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Effect of Palm Pollen on Sperm Parameters of Infertile Man

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ABSTRACT

There is a rapidly growing trend in the consumption of herbal remedies in the developing countries. The aim of this study was to determine the effects of orally administered Date Palm Pollen (DPP) on the results of semen analysis in adult infertile men. Forty infertile men participated in our study. They were treated by Pollen powder 120 mg kg⁻¹ in gelatinous capsules every other day, for two months. Before and at the end of therapy, the semen was collected after masturbation and sperm numbers, motility and morphology were determined. Our findings revealed that consumption of DPP improved the sperm count. The treatment was significantly increased sperm motility, morphology and forward progressive motility. Date palm pollen seems to cure male infertility by improving the quality of sperm parameters.

Key words: Palm pollen, sperm, male infertility

INTRODUCTION

Infertility is a major health problem. Male infertility causes was found to be about 50% of infertile couples (WHO., 2000). The prevalence of infertility after two years of attempting conception was 8% in Iranian couples (Safarinejad, 2008) and epidemiological studies suggesting an increasing incidence of male reproductive problems (Kolettis, 2003).

The herbal medicine usage has become progressively more popular worldwide principally in the Asian countries. Suspension of Phoenix dactylifera Date Palm Pollen (DPP) is widely used as a folk preparation for curing male infertility in traditional medicine and this suspension is a herbal mixture. The male flowers of date palm are also eaten directly by people to enhance fertility (Soliman and Soliman, 1958).

The effect of Phoenix dactylifera pollen on sperm parameters and reproductive system of adult male rats was studied and the results indicated that the consumption of

Phoenix dactylifera pollen suspensions improved the sperm count, motility, morphology and DNA quality with a concomitant increase in the weights of testis and epididymis (Bahmanpour *et al.*, 2006). Date extract caused a significant increase in sperm cell concentration (total count) and motility in male guinea pigs and adult male rats (Omar *et al.*, 1989; Hassan *et al.*, 2012). Also, investigators showed statistically significant increase in serum testosterone levels in rats who received DPP (Iftikhar *et al.*, 2011; Bahmanpour *et al.*, 2006). Date extracts have been shown to increase in sperm concentration and motility with a increased normal morphology and a significant increase in testosterone level in rats (Adaay and Mattar, 2012). Abedi *et al.* (2012) revealed that the aqueous extract of Phoenix dactylifera pollen can be used as a sex enhancer and seems to cure male infertility in rats. Also, their findings support the traditional use of this plant for the treatment of pre-ejaculation and impotency (Abedi *et al.*, 2012). Two studies have shown protective effect on cisplatin and cadmium induced male infertility in rats (Al-Kharage, 1982; Hassan *et al.*, 2012).

There are a few studies for effect of DPP on male fertility in human. Saad *et al.* (2012) showed that adding the 20% Phoenix dactylifera pollen extract to the culture medium of the *in vitro* sperm activation leads to an improvement in the sperm motility. In another studies, a combined therapy includes DPP and zinc sulfate capsules (Al-Sanafi *et al.*, 2006) and DPP capsule alone (Marbeen *et al.*, 2005) used for treatment of 25 infertile men. The treatment was significantly increased serum LH, FSH and testosterone levels. It was also, increased significantly sperm count and motility. Sexual desire was also significantly increased.

In recent years, it has been suggested the presence of steroidal components in Phoenix dactylifera pollen grains (Mahran *et al.*, 1976; Kikuchi and Miki, 1978; Bajpayee, 1997; Abbas and Ateya, 2011) that may be involved in the regulating the spermatogenesis (Miura *et al.*, 2003) and male reproductive tissues (Amin *et al.*, 1969).

The fertility effects of DPP in traditional medicine are not supported scientifically and the literature shows little reports on its effects on sperm parameters or male genital system. Therefore, the present investigation was designed to determine the effects of DPP on the sperm parameters of adult infertile men.

MATERIALS AND METHODS

The study was carried out on 40 patients, 22-43 years in age, attending the Infertility Clinic in Jahrom, Southeast region of Iran. The patients consulted a fertility specialist in the hospital for complete evaluation. All participants were at first interviewed and questioned about their sexual behavior, history of prior surgical interventions or childhood diseases such as cryptorchidism that affect fertility and family history of infertility. Complete drug history was obtained; the patients were specifically asked about administration of sulfasalazine, cimetidine, marijuana, cocaine and tobacco. Additionally, history of contact with chemical and ionizing radiation was acquired. All subjects were then assessed for systemic diseases such as fever and acute infections (mumps). Finally, the participants underwent full urologic examination. Smokers and subjects whose problems could be solved surgically were excluded. Appropriate subjects provided informed consent and entered the study. The study protocol was approved by the ethics committee of the Jahrom University of Medical Sciences.

Male infertility is defined as inability of the wife to conceive after 12 months of unprotected sex in the absence of female cause (Mclachlan and de Kretser, 2001).

Participants were nonsmoker, nonalcoholic and non-drug abuser, without genitourinary abnormality and used drugs with effect on spermatogenesis. The infertile men participated in this study were those who had abnormal sperm count, motility or/and morphologic parameters.

They were treated by Pollen powder 120 mg kg⁻¹ in gelatinous capsules every other day, for two months (Bahmanpour *et al.*, 2006). The semen was collected in the hospital laboratory by masturbation after 48-72 h of the sexual abstinence. The semen was collected for two times, before and after the treatment period. The seminal analyses (volume, sperm count, sperm motility, sperm morphology and sperm progressive motility) were determined by routine laboratory methods and were performed by the Sperm Quality Analyzer (SQAIC-P, America).

Statistical analysis: Data were recorded by SPSS, 11.5 versions. The paired t-test used for compare of mean of sperm count and semen volume and chi square test for percentage of sperm motility, progressive motility and normal morphology after and before the treatment period.

RESULTS

Totally 40 appropriate infertile men were enrolled in the study, all of whom finished the study course and underwent a secondary semen analysis. The mean age of the patients was 31.20±5.15 years (range, 22-42 years).

The effect of dry powder of plants mixture on epididymal sperm parameters is shown in Table 1. Highly significant (p<0.001) increase in sperm morphology was shown after two months of DPP administration than before of treatment. No significant difference in volume of sperm was found after than before of treatment. There is an increase in the sperm count up to 6.5*10⁶ mL⁻¹. Sperm motility increase significantly for infertile patients treated with pollen powder every other day for two months (p<0.05). Also the progressive sperm motility significantly increases (4.6%) with 2 months treatment of DPP.

Table 1: Mean and standard deviation and percentage of semen parameters in infertile men before and after treatment with pollen of date palm

Parameters	Before treatment	After treatment	p-value
Semen volume (mL)	3.54±1.54	3.72±1.790	0.418
Sperm count (*10 ⁶ mL ⁻¹)	12.54±5.39	19.07±10.34	0.001
Sperm motility (%)	2.72±1.75	5.22±4.970	0.003
Normal sperm morphology (%)	16.45±1.35	18.32±2.880	<0.001
Progressive sperm motility (%)	16.80±5.51	21.40±8.610	0.001

SD: Standard deviation, values are give in Means±SD

DISCUSSION

Sperm count, motility and normal morphology increased significantly for the infertile patients treated with capsule with dried powder of pollen of Date palm for two months. This is agree with the reports of investigators that dealt with this aspect on laboratory animals and human (Omar *et al.*, 1989; Marbeen *et al.*, 2005; Al-Sanafi *et al.*, 2006; Bahmanpour *et al.*, 2006; Abedi *et al.*, 2012; Adaay and Mattar, 2012; Hassan *et al.*, 2012). The addition of Phoenix dactylifera pollen extract to sperm activation medium caused significant improvement in the mean of sperm count, total sperm motility and progressive sperm motility grade compared with control portions (Saad *et al.*, 2012). Also, sperm count and motility were increased significantly in infertile patients who treated with 500 mg pollen powder alone (Marbeen *et al.*, 2005) or with 100 mg zinc sulphate capsules (Al-Sanafi *et al.*, 2006). This could be attributed to the presence of gonadotropin like substance in pollen of Date palm (Mahran *et al.*, 1976; Miura *et al.*, 2003; Nayernia *et al.*, 2004). Reports are indicating that date palm contain estradiol and flavonoid components (Bennet *et al.*, 1966; Mahran *et al.*, 1976) that have positive effects on the sperm quality (Vayalil, 2002; Kostyuk *et al.*, 2004). This will explain the rise of testosterone levels that reported by researchers (Iftikhar *et al.*, 2011; Al-Sanafi *et al.*, 2006; Bahmanpour *et al.*, 2006; Abedi *et al.*, 2012; Adaay and Mattar, 2012). Furthermore, the presence of growth hormone like material in the pollen, which had anabolic effects, could participate in this stimulation. Sperm motility, morphology and progressive motility increase for treated infertile patients; all these results could be attributed to the increment in the level of testosterone. Testosterone regulates spermatogenesis, the epididymal spermatozoa maturation and motility and sexual desire.

Palm pollen contained vitamins A, E and C and it is a good source of minerals such as zinc, selenium, iron, cooper and cobalt (Hassan, 2011) that stimulate sperm motility and the progressive forward movement. The role of vitamin E in the treatment of infertile men determined by Suleiman *et al.* (1996). They demonstrated that sperm motility increased from 31.1-48.9% after treatment. Another study showed that vitamin E improved sperm motility in 14 infertile men who was treated (Martin-Du Pan and Sakkas, 1998). Ibrahim *et al.* (2004) investigated the effect of vitamin E on 65 infertile men. Sperm motility and sperm count increased in their patients. Eskenazi *et al.* (2005) performed another study on 96 healthy male participants in 2005. They established that using vitamins E and C had beneficial effects on concentration and motility of the sperm; especially, class A motility.

Our finding revealed that the DPP caused significant improvement in the percentage of progressive sperm motility. DPP contains concentrations of phytochemicals and nutrients

and are rich in carotenoids, flavonoids and phytosterols (Broadhurts, 1999) and is good source of protein, amino acids, vitamins, dietary fiber, fatty acids, enzymes, hormones and minerals (Haro *et al.*, 2000). All of these substances stimulate sperm motility and the grade activity of forward movement.

Biochemical and hematological tests clearly proved that pollen of Date Palm was a safe treatment material (Mahran *et al.*, 1976). Liver and renal function; serum cholesterol, glucose and cholesterol and hematological indexes were not significantly changed after therapy with pollen of Date Palm (Marbeen *et al.*, 2005).

CONCLUSION

Administration of Date Palm Pollen seems to improve sperm quality in infertile men and consequently enhance fertility in the human. Therefore, it may be useful to solve infertility problems.

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