Antioxidant Role of Date Palm Pollen in Infertile Men and Its Correlation with Sperm Parameters and Expression of Sex Genes: A Controlled Clinical Trial

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ABSTRACT

Introduction: Increasing reactive oxygen species levels can be considered a threatening agent for male infertility. Phoenix dactylifera pollen (Date palm pollen, DPP) positively affects sperm parameters, which has been well documented in animal models. This study aimed to determine the effects of DPP on sperm parameters, expression of antioxidant genes, and activation of antioxidant enzymes in infertile men.

Methods and Materials: This randomized and comparative clinical trial included 20 fertile and 60 infertile men referred to Om-e-Leila Hospital in Bandar Abbas, Hormozgan, Iran, during 2016 (March)-17 (June). Sample collection of infertile cases was performed before and after using capsules of DPP powder for 30 consecutive days for semen analysis. Semen samples of fertile men were extracted as the controls. Quantitative real-time polymerase chain reaction was performed for RNA extraction to peruse the nuclear factor erythroid 2-related factor 2 (*NRF2*), superoxide dismutase (*SOD2*), glutathione peroxidase 4 (*GPX4*), and catalase (*CAT*) genes. In the end, we used SPSS 16.0 for statistical analyses.

Results: After using DPP, there was a significant enhancement in the expression of *NRF2*, *GPX4*, *SOD2*, and *CAT* genes (p = 0.001. However, in the control group, the expression of antioxidant genes was higher than that in the experimental group after the treatment, except for *the SOD2* gene (p = 0.16). Our findings also showed that the mean activity of the GPX4, SOD2, and CAT enzymes was higher in the treatment group compared to the control group. There was a correlation between DPP use, expression of antioxidant genes, and the count, volume, motility, and morphology of sperm.

Conclusion and Discussion: Administering DPP improves semen quality and positively affects the expression of *NRF2*, *SOD2*, *CAT*, and *GPX4* genes in infertile men. More studies are suggested to support this hypothesis.

Keywords: Male infertility, NRF2, SOD2, Reactive oxygen species

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