

Correlation of Glycated Hemoglobin (HbA1c) with Different Cardiovascular Risk Factors in Non-diabetic Patients

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Abstract

Objective: To determine the HbA1c levels correlation with cardiovascular events among non-diabetic patients.

Material and methods: The prospective study was conducted at cardiology department of Liaquat University of medical and health science. Total 130 cases were selected in this study. All the cases were selected with different cardiovascular diseases and having age more than 40 years. All the cases having multiple risk factors of cardiovascular disease were excluded from the study. HbA1c blood test was sent to the diagnostic research lab of Liaquat University of Medical and health science. HbA1c was recorded in the proforma according to risk factors. All the data regarding HbA1c level and its related cardiovascular risk were entered in the proforma.

Results: Mean age of the patients was found as Mean+SD=42.4+5.43 years. While majority of the cases 45 (42.6%) were found with age group of 51–60 years. Male were found in the majority 64% and female were found 36% in the cases. According to the cardiovascular risk factors smoking was found most common in 30.76% of the cases, 2nd most common risk factors were found hypertension and dyslipidemia, with percentage of 25.38% and 23.07% respectively. In this series HbA1c associated with hypertension, obesity and dyslipidemia.

Conclusion: We have found that HbA1c level is highly correlated with risk factors of CVD, especially in obesity, hypertension and dyslipidemia amongst individuals without DM.

Keywords: HbA1c; CVD; Non diabetic

Introduction

Hemoglobin glycation, found via percent HbA1c, was initially practiced clinically before 30 years to review chronic hyperglycemia degree in diabetic cases in those whose values reveal weighted average levels of glucose above former 3-months [1]. Over bygone three decades, prominent HbA1c is determinedly connected to risk of long-term complications of micro vessels and HbA1c evaluation is currently used far and wide to monitor proficient glycemic control as diabetes care cornerstone. With presentation of reference technique consistency, issues concerning high inter-assay as well as inter-laboratory analytic inconsistency have been greatly overwhelmed such that during 2002, 98% of United States laboratories surveyed practiced consistent techniques [2]. Given these positive performance uniqueness, current analytical efforts have endeavored to extend the HbA1c part as an increasing glycaemic exposure index in cardiovascular risk and diabetes valuation in non-diabetic cases. Numerous studies have assessed HbA1c levels ability to forecast prospect type 2 diabetes among pre-diabetic, high-risk patients [3,4] and up to date data propose that HbA1c can possibly as well be handy in the detection of risk for incidental cardiovascular events [5,6]. Significantly, whether an only HbA1c assessment can be applied in this purpose, stays uncertain and future population-established studies of the cases at low to moderate risk are exceptional. In a former periodical case-control investigation [7], we established that a high level of HbA1c was a univariate predictor of incidental cardiovascular events, however this

influence was not considerable subsequent to adjustment for rest of the risk factors cardiovascular disease. Though, we did not scrutinize non-linear threshold consequences that can possibly have prognostic importance as was demonstrated in several future studies of incident cardiovascular and plasma glucose events [8,9] and as a minimum one finding of cardiovascular mortality and HbA1c. Hence our purpose to evaluate the levels of HbA1c correlation with cardiovascular events in non-diabetic patients.

Methodology

This prospective study was performed at cardiology department of Liaquat University of medical and health science. Total 130 cases were selected in this study. All the cases were selected with different cardiovascular diseases and having age more than 40 years. Each subject experienced a complete physical assessment, and a self-administered survey presented data concerning medical history, drinking habits and smoking, physical activity of free time, medication and healthcare system contact history. BP was calculated through sphygmomanometer. Cholesterol and plasma glucose levels were calculated in venous blood samples while non-fasting. ECG was documented at rest during supine pose, and results were delineated. HbA1c measurement for haemolysed entire blood collection was done at the initial visit. All the cases those having multiple risk factors of cardiovascular disease were excluded from the study. HbA1c blood test was sent to the diagnostic research lab of Liaquat University of Medical and health science. HbA1c was recorded in the proforma

according to risk factors. All the data regarding HbA1c level and its related cardiovascular risk were entered in the proforma.

Results

Mean age of the patients was found as Mean+SD=42.4+5.43 years. While majority of the cases 45 (42.6%) were found with age group of 51–60 years, following by 40–50 years, 61–70 years and >70 years with the percentage of 40 (26.0%), 30 (20.0%) and 15 (5.3%) patients respectively (Table 1).

Gender	Frequency (%)
Mean + SD	42.4+5.43
Age groups	
40-50	40 (26.0%)
51-60	45 (42.6%)
61-70	30 (20.0%)
>70	15 (5.3%)

Table 1: Age distribution N=130.

Male were found in the majority 64% and female were found 36% in the cases (Figure 1).

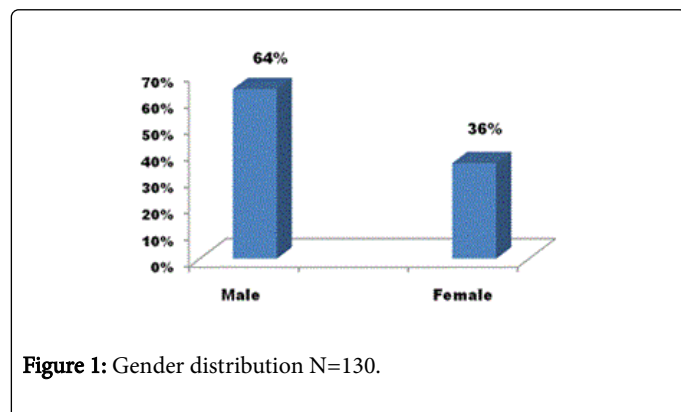


Figure 1: Gender distribution N=130.

According to the cardiovascular risk factors smoking was found most common in 30.76% of the cases, 2nd most common risk factors were found hypertension and dyslipidemia, with percentage of 25.38% and 23.07% respectively (Table 2).

CVD Risk Factors	Frequency	%
Hypertensive	33	25.38%
Obesity	15	11.53%
Smoking	40	30.76%
Alcohol consumption	12	9.23%
Family history	10	7.69%
Dyslipidemia	30	23.07%

Table 2: CVD risk factors distribution N=130

In this series HbA1c associated with hypertension, obesity and dyslipidemia (Table 3).

CVD risk factors	HbA1c	HbA1c	HbA1c	HbA1c
	≤5.0	5.1–5.4	5.5–6.4	≥6.5
Hypertensive (n=33)	16	9	7	1
Obesity (n=15)	5	3	3	4
Smoking (n=40)	19	12	11	2
Alcohol consumption (n=12)	5	3	3	1
Family history (n=10)	3	3	3	1
Dyslipidemia (n=30)	9	11	5	5

Table 3: HbA1c distribution according to CVD risk factors N=130.

Discussion

In this study, we found that HbA1c is associated with CVD development among nondiabetic cases. Thus, cases with no DM with levels of HbA1c in normal range of reference had an escalated risk of CVD development. In this finding patients' mean age was found as Mean+SD=42.4+5.43 years. While majority of the cases 45 (42.6%) were found with age group of 51–60 years. O'Sullivan et al. [10] reported that 72 years was the mean age and 59% were men. In this series male were found in the majority 64% and female were found 36% in the cases. Masood et al., [11] as well observed men in majority that is 75% as compared to women 25%. In this study according to the cardiovascular risk factors smoking was found most common in 30.76% of the cases, 2nd most common risk factors were found hypertension and dyslipidemia, with percentage of 25.38% and 23.07% respectively. A finding on disease of coronary artery, exhibited that the overall 42% cases were hypertensive [12]. During the study of Arvind kumar et al., observed elevated smoking rates as a risk factor and as well as men in majority were involved [13]. In Masood et al. finding, 1186 (53.8%) cases were hypertensive, sixty six (41.3%) were smokers, fifty eight (36.3%) retained diabetes mellitus, thirty eight (23.8%) cases retained family ischemic cardiac disease history and forty (25%) cases retained dyslipidemia. In this series HbA1c associated with hypertension, obesity and dyslipidemia. Raised risk of CVD was observed in three uppermost HbA1c quartiles. In the uppermost quartile, risk was obvious following HbA1c levels and the development of DM. In current study, we exhibit that HbA1c is related to CVD risk within our populace. Preceding studies investigating HbA1c role as a DM predictor have conventionally been carried out in high-risk [14-16] heterogeneous or small populaces [17,18]. In current study, we observed an obvious association in future CVD risk and HbA1c levels in common population. Our outcomes did not widen to discovery of statistically considerable relations in incident CVD events and HbA1c. Moreover, macro vascular complications development was not associated to levels of HbA1c in these matters. This is contrary to the outcomes of prior epidemiological cohort findings, which though in short of standardized HbA1c measurements and risk factors adjustment. However, interventional findings have exhibited slight or a probable harmful outcome of reducing HbA1c to avoid CVD events in cases which are nondiabetic [17,18] emphasize that either the association between DM and CVD (as well as arterial disease) is causal or not, remains mysterious and certainly that HbA1c can possibly be distal to genuine pathological outcomes related to cardiovascular

disease. Among nondiabetic cases, the part of HbA1c is uncertain. Selvin et al. [19] mentioned a relationship in CVD and HbA1c in a community-based finding of nondiabetic individuals in heterogeneous population of America. Other authors reported alike outcomes, though inconsistently [20,21].

Conclusion

In the given study, we established that level of HbA1c is greatly associated to the CVD development amongst case without DM, especially in the cases having obesity, dyslipidemia and old age. More studies with big sample size are required for further confirmation.

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