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Comparative Effects of Moringa Oleifera Lam. Tea on Normal and Hyperglycemic Patients

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Abstract

This study evaluates the effects on taking tea prepared from *Moringa oleifera Lam*. on blood sugar levels in humans. Two groups of individuals were tested – people with normal fasting blood sugar levels (60-120 mg/dl) and those with hyperglycemic fasting blood sugar levels (>120 mg/dl). Among the 43 patients tested, 30 belonged to the normal group and 13 to the hyperglycemic group. Results showed that blood sugar levels of people in the normal group were not significantly changed 2 hours after taking the tea. However, for hyperglycemic individuals, the blood sugar levels significantly dropped after 2 hours. A mean drop of 28.15 mg/dl in the blood sugar levels was observed among the hyperglycemic patients. The results point to the benefit of using *Moringa oleifera Lam*. tea in the management of hyperglycemia.

Introduction

The Philippine government through the Department of Heath (DOH) has recently intensified the campaign on the use of medicinal plants to address the high cost of pharmaceutical products. One of the medicinal plants that show promising multiple benefits is *Moringa oleifera Lam.,* or known as the "malunggay" in the local vernacular. In fact, the Philippine Information Agency (PIA 2007) issued a press release to emphasize the economic importance of M. oleifera specifically highlighting its medicinal properties. M. oleifera is a member of family Moringaceae and is commonly known in the Western world as horse-radish tree. It was first introduced to the Philippines from tropical Asia or Malaya way back in the prehistoric era (Guevara et al 1999).

The medicinal properties of the different plant parts of M. oleifera have long been recognized in Philippine folk medicine (Quisumbing 1978). Subsequently, various studies have been conducted to validate the ethno-botanical practices of indigenous people pertaining to the use of this plant. A study con

ducted by Guevarra et al (1999) indicates that one of the bioactive compounds of M. oleifera namely, niazimicin, has an antitumor promoter as it inhibits carcinogenesis when tested against mouse skin. Additionally, M. oleifera could also significantly reduce the lipid levels in blood (Mehta et al. 2003; Chumark et al 2008). The juice from the leaves and stem bark of M. oleifera was found to inhibit Staphylococcus aureus (Mehta et al 2003) and dermatophytes (Chuang et al. 2007). It is also suggested that low concentration of the M. oleifera plant extract can be used for the regulation of thyroid hormone metabolism (Tahiliani and Kar 1999). Moreover, an anti-diabetic property is also included among the medicinal benefits of M. oleifera (Anwar et al 2007).

Among the benefits of M. oleifera, the anti-diabetic property may have a significant impact among Filipinos. The problems implicating diabetes have long been recognized by the National Diabetes Commission since its creation in 1996. A diabetes survey showed that

the crude diabetes prevalence of 5.1% represented a 54% increase over the figure (3.3%) for a similar population in Luzon in 1982 (Baltazar et al. 2004). The same survey made by Baltazar et al (2004) showed an increase in the magnitude of impaired glucose tolerance (IGT), which almost doubled from 4.1% in 1982 to 8.1%. Interestingly, women registered a higher prevalence than men for both conditions (Baltazar et al 2004; Araneta et al 2006). Araneta et al (2006) stressed that the adoption of Western diet and lifestyle could be contributory factors for the increase in the incidence of diabetes.

From these basic tenets, this study was designed to evaluate the efficacy of the M. oleifera leaf tea in lowering the blood sugar levels for two groups categorized as being normal and hyperglycemic. However, this study does not validate the therapeutic value of M. oleifera tea for the management of diabetes or hyperglycemia.

Materials and Methods

The Participants

A total of 43 subjects participated in the study. Subjects were derived from residents of the adopted community of St. Luke's College of Nursing, Trinity University of Asia and were regular patients of the health clinic located at Sitio Valenzuela, Purok 5, Calumpang, Liliw, Laguna, Philippines. The health clinic is under the supervision of the said University. Determination of blood sugar levels were incorporated into the routine check-up performed at the clinic. The age of the subjects ranged from 21 to 72 years with a mean age of 41.60 with most of the respondents belonging to the age group of 45 to 55 (40%). There were 35 (81.4%) female and 8 (18.6%) male patients. The subjects were told that they were included in the study, and a written consent form was signed by the individuals consistent with ethical standards where human subjects are used in a research study.

Data Collection

Fasting blood sugar determination was done using a glucometer available at the clinic and done according to the specifications of the manufacturer. Testing was done early morning before the respondents had breakfast. This reading served as the baseline blood glucose level. *Moringa oleifera Lam.(*malunggay) leaves were dried and commercially prepared according to the specifications of the manufacturer. One tablespoon of leaves was mixed into a cup of hot water brewed for 5 minutes and each respondent drank one cup of tea. Two hours after taking the malunggay tea,the blood sugar levels were measured again. Participants in the study were instructed to fast until after the second blood sugar measurement.

Statistical Analysis

The subjects were divided into two groups based on fasting blood sugar levels. They were classified either as normal or hyperglycaemic. Normal fasting blood sugar levels were determined as those with readings of 60-120 mg/dl, while hyperglycaemic fasting blood sugar levels were those above 120mg/dl. Of the 43 patients, 30 (69.8%) were normal and 13 (30.2%) were hyperglycaemic. The results of the first and second blood sugar readings were compared for both groups. Statistical significance of the change in blood sugar readings was determined using the T-test for the normal group and Wilcoxon-Signed-Ranked Test for the hyperglycaemic group. Statistical computations were done using the Statistical Package for Social Scientist Version 15.

Results and Discussion

Baseline measurements of fasting blood sugar levels showed a low of 76 mg/dl and a high of 222 mg/dl for the 43 respondents. The mean value of the initial blood sugar measurements was 108.11 mg/dl. Most of the respondents (69.8%) were of normal blood sugar levels. Figure 1 shows the differences in values of blood sugar levels for the normal and hyperglycemic groups. The variability of readings for the normal group is higher as shown in the figure.

After taking tea, the blood sugar levels changed for both groups. Generally, the blood sugar levels were lower with a mean value of 102.62 mg/dl for the 43 respondents. Figure 2 shows the variability of measurements of sugar levels 2 hours after taking the tea. There was an increased variability of measurements in the hyperglycemic group. However, the hyperglycemic group still had a significantly higher mean blood sugar level as compared to the normal group ($t=-2.56$, $p<0.05$).

The graph in Figure 3 shows the change in values for both groups from the initial reading to the final reading. There was little change for the normal group ($t=9.44$, $p>.1$), and this was

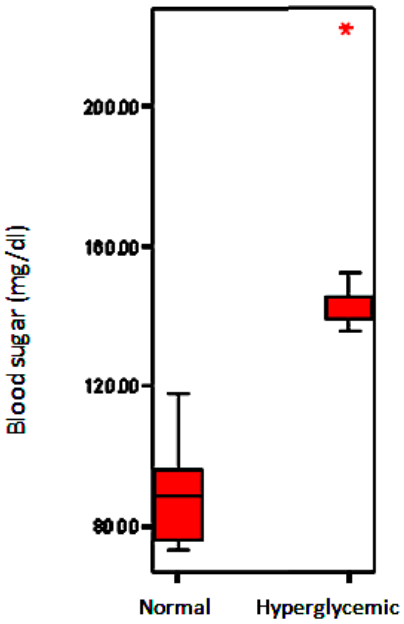

Figure 1 Range of initial blood sugar values

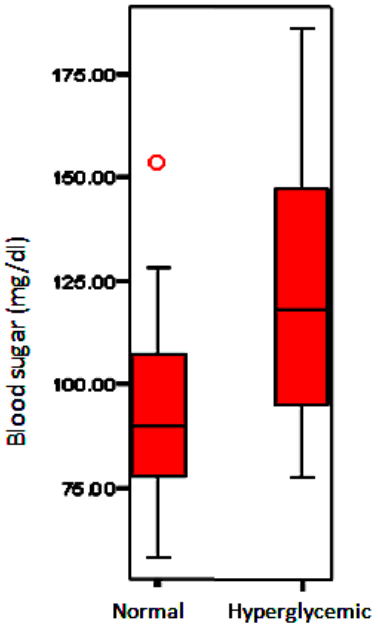

Figure 2 Range of blood sugar 2 hours after tea drinking

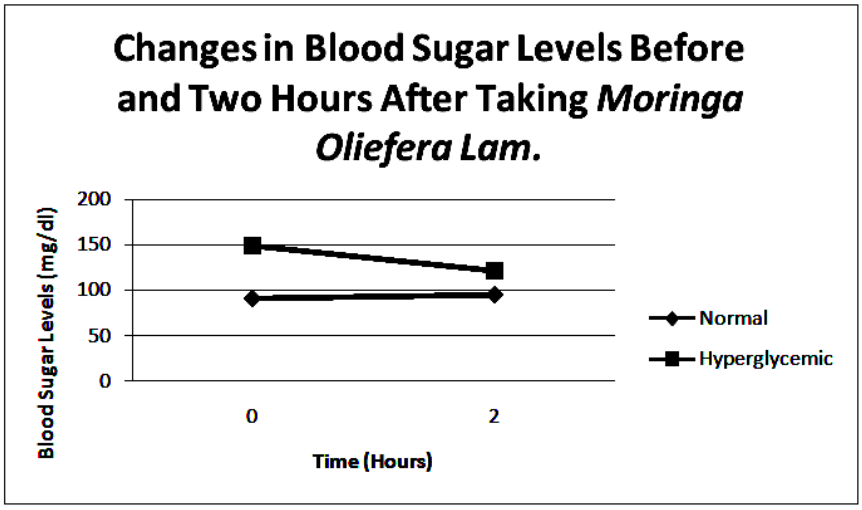

Figure 3. Changes in blood sugar level before and 2 hours after taking the tea

Table 1: Summary of Blood Sugar Levels of Normal and Hyperglycemic Before and After Two hours

	Mean (FBS*) (mg/dL)	Mean (After Tea) (mg/dL)	Mean Change	Test Stat	P
Normal	90.43	94.76	4.33	-9.44	>0.1
Hyperglycemic	148.92	120.76	-28.15	-2.976	<0.01

*FBS = Fasting Blood Sugar

not statistically significant. For the hyperglycemic group, there was a drop in blood sugar readings (z=-2.976, p<.01), and this was highly significant. The effect of the tea for the hyperglycemic group was a significant drop in blood sugar level after 2 hours.

Overall, there was a mean change of +4.33 for the normal group and -28.15 for the hyperglycemic group. A comparison of the change in blood sugar levels for the normal and the hyperglycemic group showed a significant difference, indicating a greater change for the hyperglycemic group (F=16.22, p<0.001).

Moringa oleifera leaves

Summary and Conclusions

Moringa oleifera Lam. has many potential uses in managing health, especially among diabetic patients. Hyperglycaemia is one of the most important symptoms of diabetes. Thus the treatment of diabetic patients often must take into account the anti-hyperglycemic or hypoglycemic effects of treatments protocols.

This study results showe that taking M. oleifera tea had no significant effect on the blood sugar levels 2 hours after intake for people with initial blood sugar levels that are between 60-120 mg/dl. However, when the tea is used by hyperglycemic patients, the blood sugar levels significantly decreased 2 h after intake. The mean drop in sugar levels was 28.15 mg/dl.

These effects on the blood sugar levels of hyperglycemic individuals point to the potential use of M. oleifera tea in the management or treatment of diabetes. A therapy based on tea of M. oleifera would be desirable as it is cheap and easy to apply.

Acknowledgements

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Moringa Miracle Tree