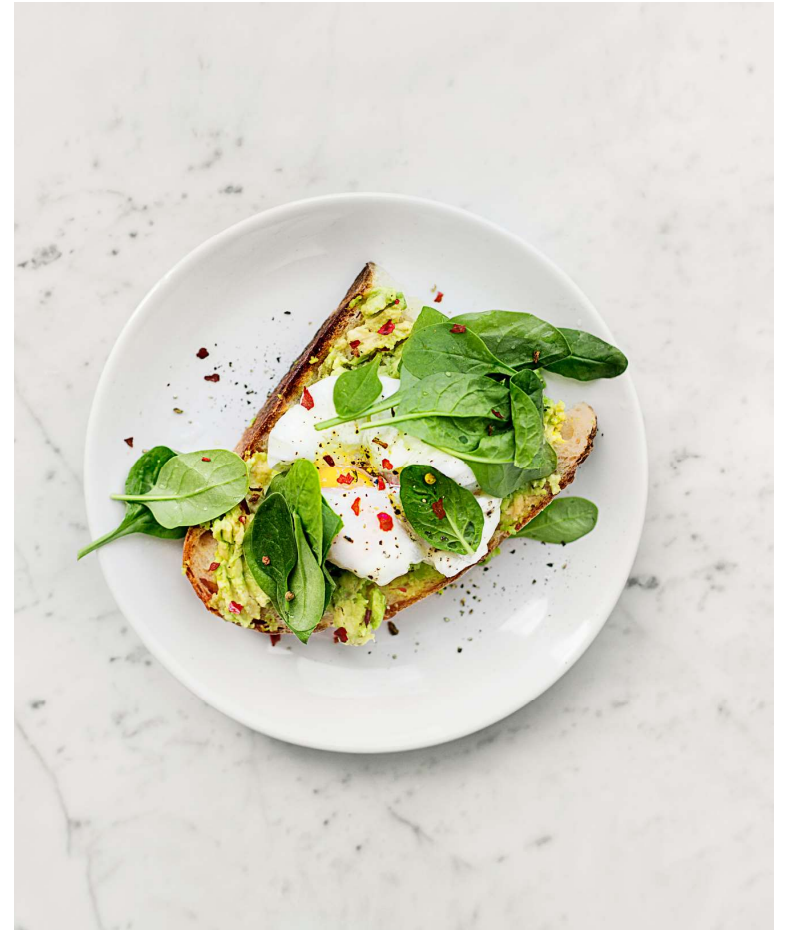


Working with fertility clients

Sandra Greenbank



Introduction to Sandra



NUTRITIONIST, COACH AND EDUCATOR

- Graduated from Institute for Optimum Nutrition in 2009
- Completed Institute for Functional Medicine training
- Specialising in fertility nutrition for the last 14 years
- Founder of The Fertility Nutrition Centre Ltd

THE
FERTILITY NUTRITION
CENTRE



Putting it all into context

Prevalence



The number of infertile people in the world may be as high as 10%, particularly in industrialised nations. 1 in 4 pregnancies ends in miscarriage.

Modifiable factors



Nutrition status, weight management, exercise, stress, smoking, drug use, medications, alcohol, caffeine, environmental exposure, infections, hormonal imbalances, oxidative stress, inflammation, methylation, ovulatory disorders, emotional health



<https://pubmed.ncbi.nlm.nih.gov/17208948/>
<https://pubmed.ncbi.nlm.nih.gov/12801554/>

'The global IVF market size was valued at USD 23.6 billion in 2022...'

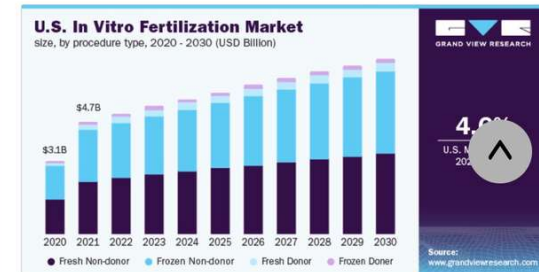
'Infertility is one of the major health concerns faced by individuals globally'

'Male infertility accounts for 30% of infertility cases'



Report Overview

The global in vitro fertilization market size was valued at USD 23.6 billion in 2022 and is expected to expand at a compound annual growth rate (CAGR) of 5.72% from 2023 to 2030. Rising repro tourism and the increasing cases of male and female infertility are the key factors driving the market growth. Infertility is one of the major health concerns faced by individuals globally. According to WHO, 8%-10% of couples globally suffer from infertility which is around 80 million couples worldwide. According to the American Pregnancy Association, [male infertility](#) accounts for 30% of infertility cases and contributes to around one-fifth of infertility cases. The average age of women and men getting married and having their first child is increasing. This trend has increased the number of women seeking the In Vitro Fertilization (IVF) treatment.



A comprehensive analysis of >100 studies, reported a 50–60% decline in sperm counts between 1973 and 2011.

Levine, H et al. Human Reproduction Update, Nov-Dec 2017,23,(6):646–659. 2.Rahban, Ret al Andrology, 2019, 7:818–826.

Idiopathic or unexplained infertility - where the semen analysis is normal, and female infertility factors have been ruled out - is thought to account for up to 45% of cases.

Moghissi & Wallach. Fertility and Sterility 1983. 39:5–21



IVF Pregnancy success for women aged 35-37 was 26% in 2019

Source: HFEA

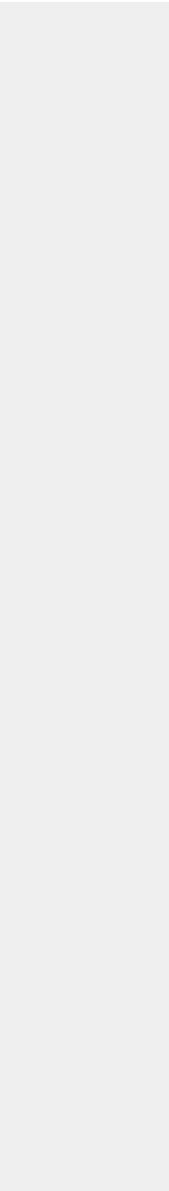
Natural pregnancy rates while going through IVF/IUI 24%

Chance over 12 months for couples with 'unexplained' infertility or mild male factor infertility scheduled for IVF. [dot:10.1093/humrep/dey051](https://www.hfea.gov.uk/docs/10_1093_humrep_dey051)



What does a Fertility Nutritionist do?

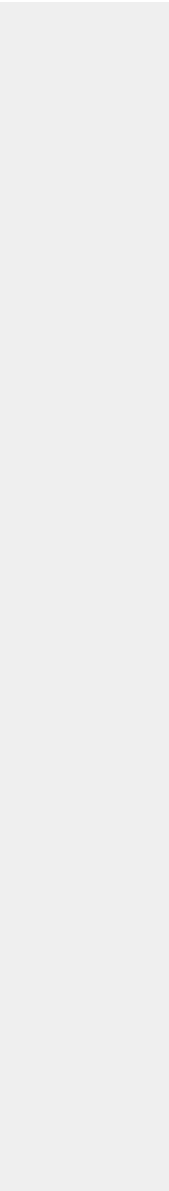
Bridge gap between GP and the fertility clinic



What does a Fertility Nutritionist do?

Bridge gap between GP and the fertility clinic

Optimise diet, lifestyle, environment and supplementation

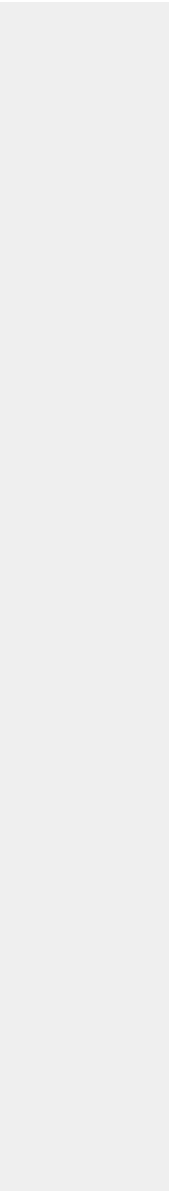


What does a Fertility Nutritionist do?

Bridge gap between GP and the fertility clinic

Optimise diet, lifestyle, environment and supplementation

Holds space and helps self advocate so that the right questions can be asked for the right support



What does a Fertility Nutritionist do?

Bridge gap between GP and the fertility clinic



Refer out to other professionals

Optimise diet, lifestyle, environment and supplementation



Holds space and helps self advocate so that the right questions can be asked for the right support



What does a Fertility Nutritionist do?

Bridge gap between GP and the fertility clinic



Optimise diet, lifestyle, environment and supplementation



Holds space and helps self advocate so that the right questions can be asked for the right support



Refer out to other professionals

Review test results and recommend tests not commonly used within conventional setting



What does a Fertility Nutritionist do?

Bridge gap between GP and the fertility clinic



Optimise diet, lifestyle, environment and supplementation



Holds space and helps self advocate so that the right questions can be asked for the right support



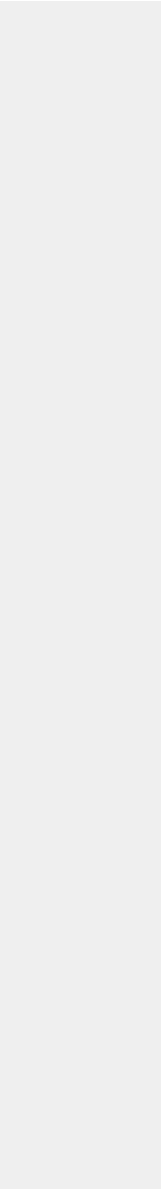
Refer out to other professionals

Review test results and recommend tests not commonly used within conventional setting

Investigate root causes

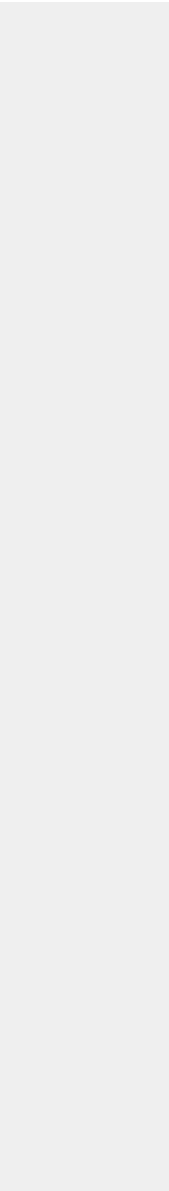


Our role is to optimise:



Our role is to optimise:

- The menstrual cycle (ovulation, progesterone levels)



Our role is to optimise:

- The menstrual cycle (ovulation, progesterone levels)
- Egg and sperm health



Our role is to optimise:

- The menstrual cycle (ovulation, progesterone levels)
- Egg and sperm health
- Genital tract and uterine environment



Our role is to optimise:

- The menstrual cycle (ovulation, progesterone levels)
- Egg and sperm health
- Genital tract and uterine environment
- Weight



Our role is to optimise:

- The menstrual cycle (ovulation, progesterone levels)
- Egg and sperm health
- Genital tract and uterine environment
- Weight
- Nutritional status



Our role is to optimise:

- The menstrual cycle (ovulation, progesterone levels)
- Egg and sperm health
- Genital tract and uterine environment
- Weight
- Nutritional status
- Lifestyle factors (sleep, stress, exercise...)



Our role is to optimise:

- The menstrual cycle (ovulation, progesterone levels)
- Egg and sperm health
- Genital tract and uterine environment
- Weight
- Nutritional status
- Lifestyle factors (sleep, stress, exercise...)
- Environment (pollution, heavy metals, plastics, mould)



Our role is to optimise:

- The menstrual cycle (ovulation, progesterone levels)
- Egg and sperm health
- Genital tract and uterine environment
- Weight
- Nutritional status
- Lifestyle factors (sleep, stress, exercise...)
- Environment (pollution, heavy metals, plastics, mould)
- Hormonal health



Our role is to optimise:

- The menstrual cycle (ovulation, progesterone levels)
- Egg and sperm health
- Genital tract and uterine environment
- Weight
- Nutritional status
- Lifestyle factors (sleep, stress, exercise...)
- Environment (pollution, heavy metals, plastics, mould)
- Hormonal health
- Immune system (inflammation, coeliac, Hashimotos)



Our role is to optimise:

- The menstrual cycle (ovulation, progesterone levels)
- Egg and sperm health
- Genital tract and uterine environment
- Weight
- Nutritional status
- Lifestyle factors (sleep, stress, exercise...)
- Environment (pollution, heavy metals, plastics, mould)
- Hormonal health
- Immune system (inflammation, coeliac, Hashimotos)
- **But first...check that anatomical causes have been ruled out in both partners**



Male investigations:

- History - general health, medical history, family history



Male investigations:

- History - general health, medical history, family history
- Semen analysis and DNA Fragmentation



Male investigations:

- History - general health, medical history, family history
- Semen analysis and DNA Fragmentation

If abnormal results;

- refer to urologist for further investigations



Male investigations:

- History - general health, medical history, family history
- Semen analysis and DNA Fragmentation

If abnormal results;

- refer to urologist for further investigations
- CBC, hormone panel, Thyroid panel, vitamin D, STI



Male investigations:

- History - general health, medical history, family history
- Semen analysis and DNA Fragmentation

If abnormal results;

- refer to urologist for further investigations
- CBC, hormone panel, Thyroid panel, vitamin D, STI
- Semen and urinary culture



Male investigations:

- History - general health, medical history, family history
- Semen analysis and DNA Fragmentation

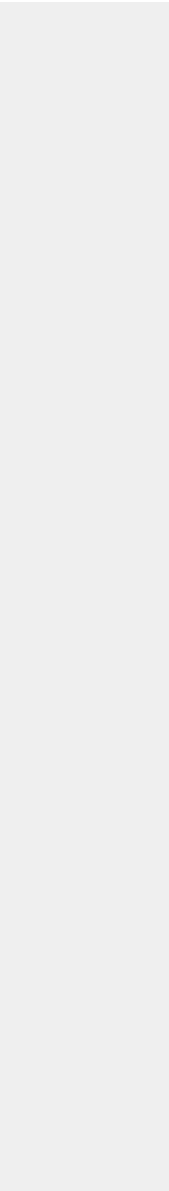
If abnormal results;

- refer to urologist for further investigations
- CBC, hormone panel, Thyroid panel, vitamin D, STI
- Semen and urinary culture
- Personalised nutrition and lifestyle interventions



Female investigations:

- Normalise cycle



Female investigations:

- Normalise cycle
- Day 21 progesterone (to check ovulation)



Female investigations:

- Normalise cycle
- Day 21 progesterone (to check ovulation)
- Full thyroid panel, hormone panel, CBC, Vitamin D



Female investigations:

- Normalise cycle
- Day 21 progesterone (to check ovulation)
- Full thyroid panel, hormone panel, CBC, Vitamin D
- Ensure uterine/ tubal abnormalities ruled out



Female investigations:

- Normalise cycle
- Day 21 progesterone (to check ovulation)
- Full thyroid panel, hormone panel, CBC, Vitamin D
- Ensure uterine/ tubal abnormalities ruled out
- Vaginal microbiome testing



Female investigations:

- Normalise cycle
- Day 21 progesterone (to check ovulation)
- Full thyroid panel, hormone panel, CBC, Vitamin D
- Ensure uterine/ tubal abnormalities ruled out
- Vaginal microbiome testing
- Personalised nutrition and lifestyle interventions



Female investigations:

- Normalise cycle
- Day 21 progesterone (to check ovulation)
- Full thyroid panel, hormone panel, CBC, Vitamin D
- Ensure uterine/ tubal abnormalities ruled out
- Vaginal microbiome testing
- Personalised nutrition and lifestyle interventions
- Refer, as needed



THE WELL-BALANCED DIET IS A MYTH

'Only *a third* of men and women are achieving the five a day fruit and vegetable target'.

Proper preparation results in better outcomes

Previous history of infertility (37%), miscarriage (38%), therapeutic abortion (11%), still birth (3%), LBW babies (15%), malformations (2%), SIDS (1%)

Following basic preconception care, no miscarriages, perinatal deaths, or malformations (normal expectation 70 MC, 6 malformations).

Couples with live births (89%), live births to those previously 'infertile' (81%), average gestational age 38.5wks (earliest 36 wks), average weight 7 lbs 3 oz, lightest baby 5 lb 3 oz

THE AGOUTI MICE



Mother of brown mouse was supplemented 2 weeks before conception, through pregnancy and lactation.

After weaning, mice were fed the same feed for 21 days.

Mother given methylation nutrients changed the genetic expression of the offspring.

<https://www.nature.com/scitable/topicpage/obesity-epigenetics-and-gene-regulation-927/>

FEMALE FERTILITY & NUTRITION



A woman's diet affects her hormones, levels of inflammation and ovulation. Consuming trans fats instead of carbohydrates correlates with a 73% increase in risk of ovulatory disorders.

<https://pubmed.ncbi.nlm.nih.gov/17209201/>

Women with high 'fertility diet' scores have lower rates of infertility due to ovulatory disorders. Beneficial foods include monounsaturated fats over trans-fats, a greater proportion of vegetarian over animal protein, high-fat dairy over low-fat dairy, and a decreased glycemic load.

<https://pubmed.ncbi.nlm.nih.gov/17978119/>

MALE FERTILITY & NUTRITION



Consuming a diet rich in carbohydrates, fibre, folate and lycopene correlates with improved semen quality.

<https://pubmed.ncbi.nlm.nih.gov/19147135/>

Oxidative stress may result in sperm protein, lipid and DNA damage and sperm dysfunction.

<https://pubmed.ncbi.nlm.nih.gov/17980058/>

Antioxidants such as Vitamin C, Vitamin E, Selenium and other antioxidants help counteract oxidative stress and improve semen quality significantly.

<https://pubmed.ncbi.nlm.nih.gov/15955895/>

<https://pubmed.ncbi.nlm.nih.gov/12623744/>

<https://pubmed.ncbi.nlm.nih.gov/8957697/>

<https://pubmed.ncbi.nlm.nih.gov/21546386/>

<https://pubmed.ncbi.nlm.nih.gov/21249690/>

MALE FERTILITY & WEIGHT



The obesity epidemic is becoming a serious issue, particularly in industrialised nations. The rising number of obese individuals may in due be part to an energy-rich diet as well as insufficient physical exercise. Obesity comes with potential health risks, including a significant impact on male and female fertility.

<https://pubmed.ncbi.nlm.nih.gov/20531281/>

BMI may be a significant factor in fertility. An increase in BMI in the male by as little as three units can be associated with infertility.

<https://pubmed.ncbi.nlm.nih.gov/16837825/>

Obese men are three times more likely to have reduced semen quality compared with men of a normal weight, and overweight men have also been found to have increased DNA damage in sperm.

<https://pubmed.ncbi.nlm.nih.gov/15567884/>

<https://pubmed.ncbi.nlm.nih.gov/15482761/>

<https://pubmed.ncbi.nlm.nih.gov/18178190/>

<https://pubmed.ncbi.nlm.nih.gov/19261274/>

<https://pubmed.ncbi.nlm.nih.gov/16339454/>

FEMALE FERTILITY & WEIGHT



A woman with a BMI below 18.5 is considered underweight, above 25 is overweight, and over 30 is considered obese.

<http://www.cdc.gov/obesity/adult/defining.html>.

Body weight can have a significant effect on health, hormones, diabetes and infertility.

<https://pubmed.ncbi.nlm.nih.gov/21848022/>

Women with a BMI of over 30 have a longer time to pregnancy and an increased risk of miscarriage. Implantation rates are also lower in obese women. These differences may be related to increases inflammation in the follicular environment.

<https://pubmed.ncbi.nlm.nih.gov/22161463/>

<https://pubmed.ncbi.nlm.nih.gov/21183175/>

<https://pubmed.ncbi.nlm.nih.gov/17418840/>

<https://pubmed.ncbi.nlm.nih.gov/19223519/>

Being underweight is associated with ovulatory dysfunction, increased risk of pre-term birth.

<https://pubmed.ncbi.nlm.nih.gov/9022905/>

<https://pubmed.ncbi.nlm.nih.gov/8173001/>

<https://pubmed.ncbi.nlm.nih.gov/21097954/>

EXERCISE & FERTILITY



In one study, moderately physically active men had significantly better sperm morphology (15.2%) in comparison with the men who played in a competitive sport (9.7%) or were elite athletes (4.7%). It also affected other semen parameters.

Bicycling for more than 5 hours per week has also been demonstrated to have a negative correlation with sperm count and concentration.

In women, physical activity has been showed to have a protective effect on fertility, however, excessive exercise can negatively affect the reproductive system and lead to menstrual abnormalities.

4 hours or more of cardio per week correlates with decreased fertility (live birth rate, implantation failure, cycle cancellation)

<https://pubmed.ncbi.nlm.nih.gov/19013565/>

<https://pubmed.ncbi.nlm.nih.gov/11431132/>

<https://pubmed.ncbi.nlm.nih.gov/17012457/>

SLEEP & FERTILITY



Sleep plays a vital role in all our lives, affecting the quality of life, overall health, regulating our hormones and, importantly, fertility.

In both men and women, the same part of the brain that regulates sleep-wake hormones (such as melatonin and cortisol) also triggers a daily release of reproductive hormones.

Long-term lack of sleep may directly affect the release of luteinizing hormone — the hormone that triggers ovulation as part of regulating your menstrual cycle.

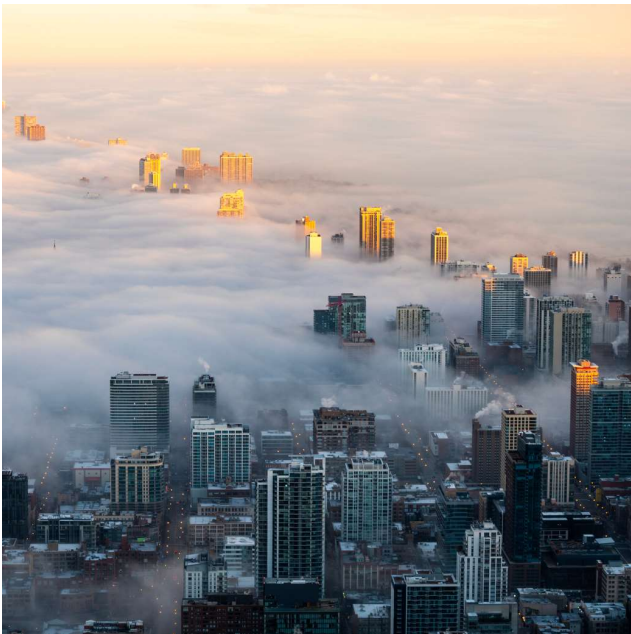
Working at night or working rotating shifts may have an impact on fertility and miscarriage.

One third of Americans don't get enough sleep.

<https://www.dovepress.com/short--and-long-term-health-consequences-of-sleep-disruption-peer-reviewed-article-NSS>

<https://www.cdc.gov/mmwr/volumes/65/wr/mm6506a1.htm>

TOXINS & FERTILITY



Environmental toxins have the ability to alter development in utero. They can cross the placenta and cause endocrine disruption and impact the immune, reproductive and nervous systems.

<https://doi.org/10.1289/EHP277>

Air pollution is known to raise inflammation in the body, which could damage egg and sperm production. Exposure to air pollution has been found to be associated with a lower number of maturing eggs in the ovaries of subfertile women.

<https://doi.org/10.1097/EDE1029>

Men eating fruit and vegetables with the highest pesticide residue had a 49% lower sperm count and 32% fewer morphologically normal sperm than those eating the smallest quantities of residual pesticides. Researchers also found that the quantities of fruit and vegetables eaten had no impact on semen quality, suggesting that the significant element was how much pesticide they had on them.

<http://www.oxfordjournals.org/eshre/press-release/freepdf/prpaper.pdf>

Alcohol and fertility

Study of couples with 2 or more failed IVF attempts.

Women who abstained from all alcohol had a 90% chance of achieving pregnancy and live birth within 3 years.

Women who drank 3 drinks per week had a 30% chance of conceiving within 3 years.

Women who drank 1 or 2 glasses of wine a week showed a reduction in their 3-year success rate to 66%.

Researchers suggested the same patterns would be seen in couples trying naturally.

Godfrey et al Fert Steril 2013; 100(3):S423

‘There is *strong evidence* that complementary treatment with an *appropriate nutraceutical* improves the natural conception rate of infertile couples and increases the success rate of ART’

SUPPLEMENTS



Women who take multivitamins may be less likely to experience ovulatory infertility.

<https://pubmed.ncbi.nlm.nih.gov/17624345/>

Taking a multivitamin has been shown to improve pregnancy rates in women compared with folic acid alone (66.7% vs 39.9% after 3 clomid supported cycles).

vAgrawal R et al. Reprod Biomed Online 2012 Jan;24(1):54-60

- ingredients
- formulation
- therapeutic dose
- fillers, excipients
- be aware of nutrient-nutrient or drug-nutrient interactions
- Often self-prescribed or Consultant-prescribed

VITAMIN D



Lower pregnancy rates in women who are deficient and undergoing ART

Li et al: Fertil Steril: 2012 Volume 97(3):Supplement pg S26

Deficiencies connected with autoimmune problems

Rudick et al Human Reproduction Vol 27 (11); 3321-3327, 2012

Promotes Th2 cells that helps body maintain a pregnancy

Hayes C E et al, 2003, Cell Mol Biol, 49(2):277-300

Making female mice deficient in vitamin D makes them infertile

Panda, DK et al, 2001, Proc Natl Acad Sci, 19;98(13):7498-503

Vitamin D correlates with endometrial thickness in women undergoing ICSI

Abdullah UH et al, 2016, J Matern Fetal Neonatal Med. 14;1-4

Vitamin D correlates with endometrial thickness in women undergoing ICSI

Heaney RP et al, 2011, J Clin Endocrinol Metab, 96, 3, E447-52

FOLATE



Folate is essential for DNA replication and normal cell formation and growth. Folate insufficiency in women of reproductive age can lead to pregnancies affected by neural tube defects. These defects, such as spina bifida and anencephaly, affect the development of the brain and spine, can lead to an early death or lifelong disability, and are among the most serious and most common congenital anomalies.

Most neural tube defects can be prevented with sufficient intake of folate for the 12 weeks prior to conception.

- NAC 600mg taken with folate has shown to significantly increase live birth rate.

Folate insufficiency >40% in most countries.

*<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6282622/>
Amin AF et al Reprod Biomed Online 2008 Nov;17(5):722-6*

Thyroid health

Foetus makes own thyroid hormone from 10-13 weeks gestation.

Throughout 1st trimester mother has to produce 30% more thyroid hormone to provide enough for herself and baby.

The optimal levels of TSH is between 1-2.5 (aim for 2 after recurrent loss)

Elevated Thyroid peroxidase antibodies may be associated with higher risk of miscarriage independent of TSH.

Pregnant women with subclinical hypothyroidism or thyroid antibodies have an increased risk of complications, especially pre-eclampsia, perinatal mortality and (recurrent) miscarriage.

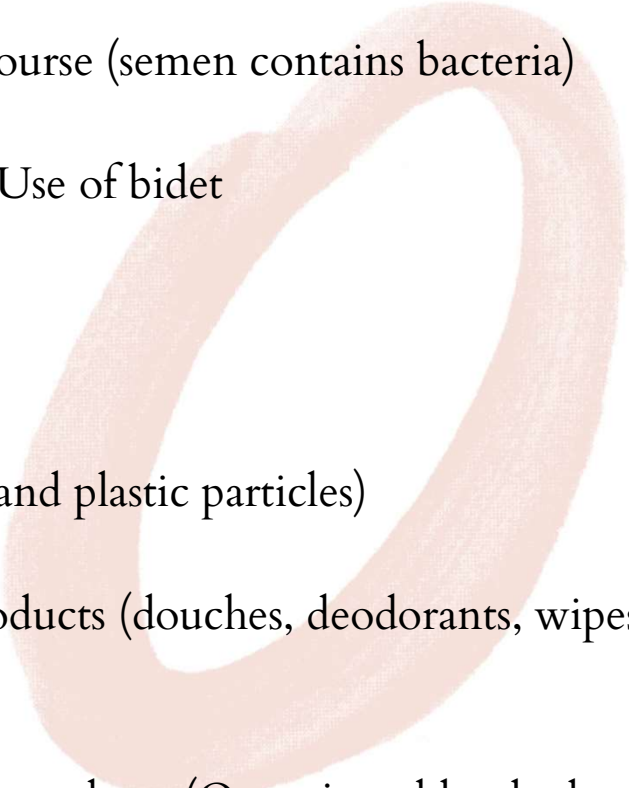
van den Boogard et al, 2011 Sep-Oct;17(5):605-19. doi: 10.1093/humupd/dmr024.Epub 2011 May 28.

Vaginal health

- The lactobacilli naturally found in the vagina form a protective barrier against infections, enhance fertility, prevents development of antisperm immunity
- Lactobacilli's main job is to keep the environment in the vagina very acidic (lower pH).
- With a higher pH, harmful bacteria is allowed to flourish in the vagina
- Harmful bacteria can travel up through the cervix and womb lining, and irritate the fallopian tubes.
- Certain bacteria may prevent healthy conception and increase risk of miscarriage or pregnancy complications.
- Research shows that higher levels of lactobacilli is associated with better birth outcomes
- Mother's vaginal flora is passed on to baby at birth

Causes of disrupted vaginal flora

- Antibiotics (IV or oral)
 - Increased frequency of intercourse (semen contains bacteria)
 - Spermicide use
 - Vaginal washing/ douching/ Use of bidet
 - Multiple sexual partners
 - Smoking
 - Topical antifungals
 - Higher exposure to stress
 - Vaginal glitter bombs (sugar and plastic particles)
 - Use of diaphragm
 - Use of feminine 'hygiene' products (douches, deodorants, wipes, steams and washes)

 - The vagina is self cleaning
 - Avoid perfumed and bleached products (Organic unbleached cotton is best)
- 

Sperm DNA fragmentation

- Having sperm with intact DNA is key, as this is what is passed on to the egg and forms the DNA of the embryo.
- Rates of DNA fragmentation can predict miscarriage rates.
- The DNA is protected inside the head of the sperm from free radical damage
- This is why antioxidants are crucial for male fertility, especially Zinc
- Zinc can't be stored in the body
- Acts as a hormone balancer and may increase testosterone levels
- Act as antibacterial agent in male urinary tract
- Low levels associated with sperm abnormalities
- Obesity associated with higher levels of DNA fragmentation and abnormal shapes

PUTTING IT ALL TOGETHER



- Ensure structural causes are ruled out
- Ovulation (regular period is not a reliable indicator)
- Progesterone (day 21 not reliable)
- Semen analysis, DNA Fragmentation
- Thyroid
- Infection (vaginal/ seminal/ gut)
- Nutritional status
- Methylation
- Mitochondrial health
- Toxic exposure and anti-nutrients
- Oxidative stress
- Normalise weight
- Optimise lifestyle factors (sleep, stress, exercise)
- Hormonal factors (Endometriosis, PCOS, prolactin)
- Immune function
- Drugs (recreational and prescribed)
- Supplementation