Review Article

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# Role of Nutrition in Female and Male Fertility

**Sh. Alizadeh (MSc)*[1], P. Mirmiran (PhD)[2], M. Hajifoghaha (MSc)[1]**

1.Students Research Committee, Department of Midwifery, Faculty of Nursing & Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, I.R.Iran

2.Nutrition Research Center, Endocrinology and Metabolism Research Institute, Shahid Beheshti University of Medical Sciences, Tehran, I.R.Iran

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## ABSTRACT

**BACKGROUND AND OBJECTIVE:** One of the sustainable development goals is universal access to reproductive services by 2030. Reproductive disorders is an important neglected component in reproductive health. Some factors, like type of nutrition effects on fertility. The aim of this study is to determine role of nutrition in female and male fertility.

**METHODS:** This study is a narrative review article. Search was conducted by using relevant keywords such as: infertility, fertility, nutrition and diet. Results were limited to 39 articles published in Iranian and international journals in SID, Magiran, Scopus, PubMed, Google Scholar, Elsevier databases, in the period 2011-2016. Also nutrition guidelines for infertile couples in scientific nutritional and university sites was used.

**FINDINGS:** The results showed that unsaturated fatty acids, fruits and vegetables and low-fat dairy, for improving women's reproductive recommended. Factors that reduce male fertility include: high consumption of red and processed meats, high intake of saturated fat, low intake of unsaturated fats, antioxidants, fruits and vegetables.

**CONCLUSION:** Following a balanced diet is one of promising and valuable interventions in maintaining reproductive health. However, Identification of a suitable fertility diet is "Important achievement" in the management of fertility.

**KEY WORDS:** *Diet, Fertility, Food, Infertility*.

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*Corresponding author: Sh. Alizadeh (MSc)

**Address:** Department of Midwifery, Faculty of Nursing & Midwifery, Shahid Beheshti University of Medical Sciences, Vali-Asr Ave., Tehran, I.R.Iran

**Tel:** +98 21 88655366

**E-mail:** gelayolalizadeh@yahoo.com

## Introduction

One of the goals of sustainable development is the universal access to sexual and reproductive health by 2030 (1,2). Reproductive disorders is an important forgotten component in reproductive health. The World Health Organization has mentioned infertility as a disease that affects over 13 to 17 percent of couples (2). Infertility in comparison to stressful events of life, after the death of mother, father and betrayed wife is in fourth place (3). WHO has estimated that for every four couples in developing countries, one person is affected by infertility (4). In 2010 among women of childbearing age, 9.1% of patients were primary infertility and 10.5 percent were secondary infertility (2). In general fertility rate in Iran is 13.2 percent that 93.9 percent are male infertility cases, 40.3 percent of women and 10.1 of cases are unknown (3).

Lifestyle, nutrition, over weight and activity level has an effect on fertility (5, 6). People who has proper diet and lifestyle have six times increased fertility (7). Obese or overweight women with polycystic ovarian syndrome, have less physical activity than individuals without polycystic ovarian syndrome (8,9) that this body over weight has negative effects on the physical aspects of quality of life, particularly among women with polycystic ovarian syndrome (10).

Fatty acids, carbohydrates, proteins are involved in the activities of human physiology and absorption and inappropriate use of them causing disturbance on metabolic homeostasis and affecting on fertility of women (11,12). Soy consumption is associated with lower sperm count (13). Alcohol also has a negative effect on semen analysis parameters (14,15). In terms of religious and cultural, fertility has a great importance in Iranian society (16,17). According to current investigations in the field of infertility treatment and fertility improvement around the world, as well as the effect of nutrition on the development of fertility and childbearing, this review was conducted to investigate the role of nutrition in the fertility of men and women.

## Methods

In this traditional review study, the role of nutrition in fertility was investigated by searching the databases of SID, Magiran, Scopus, PubMed, Google Scholar and Elsevier in the period 2011 to 2016, using the keywords infertility, infertility, fertility, nutrition, diet and infertility, fertility, diet, food. First all articles related to nutrition and fertility and infertility were collected and then laboratory and animal studies and articles available with abstract or articles have been published in other languages other than English and Farsi were omitted.

All randomized controlled trials, cross-sectional, retrospective, case-control, cross-sectional and cohort studies with full text in relation to the role of nutrition on fertility were published in Farsi and English, were considered. Also in this study nutrition guides for infertile patients available on valid nutrition servers and universities such as Harvard were used.

## Results

finally, from 297 obtained article 39 article (Infertility of women: 5 Iranian, 14 English and male infertility: 4 Iranian and 16 English) were studied. Proper diet can be useful for increasing fertility. The fertility diet includes nutrients needed to produce sex hormones, ovum and sperm health and fetal development (14).

Micronutrients that are antioxidants, vitamins D, E, C, B12, B6, COQ10, lipoic acid, folic acid, iron, selenium, zinc, essential fatty acids and minerals and macronutrients are protein, fiber, fat, carbohydrates, have a direct influence on fertility (15). High consumption of red meat, beef and bacon has increased the risk of endometriosis by 80 percent, while fresh vegetables and fruits reduce the risk of endometriosis by 40 percent (16, 15). The role of nutrition in infertility of men and women were analyzed separately (tables 1, 2).

**Table 1. Overview of the role of nutrition in women's fertility**

| First author (year) | The title | Type of study | Check tool | Sample size and execution location | Results |
|---|---|---|---|---|---|
| Górna (17) (2016) | Protein Effect on Women Infertility | Cross sectional | Checking nutrition and anthropometry | 100people - Poland | The amount of calories and protein in infertile women were higher than fertile women. |
| Afeiche (18) (2016) | The relationship between dairy consumption and laboratory fertilization in women | Futuristic cohort | Oral frequency questionnaire and examination of ovarian and fetal status | 232people, USA | Dairy consumption was associated with a higher chance of a newborn birth. |
| Shishehgar (19) (2015) | Comparison of the Standard Protein Regimen in the Treatment of | review | Study reviews | Iran | The high protein diet has led to improved metabolic variables. |

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| | Polycystic Ovary Syndrome | | | | |
| Phy (20) (2015) | Eating a low diet of starch and dairy products in the treatment of obesity | Consulting | Measuring BMI, Glucose, HbA1C, Testosterone | 24women, USA | With the intervention, weight loss and testosterone reduction were observed. |
| Nikokavoura (21) (2015) | Weight loss in women with and without polycystic ovary syndrome with a very low calorie diet | Interventional | 600Kcal / day with multivitamin | 1016female - England | Weight loss in the two groups did not differ significantly. |
| Sadeghi (22) (2015) | Comparison of diet intake, physical activity and Weight of infertile women with fertile women | Analytical descriptive | Researcher-made questionnaire and anthropometric | 288women - Iran | Physical activity in infertile women was less than healthy. Receiving calories, protein, carbohydrates, selenium, zinc and vitamin C were higher in infertile women, but receiving fat, vitamin E and iron in healthy women were higher. |
| Lerchbaum (23) (2014) | Vitamin D and female fertility | Review | Study reviews | Germany | Women with a polycystic ovary that received vitamin D had increased endometrial thickness. Vitamin D increased ovarian reserve at the late stages of fertility. |
| Ruder (24) (2014) | Antioxidant intake in infertile women with unknown cause | Cross sectional | Oral Frequency Questionnaire | 273women - USA | The consumption of vitamin E was associated with a shorter time for pregnant women over the age of 30 years. Women under 35 years of age and with increased beta-carotene and vitamin C had a shorter time to get pregnant. |
| Gaskins (25) (2014) | Folate diet and fertility in women who are receiving fertility treatment | Retrospective | Oral Frequency Questionnaire | 232women - American Boston | The intake of folate is associated with a greater replacement of zygote and the birth of the baby. |
| McGrievy (26) (2014) | Nutrition in women with polycystic ovary syndrome | Cross sectional | EBI questionnaire and quality of life and physical activity questionnaire | 46women - USA | Infertile overweight Women with polycystic ovary syndrome had a poor diet for whole grains, fiber and iron. |
| Youssef (27) (2014) | Supplementation of oral antioxidants in infertile women with unknown cause | Controlled trial | Hormonal, ultrasound and laparoscopic examination | 218women - Egypt | Use of vitamins A, E and C, Zn, Amino Acid and Bioflavonoids Antioxidant did not increase fertility in infertile women with unknown cause. |
| Rajaeieh (28) (2014) | The relationship between dairy consumption and polycystic ovary syndrome | Cross sectional | Oral Frequency Questionnaire | 400women - Iran | Milk consumption was not associated with polycystic ovary. |
| Sohrabvand (29) (2013) | Evaluation of serum zinc levels in infertile women with and without polycystic ovary syndrome | Case-control | Measuring serum zinc level | 50women - Iran | There was no significant difference in serum level of zinc between the two groups. |
| Buhling (30) (2013) | Effect of micronutrient supplements on women's Fertility | Review | Study reviews | Germany | The use of vitamins, iron, iodine and selenium had a positive impact on infertility treatment. |
| Kazemi (31) (2013) | Effect of fat on oocyte quality | Cross sectional | Oral Frequency Questionnaire | 236women - Iran | Fat consumption had a negative effect on fetal growth. Zigote, containing low levels of antioxidant, has a lower chance of fertilization and replacement. |
| Tsai (32) (2013) | Comparison of Nutrition in Infertile Women with Polycystic Ovary Syndrome with Healthy Women | Case-control | Anthropometric and food intake questionnaire | 206women-Taiwan | Women with polycystic ovary syndrome had lower carbohydrate levels than controls. |
| Twigt (33) (2012) | The relationship between pre-pregnancy diet and the likelihood of continued pregnancy in women treated with IVF / ICSI | Cross sectional | Diet questionnaire | 199women-the Netherlands | There was a correlation between the dietary scores and the odds of pregnancy after IVF / ICSI treatment. |
| Mahoney (34) (2012) | Lifestyle modification in overweight and obese women with polycystic ovary syndrome | Futuristic Interventional | Oral Frequency Questionnaire, checking Physical Activity | 12women - USA | Menstruation is regular, with a change in diet, exercise and physical activity in about 50% of people. |
| Toledo (35) (2011) | Food patterns and fertility disorders | nested case control study | Oral Frequency Questionnaire | 485women - Spain | The Mediterranean diet (fruit, vegetables, red meat and processed meat, trans and unsaturated fat, grains, nuts and beans, soft drinks, sugar and juice, alcohol and sodium (36)) increased the fertility rate. |

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**Table 2. Overview of the role of nutrition in male fertility**

| First author (year) | The title | Type of study | Check tools | Sample size and execution location | Results |
|---|---|---|---|---|---|
| Giahi (37) (2016) | Nutrition and male infertility | Review | Study reviews | 23 study-Iran | Excessive consumption of red and processed meat, low consumption of unsaturated fats and antioxidants, and fruits and vegetables, high saturated fats, reduced fertility in men. |
| Eslamian (38) (2016) | Western Nutrition and Azoospermia | Case-control | Semen Test and Oral Frequency Questionnaire | 342men - Iran | Western dietary patterns (refined grains, processed meats and sweets (35)) are associated with the risk of azoospermia. |
| Esmaeili (39) (2015) | Dietary fatty acids and sperm quality | Review | Study reviews | Iran | Supplemented fish oil in infertile men, improved seminal parameters. |
| Pant (40) (2015) | The relationship between Plumbum and cadmium in semen quality | Cross sectional | Semen Test and Questionnaire | 119men-India | Plumbum and cadmium were significantly higher in infertile women. There was a negative relationship between Plumbum and cadmium in semen and concentration, movement and abnormal morphology of sperm. |
| Rato (41) (2014) | Men's high-calorie diet and fertility | Review | Study reviews | Portugal | There was a negative correlation between high calorie diet, fat and processed meat with semen parameters. |
| Dattilo (42) (2014) | Nutrition in male fertility | Interventional | Semen Test and Oral Frequency Questionnaire | 84people - France | Nutrition support improved male fertility. |
| Chavarro (43) (2014) | The relationship between trans fatty acid and sperm count in healthy men | Cross sectional | Semen Test and Oral Frequency Questionnaire | 209men-Spain | There was a negative correlation between acid intake and sperm count. |
| Chiu (44) (2014) | The connection of drinking sweetened with semen quality in young men | Cross sectional | Semen Test and Oral Frequency Questionnaire | 189189men - USA | Sugar-beverage consumption has a reverse relationship with progressive sperm motility. |
| Afeiche (45) (2014) | Dairy consumption and semen quality | Longitudinal | Semen Test and Oral Frequency Questionnaire | 155 males - American Boston | Low-fat dairy consumption is associated with progressive sperm motility. The consumption of cheese is associated with a reduction in the number of sperm in smokers. |
| Afeiche (46) (2014) | Meat consumption and reproductive parameters in young men | Cross sectional | Semen Test and Oral Frequency Questionnaire | 189men - USA | There was a negative correlation between the consumption of processed meat and the total number of sperm and semen volume. |
| Afeiche (47) (2014) | Relationship between consumed processed meat and fish with semen quality indices | Cross sectional | Semen Test and Oral Frequency Questionnaire | 155males - USA | Processed meat was inversely related to sperm morphology and fish consumption was associated with more sperm count and normal morphology. |
| Ko (48) (2014) | Biologically active additives And fertility of men | Review | Study reviews | USA | The use of antioxidants reduced male infertility. |
| Mora-Esteves (49) (2013) | Men's nutritional supplements and fertility | Review | Study reviews | USA | Antioxidants help improvement of sperm parameters. |
| Zareba (50) (2013) | Quality of semen and antioxidant use in healthy men | Cross sectional | Semen Test and Oral Frequency Questionnaire | 189men - USA | Increased sperm motility was observed in men who had more beta-carotene absorption. There was a relationship between vitamin C and sperm concentration. |
| La Vignera (51) (2013) | Alcohol and Male Fertility | Review | Laboratory and clinical studies | Italy | Alcohol consumption reduced testosterone and gonadotropins, reduced sperm count, and increased abnormal sperm morphology. |
| Jensen (52) (2013) | Relationship of saturated fat with reduced quality of semen | Cross sectional | Semen Test and Oral Frequency Questionnaire | 701male, Danish | High levels of saturated fat reduced the total number of sperm. |
| Braga (53) (2012) | The relationship of food intake in men with intra-cytoplasmic sperm injection | Observational | Semen Test and Oral Frequency Questionnaire | 250men-brazil | Alcohol consumption had a negative effect on fertility. Red meat had a negative effect on the zygote implantation. Sperm motility was positively affected by cereals and fruits. |
| Gaskins (54) (2012) | Food patterns and sperm quality in young men | Cross sectional | Semen Test and Oral Frequency Questionnaire | 188people - USA | Cautious food patterns included whole grains, vegetables, fruits and fish (35, 53) was associated with a high percentage of progressive sperm motility. |

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| Xia (55) (2012) | The association of urinary phytoestrogens with male idiopathic infertility | Case-control | Semen Test and Questionnaire | 537men-Taiwan | Increased levels of urinary phytoestrogens were associated with abnormal concentrations and sperm motility. |
| Eslamian (56) (2012) | Nutrition and azoospermia without cause | Case-control | Semen Test and Oral Frequency Questionnaire | 241men - Iran | The highest risk of azoospermia was due to the consumption of processed meat and sweets. |

**Diet for fertility of women:**

**A.** Polycystic ovary syndrome:

1. the balance between proteins with carbohydrates.

2-foods with low glycemic index.

3. Diet rich in fiber.

4-Eating 5 meals a day.

5. The daily intake of essential fatty acids (omega 3 and 6).

6. Aerobic exercise for 30 minutes five times a week.

7-consuming organic material.

8. Turkish coffee and caffeine.

9 Plants that make regular ovulation such as liver oil of fish, licorice, Vitex, Tribulus terrestris, white flowers, natural progesterone cream and cinnamon (57).

**B.** Diet for the treatment of hirsutism and uterine hyperplasia: royal jelly and beeswax (57).

**C.** Diet for IVF:

1.low-fat proteins.

2.2-fish.

3.Zinc

4.The complex carbohydrates.

5.folic acid (58).

## Discussion

**The role of nutrition in the treatment of male fertility:** red and processed meat, unsaturated fats and antioxidants, fruits and vegetables have important effect on the fertility of women (37). There is an inverse relationship between the consumption of processed red meat with the number of sperm, semen volume (56, 47, 46). Fish consumption increases the sperm and sperm with normal morphology (47). Western dietary pattern increases azoospermia and has a negative effect on semen parameters and sperm quality (56, 47, 46, 41, 38, 37), but the use of plant-based diet is associated with reduced azoospermia (38). Low intake of fruits and vegetables is associated with an increase in male infertility (37). Eating more beans, grains and fruits also increases sperm motility (53). High intake of saturated fat was associated with low sperm count (52, 43, 41, 37) and there is a negative relationship between cholesterol and the amount of semen volume (43).

Unlike the results of mentioned researches, in a study western diet was not associated with semen parameters, but the (54, 36) was associated with a high percentage of progressive motility of sperm (54). Perhaps the small number of studied patients (188 patients) and its methodology leads to this lack of consistency. In other studies, consumption of beverages sweetened with sugar had an inverse relationship with progressive motility of sperms (44) and consumption of cookies also was associated with the risk of azoospermia (56). Low-fat milk consumption is associated with higher sperm count (45) Fish oil supplements in the diet of infertile male affects sperm fatty acid and improves semen parameters in response to omega-3 (39). Antioxidant intake are one of the factors affecting the treatment of male infertility (37). Antioxidants reduce male infertility (48), improve semen parameters and increase fertility rate to 4/18 times (49). Alcohol consumption decreases testosterone and gonadotropins, reduces sperm count and semen volume, increases sperm morphology and white blood cells of semen (53, 51).

**The role of nutrition in fertility treatment of women:** one of the causes of infertility in women is polycystic ovary syndrome. Overweight infertile women with polycystic ovary syndrome, a diet low in whole grains, fiber and iron (26) and a high intake of sugar, low amount of legumes and vegetables (59) and low consumption of starch and dairy products were successful in the treatment of their obesity (20). Weight loss is also effective in improving poly cystic ovarian syndrome (19), so that the average weight loss leads to improvement in 50% of treated patients (34). German women with PCOS receiving vitamin D, their endometrial thickness was increased. Vitamin D increased ovarian reserve in the late reproductive age (23). Rajaeieh et al in their study found that there is no relationship between milk consumption and the risk of polycystic ovarian syndrome (28), but other results suggest that consumption of dairy products is associated with a higher chance of live birth (18), the reason for this paradox may because of the dairy products (low-fat and fatty) which is not included in

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the study. Consumption of antioxidant is one of the most effective foods in the treatment of infertility in women, (31). In one study, vitamin E supplement was associated with shorter time to pregnancy in women over age 30 and women under 35 years with consumption of beta-carotene and vitamin C had a shorter time to pregnancy (24).

Higher levels of folate is in association with implantation and live birth (25). Although various micronutrients and antioxidants have a positive impact on the treatment of infertility (30), but Youssef and colleagues found that taking antioxidants does not increase fertility in women with unexplained infertility (27) which may be due to the consumption of Octatron capsules. Although physical activity and proper diet can improve fertility results but identification of a proper diet is a major achievement in fertility management (10). Hippocrates says: "If any man have proper nutrition and physical activity; has found a safe way to get health," (10).

The results of this study showed that certain foods are recommended to improve fertility in women and men, therefore it is essential that infertile couples use proper diet in addition to the treatment. Limitations of this study was that it is not possible to assess the effects of a food on the fertility of men and women due to simultaneous use of food.

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[ DOI: 10.22088/jbums.19.4.7 ]

## References

1.Reproductive, Maternal, Newborn, Child, Adolescent Health And Undernutrition. Available from: http://www.who.int/gho/publications/mdgs-sdgs/MDGs-SDGs2015_chapter4.pdf.

2.Mascarenhas MN, Flaxman SR, Boerma T, Vanderpoel S, Stevens GA. National, regional, and global trends in infertility prevalence since 1990: a systematic analysis of 277 health surveys. PLoS Med. 2012;9(12):e1001356.

3.DirekvandMoghadam A, Delpisheh A, Kourosh Sayehmiri. The prevalence of infertility in Iran, a systematic review. Iran J Obstet Gynecol Infertilit. 2014;16(81):1-7.

4.Infecundity, Infertility, and Childlessness in Developing Countries. Available from: http://www.who.int/reproductivehealth/topics/infertility/DHS-CR9.pdf?ua=1.

5.Huang H, Hansen KR, Factor-Litvak P, Carson SA, Guzick DS, Santoro N, et al. Predictors of pregnancy and live birth after insemination in couples with unexplained or male-factor infertility. Fertil Steril. 2012;97(4):959-67.

6.Esmaeilzadeh, Agajani Delavar, Basirat, Shafi H. Physical activity and body mass index among women who have experienced infertility. Arch Med Sci. 2013;3: 499-505.

7.Acubalance Fertility Diet. Available from: http://sagewellnesscenter.org/FertilityDiet.pdf. [Interne].

8.Shishehgar F, Tehrani FR, Mirmiran P, Hajian S, Baghestani AR, Moslehi N. Factors Influencing Physical Activity in Women with Polycystic Ovary Syndrome in Comparison to Eumenorrheic Non Hirsute Women. Global Health Sci. 2016;8(10):56382.

9.Ghadimi R, Esmaeilzadeh S, Firoozpour M, Ahmadi A. Does vitamin D status correlate with clinical and biochemical features of polycystic ovarysyndrome in high school girls. Caspian J Intern Med. 2014;5(4):202-8.

10.Shishehgar F, Ramezani Tehrani F, Mirmiran P, Hajian S, Baghestani AR. Comparison of the association of excess weight on health related quality of life of women with polycystic ovary syndrome: an age- and BMI-matched case control study. PLoS One. 2016;11(10):e0162911.

11.Fontana R, Torre SD. The deep correlation between energy metabolism and reproduction: a view on the effects of nutrition for women fertility. Nut. 2016;8(2). doi: 10.3390/nu8020087.

12.Ghadimi R, Kuriki K, Tsuge K, Takeda E, Imaeda N, Suzuki S, Sawai A. Serum concentrations of fatty acids and colorectal adenoma risk: a case-control study in Japan. Asian Pac J Cancer Prev. 2008;09(1):111-8.

13.Chavarro JE, Toth TL, Sadio SM, Hauser R. Soy food and isoflavone intake in relation to semen quality parameters among men from an infertility clinic. Hum Reprod. 2008;23(11):2584-90.

14.Gaur DS, Talekar MS, Pathak VP. Alcohol intake and cigarette smoking: impact of two major lifestyle factors on male fertility. Indian J Pathol Microbiol. 2010;53(1):35-40.

15.Muthusami KR, Chinnaswamy P. Effect of chronic alcoholism on male fertility hormones and semen quality. Fertil Steril. 2005;84(4):919-24.

16.Behjati Ardekani Z, Akhondi MM KK, Fazli Khalaf Z, Eskandari S, B. G. Mental health status of patients attending avicenna infertility clinic. J Reprod Infertil. 2010;4(45):319-24.

17.R Ghadimi, MS Kamrani, A Zarghami, AA Darzi. The role of nutrition in educational and spiritual development of human beings: Quranic perspective. J Babol Univ Med Sci. 2010;15(1):34-9.

18.The Natural Fertility Diet: How to Eat for Optimal Fertility. available from: http://natural-fertility-info.com/fertility-diet.

19.Diet guidelines for preconception & pregnancy. Available from: http://fertility.com.au/Docs/Downloads/Diet%20Guidelines%20-%20Preconception%20and%20Pregnancy.pdf.

20.Gorna I, Wieckowska B, Przyslawski J, Szymanowski K. Effect of increased protein intake on the risk of female infertility. Pol Arch Med Wewn. 2016;126(3):198-200.

21.Afeiche MC, Chiu YH, Gaskins AJ, Williams PL, Souter I, Wright DL, et al. Dairy intake in relation to in vitro fertilization outcomes among women from a fertility clinic. Hum Reprod. 2016;31(3):563-71.

22.Shishehgar F, Ramezani Tehrani F, Mirmiran P, Hajian S, Baghestani AR. Comparison of energy-restricted high protein (HP) with standard-protein (SP) diets in women with polycystic ovary syndrome. Med Sci J. 2015;25(2):95-104.[In Persian].

23.Phy JL, Pohlmeier AM, Cooper JA, Watkins P, Spallholz J, Harris KS, et al. Low starch/Low dairy diet results in successful treatment of obesity and co-morbidities linked to polycystic ovary syndrome (PCOS). J Obes Weight Loss Ther. 2015;5(2):259.

24.Nikokavoura EA, Johnston KL, Broom J, Wrieden WL, Rolland C. Weight loss for women with and without polycystic ovary syndrome following a very low-calorie diet in a community-based setting with trained facilitators for 12 weeks. Diabetes Metab Syndr Obes. 2015;8:495-503.

[ DOR: 20.1001.1.15614107.1396.19.4.1.8 ]
[ DOI: 10.22088/jbums.19.4.7 ]

25.Sadeghi F, Miri N, Barikani A, Hossein Rashidi B, Ghasemi Nejad A, Hojaji E, et al. Comparison of Food intake, physical activity and weight in infertile and healthy women aged 25-40 years. Iran J Obstet Gynecol Infertilit. 2015;18(173):32-40.[In Persian].
26.Lerchbaum E, Rabe T. Vitamin D and female fertility. Curr Opin Obstet Gynecol. 2014;26(3):145-50.
27.Ruder EH, Hartman TJ, Reindollar RH, Goldman MB. Female dietary antioxidant intake and time to pregnancy among couples treated for unexplained infertility. Fertil Steril. 2014;101(3):759-66.
28.Gaskins AJ, Afeiche MC, Wright DL, Toth TL, Williams PL, Gillman MW, et al. Dietary folate and reproductive success among women undergoing assisted reproduction. Obstet Gynecol. 2014;124(4):801-9.
29.Turner-McGrievy G, Davidson CR, Billings DL. Dietary intake, eating behaviors, and quality of life in women with polycystic ovary syndrome who are trying to conceive. Hum Fertil (Camb). 2015;18(1):16-21.
30.Youssef MA, Abdelmoty HI, Elashmwi HA, Abduljawad EM, Elghamary N, Magdy A, et al. Oral antioxidants supplementation for women with unexplained infertility undergoing ICSI/IVF: randomized controlled trial. Hum Fertil (Camb). 2015;18(1):38-42.
31.Rajaeieh G, Marasi M, Shahshahan Z, Hassanbeigi F, Safavi SM. The relationship between Intake of dairy products and polycystic ovary syndrome in women who referred to isfahan university of medical science clinics in 2013. Int J Prev Med. 2014;5(6):687-94.
32.Sohrabvand F, Shirazi M, Shariat M, Mahdiyin F. Serum zinc level in infertile women with and without polycystic ovary syndrome: a comparative study. Tehran Univ Med J. 2013;71(3):157-63.[In Persian].
33.Buhling KJ, Grajecki D. The effect of micronutrient supplements on female fertility. Curr Opin Obstet Gynecol. 2013;25(3):173-80.
34.Kazemi A, Ramezanzadeh F, Nasr-Esfahani MH, Saboor Yaraghi AA, Ahmadi M. Does dietary fat intake influence oocyte competence and embryo quality by inducing oxidative stress in follicular fluid?. Iran J Reprod Med. 2013;11(12):1005-12.
35.Tsai YH, Wang TW, Wei HJ, Hsu CY, Ho HJ, Chen WH, et al. Dietary intake, glucose metabolism and sex hormones in women with polycystic ovary syndrome (PCOS) compared with women with non-PCOS-related infertility. Br J Nutr. 2013;109(12):2190-8.
36.Twigt JM, Bolhuis ME, Steegers EA, Hammiche F, van Inzen WG, Laven JS, et al. The preconception diet is associated with the chance of ongoing pregnancy in women undergoing IVF/ICSI treatment. Hum Reprod. 2012;27(8):2526-31.
37.Mahoney D. Lifestyle modification intervention among infertile overweight and obese women with polycystic ovary syndrome. J Am Assoc Nurse Pract. 2014;26(6):301-8.
38.Toledo E, Lopez-del Burgo C, Ruiz-Zambrana A, Donazar M, Navarro-Blasco I, Martinez-Gonzalez MA, et al. Dietary patterns and difficulty conceiving: a nested case-control study. Fertil Steril. 2011;96(5):1149-53.
39.Hajifoghaha M, Mirmiran P, Alizadeh. S. Modification of food consumption, reduction of breast cancer: a review study. J Isfahan Med School. 2016;34(386):683-91.[In Persian].
40.Giahi L, Mohammadmoradi S, Javidan A, Sadeghi MR. Nutritional modifications in male infertility: a systematic review covering 2 decades. Nutr Rev. 2016;74(2):118-30.
41.Eslamian G, Amirjannati N, Rashidkhani B, Sadeghi MR, Baghestani AR, Hekmatdoost A. Adherence to the western pattern Is potentially an unfavorable indicator of asthenozoospermia risk: a case-control study. J Am Coll Nutr. 2016;35(1):50-8.
42.Esmaeili V, Shahverdi AH, Moghadasian MH, Alizadeh AR. Dietary fatty acids affect semen quality: a review. Andrology. 2015;3(3):450-61.
43.Pant N, Kumar G, Upadhyay AD, Gupta YK, Chaturvedi PK. Correlation between lead and cadmium concentration and semen quality. Andrologia. 2015;47(8):887-91.
44.Rato L, Alves MG, Cavaco JE, Oliveira PF. High-energy diets: a threat for male fertility? Obes Rev. 2014;15(12):996-1007.
45.Dattilo M, Cornet D, Amar E, Cohen M, Menezo Y. The importance of the one carbon cycle nutritional support in human male fertility: a preliminary clinical report. Reprod Biol Endocrinol. 2014;12:71.
46.Chavarro JE, Minguez-Alarcon L, Mendiola J, Cutillas-Tolin A, Lopez-Espin JJ, Torres-Cantero AM. Trans fatty acid intake is inversely related to total sperm count in young healthy men. Hum Reprod. 2014;29(3):429-40.
47.Chiu YH, Afeiche MC, Gaskins AJ, Williams PL, Mendiola J, Jorgensen N, et al. Sugar-sweetened beverage intake in relation to semen quality and reproductive hormone levels in young men. Hum Reprod. 2014;29(7):1575-84.
48.Afeiche MC, Bridges ND, Williams PL, Gaskins AJ, Tanrikut C, Petrozza JC, et al. Dairy intake and semen quality among men attending a fertility clinic. Fertil Steril. 2014;101(5):1280-7.
49.Afeiche MC, Williams PL, Gaskins AJ, Mendiola J, Jorgensen N, Swan SH, et al. Meat intake and reproductive parameters among young men. Epidemiol. 2014;25(3):323-30.

[ DOR: 20.1001.1.15614107.1396.19.4.1.8 ]
[ DOI: 10.22088/jbums.19.4.7 ]

50. Afeiche MC, Gaskins AJ, Williams PL, Toth TL, Wright DL, Tanrikut C, et al. Processed meat intake is unfavorably and fish intake favorably associated with semen quality indicators among men attending a fertility clinic. J Nutr. 2014;144(7):1091-8.
51. Ko EY, Sabanegh ES. The role of nutraceuticals in male fertility. Urol Clin North Am. 2014;41(1):181-93.
52. Mora-Esteves C, Shin D. Nutrient supplementation: improving male fertility fourfold. Semin Reprod Med. 2013;31(4):293-300.
53. Zareba P, Colaci DS, Afeiche M, Gaskins AJ, Jorgensen N, Mendiola J, et al. Semen quality in relation to antioxidant intake in a healthy male population. . Fertil Steril. 2013;100(6):1572-9.
54. La Vignera S, Condorelli RA, Balercia G, Vicari E, Calogero AE. Does alcohol have any effect on male reproductive function? A review of literature. Asian J Androl. 2013;15(2):221-5.
55. Jensen TK, Heitmann BL, Blomberg Jensen M, Halldorsson TI, Andersson AM, Skakkebaek NE, et al. High dietary intake of saturated fat is associated with reduced semen quality among 701 young Danish men from the general population. Am J Clin Nutr. 2013;97(2):411-8.
56. Braga DP, Halpern G, Figueira Rde C, Setti AS, Iaconelli A, Jr., Borges E, Jr. Food intake and social habits in male patients and its relationship to intracytoplasmic sperm injection outcomes. Fertil Steril. 2012;97(1):53-9.
57. Gaskins AJ, Colaci DS, Mendiola J, Swan SH, Chavarro JE. Dietary patterns and semen quality in young men. Hum Reprod. 2012;27(10):2899-907.
58. Xia Y, Chen M, Zhu P, Lu C, Fu G, Zhou X, et al. Urinary phytoestrogen levels related to idiopathic male infertility in Chinese men. Environ Int. 2013;59:161-7.
59. Eslamian G, Amirjannati N, Rashidkhani B, Sadeghi MR, Hekmatdoost A. Intake of food groups and idiopathic asthenozoospermia: a case-control study. Hum Reprod. 2012;27(11):3328-36.
60. How to Reduce the Damaging Effects of PCOS on Fertility Through Diet and Herbs Available from:. http://natural-fertility-info.com/pcos-fertility-diet.
61. Can Diet Affect Your IVF Success? Available from: http://www.embryo.net/blog/2014/06/25/can-diet-affect-your-ivf-145646.
62. Esmaeilzadeh S, Andarieh MG, Ghadimi R, Delavar MA. Body mass index and gonadotropin hormones (LH & FSH) associate with clinical symptoms among women with polycystic ovary syndrome. Global J Health Sci.2015;7(2):101.
63. Shishehgar F, Ramezani Tehrani F, Mirmiran P, Hajian S, Baghestani AR, Moslehi N. Comparison of Dietary Intake between Polycystic Ovary Syndrome Women and Controls. Global journal of health science. 2016;8(9):54801.

[ DOR: 20.1001.1.15614107.1396.19.4.1.8 ]
[ DOI: 10.22088/jbums.19.4.7 ]