

The Fertility Diet

What We Know

Clinical infertility, the inability to conceive after 12 months of unprotected intercourse, affects approximately 15% of the population in developed countries, or 1 in 6 couples, during their reproductive lifetime. The most common causes of infertility are ovulatory disorders, which account for 18% to up to 30% of cases, tubal disease, endometriosis, chromosomal abnormalities, and low sperm concentration or other sperm abnormalities. In addition, many cases of infertility are unexplained. Research has established a relationship between dietary quality, body weight, and fertility and outcome of reproductive treatments. While not all cases of infertility can be prevented, it is recommended that any couple trying to conceive improve any modifiable risk factors and follow an ideal “fertility diet,” especially prior to beginning assistive reproductive technologies (ART). The use of a nutrition screening form and medical nutrition therapy as appropriate can help to optimize reproductive outcomes ^(1,6,8,9,10)

- › In both men and women, excessive weight and obesity are associated with subfertility, decreased pregnancy rates, and increased pregnancy loss. Likewise, women who are underweight are also at risk, and are more likely to be successful when they gain weight to achieve a normal body weight. A body mass index (BMI) between 20 and 25 kg/m² is recommended for couples trying to conceive ^(1,8,9,10,11,12)
- In men, a higher BMI (> 25 kg/m²) has been linked to a decrease in the quantity and quality of sperm, as well as an increase in erectile dysfunction⁽²⁾
- In women, BMI is related to the critical body fat mass needed for menarche, sex hormone levels, and normal ovulation ^(8,9,10)
 - BMI < 20 kg/m² is associated with low body fat and weight-related amenorrhea or abnormal menstrual function. In addition, dieting with severe energy restriction is associated with higher risk pregnancy ⁽⁸⁾. As part of a review of studies on preconception diet and outcome of reproductive treatments, researchers identified a study in which underweight women had lower implantation rates and higher miscarriage rates, although the findings were not statistically significant⁽⁹⁾
 - Female obesity, especially abdominal obesity, is also associated with menstrual irregularity, anovulatory menstrual cycles, and polycystic ovarian syndrome (PCOS). In addition, overweight and obese women may have less successful outcomes from ART. In a study that examined outcome from invitro fertilization (IVF), researchers determined that pregnancy rates declined with increasing BMI. They ranged from 45.5% in those with a BMI < 25 kg/m² to 38.3% with a BMI > 25 kg/m². Findings from another IVF study showed lower rates for implantation, pregnancy, and live-birth rates in obese women ^(8,9,10,12)
 - Weight-associated infertility appears to be reversible. In women with PCOS, moderate weight loss of 5 kg results in improvements in hormone levels and reproductive function, and similar results have been found in underweight women who gain weight to normal levels ^(9,11,12)
- › Fertility is also impacted by other dietary factors, including overall dietary pattern, fatty acids, glycemic load, micronutrients, and certain specific components in foods. Together,

Author

Anne Danahy, RDN, MS

Cinahl Information Systems, Glendale, CA

Reviewer

Lori Porter, RD, MBA

Cinahl Information Systems, Glendale, CA

Editor

Sharon Richman, MSPT

Cinahl Information Systems, Glendale, CA

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these factors have been coined the “fertility diet” based on research from the Nurses’

Health Study II (NHS-II) and Harvard University (1,2,3,4,5,6,9,13)

- NHS-II is a prospective study of more than 200,000 registered nurses across the United States. In one study subgroup, researchers analyzed over an 8-year period the diets in 17,544 women with a history of infertility due to ovulatory disorder. Those with a “high fertility” diet score reported higher intake of foods high in monounsaturated fat; more sources of vegetable proteins and sources of nonheme iron; higher intake of high fiber, low-glycemic carbohydrates; and a preference for full-fat dairy foods. Low intake of trans fats and animal proteins was associated with a higher fertility score. In addition, women with a high fertility diet score had higher multivitamin use. Greater adherence to the fertility diet was associated with a lower risk of ovulatory disorder infertility (1,2,4,5,11)
 - In a study that compared ART outcomes in patients with various prepregnancy dietary patterns, researchers identified the Mediterranean diet pattern, rich in vegetable oils, vegetables, fish, and legumes, to be most associated with fertility. The Mediterranean diet resulted in a 40% greater probability of pregnancy, possibly because it was associated with higher levels of red blood cell folate and vitamin B₆ (9)
 - High seafood consumption and vegetarian diets that exclude all meat have been associated with infertility (5,8,9). In addition, in an animal study, consuming a high-fat diet for 10 weeks resulted in increased pro-inflammatory cytokine levels, a reduction in primordial follicles, and compromised fertility, independent of obesity (13)
 - In a study that examined prepregnancy dietary patterns and risk of pregnancy loss, defined as miscarriage or stillbirth, researchers studied three different dietary patterns among subjects in the NHS: the alternate Mediterranean diet, which is rich in fruits, vegetables, nuts, legumes, fish, and sources of monounsaturated fats and low in red and processed meat; the alternate Healthy Eating diet, which consists of foods associated with lower risk of chronic diseases; and the fertility diet. They found that none of the diets was associated with risk of pregnancy loss. The fertility diet resulted in the strongest inverse association with pregnancy loss in pregnancies occurring shortly after diet assessment (6)
 - In women undergoing IVF or intracytoplasmic sperm injection treatment, a higher intake of omega-3 polyunsaturated fatty acids had an impact on fertility, in that it resulted in improved embryo morphology. Researchers advised that women undergoing IVF treatment eat fatty fish twice each week (7)
 - In women undergoing AFT, higher vitamin D levels are correlated with achieving a pregnancy. Folic acid supplementation was found to have an adverse effect, as it increases the likelihood of a higher-risk twin birth after IVF. Despite this finding, folic acid supplementation is recommended to reduce the risk of birth defects (9). In women who are deficient, restoring levels of vitamin B12, folic acid, and iron has been shown to improve fertility status (10)
 - Alcohol can impair fertility, although the level of consumption associated with impairment is unclear (10)
 - Methylmercury, found in predatory fish, was associated with both male and female infertility in a study on 157 infertile couples in Hong Kong (9)
 - In men, a higher intake of soy foods and soy isoflavones (1/2 serving per day, or 4 servings per week) was associated with reduced sperm concentration. The association was stronger for men with a BMI ≥ 25 kg/m² (3)
- › A nutrition screening form (NSF) has been shown to be a helpful tool to identify infertility patients who have nutrition-related modifiable risk factors and should be referred to a dietitian. Use of such a tool is also beneficial for increasing awareness about the association between nutrition and fertility (8)
- The use of an NSF in one clinic with 300 female infertility patients identified the following patients with modifiable risk factors: 43% had a BMI < 20 or ≥ 25 kg/m²; almost half of patients were at risk of potentially low energy or nutrient intakes secondary to dieting; 14% did not supplement with folic acid; and a large number reported eating disorders or dietary patterns associated with compromised fertility (8)

What We Can Do

- › Learn about the association between diet, body weight, and infertility, and the benefits of the fertility diet, so you can accurately assess your patients’ personal characteristics and health education needs; share this information with your colleagues
- › Work with clinicians to develop and use a nutrition screening form to identify any infertility patients who have nutritional risk factors. Encourage a nutrition referral for all at-risk couples
 - Educate your patients about the importance of achieving and maintaining a healthy weight, and work together to implement a plan to achieve this

- Educate your patients about the fertility diet, including ways to incorporate foods that are associated with improved fertility and minimize those that may negatively impact fertility and healthy pregnancy outcome
 - Encourage consumption of a Mediterranean diet that includes 2 servings of low-mercury fish each week, nuts and legumes, whole-grain carbohydrate foods, olive oil and avocado as sources of monounsaturated fat, and several servings of full-fat dairy foods as appropriate

Coding Matrix

References are rated using the following codes, listed in order of strength:

M Published meta-analysis	RV Published review of the literature	PP Policies, procedures, protocols
SR Published systematic or integrative literature review	RU Published research utilization report	X Practice exemplars, stories, opinions
RCT Published research (randomized controlled trial)	QI Published quality improvement report	GI General or background information/texts/reports
R Published research (not randomized controlled trial)	L Legislation	U Unpublished research, reviews, poster presentations or other such materials
C Case histories, case studies	PGR Published government report	CP Conference proceedings, abstracts, presentation
G Published guidelines	PFR Published funded report	

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