

Optimising weight gain in pregnancy: key challenges and solutions for maternal obesity prevention

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Article history

Publication date: 12 October 2022

Citation: Hill B, Skouteris H, Teede H, Savaglio M, Harrison CL. Optimising weight gain in pregnancy: key challenges and solutions for maternal obesity prevention. *Public Health Res Pract.* 2022;32(3):e3232222. <https://doi.org/10.17061/phrp3232222>

Key points

- Antenatal lifestyle interventions incorporating counselling about diet and physical activity can reduce excess gestational weight gain, yet evidence to guide implementation is limited
- Future research should focus on identifying key implementation characteristics supported by pragmatic implementation research that is underpinned by rigorous reporting frameworks to inform learnings
- Socioecological aspects of obesity prevention, including reducing weight stigma, must be considered alongside implementation efforts to ensure equity of access to and uptake of interventions

Abstract

Pregnancy is a high-risk period for excess gestational weight gain and subsequent obesity development. Antenatal lifestyle interventions are prioritised to optimise weight, with current evidence demonstrating efficacy and associated reduction in risk of adverse maternal and neonatal outcomes. Yet, evidence to guide the field from efficacy-based to implementation research within real-world settings is lacking, and several key challenges remain. Here, we discuss key considerations to support the implementation of accessible, relevant, effective, and low-cost lifestyle interventions in routine pregnancy care. This includes identifying what components of lifestyle interventions are most effective, with pragmatic guidance on how to conduct implementation research, improving rigour in reporting to ensure learnings from implementation are captured, and recognising and addressing the socioecological aspects of obesity prevention, including supporting women living with socioeconomic disadvantage and reducing weight stigma.

Background

Preventing excessive weight gain that leads to obesity is a global public health and economic challenge. For more than a decade, our research has focused on preventing the excess weight gain experienced by more than half of women during pregnancy. Excessive gestational weight gain (GWG) increases the risk of adverse pregnancy outcomes, postpartum weight retention, maternal obesity and exacerbates intergenerational epigenetic risks, including childhood obesity¹ The authors have led research and work contributing to policy changes, including: a National Health and Medical Research Council (NHMRC) case for action²; conceptual models of GWG³; primary randomised controlled trials⁴; clinical practice guideline appraisal

for weight management⁵; network meta-analysis to evaluate the efficacy of behavioural components within lifestyle interventions to optimise GWG⁶; cost effectiveness analyses⁷; international priority setting for the prevention of maternal obesity⁸; and meta-analysis of lifestyle intervention in pregnancy incorporating 34,546 participants from 117 trials across five continents.² A NHMRC Centre of Research Excellence focused on the prevention of maternal obesity exemplifies our national leadership in this area.

Despite extensive research demonstrating the efficacy and cost-effectiveness of lifestyle intervention in pregnancy^{2,7}, significant challenges remain that prevent the translation of evidence into real-world implementation. Key challenges include: 1) heterogeneity in intervention design, which limits understanding of exactly what should be implemented, how, and by whom; 2) lack of standardised approaches to intervention reporting, limiting replicability and understanding of the implementability of trials; and 3) lack of evidence on how to improve equity, reach, and engagement of lifestyle interventions that are non-stigmatising in populations living with socioeconomic disadvantage.

To date, no antenatal lifestyle intervention has been implemented at scale and as a part of routine care to successfully and sustainably prevent excessive GWG, despite the strong mandate that exists to address escalating maternal weight gain. The antenatal period remains a critical window for intervention, especially since women in the preconception stage of life are a poorly defined population who are not necessarily engaged with the healthcare system, and 50% of pregnancies remain unplanned.⁹ Here, we discuss key challenges and propose research solutions to produce evidence to support the implementation of accessible, relevant, effective, and low-cost lifestyle interventions into routine pregnancy care.

Understanding what interventions to implement, how and by whom

While evidence from systematic reviews can identify intervention efficacy as an aggregate. It does not provide information on exactly what intervention should be implemented, how it should be implemented, and by whom.⁸ Few studies have explored exactly what intervention components are most efficacious, and none, to our knowledge, have evaluated components in combination.¹⁰ This knowledge is critical not only for identifying which specific combination of elements are most effective, but it also more pragmatically reflects how interventions are applied within real-world settings. This includes pragmatic intervention components such as intervention timing, type, frequency, duration, delivery mode and format, facilitator type, and setting, as well as behavioural strategies including shaping knowledge, self-monitoring, goal setting, feedback, and problem-solving.

Our recent component network meta-analyses of behavioural strategies contribute to this need, identifying goal setting, shaping knowledge, and feedback and monitoring as components within lifestyle interventions associated with optimised GWG.⁶ However, further research is needed, including an evaluation of the effectiveness of these components when used alone or in conjunction with other intervention types, including diet and physical activity interventions, as well as within pragmatic implementation design. Elucidating this information is vital for informing intervention design, delivery, and cost-effectiveness, enabling the most effective components to be retained, applied and evaluated.

Addressing heterogeneity in trial reporting to enhance implementation

While rigour in reporting within intervention trials to enhance replicability and reduce bias is widely advocated, a standardised approach does not yet exist. Ultimately, this limits understanding of how to implement trials, particularly lifestyle interventions that are heterogeneous in nature. Irrespective of whether a trial is designed for implementation, learnings related to implementation, including applicability, population penetration, reach, risk of bias, and fidelity, can be captured with rigorous reporting.

To support learnings, the adoption of frameworks within GWG interventions that promote detailed design reporting and replicability may reduce the risk of bias and enhance rigour while improving access to implementability information.¹¹ Alongside the use of the Consolidated Standards of Reporting Trials (CONSORT) statement, frameworks could include the Template for Intervention Description and Replication (TIDieR) checklist, capturing items to enhance replicability.¹² These include: why (applicability); what (materials, procedure); who (facilitator); how (mode, format); where (setting); when (time frame); and how much (intensity, frequency).¹² Additionally, the Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) checklist for study protocols¹³ and the Penetration, Implementation, Participation, and Effectiveness (PIPE)¹⁴ metric for population impact should be considered. Collectively, these frameworks can disentangle interventions to inform GWG strategies that optimise penetration, implementation, participation, efficacy, and cost-effectiveness to deliver population benefit.

Ensuring interventions are equitable, accessible, relevant, and non-stigmatising

Interventions to optimise behaviour, weight, and health must be delivered in the context of a supportive environment that extends beyond personal responsibility. It is important to consider the environment in which people live, including the influence of infrastructure and accessibility, as well as the influence of social networks, communities, organisations, and governments on individual health behaviours and intervention needs.¹⁵ Weight stigma is an undercurrent tightly related to weight management driven by cultural and societal norms.¹⁵ Weight stigma is pervasive, with women affected more than men and health professionals identified as a primary contributing source.¹⁶ Pregnancy presents a particularly vulnerable period for experiencing weight stigma due to the increased risk of excessive weight gain.¹⁵ Given weight stigma is counterproductive to weight maintaining and health-seeking behaviours¹⁶, it is essential that interventions are designed in a way that is sensitive to pregnancy as an experience that requires increased support and understanding of the associated barriers to maintaining healthy lifestyle behaviours; this will improve effectiveness in the delivery of programs. Weight stigma is also associated with psychological distress such as depression and anxiety, body image concerns, decreased access to and uptake of reproductive healthcare, and decreased initiation and duration of breastfeeding, so reducing weight stigma is not only warranted but vital to protect the health of mothers during pregnancy and beyond.¹⁵

Pregnant women living with social and economic disadvantage experience greater stigma, greater inequities in access to healthcare, and poorer pregnancy outcomes.^{15,17} This includes women who are Aboriginal, Torres Strait Islander, LGBTQIA+ (lesbian, gay, bisexual, trans, queer, intersex, asexual and other), asylum seekers or migrants, culturally and linguistically diverse, and those who are living in rural and remote regions or who have experienced trauma, such as family violence and/or abuse.¹⁸ This population comprises a significant proportion of pregnant and birthing women in Australia; 35.7% are non-Australian born, 25% deliver in rural or remote settings, and 20% reside in low socioeconomic areas.¹⁸ Key barriers associated with inequity in access to healthcare include language barriers, out-of-pocket costs, lack of transportation, lack of information or awareness of services, or insufficient support to access services.¹⁷ For equity in healthcare to be realised in practice, intentional approaches to dismantling the structural inequities that exist in maternity healthcare must be considered to increase penetration and reach. When designing and implementing antenatal lifestyle interventions, it is also essential to consider

the associated environmental, structural, and systemic factors that influence the implementation, reach, uptake, and impact of interventions among diverse population groups. Meaningful collaborative design or co-design with these populations must be prioritised to create accessible resources and interventions that are sensitive and tailored to the specific needs of the varied population groups presenting for care.

Work in this area of equity and accessibility is currently underway. This includes projects led by study authors focused on reducing weight stigma in pregnancy and developing and enhancing digital technology to increase accessibility, usability, and engagement across culturally diverse women and women living in regional and rural areas, respectively.

Conclusion

While potential exists for lifestyle intervention to optimise GWG and related outcomes, several key barriers remain for translation to be realised with broad impact and at scale. This includes a focus on implementation research to leverage the existing evidence to optimise weight and outcomes during pregnancy. Identifying what types and components of lifestyle interventions are most effective and real-world pragmatic guidance on how to implement lifestyle interventions in various contexts is vital, supported by rigorous reporting to inform on learnings, population reach, and effectiveness. Considering socio-ecological aspects of obesity prevention and supporting women living with disadvantages most at risk, alongside meaningful co-design methods to ensure interventions are non-stigmatising and created with women, for women and present critical next steps in informing the population and public health benefit of antenatal lifestyle intervention.

Acknowledgements

BH is funded by a NHMRC Early Career Fellowship (GNT1120477). HT is supported by NHMRC Fellowship. CLH is funded by a Senior Postdoctoral Fellowship from the NHMRC Centre for Research Excellence for Health in Preconception and Pregnancy (CRE-HiPP; GNT1171142).

BH is a lead investigator for an ARC Discovery (DP220101107) Project Grant on reducing weight stigma in pregnancy. CH is a lead investigator for a Medical Research Future Fund (APP2007507) project developing and enhancing digital technology to increase accessibility, usability, and engagement across culturally diverse women and women living in regional and rural areas.

This paper is part of a special issue of the journal focusing on obesity prevention, which has been produced in partnership with the Health and Social Care Unit, School of Public Health and Preventive Medicine, Monash University, with support from VicHealth. HS is a guest

editor of the special issue but had no involvement in this manuscript's peer review and decision-making process.

Peer review and provenance

Externally peer reviewed, invited.

Competing interests

None declared.

Author contributions

All authors contributed to the design and drafting of the manuscript and revising it critically for intellectual content. All authors approved the final manuscript.

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