

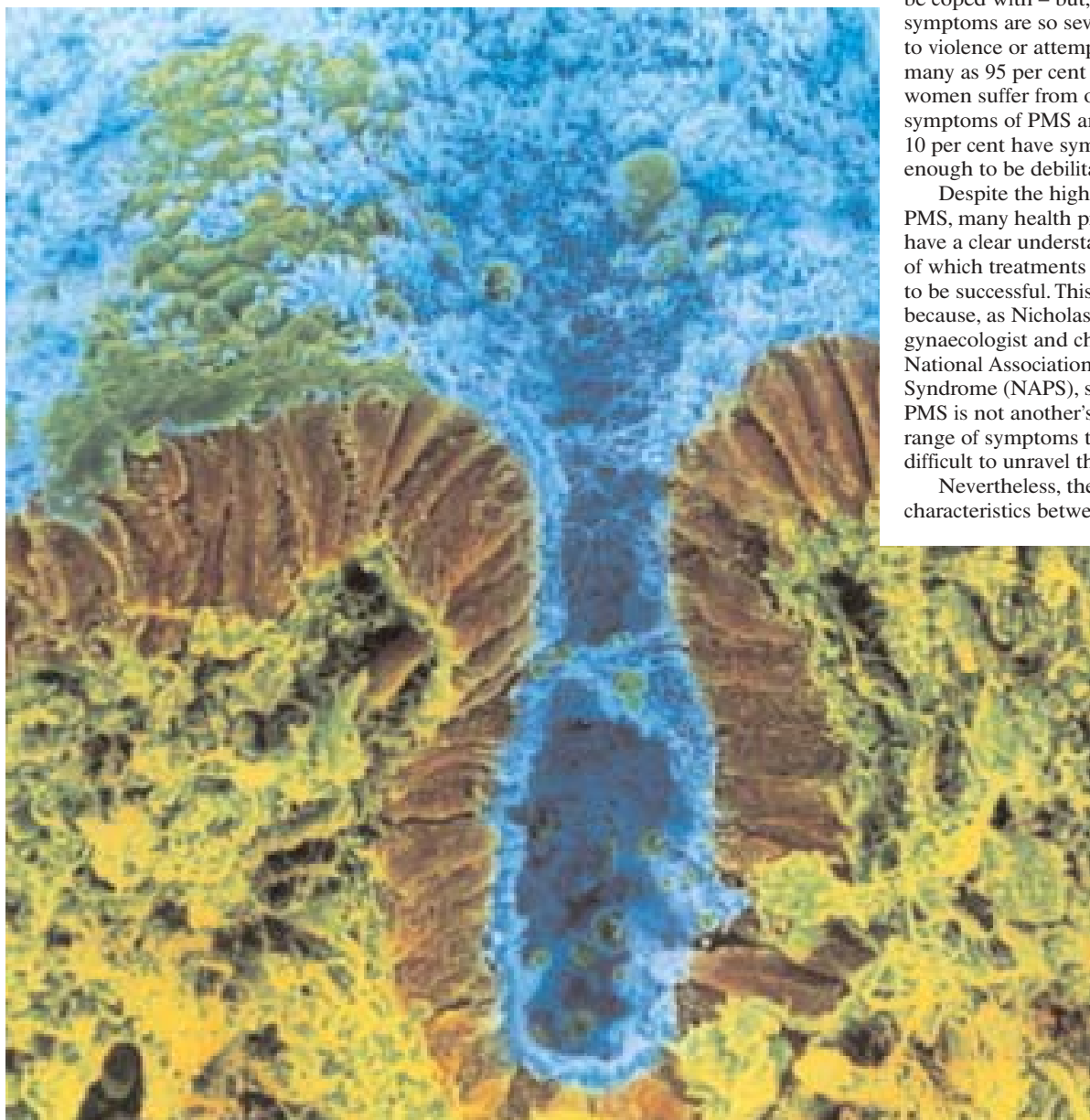
VICIOUS CYCLE: understanding the science behind PMS

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Premenstrual syndrome (PMS) is a common disorder among women of reproductive age, characterised by the cyclic recurrence of physical, mental and cognitive symptoms in the luteal phase of the menstrual cycle (the second half of the cycle, after ovulation when progesterone peaks then falls). Most women simply live with it – going up a dress size, or bursting into tears at any given moment can usually be coped with – but, for some, the symptoms are so severe they may lead to violence or attempted suicide. As many as 95 per cent of menstruating women suffer from one or more of the symptoms of PMS and between 5 and 10 per cent have symptoms severe enough to be debilitating.¹

Despite the high incidence of PMS, many health professionals don't have a clear understanding of it, or of which treatments are most likely to be successful. This is not surprising because, as Nicholas Panay, consultant gynaecologist and chairman of The National Association for Premenstrual Syndrome (NAPS), says: "One woman's PMS is not another's." It is this diverse range of symptoms that makes it difficult to unravel the causes of PMS.

Nevertheless, there are some shared characteristics between PMS sufferers.



A uterus in the mid-secretory or luteal stage of the menstrual cycle, which takes place at around day 22

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Incidence of PMS increases between the ages of 30 and 40 and following periods of hormonal upheaval, such as pregnancy or miscarriage.² There may also be some genetic elements, particularly in the more severe form of PMS – premenstrual dysphoric disorder (PMDD) – the symptoms of which include debilitating psychological symptoms and often severe depression.³ Other factors can make some individuals more susceptible: stress is one of the strongest predictors of PMS,⁴ as is having a body mass index (BMI) of over 27,⁵ lack of exercise,^{6,7,8} a diet high in sugar,⁹ caffeine,¹⁰ and moderate alcohol consumption.¹¹ Some studies identified particular vitamin, mineral and essential fatty acid deficiencies.¹²

WHAT CAUSES PMS?

Although the basic physiology of the menstrual cycle is well documented, it's surprising that the causes of PMS are only now becoming clear. According to Nicholas Panay, who spoke during a NAPS presentation at the University of Kent in September last year, scientists have proposed various influencing factors, such as hormone imbalance, vitamin and mineral deficiencies, reactive hypoglycaemia, prostaglandin imbalance, endogenous opiate peptides or hormone 'allergy', menstrual toxins, and neurotransmitter imbalance.

There are also some obvious links between fluctuations in the levels of sex hormones and the appearance of

symptoms during the luteal phase.¹³ However, no consistent differences in ovarian hormone levels have been demonstrated in PMS sufferers when compared to a control group.¹⁴ This has led to the conclusion that it may not be an absolute difference in ovarian hormone levels in PMS sufferers that leads to symptoms, but that the normal fluctuation in ovarian hormones may be the cyclical trigger for biochemical events within the central nervous system and other target tissues.¹⁵ The pathogenesis of PMS is multi-factorial and different aetiologies may be behind different groups of symptoms.^{16,17}

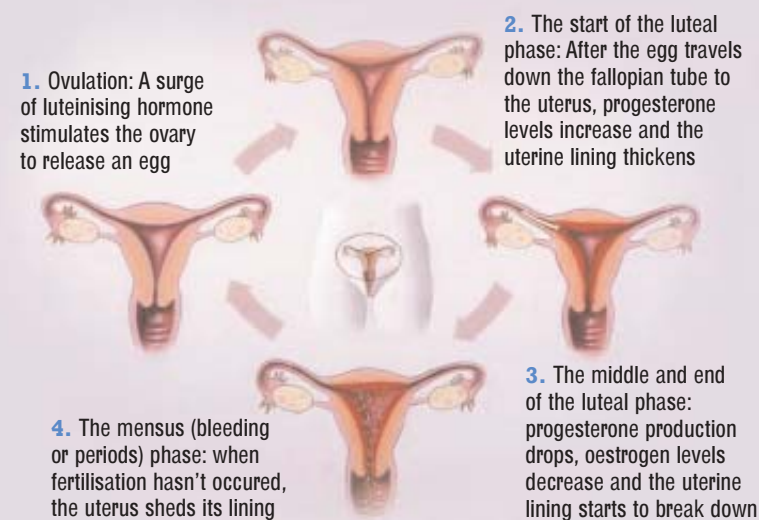
Our mood can be influenced by certain specific chemical messengers in the brain (neurotransmitters), and new research suggests that neuroendocrine imbalances may explain psychological symptoms. This year, Professor Shaughn O'Brien at Keele University published a review of research into neuroendocrine factors which may contribute to the psychological symptoms of PMS, such as mood disorders, anxiety, insomnia, appetite imbalance and, in particular, the extreme symptoms of PMDD.¹⁸ The ovarian hormones appear to exert their effects on the mood-regulating neurotransmitters serotonin and gamma-aminobutyric acid (GABA). Serotonin receptor concentration actually varies with changes in the oestrogen and progesterone levels¹⁹ and PMS sufferers have lower blood concentrations of serotonin,²⁰ leading

to low moods, depression and sleep and appetite disturbances.

The anti-anxiotic (anti-anxiety) neurotransmitter GABA has also been shown to be low in individuals with mood disorders,²¹ while women with PMDD showed a decrease in GABA levels during the late-luteal phase compared to asymptomatic women.²² This situation can also be exacerbated by low levels of allopregnanolone (a metabolite, or breakdown product, of progesterone). Allopregnanolone is a positive modulator of GABA, increasing its relaxing and calming effects. In some patients with PMS, allopregnanolone has been shown to be low.²³ Normally, when the central nervous system is faced with excitatory triggers, such as stress or rapid hormone fluctuations, the body increases levels of GABA, but it has been suggested that this does not happen as efficiently when allopregnanolone is low. This in turn may lead to increased anxiety.²⁴

An excess of oestrogen or a lack of progesterone metabolites may influence development of symptoms, particularly in perimenopausal groups.²⁵ Oestrogen also appears to have an excitatory effect on neurotransmitters, increasing the activity of norepinephrine (also known as noradrenaline), and triggering irritability and hostility, as well as decreasing receptor sensitivity to the nerve relaxant dopamine.²⁶ Relative oestrogen dominance can occur during stress, when the liver is over-burdened²⁷ ↘

KEY STAGES IN THE MENSTRUAL CYCLE



A CASE IN POINT

Claire* is 45 and enrolled on ION's PMS programme to help improve premenstrual sleeping difficulties, irritability, anxiety and breast tenderness. Sugar cravings and fatigue also accompanied each of Claire's periods. She was given some advice to help improve her diet and a supplement programme, which included 25mg zinc, essential fatty acids, B vitamins, 250mg magnesium and some chromium. Claire's adherence to the programme was good and she gave up coffee completely. After two months, Claire reported no breast tenderness or cravings and a dramatic improvement in anxiety and insomnia. She continues to improve.

*Name changed to protect privacy

LEADING UK EXPERTS AGREE THAT NATURAL INTERVENTIONS MAY BE ALL THAT'S NEEDED IN MILD TO MODERATE PMS CASES

and when perimenopausal women experience anovulatory cycles (during which ovulation fails to occur).

Common symptoms of bloating and weight gain may be influenced by the interaction between oestrogen and another hormone system – the renin-angiotension-aldosterone system (RAAS) – which regulates long-term blood pressure and extracellular volume within the body. The result is increased aldosterone levels, which in turn affects the electrolyte and fluid balance.²⁸ Alternatively, fluid retention and breast pain may be due to increased sensitivity to the hormone prolactin.²⁹

TACKLING THE ISSUE

Leading PMS experts in the UK agree that using natural interventions is an important first step and may be all that's needed in mild to moderate cases.^{30,31} It is true that women respond well to a variety of measures such as vitamin therapy, exercise, stress management, dietary changes and relaxation techniques.³² Medical intervention is available for severe PMS, and may involve using anti-depressants, progesterone or progestogens, drugs to induce anovulatory cycles or, in severe cases, a hysterectomy to eliminate hormonal fluctuations.³³

Supplementing nutrients and herbs to treat PMS is not new, but we are learning more about what works and how it works. Nutrients known to support the synthesis and balance of serotonin and dopamine have demonstrable benefits. O'Brien's meta-analysis of previous B6 trials concludes that B6 is effective in doses of 50-100mg.^{34,35} B6 is an important cofactor for enzymes involved in the synthesis of neurotransmitters and B6 deficiency has been associated with increased nervous irritability.³⁶ Similarly, calcium supplementation at 1,200-1,600mg showed a 48 per cent improvement in symptom scores (especially mood, pain, food cravings and water retention).³⁷ Trials of zinc and magnesium are also promising

but, to date, have been limited in scope.³⁸ The beneficial effects of the serotonergic herb St John's Wort in improving symptoms of depression were supported in the recent meta-analysis of 23 randomised controlled trials³⁹ and 5-Hydroxy-L-tryptophan (5-HTP – the immediate precursor of serotonin) may also be beneficial.⁴⁰

When breast tenderness, bloating and water retention are present there is evidence that magnesium (250mg),⁴¹ vitamin E (400iu)⁴² and Gamma-linolenic acid (1.5-2g)^{43,44} can be helpful.

The efficacy of *Agnus castus* (a native Mediterranean herb) in treating PMS has been well documented.⁴⁵ It may balance oestrogen and progesterone, improve dopamine levels and reduce prolactin levels – which can result in beneficial effects concerning PMS symptoms, including mood, regulation of the cycle and breast tenderness.⁴⁶

EAT TO BEAT IT

Diets that maintain a healthy hormone and neurotransmitter balance may play an important part in an intervention programme for PMS.⁴⁷ Consuming small meals throughout the day, providing balanced ratios of fibre-rich complex carbohydrates and proteins and adequate amounts of essential fatty acids, is recommended.⁴⁸ Carbohydrate-rich foods promote increased levels of the serotonin precursor, tryptophan.⁴⁹ This may help explain why sufferers of PMS often crave carbohydrates, sugar and alcohol premenstrually⁵⁰ and also why diets that help balance blood sugar – with regular complex carbohydrate snacks, such as oatcakes, porridge, wholegrains, vegetables and legumes – have been shown to help symptoms.⁵¹

Vegetables, seeds and oily fish can be useful for balancing hormones. Vegetarians have greater faecal excretion of oestrogen, decreased concentrations of plasma oestrogen and reduced beta-glucuronidase activity (hence decreased re-circulation of oestrogen).⁵² A high intake of green vegetables has been shown to have a protective effect

IN PRACTICE

The ION Female Health Clinic runs a six-month PMS programme. Clients receive advice from a nutritional therapist on changing their diet to help menstrual symptoms, and may be given a supplement programme. If appropriate, nutritional assessment tests are arranged with a laboratory. There are also follow-up consultations with a nutritional therapist and the patient's progress is monitored.

For more information, please call Basma Bhatti on 0208 614 7822 or email richmond.nutrition@ion.ac.uk.

against hormonal conditions such as fibroids.⁵³ Similarly, foods containing phytoestrogens (isoflavones, lignans and coumestans) such as soya, legumes and linseeds can have a beneficial effect on ovarian hormone balance⁵⁴ and premenstrual symptoms.⁵⁵ The lignans in linseeds also help to increase sex hormone binding globulin (SHBG) and bind endogenous oestrogen in the gut.⁵⁶

Oily fish, such as mackerel, contains eicosapentaenoic acid (EPA), which increases levels of anti-inflammatory and prolactin modulating prostaglandin E1 (a hormone-like substance produced from fatty acids, known as PGE1), while a diet that contains a large amount of red meat encourages higher levels of the pro-inflammatory arachidonic acid and prostaglandin E2 (PGE2),⁵⁷ and can make breast symptoms worse.

Alcohol increases sex steroid levels in pre-menopausal women⁵⁸ and SHBG is 15 per cent lower in women consuming alcohol, suggesting alcohol should be limited to a few units a week. Similarly, even a moderate intake of caffeine from coffee, black tea or chocolate can contribute to breast tenderness in some women.⁵⁹

For mild to moderate PMS, there is evidence that correction of nutritional deficiencies, support of the adrenal system, supplementing cofactors for serotonin and neurotransmitter balance, reducing stress and improving diet to promote optimal hormone balance is vital and should be the first point of call. However, it is vital practitioners recognise that PMS is complex and natural interventions may not be enough when there are underlying imbalances leading to more severe psychological symptoms. □

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