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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 (٨٢) subjects of aged (٢٣-٦٨ years); of which (٦٨) were hypertensive patients and (١٤) 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. ٢٠١٨).

Hypertension is an epidemic of ١ billion people and the most common risk factor for death worldwide. The World Health Statistics ٢٠١٢ estimated the prevalence of high blood pressure at ٢٩,٢% among males and ٢٤,٨% among females. About ٩٠ percent of men and women without high blood pressure at the age of ٥٥ or ٦٥ will develop high blood pressure at the age of ٨٠-٨٥. High blood pressure is not restricted to the wealthy population but affects countries in all income groups. Of the ٥٨,٨ million deaths worldwide in ٢٠٠٤, high blood pressure was responsible for ١٢,٨% (٧,٥ million deaths). Global hypertension is responsible for ٥١% of cerebrovascular disease and ٤٥% of ischemic heart disease deaths (Jitendra ٢٠١٣). 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. ٢٠١٩). 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 (٢٠١٧-٢٠١٨). 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. ٢٠٢٠).

Blood Analysis

Fasting blood sample (٥ 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, ١٩٨٤)

١- Total Serum Cholesterol (CHOL), Serum Triglycerides (T.G)

٢- Serum Blood Calcium.

Statistical Analysis:

Before the ANOVA 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 ١٦ and SPSS (Statistic Package for the Social Science Version ٢٦,٠٠) 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 (١): 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. ٢٠٠١), (Cicero et al, ٢٠٠٧). reported that psyllium supplementation significantly reduces both SBP and DBP in hypertensive-related overweight subjects (Clark et al. ٢٠٢٠).

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Table (١) Systolic and diastolic Blood Pressure in Normal and Hypertensive Patients treated with Psyllium seeds:

Groups	Sex	Normal		P-value	Sig.	Sex	Patient		P-value	Sig.
		Pre	Post				Pre	Post		
		Mean $\pm$ SD	Mean $\pm$ SD				Mean $\pm$ SD	Mean $\pm$ SD		
Systolic blood pressure MmHg	Female (٤)	١٢٦,٣ $\pm$ ١٥,٤٤	١٢٣,٨ $\pm$ ١٦,٢١	٠,٧٨٧	NS	Female (٢٢)	١٥٦,١ $\pm$ ١٧,٤٥	١٣٥,٥ $\pm$ ١٥,٦٨	<٠,٠٠١	S
	Male (٧)	١٢٠,٠ $\pm$ ١٨,٧٧	١٢٢,٥ $\pm$ ١٦,٤٤	٠,٤٣٢	NS	Male (١٧)	١٥٥,٣ $\pm$ ١٧,٣٤	١٣٥,٠ $\pm$ ١٦,٤٥	<٠,٠٠١	S
Diastolic blood pressure MmHg	Female (٤)	٧٨,٧٥ $\pm$ ١٤,٣٥	٧٧,٥٠ $\pm$ ١٦,٢٤	٠,٧٦٦	NS	Female (٢٢)	١٠١,٤ $\pm$ ١٥,٣٠	٨٥,٩١ $\pm$ ١٥,٤٢	<٠,٠٠١	S
	Male (٧)	٨٥,٠٠ $\pm$ ١٥,٣٨	٨٥,٠٠ $\pm$ ١٦,٥٨	٠,٩٨٤	NS	Male (١٧)	٩٩,٧١ $\pm$ ١٦,٣٢	٨٢,٣٥ $\pm$ ١٥,٦٨	<٠,٠٠١	S
Pulse	Female (٤)	٤٧,٥٠ $\pm$ ٨,٦٦	٤٦,٢٥ $\pm$ ٨,٥٣	٠,٧٧٢	NS	Female (٢٢)	٥٤,٧٢ $\pm$ ٧,٩٨	٤٩,٥٤ $\pm$ ٩,٢٥	٠,٢١٥	NS
	Male (٧)	٣٥,٠٠ $\pm$ ٧,٠٧	٣٧,٥٠ $\pm$ ٥,٣٦	٠,٦٩٨	NS	Male (١٧)	٥٥,٥٨ $\pm$ ٧,٤٧	٥٢,٦٤ $\pm$ ٨,٦٨	٠,٢٩٨	NS

NS= No significant at p value >٠,٠٥, HS= highly significant at p value < ٠,٠٠١

The result is shown in the table (٢): 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 (٢): indicated that statistically no significant difference was observed between pre and post-treatment with Psyllium for normal and patient regarding calcium (Cicero et al. ٢٠٠٧). Psyllium supplementation significantly improved FPG, FPI, HOMA index, HbA^{1c} (Clark et al. ٢٠٢٠).

Table (٢) Fasting Blood Glucose & Calcium in Normal and Hypertensive Patients (Psyllium Seeds):

Groups	Sex	Normal		P-value	Sig.	Sex	Patient		P-value	Sig.
		Pre	Post				Pre	Post		
		Mean $\pm$ SD	Mean $\pm$ SD				Mean $\pm$ SD	Mean $\pm$ SD		
Calcium	Female (٤)	٩,٣٥ $\pm$ ٠,٨٨	٩,٢٥ $\pm$ ٠,٩٦	٠,٨٨٣	NS	Female (٢٢)	٩,١٤ $\pm$ ١,٠٥	٩,٠٨ $\pm$ ١,١١	٠,٨٥٧	NS
	Male (٧)	٩,٤٠ $\pm$ ٠,٧١	٩,٥٠ $\pm$ ٠,٧١	٠,٩٠٠	NS	Male (١٧)	٩,٥٧ $\pm$ ١,٠٤	٩,٤٨ $\pm$ ١,١٠	٠,٨٢٩	NS

NS= No significant at p value >٠,٠٥, S= significant at p value < ٠,٠٥

The result illustrated in a table (٣): 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. ٢٠٠٧; Clark et al. ٢٠٢٠**). Psyllium supplementation significantly differences improved plasma TG concentration. Reported that Psyllium decreased total serum cholesterol, TG, LDL-C (**Murad et al. ٢٠١١**). 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 ٢٠٠٣**). With the agreement (**Cicero et al. ٢٠٠٧; Clark et al. ٢٠٢٠**). Psyllium supplementation with significantly differences improved plasma TG concentration. It was reported that Psyllium decreased total serum cholesterol, TG, LDL-C (**Murad et al. ٢٠١١**).

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Table (٣) Triglyceride, Total Cholesterol in Normal and Hypertensive Patients (Psyllium Seeds):

Group	Sex	Normal		P-value	Si g.	Sex	Patient		P-value	Si g.
		Pre	Post				Pre	Post		
		Mean $\pm$ SD	Mean $\pm$ SD				Mean $\pm$ SD	Mean $\pm$ SD		
TG. mg/dl	Female (٤)	١٤٠,٢٥ $\pm$ ٧,٦٧	١٣٦,٥٠ $\pm$ ٦,٦١ b	٠,٤٨ ٧	N S	Female (٢٢)	١٨٥,٥٠ $\pm$ ١٧,٨ ٩	١٥٩,٧٧ $\pm$ ١٤,٥ ٣	<٠,٠٠١	S.
	Male (٢)	١٣٩,٥٠ $\pm$ ١٤,٨ ٤	١٣٤,٥٠ $\pm$ ٢٠,٥ ١	٠,٨٠ ٦	N S	Male (١٧)	١٦٧,٣٥ $\pm$ ١٥,٥ ٦	١٤٣,٨٨ $\pm$ ١٠,٨ ٨	<٠,٠٠١	S.
CHOL. mg/ml	Female (٤)	١٦٣,٠٠ $\pm$ ١٩,١ ٣	١٥٥,٢٥ $\pm$ ٢٠,٩ ٨	٠,٦٠ ٥	N S	Female (٢٢)	٢٦٢,٦٦ $\pm$ ٤٧,٤ ٧	٢٠٧,٣٦ $\pm$ ٢٨,٥ ٩	<٠,٠٠١	S.
	Male (٢)	١٦٥,٥٠ $\pm$ ٩,١٩	١٥٠,٠٠ $\pm$ ١٩,٥	٠,١٤ ٠	N S	Male (١٧)	٢٤٦,٤١ $\pm$ ٤٥,٩ ٧	١٩٥,٤١ $\pm$ ٢٨,٣ ٤	<٠,٠٠١	S.

NS= No significant at p value >٠,٠٥,

HS= highly significant at p value < ٠,٠٠١

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.

References

- Burke V, Hodgson J, Beilin L, Giangiulioi N, Rogers P, Puddey I (٢٠٠١)
Dietary protein and soluble fiber reduce ambulatory blood pressure
in treated hypertensives. *Hypertension* ٣٨(٤):٨٢١-٨٢٦
- Cicero A, Derosa G, Manca M, Bove M, Borghi C, Gaddi A (٢٠٠٧)
Different effect of psyllium and guar dietary supplementation on
blood pressure control in hypertensive overweight patients: a six-
month, randomized clinical trial. *Clinical and experimental
hypertension* ٢٩(٦):٣٨٣-٣٩٤
- Clark CCT, Salek M, Aghabagheri E, Jafarnejad S (٢٠٢٠) The effect of
psyllium supplementation on blood pressure: a systematic review
and meta-analysis of randomized controlled trials. *Korean J Intern
Med* ٣٥(٦):١٣٨٥-١٣٩٩ doi:١٠,٣٩٠٤/kjim.٢٠١٩,٠٤٩
- Fernando RP, Quaresma EdSM, Francisco WdS, Figueiredo FA (٢٠١٩)
Factors associated with blood pressure disorders in children and
adolescents of African descent *BMC Pediatrics*, . ١٩:٢٤٤
- Jitendra K (٢٠١٣) Asian Institute of Medical Sciences, Department,
Sector ٢١ A, Faridabad ١٢١٠٠١, India, . ٥٦-٦١.
- Jones NR, McCormack T, Constanti M, McManus RJ (٢٠٢٠) Diagnosis
and management of hypertension in adults: NICE guideline update
٢٠١٩. *British Journal of General Practice* ٧٠(٦٩١):٩٠-٩١
- Murad S, Waseem R, Bashir A, Ashraf H, Ghurbakhshani A, Sheikh R
(٢٠١١) Keep heart healthy by normalising body weight, blood
pressure and weight reduction. *Pak J Med Health Sci* ٥:٢٢٨-٢٣١
- Oparil S, Acelajado MC, Bakris GL, Berlowitz DR, Cifkova R,
Dominiczak AF, Grassi G, Jordan J, Poulter NR, Rodgers A,
Whelton PK (٢٠١٨) Hypertension. *Nat Rev Dis Primers* ٤:١٨٠١٤
doi:١٠,١٠٣٨/nrdp.٢٠١٨,١٤
- Slavin J, Greenberg N (٢٠٠٣) Partially hydrolyzed guar gum: clinical
nutrition uses. *Nutrition* ١٩(٦):٥٤٩-٥٥٢
- Yagi K (١٩٨٤) Assay for blood plasma or serum. *Methods in enzymology*
١٠٥:٣٢٨-٣٣١

الملخص العربي

تهدفت الدراسة إلى دراسة تأثير تناول بذور السيلليوم على مرضى ارتفاع ضغط الدم. تم إجراؤها على مجموعة من البالغين من كلا الجنسين (٨٢) شخصًا تتراوح أعمارهم (٢٣-٦٨ عامًا) ؛ منهم (٦٨) مريضًا بارتفاع ضغط الدم و (١٤) من الأصحاء في نفس الوقت. تم تقسيمهم إلى مجموعتين (عادية ومرضی). تم أخذ قياسات الأنثروبومترية وضغط الدم لكلا المجموعتين (الأصحاء ومرضی). تم تسجيل التحاليل المخبرية لكلا المجموعتين: الكوليسترول ، الدهون الثلاثية ، مستوى الكالسيوم في الدم. تم إعطاء (الأصحاء ومرضی) 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