

The Effect of Natural Honey Administration on Some Sperm Function Parameters in Male Infertility Patients

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تأثير تناول العسل الطبيعي في بعض معايير وظائف النطف لدى الرجال ضعيفي الانجاب

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المستخلص:

الدراسة اجريت في مركز معالجة العقم الكائن في مستشفى الكوت – العراق حيث تم اخذ العينات من 43 شخص ممن لديهم ضعف في الانجاب تتراوح اعمارهم بين 20-40 سنة وليس لديهم امراض تؤثر سلبيًا على الدراسة وتم جمع نماذج السائل المنوي بطريقة الاستمناء في وعاء معقم بعد امتناع من 3-5 يوم وارسلت الى المختبر وتم قياس تركيز الفركتوز المنوي والنسبة المئوية لعدد وحركة ومظهر النطف وتم سحب الدم الوريدي لغرض قياس نسبة هرمونات LH و FSH و Testosterone, بعد ذلك تم اعطاء العسل الطبيعي للمرضى لغرض تناوله بشكل يومي مع الافطار وبكمية 50 غم باليوم ولمدة 30 يوم بعد ذلك تم جمع نماذج السائل المنوي والدم لغرض قياس المتغيرات السابقة بعد تناول العسل حيث وجدت الدراسة هناك زيادة ملحوظة في جميع المتغيرات بعد تناول العسل الطبيعي حيث ازداد تركيز الفركتوز والعدد الكلي للنطف وحركتها والمظهر الخارجي وكذلك هناك زيادة ملحوظة بمستوى هرمون Testosterone و LH و FSH

Abstract

The study was conducted in the infertility treatment center located in Al- Kut city of Iraq, the sample were taken from 43 individual have a weakness in fertility , aged between 20-40 years and have no diseases affect the study. Seminal fluid samples were collected by masturbation after 3-5 day abstention in sterile container and send to laboratory for measuring the concentration of fructose and the percentage of count , motility and morphology .Venous blood was drawn to measure the level of hormones LH, FSH and Testosterone .50 g of natural honey was given to patients to be eaten daily with breakfast for 30 days. After that seminal fluid and blood samples were collecting to measure the previous seminal parameters.The study found that there was a significant increase in fructose level , count , motility and the morphology. As well as there is an increase in the level of hormone testosterone, LH, FSH

Key word : honey, sperm ,fructose ,fertility

Introduction

After marriage, the couple dreams of completing the foundations of their small family and establishing their structure, waiting for the newborn to enter their lives.

But some may have problems with pregnancy, for many different reasons, including a man with infertility .The infertility of the man is inability to fertilize the female egg , as a

result of deficiencies in the production of are many reasons for male infertility is related to glands, genitalia, organic disease, or congenital causes infertility[2]. With regard to glands, the delayed maturation and puberty of men may cause infertility, in addition to damage to the pituitary gland, or increase in the level of milk hormone, or endocrine disease and even because of the decline in the production of male hormone were cause by deficiency of LH or FSH hormone that stimulate the testes to manufacture testosterone and sperm , were any decrease in LH and FSH levels, lead to decrease in testosterone levels and decrease in sperm production [3]. As for genitalia "testicles" may be due to a defect or congenital defect in the genitals[4] . Infertility may be caused by chronic kidney or liver disease, by a malformation of the sperm cells, by a defect in the immune system that produces sperm-killing antibodies, by inflammation of the prostate, by seminal vesicles and sometimes bacteria and germs that infect the reproductive system[5] . Infertility in men may also be caused by sexual dysfunction, erectile dysfunction or by the use of creams that kill sperm during sexual intercourse [6]. There are also causes associated with other diseases such as diabetes, nerve injury, spinal cord injury, pelvic fracture, the use of certain drugs that cause infertility without the knowledge of men, or the result of addiction to drugs such as marijuana and smoking[7]. There are many other reasons that are difficult to enumerate and promise. For infertility in men, medical technology and recent developments in medicine have succeeded in treating some causes of infertility. If a man suffers from varicose veins, the process of removing these varicose veins helps reduce the infertility rate in men[8]. Many fertility methods are used to help induce pregnancy and to rely on many

sperm and the quality of this liquid[1]. There artificial insemination methods. As well as many studies and research that have helped to alleviate the causes of male infertility, which are related to some behavioral actions of men[9]. Bee's honey has a clear effect in increasing fertility and treatment of infertility in both sexes. Because contain many compounds that increase sexual ability and raise the level fertility[10]. Natural honey is defined as a food made by bees collecting the nectar of flowers, digesting them for re-processing in the hive[11]. Natural honey is one of the most important health food, which is a medical treatment for a range of diseases that affect human. Honey is easy to absorb and also contains sexually-stimulating substances include (sugar) make up approximately 70% of its soluble substances. This is considered as one of the most important components of honey, fructose sugar found in percentage 42.4% enters the cells and burned in it without the need for the presence of insulin as in the glucose sugar[12], (enzymes) such as amylase, phosphatase, (amino acids) such as proline, tyrosine, histidine, (minerals) such as potassium, calcium, sodium and (vitamins) such as B series (1,2,3,4,5,6,8,9) and vitamin C[13]. Vitamins so called honey vitamin fertility[14].Yemen is famous for the best honey in the world, and people in some areas of Yemen eat honey that helps greatly increase sexual ability and thus raise the level of fertility[15]. Vitamin F (linoleic acid) and vitamin E found in honey, which are necessary for the formation of the reproductive cells and maintain their vitality and activity, and lack of this vitamins lead to stop the growth of sperm in males, causes muscle weakness, and reduce the strength of the body[16].

MATERIALS AND METHODS

The study was conducted at the infertility treatment center at Al- Kut hospital in Iraq. 43 infertility patient have no diseases that affect the fertility and inconsistent with the study and have abnormal fructose level, total count, motility and morphology were selected for the study . At least two sample examined for each patient after 3 – 5 days of sexual abstinence all samples were performed after liquefaction of semen to determine fructose level , count , motility and morphology according to the World Health Organization Criteria [17], blood samples also collected from patients for determination of LH ,FSH , Testosterone hormones level . Patients were given a quantity of natural honey to eat 50 g of honey in the morning with breakfast daily for one month with the emphasis not to eat any treatment of sexual stimulants during the study period. Semen samples were collected after one month by masturbation in a sterilized plastic container. Fructose level was examined immediately after liquefaction to ensure that not consumed by the active motile sperm using colorimetric method and using a Seliwanoff's reagent,. Direct microscopy method was used to

estimate the total count ,motility and morphology of sperm . Sperm motility was determined in 4 classes defined by the World Health Organization as follows: (grade A) fast forward progressive, (grade B) slow forward progressive, (grade C) non-progressive and (gradeD) immotile sperm [18].

Statistical analysis:

The SPSS software was used to analyze the data statistically , the results were expressed as mean $\pm$ SD, and the least significant difference at the probability level ($P < 0.01$).[19]

RESULTS

The study show significance increase in patient seminal parameters after the treatment with honey were the mean concentration of fructose sugar was (2.66 ± 0.78) before treatment and increased after treatment (3.28 ± 0.82) ($P < .001$). Total count before treatment was (37.2 ± 6.8) and increased after treatment (39.45 ± 8.4) ($P < .001$) . Morphology was ($20.4 \pm 3.8\%$) and increased to ($23.4 \pm 3.8\%$),after treatment ($P < .001$) , as in Table 1

Table (I) : The effect of natural honey on seminal fructose , count and morphology

Parameter	Before taking honey	After taking honey	P value
Fructose (mg/dl)	2.66 ± 0.14	3.28 ± 0.21	$P < .001$
Count (million/ml)	37.2 ± 6.8	39.45 ± 8.4	$P < .001$
Morphology %	$20.4 \pm 3.8\%$	$23.4 \pm 3.8\%$	$P < .001$

The study showed significant increases in the percentages of grade A ,B and C motility of sperm where the mean percentage of sperm motility with grade A was ($7.42 \pm 5.72\%$) before treatment and ($10.77 \pm 6.07\%$) after

the treatment ($P < 0.01$), grade B were ($13.34 \pm 4.24\%$) their increased to ($19.88 \pm 7.45\%$) ($P < .001$) and C were ($18.67 \pm 7.65\%$) and increased to ($24.67 \pm 9.65\%$) ($P < .001$). as in Table 2

Table (2) : The effect of honey on motility grades of seminal fluid

Motility Grade	Before taking honey	After taking honey	P value
A	$7.42 \pm 5.72\%$	$10.77 \pm 6.07\%$	$P < .001$
B	$13.34 \pm 4.24\%$	$19.88 \pm 7.45\%$	$P < .001$
C	$18.67 \pm 7.65\%$	$24.67 \pm 9.65\%$	$P < .001$

The study showed significant increases in the hormones level where the mean concentration of LH (4.28 ± 1.74) before and (5.32 ± 1.47) after the treatment ($P < .001$). The mean concentration of FSH (2.86 ± 1.06) and increased to (3.61 ± 0.97)

after treatment ($P < .001$) and the mean concentration of Testosterone (4.72 ± 1.77) before treatment and increased to (5.93 ± 2.07) after treatment ($P < .001$).as in Table 3.

Table (3) : The effect of honey on reproductive hormones LH , FSH and Testosterone

Parameter	Before taking honey	After taking honey	P value
LH (mIU/ml)	4.28 ± 1.74	6.32 ± 1.47	$P < 0.01$
FSH (mIU/ml)	2.86 ± 1.06	3.61 ± 0.97	$P < 0.01$
Testosterone (ng/ml)	4.72 ± 1.77	6.93 ± 2.07	$P < 0.01$

Discussion

The study showed important effect to administration of natural honey on seminal fluid parameters where cause increased in

fructose level , count , motility and morphology also increased level of reproductive hormones LH , FSH and testosterone .The process of spermatogenesis begins in men at puberty in the testis and manufactured under hormonal regulation where FSH stimulates semeniferous tubules to produce semen and LH stimulates certain cells in the testicle called Leydig cells to secrete the testosterone hormone which helps to manifest the characteristics of male and helps to produce sperm[20]. In addition to the role of male hormones in the production of semen there is a role of fructose sugar, which is the main source of food and energy to the spermatozoa and also reflects the secretions function of seminal vesicles and maintain alkaline medium of semen under ideal conditions to sperm survival purpose[21] . Previous Studies found that eating natural honey, which contains 42.4% of its weight fructose sugar (22) has a positive effect on the hormone LH, which stimulate the liydig cell to secrete more of testosterone hormone and

also has a positive effect on sertoli cell directly or indirectly through the FSH hormone, which stimulates the conversion of spermatides into mature cells[23]. Honey increase the number of sperm in the epididymis by activating the enzymes that share in the formation of sperm in the testicle such as activate sorbitol dehydrogenase enzyme and reduces the effective of lactate dehydronase[24] . Also it contains antioxidants such as glucoseoxidase which reduce fat oxidation and reduce the stress on sperm cells[25]. Two sources of seminal fructose are a natural source from food, or part of which is produced in the seminal vesicles by an alternative nonphosphorylative pathway were sorbitol enters as a substrate material for sorbitol dehydrogenase enzyme to produce fructose [26] .

Conclusion

Natural bee honey which cause increased seminal fluid fructose level and lead to increase count, motility, and morphology parameters also increased the level of reproductive male hormones LH,FSH and testosteron which involved in the spermatogenesis

References

- 1.Nygren, K. G. and Zegers-Huchschud (2008). Documentation of infertility prevalence, treatment access and treatment outcomes in developing countries. *Oxford Journals* 1, pg 5-7.
- 2.Brugh, V.M. ; Lipshultz, L.I. (2004). "Male factor infertility". *Medical Clinics of North America*. 88 (2):367–85.
- 3.Edmund, S. Sabanegh, Jr. (2010). Male Infertility: Problems and Solutions. Springer Science & Business Media. pp. 82–83.

4. Bhasin, S. (2007).Approach to the infertile man. *J Clin Endochnol Metab*, 92: 1995–2004.
5. Baker, H.W. (1998) .Reproductive effects of nontesticular illness. *Endocrinol Metab Clin North Am*;27:831–850
6. Zhu, J.L.; Basso, O.; Obel, C.; Bille, C.and Olsen, J.(2006). Infertility, infertility treatment, and congenital malformations: Danish national birth cohort. *BMJ*. 30;333(7570):679.

7. Ferlin, A.; Arredi, B. and Foresta, C. (2006) Genetic causes of male infertility. *Reprod Toxicol* 22(2):133–141
8. World Health Organisation. 1992. The influence of varicocele on parameters of fertility in a large group of men presenting to infertility clinics. *Fertil Steril* ;57:1289–1293.
9. Zegers-Hochschild, F.; Adamson, G.D.; de Mouzon, J.; Ishihara, O.; Mansour, R. and Nygren, K. (2009). International Committee for Monitoring Assisted Reproductive Technology (ICMART) and the World Health Organization (WHO) revised glossary of ART terminology. *Fertil Steril*;92(5):1520-4.
10. Bogdanov, et al.; Bogdanov, T.; Jurendic, R. Sieber, P. (2008). Honey for nutrition and health: a review J. Am. Coll. Nutr., pp. 677-689
11. National Honey Board (2002). Honey-health and therapeutic qualities. Pp.234-410
12. Ajibola, A.; Chamunorwa, J.D, and Erlwanger, K.H. (2012). Nutraceutical values of natural honey and its contribution to human health and wealth. *Nutrition and metabolism*, pp,98-116
13. Erejuwa, O.O.; Sulaiman, S.A. and Wahab, M.S.A.B. (2012). Honey: a novel antioxidant. *Molecules* 17, pg 4400-4423
14. Bogdanov, S. (2009). Honey Composition. In: Book of Honey, Chapter 5. Bee Product Science. pp. 887-933
15. Al-Mamary, M.; Al-Meer, A. and Al-Habori, M. (2002). Antioxidant activities and total phenolics of different types of honey. *Nutrition Research*, 22, 1041-1047
16. Ross, C. Morris, A., Khairy, M., et al. (2010). A systematic review of the effect of oral antioxidants on male infertility. *Reprod Biomed Online*. ;20(6):711–723.
17. World Health Organization. (2010). Laboratory Manual for the Examination of Human Semen and Semen-Cervical Mucus Interactions. Singapore: Press Concern; pp. 7–32.
18. World Health Organization. (2010). WHO Laboratory Manual for the Examination of Human Semen and Sperm-Cervical Mucus Interaction, 5th edn. Cambridge: Cambridge University Press, 223.
19. FIELD Andy, (2006), *Discovering Statistics using SPSS*, Sage 6:227–231.
20. Tesarik, J. (1996) Fertilization of oocytes by injecting spermatozoa, spermatids and spermatocytes. *Rev. Reprod.*, 1, 149–152.
21. Bray, G. A. (2013). Energy and fructose from beverages sweetened with sugar or high-fructose corn syrup pose a health risk for some people. *Advances in nutrition: An International Review Journal* 4 (2): 220–225.
22. Eileen, D. M., (2011). The importance of honey. *National Honey Board*, 650 : 123 – 135.
23. Tesarik, J; Guido, M.; Mendoza, C. and Greco, E. (1998) .Human spermatogenesis in vitro: Respective effects in Follicle stimulating Hormone and testosterone Meiosis, Spermiogenesis and Sertoli cell apoptosis. *Journal of clinical endocrinology and metabolism*. Vol 83, iss 12, pg 4467.
24. El- kabbani, O.; Darmanin, C. and Chung R.P.T. (2004) .Sorbitol dehydrogenase: structure, function and ligand design. *Current medicinal chemistry*. Vol 11, iss 4. Pg 465-476.
25. Erejuwa, O.O.; Sulaiman, S.A. and Wahab, M.S.A.B. (2012) .Honey: a novel antioxidant. *Molecules* 17, pg 4400-4423.
26. Gonzales, G.F. (2001). "Function of seminal vesicles and their role on male fertility". *Asian J. Androl.* 3 (4): 251–8.