The Mentors Offering Maternal Support (M-O-M-S™) Programme

Reducing pregnancy-specific anxiety

Prenatal anxiety and depression play a significant role during pregnancy. Specifically, factors associated with 'Acceptance of Pregnancy', 'Identification as a Mother', 'Fear of Labour', and 'Wellbeing of Self and Infant' have all been shown to increase concerns, known as 'pregnancy-specific' anxiety. Unmitigated, this anxiety is strongly linked to dysregulation of the inflammatory response and poor birth outcomes. The Mentors Offering Maternal Support (M-O-M-S™) Programme, developed by Dr Karen L Weis, of the University of the Incarnate Word School of Nursing in Texas, US, is an early prenatal peer-support intervention that has been shown to reduce pregnancy-specific anxiety, which is critical for improving pregnancy and birth outcomes.

Anxiety and depression have far-reaching consequences and are all too common across the world, particularly for pregnant women. Recent research conducted by Dr Karen L Weis at the University of the Incarnate Word in Texas, explores the possible links between pregnancy-specific anxiety, physiological markers of inflammation, and poor birth outcomes, such as low birth weight and premature birth.

MEASURES OF MATERNAL MENTAL HEALTH

Weis's past and current research highlights the magnitude of the problem, with almost a fifth (18.2%) of women in early pregnancy and over a quarter (26.6%) of women in later pregnancy experiencing anxiety (Weis et al, 2020). Similarly, the statistics for diagnosed depression (both minor and major) among pregnant women stands at 20%. Additionally, there are women who experience and suffer from both depression and anxiety. Although there is a strong evidential link between prenatal maternal anxiety and poor birth outcomes, the methodology of determining and quantifying these specific anxieties varies between studies undertaken over the years, which makes it challenging to draw firm conclusions.

MILITARY MOTHERS-TO-BE

Weis's research looked specifically at a cohort of military women who face a unique set of challenges that exacerbate pregnancy-specific anxiety. These challenges may include moving to a new post while pregnant, being stationed in an isolated or remote location, or having an active-duty partner deployed during the pregnancy.

Understanding these challenges, Weis developed the initial Mentors Offering Maternal Support (M-O-M-S™) study to help address and support these mothers. Specifically, this randomised, controlled clinical trial aimed to evaluate the effectiveness of an early-pregnancy support intervention in reducing pregnancy-related anxiety and depression, while building self-esteem and resilience among military women.

M-O-M-S™ STUDY DESIGN

The M-O-M-S™ study explored the connection between maternal pregnancy-specific anxiety and the risk for pre-term birth and low birth weight. All participants (367) were either active-duty service members, spouses of active-duty service members, or retirees, as well as being in the first trimester of pregnancy and at least 18 years old. After providing informed consent, the women were randomly assigned to the treatment group or the control group. Participants of both groups received standard prenatal care according to the Department of Defense (DoD) pregnancy guidelines, with only the treatment group receiving the M-O-M-S™ intervention.

DATA COLLECTION

All participants completed questionnaires in each trimester, which included psychological measures relating to pregnancy-specific anxiety, depression, self-esteem, and resilience. Anxiety was measured using Lederman's Prenatal Self-Evaluation Questionnaire (PSEQ-SF).

Topics covered in this questionnaire included: 'acceptance of pregnancy', 'identification with a motherhood role', 'preparation for labour', 'concerns for wellbeing of self and baby in labour', 'fear of pain, helplessness, and loss of control in labour', 'relationship with mother', and 'relationship with spouse/partner'. Depression was measured using the Edinburgh Postnatal Depression Scale (EPDS), which comprises ten questions designed to detect symptoms suggesting depression or anxiety. In addition to questionnaire data, 57 of the 367 participants consented to give blood samples, which were used to assess inflammation biomarkers, such as the cytokines IL-6, TNF-α, IL-1β, IL-2, IL-10, and cortisol.

INTERVENTION FORMAT

The treatment group additionally received the M-O-M-S™ support intervention, which is made up of eight one-hour mentoring sessions. Sessions took place every other week, starting in the first trimester. Topics for discussion included 'pregnancy acceptance', 'identifying with motherhood', 'mother-daughter relationship', 'family–partner relationship', 'wellbeing of self and baby', 'fear of helplessness in labour', and 'labour preparation'.

After several years of implementation research, the M-O-M-S™ programme was deemed a success. The treatment group had lower prenatal anxiety regarding identification with a motherhood role and preparation for labour. This is important, as both of these causes of prenatal anxiety were found to be connected with pre-term birth and low birth weight.

THE PSYCHOSOCIAL–PHYSIOLOGICAL CONNECTION

Recognising the gap in understanding the mechanism of action, further research conducted by Weis evaluated the association between psychosocial (the interplay between individual thought and behaviour and social factors) measures of pregnancy-specific anxiety and the body's inflammatory response. In particular, she sought to determine the effectiveness of the Mentors Offering Maternal Support (M-O-M-S™) programme in reducing psychosocial anxiety and the associated inflammatory response.

All participants completed questionnaires in each trimester.

The study explored connections between pregnancy-specific anxiety and risks of pre-term birth.

INFLAMMATORY RESPONSE INTERPLAY

Noting the impact that pregnancy-specific anxiety and stress have on the hypothalamic-pituitary axis (HPA), and its relationship to poor birth 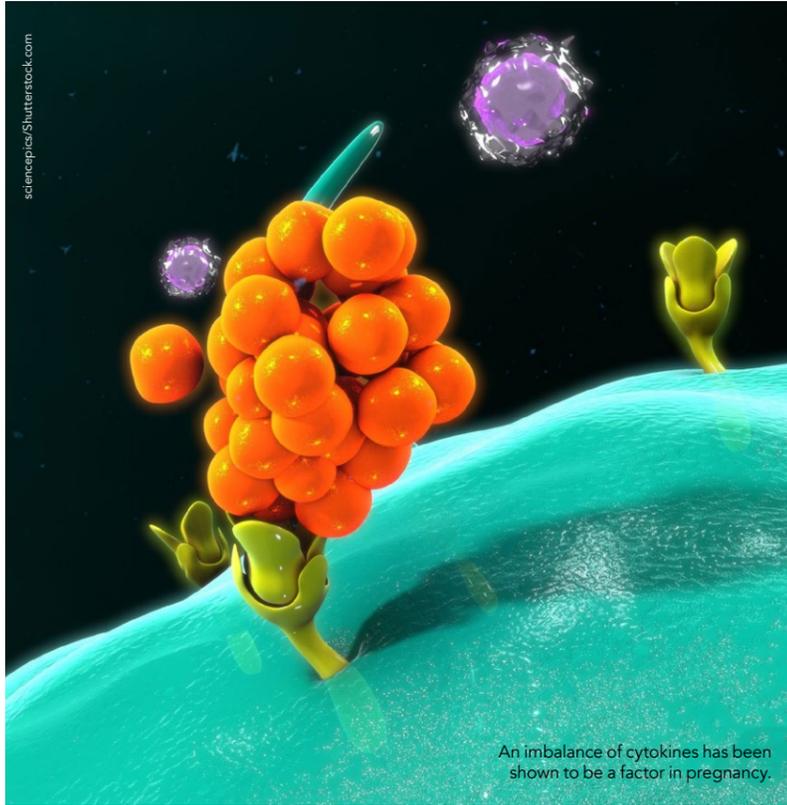outcomes, Weis measured the questionnaire responses on anxiety and depression in relation to inflammatory biomarkers for each trimester.

PRO-/ANTI-INFLAMMATORY BALANCE

The pro-/anti-inflammatory balance is critical in maintaining homeostasis, and the imbalance of the associated cytokines has been shown to be a factor in pregnancy. Specifically, TNF-α and IL-10, which are pro- and anti-inflammatory blood markers respectively. Study participants who took part in the M-O-M-S™ support sessions had a lower TNF-α/IL-10 ratio in their samples over time than those in the control group, who did not receive the support sessions.

There were also interesting findings for the relationship between inflammation blood markers and the questionnaire results regarding how the women felt

> **The treatment group had lower prenatal anxiety regarding identification with a motherhood role and preparation for labour.**

about various aspects of pregnancy and birth. For example, among the control group, the higher the ratio of TNF-α/IL-10, the less positive they felt about being 'prepared for labour' and their 'relationship with their partner'.

IL-6, another pro-inflammatory marker, and anxiety around a pregnant woman's relationship with her partner, was significantly linked to IL-6/IL-10 ratios in the blood samples. There were also borderline significant associations between IL-6/IL-10 ratios and 'identification with a motherhood role' (p=0.07), 'relationship with

An imbalance of cytokines has been shown to be a factor in pregnancy.

response, which highlighted the importance of anti-inflammatory IL-10. This group also experienced a significant increase in pro-inflammatory IL-1β, which was linked to depressive symptoms. What is more, the physiological changes were present even in relatively slight (as opposed to severe) variations in measures of anxiety and depression.

EFFECT ON FOETAL OUTCOMES
In earlier work, Weis found that anxiety associated with preparation for labour increased the odds of pre-term birth by 60%. The associated inflammatory-marker levels also showed a heightened inflammatory response within the control group for anxiety related to preparation for labour, which aligns with actual birth outcomes. Therefore, dysregulation of the inflammatory response during pregnancy can be said to be strongly linked with poor birth outcomes.

While pro-inflammatory cytokines may have been increasingly researched, it is the nuanced relationship between both pro- and anti- inflammatory cytokines that is important as a marker for pre-term birth and other complications. As pregnancy-related anxiety is related to poor birth outcomes, it is important to understand the changes in inflammatory biomarkers over the course of pregnancy. This includes the relationship with psychosocial measures of anxiety and the relationship with interventions designed to support women with maternal anxiety and depression.

PRACTICAL APPLICATION
Weis's findings highlight the importance of supporting women in the early stages of pregnancy. However, she notes that currently it is more common for classes and programmes to be provided late in the third trimester. Furthermore, women are not generally provided with support opportunities and the chance to reflect on their relationships in relation to pregnancy and becoming a parent.

She emphasises that intervention is required to reduce anxiety associated with maternal identification. Furthermore, early assessment and focused intervention are needed to support a balanced maternal immune system and improve outcomes for the new-born.

Those in the M-O-M-S™ support group maintained a balanced ratio of pro-inflammatory to anti-inflammatory cytokines.

mother' (p=0.06), and 'preparation for labour' (p=0.07).

This was not the case for those in the M-O-M-S™ group, whose results remained relatively constant throughout the trial period. Additionally, there was a borderline significant (p=0.07) relationship between the anti-inflammatory marker IL-10 and identification with a motherhood role in the M-O-M-S™ group. This is in contrast to the control group, in which IL-10 remained low and constant. The control group also showed a significant (p=0.01) link between depression and the pro-inflammatory marker IL-1β. They had significant increases in IL-1β and depressive symptoms over the women in the M-O-M-S™ group.

SIGNIFICANCE OF THE FINDINGS
Weis's work highlights the difference in inflammatory biomarker levels of

pregnant women across the three trimesters of pregnancy, depending on whether or not support is provided. The results demonstrate how the inflammatory response is regulated through a balance of pro-inflammatory (including IL-6, TNF-α) and anti-inflammatory (including IL-10) cytokines.

It is clear from her research that IL-6 and TNF-α drive inflammation are strongly linked to pregnancy anxiety. Her work also highlights the distinct inflammatory response the body has to pregnancy-related anxiety depending on whether or not support is received.

Those in the M-O-M-S™ support group maintained a balanced ratio of pro-inflammatory to anti-inflammatory cytokines. In contrast, those not receiving the M-O-M-S™ support experienced dysregulation of the inflammatory

Behind the Research
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Research Objectives

Dr Karen L Weis developed Mentors Offering Maternal Support (M-O-M-S™) to reduce pregnancy-specific anxiety and support healthy birth outcomes.

Detail

Bio
Dr Karen Weis, Professor and Lillian Dunlap Chair, University of the Incarnate Word School of Nursing in the US, has spent the last 20 years caring for pregnant women and studying the effects of mental health on birth outcomes. Her work led to the development of the Mentors Offering Maternal Support Programme (M-O-M-S™).

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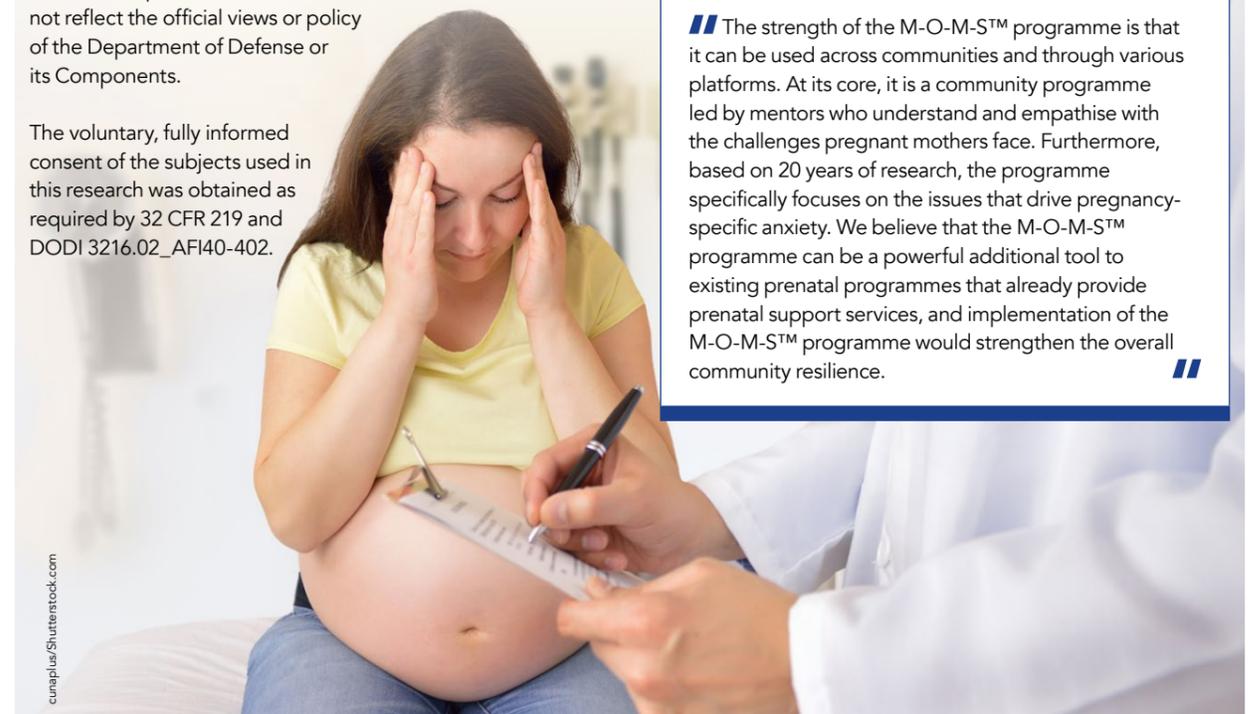
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Personal Response

How can organisations offering maternal support make use of your findings and apply them more widely to their pregnancy support services?

The strength of the M-O-M-S™ programme is that it can be used across communities and through various platforms. At its core, it is a community programme led by mentors who understand and empathise with the challenges pregnant mothers face. Furthermore, based on 20 years of research, the programme specifically focuses on the issues that drive pregnancy-specific anxiety. We believe that the M-O-M-S™ programme can be a powerful additional tool to existing prenatal programmes that already provide prenatal support services, and implementation of the M-O-M-S™ programme would strengthen the overall community resilience.