



“Extended Health Check-Up as an Incentive to Blood Donor and its Impact on the Blood Donation”

DR. LOKESH SHARMA

UNDER GUIDANCE OF

PROF. DR. D.R. ARYA

Department of Immunohaematology & Transfusion
Medicine, S. P. Medical College and Associated
Group of Hospitals, Bikaner (Rajasthan)

INTRODUCTION

- The Blood Transfusion Services should ensure that the act of blood donation is safe and causes no harm to the donor.¹ The diabetes epidemic is accelerating in the developing world, with an increasing proportion of affected people in younger age groups.^{2,3}
- Among The Blood donors deferrals Diabetes was present in among 4.9% peoples⁴.
- Due to vast presence of Pre Diabetes and Diabetes in general population, the apparently fit persons coming to Blood Bank for Blood donation who are not on any medication and not knowing about any medical illness in them, if screened at blood bank for their plasma glucose may get prevented from the complications of Hyperglycemia by prompt treatment on time. ⁴

- After all these observations we have planned to Study the prevalence of Diabetes in otherwise healthy persons who randomly presented for Blood donation at Blood Bank of Sardar Patel Medical College & Associated group of Hospitals, Bikaner.
- Present study was based on criteria laid down by American Diabetes Association (ADA) which will be as follows-
- Normal Random plasma glucose NGT- <140 mg/dl
- Impaired glucose tolerance IGT- 140-199 mg/dl
- High Risk for Diabetes Mellitus- ≥ 200 mg/dl⁵.

AIMS AND OBJECTIVES

1. To screen the Healthy (Asymptomatic) Blood donors for Diabetes Mellitus.
2. To Study and Analyze the use of screening of blood donors for Diabetes Mellitus.
3. To Study the cost-effectiveness and use of Blood glucose level among Apparently Healthy Blood donors as an Extended Health Check-up.

METHODS

- This study was conducted in the Department of Immunohematology and Transfusion Medicine, S.P. Medical College and Associated group of Hospitals, Bikaner(Rajasthan) as free diabetes screening program among apparently healthy blood donors reported to donate blood at blood bank or in camps as a part of pre-donation medical check-up.
- Reported Blood Donors were interviewed, counseled and examined as per questionnaire and criteria for donor selection laid down in Drug and Cosmetic rules, Government of India.

OBSERVATIONS

Table 1-Distribution of donors according to age group

Age Group (years)	Random Blood Sugar(mg/dl)						Total	
	<140		140-200		>200		No.	%
	No.	%	No.	%	No.	%		
18-20	156	96.3	6	3.7	0	-	162	100
21-40	2676	93.0	140	4.9	60	2.1	2876	100
41-60	802	83.4	66	6.9	94	9.8	962	100
Total	3634	90.9	212	5.3	154	3.9	4000	100
Mean	34.85		35.88		44.58			
SD	9.52		8.95		8.16			
F	50.021							
3000 ^p	<0.001							

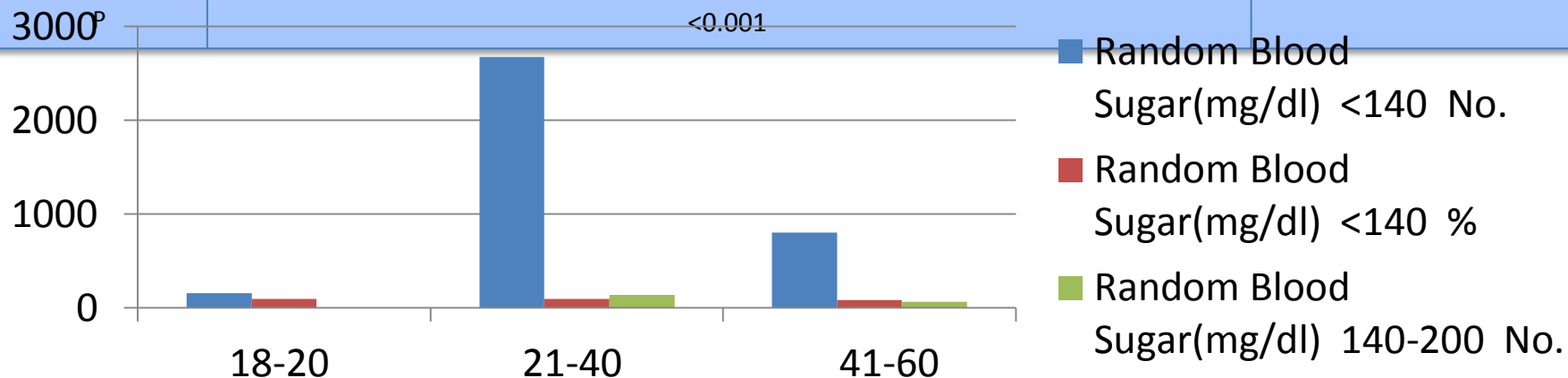


Table 2-Distribution of donors according to sex

Sex	Random Blood Sugar(mg/dl)						Total	
	<140		140-200		>200			
	No.	%	No.	%	No.	%	No.	%
Female	76	90.5	4	4.8	4	4.8	84	100.0
Male	3558	90.9	208	5.3	150	3.8	3916	100.0
Total	3634	90.9	212	5.3	154	3.9	4000	100
χ^2	0.117							
P	0.943							

Table 3-Distribution of donors according to residential area

Residential Area	Random Blood Sugar						Total	
	<140		140-200		>200			
	No.	%	No.	%	No.	%	No.	%
Urban	1776	89.2	126	6.3	90	4.5	1992	100
Rural	1858	92.5	86	4.3	64	3.2	2008	100
Total	3634	90.9	212	5.3	154	3.9	4000	100
χ^2	6.862							

Table 3-Distribution of donors according to BMI

BMI (kg/m ²)	Random Blood Sugar(mg/dl)						Total	
	<140		140-200		>200			
	No.	%	No.	%	No.	%	No.	%
<18.5	356	89.9	40	10.1	0	-	396	100.0
18.50-24.99	1852	92.5	72	3.6	78	3.9	2002	100.0
25.00-29.99	970	88.3	76	6.9	52	4.7	1098	100.0
≥30	456	90.5	24	4.8	24	4.8	504	100.0
Total	3634	90.9	212	5.3	154	3.9	4000	100
Mean	24.42		24.02		24.78			
SD	4.99		4.75		5.84			
F			1.163					
P			0.313					

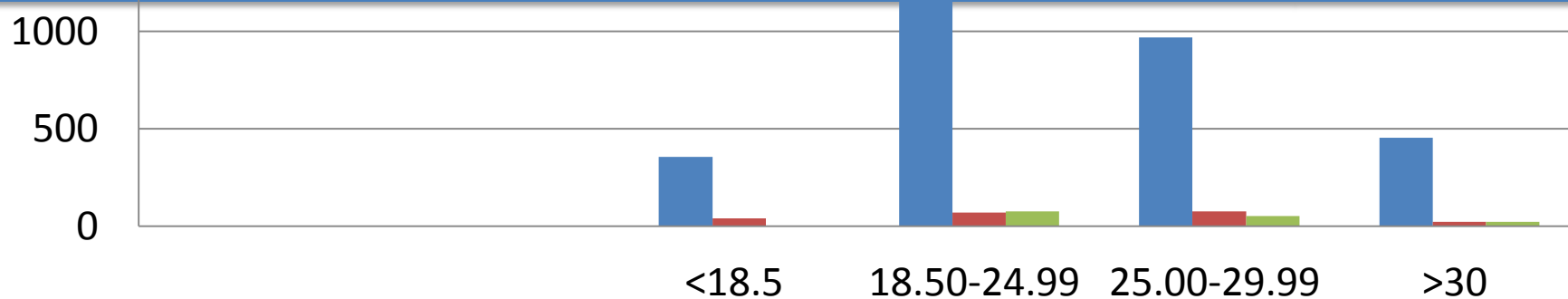


Table 4-Distribution of donors according to Educational status

Educational Status	Random Blood Sugar(mg/dl)						Total	
	<140		140-200		>200		No.	%
	No.	%	No.	%	No.	%		
Illiterate or Primary	1394	90.6	90	5.9	54	3.5	1538	100.0
Secondary	890	92.3	52	5.4	22	2.3	964	100.0
Sr. Secondary	638	93.5	22	3.2	22	3.2	682	100.0
Graduate	512	88.6	32	5.5	34	5.9	578	100.0
Post Graduate	100	84.0	16	6.7	22	9.2	238	100.0
Total	3634	90.9	212	5.3	154	3.9	4000	100
χ^2	20.612							
P	0.008							

Table 5: Distribution of donors according to family history in relation to random blood sugar

Family History	Random Blood Sugar						Total	
	<140		140-200		>200		No.	%
	No.	%	No.	%	No.	%		
Present	36	40	20	22.2	34	37.8	90	100
Absent	3598	92.0	192	4.9	120	3.1	3910	100
Total	3634	90.9	212	5.3	154	3.9	4000	100
χ^2	175.61							
p	<0.001							

Discussion

Study	Year	Test	Results	
			IGT	Newly diagnosed Diabetes
Ziemer et al ⁶	2008	RPG	24%	5.1%
Zhang et al ⁷	2010	OGT&FPG	5.2%	7.3%
Martin et al ⁸	2011	OGT	50.1%	9.7%
Present Study	2015	RPG	5.3%	3.9%

In the year 2013, Lenhard et al⁹ did a study as a free, voluntary diabetes screening program as a part of the blood donation process and screened a total of 26,415 donors using single random plasma glucose (RPG) level. 139 of 178 (78%) of the persons in the high-risk group with 33 new cases of diabetes diagnosed by the donor's physician and 26 donors indicating that they were not diagnosed with diabetes. They observed that the three risk groups were similar, except for body mass index ($28.1 \pm 5.4 \text{ kg/m}^2$ vs. $29.9 \pm 5.5 \text{ kg/m}^2$ vs. $32.7 \pm 5.6 \text{ kg/m}^2$, $p < 0.001$).

RESULTS AND CONCLUSION

Following Results were derived-

- 1. Out of total 4000 donors, only 154(3.9%) donors were found Hyperglycemic(RBS>200mg/dl)
- 2. Out of 154 Hyperglycemics, 4 were females (4.8%- n=84) and 150 were males (3.8%- n=3916).
- Maximum number of hyperglycemic donors i.e. 94(9.8%) were found in age group of 41-60 years.
- 3. Mean age in random blood sugar group RBS >200mg/dl was 44.58 ± 8.16 years
- 4. In present study, mean BMI in RBS>200mg/dl group was 24.78 ± 5.84 kg/m² .
- 5. Among 77 Hyperglycemic donors (>200 mg/dl) highest percentage of Hyperglycemia was found among post-graduate persons 9.2% followed by graduate persons 5.9%.

Donors having Hyperglycemia(>200 mg/dl) were temporarily deferred for donating blood and advised to attend Medical OPD for further close follow-up, Investigation and Management as they belong to High-Risk group for Diabetes Mellitus. Whereas, donors having Impaired Glucose Tolerance(RBS 140-200mg/dl) were advised for repeat Blood Glucose testing.

- Prevalent known cases of Diabetes are like tip of Iceberg and if proper Screening of Blood glucose level is done at a Platform where Apparently Healthy People Participate to cover a large Population then it can be a good health program to detect the cases of undiagnosed diabetes (Submerged part of Iceberg) otherwise these will remain untreated with its consequences.
- By this study we concluded that Blood Bank Set-up and Blood Donation Camps can be best place for Screening among apparently healthy donors who report for Blood Donation.

- By providing such Screening facilities as a part of Pre-donation Extended health check-up it can be an aid-on medical facility for upcoming donors which is cost-effective, convenient and by grabbing the interest of enthusiastic donors it will help to raise the donor pool which would be safe and voluntary.

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Thank u

- Following Risk factors for Type 2 Diabetes mellitus are recommended by American Diabetes Association (ADA) for screening -
 1. Family history of diabetes (i.e., parent or sibling with type 2 diabetes)
 2. Obesity (BMI ≥ 25 kg/m² or ethnically relevant definition for overweight)
 3. Physical inactivity Race/ethnicity.
 4. Previously identified with IFG, IGT, or an hemoglobin A1c of 5.7–6.4% History of GDM or delivery of baby >4 kg (9 lb)
 5. Hypertension (blood pressure $\geq 140/90$ mmHg)
 6. HDL cholesterol level <35 mg/dL (0.90 mmol/L) and/or a triglyceride level >250 mg/dL (2.82 mmol/L)
 7. Polycystic ovary syndrome or acanthosis nigricans History of cardiovascular disease.