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Integrated Group Antenatal Care Model: Development of a Brazilian Group Antenatal Care Programme Using Plan–Do–Study–Act Cycles

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Abstract

Background

Group antenatal care (ANC-G) has emerged as an innovative model to improve the quality of antenatal care (ANC) by integrating clinical assessment, health education and psychosocial support. Although evidence supporting its effectiveness is growing, its implementation within public health systems, particularly in low- and middle-income countries, remains limited.

Objective

To describe the development, implementation and structure of an ANC-G programme.

Methods

This quality improvement report, prepared in accordance with the SQUIRE 2.0 guidelines, describes a programme implemented in a teaching hospital in Brazil. The programme was developed through iterative Plan–Do–Study–Act (PDSA) cycles during a pilot randomised study; the comparative outcomes of that study are not reported in this manuscript. Group sessions were scheduled according to participants' gestational age, with one session in the postpartum period and 10 at the recommended timing for routine antenatal/postpartum care. All sessions were delivered by a multidisciplinary team.

Results

The programme comprised 11 structured group sessions, each lasting approximately 2 hours, involving 8–12 pregnant women, and facilitated by obstetric nurses, with participation from obstetricians, psychologists, a physical educator, nursing students, obstetrics resident and invited professionals, including nutritionists, physiotherapists and social workers. The model integrated all clinical/obstetric assessment with group-based health education, physical activity and psychosocial support. Topics addressed throughout the programme included nutrition, immunisation, physical activity, warning signs, infection prevention, mental health, gender-based violence, reproductive planning, birth preparedness, breastfeeding, newborn care, women's rights and postpartum adaptation. The sessions incorporated participatory educational strategies, including group discussions, simulations, practical demonstrations, games, artistic activities, reflective writing and peer learning. The PDSA process enabled the development of a structured, contextually adapted programme and generated detailed documentation of programme content, implementation procedures, educational strategies and professional roles.

Conclusions

This study provides a comprehensive description of a structured ANC-G programme implemented in a university hospital. The programme offers a replicable framework for integrating clinical, educational, and

psychosocial components of ANC and may inform future implementation and scale-up within public health systems.

Trial registration:

Brazilian Registry of Clinical Trials (ReBEC), RBR-8xcjmf; UTN U1111-1243-6241. Registered on 26 February 2020.

BACKGROUND

Antenatal care (ANC) is a cornerstone of maternal and child healthcare worldwide. It is widely recognised for helping reduce adverse maternal and perinatal outcomes and promoting safer pregnancies and positive experiences (1). Its primary objective is to support pregnancy progression, thereby contributing to a healthy newborn and preserving maternal health throughout pregnancy, childbirth and the postpartum period. In addition to clinical monitoring, ANC encompasses psychosocial, educational and preventive dimensions that are essential to comprehensive maternal care, as outlined in the World Health Organization's (WHO) global guideline on routine ANC (2).

Globally, ANC is recognised as a strategic approach for improving maternal and newborn survival and well-being. The WHO guideline recommends at least eight ANC contacts throughout pregnancy, moving beyond the traditional focus on visit frequency toward a person-centred model that prioritises a positive pregnancy experience (2). In parallel, the Ending Preventable Maternal Mortality (EPMM) initiative, led by WHO and the United Nations Population Fund, has established global coverage targets, including that at least 90% of pregnant women attend at least four ANC visits, reinforcing the international commitment to reducing maternal mortality and improving the quality of obstetric care through comprehensive, woman-centred care throughout pregnancy, childbirth and the postpartum period (3).

Despite substantial global progress in expanding ANC coverage, increasing the number of visits alone has not translated into corresponding gains in the content and quality of care received. A systematic analysis of trends across 131 low- and middle-income countries found that although the proportion of women initiating ANC in the first trimester rose from 46.2% in 1995 to 63.7% in 2023, persistent gaps remain in the essential components delivered during each visit, with missed opportunities during attended visits often outweighing gaps caused by non-attendance (4). These findings highlight that access alone does not guarantee equitable and high-quality ANC, and that quality assessment must extend beyond simple attendance counts.

In response to these challenges, innovative models of care provision have been proposed to improve the quality of maternity services. Among these, group ANC (ANC-G) has gained increasing attention as an alternative to the traditional model of individual consultations. By creating a collective space for learning, interaction and support, ANC-G promotes peer engagement, strengthens women's autonomy and contributes to maternal well-being during pregnancy (5).

Inspired by international experiences, ANC-G has been implemented in the United States since the 1990s through the CenteringPregnancy® model (1). In this approach, care is delivered by a multidisciplinary team,

typically led by an obstetric nurse or obstetrician, in groups of 8–12 pregnant women. Sessions generally last 90–120 minutes and integrate individual clinical/obstetrical assessment, structured health education and peer support, fostering a more participatory and holistic model of care (1).

Studies evaluating the CenteringPregnancy® model have shown important benefits, including reduced rates of neonatal intensive care unit admission (6), lower rates of low birthweight and increased likelihood of breastfeeding initiation (7). These findings highlight the potential of ANC-G to improve both maternal and perinatal outcomes.

The programme was developed drawing on international evidence on antenatal care in groups (ANC-G) and the principles of woman-centred care, peer learning and psychosocial support. Thus, rather than replicating a specific ANC-G model, the programme incorporated relevant elements from the evidence base and adapted them to the context of this study. Woman-centred care is defined as respectful, individualised maternity care that prioritises women's autonomy, preferences and shared decision-making within health services (8). Peer learning refers to structured group-based interactions that facilitate the exchange of experiences and collective construction of knowledge among pregnant women (9). Psychosocial support encompasses emotional, informational and relational resources that contribute to coping, well-being and reduced stress during pregnancy (10).

Although previous studies have demonstrated the benefits of ANC-G, detailed descriptions of implementation processes, session organisation, educational strategies and contextual adaptations remain scarce. Comprehensive reporting of such interventions is essential to support replication, adaptation and potential scale-up across diverse healthcare settings, contributing to both the advancement of implementation science and the improvement of ANC. Therefore, this study aimed to describe the development, implementation and structure of an ANC-G programme in a Brazilian university hospital.

METHODS

Ethical Considerations

The pilot study on which this programme was based was approved by the Research Ethics Committee (approval no. CAAE 25333119.2.0000.5404) in accordance with Resolution No. 466/2012 of the Brazilian National Health Council.

Study Design

Continuous Quality Improvement (CQI) has increasingly been adopted in healthcare systems as a structured approach to improving care processes, strengthening organisational learning and promoting the systematic adaptation of health interventions to local contexts (11). Within CQI frameworks, the Plan–Do–Study–Act (PDSA) cycle is one of the most widely used methods for designing, testing, refining and implementing service innovations (12). The PDSA cycle is embedded within the broader Model for Improvement, which combines three fundamental questions – addressing the aim of the initiative, the measures used to

determine whether a change constitutes an improvement, and the changes likely to result in improvement – with the iterative PDSA cycle (12).

In this study, the aim was to design and implement an ANC-G programme adapted to a Brazilian tertiary public hospital. Process- and experience-related observations collected throughout implementation, rather than clinical outcome measures, were used to determine whether adjustments constituted improvements. Change ideas were generated from the review of existing models, the multidisciplinary team's expertise, and ongoing feedback from professionals and participants (13).

In this study, PDSA cycles provided the methodological framework for developing and implementing an ANC-G programme at the Women's Hospital 'Prof Dr José Aristodemo Pinotti' (CAISM) of the Universidade Estadual de Campinas (UNICAMP). Rather than serving exclusively as an evaluation strategy, the PDSA cycles guided the programme's progressive adaptation to the local context and informed decisions about its content, session structure, professional roles, logistics and participant engagement.

Each element of the PDSA cycle corresponded to a distinct phase of programme development, detailed in the following section: Plan, encompassing the review of existing models and the initial design of the programme (Phase I); Do, corresponding to the pilot implementation of the programme under real-world conditions (Phase II); Study, involving the systematic analysis of implementation data and refinement of the programme (Phase III); and Act, corresponding to the consolidation of lessons learned and preparation for future adaptation and scale-up (Phase IV). This structure allowed learning from each cycle to inform the next, consistent with the iterative and cumulative nature of PDSA-based quality improvement (12).

This manuscript is reported in accordance with the SQUIRE 2.0 (Standards for QUality Improvement Reporting Excellence) guidelines (16), and the completed checklist is provided as Additional file 1. The programme was developed within a pilot randomised study registered in the Brazilian Registry of Clinical Trials (ReBEC, RBR-8xcjmf), whose protocol has been published (13). The present report describes only the development, structure and implementation of the intervention. The comparative maternal, perinatal and experience outcomes of the pilot randomised study are not reported here and will be reported separately, in accordance with the CONSORT statement.

Study Setting

This pilot study was conducted at CAISM, a teaching hospital of UNICAMP, in Campinas, São Paulo, Brazil. CAISM is a public reference centre for high-risk pregnancy and complex gynaecological, obstetric and neonatal care, serving more than 40 municipalities and a population of over six million people. It cares for a socioeconomically diverse population referred through the public health system, with approximately 1,250 births and 70,000 outpatient visits per year.

Participants of Pilot Study

The programme was delivered to routine-risk pregnant women allocated to the intervention arm of the pilot randomised study (13). Women allocated to the control arm received routine individual ANC, following the

visit schedule recommended by the Brazilian Ministry of Health; their data are not reported in this manuscript.

Programme Team

The team that conducted the sessions included a nurse-midwife, an obstetrician, a psychologist, a physical educator, undergraduate nursing students, and obstetrician residents, with occasional participation from nutritionists, physiotherapists, and social workers, depending on the needs and topics addressed in each session (14). All team members had experience in both clinical practice and qualitative and quantitative research.

Programme Implementation

Programme implementation was organised into four interconnected phases corresponding to successive stages of planning, testing, refinement and preparation for future scale-up.

Phase I: Planning and programme development

The planning phase involved reviewing international ANC-G models and identifying key programme components relevant to the healthcare context. Twenty-four programmes were examined regarding their educational approaches, session organisation, multidisciplinary involvement, psychosocial components, use of digital resources, and strategies for participant recruitment and retention (15). Findings from this review informed the design of a locally adapted programme that preserved the core elements of ANC-G while addressing contextual characteristics of the study setting. The multidisciplinary team then participated in structured training sessions focused on programme principles, facilitation techniques, clinical protocols and the thematic content of the 11 planned sessions. During this phase, the team also developed the educational materials, session guides and implementation procedures. The main components of the group prenatal care programme and their distribution across the intervention sessions are presented in Table 1.

Table 1
Distribution of the core components of the ANCG programme throughout the intervention

Intervention phase	Core components	Main objectives
Enrolment and first contact	Clinical assessment and programme introduction	Confirmation of pregnancy, obstetric risk stratification, baseline clinical assessment, introduction to the ANCG model, and establishment of group dynamics to support engagement with care.
Early ANC	Integrated clinical follow-up and health education	Routine ANC consultations combined with group activities addressing pregnancy physiology, nutrition, warning signs, maternal rights, and health promotion, with emphasis on early identification of risks.
Mid-pregnancy	Psychosocial support and participatory learning	Facilitation of peer support, shared experiences, mental health screening, and strengthening of social networks to promote emotional support, empowerment, and continued engagement in care.
Late pregnancy	Birth preparedness and clinical monitoring	Preparation for childbirth, development of birth plans, breastfeeding education, and intensified clinical monitoring to support a safe transition to labour and birth.
Postpartum transition	Postnatal orientation and continuity of care	Guidance on postpartum care, newborn care, reproductive planning, contraceptive counselling, and referral to postnatal services to ensure continuity of care.
Source: Authors' own elaboration based on the implementation of the ANCG programme at CAISM/Universidade Estadual de Campinas (UNICAMP).		

Table 1. **Distribution of the core components of the ANCG programme throughout the intervention**

A core principle of the programme was to promote pregnant women's active role in their own care. Throughout the programme, participants were encouraged to act as active partners by contributing to the selection and organisation of discussion topics and by performing self-assessments, such as blood pressure measurement and weighing and weight monitoring, with appropriate support from the healthcare team. This participant-centred approach aimed to foster autonomy, engagement and shared responsibility for health, while encouraging collaborative learning and empowering women to make informed decisions throughout pregnancy.

Phase II: Pilot implementation

Group sessions were scheduled according to gestational age and the timing recommended for routine antenatal visits in Brazil. The pilot implementation enabled testing the programme under real-world conditions and provided opportunities to refine logistical arrangements, educational strategies and multidisciplinary collaboration. This approach is consistent with the iterative, small-scale testing that characterises the Do stage of PDSA cycles (12).

Feedback from participants and facilitators after each session supported adjustments to scheduling, room set-up and session duration, as well as the balance of clinical and psychosocial content delivered.

Multidisciplinary collaboration was strengthened through brief debriefing meetings held after each cycle of sessions, where professionals discussed challenges encountered, adjusted role distribution and aligned communication strategies across disciplines, serving as a systematic mechanism for translating frontline experience into practical adjustments before the next implementation cycle.

Phase III: Programme refinement and documentation

Throughout programme delivery, the team used information generated during implementation to refine session dynamics, educational activities and operational procedures. They paid particular attention to documenting the content of each meeting, the roles of the professionals involved, the materials used and the strategies employed to promote engagement and interaction between participants. Systematic documentation of these elements is recognised as essential for enabling transparent reporting and future replication of complex healthcare interventions (16). Adjustments made during this phase and their rationale were recorded, allowing the team to trace how specific modifications influenced session flow, participant engagement and multidisciplinary workflow across successive cycles.

This iterative process produced a structured programme manual describing the programme's theoretical foundations, educational components, clinical activities and implementation procedures, including facilitator guides, session checklists and templates for participant self-assessment. The manual was designed as a practical resource to guide future teams through the same sequence of activities, while remaining flexible enough to accommodate local adaptations. This article reports this final version of the programme.

Phase IV: Preparation for future adaptation and scale-up

The final phase focused on consolidating implementation knowledge generated during programme development and identifying elements relevant to future adaptation in other healthcare settings. Consistent with CQI principles (11), the programme was conceived as an intervention capable of ongoing refinement through subsequent PDSA cycles according to local needs, available resources and service organisation.

Particular attention was given to distinguishing core intervention components, considered essential to preserve the programme's theoretical basis and clinical safety, from peripheral components that could be modified to accommodate different institutional contexts, staffing profiles, or resource constraints. This distinction aligns with sustainability frameworks that emphasise ongoing adaptation to the delivery context as a condition for long-term maintenance, rather than as a threat to fidelity (17). The implementation fidelity checklist used to assess participation in the group prenatal care programme is presented in Table 2.

Table 2
Implementation Fidelity Checklist for the ANCG Programme in a Brazilian Tertiary Maternity Setting

Fidelity indicator	Criterion	Score (0–1)
Enrolment and screening		
Individual obstetric nursing consultation completed	First ANC visit includes a structured clinical assessment	
Obstetric risk classification performed	Formal obstetric risk stratification documented	
Eligibility confirmed for ANCG participation	Inclusion criteria applied consistently	
Enrolment in ANCG completed	Woman formally assigned to the programme	
Care structure		
Scheduled group sessions delivered	Planned sessions implemented according to protocol	
Minimum number of sessions completed	Minimum protocol dose achieved	
Continuity with individual ANC maintained	Individual consultations integrated with the ANCG model	
Educational content		
Pregnancy health education delivered	Physiological changes during pregnancy and self-care addressed	
Education on warning signs provided	Warning signs of obstetric complications discussed	
Birth preparation provided	Labour, childbirth, and birth planning addressed	
Breastfeeding education provided	Breastfeeding initiation and techniques discussed	
Multidisciplinary integration		
Obstetric nurse participation	Obstetric nurse actively facilitates sessions	
Obstetrician participation	Obstetrician contributes to group activities and clinical support	
Nutritionist participation	Nutritional counselling provided during the programme	
Psychologist participation	Psychosocial support integrated into care	
Physical educator or physiotherapist participation	Physical activity, relaxation, birth preparation, and group-bonding activities facilitated	

Source: Authors' elaboration based on the implemented ANCG protocol at CAISM/Universidade Estadual de Campinas (UNICAMP).

Fidelity indicator	Criterion	Score (0–1)
Social worker participation	Social support and vulnerability assessment included	
Group processes		
Peer interaction facilitated	Structured opportunities for sharing experiences provided	
Psychosocial support delivered	Emotional support interventions included	
Continuity of care		
Final individual consultation completed	End-of-programme clinical review performed	
Birth plan discussed or updated	Structured birth planning documented	
Referral to postpartum care completed	Continuity of postpartum follow-up ensured	
Source: Authors' elaboration based on the implemented ANCG protocol at CAISM/Universidade Estadual de Campinas (UNICAMP).		

Table 2. **Implementation Fidelity Checklist for the ANCG Programme in a Brazilian Tertiary Maternity Setting**

Preliminary recommendations were also outlined regarding staffing requirements, training needs and minimum infrastructure conditions considered necessary for successful adaptation. These recommendations are intended to support future implementation and evaluation efforts, including the ongoing randomised controlled trial testing the expansion of the programme to primary healthcare services.

Measures and Analysis of the Improvement Process

Consistent with the Model for Improvement (12), the measures used to judge whether a change constituted an improvement were process- and experience-related rather than clinical. They comprised attendance at each session, recorded with the implementation fidelity checklist (Table 2); adherence to the planned session structure, timing and content; feedback from participants and companions at the end of each session; and facilitators' observations, recorded in session notes and discussed at the debriefing meetings held after each cycle. Clinical outcome measures were not used to guide the adjustments described in this report.

To ensure the completeness and accuracy of the documentation, session records, attendance lists and debriefing notes were consolidated by the coordinating researcher after each cycle and checked against the session guides and the fidelity checklist.

The information was analysed descriptively. Feedback and observations were grouped into four domains (logistics and scheduling, educational strategies, multidisciplinary collaboration and participant engagement), and each proposed change, its rationale and the decision taken were recorded before the next cycle began.

RESULTS

Programme Implementation

The ANC-G programme was structured to integrate clinical care, health education, physical activity and psychosocial support within a single care setting. Sessions were conducted by the multidisciplinary team described above (14). The care model was grounded in the principles of ANC-G and aligned with contemporary evidence describing it as a complex intervention that integrates clinical assessment, peer learning, health education, social support and the active participation of women in their own care (14, 18–20). By combining these interconnected components, the model aims to promote women's empowerment and autonomy, strengthen relationships among participants and healthcare professionals, foster collaborative learning, and provide a more participatory, person-centred prenatal care experience (14, 18, 19, 21).

Sessions were held in an environment designed to promote a welcoming, comfortable, and interactive atmosphere, with chairs arranged in a circle and the space organised to support collective participation. The programme used active, participatory methodologies throughout, as detailed in the following section on pedagogical strategies. All sessions included moments for interaction among participants and to strengthen support networks, and ended with a closing moment of fellowship and sharing of a healthy snack.

Evolution of the Programme Across PDSA Cycles

The programme evolved across successive cycles in four main areas. In logistics, feedback from participants and facilitators led to adjustments in session scheduling, room set-up and session duration, which resulted in the standardised structure of approximately 120 minutes described below. In content, the balance between clinical and psychosocial components was readjusted, and questions and topics raised by participants were incorporated into the planning of subsequent sessions. In teamwork, the debriefing meetings led to the redistribution of roles among professionals and to shared communication strategies across disciplines. In documentation, the session guides, checklists and self-assessment templates were progressively revised and consolidated into the programme manual.

General Session Structure

Each session lasted approximately 120 minutes and followed a standardised structure, organised into different complementary moments. The first 15 minutes were dedicated to welcoming participants, allowing for group integration and identifying questions, experiences, and emerging needs related to pregnancy. Next, over approximately 10 minutes, all participants measured their blood pressure and body weight and recorded the results in their antenatal care booklets, with support from the team when needed. This activity was designed to promote women's autonomy and active participation in their own antenatal care, while enhancing their understanding of the health indicators routinely monitored during ANC.

Then, approximately 20 minutes were dedicated to physical activities led by the physical educator or physiotherapist. These included stretching exercises, muscle strengthening, breathing techniques, relaxation, massage, and activities focused on preparing for labour and managing common pregnancy discomforts. Alongside the group activities, participants were individually called for a clinical consultation in a private

room, during which the nurse-midwife and obstetrician conducted assessments, including a targeted clinical history, obstetric physical examination, fundal height measurement, auscultation of fetal heart sounds, assessment of fetal movement, and other necessary clinical procedures.

After the individual consultations were completed, approximately 60 minutes were dedicated to developing the session's central theme. Content was delivered through participatory, experience-based methodologies, emphasising dialogue, shared knowledge construction and peer-to-peer learning. At the end of each session, time was reserved for clarifying questions, summarising the main content discussed, and social interaction among participants, companions and the multidisciplinary team.

Pedagogical strategies used in the programme

Participatory and experience-based methodologies were used throughout the programme, including discussion circles, artistic activities, reflective exercises, educational games, practical demonstrations, skills workshops and clinical simulations. Content was built from participants' own experiences and complemented with information grounded in scientific evidence and national and international recommendations for maternal and neonatal care. The use of concrete resources, such as dolls, childcare materials, anatomical models and simulated scenarios, aimed to foster meaningful learning and help participants apply the knowledge in their daily lives.

Beyond its educational objectives, the activities were designed to promote social support, strengthen autonomy and build bonds among participants, companions and professionals. In the final sessions, the simultaneous participation of pregnant and postpartum women broadened opportunities for peer learning, allowing experiences related to childbirth, breastfeeding and newborn care to be shared and discussed collectively. The multidisciplinary team acted as a facilitator of this process, bridging scientific knowledge and lived experience in the collective construction of learning.

In addition to the activities conducted during the group sessions, participants received educational materials summarising the key topics discussed at each meeting. They also received recommendations for evidence-based websites and reliable health information resources, enabling them to revisit the content outside the sessions and reinforce their learning. This strategy was designed not only to support participants' understanding and decision-making but also to help them share information with family members and others in their support network during pregnancy and the postpartum period. The structure and content of the ANC-G sessions are presented in Table 3.

Table 3

Structure and content of the ANCG sessions All sessions lasted approximately 120 minutes.

Session	Additional professionals involved*	Main topics	Key activities and care components
1	Nutritionist; physical educator	Importance of ANC; micronutrient supplementation; physical activity during pregnancy	Participatory workshop; relaxation and group-connection exercises; group introduction; discussion of expectations and experiences; clinical assessment; individualised guidance
2	Nutritionist; physical educator	Healthy eating; immunisation; management of common pregnancy discomforts	Participatory workshop; relaxation and group-connection exercises; interactive health education; discussion of healthy eating and self-care; clinical assessment; peer exchange
3		Warning signs in pregnancy; infections; self-care measures	Participatory workshop; relaxation and group-connection exercises; identification of warning signs; discussion of infection prevention and care-seeking; clinical assessment; self-care strategies
4	Psychologist; social worker	Family relationships; support networks; emotional preparation for motherhood	Participatory workshop using drawing activities; relaxation and group-connection exercises; reflection on family relationships and support networks; group discussion; psychosocial support
5	Psychologist; social worker	Gender-based violence; vulnerabilities; mental health during pregnancy	Participatory workshop using drawing and writing activities; relaxation and group-connection exercises; discussion of vulnerabilities, gender-based violence, and mental health; identification of support resources
6		Reproductive planning; sexuality; contraceptive methods	Participatory workshop; relaxation and group-connection exercises; interactive discussion of reproductive intentions, sexuality, and contraceptive options; clarification of questions; promotion of informed decision-making
7		Birth plan; women's agency; birthing spaces	Participatory workshop; relaxation and group-connection exercises; development and discussion of birth plans; strengthening women's agency

* An obstetric nurse and an obstetrician participated in all sessions and led the clinical and educational activities. Additional professionals contributed according to the thematic content of each session.

Common elements across all sessions: Clinical assessment, health education, peer interaction, active participation, and recording of health information in ANC booklets. A shared snack was offered at every session to encourage social interaction and peer support.

Source: Authors' own elaboration based on the implementation of the ANCG programme at CAISM/Universidade Estadual de Campinas (UNICAMP).

Session	Additional professionals involved*	Main topics	Key activities and care components
			and decision-making; guided visit to the birthing centre and rooming-in unit
8	Physiotherapist; psychologist	Breastfeeding; birth preparation; maternal confidence	Participatory workshop; relaxation and group-connection exercises; breastfeeding education; birth preparation; confidence-building activities; peer support
9		Newborn care; accident prevention; safe sleep	Participatory workshop; relaxation and group-connection exercises; simulated scenarios on newborn sleep and safe sleeping position; discussion of newborn care and accident prevention; practical guidance
10	Psychologist; social worker	Rights of pregnant women and children; labour rights; birth experiences; preparation for the postpartum period	Participatory workshop; relaxation and group-connection exercises; card game based on the Brazilian Child and Adolescent Statute (ECA); discussion of women's, children's, and workers' rights; sharing of birth experiences; belly painting
11	Psychologist; social worker	Postpartum consultation; comprehensive health care; mental health; support networks; reproductive planning; sexual health	Participatory workshop; relaxation and group-connection exercises; belly painting; postpartum clinical assessment; discussion of mental health, support networks, reproductive planning, and sexual health; preparation for transition to ongoing care
* An obstetric nurse and an obstetrician participated in all sessions and led the clinical and educational activities. Additional professionals contributed according to the thematic content of each session.			
Common elements across all sessions: Clinical assessment, health education, peer interaction, active participation, and recording of health information in ANC booklets. A shared snack was offered at every session to encourage social interaction and peer support.			
Source: Authors' own elaboration based on the implementation of the ANCG programme at CAISM/Universidade Estadual de Campinas (UNICAMP).			

Table 3. **Structure and content of the ANC-G sessions**

Description of Group Sessions

Session 1: The importance of ANC, micronutrient supplementation and physical activity during pregnancy

The first session introduced the ANC-G programme, promoted integration among participants, and discussed the fundamentals of ANC. Participants shared expectations and experiences related to pregnancy, helping build the group's initial bonds. The session covered ANC objectives and the importance of routine visits and examinations; the nutritionist discussed folic acid and iron supplementation, including benefits, possible

adverse effects and strategies to support adherence. The physical educator discussed the benefits of physical activity during pregnancy and led stretching, mobility, and body-awareness exercises that participants could repeat at home. Participants recorded questions and expectations to inform the planning of subsequent sessions.

Session 2: Healthy eating, immunisation and management of common pregnancy discomforts

The second session covered healthy eating, immunisation for pregnant women, and managing the most common pregnancy discomforts. Through a hands-on activity led by the nutritionist, the group discussed dietary habits, food groups, gestational weight gain, hydration and anaemia prevention. The session also covered recommended vaccines during pregnancy and their benefits for maternal and neonatal protection. The discussion also covered nausea, vomiting, constipation, heartburn, cramps, oedema and fatigue, encouraging participants to share experiences and self-care strategies.

Session 3: Warning signs in pregnancy, infections and self-care measures

The third session focused on recognising warning signs in pregnancy and preventing the most common infections during this period. Using problem-based scenarios inspired by real clinical cases, participants discussed possible courses of action in the face of vaginal bleeding, fluid loss, reduced fetal movements, fever, severe headache, epigastric pain, and visual disturbances. The session also covered urinary tract infections, sexually transmitted infections, vector-borne diseases such as dengue and other arboviral diseases, and congenital infections, emphasising preventive strategies, early diagnosis and maternal and fetal repercussions. At the end of the session, the group collectively developed a panel summarising the main warning signs of pregnancy complications.

Session 4: Family relationships, support networks and emotional preparation for motherhood

The fourth session explored the family changes associated with the baby's arrival and the role of support networks during pregnancy and the postpartum period. Through reflective activities and discussion circles led by the psychologist, participants discussed expectations related to motherhood, marital relationships, the division of responsibilities and changes in family dynamics. Participants also identified the emotional and social resources available to them, and they developed strategies to organise and strengthen support networks during the postpartum period.

Session 5: Gender-based violence, vulnerabilities and mental health during pregnancy

The fifth session addressed mental health, social vulnerabilities and situations of violence that can impact women's experience of pregnancy and their lives more broadly. Expressive activities and discussion circles allowed participants to discuss anxiety, fears related to childbirth, family conflicts, domestic overload and coping strategies they used. Different forms of gender-based violence were also presented, including

psychological, physical, sexual, financial and institutional violence, along with the services available for support and protection.

Session 6: Reproductive planning, sexuality and contraceptive methods

The sixth session focused on sexuality, reproductive planning and contraceptive methods. The discussion addressed the physiological and emotional changes in sexuality during pregnancy and the postpartum period, as well as aspects related to pleasure, intimacy, partner communication and the safety of sexual intercourse. Using demonstration models and educational materials, the team presented contraceptive methods, discussing their characteristics, effectiveness, limitations and suitability for the postpartum period, supporting women's choice and its documentation in the medical record.

Session 7: Birth plan, women's agency and visit to birthing spaces

The seventh session focused on preparation for childbirth and strengthening women's autonomy. It discussed expectations related to birth, pain relief methods, companions' participation, and care practices during labour and delivery. Using CAISM's institutional model, participants began developing their birth plans with support from the multidisciplinary team. As a complementary activity, participants had a guided visit to the pre-labour, labour and postpartum units; the obstetric centre; and the rooming-in ward, fostering familiarity with the care spaces and workflows. The birth plan was revisited in subsequent sessions as an ongoing educational tool. The materials are available at: https://www2.caism.unicamp.br/biblioteca-digital/.

Session 8: Breastfeeding, birth preparation and strengthening maternal confidence

The eighth session focused on preparation for breastfeeding and initial newborn care. Topics addressed included the physiology of lactation, proper latch, breastfeeding positions, feeding on demand and preventing breast-related complications. Using anatomical models and dolls, participants engaged in hands-on activities on positioning the baby and managing breastfeeding, while companions discussed ways to support the woman during this process.

Session 9: Newborn care and accident prevention

The ninth session was structured as a hands-on workshop focused on newborn care. Using dolls and childcare materials, participants practised bathing, diaper changing, body hygiene, umbilical cord stump care and recognising signs of discomfort. A simulated scenario on safe sleep and the prevention of sudden infant death syndrome (SIDS) was also presented, allowing participants to identify risk factors and reorganise the sleep environment according to evidence-based recommendations.

Session 10: Rights of pregnant women and children, birth experiences and preparation for the postpartum period

The tenth session addressed reproductive rights, children's rights, social benefits and aspects related to the postpartum period. Using an educational game with problem-based scenarios, the social worker led discussions on access to health services, the right to a companion and social protection. As the programme progresses into its later sessions, some participants may have already given birth and may bring their experiences of childbirth, hospital admission, breastfeeding and adapting to newborn care into the group discussions. These experiences can provide opportunities to address the postpartum period, mental health and family reorganisation, while supporting peer exchange and continuity of care.

Session 11: Postpartum consultation, expanded health care, mental health, support network, reproductive planning and sexual health

The final session aimed to integrate the main topics related to the postpartum period. It discussed physical recovery, adaptation to motherhood, mental health, postpartum warning signs, sexuality, and reproductive planning. The simultaneous presence of pregnant and postpartum women favoured peer learning, allowing them to share and discuss actual experiences related to childbirth, breastfeeding, and newborn care. The session closed the group's trajectory with a summary of the main lessons built throughout the programme. An overview of the Integrated Group Prenatal Care Model (MIPREG) implemented at the CAISM Women's Hospital, Universidade Estadual de Campinas (UNICAMP), is presented in Fig. 1.

Figure 1. Integrated Group Prenatal Care Model (MIPREG) implemented at the CAISM Women's Hospital, Universidade Estadual de Campinas (UNICAMP)

Unintended Consequences

Because the groups were formed according to gestational age at enrolment, some women had already given birth by the later sessions. Rather than disrupting the programme, the simultaneous participation of pregnant and postpartum women broadened peer learning about childbirth, breastfeeding and newborn care, and this feature was incorporated into the final sessions. The main challenges were logistical, namely scheduling the sessions, securing a suitable room and coordinating the availability of a multidisciplinary team, and these required the adjustments described above.

DISCUSSION

Based on the PDSA cycle framework, we present the documentation and systematisation of an ANC-G programme, highlighting its structure, components and potential to enhance the quality of care and the organisation of services. Formalising this programme as a care tool represents a strategic step towards consolidating more consistent, evaluable models aligned with international recommendations for improving maternal care.

Organising and documenting health interventions is fundamental to improving care quality, as it makes the essential components of care explicit, standardises processes, and supports the systematic evaluation of implementation. In obstetric care, where fragmented and heterogeneous practices predominate, particularly within the Unified Health System (SUS) and supplementary healthcare, the lack of structured models hinders continuity of care and limits the incorporation of evidence-based practices. Therefore, documenting an ANC-

G programme helps transform a care practice into a clearly defined intervention that can be replicated, monitored and continuously improved.

This perspective aligns with WHO recommendations, which emphasise the importance of woman-centred, evidence-based ANC models oriented towards a positive pregnancy experience. Improving care quality depends not only on increasing the number of visits, but also on how care is organised, communicated and experienced by women, including dimensions of welcoming, bonding, information and active participation in the care process (22).

In this context, ANC-G is notable as an innovative strategy that integrates clinical care, health education and peer support within a single structured intervention. This model can favour greater satisfaction among pregnant women, broader health literacy, strengthened support networks and greater engagement in care, with potential positive consequences for maternal and neonatal outcomes, particularly in contexts of greater social vulnerability (1, 7, 14, 21). In the Brazilian context, recent initiatives to reorganise obstetric care, such as the Rede Alyne, reinforce the need to strengthen care models that can integrate safe, humanised, evidence-based care throughout the pregnancy–postpartum continuum.

This strategy seeks to address preventable maternal mortality and inequities in access to and quality of care, which requires not only normative guidelines but also the implementation of structured, operationalisable care models within health services (23).

In this context, formally described and organised programmes, such as ANC-G, become strategic tools for translating these guidelines into concrete practices. Thus, systematic documentation helps consolidate the programme as a care-organisation tool by clarifying its components, standardising its implementation, and enabling outcome evaluation.

This formalisation is particularly relevant for complex interventions, such as ANC-G, where effectiveness depends on integrating clinical care, health education and peer support. Moreover, the model's structured definition favours its incorporation into different care settings, expanding its potential scalability within both the SUS and the supplementary healthcare sector (22, 24).

Therefore, ANC-G, as systematised here, should be understood as a care tool aligned with international recommendations for a positive pregnancy experience and for improving maternal care. Its description and documentation contribute not only to the programme's transparency and reproducibility, but also to strengthening more equitable, comprehensive and woman-centred practices, consistent with WHO guidelines and with recent national strategies to improve the maternal care network (22, 23).

Limitations

This study has limitations. First, the programme was developed and implemented in a single tertiary teaching hospital, a reference centre for high-risk pregnancy, by a multidisciplinary team with research experience. Its transferability to primary healthcare services and to settings with fewer human and material resources therefore cannot be assumed.

Second, the adjustments made across the PDSA cycles were based on process- and experience-related observations, participant and facilitator feedback and team debriefings, which were documented descriptively rather than through predefined quantitative process measures. Consequently, the contribution of each individual modification cannot be estimated, and the documentation may reflect the perspective of the implementation team.

Third, this report does not assess the effectiveness of the programme. The comparative outcomes of the pilot randomised study will be reported separately, and no conclusions about clinical benefit should be drawn from the present description.

To mitigate these limitations, the team kept systematic records of each session and of the rationale for each adjustment, developed a programme manual and an implementation fidelity checklist, and distinguished core from adaptable components. The programme is now being tested in primary healthcare services through a randomised controlled trial, which will provide evidence on its transferability and effectiveness.

Declarations

Ethics approval and consent to participate:

The pilot study on which this programme was based was approved by the Research Ethics Committee of the Universidade Estadual de Campinas (UNICAMP) (CAAE 25333119.2.0000.5404). Participants were invited in person and, after the study had been explained and the consent form read with them, all provided written informed consent. The consent form was signed in two copies, one kept by the principal investigator and the other given to the participant.

Consent for publication:

Not applicable.

Competing interests

The authors declare no competing interests.

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Author Contribution

LR, ODRS and FGS conceived and designed the study. LR coordinated the implementation of the intervention. LR, ODRS, AV, EZ, DSMP and GJM contributed to the implementation of the intervention. LR drafted the manuscript and prepared the figure and tables. LR, ODRS and FGS critically revised the manuscript for important intellectual content. LR and FGS supervised the project. All authors reviewed, approved, and agreed to the final version of the manuscript.

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Availability of data and materials

The datasets are available from the corresponding author on reasonable request.

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Figures



Figure 1

Integrated Group Prenatal Care Model (MIPREG) implemented at the CAISM Women's Hospital, Universidade Estadual de Campinas (UNICAMP)

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Table3.StructureandcontentoftheANCGsessions.docx
- Table1.DistributionofthecorecomponentsoftheANCGprogrammethroughouttheintervention.docx

- Table2.ImplementationFidelityChecklistfortheANCGProgrammeinaBrazilianTertiaryMaternitySetting.docx
- SQUIRE2.0Checklist.docx