INTRODUCTION

According to WHO, the diabetes mellitus is categorized clinically and etiologically into two major types as type 1 DM or insulin dependent diabetes mellitus (IDDM) and type II DM or non insulin dependent diabetes mellitus (NIDDM). Type I diabetes mellitus is also called as juvenile diabetes that usually occurs below the age of 40 years or in childhood. This is due to the complete or partial degeneration of beta cells of pancreas thus causing the deficiency of insulin. On the other hand, type II diabetes mellitus that occur after the age of 40 years is usually non insulin dependent type of diabetes and is caused either by deficient secretion of insulin or due to the defect of insulin receptors. This type of disease is mild than juvenile type and can easily be controlled through diet and oral hypoglycemic drugs.

Experimental induction of diabetes mellitus in various species of animal can be achieved with chemicals such as uric acid, dehydro ascorbic acid, magnesium and quinolone. However, the most frequently chemical method used in experimental work for the induction of diabetes in animal is through the administration of either alloxan or streptozotosin.

First generation potassium channel blocker Tolbutamide under the brand name Orinase is used in the management of type II diabetes if diet is not impressive. Tolbutamide act by stimulating the secretion of pancreas. Generally it has a short duration of action due to its rapid metabolism.

ABSTRACT...

Objective: To evaluate the anti diabetic effect of cinnamon extract in alloxan induced diabetic animal model (albino rats) in comparison with oral hypoglycemic drugs. Study Design: An Experimental study. Place of Study: Al Tibri Medical College, Isra University, Karachi Campus. Duration of Study: December 2012 to December 2013. Materials and Methods: Total 60 Albino rats of both genders were divided into 6 groups consisting of 10 rats in each group. Each group of animals was further divided into two sub groups containing 5 rats in each group.

Results: The results obtained from the data indicated that there is significant reduction in blood glucose level rats treated with low dose of cinnamon extract. The animals of low dose cinnamon extract (200mg/kg. bw) when compared with other groups; there is a reduction in the blood glucose level in alloxan induced diabetic rats. Also tolbutamide and acarbose treated groups showed better antidiabetic effects as compared with cinnamon extract treated groups (p value<0.007 and p value<0.012 respectively), but cinnamon extract treated group showed synergistic effects when it was given in combination with tolbutamide or acarbose having significant p value<0.001 and p value<0.011 respectively.

Conclusions: Tolbutamide and Acarbose showed better anti diabetic effect in comparison with cinnamon extract treated groups when used individually. This effect was enhanced when cinnamon was used in combination with either tolbutamide or acarbose.

Key words: Cinnamon extract, Serum glucose, Diabetes.

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Key words: Cinnamon extract, Serum glucose, Diabetes.
When given through oral route, it is rapidly absorbed from gastrointestinal tract. Absorption and glucose lowering and insulin releasing effect are not altered if the drug is taken with food. On the other hand Acarbose (glucobay) is an alpha glucosidase inhibitor can be used for the treatment of non insulin dependent (NIDDM) diabetes and insulin dependent (IDDM). The mechanism of action of acarbose is to inhibit the intestinal enzymes (alpha glucosidase) used in the degradation of disaccharides, oligosaccharides and polysaccharides. Acarbose (glucobay) also lowers abnormally high concentration of glycosylated hemoglobin, but in clinical practice have produced side effects.

Thus there is increasing demand of herbal and natural products having anti diabetic activity with fewer side effects. Marles and Farnsworth reported a scientific investigation of traditional herbal remedies for diabetes that may provide valuable leads for the development of alternative drugs and therapeutic strategies. Very little research work has been done to evaluate the comparative effect of ethanol based cinnamon extract with hypoglycemic drugs. Therefore, present study was carried out to evaluate the anti diabetic effect of ethanol based Cinnamon bark extract in allaxon induced diabetic rats in comparison with two oral hypoglycemic drugs tolbutamide and acarbose (glucobay).

MATERIALS AND METHODS
This is an experimental study conducted in the Department of Physiology Al Tibri Medical College and Hospital, Karachi from December 2012 to December 2013. Total 60 Albino rats of either gender were divided into 6 groups consisting of 10 rats in each group. Each group of animals was further divided into two sub groups containing 5 rats in each group. The distribution is as under:

1.4.1 Group A (n = 10)
Further sub divided into two groups:
- Group A1 Simple control (n = 5)----------Treated with normal saline only
- Group A2 Diabetic Control (n = 5)----------Treated with Alloxan only

1.4.2 Group B (n = 10)
Cinnamon extract treated group, further sub divided into:
- Group B1 (n=5) - Treated with low dose extract
- Group B2 (n=5) - Treated with high dose extract

1.4.3 Group C (n = 10)
Tolbutamide treated group, further sub divided into:
- Group C1 (n=5) - Low dose of tolbutamide
- Group C2 (n=5) - High dose of tolbutamide

1.4.4 Group D (n = 10)
Acarbose treated group
- Group D1 (n = 5) - Low dose of acarbose
- Group D2 (n = 5) - High dose of acarbose

1.5 Combination of Low & High Dose Of Extract + Tolbutainde & Acarbose:
1.5.1 Group E (n = 10)
Low dose of combination (Ext + drug)
E₁ (n = 5) = L₁ Ext + L₁ Drug₁ (Tolbutamide)
E₂ (n = 5) = L₂ Ext + L₂ Drug₂ (Acarbose)

1.5.2 Group F (n = 10)
High dose of combination (Ext + drug)
F₁ (n = 5) = H₁ Ext + H₁ Drug₁ (Tolbutamide)
F₂ (n = 5) = H₂ Ext + H₂ Drug₂ (Acarbose)

All the data obtained after experimental work was analyzed statistically by SPSS version 21, Chi square test and student T test was used to compare the findings between the affected and control group. Statistically P value < 0.05 was considered significant.

RESULTS
The anti diabetic effects of cinnamon extract were observed and compared with the control animals and anti diabetic drugs groups.

1. Comparison of Blood Glucose Level within Group A
Mean blood glucose level of group A1 was 115 where as in group A2 it was 280 as shown in Table 1. Group A2 showed significant rise in blood glucose level after alloxan treatment.
2. Comparison of Blood Glucose Level within Group B
Mean blood glucose level of group B1 was 165 whereas in Group B2 it was 185 as shown in Table II. Group B1 showed more decrease in blood glucose level as compared to Group B2.

3. Comparison of Blood Glucose Level within Group C
Mean blood glucose level of group C1 was 140 whereas in group C2 it was 135 as shown in Table III. Group C2 showed more decrease in blood glucose level as compared to Group C1.

4. Comparison of blood glucose level within group D
Mean blood glucose level of group D1 was 145 whereas in group D2 it was 140 as shown in Table IV. Group D2 showed more decrease in blood glucose level as compared to Group D1.

5. Comparison of blood glucose level within group E
Mean blood glucose level of group E1 was 140 whereas in group E2 it was 145 as shown in Table V. Group E1 showed more decrease in blood glucose level as compared to Group E2.

6. Comparison of blood glucose level within group F
Mean blood glucose level of group F1 was 130 whereas in group F2 it was 135 as shown in Table VI. Group F1 showed more decrease in blood glucose level as compared to Group F2.

DISCUSSION
A variety of herbs reported in the scientific literature have hypoglycemic property and are important in reduction of blood sugar level, so these herbs are widely used in the management of diabetes. Despite of having ability in the control of diabetes therapeutically by using synthetic

<table>
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<tr>
<th>Blood glucose level (mg/dL)</th>
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<tr>
<td>Group</td>
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<tr>
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<tr>
<td>Normal Saline</td>
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<td>Alloxan</td>
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</table>

Table-I. Mean blood glucose level of group A1 and A2

<table>
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<th>Blood glucose level (mg/dL)</th>
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<tbody>
<tr>
<td>Group</td>
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<tr>
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<tr>
<td>Cinnamon extract 200mg/kg</td>
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<tr>
<td>Cinnamon extract 600mg/kg</td>
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</tbody>
</table>

Table-II. Mean of blood glucose level of group B1 and B2

<table>
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<th>Blood glucose level (mg/dL)</th>
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<tbody>
<tr>
<td>Group</td>
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<tr>
<td>-------</td>
</tr>
<tr>
<td>Tolbutamide 20 mg/kg</td>
</tr>
<tr>
<td>Tolbutamide 40 mg/kg</td>
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Table-III. Mean of blood glucose level of group C1 and C2
drugs, many traditionally based plant materials are used as medicine in the control of diabetes\textsuperscript{12}. Many pharmaceutical companies preparing some modern medicine are of natural plant origin. Cinnamon is amongst the most important and frequently used herbal drugs, commonly known as ADalchini\textregistered used as spice and also involved in the treatment of various diseases such as gastric ulcers, diabetes and other inflammatory disorders. The present study has evaluated the anti diabetic effect of Cinnamon bark extract in alloxan induced diabetic rats and compared it with the oral hypoglycemic drugs i.e: tolbutamide and acarbose. To induced diabetes in rats 150mg/kg body weight of alloxan monohydrate was injected intraperitoneally. Our study is also agreed with the studies of other researchers who also used alloxan monohydrate by giving a dose of 150 mg /kg.bw to induce diabetes in rats\textsuperscript{14,15,16}. The data regarding blood glucose obtained by the present study showed that alloxan induced diabetic rats produced significant increase in blood glucose level as shown in Table-I. This finding by the present study is almost in accordance with the studies of others\textsuperscript{17,18,19,20} who also reported a significant increase in blood glucose level in alloxan induced diabetic rats. The present study also assessed the anti diabetic effect of Cinnamon extract with low dose (200mg/kg body weight) and high dose (600mg/kg body weight) to diabetic rats. When cinnamon extract was administered to rats with low dose orally by feeding tube,
significant reduction in blood glucose level was seen (Table-II).

The hypoglycemic drugs such as tolbutamide and acarbose on the other hand showed better anti diabetic effect as compared to cinnamon extract treated group (P-value <0.007 and P value <0.012 ) respectively, but cinnamon extract showed synergetic effect when it was given in combination with hypoglycemic drugs and showed significant P value <0.001 and P value <0.0111 respectively. Similarly when high dose 600 mg/kg of cinnamon extract was given to diabetic rats a comparatively less effect was noticed. The same findings were also reported in other studies 21,22,23. It has also been claimed by many authors that the reduction in blood glucose level may be due to the active anti hypoglycemic agents present in extract as reported in literature24.

CONCLUSIONS
Tolbutamide and Acarbose groups showed better anti diabetic effect in comparison with cinnamon extract treated groups when used separately. This effect was enhanced when cinnamon was used in combination with either tolbutamide or a carbose.

REFERENCES


"Don't make a permanent decision for you temporary emotion."