Project Details	
Project Code	MRCPHS26Ex Lawrence
Title	"Cravings, Cycles, and Moods: Tracking the link between Diet and Women's Health with AI and Smartphones
Research Theme	PHS
Project Type	Dry lab
Summary	Are you passionate about women's health and behaviour change? Join our cutting-edge research project examining the relationship between diet, mental health and well-being, premenstrual syndrome (PMS) and perimenopausal symptoms across the menstrual cycle. In this project you will combine innovative smart technology and the latest AI-based food tracking apps to understand the impact of dietary behaviours on PMS and perimenopausal symptoms and develop skills highly valued in FemTech and diet and health industries.
Description	This project uses novel methods including self-tracking technology and apps to understand the relationships between women's menstrual and mental health and diet. The menstrual cycle can substantially impact individual health and well-being, and this relationship can worsen as an individual enters perimenopause. Worldwide, up to 80% of people who menstruate report experiencing PMS, a set of symptoms that occur in the luteal phase, including cramps, bloating, anxiety, low mood, and irritability, while Premenstrual Dysphoric Disorder (PMDD) is a recognized psychiatric condition that has many of the same symptoms as PMS but with severe functional impairment and effects on quality of life. Both PMS and PMDD can substantially reduce an individual's quality of life, limit work capacity, and lead to absenteeism from school, work, and social activities (Liguori et al., 2023; Delara et al., 2012). Moreover, the pain associated with menstrual cramps can impact mood and sleep quality, further exacerbating PMS symptoms. From mid-life, between 70-80% of people with ovaries suffer from perimenopausal symptoms, including emotional changes, poor sleep, night sweats, and hot flushes, so severe that they seek medical care. In 20-30% of perimenopausal women, these symptoms are so severe that they significantly impact their mental health, personal relationships, ability to work and complete everyday tasks, and overall well-being and life satisfaction. Annually, more than 1.5 million outpatient healthcare visits, and 26-33 million prescriptions, are attributed to perimenopausal symptoms (Cunningham et al., 2025). Despite the clear impact of PMS and perimenopausal symptoms on women's health and well-being, many women do not consult a doctor while experiencing these symptoms, which has been attributed to medication avoidance. Many women do not want to or cannot take hormonal-based contraceptives or therapies – the standard prescription for PMS and perimenopausal symptoms – leading to women trying their own alternative remedies. While there is some evidence that following a healthy diet (e.g., limiting ultra-processed foods rich in refined carbohydrates or fats, and reducing alcohol intake) can help prevent and manage menstrual and perimenopausal related symptoms, there is a limited amount of research in this area. As such, several questions

	remain unaddressed or unanswered, including: (1) How does typical diet (e.g. healthy plant-based diet index scores) affect PMS and perimenopausal symptoms within and between-people?; (2) Are there changes in diet quality across the menstrual cycle and how are these related to symptoms (bidirectionally)? ; (3) Can dietary intervention reduce the severity of these symptoms and lead to improvements in mental health and well-being? Smartphone apps and wearable devices (e.g., smart watches, fitness trackers) make it possible to collect quality, prospective, real-time data on dietary choices, menstrual symptoms, and emotional states across the menstrual cycle to address these questions. Aims and Objectives Over the course of the studentship, the student will have the opportunity to work on several research projects designed to address these aims and objectives. Depending on their interest, existing skills, and career aspirations the student may choose to develop any one of the aims/objectives outlined below in more detail (in consultation with supervisors). The research provides an excellent opportunity to develop skills that are highly valued in the FemTech and nutrition and health industries and to become one of only a few global experts in EMA based methods. In Year 1, the student will prep a scoping or systematic review related to this topic. Key research objectives/questions (student can choose 2-3 to focus on as part of a larger study): Year One: Systematic review and pilot study. The student will develop and pilot an approach to combine AI-based dietary assessment (Fueld) and EMA measures to assess the feasibility and acceptability of using these methods in diverse participants. This will involve assessing participants' experiences during the study and willingness to participate in similar future studies, and the quality of the collected data such as the amount of missing data. It could also include developing approaches to best analyse these repeated-measures data, or how feasibility / acceptability varies across demographic groups. Year Two: Conduct a larger study combining the Fueld app with EMA measures to capture dietary intake data, menstrual and perimenopausal symptoms and psychological outcomes. This will involve assessing how food cravings fluctuate across the menstrual cycle, and whether these cravings result in changes in dietary behaviours that exacerbate PMS and perimenopausal symptoms? Year Three: Intervention study, e.g., assessing how adopting a plant-based diet during Veganuary or abstaining from alcohol during Dry January impacts PMS and perimenopausal symptoms and well-being across the menstrual cycle.
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