



## Examining the prevalence of Hemoglobin A1C level disorder in women affected with polycystic ovaries syndrome (PCOS) at Imam Ali Hospital, Karaj

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### ABSTRACT

PCOS is commonly associated with metabolic disorders, therefore it is reasonable and timely action to identify and manage the disorders. Accordingly in this study we decided to determine, the prevalence of abnormal hemoglobin A1C levels in women with signs and symptoms at PCOS. so 50 women with PCOS, based on clinical symptoms and laboratory results, were studied. Then hemoglobin A1C levels were assessed (by a blood test). The data analysis was performed using SPSS software. Chi-Square test didn't show the significant relationship between BMI and HbA1C levels ( $P>0.05$ ). Chi-Square test didn't show the significant relationship between age and HbA1C levels ( $P>0.05$ ). Independent T-test showed, there is significant relationship between fasting blood glucose and HbA1C levels ( $P<0.05$ ).

**Keywords:** hemoglobin A1C, PCOS, FBS.

### INTRODUCTION

Polycystic ovaries syndrome (PCOS) is among the common causes of sterility and reduced level of fertility in women, which is seen in 50% of women at the age of fertility, Polycystic ovaries syndrome (PCOS) causes physical and psychological problems in women, results in a significant reduction in life quality of then ones suffering from this syndrome. This syndrome is diagnosed with such symptoms as hirsutism, infertility and Para clinical symptoms like change in the ratio of LH to FSH, which lead to metabolic problems such as dysfunction in Glucose metabolism. As much as 10% of these patients suffer glucose intolerance. Polycystic ovaries syndrome (PCOS) is among the most common endocrine disorders in women and among the most common causes of severity arising from anovulation [1].

This syndrome has been due to the existence of relatively large ovaries containing a variety of small cysts (in most affected women not in all) situated in the perimeter part of the each ovary. Women suffering from this patience expose such prevalent symptoms as menstrual and oligomenorrhea disorders, hyperandrogenism symptoms like hirsutism and acne, hair loss and infertility. Patients are subjected to serious side effects such as increase risk of endometrial and breast cancers, hyperlipidemia, hypertension, cardiovascular illness and diabetes. Prevalence of obesity and dyslipidemia in paat8eyts affects with PCOS are higher compared to healthy women [2]. This ailment is seen in almost 6-10% of women at the age of fertility. The main cause of this ailment is not clear; however, researchers maintain that heredity and diabetes factors are effective [3].

Irregular periods, growth of excess hair, skin rash (acne) and obesity in women suffering from polycystic ovaries syndrome (PCOS) can be seen. This ailment can be accompanied in adolescence with irregular periods and later with exposure of increase weights and fertility related problems. The accurate reason of polycystic ovaries syndrome (PCOS) is not still clear [4]. Women affected with this ailment may be faced with problems for giving birth due to impairment in ovulation. Early diagnosis and receiving treatment could help prevent its long term side effects like

type II diabetes and cardiovascular ailments [5]. Sonography evidence in patients with polycystic ovaries syndrome (PCOS) is: increased volume of ovaries to more than 9 ml, existence of 2-8 ml cysts for as many as 10 or higher in each ovary, increase ovary stromal and endometrial hyperplasia. Other disorders, including increase serum level of Hormones LH, testosterone [6]. Insulin, prolactin, hemoglobin A1C [7], as well as resistance to insulin are seen in these patients. This syndrome might secrete higher volume of luteinizing hormone and then ovaries could produce higher level of androgens. This issue disrupts the normal menopause cycle and could lead to infertility, hirsutism and acne. Polycystic ovaries syndrome (PCOS) symptoms mainly start in early ages of fertility. In some cases, in later years, as weight gradually increases, thus impairment is seen. Diabetes syndromes vary from one person to another in terms of severity and diversity. There are two main signs for diagnosis which are irregular menopause and signs related with increased androgens. To diagnose Polycystic ovaries syndrome (PCOS), these two signs are necessary in addition to the existence of large ovaries containing plenty of cysts. In Polycystic ovaries syndrome (PCOS), such symptoms as infertility, obesity, pre-diabetes or type II diabetes and acanthoses can be seen altogether. Early diagnosis and receiving treatment could help prevent its long term side effects like type II diabetes and cardiovascular ailments. Existence of PCOS could increase the likelihood of creation of such cases as type II diabetes, higher blood pressure, increase cholesterol, serum triglyceride, along with reduced HDL or the same good cholesterol, higher level of protein C-reactive (one of the indications of coronary ailments), metabolic syndrome, nonalcoholic fatty liver, sleep apnea and abnormal uterine bleeding. Specifically, if this ailment is accompanied by obesity, the side effects will be aggravating. Although scientists do not know about the absolute cause of the polycystic ovaries syndrome (PCOS), such factors as higher insulin, inflammatory reactions, heredity and development disorders in fetus; periods could contribute to this [8-9].

Hemoglobin is one of the proteins inside red globules and has the duty of carrying oxygen to the blood. Hemoglobin, like all other proteins in the body, is combined with sugars, including glucose. This combination, until the red globule is alive (almost 120 days), sustains and this process comprises the hemoglobin A1C Test. This test, in fact, determines the blood sugar concentration in a time period of past 2-3 months. Put it simple, as blood sugar concentration rises, sugar is connected to the blood hemoglobin (which is the protein carrying oxygen inside red globules). Hemoglobin has different types which, in natural states, 95-97% of which is comprised by A1C. When sugar is connected to this kind of hemoglobin, it is called glycosylated hemoglobin or Hb A1C. In this hemoglobin, glucose is connected to the end N-terminal amino acid valine of the beta chain of hemoglobin of hemoglobin A.

The aim of measuring hemoglobin A1C is to preserve the blood sugar concentration in a natural range or close to it in a diabetic person. It is clear that this issue contributes to reduced chronic side effects of blood sugar rise. These side effects include progressive damage of body members like livers, eyes, cardiovascular systems and nerves. Measuring hemoglobin A1C is done for two reasons: first for diagnosing the existence of diabetes in the person and second for assessing the efficacy of the treatment in the person affected with diabetes. A1C is reported in percentage form. In non-diabetic persons, the level of hemoglobin A1C, which is combined with glucose, is less than 6%. In people affected with diabetes, this percentage varies in terms of diabetes control way and blood sugar.

Hemoglobin A1C less than 7% indicates diabetes and blood sugar has been controlled and volumes higher than 8% illustrates that the person needs to revise his own diabetes treatment method. Therefore, the goal to successfully treat diabetes is to reach hemoglobin A1C to less than 7 percent. Preserving A1C volumes in a normal range helps patients not to suffer from optical problems related with diabetes (which might lead to blindness), diabetes nervous problems (diabetic neuropathy) and liver ailments arising from diabetes, or that their affect is delayed. In patients whose ailments have just been diagnosed, preserving A1C in a normal range hinders heart attacks and seizures.

## MATERIAL AND METHODS

Then research was in a descriptive and cross-sectional form, in which 50 women patients suffering from PCOS, referring to Imam Ali Hospital in Karaj, in 2011 were selected via convenience style. Data were gathered in a field form. The subjects were entered into the study based on clinical and experimental features. Thereafter, by means of blood tests, their hemoglobin A1C serum level was determined. In the end, data statistical analysis was conducted by using SPSS statistical software.

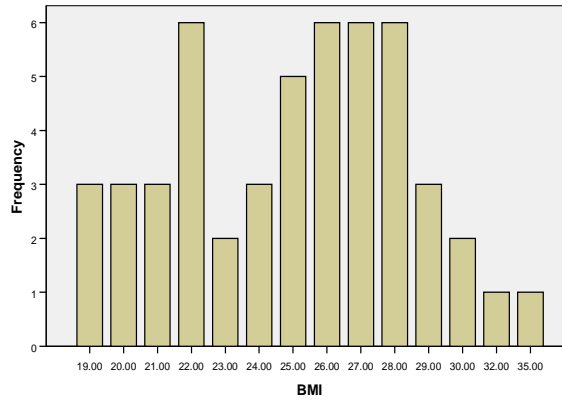
## RESULTS

It was determined in the survey that the patients' mean age was  $28 \pm 5/2$  and the minimum and maximum patients' age was 22 and 41 years respectively. Mean index of body mass was  $25/8 \pm 3/8$  and the minimum and maximum index of body mass was 18/6 and 35 respectively. The body mass index in an interval of 19-25 enjoyed the highest frequent percentage (50%) and in more than 31, it enjoyed the least frequency percentage (46%). HbA1C mean in patients was  $5/5 \pm 0/5$  and the minimum and maximum HbA1C in patients was 4/8 and 7/1 respectively. In the

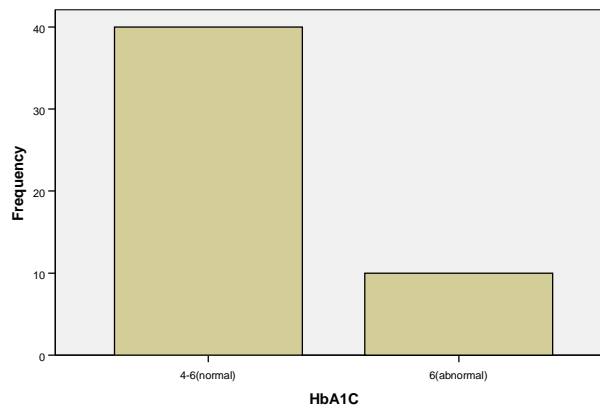
patients under study, i.e. in 80% of the results, 20% of the patients were normal (unduly normal). Patients' blood sugar mean was  $89/1 \pm 7/4$  and the minimum and maximum of blood sugar among patients was 69 and 100 respectively.

**Table 1. Mean and age criterion deviation, body mass, HbA1C and FBS**

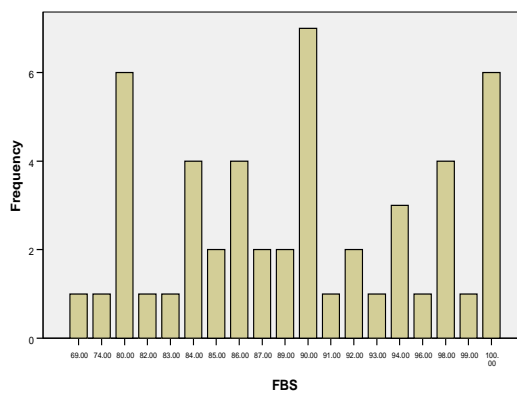
	Mean	SD	Min.	Max.
Age	28/06	5/227	22	41
Body mass	25/828	3/7771	18/6	34/9
HbA1C	5/508	0/5010	4/8	7/1
FBS	89/14	7/409	69	100



**Figure 1. BMI index in patients**



**Figure 2. HbA1C index in patients**



**Figure 3. FBS index in patients**

**Table 2. Examination of frequency distribution of body mass index and HbA1C level**

	validity	Freedom degree	Sig.
Chi-square coefficient	1/283(a)	2	0/527
Probable mean	1/654	2	0/437
Line by line measurements	0/134	1	0/714
Frequency	50		

According to the Chi-square, no significant relationship was seen between body mass index and hemoglobin A1C level ( $p>0/05$ ).

**Table 3. Examination of blood sugar relation with HbA1C level**

Variable	group	F	Sig.	T	Freedom degree	Sig.	Mean diff.	Differences standard error
HbA1C	Equal variances	0/409	0/526	-8/880	48	0/001	0/9775	0/1101
	Unequal variances	.	.	8/817-	13/744	0/001	0/9775	0/1109

According to the independent T test, there was a significant relation between FBS and HbA1C level ( $p<0/05$ ).

### DISCUSSION AND CONCLUSION

Body mass index, in an interval of 19-25 of normal HbA1C level was 52/5%; in an interval of 26-30 of normal HbA1C level, 45/5% and in more than 31 of normal HbA1C level, it was 5%. According to the independent T test, there was a significant relation between FBS and HbA1C level ( $p<0/05$ ). Mean blood sugar in people with normal HbA1C level was 87/52 and it was 95/6 in people with HbA1C higher than the normal. In a study by Golland et al. which was done in England and the results were released in 1989, it was found out that patients with PCOS had higher levels of hemoglobin A1C in 7/2% of the cases which has no relation with glucose tolerance disorder (Golland et al, 1989). In the current paper, Hemoglobin A1C level higher than 6 was around 20%.

In a study done by Codner et al in Chile and the pertaining results were published in 2011, it was found out that hemoglobin A1C level higher than 7/5 did have no statistical relationship with rate of fertility [10]. In the current paper, Hemoglobin A1C level higher than 6 (abnormal group) was 20% and this same rate stood at 4-6 in 80% of people. In a study by Silfen et al, which was done in the United States and the pertaining findings were published in 2003, it was announced that the mean hemoglobin A1C level in the ones suffering from PCOS is 5 with a standard deviation of 0/3 [8]. In the current paper, HbA1C mean in the patients affected with PCOS was 5/5 with a standard deviation of  $\pm 0/5$ .

In the area of hemoglobin A1C level in women affected with polycystic ovary syndrome, scant research is done; thus, it is advised to carry out similar researches in this field. It is also better to conduct methods with higher sensitivity. Since the current paper has been conducted in a limited society, it is recommended it be done in similar populations so that the findings can be applied in regards to other patients.

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