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Original Research Article

Profile of Blood Sugar Estimation in Adult Individuals Seeking Services in Health Camps and Hospital at ESICMCH, Bihta: An Observational Study

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Abstract:

Introduction: Diabetes is the global health problem. It is a one of the most common endocrinal disorder. Its prevalence has been increased maximum since last one to two decades. Diabetes mellitus is one of the leading causes of mortality among non-communicable disease together with cardiovascular disease, respiratory disease and cancer.

Aims & Objective: To study the level of blood sugar among adult population coming to ESICMCH and attending in different Health camps organised by ESICMCH, Bihta Patna.

Study design: This study was a observational study, conducted in a the Department of Biochemistry, ESICMCH, Bihta, and health camps of ESICMCH, Bihta, India.

Study setting: A retrospective study on 11038 samples received for blood sugar has been done in Biochemistry central lab for a study period of 16 months (from April 2021 to July 2022).

Inclusion criteria: (a) All adult who were above the age 18 yrs. (b) All samples received in biochemistry central lab for Blood sugar testing. (c) All samples of patients attending health camps of ESICMCH ,Bihta Exclusion criteria (a) Icteric and haemolysed sample were excluded.

Study duration: The study period of 16 months (from April 2021 to July 2022) at ESICMCH, Bihta.

Sample size: 9716 samples are taken. Results: Out of total 3059 fasting blood samples, only 903 persons are having FBS more than 126 mg/dl, Out of these 499 females & 404 persons were males. Out of total 2322 post prandial blood samples, 750 persons were having 200 mg/dl & above postprandial blood sugar in which 410 females and 310 were males. Total 5657 Random blood sugar were taken, out of which only 222 persons are having 200 mg/dl or more, in which 115 males and 117 were females. The relationship between age group & fasting blood sugar, the relationship between PPBS and age is found to be significant as p-value is <0.00001.

Conclusion: Our study implies a need for physicians to focus on the education of diabetes-related knowledge in the clinical practice, which is of great importance to improve blood glucose monitoring adherence.

Keywords: Fasting Blood Sugar (FBS), Post prandial Blood Sugar (PPBS), Random Blood Sugar (RBS), Diabetes Mellitus (DM).

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Introduction

Diabetes is the global health problem. It is a one of the most common endocrinal disorder. Its prevalence has been increased maximum since last one to two decades. Diabetes mellitus is one of the leading cause of mortality among non-communicable disease together with cardiovascular disease, respiratory disease and cancer [1,2]. According to WHO (World Health Organization) non-communicable disease causes 74% of death worldwide in 2019 ,from which 1.6 million death caused due to diabetes, it is becoming the cause of death globally [2]. Urbanization and industrialization leads to sedentary life style and increased junk food habit that play important role to increased prevalence of diabetes [3]. But it is seen that number of diabetic patients increases more in rural population than urban, it may be due lack of awareness among the rural areas people. Diabetes is a progressive disorder, which leads to many complications (macro vascular and micro vascular).69.2 million People of the India are suffering from T2DM, and India is the country with 2nd highest number of persons living with diabetes mellitus worldwide next to China [4]. Diabetes

affects persons work capacities and quality of life, leading to morbidity and premature mortality [5]. By the year 2035, nearly 592 million people are predicted to die of diabetes. [6]

According to WHO, the prevalence of diabetes is increasing most rapidly in low- and middle-income countries.[7] Diabetes is a progressive disorder that leads to many worst complications, that leads to increased risk of vascular disease and much of the burden of type 2 diabetes is caused by macro vascular cardiovascular , cerebrovascular, and peripheral artery disease and micro vascular - diabetic retinopathy, nephropathy, and neuropathy complications.[8,9]

Aims of the study: To study the level of blood sugar among adult population coming to ESICMCH and attending in different Health camps organised by ESICMCH, Bihta Patna.

Objectives of the study : To determine the age and sex wise distribution of blood sugar among the patients coming to Tertiary Care Hospital of Bihar and health camps organised by ESIC ,Bihta.

Methodology

Study design:

This study was an **observational** study, conducted in the department of Biochemistry, ESICMCH, Bihta, and health camps of ESICMCH, Bihta, India.

Study setting:

A retrospective study on 9716 samples received for blood sugar have been done in Biochemistry central lab for a study period of 16 months(from April 2021 to July 2022) .The patients plasma samples 8716 from different clinical department of Hospital and 1000 samples from health camps of ESICMCH BIHTA were collected and send for blood sugar estimation.

Inclusion criteria:

a) All adult who were above the age 18 yrs.
b) All samples received in biochemistry central lab for Blood sugar testing.
c) All samples of patients attending health camps of ESICMCH ,Bihta

Exclusion criteria:

a) **Icteric and haemolysed sample were excluded.**

Study duration:

The study period of 16 months (from April 2021 to July 2022) at ESICMCH, Bihta.

Sample size: 9716 samples were taken.

Study tool:

The Patients sample was collected in Fluoride vial, after centrifugation plasma was collected. The VITROS GLU Slide method is performed using the VITROS GLU Slides on VITROS 350. A drop of patient sample is deposited on the slide and is evenly distributed by the spreading layer to the underlying layer. The intensity of the dye is measured by reflected light.

Statistical analysis:

Data has been entered in Microsoft excel and analysed using SPSS. Distribution of age and sex have expressed as mean (±SD).The association between qualitative variables have been analysed using Chi-square and that between quantitative variables will be calculated using t-test. The p-value of <0.5 is significant.

Result

In our study total 9716 samples were taken , out which 3059 were collected for fasting blood sugar , 2322 persons samples collected for post prandial and 5657 for Random blood sample.

Table 1 showing that 3059 fasting blood sugar is taken, out of which1560 belong to less than 44yrs of age, 640 persons belong to age group 45 to 54 yrs,512 belongs to 55 to 64yrs,281 belongs to 65 to 74 yrs age group & rest 66 belongs to 75 years & above. Out of 3059 persons,804 persons have their fasting blood sugar lying between 100 to 125, 903 have their fasting blood sugar between 126 & above,1352 have their Fasting blood sugar less than 100. As p-value comes out to be p< 0.00001,the relationship between age group and fasting blood sugar is found to be statistically significant.

Table1: Relationship between age group and fasting blood sugar.

			FBS			Total
			100 - 125 mg/dl	126 mg/dl and Above	LESS Than 100mg/dl	
Age Group In Years	Less Than 44	Count	357	276	927	1560
		% within FBS	44.4%	30.6%	68.5%	51%
	45 to 54	Count	183	269	188	640
		% within FBS	22.8%	29.8%	13.9%	20.9%
	55 to 64	Count	134	235	143	512
		% within FBS	16.7%	26.0%	10.6%	16.7%
	65 to 74	Count	109	102	70	281

		% within FBS	13.6%	11.3%	5.2%	9.2%
	75 and Above	Count	21	21	24	66
		% within FBS	2.6%	2.3%	1.8%	2.2%
Total		Count	804	903	1352	3059
		% within FBS	100.0%	100.0%	100.0%	100.0%

The chi-square statistic is 353.3967.The *p*-value is <0.00001.

Table 2 showing that out of total 3059 persons, 1965 (i.e 64.2%) are females and 1094 (i.e 35.8%) are males. Out of the 1352 persons having less than 100mg/dl fasting blood sugar,987(73.0%) are females and 365 (i.e 27.0%) are males. Out of total 804,who belong to prediabetic group i.e having 100 to 125 fasting blood sugar,479(59.6%) are females and 325(i.e 40.4%) are males.

The p-value is <0.00001,i.e the relationship between sex and fasting blood sugar is found to be statistically significant, i.e more females in our study are diabetic.

Table 2: Relationship between sex and Fasting blood sugar

			FBS			Total
			100 - 125 mg dl	**126 mg/dl AND ABOVE**	**LESS THAN 100 mg/dl**	
SEX	F	Count	479	499	987	1965
		% within FBS	59.6%	55.3%	73.0%	64.2%
	M	Count	325	404	365	1094
		% within FBS	40.4%	44.7%	27.0%	35.8%
Total		Count	804	903	1352	3059
		% within FBS	100.0%	100.0%	100.0%	100.0%

The chi-square statistic is 84.4962.The *p*-value is <0.00001. Table 3 showing that ,Out of total 2322 persons,1159 (i.e 49.9%) belongs to less than 44yrs of age,485 (20.9%) belong to age group 45 to 54 yrs ,401(17.3%) belong to age group 55 to 64 yrs, 226 (i.e 9.7%) belong to age group 65 to 74 yrs, 51(2.2%) belong to 75 yrs and above. Out of 2322 samples, 750 have Post prandial blood sugar 200 mg/dl & above, 399 persons have blood sugar between 140-199 mg/dl and 1173 have Post prandial blood sugar less than 140 mg/dl. The relationship between age group and Post prandial blood sugar is found to be statistically significant as p-value is <0.00001.

Table 3: Relationship between Postprandial blood sugar (PBS) & Age group

			PPBS			Total
			140 -199 mg/dl	**200 mg/dl& above**	**Less than 140 mg/dl**	
Age group Years	LESS THAN 44	Count	125	221	813	1159
		% within PPBS	31.4%	29.4%	69.3%	49.9%
	45 TO 54	Count	100	229	156	485
		% within PPBS	25.1%	30.5%	13.3%	20.9%
	55 TO 64	Count	94	206	101	401
		% within PPBS	23.6%	27.5%	8.6%	17.3%
	65 TO 74	Count	61	84	81	226
		% within PPBS	15.3%	11.2%	6.9%	9.7%
	75 AND ABOVE	Count	19	10	22	51
		% within PPBS	4.8%	1.3%	1.9%	2.2%
Total		Count	399	750	1173	2322
		% within PPBS	100.0%	100.0%	100.0%	100.0%

The chi-square statistic is 392.1377.The *p*-value is <0.00001. Table 4 showing that Out of total 2322, 1506 (i.e 64.9%) are females and 816 (i.e 35.1%) are males. Out of total 750 persons with Post prandial blood sugar 200 mg/dl & above, 410(54.7%) are females and 340(45.3%) are males. That is females are more diabetic than males. The relationship between Post prandial blood sugar &sex is found to be statistically significant.

Table 4: Relationship between Postprandial blood sugar & sex

			PPBS			Total
			140 - 199 mg/dl	200 mg/dl AND ABOVE	LESS THAN 140 mg/dl	
SEX	F	Count	246	410	850	1506
		% within PPBS	61.7%	54.7%	72.5%	64.9%
	M	Count	153	340	323	816
		% within PPBS	38.3%	45.3%	27.5%	35.1%
Total		Count	399	750	1173	2322
		% within PPBS	100.0%	100.0%	100.0%	100.0%

The chi-square statistic is 65.7448.The *p*-value is <0.00001.

Table 5: Relationship between Random blood sugar (RBS) & Age group

			RBS			Total
			LESS THAN 140 mg/dl	140-199 mg/dl	200 mg/dl & ABOVE	
Age groups Yrs	LESS THAN 44	Count	3149	111	80	3340
		% within RBS	61.36%	36.63%	36.03%	59.04%
	45 TO 54	Count	907	74	65	1046
		% within RBS	17.67%	24..42%	29.27%	18.49%
	55 TO 64	Count	611	70	40	721
		% within RBS	11.90%	23.10%	18.02%	12.75%
	65 TO 74	Count	352	39	28	419
		% within RBS	6.85%	12.87%	12.61%	7.41%
	75 AND ABOVE	Count	113	9	9	131
		% within RBS	2.20%	2.97%	4.05%	2.32%
Total		Count	5132	303	222	5657
		% within RBS	100.0%	100.0%	100.0%	100.0%

The chi-square statistic is 131.2804. The p-value is < 0.00001.

In Table 5, Out of total 5657 persons whose RBS is taken , 5132 persons are having RBS less than 140 mg/dl. Out of 5132 persons,3149 (i.e 61.36%) are less than 44yrs of age,907(i.e 17.67%) belong to age group 45 to54 yrs of age,611(i.e 11.90%) belong to 55 to 64 yrs of age and 352(6.85%) belong to 65 to 74 yrs of age and 113(2.20%) belong to more than 75 yrs of age.303 persons are having RBS between 140-199 mg/dl and 222 persons are having 200 mg/dl & above.

It is clear from the table 5 that, out of total 222 persons who have 200 mg/dl & more random blood sugar, maximum i.e 80(36.03%) are less than 44 yrs of age, and 9 (i.e 4.05%) are in the age group more than 75 yrs. The relationship between age and RBS is found to be significant as the $p< 0.05$.

Table 6: Relationship between Random blood sugar & Sex

			RBS			Total
			<140 mg/dl	140-199 mg/dl	200 mg/dl & ABOVE	
SEX	F	Count	3102	145	115	3362
		% within RBS	60.21%	50.71%	52.44%	59.43%
	M	Count	2050	138	107	2295
		% within RBS	39.80%	49.29%	47.56%	40.57%
Total		Count	5152	280	222	5657
		% within RBS	100.0%	100.0%	100.0%	100.0%

The chi-square statistic is 14.6744. The p-value is .000651. In table 6,the relationship between RBS and sex is shown, out of total 3362 females ,3102(i.e 60.21%) are having RBS less than 140 mg/dl .142(i.e 50.71%) females are having RBS between 140-199 mg/dl and 118 (i.e 52.44%) females are having RBS as more than 200mg/dl. Out of total 2295 males, 2050(i.e 39.80%) females are having RBS as less than 140.138 persons are having RBS between 140-199 mg/dl and 107 (i.e 47.56%) persons are having RBS as 200 mg/dl & above.

Discussion

In this study, the prevalence of diabetes is 19.2% and the prevalence of prediabetes is 15.5%.Among the sex differentiation, females are more prone to diabetes than males. As per Tripathy et.al [10], only 8.3% of all participants are diabetic and 6.3% are prediabetic,18% of diabetic cases are already

known and on treatment and among them only one third had controlled blood glucose status.

Barik et al., this is a large cross-sectional survey in rural West Bengal, in this the prevalence of diabetes and prediabetes among adults>18 years of age was 29.5% & 3.34% respectively.

Little et.al, this study was done in rural parts of South India. The prevalence of Type 2 diabetes mellitus is 10.8% among adults (>19 yrs) population. In this study, there is no gender differences in the prevalence of diabetes mellitus as in Ramachandran A. et. Al [13] and Goswami AK et.al [14], however, a few studies have shown a male preponderance as in Anjana et.al [15] and Meshram et.al [16].

Mohan et.al.[17] was a study which was done in South India, in this high incidence of T2DM was reported, it was done in South India, in this high incidence of T2DM was reported ,it was 20.2 per 1000person years, In Ghorpade et. Al [18], the incidence of T2DM ism21.5 per1000 person years. As per Anjana et.al. in 2015[19],the incidence of T2DM is 22.2 per 1000 person years. Latifield et. al [20] was a study done in Iran, which reported a T2DM incidence rate of 21.9 per 1000 person year from Iran.

In India, a recent multi-centric cross-sectional study [21] was done in 15 states,according to which prevalence of prediabetes is high i.e. 24.7% as compared to T2DM i.e 7.3%.

Vaidya et.al[22] was a study done in China reported a high incidence of prediabetes,46.1 per 1000 person-years in men and 36.8 per 1000 person-years in women[23].

Conclusion

As this study is done in ESIC Medical College & Hospital, it is found that patients as they lived in rural area, they have lack of knowledge and they are not performing the blood glucose monitoring as per recommendation. We need to increase the blood glucose monitoring adherenace and for that health education should be given. We should also focus on increasing awareness among people to increase annual check-up including blood sugar levels for the betterment of diabetes management.

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