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Original Article

Analysis of Urinary pH and Insulin Resistance in Offsprings of Diabetic & Non Diabetic Parents

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***ABSTRACT*:**

Background: Diabetes Mellitus is a disorder caused by the total (or relative) absence of insulin, which manifests clinically as an elevated blood glucose. This study was undertaken to determine the insulin resistance and urinary pH in offspring of diabetic parents. **Materials & Methods:** The present study was conducted in the department of Physiology. It comprised of 80 subjects of both genders. All were divided into 2 groups. Group I had those who had parental history of type II DM and group II was control group. Serum glucose levels were determined by the glucose oxidase method. Serum insulin concentration was determined by ELISA using commercial kits. Fasting glucose and fasting insulin levels were used to measure homeostasis model assessment of insulin resistance (HOMA-IR) index. **Results:** Out of 80 subjects, in group I, males were 22 and females were 18. In group II, males were 25 and females were 15. The difference was non- significant (P> 0.05). Fasting glucose (mmol/lt) in group I was 4.72± 0.62 and in group II was 4.62± 0.58. Fasting Insulin (μIU/ml) in group I was 12.6± 5.68 and in group II was 10.4± 6.22. HOMA- IR in group I was 2.58± 1.21 and in group II was 2.08± 1.42. Urine pH in group I was 6.62± 1.2 and in group II was 6.50± 1.7. The difference was non- significant (P> 0.05). **Conclusion:** Author concluded that DM is a group of disorder having high mortality and morbidity. Insulin resistance and urinary pH as predictors of type2 diabetes is needed to be studied further.

Key words: Diabetes mellitus, Insulin, Urine.

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INTRODUCTION

Diabetes Mellitus is a disorder caused by the total (or relative) absence of insulin, which manifests clinically as an elevated blood glucose. The classification of diabetes mellitus has been a major discussion point over the last few years. It has been increasingly recognized that the old classification system based upon a patients' dependence on insulin was misleading; under the old system patients were either classified as either Insulin Dependent Diabetes Mellitus (IDDM) or Non Insulin 2 Dependent Diabetes Mellitus (NIDDM).[1]

Type 1 diabetes is an immune mediated and idiopathic forms of b cell dysfunction, which lead to absolute insulin deficiency. This is an autoimmune mediated disease process which gives rise to absolute deficiency of insulin and therefore total dependancy upon insulin for survival. Type 2 diabetes is a disease of adult onset, which may originate from insulin resistance and relative insulin deficiency or from a secretory defect. This is a disease, which appears to have a very strong genetic predisposition and is caused by a combination of inadequate insulin secretion and an insensitvity of the body tissues to insulin so leaving patients with this condition relatively deficient in insulin.[2]

Recent studies by Maalouf et al[3]., showed that low urinary pH is a novel feature of renal manifestation of insulin resistance. This study was undertaken to determine the insulin resistance and urinary pH in offspring of diabetic parents.

MATERIALS & METHODS

The present study was conducted in the department of Physiology. It comprised of 80 subjects of both genders. All were informed regarding the study and written consent was obtained.

General information such as name, age, gender etc. was recorded in case history performa. All participants were

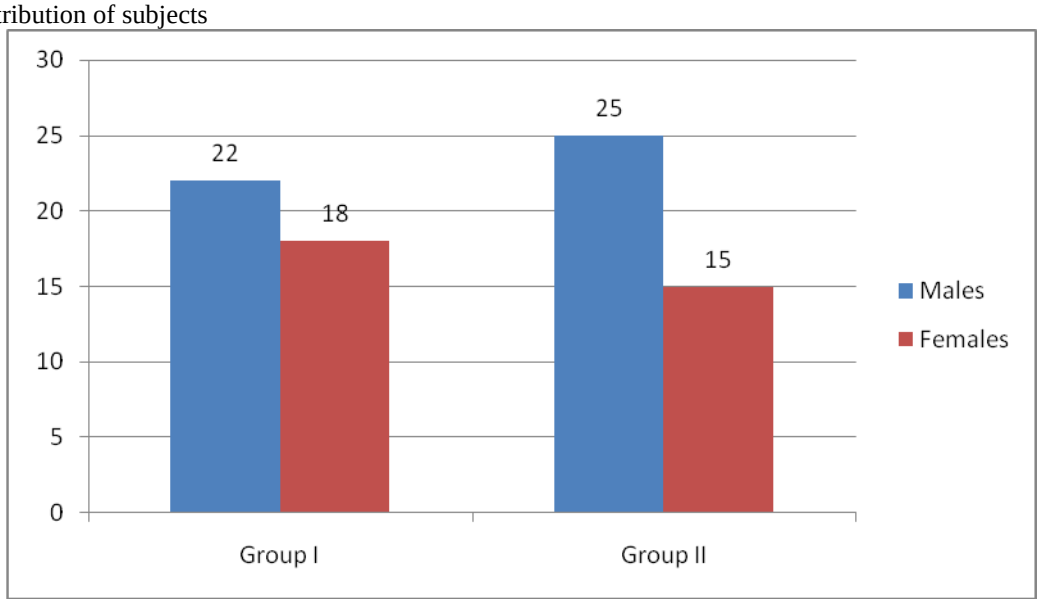
asked to complete a questionnaire on their family history of diabetes and any other major disease such as cardiovascular, respiratory and renal diseases. All were divided into 2 groups. Group I had those who had parental history of type II DM and group II was control group.

3 ml of venous blood was drawn from the cubital vein after overnight fasting of 12h for analytical purposes. Immediately after this urine pH was measured by pH electrode. Serum glucose levels were determined by the glucose oxidase method. Serum insulin concentration was determined by ELISA using commercial kits. Fasting glucose and fasting insulin levels were used to measure homeostasis model assessment of insulin resistance (HOMA-IR) index by the formula suggested by Matthews et al., as-

HOMA-IR = Fasting insulin (µIU/ml) x Fasting glucose (mmol/l)/22.5. Results were tabulated and subjected to statistical analysis using chi- square test. P value less than 0.05 was considered significant.

RESULTS

Graph I Distribution of subjects



Graph I shows that out of 80 subjects, in group I, males were 22 and females were 18. In group II, males were 25 and females were 15. The difference was non- significant (P> 0.05).

Table II Bio- chemical analysis in both groups

Parameters	Group I	Group II	P value
Fasting glucose (mmol/lt)	4.72± 0.62	4.62± 0.58	0.1
Fasting Insulin (µIU/ml)	12.6± 5.68	10.4± 6.22	0.5
HOMA- IR	2.58± 1.21	2.08± 1.42	0.4
Urine pH	6.62± 1.2	6.50± 1.7	0.3

Table II shows that fasting glucose (mmol/lt) in group I was 4.72± 0.62 and in group II was 4.62± 0.58. Fasting Insulin (µIU/ml) in group I was 12.6± 5.68 and in group II was 10.4± 6.22. HOMA- IR in group I was 2.58± 1.21 and in group II was 2.08± 1.42. Urine pH in group I was 6.62± 1.2 and in group II was 6.50± 1.7. The difference was non- significant (P> 0.05).

DISCUSSION

Diabetes places a huge burden of illness on sufferers and society. People with diabetes in the age group 45-64 years are 23 times more likely to be registered blind than the non diabetic population of the same age. Diabetic retinopathy is the lead cause of blindness in this age group. Diabetes often affects the kidneys and up to 40% of people who develop Type 1 diabetes before the age of 30 years can expect to develop diabetes related nephropathy. A significant number of these will progress to renal failure requiring long term renal dialysis treatment. 30% of people with diabetes develop diabetic neuropathy leading to a range of problems including from foot ulceration, sexual difficulties, cardiac arrhythmias and sudden death.[4]

In this study, out of 80 subjects, in group I, males were 22 and females were 18. In group II, males were 25 and females were 15. Fasting glucose (mmol/lt) in group I was 4.72± 0.62 and in group II was 4.62± 0.58. Fasting Insulin (μIU/ml) in group I was 12.6± 5.68 and in group II was 10.4± 6.22. HOMA- IR in group I was 2.58± 1.21 and in group II was 2.08± 1.42. Urine pH in group I was 6.62± 1.2 and in group II was 6.50± 1.7. This is in agreement with Osei et al.[5]

The body usually is able to keep glucose concentrations stable. The normal fasting blood sugar is usually between 3.5-6.7mmol/l. After a meal it would rarely exceed 8mmol/l. Normally there is no glucose in urine since the normal threshold above which glucose would appear in the urine would be 10mmol/l. Below a concentration of 10mmol/l the kidneys reabsorbs glucose back into the blood stream and so glucose does not appear in the urine unless the blood concentration of glucose is high. Dipsticking urine for the presence of glucose is therefore often used as a screening test for diabetes mellitus.[6]

The diagnosis of diabetes mellitus is made by finding a fasting blood glucose of over 6.7mmol/l or a random glucose of >10mmol/l. If a patient presents with symptoms of diabetes and is found to have a single very high glucose measurement eg >15mmol/l then this can be diagnostic. More commonly it would be appropriate to ask the patient to fast overnight and attend for a fasting blood glucose to be taken the next morning. Ideally this should be performed on two occasions before diagnosing diabetes.[7]

In a study of Senthamil et al[8], 30 subjects with one or both diabetic parents were compared with 30 who are offspring of non diabetic parents. No statically significant difference was observed between the two groups in any of the values.

CONCLUSION

Author concluded that DM is a group of disorder having high mortality and morbidity. Insulin resistance and urinary pH as predictors of type2 diabetes is needed to be studied further.

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