Effect of Dietary Psyllium Seeds in Hypertensive Subjects

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Abstract

The study aimed at studying the effect of psyllium seeds on hypertensive subjects. It was conducted on a group of adults of both sexes (82) subjects of aged (23-68 years); of which (68) were hypertensive patients and (14) normal subjects, at the same time. They were divided into two groups (normal and patients). Anthropometric and blood pressure measurements were taken for both groups (normal and patients). Laboratory analyses of both groups were recorded: Cholesterol, TG, blood calcium level. The (normal and patients) were given psyllium seeds, each as desired. Statistical analysis results of this study also demonstrated there were statistically significant difference (SSD) between hypertension, nutritional status & food habits, with no SSD between hypertension & weight. There were no SSD between consumption of psyllium, high blood pressure. Cholesterol and triglycerides, while there were no SSD’s between consumption of psyllium according to calcium. The study recommended inclusion of psyllium in daily diet of hypertensive patients.

Key words: Psyllium, calcium, Cholesterol, triglycerides
Introduction

Proper nutrition is essential for normal organ development and function, normal reproduction, maintenance of normal organ growth, optimal body activity, and work efficiency. In addition to that, eating a healthy diet helps prevent malnutrition in all its forms, as well as non-communicable diseases, including diabetes, heart disease, stroke, cancer, and fighting infections and diseases. Proper nutrition means that all essential nutrients such as carbohydrates, fats, proteins, vitamins, minerals and water are provided and used in sufficient balance to maintain optimum health and wellness (Oparil et al. 2018).

Hypertension is an epidemic of 1 billion people and the most common risk factor for death worldwide. The World Health Statistics 2012 estimated the prevalence of high blood pressure at 29.2% among males and 24.8% among females. About 6% percent of men and women without high blood pressure at the age of 50 or 60 will develop high blood pressure at the age of 80-85. High blood pressure is not restricted to the wealthy population but affects countries in all income groups. Of the 58.8 million deaths worldwide in 2004, high blood pressure was responsible for 12.8% (7.5 million deaths). Global hypertension is responsible for 31% of cerebrovascular disease and 45% of ischemic heart disease deaths (Jitendra 2013). Most children and teens have normal blood pressure. However, higher levels of dyslipidemia and lower calcium intake were factors associated with high blood pressure in the study group with hypertension (Fernando et al. 2019).

The present study is Effects of Dietary Sesame and Psyllium Seed in Hypertensive Subjects.

Patient and methods

The study was conducted in two places. The first: In the Official Language School Tariq Bin Ziad El Sahel Educational Zone in Shubra District Cairo. It was applied in September 2017-2018. The second part of the study was applied in Al Shams Center, Ain Shams El sharqiya district, Gesr El Suez Street. The experiment was conducted on subjects divided into two groups of hypertensive and a normal group.

Materials:

Sesame seeds and Psyllium seeds) were purchased from Local Market in Cairo and El-Giza Agriculture Research center.
Clinical Assessment:
Measurement of Blood Pressure (BP):
Accurate and repeated blood pressure measurement using cuff technology is the most important part of the diagnostic evaluation in the first blood pressure measurement visit. The patient must be sitting comfortably for at least a few minutes with his arm exposed. Two or three measurements must be made at each visit, including about two minutes (Jones et al. 2020).

Blood Analysis
Fasting blood sample (5 ml) of venous blood was taken from each subject (Hypertensive & Normal) groups before the experiment and after one month from taking either (Psyllium Seeds).
Blood Analyses were carried out in an Al-Sahel Governmental Hospital in Shoubra District and Al-Borg Lab in Ain Shams El Sharkia District according to (Yagi, 1984)
¹- Total Serum Cholesterol (CHOL), Serum Triglycerides (T.G)
²- Serum Blood Calcium.

Statistical Analysis:
Before the ANOA test, t-test Levene's Test for Equality of Variances was performed. The Levene's test for different variables at all treatments was negative<0.05, showing the variances' homogeneity. The experimental design was established as a complete randomized block design. All statistical calculations were done using Microsoft Excel version and SPSS (Statistic Package for the Social Science Version 26.00) Statistical Program at 0.05 levels of probability. Experiments were subjected to t-test and one way ANOVA.

Results and Discussion
The results are shown in Table (1): There were no significant differences between the normal treatment of psyllium concerning systolic and diastolic blood pressure and pulse. In contrast, there was a significant difference between psyllium treatment before and after the patient's psyllium treatment, causing the patient's systolic and diastolic blood pressure to decrease after treatment with psyllium. Dietary fiber, including psyllium, has been shown to help reduce high blood pressure. I agree with previous studies stating that psyllium can reduce high blood pressure from the study (Burke et al. 2001), (Cicero et al, 2007). reported that psyllium supplementation significantly reduces both SBP and DBP in hypertensive-related overweight subjects (Clark et al. 2020).
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Table (1) Systolic and diastolic Blood Pressure in Normal and Hypertensive Patients treated with Psyllium seeds:

| Groups                      | Sex | Normal | P-value | Sig. | Patient | P-value | Sig. |
|-----------------------------|-----|--------|---------|------|---------|---------|------|
|                            |     | Pre    | Post    |      | Pre     | Post    |      |
|                            |     | Mean ± SD |        |      | Mean ± SD |        |      |
| Systolic blood pressure MmHg | Female (♀) | 126.3 ± 15.44 | 123.8 ± 16.21 | >0.05 | 106.7 ± 17.0 | 135 ± 15.6 | <0.001 | S |
|                            | Male (♂) | 156.1 ± 17.45 | 135.5 ± 15.68 | <0.001 | 105.7 ± 17.3 | 135 ± 15.6 | <0.001 | S |
| Diastolic blood pressure MmHg | Female (♀) | 78.75 ± 14.35 | 77.50 ± 16.24 | >0.05 | 80.91 ± 10.4 | <0.001 | S |
|                            | Male (♂) | 99.71 ± 16.32 | 82.35 ± 15.68 | <0.001 | 88.50 ± 10.7 | <0.001 | S |
| Pulse                      | Female (♀) | 47.50 ± 8.66 | 46.25 ± 8.53 | >0.05 | 49.54 ± 9.25 | 0.215 | NS |
|                            | Male (♂) | 35.00 ± 7.07 | 37.50 ± 5.36 | >0.05 | 37.50 ± 5.36 | 0.698 | NS |

NS= No significant at p value >0.05,
S= highly significant at p value <0.001

The result is shown in the table (ᵀ): no statistically significant differences were observed between pre and post-treatment with Psyllium for normal regarding fasting blood glucose. Significant differences were observed between pre and post-treatment with Psyllium for a patient, which causes a decrease in Fasting Blood Glucose after treatment with Psyllium at the patient. The result illustrated in the table (ᵀ): indicated that statistically no significant difference was observed between pre and post-treatment with Psyllium for normal and patient regarding calcium (Cicero et al. 2007). Psyllium supplementation significantly improved FPG, FPI, HOMA index, HbA1c (Clark et al. 2020).

Table (2) Fasting Blood Glucose& Calcium in Normal and Hypertensive Patients (Psyllium Seeds):

| Groups | Sex | Normal | P-value | Sig. | Patient | P-value | Sig. |
|--------|-----|--------|---------|------|---------|---------|------|
|        |     | Pre    | Post    |      | Pre     | Post    |      |
|        |     | Mean ± SD |        |      | Mean ± SD |        |      |
| Calcium | Female (♀) | 9.5 ± 0.58, 88 | 9.5 ± 0.67, 87 | >0.05 | 9.1 ± 0.5, 85 | 9.1 ± 0.5, 85 | >0.05 | NS |
|        | Male (♂) | 9.5 ± 0.57, 87 | 9.5 ± 0.68, 87 | >0.05 | 9.1 ± 0.5, 85 | 9.1 ± 0.5, 85 | >0.05 | NS |

NS= No significant at p value >0.05,
S= significant at p value <0.05
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The result illustrated in a table (3): indicated that no statistically significant differences were observed between pre and post-treatment with Psyllium for normal TG, Cholesterol. While highly substantial were observed between pre and post-treatment with Psyllium for the patient, which causes decrease TG, Cholesterol after treatment with Psyllium at the patient.

This result was in agreement with Cicero et al. (2007; Clark et al. (2020). Psyllium supplementation significantly differences improved plasma TG concentration. Reported that Psyllium decreased total serum cholesterol, TG, LDL-C (Murad et al. 2011). Previously randomized clinical trials and meta-analyses demonstrated the efficacy of soluble fibers and psyllium as anti hypercholesterolemic agents in moderately hypercholesterolemia subjects (Slavin and Greenberg 2011). With the agreement (Cicero et al. (2007; Clark et al. (2020). Psyllium supplementation with significantly differences improved plasma TG concentration. It was reported that Psyllium decreased total serum cholesterol, TG, LDL-C (Murad et al. 2011).
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Table (3) Triglyceride, Total Cholesterol in Normal and Hypertensive Patients (Psyllium Seeds):

| Group | Sex   | Pre Mean ± SD | Post Mean ± SD | P-value | Si g. | Sex   | Pre Mean ± SD | Post Mean ± SD | P-value | Si g. |
|-------|-------|---------------|----------------|---------|-------|-------|---------------|----------------|---------|-------|
| TG. mg/dl | Female (4) | 140.25 ± 7.67 | 136.50 ± 6.61 | 0.48    | N     | Female (22) | 180.00 ± 17.8 | 159.77 ± 14.5 | <0.001 | S.    |
|        | Male (2)  | 139.50 ± 14.8 | 134.50 ± 20.5 | 0.80    | N     | Male (17)  | 178.10 ± 15.0 | 143.88 ± 10.8 | <0.001 | S.    |
| CHOL. mg/ml | Female (4) | 185.50 ± 17.8 | 159.77 ± 14.5 | 0.60    | N     | Female (22) | 262.66 ± 47.4 | 207.36 ± 28.5 | <0.001 | S.    |
|        | Male (2)  | 165.50 ± 9.19 | 150.00 ± 19.5 | 0.14    | N     | Male (17)  | 246.41 ± 45.9 | 195.41 ± 28.3 | <0.001 | S.    |

NS= No significant at p value > 0.05, HS= highly significant at p value < 0.001

Conclusion
The study aimed at studying the effect of psyllium seeds on hypertensive subjects. They were divided into two groups (normal and patients). Anthropometric and blood pressure measurements were taken for both groups (normal and patients). Before, during and after the experiment, laboratory analyses of both groups were recorded: Cholesterol, TG, blood calcium level. The (normal and patients) were given psyllium seeds, each as desired. Statistical analysis results of this study also demonstrated there were SSD between hypertension, nutritional status and food habits, with no statistically significant difference (SSD) between hypertension & weight. There were SSD between consumption of psyllium, high blood pressure. Cholesterol and triglycerides, while there were no SSD's between consumption of psyllium according to calcium. Psyllium helped reduce triglycerides and cholesterol level, which led to a decrease in systolic and diastolic blood pressure and had no effect on kidney function (creatinine and urea levels and did not affect liver function). The study recommended inclusion of psyllium in daily diet of hypertensive patients.
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الملخص العربي

تهدف الدراسة إلى دراسة تأثير تناول بذور السيلليوم على مرضى ارتفاع ضغط الدم. تم إجراؤها على مجموعة من البالغين من كلا الجنسين (82) شخصًا تتراوح أعمارهم (23-68 عامًا)؛ منهم (68) مريضا بارتفاع ضغط الدم و (14) من الأصحاء في نفس الوقت. تم تقسيمهم إلى مجموعتين (عادية ومرضى). تم أخذ قياسات الأثاثومترية وضغط الدم لكل المجموعتين (الاصحاء ومرضى). تم تسجيل التحاليل المخبرية لكل المجموعتين: الكوليسترول، الدهون الثلاثية، مستوى الكالسيوم في الدم. تم إعطاء (الاصحاء والمرضى) بذور سيلليوم حسب الرغبة. أظهرت نتائج التحليل الإحصائي لهذه الدراسة أيضًا وجود فروق ذات دلالة إحصائية بين ارتفاع ضغط الدم والحالة الغذائية والعادات الغذائية، مع عدم وجود فروق ذات دلالة إحصائية بين ارتفاع ضغط الدم والوزن. كان هناك فروق ذات دلالة إحصائية بين استهلاك سيلليوم وارتفاع ضغط الدم والكوليسترول والدهون الثلاثية، بينما لم يكن هناك فروق ذات دلالة إحصائية بين استهلاك سيلليوم والكالسيوم. أوصت الدراسة باستخدام السيلليوم في النظام الغذائي اليومي لمرضى ارتفاع ضغط الدم.

الكلمات المفتاحية: سيلليوم، كالسيوم، كوليسترول، دهون ثلاثية