) had glucose ≤110 mg/dL, 2873 (26.4%) ≥126 mg/dL, 1553 (14.3%) >140 mg/dL and 170 (1.6%) ≥200 mg/dL. Compared to subjects with blood glucose ≤140 mg/dL, those with dysglycemia or diabetes were older (58.9 ± 13.4 vs. 52.7 ± 15.2 years, $P < 0.001$), had elevated BMI (27.5 ± 4.6 kg/m^2 vs. 26.6 ± 4.6 kg/m^2, $P < 0.001$), higher systolic (137.5 ± 22.2 mmHg vs. 132.2 ± 21.3 mmHg, $P < 0.001$) and diastolic blood pressure (80.3 ± 15.6 mmHg vs. 78.6 ± 13.7 mmHg, $P < 0.001$). Compared to subjects with blood glucose < 200 mg/dL, those with probable newly-identified diabetes were older (58.6 ± 10.9 vs. 53.5 ± 15.2, $P < 0.001$), had elevated BMI (28.4 ± 4.8 kg/m^2 vs. 26.7 ± 4.6 kg/m^2, $P < 0.001$), higher systolic (139.4 ± 24.0 mmHg vs. 132.8 ± 21.4 mmHg, $P < 0.001$) and diastolic blood pressure (85.4 ± 20.7 mmHg vs. 78.8 ± 13.9 mmHg, $P < 0.001$).

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Conclusions: Screening supervised by healthcare center can identify individuals at high-risk for dysglycemia and abnormal blood pressure, who are referred for further diagnosis and treatment and may serve as a complementary step in primary health care setting.
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1. Introduction

Quality healthcare for individuals includes two fundamental elements: appropriate treatment for current illness and appropriate preventive care to avert future health declines. Interventions that support healthcare providers' recommendations to patients to obtain preventive services have been proven to increase the use of these services [1].

Thirty-five percent of myocardial infarctions and strokes, 49% of episodes of heart failure, and 24% of premature deaths are attributed to hypertension [2]. There is clear evidence that treating high blood pressure can decrease the incidence of cardiovascular disease. Thus, the benefits of screening and treating high blood pressure in adults substantially outweigh the potential risks [3].

Also randomized controlled studies have shown that individuals at high risk for developing type 2 diabetes can significantly decrease the rate of diabetes onset with certain interventions [4–6] hence the American Diabetes Association (ADA) recommends diabetes and prediabetes screening [7].

Despite the importance of preventive medicine and health promotion, certain factors hinder the implementation of preventive actions. Among them are factors related to the healthcare system, including lack of knowledge and skills of the practitioner, lack of time in busy clinics, and lack of teamwork and organizational infrastructure to support these activities. Other factors prevent the implementation of the recommendations among patients. Some refuse effective preventive services or do not find the time to implement the recommendations [8–10]. Patients may have misconceptions about preventive services that lead them to believe that the services are undesirable, would not benefit them or might be harmful [11–13]. As such, patients may have undiagnosed medical conditions, including hypertension, diabetes and dysglycemia, as these do not always have overt symptoms.

The objective of the study was to examine the feasibility of a public screening station located in a central location in a university hospital, operated by trained volunteers supervised by the Diabetes Unit of the hospital and its effectiveness in detecting abnormal blood pressure and dysglycemia.

2. Methods

2.1. Study design and participants

A cross-sectional analysis of a program offering free screening services to non-hospitalized pedestrians.

2.2. Setting

From 2011 through 2013, the Diabetes Unit at Wolfson Medical Center, a 700-bed public hospital, serving approximately 500,000 residents, established a screening station for hypertension and dysglycemia. The station was staffed by volunteers from the diabetes unit. The volunteers were retirees who received special training from the Diabetes Unit nurses.

The station was allocated at the main entrance of the hospital near the hospital mall. Several signs explaining the goals of the station and the importance of testing blood pressure and sugar were hung nearby. The station was operated by two volunteers 5 days a week, from 8:00 am to 12:00 pm.

2.2.1. Measurements and definitions

The volunteers measured height using a wall mounted ruler, weight with a digital scale, blood glucose with a glucometer and blood pressure with a sphygmomanometer after a short rest at the station. Screened subjects were asked their age and whether they had diabetes or hypertension. Data were entered on structured questionnaires, which were collected for learning and debriefing.

Dysglycemia was defined as blood glucose 141–199 mg/dL and probably, newly-identified diabetes as ≥200 mg/dL. Abnormal blood pressure was defined as SBP higher than 140 mmHg and DBP ≥90 mmHg.

In cases where the results were abnormal according to the definitions, subjects were advised to follow-up with their family physician as soon as possible. When the results were highly abnormal (≥250 mg/dL), the subjects were referred to the Diabetes Unit at the hospital for further examination and treatment.

The local Helsinki committee approved publication of the results.

2.3. Statistical methods

Data were stored on Excel (Microsoft Inc., Washington, USA) and analyzed on SPSS v21 (IBM Inc., USA). Analysis of data took place at 2014. Distributions of continuous variables such as age and blood glucose were assessed for normality using the Kolmogorov–Smirnov test, cutoff at $P < 0.01$. Continuous variables were described as mean ± standard deviation and compared by category of blood glucose level using one way analysis of variance (ANOVA). Post hoc pairwise testing was performed using Bonferroni's test. All tests were two-sided and considered significant at $P < 0.05$.

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