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Original Article

Awareness of Glycosylated Haemoglobin (HbA1c) among Type 2 Diabetes Mellitus Patients in a Diabetic clinic in Urban Allahabad

Ankur Shrivastava[1], Pankaj Mishra[2], Nidhi Shrivastava[3], Sandhya Mishra[4], Vijay Kumar[5], SNH Zaidi[6], Neha Shukla[7], Mallicka[8]

[1,4]Associate Professor, [2,6]Professor, [5,7,8]Assistant Professor, Department of Community Medicine, [3]Assistant Professor, Department of Dentistry, Mayo Institute of Medical Sciences, Barabanki, U.P., India

***ABSTRACT*:**
Background: In India, presently 72.9 million people are living with diabetes, which is expected to reach 134.3 million by the year 2045. The glycosylated haemoglobin (HbA1c) test is the most widely accepted laboratory test for evaluating long term glycemic control. Patient's understanding of HbA1c can lead to better glycemic control. **Aims and Objectives:** (1) To determine the awareness and level of understanding of HbA1c among type 2 DM patients. **Material and methods:** A cross-sectional study was conducted among Type 2 DM patients undergoing routine follow up in a private clinic. A predesigned questionnaire was administered to the patients, which assessed their awareness and understanding of HbA1c. **Result:** A total of 128 participants were recruited. 68% of the participants were male and 32% were females. 93 participants had attained primary education, remaining 35 participants had attained education above primary level. Thirty five (27.3%) were aware of the term HbA1c.**Conclusion:** The current study indicates inadequate knowledge of HbA1C among diabetic patients. This lack of knowledge and awareness may lead to increased susceptibility to the development of diabetic complications, and potentially higher healthcare costs among these patients. It is our recommendation that policy makers focus on strategies that address HbA1C test accessibility to everyone and everywhere, so as to effectively monitor and combat DM.
Key words: Awareness, HbA1c

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Corrseponding Author : DrAnkur Shrivastava., Associate Professor, Department of Community Medicine, Mayo Institute of Medical Sciences, Barabanki, U.P., India

INTRODUCTION

Diabetes is one of the largest global health emergencies of the 21st century. Diabetes is among the top 10 causes of death globally and together with the other three major non communicable diseases (NCDs) (cardiovascular disease, cancer and respiratory disease) account for over 80% of all premature NCD deaths. In 2015, 39.5 million of the 56.4 million deaths globally were due to NCDs[1]. A major contributor to the challenge of diabetes is that 30-80% of people with diabetes areUndiagnosed[2]. Some 425 million people worldwide, or 8.8% of adults 20-79 years, are estimated to have diabetes. About 79% live in low and middle income countries. The number of people with diabetes increases to 451 million if the age is expanded to 18-99 years. If these trends continue, by 2045, 693 million people 18-99 years, or 629 million of people 20-79 years, will have diabetes. The largest increases will take place in regions where economies are moving from low income to middle income levels.[3]The glycosylated haemoglobin (HbA1c) test has been the most widely accepted, reliable biomarker for evaluating long term glycemic control in patients with diabetes mellitus (DM). Despite HbA1c being the most important indicator used by clinicians to manage diabetes, studies show that HbA1c results is either poorly recalled or understood among diabetic patients.[4,5]HbA1c or glycosylated Hemoglobin which is developed when haemoglobin joins with glucose in the blood, becoming 'glycated'. By measuring glycatedhaemoglobin (HbA1c), it gives an overall picture of what our average blood sugar levels have been over a period of weeks/months[6]. It is considered as a good test to check the accuracy and/or any errors in the measured blood sugar levels and can be used for monitoring glucometer accuracy [7].It is a well-

established biomarker of long-term glucose control and was approved by the World Health Organization (WHO) for the diagnosis of DM and monitoring glycemic control in people with diabetes[8,9]. Higher HbA1c levels (recommended levels should be maintained at <7%) are associated with the development of diabetic complications, and such an association is notapparent with usual blood glucose tests[10,11]. Health literacy among diabetic patients has been associated with better glycemic control, optimal medication and enhanced individual participation in diabetes selfcare[12,13]. Heisler et al[12], reported that respondents who knew their HbA1c values had better understanding of diabetes care and assessment of their glycemic controlthan those who did not.The current study therefore aimed to establish the state of awareness of the HbA1C test as well as its use among a subset of patients attending the diabetesclinic in Allahabad. As this test provides important feedback to both health care professionals and patients.

AIMS AND OBJECTIVES

(1) To determine the awareness and level of understanding of HbA1c among type 2 DM patients.

MATERIALS AND METHOD

This cross-sectional descriptive study was conducted in a private clinic of Urban Allahabad, India. Consecutive patients with type 2 diabetes age 18 years and above who came in for their scheduled follow up to the clinic in the month of November 2015 were invited to participate in the study. Informed written consent was taken from all the participants. Participants were asked to complete a predesigned questionnaire which consists of questions assessing participants understanding of HbA1c, their demographics and their diabetes history and complications. The questionnaire was evaluated by ten type 2 diabetes patients prior to being implemented in the current study with only minimal changes made. The first part of the questionnaire was on socio-demographics, their diabetes history as well as their perceived knowledge on diabetic complications. The second part of the questionnaire focuses on patient's understanding of HbA1c. The patients were first asked if they have heard or aware of the term HbA1c. Those who answered yes proceed to answering three other questions on HbA1c including what does the value of HbA1c indicate, their target HbA1c goals and whether they could correctly remember their last HbA1c results. Participants were categorised as having good HbA1c understanding if they could answer 3 out of 4 questions on HbA1c correctly. Participant's previous HbA1c results were retrieved from the laboratory information system. Statistical calculations were performed using the standard statistical software package, IBM SPSS Statistics for Windows, Version 16.0. Median with range was calculated for all non-normally distributed continuous variables. Chi-square test was used to determine the association between patients HbA1c understanding with factors such as socio-demographics and duration of diabetes. In all statistical analyses, a p value of <0.05 (95% confidence interval) was considered to be statistically significant.

RESULT

A total of 128 patients were recruited in the study. Majority were male (n=86, 68 %), and married (n=110, 85.9%). The median age was 53 (SD ± 10.91) years old. Most of the participants had completed Primary education (n=93, 72%) and belonged to upper class according to modified BG Prasad classification (n=52, 40.6%) (Table.1). The median duration of diabetes was 10 years (SD ± 7.2) and majority were on Oral Hypoglycemic Agents (n=116, 90.6%). Almost all of the respondents had seen a diabetic health care professional or physician (n= 120, 94%).

Table 1: Socio-demographic characteristics of participants (N=128)

Characteristics	N (%)
Age (Years)	
<40	21 (16.4%)
40 to 49	27 (21.1%)
50 to 59	45 (35.1%)
>60	35 (27.4%)
Gender	
Male	86 (68%)
Female	42 (32%)
Marital status	
Married	110 (85.9%)
Unmarried	18 (14.1%)
Educational Level	
Upto Primary school	35 (27.3%)
Above Primary School	93 (72.7%)
Socioeconomic status	
Upper Class (Class 1)	52 (40.6%)
Upper middle class (Class 2)	40 (31.2%)
Middle class(Class 3)	14 (11%)
Lower middle class (Class 4)	12 (9.4%)
Lower class (Class 5)	10 (7.8%)
Diabetic Duration (years)	
<5	40 (31.2%)
>5	88 (68.8%)
Type of medication used	
Insulin	12 (9.4%)
OHA	116 (90.6%)
Seen a diabetic Doctor before	
Yes	120 (94%)
No	08 (06%)

In the present study Out of total 128 participants, 35 (27.3%) participants were aware of the term HbA1c (Table 2). Out of those who were aware of the term HbA1c, 21 (60%) knew the correct indication for HbA1c measurement. 28 (80%) knew their HbA1c target goal out of which 22 (62.8%) had achieved this target. Of those 35 patients who were aware of HBA1c, Physicians (n=25, 71.4%) were the main source for their HbA1c information, followed by own self (n=7, 20 %) and others (n=3, 8.6%). Out of the 128 participants, 25 (19.5%) were found to have good level of understanding of HbA1c. Socio-demographic factors that were significantly associated with awareness of HbA1c, were level of education (p=0.04) and socioeconomic status (p= 0.02). Those who had higher levels of education and higher per capita income were more aware of HbA1c. There was an significant association between duration of diabetes (p= 0.03) and HbA1c awareness

Table 2: Participants awareness of HbA1c

Question	Yes N (%)	No N (%)
1. Have they heard of HbA1c test	35/128 (27.3%)	93 (72.7%)
2. Knew the correct indication or use of HbA1c test	21/35 (60%)	14/35
3. Knew their correct HbA1c target goal	28/35 (80%)	7/35 (20%)

Table 3: Association between socio-demographic factors with level of HbA1c understanding

Characteristic	Awareness about HbA1c				
Educational Status	Aware	Unaware	Total	X2	p-valve
Upto Primary Education	5	30	35	4.134	0.04
Above Primary Education	30	63	93		
Total	35	93	128		
Socio economic status					
Upper Class (Class I)	21	31	52	7.5	0.02
Middle (Class II,III&IV)	12	54	66		
Lower class (Class V)	2	8	10		
	35	93	128		
Duration of presence of Disease					
<5 years	6	34	40	4.46	0.03
>5 years	29	59	88		
	35	93	128		

DISCUSSION

Given the significance of HbA1c as part of diabetes management, patients should realize its importance in relation to glycemic control to improve their clinical outcome. A total of 27.3% of the participants have heard of the term HbA1c. Unfortunately, the remainder were not aware, despite it being written in their diabetes prescription. It was reported that only 40.5% (45/111) of participants (both type 1 and 2 DM) attending a diabetic clinic in a hospital in UK have heard of the term HbA1c[4]. Out of this, only 13.3% (6/45) knew of the correct interpretation of a given HbA1c value in terms of its association with mean plasma glucose over the preceding 3 months[4]. In contrast, 71.4% (25/35) of the participants in this current study knew what HbA1c indicates in association with their glycemic control.Factors associated with awareness of HbA1c In this study, education level (p=0.04) and socioeconomic status (p=0.02) were found to be significantly associated with participants awareness of HbA1c. Similarly, another study noted that HbA1c understanding was greatest with increasing education level and those with higher income[14]. In contrast, Beard *et al* found that income was not a significant contributor to patients' good understanding of HbA1c. Beard et al reported that older diabetic patients had poor understanding and hence poorer glycemic control[5].Gender and age were not found to be significantly associated with understanding of HbA1c.

Duration of diabetes was thought to be an important factor determining the level of understanding of HbA1c. In this study the duration of disease was found to be statistically significant with the awareness of HbA1c. Similarly, Beard et al noted that those who have awareness had longer diabetes mean duration (18 years) compared to those with poor understanding (14.4 years). The median duration of diagnosis in our study was even shorter (10 years). Only type 2 type diabetes patients was recruited in this study thus unable to determine whether type of diabetes contributes to the understanding of HbA1c.

CONCLUSION

The level of HbA1c awareness and understanding among patients attending diabetic clinic in the city was comparable with other cities. Education level, monthly income and duration of disease were important factors associated with awareness of HbA1c. It is hoped that patient's education programme on diabetes and their disease markers in particular HbA1c will be emphasized more to those with lower education and income level. Their understanding post education could also be assess to see whether this would lead to improvement in their glycemic control. Strategies to engage patients to know and interpret their HbA1c values should be encouraged within routine clinical practice.

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