

SHORT COMMUNICATION

Routine diabetes screening in blood donation campaigns

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Abstract

Background: Data from the National Health and Morbidity Survey 2011 showed that 20.8% of Malaysians above 30 years have diabetes. 10.1% of them are undiagnosed. Mobile blood drives could complement the public health department efforts in diabetes screening for early detection of the illness. **Aims:** This study aims to determine the necessity of diabetes screening as a routine screening program during blood donation campaign. **Methods and Material:** Blood donation campaigns which involved the public community between January 2013 and June 2013 were included in this study. Donors above 30-years-old, not known to have diabetes, consented for diabetes screening. Diabetes screening was done by checking random capillary blood sugar (RCBS) levels while performing a Hemoglobin test and ABO grouping. Donors with RCBS of ≥ 7.8 mmol/L were given appointments for oral glucose tolerance test (OGTT) to confirm the diagnosis of diabetes. **Results:** A total of 211 diabetes screenings were performed. Mean RCBS was 6mmol/L. 43(20.4%) donors had RCBS ≥ 7.8 mmol/L. 10 donors were later diagnosed to have diabetes (5.0%) and 5 donors were prediabetes (2.5%). 9 donors (4.3%) did not turn up for further investigation. **Conclusions:** Blood donors are expected to be healthy volunteers. The diabetes prevalence among blood donors (5.0%) is considered low if compared with the prevalence in the whole population (20.8%). However, the number is largely comparable to the prevalence of undiagnosed diabetes in the country (10.1%). Routine diabetes screening during blood donation campaign should be implemented to safeguard donors' health and serve as a public health initiative to improve community health.

Keywords: blood donors, diabetes, prevention and control, health promotion

INTRODUCTION

Asian countries have the highest prevalence of diabetes mellitus and contribute to more than 60% of the world's diabetic population.¹ Malaysia is no exception. The diabetes mellitus prevalence in Malaysia is high and is on the rise. Data from the National Health and Morbidity Survey 2011 showed that 20.8% of Malaysians above the age of 30 years are diabetic, a 40% increase compared to 2006.² The prevalence is expected to increase further over the next decade to affect 4.5 million Malaysians in 2020.² Diabetes mellitus has a long asymptomatic phase. 10.1% of Malaysians above the age of 30 years are not aware of their diabetes mellitus.² Untreated hyperglycemia over long periods of time poses a huge risk of chronic diabetic complications and a financial burden to the country. The UK Prospective

Diabetes Study showed that 20-30% of newly diagnosed individuals suffered from diabetes-related complications at the time of diagnosis.³ Early glycemic control is vital in order to reduce diabetes mortality and morbidity.⁴ As it is usually asymptomatic, an efficient diabetes screening program plays an important role in the early detection and management of the illness.

Blood centres across Malaysia collect more than 500,000 blood donations annually⁵ at their respective centres as well as at various blood donation drives. As an effort to increase blood collection, mobile blood drives operate almost every day at various locations for the convenience of donors. Mobile blood drives receive good response from the public and account for three quarters of the total blood collections of the country.⁵ Positive response, high area coverage

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as well as individual interactions at mobile blood drives create a good platform for added community healthcare service such as diabetes screening program.

Currently diabetes screening is not conducted routinely in public hospitals or community health clinics. It is usually carried out by the Public Health Department during various health campaigns. Mobile blood drives would be able to complement the public health department efforts in diabetes screening and in promoting public awareness.

Our study aims to determine the necessity in implementing routine diabetes screening during blood donation among donors above the age of 30 years.

SUBJECTS AND METHODS

Blood donation campaigns involving the general public at Melaka state between January 2013 and June 2013 were included in this study. Donors above 30-years-old, who were not known to have

diabetes, would be given information regarding diabetes screening. They were free to give their consent for the screening. As per standard protocol, blood donors would approach the medical laboratory technician at the blood drive for hemoglobin testing and ABO grouping before blood donation. Finger prick was performed by the medical laboratory technician. For donors who agreed to have diabetes screening, an additional drop of their blood was put on a glucose test strip attached to a glucometer at the same time. Random capillary blood sugar (RCBS) levels were read and written down. Donors with RCBS of ≥ 7.8 mmol/L were given appointments for oral glucose tolerance test (OGTT) at Hospital Melaka to confirm the diagnosis of diabetes. OGTT was performed on an empty stomach where donors were instructed to fast for at least 8 hours. After a blood sample was taken in the fasting state, the respective donors were given a 75g oral glucose drink. Another blood sample was taken 2 hours after the glucose drink. The protocol is shown in Figure 1.

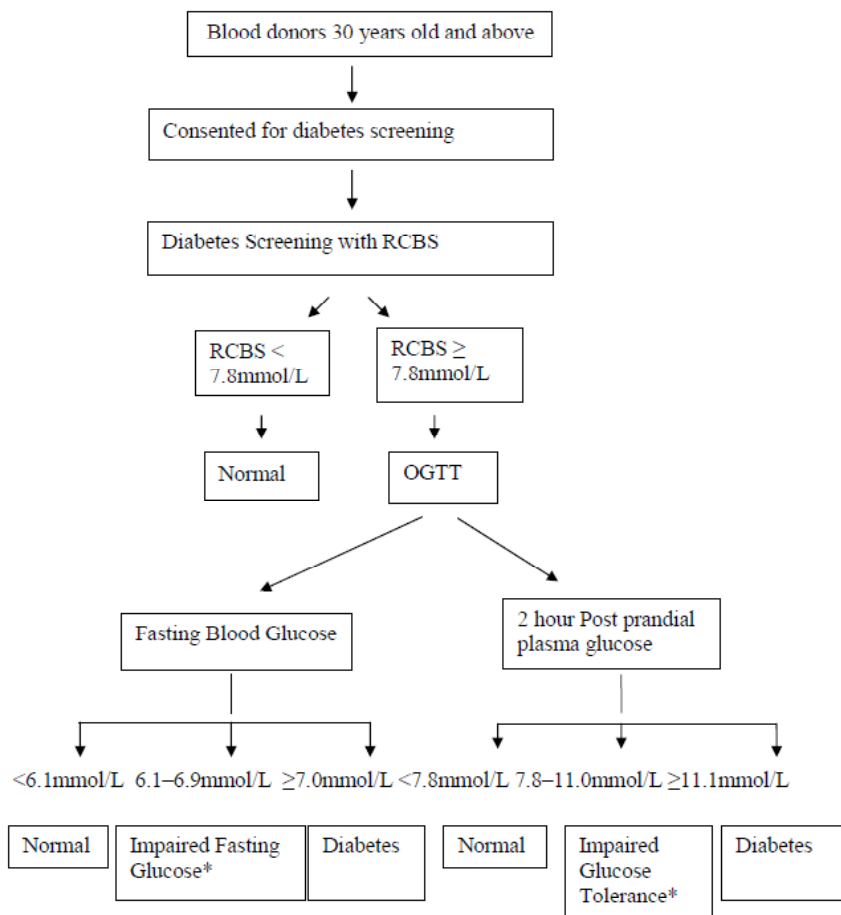


FIG. 1: Flow chart for diabetes screening. RCBS = Random capillary blood sugar; OGTT = Oral Glucose Tolerance Test; *Impaired fasting glucose and impaired glucose tolerance are both prediabetes.

Prevalence of diabetes among Malaysians above 30 years is shown to be 20.8%.² We estimate the prevalence among donors above 30 years to be 15.5%. Sample size was calculated by using Epi-info software version 3.4.3 with confidence interval 95%. The sample needed was 211.

The study proposal was submitted through National Medical Research Register to Malaysia Research and Ethics Committee (MREC). Approval from MREC was obtained before data collection. The data was analysed with SPSS software version 15. Descriptive analysis was done.

RESULTS

A total of 211 blood donors from Melaka state were screened for diabetes in this study. The median age of donors was 45 (15) years. The mean RCBS among blood donors was 6.0 (\pm 1.9) mmol/L. 168 (79.6%) donors were having normal RCBS, without diabetes mellitus. Further investigation on 43 (20.4%) donors with RCBS \geq 7.8mmol/L indicated that 10 (5.0%) donors had diabetes whereas 5 (2.5%) donors had prediabetes. Table 1 summarizes the donors' characteristics and their diabetes status.

DISCUSSION

Researchers have been actively exploring innovative methods to engage blood centres in community health. One of the suggestions is to extend screening tests during blood donations to not only blood-borne diseases but also to non-communicable diseases.⁶⁻⁸ Random blood sugar testing is one of the screening

tests recommended.^{6,7} Healthy blood donors are valuable assets of the healthcare system. Although blood donors are thought to be healthy, 5.0% of them were diagnosed to have diabetes in our study and 2.5% had prediabetes. The donor population appears to be healthier than the general population where the prevalence of undiagnosed diabetes was 10.1%. However, the emerging diabetes epidemic increases diabetic risks in the general as well as the donor population.

Once the diagnosis of diabetes is established, blood donors would be referred to physicians for management to prevent complications so as to remain eligible to continue donating blood. Diabetes with complications is a rejection criterion in blood donation.⁹ Awareness of prediabetes or diabetes status will help donors to act promptly to modify risks of complications and prolong their eligibility to donate blood.

A recent study in the United States supports the implementation of diabetes screening at blood donation.⁷ Diabetes screening during blood donation has been shown to be cost-effective. Random blood sugar testing is easy, inexpensive and convenient. Neither an additional finger prick nor additional healthcare personnel is required for diabetes screening, as finger prick tests for hemoglobin level and ABO grouping of donors are performed routinely before blood donation. A medical laboratory technician is usually available in a blood drive to carry out the procedure. Furthermore, diabetes screening requires only a mere additional 10 seconds to provide reliable information about a donor's diabetes status.

TABLE 1. Donors' characteristics and diabetes status

Age , years, median (interquartile range)	45	(15)
Gender, n (%)		
Male	111	(52.6)
Female	100	(47.4)
RCBS, mmol/l, median (interquartile range)	6.0	(1.9)
RCBS <7.8mmol/L, n (%)	168	(79.6)
RCBS \geq 7.8mmol/L, n (%)	43	(20.4)
Diabetes status, n* (%)		
Normal	187	(92.6)
Diabetes	10	(5.0)
Impaired Fasting Glucose**	2	(1.0)
Impaired Glucose Tolerance**	3	(1.5)

RCBS = Random capillary blood sugar

*n=202, 9 patients who did not turn up for further investigation were excluded

** Impaired fasting glucose and impaired glucose tolerance are both prediabetes.

Previous research shows that offering screening does not appear to increase the number of presenting donors.^{8,10,11} However, screening programs increase donor's awareness of cardiovascular risks. Feedback by donors on screening programs were generally good, the majority of them were motivated to change their lifestyle following these programs.^{8,10}

Our study has several limitations. The study does not represent the whole donor population in Malaysia as sampling was done only in the state of Melaka. The current clinical practice guidelines recommend annual diabetes screening in high risk individuals above 30 years. Two random blood sugar readings of ≥ 11.1 mmol/l are sufficient to diagnose diabetes mellitus in an asymptomatic individual.¹² However, our study did not perform risk stratification before performing the screening. All donors above 30 years at blood donation were consented for diabetes screening. Most blood donations were from repeat donors. It would not be practical to screen the whole donor population at every blood drive.

Diabetes is known to have a major impact not only on individual health, but also on the healthcare system and the national economy. Screening and early diagnosis of the illness will lead to better disease management and patient outcome, which in turn will reduce disease burden. However, the benefit of screening should outweigh the cost. Further research on cost effectiveness analysis is recommended to develop a sustainable screening program.

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The authors declare no conflict of interest.

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