

**Roundtable discussion report on:**

# **Premenstrual Dysphoric Disorder (PMDD) and transcranial direct current stimulation (tDCS)**

**24<sup>th</sup> March 2025**

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# 1. Acknowledgements

The Health Innovation Network South London (HIN SL) would like to thank all participants in this roundtable, and our UK wide collaborators who identified, recommended, and introduced potential attendees. The list of participants is provided on page 4. This paper is a synthesis of the roundtable discussion organised and chaired by the Health Innovation Network South London.

## 2. Introduction

Premenstrual Dysphoric Disorder (PMDD) is a debilitating psychiatric disorder that affects [~820,000 women in the UK](#) and [costs the UK economy £8.47 billion per year](#). This disorder is a severe form of premenstrual syndrome (PMS), characterised by intense symptoms of depression, anxiety, and suicidal thoughts in the two weeks prior to menstruation, meaning that it can severely negatively impact a woman's life for nearly half of her reproductive years.

Current treatments for PMDD, including psychotherapy, antidepressants, oral contraceptives and hysterectomies, are largely inadequate as they are not tailored to alleviate the specific symptoms of PMDD. They are also difficult to maintain, have unwanted side effects or are extremely invasive.

The National Institute for Health and Care Excellence ([NICE](#)) recommendations for the management of PMDD currently only includes the consideration of the use of selective serotonin reuptake inhibitors (SSRIs), however patients would need to be informed this is off-label in the UK. Patients should also be warned of the side effects and the high relapse rate upon stopping. Close monitoring of a patient is essential, with follow-ups required to assess response, side effects, and any suicidal ideation. If ineffective after 2-3 months, adjustments or alternative treatments should be considered.

Research over the last 20 years shows that non-invasive stimulation of the prefrontal cortex via transcranial direct current stimulation (tDCS) [can significantly improve symptoms of depression](#) and anxiety, particularly in women. Moreover, this technique is easy to administer at home and has minimal side effects, making it a promising, maintainable treatment option.

**Validation of a Non-Invasive Brain Stimulation Device (Nettle™) to Manage Symptoms of Premenstrual Dysphoric Disorder** is a 6-month [Small Business Research Initiative](#) (SBRI) funded project, led by [Dr Paul Faulkner](#) at Queen Mary University of London in partnership with HIN SL that aims to improve the mental health of women who suffer from Premenstrual Dysphoric Disorder (PMDD).

The project has two primary objectives.

1. To validate the at-home use of a novel transcranial direct current stimulation (tDCS) device termed Nettle™ to alleviate the physical and mental symptoms of PMDD.
2. To determine optimal strategies for integrating Nettle™ into NHS treatment protocols for PMDD.

[Nettle™](#), is a Class-IIa, CE-marked, non-invasive, drug-free, hormone-free, Bluetooth-controlled wearable tDCS device developed by women at [Samphire Neuroscience](#) to alleviate symptoms of PMS and PMDD. This device is controlled by a smartphone app to provide painless stimulation to both the motor cortex (to alleviate pain) and the prefrontal cortex (to improve symptoms of mood disorders).

Use of Nettle™ during the final two weeks of the menstrual cycle, during the luteal phase, when symptoms are greatest, [has been shown to relieve pain and low mood associated with PMS](#). Its ability to alleviate these symptoms in women with PMDD, who experience such symptoms to a greater extent, has not yet been demonstrated. However, we expect this to be validated as part of the **Validation of a Non-Invasive Brain Stimulation Device (Nettle™) to Manage Symptoms of Premenstrual Dysphoric Disorder** study.

### 3. Roundtable aim

The aim of this roundtable was to bring together an invited group of academics, NHS clinicians, commissioners, and other relevant organisations, that have an active interest in this area, to discuss the viability and optimal approach for integrating the Nettle™ device into NHS treatment for PMDD.

The discussion focused on three main areas:

1. Understanding the clinical need
2. Benefits and potential of the technology
3. Barriers to adoption and implementation

This is the first of two roundtable events that are being held for this SBRI project. The second roundtable will take place on Monday 23<sup>rd</sup> June 2025 and will address a further series of questions related to the **Validation of a Non-Invasive Brain Stimulation Device (Nettle™) to Manage Symptoms of Premenstrual Dysphoric Disorder** study.

### 4. Attendance

The Health Innovation Network South London compiled an invite list of approximately 60 stakeholders from across the UK. This list was developed through a combination of desktop research, personal recommendations and introductions from individuals working within the PMDD field. It included a diverse range of stakeholders representing GP practices, NHS Trusts, specialist clinics, universities, health innovation and research organisations, national bodies, Integrated Care Boards (ICBs), and charities. All those approached expressed an interest in this study.

The roundtable event took place on 24th March 12.30pm-14.00pm via Zoom. An online approach was taken to support attendance from across the UK and remove geographical barriers to attendance.

Dr Muj Husain, Director for Mental Health at the Health Innovation Network South London, and Consultant Liaison Psychiatrist South London and Maudsley NHS Foundation Trust, was invited to chair this event, due to his extensive experience of innovation in the NHS and clinical mental health services.

#### Roundtable Attendees on 24th March 2025

Name	Organisation	Job Title
Chloe Apsey	University of Cardiff	Psychology Assistant, Division of Psychological Medicine, and Clinical Neurosciences
Claire Bellone	Chelsea and Westminster NHS Foundation Trust	Nurse Consultant - Menopause Clinic & PMS Service
Lotte Coppieters	NHS England	Senior Project Manager - Digital Mental Health
Dr Natasha Curran	Health Innovation Network South London	Medical Director (& Consultant in Pain Medicine at University College London Hospitals.)
Paul Faulkner	Queen Mary University of London	Assistant Professor of Cognitive Neuroscience
Dr Andrea Ford	The University of Edinburgh	Wellcome Trust Research Fellow (Assistant Professor)
Professor Cynthia Fu	King's College London University of East London South London and Maudsley NHS	Professor of Affective Neuroscience & Psychotherapy, Honorary Consultant Psychiatrist

	Foundation Trust	
Dr Muj Husain (Chair)	Health Innovation Network South London & South London and Maudsley NHS Foundation Trust	Clinical Director, Mental Health, Consultant Psychiatrist
Aileen Jackson	Health Innovation Network South London	Head of Mental Health
Julie McCullough	Health and Social Care NI, Research and Development Division, Public Health Agency	Industry Engagement Manager
Kate Organ	The Menopause Specialists	BMS Menopause Specialist, Consultant Pharmacist MRPharms Hons, MSc
Dr Thomas Reilly	University of Oxford	MRC Clinical Research Training Fellow
Phoebe Williams	<a href="#">The PMDD Project</a>	Founder

## 5. Discussion

The roundtable discussion was centred around three key questions:

1. What are the key challenges in diagnosing and managing PMDD, and how might this new technology address them?
2. What are the benefits to adoption of technology like Nettle™? In what ways could the technology improve patient outcomes and quality of life for those with PMDD?
3. What are the barriers to adoption and implementation of technology like Nettle™?

### Question one: What are the key challenges in diagnosing and managing PMDD, and how might this new technology address them?

Key points discussed by roundtable attendees were:

- There was a strong consensus across attendees that PMDD is underdiagnosed and there is a significant unmet need in the community.
- One of the key challenges in diagnosing PMDD is the lack of prospective symptom tracking, which is essential for an accurate diagnosis. PMDD requires daily symptom monitoring over at least two menstrual cycles, which can be difficult for patients to engage with when they are feeling unwell. While patients may present with suspected PMDD, many do not then meet the diagnostic criteria once systematic tracking is completed.
- Some patients may choose to access private specialist services after finding that an initial treatment offered by their GP has not been effective. In general, these patients will only have completed one month of prospective symptom tracking, whereas a PMDD diagnosis would require at least two months. Understandably, patients can be reluctant to delay the start of alternative treatment options to complete further tracking, however symptom peaks and troughs may become less exaggerated if they were on an effective treatment, which can make diagnosis more challenging.
- There can be symptom overlap with other hormonal or mental health conditions, such as Polycystic Ovary Syndrome (PCOS) or bipolar disorder, which can make diagnosis and management extremely challenging. Historically, it has been common for women with PMDD to be misdiagnosed with bipolar disorder. More recently, there has been a shift, with many women self-identifying as having PMDD later receiving a diagnosis of Attention Deficit Hyperactivity Disorder (ADHD). A strong overlap between PMDD and ADHD has been observed, however it remains unclear whether this reflects true comorbidity or distinct conditions. Accurate diagnosis is essential to ensure appropriate treatment.

- For future research it would be important to distinguish between cases of 'pure' PMDD, where patients experience symptoms in the premenstrual phase and feel well for the remainder of their cycle, and cases where an underlying mental health condition (e.g. ADHD, chronic depression, or anxiety) is significantly exacerbated premenstrually. This distinction should be considered when developing inclusion and exclusion criteria for future studies.
- Unlike other pain-related conditions where treating one aspect (pain, depression, or anxiety) tends to benefit the others, reducing pain does not necessarily improve mood symptoms in PMDD.
- Clinical observations indicate that patients often experience the psychological symptoms of PMDD, such as mood swings and depression, as the most distressing aspect, while pain is typically more manageable and may even be perceived as a reassuring sign that menstruation is approaching.
- [Current pharmacological treatments typically produce a response rate of approximately 60-70% among women with severe PMDD.](#) These women will still experience a cyclical nature to their mood fluctuations; however, they may not experience pre-treatment symptoms with the same severity. For this reason, it was suggested Nettle™ could be considered as an additional therapy alongside other treatment options.
- There are currently few evidence-based treatments for PMDD. While strategies such as hormonal therapies and SSRIs are available, their effectiveness is limited and often inconsistent across the diverse population of women affected by the condition.
- Phase one of the 'Validation of a Non-Invasive Brain Stimulation Device to Manage Symptoms of Premenstrual Dysphoric Disorder' project is looking to recruit participants that are not currently on any other treatment for their PMDD which has proven to be challenging. Examples were shared from other tDCS-focused studies (though not specific to PMDD) where participants were allowed to take part while on other treatments. It was felt that excluding individuals solely because they are using other forms of treatment may unnecessarily limit participation and exclude those who could still benefit from the intervention.
- PMDD is a lifelong reproductive condition, which means patients would need to tolerate the use of technology like Nettle™ over an extended period. Current research is yet to explore the use of tDCS as a treatment option for a long duration.

## **Question two: What are the benefits to adoption of technology like Nettle™? In what ways could the technology improve patient outcomes and quality of life for those with PMDD?**

Key points discussed by roundtable attendees were:

- The adoption of technology like Nettle™ could allow clinicians to offer patients a non-pharmacological, non-hormonal, non-invasive treatment option. This may better serve patients who cannot tolerate current treatment options such as SSRIs or the combined oral contraceptives due to their hormone sensitivity of the condition or side effects of the treatment. This treatment option would also align with patient preference, offering a more acceptable and tolerable alternative.
- The use of Nettle™ could form a 'toolbox' treatment approach, where patients have a choice and are offered a range of treatment options which would complement each other and support individualised care for people with PMDD.
- The potential for return on investment was highlighted, especially in the working-age female population, who often carry significant caring responsibilities. This included the concept of a

multiplier effect in women's health—improving women's health can have wide-reaching benefits for families and communities.

- There is growing interest and acceptance of digital or at-home treatment devices. The Health Innovation Network South London [had carried out previous work](#) that showed people are willing to try digital treatments, but integration into clinical pathways and ongoing clinician engagement would be crucial for success. A take-home tDCS device could help bridge gaps in care, especially for patients seeking self-managed, accessible support.

### **Question three: What are the barriers to adoption and implementation of technology like Nettle™?**

Key points discussed by roundtable attendees were:

- One of the biggest barriers to adoption and implementation of technology like Nettle™ in the NHS is a lack of awareness of PMDD.
- Service provision for people with PMDD is currently limited and inconsistent, with a patchwork of care across the country. Management of the condition often falls to different services, such as primary care or local gynaecology services, depending on local expertise. As a result, identifying the most appropriate setting for implementing a technology like Nettle™ may be challenging.
- The NHS is a complex and evolving landscape, especially with the uncertainty that has come from upcoming changes in leadership, oversight, and commissioning at national (NHS England and the Department of Health and Social Care) and local system levels (Integrated Care Boards).
- Innovators often face repeated challenges when engaging with multiple NHS organisations due to differing local requirements.
- There has not yet been significant adoption of tDCS technology in the NHS for treatment of common conditions such as depression. Given that PMDD is a relatively niche area, this could limit the adoption and implementation of technology like Nettle™ within the NHS, until a broader uptake of tDCS is established for more prevalent disorders.
- Clinicians' unfamiliarity with this type of treatment could be a barrier to adoption and implementation in the NHS. Although GPs may have limited knowledge of PMDD, they tend to be comfortable prescribing SSRIs and combined oral contraceptives. Similarly, gynaecologists are familiar with a range of hormonal treatment options, and psychiatrists with the use of antidepressants. However, the lower familiarity amongst health care professionals of prescribing tDCS may present a challenge. There would be a need for cultural change alongside evidence generation.
- NHS clinicians are already under significant pressure, which may make it difficult to identify those with the capacity to support the adoption and implementation of new technology such as Nettle™.
- Clinical championing would be crucial for the successful adoption of technology like Nettle™ in the NHS. There may be opportunities for use in various clinical settings, but clinician buy-in is essential to develop a viable care pathway. Patient advocacy would also be very important. For example, the widespread adoption of the Freestyle Libre continuous glucose monitoring system was significantly driven by patient campaigning by an engaged and vocal patient community. Collaboration with patient charities could help build support and policy influence.



## 6. Summary

There is a growing recognition of the significant unmet need in supporting individuals with PMDD, however major barriers remain across diagnosis, treatment, and service provision. Accurate diagnosis is often impacted by the need for prospective symptom tracking over multiple cycles, a process that is difficult for patients to engage with while they are experiencing symptoms. Challenges in diagnosis are further complicated by symptom overlap with other hormonal and mental health conditions, such as ADHD and bipolar disorder, which highlights the need for better clinical awareness.

Current treatment options, including the use of SSRIs and hormonal therapies, have limitations including side effects and inconsistent relief. A technology like Nettle™, which offers a non-pharmacological, non-hormonal, and non-invasive approach, could provide a valuable addition to the PMDD treatment "toolbox," particularly for patients who do not tolerate existing options. However, long-term use considerations, limited awareness of PMDD and of technologies like tDCS among clinicians, could pose barriers to adoption within the NHS.

To enable the successful adoption and integration of Nettle™ into the NHS, it would be essential to develop clinician buy-in and patient support and engage clinical champions who could support cultural change and the development of new care pathways. The fragmented nature of current PMDD services across the United Kingdom, combined with broader systemic challenges in the NHS, reinforces the need for a clear, coordinated approach to implementation. With appropriate support, digital treatments like Nettle™ have the potential to improve outcomes for patients while also delivering wider social and economic benefits, particularly among the working-age female population.

## 7. References

- The prevalence of premenstrual dysphoric disorder: Systematic review and meta-analysis, Journal of Affective Disorders:  
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- Premenstrual dysphoric disorder: is there an economic burden of illness?:  
<https://pubmed.ncbi.nlm.nih.gov/12409855/#:~:text=We%20found%20little%20evidence%20that,with%20time%20away%20from%20work.>
- NICE Scenario: Management of premenstrual syndrome:  
<https://cks.nice.org.uk/topics/premenstrual-syndrome/management/management/>
- A randomized, double-blind clinical trial on the efficacy of cortical direct current stimulation for the treatment of major depression:  
<https://academic.oup.com/ijnp/article/11/2/249/767876>
- Dr Paul Faulkner:  
<https://paulfaulkner.uk/>
- Meet Nettle™:  
<https://samphireneuro.com/pages/nettle>
- About Samphire Neuroscience:  
<https://samphireneuro.com/pages/about>
- Nettle™ Clinical Trail (The WIND Trial):  
<https://samphireneuro.com/pages/wind-trial>
- The PMDD Project:  
<https://thepmddproject.org/>
- The impact of pharmacotherapy for premenstrual dysphoric disorder on sleep:  
<https://www.sciencedirect.com/science/article/pii/S108707922500022X#sec2>
- Patient Perspectives on Digital Access to Primary Care:  
<https://healthinnovationnetwork.com/resources/report-patient-perspectives-on-digital-access-to-primary-care/>



## 8. Appendix one: Roundtable agenda

Time	Item	Lead
12.30	<b>Welcome and introductions</b>	Dr Muj Husain
12.40	<b>Setting the scene</b>	Paul Faulkner
12.50	<b>Questions and attendees' opening thoughts</b>	Dr Muj Husain facilitating
13.00	<b>Question 1 - discussion</b> <b>Understanding the clinical need</b> <ul style="list-style-type: none"> <li>What are the key challenges in diagnosing and managing PMDD, and how might this new technology address them?</li> </ul>	Dr Muj Husain facilitating
13.15	<b>Question 2 - discussion</b> <b>Benefits and potential of the technology</b> <ul style="list-style-type: none"> <li>What are the benefits to adoption of technology like Nettle™? In what ways could the technology improve patient outcomes and quality of life for those with PMDD?</li> </ul>	Dr Muj Husain facilitating
13.30	<b>Question 3 - discussion</b> <b>Barriers to adoption and implementation</b> <ul style="list-style-type: none"> <li>What are the barriers to adoption and implementation of technology like Nettle™?</li> </ul>	Dr Muj Husain facilitating
13.45	<b>Summary and reflections from the chair</b> <b>Next Steps</b> <b>Close</b>	Dr Muj Husain

## About us

Health Innovation Network (HIN) South London is one of 15 HINs across England. As the only bodies that connect NHS and academic organisations, local authorities, the third sector and industry, we are catalysts that create the right conditions to facilitate change across whole health and social care economies, with a clear focus on improving outcomes for patients.

This means we are uniquely placed to identify and spread health innovation at pace and scale; driving the adoption and spread of innovative ideas and technologies across large populations. Our staff bring together a broad range of skills including clinical and lived experience partners, and subject matter expertise in commercial, digital transformation, quality improvement, user involvement, communications and engagement, community and capacity building, research and data analytics, project, and programme management.