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Screening of Random Blood Sugar in Women: A Critical View

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Authors' contributions

This work was carried out in collaboration between all authors. Author MTK designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors SBP and MSBAW helped in manuscript writing. Author SBJ has done statistical analyses. All authors read and approved the final manuscript.

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ABSTRACT

Diabetes mellitus is a group of metabolic disorders of carbohydrate metabolism in which glucose is underused, producing hyperglycemia. 250 million people currently have diabetes, by 2025 this number will reach 280 million. 80% among these live in developing countries .Analysis of the 2005-2006 National Health and Nutritional Examination Survey (NHANES) using both fasting glucose and oral glucose tolerance test (OGTT) shows prevalence of diabetes in US in persons 20 years of age and older of 12.9%. The prevalence of diabetes mellitus increases with age, and approximately half of all cases occur in people older than 55 years. Diabetes is the fourth common cause of death in the developed world.

Because early detection and prompt treatment may reduce the burden of type 2 diabetes and its complications, screening for diabetes may be appropriate under certain circumstances. This

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position statement provides recommendations for diabetes screenings performed in physicians' offices and community screening programs. This position statement does not address screening for type 1 diabetes or gestational diabetes mellitus (GDM). Because of the acute onset of symptoms, most cases of type 1 diabetes are detected soon after symptoms develop.

Keywords: Random blood sugar; risk factors; screening; type 2 diabetes mellitus; complications; early diagnosis.

1. INTRODUCTION

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both.

The burden of type 2 diabetes has a rising trend in the world. The worldwide prevalence of diabetes among general population was estimated at 150 millions in 1995, and this is projected to increase to 300 millions by 2025 [1].

Developing countries such as most of the Middle Eastern countries are experiencing an accelerated rate in this issue [2].

It is estimated that about one third of people with type 2 diabetes might be undiagnosed until the complications are developed [3].

Diabetes is a chronic illness that requires continuing medical care and patient self-management education to prevent acute complications and to reduce the risk of long-term complications. Diabetes care is complex and requires that many issues, beyond glycemic control, be addressed. A large body of evidence exists that supports a range of interventions to improve diabetes outcomes.

The basis of the abnormalities in carbohydrate, fat, and protein metabolism in diabetes is deficient action of insulin on target tissues. Deficient insulin action results from inadequate insulin secretion and/or diminished tissue responses to insulin at one or more points in the complex pathways of hormone action. Impairment of insulin secretion and defects in insulin action frequently coexist in the same patient, and it is often unclear which abnormality, if either alone, is the primary cause of the hyperglycemia.

Over the past decade it has been obvious that the prevalence of type 2 diabetes is increasing rapidly. Unless appropriate action is taken, it is predicted that there will be at least 350 million people in the world with type 2 diabetes by the year 2030. This is double the current number. Equally alarming and less well known is the fact that, of these people, only around one half are known to have the condition. This has been shown repeatedly in epidemiological surveys. An added concern is that half of those who do present with type 2 diabetes clinically already have signs of the complications of the disorder.

It is clear to both the World Health Organization (WHO) and the International Diabetes Federation (IDF) that guidance is needed for both our member countries and member associations.

Impaired glucose tolerance (IGT) and impaired fasting Glycaemia (IFG) are risk categories for the future development of diabetes and cardiovascular disease (CVD).

The diabetes epidemic is accelerating in the developing world, with an increasing proportion of affected people in younger age groups. Recent reports describe type 2 diabetes being diagnosed in children and adolescents [4,5,6].

1.1 Objectives

About half of the people with non-insulin dependent diabetes mellitus (NIDDM) are undiagnosed and usually present in emergency ward with complications.

Maintenance of near normal glycemic control can prevent complications of diabetes mellitus.

We evaluated medical camp based screening of random blood sugar of 110 voluntary participants of varied age group.

Screening for undiagnosed diabetes has been favored by some (a, b, c, d) but discouraged by others (e, f).

a) World Health Organization Study Group on Prevention of Diabetes Mellitus: *Prevention of Diabetes Mellitus*. Geneva, World Health Organization, 1994 (Tech. Rep. Ser., no. 844).

b) *Patterson KR: Population screening for diabetes mellitus. Diabet Med10:77–81, 1993.*
c) *Expert Committee on the Diagnosis and Classification of Diabetes Mellitus: Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Diabetes Care20:1183–1197, 1997.*
d) *American Diabetes Association: Clinical practice recommendations 2000: screening for type 2 diabetes. Diabetes Care 23: S20–S23, 2000.*
e) U.S: Preventive Services Task Force: *Guide to Clinical Preventive Services*. 2nd ed. Alexandria, VA, International Medical Publishing, 1996.
f) *Canadian Task: Force on the Periodic Health Examination: The periodic health examination. Can Med Assoc J121:1193–1254, 1979.* Medline

The burdens of hypertension and diabetes are increasing in low- and middle-income countries (LMICs). It is important to identify patients with these conditions early in the disease process.

Screening for diabetes as part of routine medical care may be appropriate if the patient has one or more of the risk factors shown in Table 1. Based on the lack of high-quality cost-benefit studies, it is premature to recommend screening all high-risk individuals. Thus, the decision to screen for diabetes should ultimately be based on clinical judgment and patient preference.

On the basis of expert opinion, screening of high-risk individuals should be considered at 3-year intervals. The rationale for this interval is that there is little likelihood of anindividual developing diabetes and any of the complications of diabetes to a significant degree within 3 years of a negative screening test result.

Several pathogenic processes leading to derangement in carbohydrate metabolism are involved in the development of diabetes. These range from autoimmune destruction of the β-cells of the pancreas with consequent insulin deficiency to abnormalities that result in resistance to insulin action. The pancreatic hormone insulin controls carbohydrate, fat and protein metabolism. The basis of the abnormalities in carbohydrate, fat, and protein metabolism in diabetes is deficient action of insulin on target tissues. Deficient insulin action results from inadequate insulin secretion and/or diminished tissue responses to insulin at one or more points in the complex pathways of hormone action. Impairment of insulin secretion and defects in insulin action frequently coexist in the same patient, and it is often unclear which abnormality, if either alone, is the primary cause of the hyperglycemia.

2. MATERIALS AND METHODS

110 women participated voluntarily in a medical camp of "well women's clinic" held on 11th January 2015. The participants were of different age group and pre-registered a week before. The participants were informed to come in fasting state having nothing orally except water after 8 pm on previous day and on waking up the next day. 3 ml of fasting sample drawn through phlebotomy using disposable syringe under

.

Table 1. Risk factors in development of type 2 diabetes mellitus [7]

Major risk factors of type 2 diabetes mellitus
Family history of diabetes (i.e., parents or siblings with diabetes)
Obesity (i.e., ≥20% over desired body weight or BMI ≥27 kg/m^2)
Race/ethnicity (e.g., African Americans, Hispanic Americans, Native Americans, Asian-Americans, Pacific Islanders);
Age ≥45 years
Previously identified IFG or IGT
Hypertension (≥140/90 mmHg in adults)
HDL cholesterol level ≤35 mg/dl (0.90 mmol/l) and/or a triglyceride level
≥250 mg/dl (2.82 mmol/l)
History of GDM or delivery of babies over 9 lb
Hypertension (140/90 mmHg in adults)
HDL cholesterol
35 mg/dl (0.90 mmol/l) and/or a triglyceride level
250 mg/dl (2.82 mmol/l)
Polycystic ovary syndrome
History of vascular disease

aseptic precautions and stored in plain vacutainer under room temperature for serum separation.

After 2 hours the serum was separated and aliquoted in separate sterile eppendorf.

The serum sample was tested for total cholesterol level by CHOD-POD (cholesterol oxidase peroxidase) kit method supplied by ERBA and analysed in fully automated analyzer.

Collected data was analyzed by Tukeys multiple post hoc procedures, ANOVA and Karl Pearson's correlation coefficient method.

3. RESULTS

The collected data was analyzed and put forth amid the age distribution, biochemical values.

Table 2. Distribution of study samples by age groups

Age groups	No	%
<=20	18	16.36
21-30	34	30.91
31-40	39	35.45
>=41	19	17.27
Total	110	100.00
Mean age	30.79	
SD age	8.51	

Table 3. Comparison of age groups with status of different variables

Variables	<=20	%	21-30	%	31-40	%	>=41	%	Total	%
RBS										
Healthy	18	20.45	34	38.64	29	32.95	7	7.95	88	80.00
Un healthy	0	0.00	0	0.00	10	45.45	12	54.55	22	20.00
Chi-square= 35.8943 p=0.0001*										

Table 4. Comparison of age groups with RBS by one way ANOVA

Age groups	RBS	
	Means	Std. Dev.
<=20	110.78	7.06
21-30	121.35	9.76
31-40	136.87	14.72
>=41	154.21	28.81
Total	130.80	21.26
F-value	28.7518	
P-value	0.0001*	

**p<0.05*

Table 5. Comparison of age groups with RBS values by Tukeys multiple posthoc procedures

Variables	Age groups	<=20	21-30	31-40	>=41
RBS	Mean	110.7800	121.3500	136.8700	154.2100
	<=20	-			
	21-30	p=0.1126	-		
	31-40	p=0.0001*	p=0.0005*	-	0.0012
	>=41	p=0.0001*	p=0.0001*	p=0.0012*	-

Table 6. Correlations among age, RBS values by Karl Pearson's correlation coefficient method

Variables	Age
Age	-
RBS	0.6784*

**indicates correlations are significant at 5% level of significance*

4. CONCLUSION

Diabetes mellitus type 2 usually remains undiagnosed unless complications appear. Approximately one third of diabetic population may be undiagnosed. Since the burden of diabetes is well known, its history and characterization is well defined; opportunistic complications are quite expected even at the time of diagnosis and later also.

The risk of developing type 2 diabetes increases with age, obesity, and lack of physical activity. Type 2 diabetes is more common in individuals with a family history of the disease and in members of certain racial/ ethnic groups. It occurs more frequently in women with prior GDM or polycystic ovary syndrome and in individuals with hypertension, dyslipidemia, impaired glucose tolerance (IGT), or impaired fasting glucose (IFG).

Thus, while it is well established that treating diabetes diagnosed through standard clinical practice is effective in reducing diabetic microvascular complications, it is unknown whether the additional years of treatment that might be received by individuals diagnosed through screening would result in clinically important improvements in diabetes-related outcomes.

Screening in a clinical setting of individuals at high risk; demonstrates the benefits of early diagnosis through screening of asymptomatic individuals.

Also, clinicians should be vigilant in evaluating clinical presentations suggestive of diabetes.

The undiagnosed cases which present with complications at the first visit to clinic are usually females (house wives) residents of peripheral region, uneducated with ignorant attitude. Thus a medical camp based screening made it a vital approach for awareness.

CONSENT

Consent was provided by all the participants and involved in the study voluntarily with their full will.

ETHICAL APPROVAL

This data has been obtained from a medical camp conducted at DIAT-DRDO, Girinagar, Pune-25. Hence it is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Adeghate E, Schattner P, Dunn E. An update on the etiology and epidemiology of diabetes mellitus. Ann N Y Acad Sci. 2006;1084:1–29. [PubMed]
2. Reinauer H, Home PD, Kanagasabapathy AS, Heuck C. Laboratory diagnosis and monitoring of diabetes mellitus. World Health Organization; 2002.
3. American Diabetes Association. Standards of medical care in diabetes. Diabetes Care; 2005.
   [Cited 2010 May 29]
   Available:http://care.diabetesjournals.org/content/28/suppl_1/s4.full
4. Rosenbloom AL, et al. Emerging epidemic of type 2 diabetes in youth. Diabetes Care. 1999;22:345-354.
5. Dabelea D, et al. Increasing prevalence of type 2 diabetes in American Indian children. Diabetologia. 1998;41: 904-910.
6. Kitagawa T, et al. Increased incidence of non-insulin dependent diabetes mellitus among Japanese school children correleates with an increased intake of animal protein and fat. Clinical Paediatrics. 1998;37:111-115.
7. Screening for type 2 diabetes. American Diabetes Association. Originally approved April 1989. Most recent review/ revision, 1999. Reprinted with permission from Diabetes Care. 2000;23(Supp 1): S20-23.

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