The Professional Medical Journal
www.theprofesional.com

DOI: 10.17957/TPMJ/17.3972

ORIGINAL PROF-3972

HAEMOGLOBIN A1C;

PREVALENCE OF CONTROLLED DIABETES IN REGISTERED DIABETIC PATIENTS WITH HAEMOGLOBIN A1C (HBA1C) ≤ 7 OF THREE SELECTED MOH PRIMARY HEALTH CARE CENTERS OF MAKKAH.

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Article received on:
13/04/2017
Accepted for publication:
21/06/2017
Received after proof reading:
08/08/2017

ABSTRACT… Objectives: Our aim was to determine the prevalence of controlled diabetes on the basis of HbA1c test (Hb ≤ 7) in registered diabetic population in three Primary Health Centers of Ministry of Health Makkah al Mukarrahma. **Study Design:** Retrospective review of medical records of registered adult Saudi patients with type 2 diabetes. **Setting:** Three Primary Health Centers of Ministry of Health Makkah al Mukarrahma. **Period:** 20 June 2015 to 31 December 2015. **Methods:** The sample size calculated was 354 patients with confidence level of 95% and confidence interval of 5. The cut of values adjusted for all diabetes mellitus patients was, haemoglobin A1c (HBA1c) ≤ 7. Three last readings were recorded and to be declared as controlled diabetic case (valid control), last two readings were required to be within this normal limit. Data was processed on Microsoft Excel and SPSS-23 software. **Results:** Overall the age range was 21–79 (58) years and a mean of +/- SD of 56.67 +/- 11.97. Male were 206 and female 148 in number. Hb A1c test entries recorded in 292. On the basis of set HbA1c criteria no valid control entry was found in one PHC while in other two, there were 15 (4.23% prevalence) valid control entries. Valid control results were found significant (P < 0.05). **Conclusion:** Very low Prevalence of controlled diabetes on bases of HbA1c test in Primary Health Centers indicate noncompliance of this test in our study group. Guidelines of the Ministry of Health regarding care of diabetic patients in Primary Health Care should be followed to achieve the recommended outcome.

Key words: HbA1c, Prevalence, Controlled Type2 diabetes, Primary Health Care Center.

Article Citation: Siddiqui MS, Ali MA, Zakaria M, Aziz M. Haemoglobin A1C; Prevalence of controlled diabetes in registered diabetic patients with haemoglobin A1C (HBA1C) ≤ 7 of three selected MOH Primary Health Care Centers of Makkah. Professional Med J 2017;24(8):1162-1166. **DOI:** 10.17957/TPMJ/17.3972

INTRODUCTION

Diabetes is one of the largest global health emergencies of the 21st century.[1] According to the World Health Organization (WHO) estimates, high blood glucose is the third highest risk factor for premature mortality, after high blood pressure and tobacco use.[2]

WHO has recommended Glycated haemoglobin HbA1c as a diagnostic test for diabetes with certain conditions of standardization.[3] The test was introduced into clinical use in the 1980s and subsequently has become a cornerstone of clinical practice.[4] The potential utility of HbA1c in diabetes care is first mentioned in the 1985 WHO report.[5] This test gives an indication of chronic glycaemia, an integrated index of glycaemia over the entire 120-day lifespan of the red blood cell.[6] It is relatively a convenient test, not requiring the patient to fast and only using a single blood sample.[7,8]

Saudi Arabia ranked 07 in the world for prevalence (%) of diabetes (20-79 years) in 2013 and expected to occupy sixth position in 2035.[9] There were 3.4 million cases of diabetes in Saudi Arabia in 2015.[10] According to World Health Organization Ranking; The World's Health Systems, Saudi Arabia ranked on top 26 country which has been achieved by tremendous improvements in its health care systems in a short time because of extensive investments.[11,12] Ministry of Health Kingdom of Saudi Arabia in 2011 has started a Diabetes Prevention and Control Program according to which HbA1c test is to be carried out every three months.[13]

Our aim/objective was to determine the prevalence of controlled diabetes on the basis of Hb A1c test - Haemoglobin A1c ≤ 7 in diabetic patients both male and female, only diabetes and diabetes with hypertension categories in three primary health centers (PHCs) Al-Rusaifa, Zahara and Jarwal.

MATERIAL AND METHODS

This was a descriptive study (Cross Sectional) started from 20 June 2015 to 31 December 2015. Cluster probability sampling method was adopted. Cluster of north, south, west and east sectors of Makkah region were made by dividing the area geographically. Two PHCs from each sector were marked out of 28 primary health care centers located in Makkah city. In this study three Primary Health Care Centers (PHCs), Al – Rusaifa, Al- Zahra and Jarwal regions of Ministry of Health in holy capital Makkah al Mukarrahma were selected. Selected centers, patients load and size of sample is given in Table -I The sample size calculated for this population was 354 patients with confidence level of 95% and confidence interval 5. The cut off values adjusted for all diabetes mellitus patients was, haemoglobin A1c (HBA1c) ≤ 7. Three last readings were to be recorded and to declared as controlled diabetic case, last two readings were required to be within this normal limit. Year 2015 normal values within 06 months of data reviewing will also be labelled as valid control. Fasting /Random blood sugar entries whether in normal or abnormal range will not be counted.

No	Name of PHC	Total Diabetic Patients	Distribution of Sample size
1	Al - Rusaifah	904	124
2	Al - Zahraa	869	162
3	Jarwal	484	68
	Total	2257	354

Table-I. Selected Primary Health Care Centers with registered Diabetic patients and Size of samples.

SELECTION CRITERIA

Inclusion Criteria

Type-1I diabetes mellitus Saudi registered patients aged ≥18 years in respective primary health care centers and should be permanent resident of the holy capital Makkah al Mukarrahma.

Exclusion Criteria

Unregistered Saudi patients aged < 18 years of type-1I diabetes mellitus in respective primary health care centers and not a permanent resident of the holy capital Makkah al Mukarrahma.

Formal written permission from Director Public Health programme Directorate of Makkah ministry of health was obtained. The data was processed using manual and computer software IBM SPSS -23.

RESULTS

Overall the age range was 21 – 79 (58) years and a mean of +/- SD of 56.67 +/- 11.17. Maximum sample population were of the age group 51 – 60 years. (Figure–1). According to sample size we found 172 (48.59 %) patients of only diabetes and 182 (51.41%) patients of diabetes with hypertension. Male and female distribution was 206 (41.81 %) and 148 (58.19 %) respectively (Figure–2).

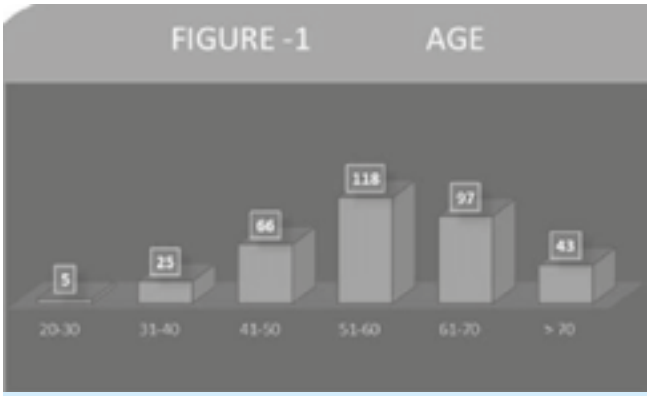

Figure-1.

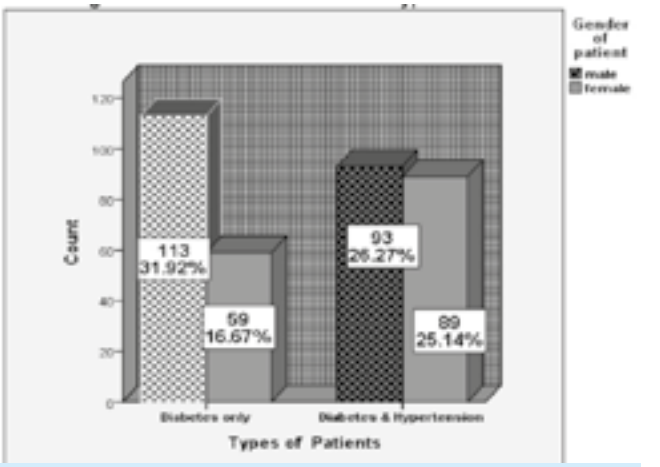

Fig-2. Gender and disease types

Distribution of patients at the different PHCs is shown in Table-II.

The mean HbA1c levels of patients was 8.95% SD ± 2.44. Range of HbA1c was 24.10 with minimum value 4.50% and maximum 28.60 %. Age group 41- 60 had maximum abnormality and non-compliance of HbA1c (Table-III).

The record of entries of HbA1c in Primary Health Care Centers is shown in Table-IV. Results in three PHCs were highly significant $p < 0.001$ (42.448 df: 6).

There was no valid control entry in PHC Jarwal. In other PHCs in total, there were 15 (4.23%) valid control observations (prevalence) on the basis of set HbA1c criteria. Figure–3.

Cross tabulation of all readings of HbA1c and valid control was done. The results were highly significant $P < 0.001$ (359.30 at df: 6) Table-V.

Patients			Primary Health Care Centers			Total
Types	Gender		AlRusaifah	AlZahraa	Jarwal	
Diabetes only		Male	40	57	16	113
		Female	22	29	8	59
	Total		62	86	24	172
Diabetes & Hypertension		Male	26	37	30	93
		Female	36	39	14	89
	Total		62	76	44	182
Total		Male	66	94	46	206
		Female	58	68	22	148
	Total		124	162	68	354

Table-II. Diabetic patients in different Primary Health Care Centers.

Age Group	HbA1c		Not Done	Total
	Normal	Abnormal		
21 - 30	1	2	12	15
31 - 40	4	20	51	75
41 – 50	17	65	116	198
51 – 60	19	**128**	**207**	354
61 -70	35	92	164	291
> 70	6	48	75	129
Total	82	355	625	1062

Table-III. Record of HbA1c in different age groups.

		All reading of HbA1c				Total
		Single entry	Two entries	Three entries	Not done	
PHC Centers	AlRusaifah	49	37	21	17	124
	AlZahraa	80	33	15	34	162
	Jarwal	54	3	0	11	68
Total		183	73	36	62	354

Table-IV. Record of hba1c test in primary health care centers.

		All reading of HbA1c				Total
		Single entry	Two entries	Three entries	Not done	
Valid control	Valid control	6	5	4	0	15
	Not valid control	177	68	32	0	277
	Not done	0	0	0	62	62
Total		183	73	36	62	354

Table-V. Findings of valid control according to records entries

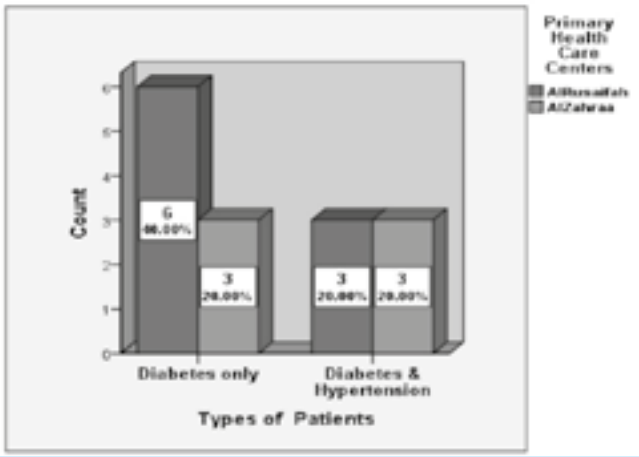

Fig-3. Valid control in two types of diabetes

DISCUSSIONS

The diabetic patients report at respective Primary Health Care Centers for want of laboratory checkup and treatment on monthly basis. These patients are required to have HbA1c test on quarterly basis per year.

The focus of attention of this search was to know how frequently diabetic patients are referred for HbA1c test by doctors and what inferences can be drawn about prevalence of controlled type 2 diabetes mellitus on the basis of this test. The record of HbA1c test entries was spread from the year 1993 to 2015. Out of 354 patients, 62 were not ever having HbA1c test entry, 183 had single entry (06 valid controls), 73 having two entries (05 valid controls) and 36 having three entries (04 valid controls). These results were highly significant $p<0.001$.

The most effected age group was 41- 60 years who showed 54.36 % abnormal results. In our study, valid control cases were only 15 (5.41%). At PHC, Rusaifa it was 9 (9.18 %), Zahra 6 (4.91 %) while at Jarwal it was 0%. These results were highly significant $p < 0.001$. A study at Madina Munawara Saudi Arabia[14] found 24.4% patients having < 7% HbA1c level. Another study[15] conducted at the outpatient department of King Abdul-Aziz University Hospital, Jeddah, Saudi Arabia, found HbA1c levels poor control in 77% of the patients. This study showed underestimation of HbA1c during routine OPD follow up.

The Kingdom of Saudi Arabia (KSA) is still facing several health challenges that are unusual for a country with high income.[12] There is a rising burden of non-communicable diseases including diabetes as a result of rapid changes in behaviors.[16]

This can be attributed to socio-economic changes, westernization, and ageing of the population, changes in nutrition, a decrease in physical activity, and the resulting tendency towards obesity.

CONCLUSION

HbA1c test is an important test in treatment and dealing with the complications of Diabetes mellitus. In the sample population, it has been observed that this test was casually taken on both ends of physicians and patients. There were limited entries of the test and that too showed a very low prevalence of controlled type 2 diabetes mellitus. Ministry of Health guidelines if followed in PHCs in letter and spirit better results can be expected. Thus health awareness programme for diabetic patients and for staff at PHCs be initiated to get positive results.

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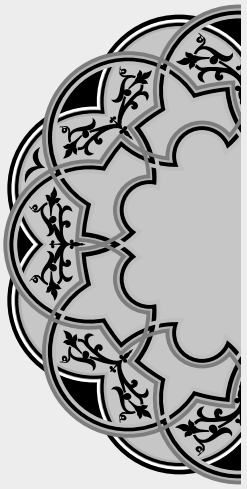

"It is amazing what you can accomplish if you do not care who gets the credit."

Harry S. Truman

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
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2	Makki Ahmad Ali	Data, Collection and tubulation.	
3	Muhammad Zakaria	Medical writing	
4	Muhammad Aziz	Editing and rechecking of all research work	