Group Care Global

THE STATE OF GROUP CARE ACROSS THE WORLD

A COLLECTION OF PEER-REVIEWED ARTICLES

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Synthesis

This document, developed by Group Care Global, compiles abstracts of articles focused on group care around the world, excluding the United States (for articles on group care in the United States, visit the Centering Healthcare Institute). This collection contains 134 peer-reviewed, published journal articles related to the group-care model. Table 1 presents more detailed information about the countries where these studies were conducted.

Table 1. Countries where research on a group care model was conducted

#	Country	Number of studies
1.	Canada	11
2.	Australia	10
3.	UK	10
4.	Malawi	10
5.	Sweden	8
6.	Rwanda	8
7.	Kenya	8
8.	Tanzania	8
9.	Netherlands	8
10.	Nigeria	7
11.	Egypt	6
12.	Mexico	6
13.	Nepal	6
14.	Iran	5
15.	Ghana	5
16.	Bangladesh	4
17.	Bangladesh	3
18.	India	3
19.	Brazil	2
20.	Senegal	2
21.	Belgium	2
22.	Haiti	2
23.	Botswana	1
24.	American Samoa	1
25.	Northern Ireland	1
26.	Suriname	1
27.	Uganda	1
28.	Spain	1
29.	Iceland	1
30.	Guatemala	1
31.	Ireland	1
32.	Israel	1
33.	China	1

The research publications include qualitative design, randomized control trial, quasi-experimental design, cohort design, systematic evidence synthesis/review, effectiveness–implementation hybrid design, mixed design, descriptive study design, cross-sectional design, quantitative design, prospective observational design, secondary analysis, process evaluation, and supply-side perspective.

The impact of a group care model on women and their children and support persons

Most studies explored women's experiences and perceptions of the group care model. Numerous studies found that the group care model facilitates gaining health skills and knowledge among women. In addition, many studies showed that this model enables building peer support networks and a collaborative relationship between a woman and her healthcare provider. Other reported significant benefits of the group care model included higher infants' vaccination coverage, postpartum contraceptive use, improved psychosocial health, reduced fear of birth, helping women limit weight gain in pregnancy, reduced distress about the experienced pregnancy physical discomforts, receiving quality antenatal care, decreased prenatal hospital admission and increased intermittent preventive malaria treatment with Sulfadoxine–pyrimethamine (IPTp-SP) uptake and insecticide-treated nets use. Although women praised group care highly in the majority of the studies, in five of them women raised concerns about lack of privacy.

Several studies found significant positive relationships between group antenatal care and utilization of antenatal services and birth preparedness. However, one research found no relationship between group antenatal care and antenatal care completion and birth preparedness. Many studies also explored the relationship between women's satisfaction with care and receiving antenatal group care. Ten studies found that women enrolled in group care were significantly more satisfied with care compared to their counterparts who received individual antenatal care. However, this finding is not consistent across all the reviewed studies. Three studies found no differences between the two groups in overall antenatal care satisfaction.

Receiving group care is also not consistently linked with pregnancy-related empowerment. Higher pregnancy-related empowerment was found among women who received group antenatal care compared to women from the individual antenatal care group in seven studies. However, in a study in Tanzania, pregnancy-related empowerment was not significantly affected by the type of antenatal care women received. Moreover, group care models had different effects on Muslim and Christian women; among Muslim women, group antenatal care was associated with significantly higher level of pregnancy-related empowerment, whereas among Christian women, such a difference was not observed.

Several studies explored the impact of a group care model on mode of birth, place of birth, initiation of breastfeeding, exclusive breastfeeding, preterm birth, birth weight, and the need for obstetric interventions. Results of some studies showed more frequent initiation of breastfeeding and exclusive breastfeeding, a decreased prevalence of preterm birth, lower rates of Cesarean section, higher rates of a facility-based delivery and less need for obstetric interventions among women receiving group pregnancy care compared to those receiving standard individual care. Other studies found no significant differences between the two groups

in terms of birth weight/low birth weight, preterm birth, mode of birth, breastfeeding initiation, place of birth, and use of pain relief.

Finally, seven studies collected data from women's support persons (e.g., partners, husbands, and mothers-in-law) to explore their opinions about group antenatal care. In these studies, support persons praised the group antenatal care. In some studies fathers expressed appreciation for provided information and support. Fathers also appreciated having opportunities to share pregnancy-related issues with other group members. Lastly, one study found that fathers in group care attended more antenatal visits and had more positive assessment of opportunities to plan for the birth with the midwife.

The perceptions of the group care model's implementers

Many studies assessed and described implementers' experiences and opinions about the group care model. The researchers collected data from midwives, decision-makers/administrators/program leaders, doctors, nurses, local stakeholders, clinical/support staff, interns, assistants, Indigenous health workers, community health workers, matrones, and midwifery students. In the majority of research, the healthcare providers acknowledged several benefits of the group care model, including creating support networks for women, better education and communication, developing close relationships with women, shared ownership of care, enhanced care, team relationship building across healthcare providers, and job satisfaction. The respondents also believed that the group care model allowed them to empower women and to increase healthcare utilization. Lastly, in one study, respondents reported that the group care model enhanced midwifery students' opportunities to fulfill their clinical requirements.

The researchers also explored challenges and barriers implementers faced during the group care model implementation. The respondents identified several practical hindrances in the group care model implementation, including increased workload, space availability, time constraints, balancing the schedules of women and midwives, shortage of trained staff, and financial constraints. In addition, in four studies, midwives/health workers expressed their concerns about discussing sensitive/private issues (e.g., talking about sexuality) and lack of privacy in group settings. Furthermore, in one study, midwives pointed out that psychosocial problems could be difficult to identify in a group. Other reported organizational differences, lack of support from colleagues/managers, language barriers, political will, self-testing, involvement of partners, long distances from women's home to the health center, insurance payment delays, unpredictable group attendance, overly didactic group discussions, sub-standard documentation, and limited number of expectant women with similar gestational ages.

Finally, throughout studies health care providers provided the following recommendations to improve the process of implementing a group care model: setting up an internet site on which women can find information about the groups, times, dates, and any changes, involvement of other professionals and specialists (e.g., nurses, nutritionists, physiotherapists, midwifery students) during group sessions, setting antenatal group care up as a research project, conducting group sessions in the afternoons, sending session reminders, and grouping women based on similar gestational age and a common language.

The group care model and its process of implementation

Multiple publications included information about the group care model's adaptation and implementation. The researchers provided information about essential elements and what elements were maintained and adapted (e.g., number of sessions, sessions' content, etc.) during the model's adaptation and implementation. In addition, several of these publications included information about challenges (e.g., space availability, recruitment strategies, poor documentation, inadequate referral system, existed norms about scheduling and medical culture, etc.) that may be encountered during the implementation of a group care model. A few publications outlined details of the studies' protocols that will be/are/were implemented to determine the feasibility and effectiveness of the group care model to improve quality of healthcare assistance as well as maternal and neonatal/infant health outcomes. In one of the publications the researchers estimated costs of the group care model integration into the government service delivery system.

Some studies explored the process of group care model implementation focusing on fidelity and/or costs. A study implemented in Mexico found the overall fidelity to the group antenatal care intervention was 82%, with variability by health center (78–88%). Fidelity by phase varied between 73.1 and 94.4%. Another study implemented in Nepal also found high process fidelity to the model, with 85.7% of visits completing all process elements and high content fidelity. The annual per capita costs for group antenatal care were US$ 0.50. A study implemented in Rwanda found that about 80% of all group visits were delivered as intended, with respect to both process fidelity and objective measures. At the same time, according to results of research implemented in Senegal the estimated fixed cost (e.g., facilitator guides, self-assessment cards, blood pressure cuffs, training of facilitators) to introduce group antenatal care at health posts was $357 USD per health post. The recurrent operational costs (e.g., mobile phone credit and refreshments provided to women during each group session) were $81 USD for the implementation of the four group antenatal care sessions per each group. Lastly, a study implemented in Bangladesh estimated that the total cost of group care model integration was US$ 15,216.3 and it was concluded that the incremental cost of this model introduction is doable within the existing government settings.

Finally, one of the articles the authors focused on 10 landmark health system, clinical, and technology-based in the area of global maternal health and one of the indicated advancements was group care model. Another article highlighted effective approaches for patients participating in shared medical appointments and the authors focused on three models of care: cooperative health care clinic, shared medical appointment / group visit, and group prenatal care / CenteringPregnancy®. One of the publications included information about history of the Global Group Antenatal Care Collaborative. In addition, the authors outlined key principles for group antenatal care and an evaluation and reporting framework for group antenatal care research developed by the Collaborative. Lastly, in one of the articles the researchers reviewed the successes and challenges of implementation of different antenatal care and postnatal care delivery models including group prenatal care in various settings around the world. In these three articles the authors acknowledged that the group care model is an effective approach to improve quality of healthcare assistance and health outcomes.

Articles

Abrams, J. A., et al. (2018). "Considerations for Implementing Group-Level Prenatal Health Interventions in Low-Resource Communities: Lessons Learned From Haiti." Journal of Midwifery Womens Health **63**(1): 121-126.

Haiti's high maternal and infant mortality rates evidence an urgent need for implementation of evidence-based strategies. A potential cost-effective strategy to mitigate high maternal and infant mortality rates is group prenatal care, an innovative model that combines antenatal clinical assessment with pregnancy education. Despite research demonstrating the effectiveness of this model in high-resource settings, less is known about the challenges of implementing it in low-resource settings. The purpose of this article is to provide recommendations for overcoming challenges of implementing group prenatal care in low-resources communities globally. Challenges addressed include language, literacy, space, cultural appropriateness of intervention content, and sociopolitical climate. Using examples from work conducted in Haiti, this information can be used to assist practitioners and researchers with overcoming challenges of implementing models of group care in international low-resource communities.

Adaji, S. E., et al. (2019). "Women's experience with group prenatal care in a rural community in northern Nigeria." Int J Gynaecol Obstet **145**(2): 164-169.

OBJECTIVE: To assess women's experience of group prenatal care in a rural Nigerian community. METHODS: In an observational study, consenting pregnant women were enrolled in a group prenatal care program based on the CenteringPregnancy model from July 1, 2010, to June 30, 2011, in Tsibiri, Nigeria. Women were interviewed before joining the group and postnatally. A predesigned pro forma was used to assess group behavior during sessions. Descriptive and inferential statistics were applied to data. RESULTS: In total, 161 women enrolled, and 54 of 72 scheduled prenatal sessions took place. The average number of visits was three per woman, with good group interaction and cohesion. Mothers who could mention at least five out of eight danger signs of pregnancy increased from 1.4% (2) to 13.3% (14) (P<0.001, 95% CI 4.28-19.52), while mean knowledge score for danger signs increased from 31% to 47.8% (P<0.001, 95% CI 0.86-2.16). Commitment to birth preparedness plans was impressive. The mothers enjoyed the group sessions and shared the lessons they learned with others. CONCLUSION: Group prenatal care was feasible and acceptable to women in the present study setting. Comparative trials would be helpful to demonstrate the benefits of the tested model in low-income settings.

Ahrne, M., et al. (2022). "Group antenatal care (gANC) for Somali-speaking women in Sweden – a process evaluation." BMC Pregnancy and Childbirth **22**(1).

Background: Language supported group antenatal care (gANC) for Somali-born women was implemented in a Swedish public ANC clinic. The women were offered seven 60-min sessions, facilitated by midwives and starting with a presentation of a selected topic, with an additional 15-min individual appointment before or after. The aim of this study was to assess the feasibility for participants and midwives of implementing The Hooyo (“mother” in Somali) gANC intervention, including implementation, mechanisms of impact and contextual factors. Methods: A process evaluation was performed, using The Medical Research Council (MRC) guidelines for evaluating complex interventions as a framework. A range of qualitative and

quantitative data sources were used including observations (n = 9), complementary, in-depth and key-informant interviews (women n = 6, midwives n = 4, interpreters and research assistants n = 3) and questionnaire data (women n = 44; midwives n = 8). Results: Language-supported gANC offered more comprehensive ANC that seemed to correspond to existing needs of the participants and could address knowledge gaps related to pregnancy, birth and the Swedish health care system. The majority of women thought listening to other pregnant women was valuable (91%), felt comfortable in the group (98%) and supported by the other women (79%), and they said that gANC suited them (79%). The intervention seemed to enhance knowledge and cultural understanding among midwives, thus contributing to more women-centered care. The intervention was not successful at involving partners in ANC. Conclusions: The Hooyo gANC intervention was acceptable to the Somali women and to midwives, but did not lead to greater participation by fathers-to-be. The main mechanisms of impact were more comprehensive ANC and enhanced mutual cultural understanding. The position of women was strengthened in the groups, and the way in which the midwives expanded their understanding of the participants and their narratives was promising. To be feasible at a large scale, gANC might require further adaptations and the "othering" of women in risk groups should be avoided.

Ahrne, M., et al. (2023). "Group antenatal care compared with standard antenatal care for Somali-Swedish women: a historically controlled evaluation of the Hooyo Project." BMJ Open **13**.

Objectives Comparing language-supported group antenatal care (gANC) and standard antenatal care (sANC) for Somali-born women in Sweden, measuring overall ratings of care and emotional well-being, and testing the feasibility of the outcome measures.
Design A quasi-experimental trial with one intervention and one historical control group, nested in an intervention development and feasibility study.
Setting Midwifery-led antenatal care clinic in a mid-sized Swedish town.
Participants Pregnant Somali-born women (<25 gestational weeks); 64 women in gANC and 8 in sANC. Intervention Language-supported gANC (2017–2019). Participants were offered seven 60-minute group sessions with other Somali-born women led by one to two midwives, in addition to 15–30 min individual appointments with their designated midwife.
Outcomes Primary outcomes were women's overall ratings of antenatal care and emotional well-being (Edinburgh Postnatal Depression Scale (EPDS)) in gestational week ≥35 and 2 months post partum. Secondary outcomes were specific care experiences, information received, social support, knowledge of pregnancy danger signs and obstetric outcomes.
Results Recruitment and retention of participants were challenging. Of eligible women, 39.3% (n=106) declined to participate. No relevant differences regarding overall ratings of antenatal care between the groups were detected (late pregnancy OR 1.42, 95% CI 0.50 to 4.16 and 6–8 weeks post partum OR 2.71, 95% CI 0.88 to 9.41). The reduction in mean EPDS score was greater in the intervention group when adjusting for differences at baseline (mean difference −1.89; 95% CI −3.73 to −0.07). Women in gANC were happier with received pregnancy and birth information, for example, caesarean section where 94.9% (n=37) believed the information was sufficient compared with 17.5% (n=7) in standard care (p<0.001) in late pregnancy.
Conclusions This evaluation suggests potential for language-supported gANC to improve knowledge acquisition among pregnant Somali-born women with residence in Sweden <10

years. An adequately powered randomised trial is needed to evaluate the effectiveness of the intervention.

Ahrne, M., et al. (2019). "Antenatal care for Somali-born women in Sweden: Perspectives from mothers, fathers and midwives." Midwifery **74**: 107-115.

OBJECTIVE: To explore Somali-born parents' experiences of antenatal care in Sweden, antenatal care midwives' experiences of caring for Somali-born parents, and their respective ideas about group antenatal care for Somali-born parents. DESIGN: Eight focus group discussions with 2-8 participants in each were conducted, three with Somali-born mothers, two with fathers and three with antenatal care midwives. The transcribed text was analysed using Atride-Stirling's tool "Thematic networks". SETTING: Two towns in mid-Sweden and a suburb of the capital city of Sweden. PARTICIPANTS: Mothers (n=16), fathers (n=13) and midwives (n=7) were recruited using purposeful sampling. FINDINGS: Somali-born mothers and fathers in Sweden were content with many aspects of antenatal care, but they also faced barriers. Challenges in the midwife-parent encounter related to tailoring of care to individual needs, dealing with stereotypes, addressing varied levels of health literacy, overcoming communication barriers and enabling partner involvement. Health system challenges related to accessibility of care, limited resources, and the need for clear, but flexible routines and supportive structures for parent education. Midwives confirmed these challenges and tried to address them but sometimes lacked the support, resources and tools to do so. Mothers, fathers and midwives thought that language-supported group antenatal care might help to improve communication, provide mutual support and enable better dialogue, but they were concerned that group care should still allow privacy when needed and not stereotype families according to their country of birth. KEY CONCLUSIONS: ANC interventions targeting inequalities between migrants and non-migrants may benefit from embracing a person-centered approach, as a means to counteract stereotypes, misunderstandings and prejudice. Group antenatal care has the potential to provide a platform for person-centered care and has other potential benefits in providing high-quality antenatal care for sub-groups that tend to receive less or poor quality care. Further research on how to address stereotypes and implicit bias in maternity care in the Swedish context is needed.

Akunzirwe, R., et al. (2022). "Optimal utilization of prevention of mother-to-child transmission of HIV services among adolescents under group versus focused antenatal care in Eastern Uganda." PLoS ONE **17**(11): e0275905.

Background: Group antenatal care (G-ANC), an alternative to focused ANC (F-ANC), involves grouping mothers by gestational and maternal age. In high-income countries, G-ANC has been associated with improved utilization of health care services like Prevention of Mother to Child Transmission (PMTCT) of HIV services. Some low-resource countries with poor utilization of health care services have piloted G-ANC. However, there is limited evidence of its efficiency. We, therefore, compared G-ANC versus F-ANC with regards to optimal utilization of PMTCT of HIV services and assessed associated factors thereof among adolescent mothers in eastern Uganda. We defined optimal utilization of PMTCT of HIV services as the adolescent being up to date with HIV counseling and testing. If found HIV negative, subsequent timely re-testing. If found HIV positive, initiation of antiretroviral therapy (ART) under option B plus for the mother.

While for the infant, it entailed safe delivery, testing, feeding, and appropriate HIV chemotherapy.
Methods: From February to April 2020, we conducted a cross-sectional study among 528 adolescent mothers in four sites in eastern Uganda. We assessed the optimal utilization of PMTCT of HIV services among adolescent mothers that had attended G-ANC versus F-ANC at the post-natal care or immunization clinics. We also assessed the factors associated with optimal utilization of PMTCT of HIV services among these mothers.
Results: Optimal utilization of PMTCT was higher among those in G-ANC than in F-ANC (74.7% vs 41.2, p-0.0162). There was a statistically significant association between having attended G-ANC and optimal utilization of PMTCT [PR = 1.080, 95%CI (1.067–1.093)]. Other factors independently associated with optimal utilization were; having a partner that tested for HIV [PR = 1.075, 95%CI (1.048–1.103)], trimester of first ANC visit: second trimester [PR = 0.929, 95%CI (0.902–0.957)] and third trimester [PR = 0.725, 95%CI (0.616–0.853)], and the health facility attended: Bugembe HCIV [PR = 1.126, 95%CI (1.113–1.139)] and Jinja regional referral hospital [PR = 0.851, 95%CI (0.841–0.861]
Conclusions: Adolescent mothers under G-ANC had significantly higher optimal utilization of PMTCT of HIV services compared to those under F-ANC. We recommend that the Ministry of Health considers widely implementing G-ANC, especially for adolescent mothers.

Allen, J., et al. (2015). "How does group antenatal care function within a caseload midwifery model? A critical ethnographic analysis." Midwifery **31**(5): 489-497.

BACKGROUND: caseload midwifery and CenteringPregnancy (a form of group antenatal care) are two models of maternity care that are separately associated with better clinical outcomes, maternal satisfaction scores and positive experiences compared to standard care. One study reported exclusively on younger womens experiences of caseload midwifery; none described younger womens experiences of group antenatal care. We retrieved no studies on the experiences of women who received a combination of caseload midwifery and group antenatal care. OBJECTIVE: examine younger womens experiences of caseload midwifery in a setting that incorporates group antenatal care. DESIGN: a critical, focused ethnographic approach. SETTING: the study was conducted in an Australian hospital and its associated community venue from 2011 to 2013. PARTICIPANTS: purposive sampling of younger (19-22 years) pregnant and postnatal women (n=10) and the caseload midwives (n=4) who provided group antenatal care within one midwifery group practice. METHODS: separate focus group interviews with women and caseload midwives, observations of the setting and delivery of group antenatal care, and examination of selected documents. Thematic analyses of the womens accounts have been given primary significance. Coded segments of the midwives interview data, field notes and documents were used to compare and contrast within these themes. FINDINGS: we report on womens first encounters with the group, and their interactions with peers and midwives. The group setting minimised the opportunity for the women and midwives to get to know each other. CONCLUSIONS: this study challenges the practice of combining group antenatal care with caseload midwifery and recommends further research.

Altman, M. R. and K. B. Daratha (2016). "Abstracts from Research Forums Presented at the American College of Nurse-Midwives' 61st Annual Meeting." Journal of Midwifery Womens Health **61**(5): 658-658.

The American College of Nurse-Midwives (ACNM) Di- vision of Research, Division of Global Health, and the Journal of Midwifery & Women's Health are pleased to present the abstracts from the 2016 Research Forum podium presentations. The podium presentations were selected in a blinded peer review process and presented at the ACNM Annual Meeting in May 2016. The abstracts of completed research were eligible for presentation and therefore publication. The abstracts presented here demonstrate the breadth and quality of research being conducted about midwifery and women's health by mid-wifery researchers and our colleagues.

Andersson, E., et al. (2012). "Parents' experiences and perceptions of group-based antenatal care in four clinics in Sweden." Midwifery **28**(4): 502-508.

BACKGROUND: group-based antenatal care consists of six to nine two-hour sessions in which information is shared and discussed during the first hour and individual examinations are conducted during the second hour. Groups generally consist of six to eight pregnant women. Parent education is built into the programme, which originated in the United States and was introduced in Sweden at the beginning of the year of 2000. OBJECTIVE: to investigate parents' experiences of group antenatal care in four different clinics in Sweden. METHOD: a qualitative study was conducted using content analysis five group interviews and eleven individual interviews with parents who experienced group-based antenatal care. An interview guide was used. SETTINGS: the study was set in four antenatal clinics that had offered group-based antenatal care for at least one year. The clinics were located in three different areas of Sweden. PARTICIPANTS: the participants were women and their partners who had experienced group-based antenatal care during pregnancy. Other criteria for participation were mastery of the Swedish language and having followed the care programme. FINDINGS: three themes emerged, 'The care-combining individual physical needs with preparation for parenthood, refers to the context, organisation, and content of care'. Group antenatal care with inbuilt parent education was appreciated, but respondents reported that they felt unprepared for the first few weeks after birth. Their medical needs (for physical assessment and screening) were, however, fulfilled. The theme, 'The group-a composed recipient of care', showed the participants role and experience. The role could be passive or active in groups or described as sharers. Groups helped parents normalise their symptoms. The theme, 'The midwife-a controlling professional', showed midwives are ignorant of gender issues but, for their medical knowledge, viewed as respectable professionals. KEY CONCLUSIONS: in the four clinics studied, group-based antenatal care appeared to meet parents' needs for physical assessment and screening. Parents identified that the groups helped them prepare for birth but not for parenthood. The group model created a forum for sharing experiences and helped participants to normalise their pregnancy symptoms. IMPLICATIONS FOR PRACTISE: the midwife's role in facilitating group-based antenatal care demands new pedagogical strategies and approaches.

Andersson, E., et al. (2013). "Mothers' satisfaction with group antenatal care versus individual antenatal care--a clinical trial." Sex Reprod Healthc **4**(3): 113-120.

OBJECTIVE: The aim of this study was to compare women's satisfaction with group based antenatal care and standard care. DESIGN: A randomised control trial where midwives were randomized to perform either GBAC or standard care. Women were invited to evaluate the two models of care. Data was collected by two questionnaires, in early pregnancy and six months after birth. Crude and adjusted odds ratios with a 95% confidence interval were calculated by model of care. SETTINGS: Twelve antenatal clinics in Sweden between September 2008 and December 2010. PARTICIPANTS: Women in various part of Sweden (n=700). FINDINGS: In total, 8:16 variables in GBAC versus 9:16 in standard care were reported as deficient. Women in GBAC reported significantly less deficiencies with information about labour/birth OR 0.16 (0.10-0.27), breastfeeding OR 0.58 (0.37-0.90) and time following birth OR 0.61 (0.40-0.94). Engagement from the midwives OR 0.44 (0.25-0.78) and being taken seriously OR 0.55 (0.31-0.98) were also found to be less deficient. Women in GBAC reported the highest level of deficiency with information about pregnancy OR 3.45 (2.03-5.85) but reported less deficiency with time to plan the birth OR 0.61 (0.39-0.96). In addition, women in GBAC more satisfied with care in supporting contact with other parents OR 3.86 (2.30-6.46) and felt more support to initiate breastfeeding OR 1.75 (1.02-2.88). CONCLUSIONS: Women in both models of care considered the care as deficient in more than half of all areas. Variables that differed between the two models favoured group based antenatal care.

Andersson, E. and R. Small (2017). "Fathers' satisfaction with two different models of antenatal care in Sweden - Findings from a quasi-experimental study." Midwifery **50**: 201-207.

Andersson, E. C., K.; Hildingsson, I. (2014). "Swedish midwives´ perspectives on group based antenatal care."

Antenatal care in Sweden is routinely delivered on an individual level with optional parental education classes. Group based antenatal care (GBAC) is a model of antenatal care that has been implemented in Sweden since the year 2000. Previous research has focused mainly on parents' experiences and perceptions of GBAC. Midwives have an important role in developing Swedish antenatal care, but studies focusing on midwives' perspectives are rare. Hence, the aim of this study was to investigate and describe antenatal midwives' perceptions and experiences of their current work, with a special focus on their opinions about group-based antenatal care. Method: An interview study was conducted and analyzed by descriptive statistics and quantitative content analysis. Participants: 56 midwives from 52 antenatal clinics in Sweden. Results: The major findings of this study were that midwives were satisfied with their work in antenatal care but have reservations concerning time constraints and parental classes. More than half of the midwives reported an interest in trying the group model but expressed personal and organizational obstacles on the basis of identifiable difficulties in implementing the model. Midwives had strong opinions about the suitability of the model for women. Conclusions: This is the first study in Sweden to investigate midwives' perspectives on GBAC. Midwives showed an interest in the group model but have concerns about implementing the process. The midwives considered GBAC as inappropriate for immigrants and well-educated parents.

Andrade-Romo, Z., et al. (2019). "Group prenatal care: effectiveness and challenges to implementation." Rev Saude Publica **53**: 85.

Group prenatal care is an alternative model of care during pregnancy, replacing standard individual prenatal care. The model has shown maternal benefits and has been implemented in different contexts. We conducted a narrative review of the literature in relation to its effectiveness, using databases such as PubMed, EBSCO, Science Direct, Wiley Online and Springer for the period 2002 to 2018. In addition, we discussed the challenges and solutions of its implementation based on our experience in Mexico. Group prenatal care may improve prenatal knowledge and use of family planning services in the postpartum period. The model has been implemented in more than 22 countries and there are challenges to its implementation related to both supply and demand. Supply-side challenges include staff, material resources and organizational issues; demand-side challenges include recruitment and retention of participants, adaptation of material, and perceived privacy. We highlight specific solutions that can be applied in diverse health systems.

Ann McNeil, D. and J. C. Johnston (2016). "Implementing CenteringParenting in Well Child Clinics: Mothers' Nurses' and Decision Makers' Perspectives." Journal of Community & Public Health Nursing **2**(3).

Objective: The purpose of this study was to explore perceptions of mothers, nurses and decision-makers involved in implementing CenteringParenting (CP) in two Public Health (PH) clinics. Design: Families participated in Public Health Nurse (PHN) facilitated health assessments, parent-led discussions, and vaccination within a group space at six timepoints in their children's first year of life. Following completion of the program, mothers, nurses, and decision-makers participated in focus groups or individual interviews to discuss their experiences in CP. Qualitative data, collected via open-ended questions, were recorded, transcribed, and analyzed. Themes and sub-themes were identified. Results: Thirteen mothers, five nurses and four decision makers were interviewed. Mothers found the program valuable in meeting their need for peer and personal support, information, and skill development. Nurses, although enjoying the opportunity to participate in the CP model, experienced challenges with the group model. Decision-makers identified the need for new ways of thinking. Conclusion: The CP program provided benefits to new mothers beyond what they expected. PHN facilitators experienced conflicts with standard practice, but were committed to making it work. Addressing logistical challenges will be required prior to expansion.

Apetorgbor, V., et al. (2024). "The impact of group antenatal care on newborns: Results of a cluster randomized control trial in Eastern Region, Ghana." BMC Pediatrics **24**(1).

Background: Maternal recognition of neonatal danger signs following birth is a strong predictor of care-seeking for newborn illness, which increases the odds of newborn survival. However, research suggests that maternal knowledge of newborn danger signs is low. Similarly, maternal knowledge of optimal newborn care practices has also been shown to be low. Since both issues are typically addressed during antenatal care, this study sought to determine whether group antenatal care (G-ANC) could lead to improvements in maternal recognition of danger signs and knowledge of healthy newborn practices, as well as boosting postnatal care utilization.
Methods: This cluster randomized controlled trial of G-ANC compared to routine individual antenatal care (I-ANC) was conducted at 14 health facilities in Ghana, West Africa, from July 2019 to July 2023. Facilities were randomized to intervention or control, and pregnant participants at each

facility were recruited into groups and followed for the duration of their pregnancies. 1761 participants were recruited: 877 into G-ANC; 884 into I-ANC. Data collection occurred at enrollment (T0), 34 weeks' gestation to 3 weeks postdelivery (T1) and 6–12 weeks postpartum (T2). Comparisons were made across groups and over time using logistic regression adjusted for clustering.

Results: Overall, knowledge of newborn danger signs was significantly higher for women in G-ANC, both in aggregate (13-point scale) and for many of the individual items over time. Likewise, knowledge of what is needed to keep a newborn healthy was higher among women in G-ANC compared to I-ANC over time for the aggregate (7-point scale) and for many of the individual items. Women in G-ANC were less likely to report postnatal visits for themselves and their babies within 2 days of delivery than women in I-ANC, and there was no difference between groups regarding postnatal visits at one week or 6 weeks after birth.

Conclusion: This study illustrates that group ANC significantly improves knowledge of newborn danger signs and healthy newborn practices when compared to routine care, suggesting that the impact of G-ANC extends beyond impacts on maternal health. Further research elucidating care pathways for ill newborns and maternal behaviors around healthy newborn practices is warranted.

Arnold, J., et al. (2014). "Paternal Perceptions of and Satisfaction with Group Prenatal Care in Botswana." Online Journal of Cultural Competence in Nursing and Healthcare **4**(2): 17-26.

Botswana is a patriarchal society in which the involvement of men in women's reproductive health ends after their contribution to conception. The purpose of this study was to enroll male partners in a group-centered model of prenatal care that incorporates prenatal risk assessments, education, and support into ten sessions. This questionnaire-based descriptive study investigated perceptions of and satisfaction with the group prenatal care model GPNC), and was conducted in a private hospital in Gaborone, Botswana. Evaluations of the seven men in the study sample showed that they exhibited positive perceptions and high levels of satisfaction with group prenatal care. The calm and connection response was demonstrated by

their attentiveness toward female partners and their willingness to continue participation in the sessions. This response may serve as a contributing factor in men's continued involvement in women's reproductive health, and opens an opportunity to establish family-centered care in Botswana.

Benediktsson, I. M., S. W.; Veked, M.; McNeil, D. A.; Dolan, S. M.; Tough, S. C. (2013). "Comparing CenteringPregnancy to standard prenatal care plus prenatal education." BCM Pregnancy and Childbirth **13**: 1-10.

Background: There is significant evidence to support the importance of prenatal care in preventing adverse outcomes such as preterm birth and low infant birth weight. Previous studies have indicated that the benefits of prenatal care are not evenly distributed throughout the social strata. In addition, emerging evidence suggests that among particular populations, rates of preterm birth are unchanged or increasing. This suggests that an alternate care model is necessary, one that seeks to addresses some of the myriad of social factors that also contribute to adverse birth outcomes. In previous studies, the group prenatal care model CenteringPregnancy had been shown to reduce adverse birth outcomes, but to date, no comparison had been made with a model that included prenatal education. This study sought to investigate whether any significant difference remained within the comparison groups when both models accounted for social factors. Methods: This analysis was based on survey data collected from a prospective cohort of pregnant women through the All Our Babies Study in Calgary, Alberta. Results: At baseline, there were significant differences between the comparison groups in their psychosocial health, with the women in the CenteringPregnancy group scoring higher levels of depressive symptoms, stress and anxiety. At four months postpartum, the differences between the groups were no longer significant. Conclusions: These results suggest that CenteringPregnancy can recruit and retain a demographically vulnerable group of women with a constellation of risk factors for poor pregnancy and birth outcomes, including poverty, language barriers and poor mental health. Post program, the rates of stress, anxiety and depression were similar to other women with more social and financial advantage. These findings suggest that CenteringPregnancy may be a community-based care strategy that contributes to improved mental health, knowledge, and behaviours to optimize outcomes for mothers and children.

Biringer, A., et al. (2024). "Recreating the village: the patient experience with a hybrid model of Group Perinatal Care (GPPC) in an academic family health team." BMC Pregnancy and Childbirth **24**(1).

Background: Group prenatal care (GPC) has been shown to have a positive impact on social support, patient knowledge and preparedness for birth. We developed an interprofessional hybrid model of care whereby the group perinatal care (GPPC) component was co-facilitated by midwives (MW) and family medicine residents (FMR) and alternating individual visits were provided by family physicians (FP's) within our academic family health team (FHT) In this qualitative study, we sought to explore the impact of this program and how it supports patients through pregnancy and the early newborn period. Methods: Qualitative study that was conducted using semi-structured telephone interviews with 18 participants who had completed GPPC in the Mount Sinai Academic Family Health Team in Toronto, Canada and delivered between November 2016 and October 2018. Interviews were audio-recorded and transcribed verbatim. Thematic analysis was conducted by team members using grounded theory. Results:

Four over-arching themes emerged from the data: (i) Participants highly valued information they received from multiple trusted sources, (ii) Participants felt well cared for by the collaborative and coordinated interprofessional team, (iii) The design of GPPC enabled a shared experience, allowing for increased support of the pregnant person, and (iv) GPPC facilitated a supportive transition into the community which positively impacted participants' emotional well-being. Conclusions: The four constructs of social support (emotional, informational, instrumental and appraisal) were central to the value that participants found in GPPC. This support from the team of healthcare providers, peers and partners had a positive impact on participants' mental health and helped them face the challenges of their transition to parenthood.

Black, M. M., et al. (2017). "Advancing Early Childhood Development: from Science to Scale 1 - Early childhood development coming of age: science through the life course." The Lancet **389**: 77-90.

Early childhood development programmes vary in coordination and quality, with inadequate and inequitable access, especially for children younger than 3 years. New estimates, based on proxy measures of stunting and poverty, indicate that 250 million children (43%) younger than 5 years in low-income and middle-income countries are at risk of not reaching their developmental potential. There is therefore an urgent need to increase multisectoral coverage of quality programming that incorporates health, nutrition, security and safety, responsive caregiving, and early learning. Equitable early childhood policies and programmes are crucial for meeting Sustainable Development Goals, and for children to develop the intellectual skills, creativity, and wellbeing required to become healthy and productive adults. In this paper, the first in a three-part Series on early childhood development, we examine recent scientific

progress and global commitments to early childhood development. Research, programmes, and policies have advanced substantially since 2000, with new neuroscientific evidence linking early adversity and nurturing care with brain development and function throughout the life course.

Brookfield, J. (2019). "Group antenatal care for Aboriginal and Torres Strait Islander women: An acceptability study." Women Birth **32**(5): 437-448.

BACKGROUND: Good quality antenatal care is essential to improve the perinatal outcomes of Aboriginal and Torres Strait Islander women in Australia. Group antenatal care (GAC) is an innovative model which places clinical assessment, education and social support into a group setting. Previous studies have found GAC to be associated with improved perinatal outcomes, particularly for vulnerable populations, and high satisfaction levels among group members. No implementations of GAC, or evaluations of its acceptability, for an Indigenous population in Australia have been previously conducted. AIM: To explore the perceptions of a group of Indigenous health workers (n=5) in a health service in Far North Queensland, Australia, towards the prospective acceptability of GAC as an additional choice of model of care for their Indigenous women clients. METHODS: This qualitative acceptability study employed a descriptive/exploratory methodology. Data collection was by semi structured interview. Data analysis was guided by a theoretical framework of acceptability and conducted following a process of iterative categorisation. FINDINGS: No overall precluding factors were identified to render the model unacceptable for Indigenous women in this locality. Some features of the model would not suit all women. Indigenous health workers were interested in increased involvement with antenatal care and participation in a GAC model. CONCLUSION: A foundation of acceptability exists upon which the implementation of a GAC model could offer benefits to Indigenous women in this health service. The positive response of the Indigenous health workers to the concept of GAC endorsed the potential of this model to contribute to the provision of culturally appropriate and effective antenatal care within mainstream services.

Butrick, E., et al. (2020). "Model fidelity of group antenatal and postnatal care: a process analysis of the first implementation of this innovative service model by the Preterm Birth Initiative-Rwanda." Gates Open Res **4**: 7.

Background: For a large trial of the effect of group antenatal care on perinatal outcomes in Rwanda, a Technical Working Group customized the group care model for implementation in this context. This process analysis aimed to understand the degree of fidelity with which the group antenatal care model was implemented during the trial period. Methods: We used two discreet questionnaires to collect data from two groups about the fidelity with which the group antenatal care model was implemented during this trial period. Group care facilitators recorded descriptive data about each visit and self-assessed process fidelity with a series of yes/no checkboxes. Master Trainers assessed process fidelity with an 11-item tool using a 5-point scale of 0 (worst) to 4 (best). Results: We analyzed 2763 questionnaires completed by group care facilitators that documented discreet group visits among pregnant and postnatal women and 140 questionnaires completed by Master Trainers during supervision visits. Data recorded by both groups was available for 84 group care visits, and we compared these assessments by visit. Approximately 80% of all group visits were provided as intended, with respect to both objective measures (e.g. group size) and process fidelity. We did not find reliable correlations between

conceptually-related items scored by Master Trainers and self-assessment data reported by group visit facilitators. Conclusions: We recommend both the continued participation of expert observers at new and existing group care sites and ongoing self-assessment by group care facilitators. Finally, we present two abbreviated assessment tools developed by a Rwanda-specific Technical Working Group that reviewed these research results.

Byrskog, U., et al. (2019). "Rationale, development and feasibility of group antenatal care for immigrant women in Sweden: a study protocol for the Hooyo Project." BMJ Open **9**(7): e030314.

INTRODUCTION: Somali-born women comprise a large group of immigrant women of childbearing age in Sweden, with increased risks for perinatal morbidity and mortality and poor experiences of care, despite the goal of providing equitable healthcare for the entire population. Rethinking how care is provided may help to improve outcomes. OVERALL AIM: To develop and test the acceptability, feasibility and immediate impacts of group antenatal care for Somali-born immigrant women, in an effort to improve experiences of antenatal care, knowledge about childbearing and the Swedish healthcare system, emotional well-being and ultimately, pregnancy outcomes. This protocol describes the rationale, planning and development of the study. METHODS AND ANALYSIS: An intervention development and feasibility study. Phase I includes needs assessment and development of contextual understanding using focus group discussions. In phase II, the intervention and evaluation tools, based on core values for quality care and person-centered care, are developed. Phase III includes the historically controlled evaluation in which relevant outcome measures are compared for women receiving individual care (2016-2018) and women receiving group antenatal care (2018- 2019): care satisfaction (Migrant Friendly Maternity Care Questionnaire), emotional well-being (Edinburgh Postnatal Depression Scale), social support, childbirth fear, knowledge of Swedish maternity care, delivery outcomes. Phase IV includes the process evaluation, investigate process, feasibility and mechanisms of impact using field notes, observations, interviews and questionnaires. All phases are conducted in collaboration with a stakeholder reference group. ETHICS AND DISSEMINATION: The study is approved by the Regional Ethical Review Board, Stockholm, Sweden. Participants receive information about the study and their right to decline/withdraw without consequences. Consent is given prior to enrolment. Findings will be disseminated at antenatal care units, national/international conferences, through publications in peer-reviewed journals, seminars involving stakeholders, practitioners, community and via the project website. Participating women will receive a summary of results in their language.

Casella Jean-Baptiste, M., et al. (2024). "Integrated group antenatal and pediatric care in Haiti: A comprehensive care accompaniment model." PLoS One **19**(7): e0300908.

Introduction: The J9 Plus (J9) maternal-child accompaniment program is based on four pillars: group antenatal care (GANC), group pediatric care, psychosocial support, and community-based care. We aimed to evaluate the impact of the J9 model of care on perinatal outcomes. Methodology: We conducted a convergent mixed methods study of maternal-newborn dyads born in 2019 at Hôpital Universitaire de Mirebalais. Quantitative data was collected retrospectively to compare dyads receiving J9 care to usual care. A secondary analysis of qualitative data described patient perspectives of J9 care. Results: Antenatal care attendance was significantly higher among women in J9 (n = 524) compared to usual care (n = 523), with

490(93%) and 189(36%) having >4 visits, respectively; p <0.001, as was post-partum visit attendance [271(52%) compared to 84(16%), p<0.001] and use of post-partum family planning methods [98(19%) compared to 47(9%), p = 0.003]. Incidence of pre-eclampsia with severe features was significantly lower in the J9 group [44(9%)] compared to the usual care group [73(14%)], p <0.001. Maternal and neonatal mortality and low birth weight did not differ across groups. Cesarean delivery [103(20%) and 82(16%), p<0.001] and preterm birth [118 (24%)] and 80 (17%), p <0.001] were higher in the J9 group compared to usual care, respectively. In the qualitative analysis, ease of access to high-quality care, meaningful social support, and maternal empowerment through education were identified as key contributors to these outcomes. Conclusion: Compared to usual care, the J9 Plus maternal-child accompaniment model of care is associated with increased engagement in antenatal and postpartum care, increased utilization of post-partum family planning, and lower incidence of pre-eclampsia with severe features, which remains a leading cause of maternal mortality in Haiti. The J9 accompaniment approach to care is an empowering model that has the potential to be replicated in similar settings to improve quality of care and outcomes globally.

Catling, C. J., et al. (2015). "Group versus conventional antenatal care for women." Cochrane Database Syst Rev(2): CD007622.

BACKGROUND: Antenatal care is one of the key preventive health services used around the world. In most Western countries, antenatal care traditionally involves a schedule of one-to-one visits with a care provider. A different way of providing antenatal care involves use of a group model. OBJECTIVES: 1. To compare the effects of group antenatal care versus conventional antenatal care on psychosocial, physiological, labour and birth outcomes for women and their babies.2. To compare the effects of group antenatal care versus conventional antenatal care on care provider satisfaction. SEARCH METHODS: We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (31 October 2014), contacted experts in the

field and reviewed the reference lists of retrieved studies. SELECTION CRITERIA: All identified published, unpublished and ongoing randomised and quasi-randomised controlled trials comparing group antenatal care with conventional antenatal care were included. Cluster-randomised trials were eligible, and one has been included. Cross-over trials were not eligible. DATA COLLECTION AND ANALYSIS: Two review authors independently assessed trials for inclusion and risk of bias and extracted data; all review authors checked data for accuracy. MAIN RESULTS: We included four studies (2350 women). The overall risk of bias for the included studies was assessed as acceptable in two studies and good in two studies. No statistically significant differences were observed between women who received group antenatal care and those given standard individual antenatal care for the primary outcome of preterm birth (risk ratio (RR) 0.75, 95% confidence interval (CI) 0.57 to 1.00; three trials; N = 1888). The proportion of low-birthweight (less than 2500 g) babies was similar between groups (RR 0.92, 95% CI 0.68 to 1.23; three trials; N = 1935). No group differences were noted for the primary outcomes small-for-gestational age (RR 0.92, 95% CI 0.68 to 1.24; two trials; N = 1473) and perinatal mortality (RR 0.63, 95% CI 0.32 to 1.25; three trials; N = 1943).Satisfaction was rated as high among women who were allocated to group antenatal care, but this outcome was measured in only one trial. In this trial, mean satisfaction with care in the group given antenatal care was almost five times greater than that reported by those allocated to standard care (mean difference 4.90, 95% CI 3.10 to 6.70; one study; N = 993). No differences in neonatal intensive care admission, initiation of breastfeeding or spontaneous vaginal birth were observed between groups. Several outcomes related to stress and depression were reported in one trial. No differences between groups were observed for any of these outcomes. No data were available on the effects of group antenatal care on care provider satisfaction. We used the GRADE (Grades of Recommendation, Assessment, Development and Evaluation) approach to assess evidence for seven prespecified outcomes; results ranged from low quality (perinatal mortality) to moderate quality (preterm birth, low birthweight, neonatal intensive care unit admission, breastfeeding initiation) to high quality (satisfaction with antenatal care, spontaneous vaginal birth). AUTHORS' CONCLUSIONS: Available evidence suggests that group antenatal care is positively viewed by women and is associated with no adverse outcomes for them or for their babies. No differences in the rate of preterm birth were reported when women received group antenatal care. This review is limited because of the small numbers of studies and women, and because one study contributed 42% of the women. Most of the analyses are based on a single study. Additional research is required to determine whether group antenatal care is associated with significant benefit in terms of preterm birth or birthweight.

Chirwa, E., et al. (2020). "An effectiveness-implementation hybrid type 1 trial assessing the impact of group versus individual antenatal care on maternal and infant outcomes in Malawi." BMC Public Health **20**(1): 205.

BACKGROUND: Sub-Saharan Africa has the world's highest rates of maternal and perinatal mortality and accounts for two-thirds of new HIV infections and 25% of preterm births. Antenatal care, as the entry point into the health system for many women, offers an opportunity to provide life-saving monitoring, health promotion, and health system linkages. Change is urgently needed, because potential benefits of antenatal care are not realized when

pregnant women experience long wait times and short visits with inconsistent provisioning of essential services and minimal health promotion, especially for HIV prevention. This study answers WHO's call for the rigorous study of group antenatal care as a transformative model that provides a positive pregnancy experience and improves outcomes. METHODS: Using a hybrid type 1 effectiveness-implementation design, we test the effectiveness of group antenatal care by comparing it to individual care across 6 clinics in Blantyre District, Malawi. Our first aim is to evaluate the effectiveness of group antenatal care through 6 months postpartum. We hypothesize that women in group care and their infants will have less morbidity and mortality and more positive HIV prevention outcomes. We will test hypotheses using multi-level hierarchical models using data from repeated surveys (four time points) and health records. Guided by the consolidated framework for implementation research, our second aim is to identify contextual factors related to clinic-level degree of implementation success. Analyses use within and across-case matrices. DISCUSSION: This high-impact study addresses three global health priorities, including maternal and infant mortality, HIV prevention, and improved quality of antenatal care. Results will provide rigorous evidence documenting the effectiveness and scalability of group antenatal care. If results are negative, governments will avoid spending on less effective care. If our study shows positive health impacts in Malawi, the results will provide strong evidence and valuable lessons learned for widespread scale-up in other low-resource settings. Positive maternal, neonatal, and HIV-related outcomes will save lives, impact the quality of antenatal care, and influence health policy as governments make decisions about whether to adopt this innovative healthcare model. TRIAL REGISTRATION: ClinicalTrials.gov registration number NCT03673709. Registered on September 17, 2018.

Craswell, A., et al. (2016). "'Expecting and Connecting' Group Pregnancy Care: Evaluation of a collaborative clinic." Women Birth **29**(5): 416-422.

PROBLEM: Establishment of a service to increase clinical placement opportunities for midwifery students in a regional area of Queensland, Australia with unknown impact on all service stakeholders. BACKGROUND: Group antenatal care (known as Expecting and Connecting) was provided at the university campus, instigated collaboratively between the health service and university in response to population growth and student needs in a health service jurisdiction not otherwise serviced for public pregnancy care. QUESTION, HYPOTHESIS OR AIM: This study evaluated the 'Expecting and Connecting' Group Pregnancy Care service from the perspective of attending women, midwifery students and midwives. METHODS: Qualitative findings were obtained from mothers, midwives and midwifery students. The study was guided by Donabedian's conceptual framework to assess quality within a health service. Thematic analysis was used to identify themes and concepts from the data within the areas of structure, process and outcome. FINDINGS: Expecting and Connecting provided benefits to participants including an environment for students and pregnant women to build relationships to meet Continuity of Care requirements for students. Mothers reported high levels of satisfaction with antenatal care including the ability to develop peer support. DISCUSSION: The collaborative facilitation of group antenatal care by university and health service midwives provided a catalyst to the development of peer support networks within the local community and enhance opportunity for midwifery student requirements. CONCLUSION: The 'Expecting and Connecting' group

antenatal care service was highly regarded by participant mothers, midwives and midwifery students and provided an additional source of midwifery student placement.

Dai, J., et al. (2022). "The Experience of Pregnant Women in the Health Management Model of Internet-Based Centering Pregnancy: A Qualitative Study." International Journal of Women's Health **Volume 14**: 1281-1289.

Background: CenteringPregnancy Care is a promising group prenatal care innovation that combines assessment, education, and peer support. In China, it is not clear how best to integrate the CenteringPregnancy Care into existing maternal health care models. This qualitative study aimed to explore Chinese pregnant women's experience in the Internet-based CenteringPregnancy management model.
Methods: The Internet-based CenteringPregnancy was applied in a tertiary hospital between 2018 and 2019 in Wuhan, Hubei Province. Through purposive sampling, a total of 9 pregnant women who had experienced Internet-based CenteringPregnancy were recruited. A semi-structured interview was used to collect qualitative data, and Colaizzi's 7-step method of phenomenological data analysis was used to analyze the collected data.
Results: Three themes were extracted from the participants' interviews, including: 1) empowerment; 2) psychological and social support; 3) challenges of the Internet-based CenteringPregnancy. The Internet-based CenteringPregnancy management model retained advantages of CenteringPregnancy, emphasizing the pregnant woman as the subject of health care and promoting them to participate in health care. Participants believed that they could exchange pregnancy knowledge, help each other, and improve mood both timely and efficiently from the new model. However, it was found that there were challenges in seminar time arrangement, topic selection, and discussion management.
Conclusion: The Internet-based CenteringPregnancy management model positively affected pregnant women's empowerment, psychological, and social support. It is recommended to improve the seminar's design in future studies.

El Aliem, R. S. A. M., S. A.; Ellatef, M. A. B. A. (2019). "Effect of Applying Pregnancy Centered Care Model on Pregnant Women Health Behaviors and Prenatal Controls." American Journal of Nursing Research **7**(2): 219-227.

Background: Pregnancy Centered Care is an innovative prenatal care model provides both prenatal care and education in a group setting which contribute positively to the transition from pregnancy to delivery rather than routine hospital care. The aim: this study aimed to evaluate the effect of applying pregnancy centered care model on improving pregnant women health behaviors and prenatal controls. Design: A quasi-experimental design was utilized. Setting: The present study was conducted at outpatient clinic and intra-partum room in Obstetrics & Gynecological Department at Benha University Hospital. Sample: Purposive sample composed of 220 pregnant women between (15-35years) were included in this study. Tools: I: Pre-designed Questionnaire Format by Interviewing: to assess socio-demographic characteristics and obstetric history of pregnant women. II: Prenatal health behavior scale, to assess health promoting behaviors of pregnant women .III: Prenatal controls questionnaires, to assess minors discomfort and prenatal controls. Results: the study revealed that there high statistically improvement in pregnant women prenatal health behaviors and prenatal controls after

applying pregnancy centered care model with (p-value <0.001) ,also there was a positive correlation between total prenatal health behaviors scale and improving good prenatal controls of pregnancy centered care group as compared to hospital care group with (p-value <0.001). The present study concluded that the pregnancy centered care model associated with improved prenatal health behaviors and prenatal controls rather than the routine hospital care. Recommendations: the pregnancy centered care model could be used as best practices at antenatal clinics and as a model for education and training of future midwives nurses.

Eluwa, G. I., et al. (2018). "The effects of centering pregnancy on maternal and fetal outcomes in northern Nigeria; a prospective cohort analysis." BMC Pregnancy Childbirth **18**(1): 158.

BACKGROUND: Maternal and infant mortality remains high in Nigeria primarily due to low use of skilled birth attendants. Huge disparities exist between southern and Northen Nigeria on use of skilled birth attendants with south significantly higher than the north. We assessed the effect of centering pregnancy group (CPG) antenatal care on the uptake of antenatal care (ANC), facility delivery and immunization rates for infants in Kano state. METHODS: Between December 2012 and May 2014, pregnant women with similar sociodemographics and obstetric history were enrolled into intervention (CPG) and control groups and followed up prospectively. Chi-square tests were conducted to compare the differences between the intervention and the control groups with respect to background characteristics and intervention outcomes. Logistic regression was used to measure the associations between CPG and uptake of services for mother-baby pairs in care. RESULTS: A total of 517 (260 in the control group and 257 in the CPG) pregnant women enrolled and participated in the study. Thirty-six percent of women in the control group attended ANC at least once in 2nd and 3nd trimester compared to 49% of respondents in the CPG ($p < 0.01$). Health facility delivery was higher among CPG (13% vs. 8%; $p < 0.01$). When controlled for age, number of previous pregnancies, number of term deliveries, number of children alive and occupation of respondent or their spouses, respondents who participated in the CPGs compared to those who did not, were more likely to attend at least one antenatal care (ANC) session in the third trimester [adjusted risk ratio (ARR):1.52; 95% CI:1.36-1.69], more likely to immunize their babies at six weeks [ARR: 2.23; 95% CI: 1.16-4.29] and fourteen weeks [ARR: 3.46; 95% CI: 1.19-10.01] and more likely to use health services [ARR: 1.50; 95% CI: 1.06-2.13]. CONCLUSION: Centering or group pregnancy showed a positive effect on the use of antenatal services, facility delivery and postnatal services and thus is a promising intervention to increase uptake of maternal health care services in northern Nigeria. The low facility delivery remains a cause for alarm and requires further investigation to improve facility delivery in northern Nigeria.

Fuentes-Rivera, E., et al. (2020). "Evaluating process fidelity during the implementation of Group Antenatal Care in Mexico." BMC Health Serv Res **20**(1): 559.

BACKGROUND: CenteringPregnancy (CP) is a group antenatal care (G-ANC) model that has proven beneficial for mothers and their newborns. We conducted a feasibility study beginning in 2016 as part of the Mexican effort to implement G-ANC locally. This study reports on fidelity to the essential elements of CP during its implementation in Mexico. METHODS: We collected prospective data using a standardized checklist at four primary-care centers that implemented our adapted G-ANC model. We performed a descriptive analysis of fidelity to 28 processes per

G-ANC session (71 sessions made up of 10 groups and 129 women across 4 health centers). We calculated fidelity to each process as a proportion with 95% confidence intervals. We present overall results and stratified by health center and by facilitation team. RESULTS: Overall fidelity to the G-ANC intervention was 82%, with variability by health center (78-88%). The elements with the highest fidelity were having space for activities such as checking vital signs, conversation in a circle, and medical check-ups (100% each) and the element with the lowest fidelity was using music to enhance privacy (27.3%). Fidelity was not significantly different by center. CONCLUSIONS: Our study suggests good model fidelity during the implementation of G-ANC in Mexico. Our findings also contribute useful information about where to focus efforts in the future to maintain and improve G-ANC model fidelity.

Gaudion, A. and K. Yiannouzis (2011-3). "12 bumps are better than one." Midwives (3): 34-35.

Anna Gaudion and Katie Yiannouzis reveal how a project developed by a US midwife has proved a major success in a London hospital.

Gaudion, A. B., D.; Menka, Y.; Demilew, J.; Walton, C.; Yiannouzis, K.; Robbins, J.; Rising, S. S (2011-1). "Adapting the CenteringPregnancy model for a UK feasibility study." British Journal of Midwifery **19**(7): 433-438.

CenteringPregnancy is an innovative model of group antenatal care devised and developed in the United States. The model differs from traditional care in that women participate in a social, supportive group process, which develops their knowledge and confidence, and increases their personal and maternal self-efficacy. Following initial studies in the US, the CenteringPregnancy model has been adapted and implemented in a number of studies internationally, with a growing body of evidence of positive results in terms of clinical outcomes, satisfaction with antenatal care, perceived knowledge of issues around pregnancy, birth and parenthood. The background to the development and implementation of the first feasibility study to be conducted in the UK is described. This includes adaptations necessary to comply with national guidance and policy recommendations for NHS maternity care, and midwifery rules and regulations. There is a need for further larger studies to assess if similar positive outcomes could be replicated in the UK maternity settings.

Gaudion, A. M., Y.; Demilew, J.; Walton, C.; Yiannouzis, K.; Robbins, J.; Rising, S. S.; Bick, D. (2011-2). "Findings from a UK feasibility study of the CenteringPregnancy model." British Journal of Midwifery **19**(12): 796-802.

CenteringPregnancy is a model of group antenatal care which was devised and developed in the United States. A feasibility study was conducted in South East London from 2008 to 2010, to assess if the model could be introduced into NHS settings, if women would be prepared to join a group model of care and to explore the views of the women, their partners and midwives who participated. This was the first time the model had been implemented in the UK. Six antenatal groups, attended by 60 women and their partners and facilitated by 12 midwives, were established for the feasibility study with a seventh group of 8 women and their partners established later to bring the learning together and inform an operational guidance document (Gaudion and Menka, 2011). Women whose pregnancies were classed as low or high risk could opt for group antenatal care at the study site after discussion with a midwife at their antenatal

booking visit. Integral components of the CenteringPregnancy model are the evaluations of care which women and their partners are asked to provide in late pregnancy and at one month after the birth of their baby. The midwives who facilitate the groups are also required to complete evaluation forms and to contemporaneously reflect and enhance the care they offer, if this is appropriate. Feedback from these sources, together with an evaluation of the means of learning in the development process, was very positive and has informed the ongoing roll-out of the model at the study site. The potential to conduct randomized controlled trials in the UK to assess the clinical utility and cost-effectiveness of group antenatal care compared with individual antenatal care for women in low- and high-risk obstetric populations should now be considered.

Ghani, R. M. A. (2015). "Perception toward conduction the centering pregnancy model in the Egyptian teaching hospitals: A step to improve the quality of antenatal care." European Journal of Biology and Medical Science Research **3**(1): 9-18.

This study looked at assessing the perception of the health care providers toward the centering pregnancy model. A descriptive, cross sectional analytical design was utilized. This study was conducted at Qasr al-Aini, Cairo University maternity hospitals. All resident doctors, registered nurses working in the maternity hospital were invited to participate in the study. Data were collected utilized a structured self-administered questionnaire. Most of sample perceived the centering pregnancy model of care as it is an important method of antenatal care helps in early detection of risks (91.6%), improves patient empowerment and learning (94.2%), and enhances mother's self-care (93.3%). The most important barriers to conduct the present model in the governmental setting were; lack of staff training programs (94.2%) and hospital's financial constraints (95.0%). On conclusion, the centering pregnancy model has many benefits for pregnant women. Few barriers in the governmental setting can be overcome by policy makers' decisions.

Ghani, R. M. A. (2018). "Effect of Group Centering Pregnancy on Empowering Women with Gestational Hypertension." Journal of Health, Medicine and Nursing **55**.

The aim of the study is to examine the effect of group centering pregnancy on empowering women with gestational hypertension. Design: randomized controlled trial. Sample: random sample of two hundred primigravida who were between 24-26 weeks gestation, singleton, age ranged between 35- 45 years old, diagnosed with gestational hypertension and on treatment. Tool: Data collection tools included the following; 1) an interview & a follow up assessment questionnaire, 2) pregnancy-related empowerment scale (PRES), and 3) medical records. Procedure: In the group centering pregnancy, there were 10 women in each group formed around their estimated due dates, and the same women met together for each session till delivery. The antenatal schedule visits were 6 sessions, one every two weeks. Results: women in the group centering pregnancy were strongly empowered than women who received the standard follow up antenatal care. There was statistical significant difference between both groups related to the total mean score of PRES of the empowerment categories (t=17.61, p0.0001). Conclusion: Group centering pregnancy may hold promise for empowering pregnant women with gestational hypertension.

Grenier, L., et al. (2020). "Building a Global Evidence Base to Guide Policy and Implementation for Group Antenatal Care in Low- and Middle-Income Countries: Key Principles and Research Framework Recommendations from the Global Group Antenatal Care Collaborative." J Midwifery Womens Health **65**(5): 694-699.

Evidence from high-income countries suggests that group antenatal care, an alternative service delivery model, may be an effective strategy for improving both the provision and experience of care. Until recently, published research about group antenatal care did not represent findings from low- and middle-income countries, which have health priorities, system challenges, and opportunities that are different than those in high-income countries. Because high-quality evidence is limited, the World Health Organization recommends group antenatal care be implemented only in the context of rigorous research. In 2016 the Global Group Antenatal Care Collaborative was formed as a platform for group antenatal care researchers working in low- and middle-income countries to share experiences and shape future research to accelerate development of a robust global evidence base reflecting implementation and outcomes specific to low- and middle-income countries. This article presents a brief history of the Collaborative's work to date, proposes a common definition and key principles for group antenatal care, and recommends an evaluation and reporting framework for group antenatal care research.

Grenier, L., et al. (2022). "Transforming women's and providers' experience of care for improved outcomes: A theory of change for group antenatal care in Kenya and Nigeria." PLoS ONE **17**(5): e0265174.

Background: Group antenatal care (G-ANC) is a promising model for improving quality of maternal care and outcomes in low- and middle-income countries (LMICs) but little has been published examining the mechanisms by which it may contribute to those improvements. Substantial interplay can be expected between pregnant women and providers' respective experiences of care, but most studies report findings separately. This study explores the experience and effects of G-ANC on both women and providers to inform an integrated theory of change for G-ANC in LMICs.

Methods: This paper reports on multiple secondary outcomes from a pragmatic cluster randomized controlled trial of group antenatal care in Kenya and Nigeria conducted from October 2016 —November 2018 including 20 clusters per country. We collected qualitative data from providers and women providing or receiving group antenatal care via focus group discussions (19 with women; 4 with providers) and semi-structured interviews (42 with women; 4 with providers). Quantitative data were collected via surveys administered to 1) providers in the intervention arm at enrollment and after facilitating 4 cohorts and 2) women in both study arms at enrollment; 3–6 weeks postpartum; and 1 year postpartum. Through an iterative approach with framework analysis, we explored the interactions of voiced experience and perceived effects of care and placed them relationally within a theory of change. Selected variables from baseline and final surveys were analyzed to examine applicability of the theory to all study participants. Results: Findings support seven inter-related themes. Three themes relate to the shared experience of care of women and providers: forming supportive relationships and open communication; becoming empowered partners in learning and care; and providing and receiving meaningful clinical services and information. Four themes relate to effects of that experience, which are not universally shared: self-reinforcing cycles of more and

better care; linked improvements in health knowledge, confidence, and healthy behaviors; improved communication, support, and care beyond G-ANC meetings; and motivation to continue providing G-ANC. Together these themes map to a theory of change which centers the shared experience of care for women and providers among multiple pathways to improved outcomes.
Discussion: The reported experience and effects of G-ANC on women and providers are consistent with other studies in LMICs. This study is novel because it uses the themes to present a theory of change for G-ANC in low-resource settings. It is useful for G-ANC implementation to inform model development, test adaptations, and continue exploring mechanisms of action in future research.

Grenier, L., et al. (2019). "Impact of group antenatal care (G-ANC) versus individual antenatal care (ANC) on quality of care, ANC attendance and facility-based delivery: A pragmatic cluster-randomized controlled trial in Kenya and Nigeria." PLoS ONE **14**(10): e0222177.

BACKGROUND: Low quality and frequency of antenatal care (ANC) are associated with lower uptake of facility-based deliveries-a key intervention to reduce maternal and neonatal mortality. We implemented group ANC (G-ANC), an alternative service delivery model, in Kenya and Nigeria, to assess its impact on quality and attendance at ANC and uptake of facility-based delivery. METHODS: From October 2016January 2018, we conducted a facility-based, pragmatic, cluster-randomized controlled trial with 20 clusters per country. We recruited women <24 weeks gestation during their first ANC visit and enrolled women at intervention facilities who agreed to attend G-ANC in lieu of routine individual ANC. The G-ANC model consisted of five monthly 2-hour meetings with clinical assessments alongside structured gestationally specific group discussions and activities. Quality of care was defined as receipt of eight specific ANC interventions. Data were obtained through facility records and self-report during a home-based postpartum survey. Analysis was by intention to treat. FINDINGS: All women who completed follow up are included in the analysis (Nigeria: 1018/1075 enrolled women [94.7%], Kenya: 826/1013 [81.5%]). In Nigeria women in the intervention arm were more likely to have a facility-based delivery compared to those in the control arm (Nigeria: 76.7% [391/510] versus 54.1% [275/508]; aOR 2.30, CI 1.51-3.49). In both countries women in the intervention arm were more likely than those in the control arm to receive quality ANC (Nigeria: aOR 5.8, CI 1.98-17.21, p<0.001; Kenya: aOR 5.08, CI 2.31-11.16, p<0.001) and to attend at least four ANC visits (Nigeria: aOR 13.30, CI 7.69-22.99, p<0.001; Kenya: aOR 7.12, CI 3.91-12.97, p<0.001). CONCLUSIONS: G-ANC was associated with higher facility-based delivery rates in Nigeria, where those rates associated with individual ANC were low. In both Kenya and Nigeria it was associated with a higher proportion of women receiving quality ANC and higher frequency of ANC visits.

Gresh, A., et al. (2022). "Experiential Training Workshops for Group Antenatal Care in Malawi." Journal of Midwifery Womens Health.

The positive effects of the CenteringPregnancy group antenatal care (ANC) model on perinatal outcomes in the United States has led to its adaptation and implementation in many low- and middle-income countries. Facilitative discussions are a core component of this group ANC model. Facilitator training lays a critical foundation for delivery of this paradigm-shifting mode

as practitioners learn to adapt their approach to health education from didactive to facilitative. However, there is little rigorous research focused on best practices for training group health care facilitators and none that is guided by a theoretical framework. Kolb's experiential learning theory offers a theoretical framework to guide the development of training workshops that allow trainees to experience, reflect on, and practice the facilitation skills needed to deliver this evidence-based intervention. This article describes an experiential learning-based training workshop that was implemented as part of an ongoing effectiveness-implementation trial of a Centering-based group ANC model in Blantyre District, Malawi. We provide a blueprint for conducting group ANC facilitator trainings that, in addition to imparting knowledge, effectively builds confidence and buy-in to this paradigm-changing approach to ANC delivery. This blueprint can be adapted for use in designing and implementing group health care across settings in the United States and globally.

Gresh, A., et al. (2023). "Evaluation of implementation outcomes of an integrated group postpartum and well-child care model at clinics in Malawi." BMC Pregnancy and Childbirth **23**.

Background: Persistently elevated rates of maternal and infant mortality and morbidities in Malawi indicate the need for increased quality of maternal and well-child care services. The first-year postpartum sets the stage for long-term health for the childbearing parent and infant. Integrated group postpartum and well-child care may improve maternal and infant health outcomes. The purpose of this study was to examine implementation outcomes for this model of care.

Methods: We used mixed methods to examine implementation outcomes of integrated group postpartum and well-child care. We piloted sessions at three clinics in Blantyre District, Malawi. During each session we evaluated fidelity using a structured observation checklist. At the end of each session, we administered three surveys to health care workers and women participants, the Acceptability of Intervention Measure, the Intervention Appropriateness Measure, and the Feasibility of Intervention Measure. Focus groups were conducted to gain greater understanding of people's experience with and evaluation of the model.

Results: Forty-one women with their infants participated in group sessions. Nineteen health care workers across the three clinics co-facilitated group sessions, 9 midwives and 10 health surveillance assistants. Each of the 6 sessions was tested once at each clinic for a total of 18 pilot sessions. Both women and health care workers reported group postpartum and well-child care was highly acceptable, appropriate, and feasible across clinics. Fidelity to the group care model was high. During each session as part of structured observation the research team noted common health issues, the most common one among women was high blood pressure and among infants was flu-like symptoms. The most common services received within the group space was family planning and infant vaccinations. Women reported gaining knowledge from health promotion group discussions and activities. There were some challenges implementing group sessions.

Conclusion: We found that clinics in Blantyre District, Malawi were able to implement group postpartum and well-child care with fidelity and that it was highly acceptable, appropriate, and feasible to women and health care workers. Due to these promising results, we recommend future research examine the effectiveness of the model on maternal and child health outcomes.

Gresh, A., et al. (2023). "A Conceptual Framework for Group Well-Child Care: A Tool to Guide Implementation, Evaluation, and Research." Maternal and Child Health Journal **27**: 991–1008.

Objective To use scoping review methods to construct a conceptual framework based on current evidence of group well- child care to guide future practice and research.
Methods We conducted a scoping review using Arksey and O'Malley's (2005) six stages. We used constructs from the Consolidated Framework for Implementation Research and the quadruple aim of health care improvement to guide the construction of the conceptual framework.
Results The resulting conceptual framework is a synthesis of the key concepts of group well-child care, beginning with a call for a system redesign of well-child care to improve outcomes while acknowledging the theoretical antecedents structuring the rationale that supports the model. Inputs of group well-child care include health systems contexts; administration/ logistics; clinical setting; group care clinic team; community/patient population; and curriculum development and training. The core components of group well-child care included structure (e.g., group size, facilitators), content (e.g., health assessments, service linkages). and process (e.g., interactive learning and community building). We found clinical outcomes in all four dimensions of the quadruple aim of healthcare.
Conclusion Our conceptual framework can guide model implementation and identifies several outcomes that can be used to harmonize model evaluation and research. Future research and practice can use the conceptual framework as a tool to standardize model implementation and evaluation and generate evidence to inform future healthcare policy and practice.

Harsha Bangura, A., et al. (2020). "Measuring fidelity, feasibility, costs: an implementation evaluation of a cluster-controlled trial of group antenatal care in rural Nepal." Reprod Health **17**(1): 5.

BACKGROUND: Access to high-quality antenatal care services has been shown to be beneficial for maternal and child health. In 2016, the WHO published evidence-based recommendations for antenatal care that aim to improve utilization, quality of care, and the patient experience. Prior research in Nepal has shown that a lack of social support, birth planning, and resources are barriers to accessing services in rural communities. The success of CenteringPregnancy and participatory action women's groups suggests that group care models may both improve access to care and the quality of care delivered through women's empowerment and the creation of social networks. We present a group antenatal care model in rural Nepal, designed and implemented by the healthcare delivery organization Nyaya Health Nepal, as well as an assessment of implementation outcomes. METHODS: The study was conducted at Bayalata Hospital in Achham, Nepal, via a public private partnership between the Nepali non-profit, Nyaya Health Nepal, and the Ministry of Health and Population, with financial and technical assistance from the American non-profit, Possible. We implemented group antenatal care as a prospective non-randomized cluster-controlled, type I hybrid effectiveness-implementation study in six village clusters. The implementation approach allows for iterative improvement in design, making changes to improve the quality of the intervention. Assessments of implementation process and model fidelity were undertaken using a mobile checklist completed by nurse supervisors, and observation forms completed by program leadership. We evaluated data quarterly using descriptive statistics to identify trends. Qualitative interviews and team communications were analyzed through immersion crystallization to identify major

themes that evolved during the implementation process. RESULTS: A total of 141 group antenatal sessions were run during the study period. This paper reports on implementation results, whereas we analyze and present patient-level effectiveness outcomes in a complementary paper in this journal. There was high process fidelity to the model, with 85.7% (95% CI 77.1-91.5%) of visits completing all process elements, and high content fidelity, with all village clusters meeting the minimum target frequency for 80% of topics. The annual per capita cost for group antenatal care was 0.50 USD. Qualitative analysis revealed the compromise of stable gestation-matched composition of the group members in order to make the intervention feasible. Major adaptations were made in training, documentation, feedback and logistics. CONCLUSION: Group antenatal care provided in collaboration with local government clinics has the potential to provide accessible and high quality antenatal care to women in rural Nepal. The intervention is a feasible and affordable alternative to individual antenatal care. Our experience has shown that adaptation from prior models was important for the program to be successful in the local context within the national healthcare system. TRIAL REGISTRATION: ClinicalTrials.gov Identifier: NCT02330887, registered 01/05/2015, retroactively registered.

Hawley, N. L., et al. (2024). "A group prenatal care intervention reduces gestational weight gain and gestational diabetes in <scp>American Samoan</scp> women." Obesity **32**(10): 1833-1843.

Objective: The objective of this study was to determine the preliminary effectiveness of an intervention to mitigate adverse pregnancy outcomes associated with pre-pregnancy obesity in American Samoa. Methods: We enrolled n = 80 low-risk pregnant women at <14 weeks' gestation. A complete case analysis was conducted with randomized group assignment (group prenatal care-delivered intervention vs. one-on-one usual care) as the independent variable. Primary outcomes were gestational weight gain and postpartum weight change. Secondary outcomes included gestational diabetes screening and exclusive breastfeeding at 6 weeks post partum. Other outcomes reported include gestational diabetes incidence, preterm birth, mode of birth, infant birth weight, and macrosomia. Results: Gestational weight gain was lower among group versus usual care participants (mean [SD], 9.46 [7.24] kg vs. 14.40 [8.23] kg; p = 0.10); postpartum weight change did not differ between groups. Although the proportion of women who received adequate gestational diabetes screening (78.4% group; 65.6% usual care) was similar, there were clinically important between-group differences in exclusive breastfeeding (44.4% group; 25% usual care), incidence of gestational diabetes (27.3% group; 40.0% usual care), and macrosomia (8.3% group; 29.0% usual care). Conclusions: It may be possible to address multiple risk factors related to intergenerational transmission of obesity in this high-risk setting using a group care-delivered intervention.

Heredia-Pi, I. B., et al. (2018). "The Mexican Experience Adapting CenteringPregnancy: Lessons Learned in a Publicly Funded Health Care System Serving Vulnerable Women." Journal of Midwifery Womens Health.

Group antenatal care is an innovative model of health care in which all components of antenatal care-clinical, educational, and supportive-happen in a group context with health care professionals as facilitators. CenteringPregnancy is the most studied model of group antenatal care, now widely implemented in the United States. This model has been shown to be effective in improving health and behavioral outcomes in the United States, but there is less known about the experience adapting group antenatal care in settings outside the US health care

system. This article describes the adaptation of the CenteringPregnancy model to a Mexican context. We describe the Mexican health care context and our adaptation process and highlight key factors to consider when adapting the content and modality of the CenteringPregnancy model for diverse populations and health systems. Our findings are relevant to others seeking to implement group antenatal care in settings outside the US health care system.

Hetherington, E., et al. (2018). "Vulnerable Women's Perceptions of Individual Versus Group Prenatal Care: Results of a Cross-Sectional Survey." Matern Child Health J **22**(11): 1632-1638.

Introduction Vulnerable pregnant women (e.g. women with low socio-economic status or recent immigrants) are less likely to receive adequate prenatal care or to attend perinatal education classes. CenteringPregnancy (CP) is a model of group prenatal care which combines assessment, education and support. This study aimed to assess patient experience among vulnerable women in group prenatal care compared to individual care. Methods Women participating in CP at a community-based health centre in urban Alberta were eligible to participate. A convenience sample of women who received individual care at a low-risk maternity clinic served as comparison. Women were asked a series of questions on their prenatal care experience. Demographic and patient responses were compared using Chi square, fisher's exact and t tests. Results Forty-five women accessing CP and 92 women accessing individual care participated. Women in CP were younger, more likely to be single and having

their first baby than women in individual care. Women in CP were significantly more likely to report having received enough information on exercise during pregnancy (92 vs. 66%, p = 0.002), breastfeeding (95 vs. 70%, p = 0.002) and baby care (95 vs. 67%, p = 0.001). Women in CP were more likely to report that they felt their prenatal care providers were interested in how the pregnancy was affecting their life (100 vs. 93%, p </= 0.001). Discussion Group prenatal care provides a positive experience and improved information exchange among vulnerable populations. Programs interested in engaging, educating and empowering vulnerable pregnant women may benefit from implementation of group care.

Hodgson, Z. G., et al. (2017). "An evaluation of Interprofessional group antenatal care: a prospective comparative study." BMC Pregnancy Childbirth **17**(1): 297.

BACKGROUND: Maternal and neonatal outcomes are influenced by the nature of antenatal care. Standard pregnancy care is provided on an individual basis, with one-on-one appointments between a client and family doctor, midwife or obstetrician. A novel, group-based antenatal care delivery model was developed in the United States in the 1990s and is growing in popularity beyond the borders of the USA. The purpose of this study was to evaluate outcomes in clients receiving interprofessional group perinatal care versus interprofessional individual care in a Canadian setting. METHODS: Clients attending the South Community Birth Program (SCBP), an interprofessional, collaborative, primary care maternity program, offering both individual and group care, were invited to participate in the study. Pregnancy knowledge and satisfaction scores, and perinatal outcomes were compared between those receiving group versus individual care. Chi-square tests, general linear models and logistic regression were used to compare the questionnaire scores and perinatal outcomes between cohorts. RESULTS: Three hundred three clients participated in the study. Group care was comparable to individual care in terms of mode of birth, gestational age at birth, infant birth weight, breastfeeding rates, pregnancy knowledge, preparedness for labour and baby care, and client satisfaction. The rates of adverse perinatal outcomes were extremely low amongst SCBP clients, regardless of the type of care received (preterm birth rates ~5%). Breastfeeding rates were very high amongst all study participants (> 78% exclusive breastfeeding), as were measures of pregnancy knowledge and satisfaction. CONCLUSIONS: This is the first Canadian study to compare outcomes in clients receiving interprofessional group care versus individual care. Our observation that interprofessional group care outcomes and satisfaction were as good as interprofessional individual care has important implications for the antenatal care of clients and for addressing the projected maternity provider crisis facing Canada, particularly in small and rural communities. Further study of group-based care including not only client satisfaction, but also provider satisfaction, is needed. In addition, research into the role of interprofessional care in meeting the needs and improving perinatal outcomes of different populations is necessary.

Honorato, D. J. P., et al. (2021). "Risks of Adverse Neonatal Outcomes in Early Adolescent Pregnancy Using Group Prenatal Care as a Strategy for Public Health Policies: A Retrospective Cohort Study in Brazil." Frontiers in Public Health **9**.

Background: Adolescent pregnancy is a public health concern and many studies have evaluated neonatal outcomes, but few have compared younger adolescents with older using adequate prenatal care.

Objective: To compare the risks of adverse neonatal outcomes in younger pregnant adolescents who are properly followed through group prenatal care (GPC) delivered by specialized public services.
Methods: This retrospective cohort study followed pregnant adolescents (aged 10–17 years) who received GPC from specialized public services in Brazil from 2009 to 2014. Data were obtained from medical records and through interviews with a multidisciplinary team that treated the patients. The neonatal outcomes (low birth weight, prematurity, Apgar scores with 1 and 5 min, and neonatal death) of newborns of adolescents aged 10–13 years were compared to those of adolescents aged 14–15 years and 16–17 years. Incidence was calculated with 95% confidence intervals (CIs) and compared over time using a chi-squared test to observe trends. Poisson Multivariate logistic regression was used to adjust for confounding variables. The results are presented as adjusted relative risks or adjusted mean differences.
Results: Of the 1,112 adolescents who were monitored, 758 were included in this study. The overall incidence of adverse neonatal outcomes (low birth weight and prematurity) was measured as 10.2% (95% CI: 9.7–11.5). Apgar scores collected at 1 and 5 min were found to be normal, and no instance of fetal death occurred. The incidence of low birth weight was 16.1% for the 10–13 age group, 8.7% for the 14–15 age group and 12.1% for the 16–17 age group. The incidence of preterm was measured at 12, 8.5, and 12.6% for adolescents who were 10–13, 14–15, and 16–17 years of age, respectively. Neither low birth weight nor prematurity levels significantly differed among the groups ($p > 0.05$). The infants born to mothers aged 10–13 years presented significantly ($p < 0.05$) lower Apgar scores than other age groups, but the scores were within the normal range.
Conclusions: Our findings showed lower incidence of neonatal adverse outcomes and no risk difference of neonatal outcomes in younger pregnancy adolescents. It potentially suggests that GPC model to care pregnant adolescents is more important than the age of pregnant adolescent, however further research is needed.

Hunter, L., et al. (2018). "`It makes sense and it works': Maternity care providers' perspectives on the feasibility of a group antenatal care model (Pregnancy Circles)." Midwifery **66**: 56-63.

AIM: To test the feasibility of introducing a group antenatal care initiative (Pregnancy Circles) in an area with high levels of social deprivation and cultural diversity by exploring the views and experiences of midwives and other maternity care providers in the locality before and after the implementation of a test run of the group model. DESIGN: (i) Pre-implementation semi-structured interviews with local stakeholders. (ii) Post-implementation informal and semi-structured interviews and a reflective workshop with facilitating midwives, and semi-structured interviews with maternity managers and commissioners. Data were organised around three core themes of organisational readiness, the acceptability of the model, and its impact on midwifery practice, and analyzed thematically. SETTING: A large inner-city National Health Service Trust in the United Kingdom. PARTICIPANTS: Sixteen stakeholders were interviewed prior to, and ten after, the group model was implemented. Feedback was also obtained from a further nine midwives and one student midwife who facilitated the Pregnancy Circles. INTERVENTION: Four Pregnancy Circles in community settings. Women with pregnancies of similar gestation were brought together for antenatal care incorporating information sharing and peer support. Women undertook their own blood pressure and urine checks, and had brief

individual midwifery checks in the group space. FINDINGS: Dissatisfaction with current practice fueled organisational readiness and the intervention was both possible and acceptable in the host setting. A perceived lack of privacy in a group setting, the ramifications of devolving blood pressure and urine checks to women, and the involvement of partners in sessions were identified as sticking points. Facilitating midwives need to be adequately supported and trained in group facilitation. Midwives derived accomplishment and job satisfaction from working in this way, and considered that it empowered women and enhanced care. KEY CONCLUSIONS: Participants reported widespread dissatisfaction with current care provision. Pregnancy Circles were experienced as a safe environment in which to provide care, and one that enabled midwives to build meaningful relationships with women. IMPLICATIONS FOR PRACTICE: Pre-registration education inadequately prepared midwives for group care. Addressing sticking points and securing management support for Pregnancy Circles is vital to sustain participation in this model of care.

Hunter, L. J., et al. (2019). "Better together: A qualitative exploration of women's perceptions and experiences of group antenatal care." Women Birth **32**(4): 336-345.

PROBLEM: Childbearing women from socio-economically disadvantaged communities and minority ethnic groups are less likely to access antenatal care and experience more adverse pregnancy outcomes. BACKGROUND: Group antenatal care aims to facilitate information sharing and social support. It is associated with higher rates of attendance and improved health outcomes. AIMS: To assess the acceptability of a bespoke model of group antenatal care (Pregnancy Circles) in an inner city community in England, understand how the model affects women's experiences of pregnancy and antenatal care, and inform further development and testing of the model. METHODS: A two-stage qualitative study comprising focus groups with twenty six local women, followed by the implementation of four Pregnancy Circles attended by twenty four women, which were evaluated using observations, focus groups and semi-structured interviews with participants. Data were analysed thematically. FINDINGS: Pregnancy Circles offered an appealing alternative to standard antenatal care and functioned as an instrument of empowerment, mediated through increased learning and knowledge sharing, active participation in care and peer and professional relationship building. Multiparous women and women from diverse cultures sharing their experiences during Circle sessions was particularly valued. Participants had mixed views about including partners in the sessions.
CONCLUSIONS: Group antenatal care, in the form of Pregnancy Circles, is acceptable to women and appears to enhance their experiences of pregnancy. Further work needs to be done both to test the findings in larger, quantitative studies and to find a model of care that is acceptable to women and their partners.

Ibañez-CuevasI, M., et al. (2020). "Group Prenatal Care in Mexico: perspectives and experiences of health personnel." Revista de Saude Publica **54**(140).

OBJECTIVE: Identify barriers and facilitators to implementing the Group Prenatal Care model in Mexico (GPC) from the health care personnel’s perspective.
METHODS: We carried out a qualitative descriptive study in four clinics of the Ministry of Health in two states of Mexico (Morelos and Hidalgo) from June 2016 to August 2018. We conducted 11 semi-structured interviews with health care service providers, and we examined their

perceptions and experiences during the implementation of the GPC model. We identified the barriers and facilitators for its adoption in two dimensions: a) structural (space, resources, health personnel, patient volume, community) and b) attitudinal (motivation, leadership, acceptability, address problems, work atmosphere and communication).
RESULTS: The most relevant barriers reported at the structural level were the availability of physical space in health units and the work overload of health personnel. We identified the difficulty in adopting a less hierarchical relationship during the pregnant women's care at the attitudinal level. The main facilitator at the attitudinal level was the acceptability that providers had of the model. One specific finding for Mexico's implementation context was the resistance to change the doctor-patient relationship; it is difficult to abandon the prevailing hierarchical model and change to a more horizontal relationship with pregnant women.
CONCLUSION: Analyzing the GPC model's implementation in Mexico, from the health care personnel's perspective, has revealed barriers and facilitators similar to the experiences in other contexts. Future efforts to adopt the model should focus on timely attention to identified barriers, especially those identified in the attitudinal dimension that can be modified by regular health care personnel training.

Jafari, F., et al. (2010). "Comparison of maternal and neonatal outcomes of group versus individual prenatal care: a new experience in Iran." Health Care Women Int **31**(7): 571-584.

The majority of perinatal deaths occur in developing countries. Pragmatic reality in developing countries dictates the need for implementation of evidence-based, cost-effective interventions to improve child health outcomes. In this article we describe the implementation and evaluation of group prenatal care in Iran. Group prenatal care ideally may be suited for mothers in developing countries where lack of support, cultural and traditional practices, and low- quality health services interfere with satisfactory implementation of prenatal care. We believe that provision of prenatal care by group model improves perinatal outcomes. In developing countries such an approach is feasible and practical.

Jafari, F., et al. (2010). "Does Group Prenatal Care Affect Satisfaction And Prenatal Care Utilization in Iranian Pregnant Women?" Iranian Journal of Public Health **39**(2): 52-62.

Background: The need to provide high quality prenatal care services, which take account of women's views and specifically address their need for information, support and communication, has been advocated and group prenatal care, had been suggested as one of the ways to achieve this objective. The purpose of this study was to examine the impact of group versus individual prenatal care on satisfaction and prenatal care use.
Methods: This was a cluster-randomized controlled trial with the health center as the randomization unit that conducted in 2007. Satisfaction was measured through a standardized questionnaire, and the Kotelchuck Adequacy of Prenatal Care Utilization Index was used to measure prenatal care utilization.
Results: We recruited 678 women (group prenatal care, (N= 344) and individual prenatal care, (N=334) in the study. Women in group prenatal care model were more satisfied than women in individual prenatal care model in all areas evaluated, including information, communication, co-ordination and quality of care. Group care women were significantly more likely to have adequate prenatal care than individual care women were (OR=1.35 95% CI=1.26-1.44).

Conclusions: Group prenatal care was associated with a significant improvement in client satisfaction and prenatal care utilization. This model of care has implications for the planning and provision of prenatal services within public health system, which is moving toward a better quality health care, and increasing use of services.

Jans, S., et al. (2023). "Long-term cost savings with Centering-based group prenatal care." Midwifery.

Introduction: Group antenatal care (gANC) is a group-based care-model combining routine antenatal care, with health assessment, education, and community building. GANC has shown positive results on perinatal outcomes. However, midwives in Dutch primary care have reported higher costs when providing gANC. The purpose of this study was to assess the effect of replacing individual prenatal care (IC) by gANC on (expected future) health care costs and health outcomes.

Methods: We performed an exploratory cost-benefit analysis comparing costs and consequences of gANC with those of IC, using a hypothetical cohort of 12,894 women in gANC. Primary input data were derived from a stepped wedge cluster randomized controlled trial carried out in the Netherlands, assessing both health and psychosocial effects of gANC comparing them with IC. Other data was retrieved from available literature and an online questionnaire among midwifery practices. The main outcome measure was differential cost of gANC and lifetime direct healthcare costs related to the effects of gANC compared to IC(price level 2019).

Results: Results showed that gANC comes at a differential cost of €45 extra per person when compared to IC. However, projected healthcare cost-savings related to increased breastfeeding rates, reduced prevalence of pregnancy induced hypertension and less postpartum smoking, lead to an average net cost-savings of €67 per gANC participant.

Discussion: Although gANC shows better health- and psychosocial outcomes when compared to IC, it is more costly to provide. However, findings indicate that the differential costs of gANC are off-set by long-term healthcare cost-savings.

Jeremiah, R. D. P., Dhruvi R.; Chirwa, Ellen; Kapito, Esnath; Mei, Xiaohan; McCreary, Linda L.; Norr, Kathleen F.; Liu, Li; Patil, Crystal L. (2021). "A randomized group antenatal care pilot showed increased partner communication and partner HIV testing during pregnancy in Malawi and Tanzania." BMC Pregnancy and Childbirth **21**(790).

Background: HIV testing at antenatal care (ANC) is critical to achieving zero new infections in sub-Saharan Africa. Although most women are tested at ANC, they remain at risk for HIV exposure and transmission to their infant when their partners are not tested. This study evaluates how an HIV-enhanced and Centering-based group ANC model- Group ANC+ that uses interactive learning to practice partner communication is associated with improvements in partner HIV testing during pregnancy.

Methods: A randomized pilot study conducted in Malawi and Tanzania found multiple positive outcomes for pregnant women (n = 218) assigned to Group ANC+ versus individual ANC. This analysis adds previously unpublished results for two late pregnancy outcomes: communication with partner about three reproductive health topics (safer sex, HIV testing, and family planning) and partner HIV testing since the first antenatal care visit. Multivariate logistic regression models were used to assess the effect of type of ANC on partner communication and partner

testing. We also conducted a mediation analysis to assess whether partner communication mediated the effect of type of care on partner HIV testing.
Results: Nearly 70% of women in Group ANC+ reported communicating about reproductive health with their partner, compared to 45% of women in individual ANC. After controlling for significant covariates, women in group ANC were twice as likely as those in individual ANC to report that their partner got an HIV test (OR 1.99; 95% CI: 1.08, 3.66). The positive effect of the Group ANC + model on partner HIV testing was fully mediated by increased partner communication.
Conclusions: HIV prevention was included in group ANC health promotion without compromising services and coverage of standard ANC topics, demonstrating that local high- priority health promotion needs can be integrated into ANC using a Group ANC+. These findings provide evidence that greater partner communication can promote healthy reproductive behaviors, including HIV prevention. Additional research is needed to understand the processes by which group ANC allowed women to discuss sensitive topics with partners and how these communications led to partner HIV testing.

Johnston, J. C., et al. (2017). "Piloting CenteringParenting in Two Alberta Public Health Well-Child Clinics." Public Health Nurs **34**(3): 229-237.

OBJECTIVES: To pilot a group health service delivery model, CenteringParenting, for new parents, to assess its feasibility and impact on maternal and infant outcomes. DESIGN AND SAMPLE: Families attended six, 2-hr group sessions in their child's first year of life with three to seven other families. Health assessments, parent-led discussions, and vaccinations occurred within the group. MEASURES: Demographic, breastfeeding, vaccination, maternal psychosocial health, parenting, and satisfaction data were collected and compared to a representative cohort. RESULTS: Four groups ran in two clinics. Four to eight parent/infant dyads participated in each group, 24 total dyads. Most participating parents were mothers. Dyads in the group model received 12 hr of contact with Public Health over the year compared to 3 hr in the typical one-on-one model. Participants were younger, more likely to have lower levels of education, and lower household income than the comparison group. Parents reported improvements in parenting experiences following the program. At 4 months, all CenteringParenting babies were vaccinated compared to 95% of babies in the comparison group. CONCLUSIONS: The pilot was successfully completed. Additional research is required to examine the effectiveness of CenteringParenting. Data collected provide insight into potential primary outcomes of interest and informs larger, rigorously designed longitudinal studies.

Jolivet, R. R., et al. (2018). "Exploring perceptions of group antenatal Care in Urban India: results of a feasibility study." Reprod Health **15**(1): 57.

BACKGROUND: Making high-quality health care available to all women during pregnancy is a critical strategy for improving perinatal outcomes for mothers and babies everywhere. Research from high-income countries suggests that antenatal care delivered in a group may be an effective way to improve the provision, experiences, and outcomes of care for pregnant women and newborns. A number of researchers and programmers are adapting group antenatal care (ANC) models for use in low- and middle-income countries (LMIC), but the evidence base from these settings is limited and no studies to date have assessed the feasibility

and acceptability of group ANC in India. METHODS: We adapted a "generic" model of group antenatal care developed through a systematic scoping review of the existing evidence on group ANC in LMICs for use in an urban setting in India, after looking at local, national and global guidelines to tailor the model content. We demonstrated one session of the model to physicians, auxiliary nurse midwives, administrators, pregnant women, and support persons from three different types of health facilities in Vadodara, India and used qualitative methods to gather and analyze feedback from participants on the perceived feasibility and acceptability of the model. RESULTS: Providers and recipients of care expressed support and enthusiasm for the model and offered specific feedback on its components: physical assessment, active learning, and social support. In general, after witnessing a demonstration of the model, both groups of participants-providers and beneficiaries-saw group ANC as a vehicle for delivering more comprehensive ANC services, improving experiences of care, empowering women to become more active partners and participants in their care, and potentially addressing some current health system challenges. CONCLUSION: This study suggests that introducing group ANC would be feasible and acceptable to stakeholders from various care delivery settings, including an urban primary health clinic, a community-based mother and child health center, and a private hospital, in urban India.

Kabue, M. M., et al. (2018). "Group versus individual antenatal and first year postpartum care: Study protocol for a multi-country cluster randomized controlled trial in Kenya and Nigeria." Gates Open Research **2**.

Background: Antenatal care (ANC) in many low- and middle-income countries is underutilized and of suboptimal quality. Group ANC (G-ANC) is an intervention designed to improve the experience and provision of ANC for groups of women (cohorts) at similar stages of pregnancy.
Methods: A two-arm, two phase, cluster randomized controlled trial (cRCT) (nonblinded) is being conducted in Kenya and Nigeria. Public health facilities were matched and randomized to either standard individual ANC (control) or G-ANC (intervention) prior to enrollment. Participants include pregnant women attending first ANC at gestational age <24 weeks, health care providers, and sub-national health managers. Enrollment ended in June 2017 for both countries. In the intervention arm, pregnant women are assigned to cohorts at first ANC visit and receive subsequent care together during five meetings facilitated by a health care provider (Phase 1). After birth, the same cohorts meet four times over 12 months with their babies (Phase 2). Data collection was performed through surveys, clinical data extraction, focus group discussions, and in-depth interviews. Phase 1 data collection ended in January 2018 and Phase 2 concludes in November 2018. Intention-to-treat analysis will be used to evaluate primary outcomes for Phases 1 and 2: health facility delivery and use of a modern method of family planning at 12 months postpartum, respectively. Data analysis and reporting of results will be consistent with norms for cRCTs. General estimating equation models that account for clustering will be employed for primary outcome analyzes.
Results: Overall 1,075 and 1,013 pregnant women were enrolled in Nigeria and Kenya, respectively. Final study results will be available in February 2019.
Conclusions: This is the first cRCT on G-ANC in Africa. It is among the first to examine the effects of continuing group care through the first year postpartum.

Kania-Richmond, A., et al. (2017). "The Impact of Introducing Centering Pregnancy in a Community Health Setting: A Qualitative Study of Experiences and Perspectives of Health Center Clinical and Support Staff." Matern Child Health J **21**(6): 1327-1335.

Objectives Introducing new programming into an existing setting may be challenging. Understanding how staff and clinicians who are not directly involved in program delivery view the program can help support program implementation. This study aimed to understand how peripheral staff and clinicians perceived a newly implemented Centering Pregnancy group prenatal care program in a community-based health center and its impact on clinic operations. Methods Semi-structured interviews were conducted with a purposive sample of 12 staff members at a community-based health center. The interview guide covered topics such as perceptions of Centering Pregnancy and how the program impacted their work. An interpretive description approach was used to analyze the interview data. A coding framework was developed iteratively and all interview data were analyzed independently by multiple researchers. Results Staff had overall positive perceptions of Centering Pregnancy, but the level of understanding about the program varied widely. Most respondents viewed the Centering Pregnancy program as separate from other programs offered by the clinic, which created both opportunities and challenges. Opportunities included increased cross-referrals between established services and Centering Pregnancy. Challenges included a lack of communication about responsibilities of staff in relation to Centering Pregnancy patients. Impact on staff and overall clinic operations was perceived to be minimal to moderate, and most tensions related to roles and expectations were resolved. Conclusions for Practice Clear communication regarding fit within clinic structures and processes and expectations of staff in relation to the program was critical to the integration of Centering Pregnancy program into an established health center.

Kearney, L., et al. (2017). "The relationship between midwife-led group-based versus conventional antenatal care and mode of birth: a matched cohort study." BMC Pregnancy Childbirth **17**(1): 39.

BACKGROUND: Midwife facilitated, group models of antenatal care have emerged as an alternative to conventional care both within Australia and internationally. Group antenatal care can be offered in a number of different ways, however usually constitutes a series of sessions coordinated by a midwife combining physical assessment, antenatal education and peer support in a group setting. Midwife-led group antenatal care is viewed positively by expectant mothers, with no associated adverse outcomes identified in the published literature for women or their babies when compared with conventional care. Evidence of an improvement in outcomes is limited. The aim of this study was to compare mode of birth (any vaginal birth with caesarean birth) between pregnant women accessing midwife-led group antenatal care and conventional individual antenatal care, in Queensland, Australia. METHODS: This was a retrospective matched cohort study, set within a collaborative antenatal clinic between the local university and regional public health service in Queensland, Australia. Midwife-led group antenatal care (n = 110) participants were compared with controls enrolled in conventional antenatal care (n = 330). Groups were matched by parity, maternal age and gestation to form comparable groups, selecting a homogeneous sample with respect to confounding variables likely to affect outcomes. RESULTS: There was no evidence that group care resulted in a greater number of caesarean births. The largest increase in the odds of caesarean birth was associated

with a previous caesarean birth ($p < 0.001$), no previous birth (compared with previous vaginal birth) ($p < 0.003$), and conventional antenatal care ($p < 0.073$). The secondary outcomes (breastfeeding and infant birth weight) which were examined between the matched cohorts were comparable between groups. CONCLUSIONS: There is no evidence arising from this study that there was a significant difference in mode of birth (caesarean or vaginal) between group and conventional care. Group care was associated with a lower risk of caesarean birth after controlling for previous births, with the highest chance for a vaginal birth being a woman who has had a previous vaginal birth and was in group care. Conversely, the highest risk of caesarean birth was for women who have had a previous caesarean birth and conventional care.

Kearns, A. D., et al. (2016). "Antenatal and postnatal care: a review of innovative models for improving availability, accessibility, acceptability and quality of services in low-resource settings." BJOG **123**(4): 540-548.

UNLABELLED: Key lessons can be drawn from innovative approaches that have been implemented to ensure access to better antenatal care (ANC) and postnatal care (PNC). This paper examines the successes and challenges of ANC and PNC delivery models in several settings around the world; discusses the lessons to be learned from them; and makes recommendations for future programmes. Based on this review, we conclude that close monitoring of ANC and PNC quality and delivery models, health workforce support, appropriate use of electronic technologies, integrated care, a woman-friendly perspective, and adequate infrastructure are key elements of successful programmes that benefit the health and wellbeing of women, their newborns and families. However, a full evaluation of care delivery models is needed to establish their acceptability, accessibility, availability and quality. TWEETABLE ABSTRACT: New paper examines global innovations in antenatal/postnatal care @MHTF @ICS_Integrare #MNCH #healthsystems.

Khorrami, N., et al. (2019). "An overview of advances in global maternal health: From broad to specific improvements." Int J Gynaecol Obstet **146**(1): 126-131.

After the declaration of the Millennium Development Goals in 2000 by the United Nations, many stakeholders allocated financial resources to "global maternal health." Research to expand care and improve delivery of maternal health services has exponentially increased. The present article highlights an overview, namely 10 of the health system, clinical, and technology-based advancements that have occurred in the past three decades in the field of global maternal health. The list of topics has been selected through the cumulative clinical and public health expertise of the authors and is certainly not exhaustive. Rather, the list is intended to provide a mapping of key topics arranged from broad to specific that span from the global policy level to the level of individual care. The list of health system, clinical, and technology-based advancements include: (10) Millennium Development Goals and Sustainable Development Goals; (9) Development of clinical training programs, including the potential for subspecialty development; (8) Prenatal care expansion and potential; (7) Decentralized health systems, including the use of skilled birth attendants; (6) Antiretroviral therapy for HIV; (5) Essential medicines; (4) Vaccines; (3) mHealth/eHealth; (2) Ultrasonography; and (1) Obstetric hemorrhage management. With the Sustainable Development Goals now underway, the field

must build upon past successes to sustain maternal and neonatal well-being in the future global health agenda.

Kinra, T. D., et al. (2024). "Group Antenatal Care Start-Up in the Indian Private Sector: An Implementation Journey to Improve Quality of Care." Global Journal on Quality and Safety in Healthcare **7**(4): 191-196.

Introduction: The introduction of the innovative group antenatal and postnatal care model into the private health sector in India has the potential to pivot the experiences of families during pregnancy and beyond. Growing evidence worldwide shows this model moves fragmented healthcare systems toward a more integrated model to improve quality in care and outcomes for mothers and children. The aim of this study was to better understand the challenges and benefits of implementation of the group model of antenatal care in the Indian private health sectorfor the purpose of improving quality of care.
Methods: Through a collaborative innovation project led by amaster's student of public health and an international organization with expertise in implementing this model, anurban 35-bed private hospital in Pune was identified with readiness to explore the model with stakeholders, trainhospital staff as facilitators, and initiate group antenatal care. Semi-structured interviews with facilitators, alongwith feedback from participants in cohorts and observation of the groups by the trainer, were done for qualitativeanalysis of themes related to the strengths and barriers in implementing the model.
Results: A total of 31pregnant women participated in two cohorts over their second to third trimesters for group antenatal care with ateam of three facilitators from November 2022 to June 2023. On review of experiences in implementing themodel, the top strengths demonstrated were meeting of felt needs of the participants, high engagement, andrelative advantage of the model. Challenges for implementation included for scheduling and attendance, adaptingthe model for compatibility, capacity-building, and need for more ongoing planning, monitoring, and evaluation.
Conclusions: Through this innovation project, important lessons were learned for robust planning for a futurepilot study. Patient-centered and integrated antenatal care are markers of quality of care that this group model canbring not only in the private healthcare sector but throughout India.

Kweekel, L. G., T.; Rijnders, M.; Brown, P. (2017). "The Role of Trust in CenteringPregnancy: Building Interpersonal Trust Relationships in Group-Based Prenatal Care in The Netherlands." BIRTH **44**(1): 41-47.

Background: CenteringPregnancy (CP) is a specific model of group-based prenatal care for women, implemented in 44 midwifery practices in The Netherlands since 2011. Women have evaluated CP positively, especially in terms of social support, and improvements have been made in birthweight and preterm-birth outcomes; however, there is limited understanding as to why. The purpose of this study was to examine the mechanisms that create trusting relationships within CP to better understand CP outcomes and effectiveness. Methods: A qualitative study was conducted using in-depth interviews with 26 (former) CP participants, alongside observations of CP sessions. All interviews were transcribed and analyzed following open, axial, and selective coding. Results: Most women characterized trust as a positive

expectation about how others would respond to sensitive information that was shared within the group. Trust emerged within the data as a multidimensional concept and several preconditions seemed crucial in building trusting relations: vulnerability, communication, reciprocity, chemistry, and atmosphere. The facilitating of interpersonal trust among CP participants enhanced group processes, especially as a basis for social support by which women said they were more eager to share sensitive information in a trusting environment.
Conclusions: Processes of trust were interwoven within various CP group dynamics. Trust facilitated social support which in turn enabled reassurance and the building of women's self-confidence

Lazar, J. B. R., Laura; Olander, Ellinor K.; McCourt, Christine (2021). "A systematic review of providers' experiences of facilitating group antenatal care." BMC Reproductive Health **18**(180).

Background: Group antenatal care is a rapidly expanding alternative antenatal care delivery model. Research has shown it to be a safe and effective care model for women, but less is known about the perspectives of the providers leading this care. This systematic review examined published literature that considered health care professionals' experiences of facilitating group antenatal care.
Methods: Systematic searches were conducted in seven databases (Cinahl, Medline, Psychinfo, Embase, Ovid Emcare, Global Health and MIDRS) in April 2020. Qualitative or mixed methods studies with a significant qualitative component were eligible for inclusion if they included a focus on the experiences of health care providers who had facilitated group antenatal care. Prisma screening guidelines were followed and study quality was critically appraised by three independent reviewers. The findings were synthesised thematically.
Results: Nineteen papers from nine countries were included. Three main themes emerged within provider experiences of group antenatal care. The first theme, 'Giving women the care providers feel they want and need', addresses richer use of time, more personal care, more support, and continuity of care. The second theme, 'Building skills and relationships', highlights autonomy, role development and hierarchy dissolution. The final theme, 'Value proposition of group antenatal care', discusses provider investment and workload.

Conclusions: Health care providers' experience of delivering group antenatal care was positive overall. Opportunities to deliver high-quality care that benefits women and allows providers to develop their professional role were appreciated. Questions about the providers' perspectives on workload, task shifting, and the structural changes needed to support the sustainability of group antenatal care warrant further exploration.

Liese, K. L., et al. (2021). "Impact of group prenatal care on key prenatal services and educational topics in Malawi and Tanzania." Int J Gynaecol Obstet **153**(1): 154-159.

OBJECTIVE: To examine whether group prenatal care (PNC) increased key services and educational topics women reported receiving, compared with individual PNC in Malawi and Tanzania. METHODS: Data come from a previously published randomized trial (n=218) and were collected using self-report surveys. Late pregnancy surveys asked whether women received all seven services and all 13 topics during PNC. Controlling for sociodemographics, country, and PNC attendance, multivariate logistic regression used forward selection to produce a final model showing predictors of receipt of all key services and topics. RESULTS: In multivariate logistic regression, women in group PNC were 2.49 times more likely to receive all seven services than those in individual care (95% confidence interval [CI] 1.78-3.48) and 5.25 times more likely to have received all 13 topics (95% CI 2.62-10.52). CONCLUSION: This study provides strong evidence that group PNC meets the clinical standard of care for providing basic clinical services and perinatal education for pregnant women in sub-Saharan Africa. The greater number of basic PNC services and educational topics may provide one explanatory mechanism for how group PNC achieves its impact on maternal and neonatal outcomes. ClinicalTrials.gov: NCT03673709, NCT02999334.

Liu, Y. W., Yuchen; Wu, Yinyin; Chen, Xiaoli; Bai, Jinbing (2021). "Effectiveness of the CenteringPregnancy program on maternal and birth outcomes: A systematic review and meta-analysis." International Journal or Nursing Studies **120**.

Background: The World Health Organization has emphasized the critical role of prenatal care in achieving the Millennium Development Goals to reduce child and maternal mortality. The CenteringPregnancy program is a widely recognized model of prenatal care. Several countries have attempted to implement the program in prenatal care practice; however, its effectiveness on maternal and birth outcomes has not been systematically evaluated and analyzed.

Objectives: To determine the effect of the CenteringPregnancy program on improving maternal and birth outcomes, including low birth weight, preterm birth, and postpartum depression.

Design: This study evaluated and analyzed randomized controlled trials by comparing the CenteringPregnancy program with o0bstetric led prenatal care. Maternal and birth outcomes of interest included low birthweight, preterm birth, and postpartum depressive symptoms.

Data Sources: Embase, PubMed, CINAHL, Web of Science, and The Cochrane Library were utilized in this systematic review. Additionally, a supplemental Google Scholar search was performed to capture all relevant articles.

Methods: All data were extracted independently by two trained researchers, who evaluated the quality of the study by examining the risk of bias. The biases of selection, allocation, measurement, reporting, and loss of follow-up were assessed using the Cochrane risk of bias for these included randomized controlled trials. A meta-analysis of eligible randomized controlled

trials was conducted using Review Manager. Het- erogeneity of studies was assessed using the I2 statistic.
Results: Out of 591 articles reviewed, seven randomized controlled trials were included in this study. Findings showed that the CenteringPregnancy program was not associated with lower rates of preterm birth (0.88 [0.71–1.07], p = 0.20, I2 = 0%), low birth weight (0.87 [0.68–1.12], p =0.29, I2 = 0%), or 12-month postpartum depressive symptoms (0.07 [-0.12–0.26], p =0.46, I2 = 69%). However, the CenteringPregnancy program was associated with reduced rates of 6- month postpartum depressive symptoms (0.49 [0.40–0.59], p < 0.01, I2 = 40%).
Conclusions: Existing evidence suggests that the CenteringPregnancy program and obstetric led care have similar effects on reducing the rates of preterm birth and low birth weight but different effects on post- partum depressive symptoms. More studies are needed to examine the effect of the CenteringPregnancy program on the improvement of postpartum depressive symptoms.

Lori, J. R., et al. (2018). "Increasing postpartum family planning uptake through group antenatal care: a longitudinal prospective cohort design." Reprod Health **15**(1): 208.

BACKGROUND: Despite significant improvements, postpartum family planning uptake remains low for women in sub-Saharan Africa. Transmitting family planning education in a comprehensible way during antenatal care (ANC) has the potential for long-term positive impact on contraceptive use. We followed women for one-year postpartum to examine the uptake and continuation of family planning following enrollment in group versus individual ANC. METHODS: A longitudinal, prospective cohort design was used. Two hundred forty women were assigned to group ANC (n = 120) or standard, individual care (n = 120) at their first ANC visit. Principal outcome measures included intent to use family planning immediately postpartum and use of a modern family planning method at one-year postpartum. Additionally, data were collected on intended and actual length of exclusive breastfeeding at one-year postpartum. Pearson chi-square tests were used to test for statistically significant differences between group and individual ANC groups. Odds ratios and adjusted odds ratios were calculated using logistic regression. RESULTS: Women who participated in group ANC were more likely to use modern and non-modern contraception than those in individual care (59.1% vs. 19%, p < .001). This relationship improved when controlled for intention, age, religion, gravida, and education (AOR = 6.690, 95% CI: 2.724, 16,420). Women who participated in group ANC had higher odds of using a modern family planning method than those in individual care (AOR = 8.063, p < .001). Those who participated in group ANC were more likely to exclusively breastfeed for more than 6 months than those in individual care (75.5% vs. 50%, p < .001). This relationship remained statistically significant when adjusted for age, religion, gravida, and education (AOR = 3.796, 95% CI: 1.558, 9.247). CONCLUSIONS: Group ANC has the potential to be an effective model for improving the uptake and continuation of post-partum family planning up to one-year. Antenatal care presents a unique opportunity to influence the adoption of postpartum family planning. This is the first study to examine the impact of group ANC on family planning intent and use in a low-resource setting. Group ANC holds the potential to increase postpartum family planning uptake and long-term continuation. TRIAL REGISTRATION: Not applicable. No health related outcomes reported.

Lori, J. R., et al. (2016). "Use of a facilitated discussion model for antenatal care to improve communication." Int J Nurs Stud **54**: 84-94.

BACKGROUND: Achieving health literacy is a critical step to improving health outcomes and the health of a nation. However, there is a lack of research on health literacy in low-resource countries, where maternal health outcomes are at their worst. OBJECTIVES: To examine the usefulness and feasibility of providing focused antenatal care (FANC) in a group setting using picture cards to improve patient-provider communication, patient engagement, and improve health literacy. DESIGN: An exploratory, mixed methods design was employed to gather pilot data using the Health Literacy Skills Framework. SETTINGS: A busy urban district hospital in the Ashanti Region of Ghana was used to gather data during 2014. PARTICIPANTS: A facility-driven convenience sample of midwives (n=6) aged 18 years or older, who could speak English or Twi, and had provided antenatal care at the participating hospital during the previous year prior to the start of the study participated in the study. METHODS: Data were collected using pre-test and post-test surveys, completed three months after the group FANC was implemented. A semi-structured focus group was conducted with four of the participating midwives and the registered nurse providing support and supervision for the study (n=5) at the time of the post-test. Data were analyzed concurrently to gain a broad understanding of patient communication, engagement, and group FANC. RESULTS: There were no significant differences in the mean communication (t(df=3)=0.541, p=0.626) and engagement (t(df=3)=-0.775, p=0.495) scores between the pre- and post-test. However, the focus group revealed the following themes: (a) improved communication through the use of picture cards; (b) enhanced information sharing and peer support through the facilitated group process and; and (c) an improved understanding of patient concerns. CONCLUSIONS: The improved communication noted through the use of picture cards and the enhanced information sharing and peer support elicited through the group FANC undoubtedly provided patients with additional tools to invoke self-determination, and carry out the behaviors they thought were most important to improve pregnancy outcomes.

Lori, J. R., et al. (2017). "Improving health literacy through group antenatal care: a prospective cohort study." BMC Pregnancy Childbirth **17**(1): 228.

BACKGROUND: To examine whether exposure to group antenatal care increased women's health literacy by improving their ability to interpret and utilize health messages compared to women who received standard, individual antenatal care in Ghana. METHODS: We used a prospective cohort design. The setting was a busy urban district hospital in Kumasi, the second most populous city in Ghana. Pregnant women (N = 240) presenting for their first antenatal visit between 11 and 14 weeks gestation were offered participation in the study. A 27% drop-out rate was experienced due to miscarriage, transfer or failure to return for follow-up visits, leaving 184 women in the final sample. Data were collected using an individual structured survey and medical record review. Summary statistics as well as two sample t-tests or chi-square were performed to evaluate the group effect. RESULTS: Significant group differences were found. Women participating in group care demonstrated improved health literacy by exhibiting a greater understanding of how to operationalize health education messages. There was a significant difference between women enrolled in group antenatal care verses individual antenatal care for preventing problems before delivery, understanding when to access care,

birth preparedness and complication readiness, intent to use a modern method of family planning postpartum, greater understanding of the components of breastfeeding and lactational amenorrhea for birth spacing, and intent for postpartum follow-up. CONCLUSION: Group antenatal care as compared to individual care offers an opportunity to increase quality of care and improve maternal and newborn outcomes. Group antenatal care holds the potential to increase healthy behaviors, promote respectful maternity care, and generate demand for services. Group ANC improves women's health literacy on how to prevent and recognize problems, prepare for delivery, and care for their newborn.

Lori, J. R., et al. (2022). "Group Antenatal Care in Ghana: Protocol for a Cluster Randomized Controlled Trial." JMIR Research Protocols **11**(9): e40828.

Background: While group antenatal care (ANC) has been delivered and studied in high-income countries for over a decade, it has only recently been introduced as an alternative to individual care in sub-Saharan Africa. Although the experimental design of the studies from high-resource countries have been scientifically rigorous, findings cannot be generalized to low-resource countries with low literacy rates and high rates of maternal and newborn morbidity and mortality. The Group Antenatal Care Delivery Project (GRAND) is a collaboration between the University of Michigan in the United States and the Dodowa Health Research Centre in Ghana. GRAND is a 5-year, cluster randomized controlled trial (RCT). Our intervention—group ANC—consists of grouping women by similar gestational ages of pregnancy into small groups at the first ANC visit. They then meet with the same group and the same midwife at the recommended intervals for care.

Objective: This study aims to improve health literacy, increase birth preparedness and complication readiness, and optimize maternal and newborn outcomes among women attending ANC at seven rural health facilities in the Eastern Region of Ghana.

Methods: Quantitative data will be collected at four time points using a secure web application for data collection and a database management tool. Data will be analyzed on an intention-to- treat basis to test the differences between the two arms: women randomized to group-based ANC and women randomized to routine individual ANC. We will conduct a process evaluation concurrently to identify and document patient, provider, and system barriers and facilitators to program implementation.

Results: The study was funded in September 2018. Recruitment and enrollment of participants and data collection started in July 2019. In November 2021, we completed participant enrollment in the study (n=1761), and we completed data collection at the third trimester in May 2022 (n=1284). Data collection at the additional three time points is ongoing: 6 weeks postpartum, 6 months postpartum, and 1 year postpartum.

Conclusions: This study is significant and timely because it is among the first RCTs to be conducted to examine the effects of group ANC among low-literacy and nonliterate participants. Our findings have the potential to impact how clinical care is delivered to low-literacy populations, both globally and domestically, to improve maternal and newborn outcomes.

Lundeen, T., et al. (2019). "Nurses' and midwives' experiences of providing group antenatal and postnatal care at 18 health centers in Rwanda: A mixed methods study." PLoS ONE **14**(7): e0219471.

BACKGROUND: The East Africa Preterm Birth Initiative-Rwanda began a cluster randomized controlled trial of group antenatal care (ANC) and postnatal care (PNC) in Rwanda in 2017. That trial will report its primary outcome, gestational length at birth, after data collection concludes in 2019. This nested study includes providers of ANC and/or PNC at the 18 health centers randomized to provide the group model of ANC/PNC and the 18 health centers randomized to continue providing ANC/PNC in the traditional, individual visit model. The objective of this study is to understand the experiences of providers of group ANC/PNC and compare their job satisfaction and perceived stress with individual ANC/PNC providers. METHODS: We collected both quantitative and qualitative data from providers (nurses and midwives) who were recruited by health center directors to participate as group ANC and PNC facilitators at intervention sites and from a similar number of providers of standard ANC and PNC at control sites. Quantitative data was collected with questionnaires administered at baseline and approximately 9 months later (follow up). Qualitative data was collected in 3 focus groups of group ANC/PNC providers conducted one year after group care began. RESULTS: Eighty-six percent of nurses and midwives surveyed who implemented group ANC and PNC reported that they prefer group care to the traditional individual model of ANC and PNC. Perceived stress levels and job satisfaction results were similar between groups. Mixed focus group discussions among both nurses and midwives experienced in group ANC and PNC suggest that the group model of care has advantages for both service beneficiaries and providers. When providers described implementation challenges, their peers in the focus groups offered them suggestions to cope and improve service delivery. DISCUSSION: These results are consistent with studies of providers of group ANC and PNC in other LMIC contexts with respect to the perceived benefits of group care. This study adds new insights into the ways peer providers can help one another solve implementation problems. When given the opportunity to meet as a group, these study participants offered one another peer support and shared knowledge about best practices for successful implementation of group ANC/PNC. This trial is registered at clinicaltrials.gov as NCT03154177.

Maier, B. J. (2013). "Antenatal group care in a midwifery group practice--a midwife' perspective." Women Birth **26**(1): 87-89.

The following article describes a midwife's experience in the adaption of the CenteringPregnancy model into her own group practice to provide education and support to the women in her care. Using personal experience and feedback from women and midwifery students the author describes not only the process of group care in her work context but the apparent benefits to women, families', midwifery students and herself. Antenatal group care was so successful for the author that it extended to postnatal group care and student group care, all well attended and sought after groups. This is an exciting and innovative way to provide care for women and families and the author encourages other midwives and group practices to consider how they can adapt and progress similar group care into their own practice.

Malchi, F., et al. (2023). "The Effect of Group Prenatal Care on Empowerment of Pregnant Adolescents: A randomized controlled trial." Sultan Qaboos University Medical Journal **1**(1).

Objectives: This study aimed to evaluate the effect of group prenatal care on empowerment of 20pregnant adolescents. Methods: In this randomized controlled trial, 294 pregnant

adolescents 21(aged 15-19) were randomly assigned into two groups of group prenatal care (GPNC, n=147) 22and individual prenatal care (IPNC, n=147). GPNC group received 5 sessions of GPNC (90-120 23min) during 16-20 weeks of pregnancy, while the control group received individual prenatal 24care. The empowerment of participants in the two groups was measured using the empowerment 25scale for pregnant women. Data were analyzed using the Chi-square test, independent t-test, and 26adjusted regression test. Results: The mean total score of pregnant women's empowerment in the 27GPNC and IPNC groups after the intervention was 86.46±4.95 and 81.89±4.75, respectively [β= 286.11, 95% CI: 4.89, 7.33, p<0.0001]. The improvement of dimensions of pregnancy 29empowerment in GPNC versus IPNC was as follows: Self-efficacy: 18.21 ± 2.12 vs. 16.19 ± 30 21.79 [β= 2.52, 95% CI: 2.19, 2.86, p<0.0001], Future image: 19.57±1.57 vs. 18.95±1.54 [β= 310.67, 95% CI: (0.44, 0.9], Self-esteem: 21.79 ± 1.75 vs. 20.90 ± 1.85 [β= 0.69, 95% CI: 0.41, 320.97, P<0.0001], Joy of an addition to the family: 13.13±1.69 vs. 12.84±1.40 [β= 0.51, 95% CI: 330.28, 0.74, P=0.009], and Support and assurance from others: 13.70 ± 1.1 and 13.04 ± 1.07, [β= 340.76, 95% CI: 0.13, 1.65, P<0.0001]. Conclusion: Group prenatal care can improve adolescent 35pregnant women's empowerment. Results of the present study can serve as a useful foundation 36for implementing the group prenatal care model in Iran.

Maldonado, L. Y., et al. (2020). "Promoting positive maternal, newborn, and child health behaviors through a group-based health education and microfinance program: a prospective matched cohort study in western Kenya." BMC Pregnancy and Childbirth **20**(1).

Background: Chamas for Change (Chamas) is a group-based health education and microfinance program for pregnant and postpartum women that aims to address inequities contributing to high rates of maternal and infant mortality in rural western Kenya. In this prospective matched cohort study, we evaluated the association between Chamas participation and facility-based delivery. We additionally explored the effect of participation on promoting other positive maternal, newborn and child health (MNCH) behaviors.

Methods: We prospectively compared outcomes between a cohort of Chamas participants and controls matched for age, parity, and prenatal care location. Between October–December 2012, government-sponsored community health volunteers (CHV) recruited pregnant women attending their first antenatal care (ANC) visits at rural health facilities in Busia County to participate in Chamas. Women enrolled in Chamas agreed to attend group-based health education and microfinance sessions for one year; controls received the standard of care. We used descriptive analyses, multivariable logistic regression models, and random effect models to compare outcomes across cohorts 12 months following enrollment, with α set to 0.05.

Results: Compared to controls (n = 115), a significantly higher proportion of Chamas participants (n = 211) delivered in a health facility (84.4% vs. 50.4%, p < 0.001), attended at least four ANC visits (64.0% vs. 37.4%, p < 0·001), exclusively breastfed to six months (82.0% vs. 47.0%, p < 0·001), and received a CHV home visit within 48 h postpartum (75.8% vs. 38.3%, p < 0·001). In multivariable models, Chamas participants were over five times as likely as controls to deliver in a health facility (OR 5.49, 95% CI 3.12–9.64, p < 0.001). Though not significant, Chamas participants experienced a lower proportion of stillbirths (0.9% vs. 5.2%), miscarriages (5.2% vs. 7.8%), infant deaths (2.8% vs. 3.4%), and maternal deaths (0.9% vs. 1.7%) compared to controls.

Conclusions: Chamas participation was associated with increased odds of facility-based delivery compared to the standard of care in rural western Kenya. Larger proportions of program participants also practiced other positive MNCH behaviors. Our findings demonstrate Chamas' potential to achieve population-level MNCH benefits; however, a larger study is needed to validate this observed effect.

Martens, N., et al. (2022). "Group Care in the first 1000 days: implementation and process evaluation of contextually adapted antenatal and postnatal group care targeting diverse vulnerable populations in high-, middle- and low-resource settings." Implementation Science Communications **3**(1).

Background: Group care (GC) improves the quality of maternity care, stimulates women's participation in their own care and facilitates growth of women's social support networks. There is an urgent need to identify and disseminate the best mechanisms for implementing GC in ways that are feasible, context appropriate and sustainable. This protocol presents the aims and methods of an innovative implementation research project entitled Group Care in the first 1000 days (GC_1000), which addresses this need. Aims: The aim of GC_1000 is to co-create and disseminate evidence-based implementation strategies and tools to support successful implementation and scale-up of GC in health systems throughout the world, with particular attention to the needs of 'vulnerable' populations. Methods: By working through five inter-related work packages, each with specific tasks, objectives and deliverables, the global research team will systematically examine and document the implementation and scale-up processes of antenatal and postnatal GC in seven different countries. The GC_1000 project is grounded theoretically in the consolidated framework for implementation research (CFIR), while the process evaluation is guided by 'Realistic Evaluation' principles. Data are gathered across all research phases and analysis at each stage is synthesized to develop Context-Intervention-Mechanism-Outcome configurations. Discussion: GC_1000 will generate evidence-based knowledge about the integration of complex interventions into diverse health care systems. The 4-year project also will pave the way for sustained implementation of GC, significantly benefiting populations with adverse pregnancy and birthing experiences as well as poor outcomes.

Martens, N., et al. (2023). "Anticipated benefits and challenges of implementing group care in Suriname's maternity and child care sector: a contextual analysis." BMC Pregnancy and Childbirth **23**.

Background: Suriname is a uppermiddle-income country with a relatively high prevalence of preventable pregnancy complications. Access to and usage of high-quality maternity care services are lacking. The implementation of group care (GC) may yield maternal and child health improvements. However, before introducing a complex intervention it is pivotal to develop an understanding of the local context to inform the implementation process.

Methods: A context analysis was conducted to identify local needs toward maternity and postnatal care services, and to assess contextual factor relevant to implementability of GC. During a Rapid Qualitative Inquiry, 63 online and face-to-face semi-structured interviews were held with parents, community members, on-and off-site healthcare professionals, policy makers, and one focus group with parents was conducted. Audio recordings were transcribed in verbatim and analysed using thematic analysis and Framework Method. The Consolidated

Framework for Implementation Research served as a base for the coding tree, which was complemented with inductively derived codes.
Results: Ten themes related to implementability, one theme related to sustainability, and seven themes related to reaching and participation of the target population in GC were identified. Factors related to health care professionals (e.g., workload, compatibility, ownership, role clarity), to GC, to recipients and to planning impact the implementability of GC, while sustainability is in particular hampered by sparse financial and human resources. Reach affects both implementability and sustainability. Yet, outer setting and attitudinal barriers of health professionals will likely affect reach.
Conclusions: Multi-layered contextual factors impact not only implementability and sustainability of GC, but also reach of parents. We advise future researchers and implementors of GC to investigate not only determinants for implementability and sustainability, but also those factors that may hamper, or facilitate up-take. Practical, attitudinal and cultural barriers to GC participation need to be examined. Themes identified in this study will inspire the development of adaptations and implementation strategies at a later stage.

Maru, S., et al. (2018). "An integrated community health worker intervention in rural Nepal: a type 2 hybrid effectiveness-implementation study protocol." Implement Sci **13**(1): 53.

BACKGROUND: Evidence-based medicines, technologies, and protocols exist to prevent many of the annual 300,000 maternal, 2.7 million neonatal, and 9 million child deaths, but they are not being effectively implemented and utilized in rural areas. Nepal, one of South Asia's poorest countries with over 80% of its population living in rural areas, exemplifies this challenge. Community health workers are an important cadre in low-income countries where human resources for health and health care infrastructure are limited. As local women, they are uniquely positioned to understand and successfully navigate barriers to health care access. Recent studies of large community health worker programs have highlighted the importance of training, both initial and ongoing, and accountability through structured management, salaries, and ongoing monitoring and evaluation. A gap in the evidence regarding whether such community health worker systems can change health outcomes, as well as be sustainably adopted at scale, remains. In this study, we plan to evaluate a community health worker system delivering an evidence-based integrated reproductive, maternal, newborn, and child health intervention as it is scaled up in rural Nepal. METHODS: We will conduct a type 2 hybrid effectiveness-implementation study to test both the effect of an integrated reproductive, maternal, newborn, and child health intervention and the implementation process via a professional community health worker system. The intervention integrates five evidence-based approaches: (1) home-based antenatal care and post-natal care counseling and care coordination; (2) continuous surveillance of all reproductive age women, pregnancies, and children under age 2 years via a mobile application; (3) Community-Based Integrated Management of Newborn and Childhood Illness; (4) group antenatal and postnatal care; and 5) the Balanced Counseling Strategy to post-partum contraception. We will evaluate effectiveness using a pre-post quasi-experimental design with stepped implementation and implementation using the RE-AIM framework. DISCUSSION: This is the first hybrid effectiveness-implementation study of an integrated reproductive, maternal, newborn, and child health intervention in rural Nepal that we are aware of. As Nepal takes steps towards achieving the Sustainable

Development Goals, the data from this three-year study will be useful in the detailed planning of a professionalized community health worker cadre delivering evidence-based reproductive, maternal, newborn, and child health interventions to the country's rural population. TRIAL REGISTRATION: ClinicalTrials.gov Identifier: NCT03371186 , registered 04 December 2017, retrospectively registered.

Marzouk, T., et al. (2018). "Effect of applying centering pregnancy model versus individual prenatal care on certain prenatal care outcomes." Clinical Nursing Studies **6**(2).

Objective: This study aimed to compare effect of applying centering pregnancy model (CPM) versus individual prenatal care on certain prenatal care outcomes. Methods: A quasi experimental research design was followed. A purposive sample of 216 pregnant women without medical or obstetric problems requiring individualized care, was recruited from the Antenatal Outpatient Clinics of Mansoura University Hospitals, Egypt. Participants were randomly assigned to receive prenatal care under CPM or individual prenatal approach. Data were collected for the healthy behaviors adoption using Pregnancy-relevant Health Behaviors scale, women's extent of troubling about pregnancy physical discomforts using a Pregnancy Symptoms Distress scale, and women's satisfaction with prenatal care using Patient Participation & Satisfaction Questionnaire. Results: Post-intervention, CPM group equated to individual care group experienced lower distress about experienced pregnancy physical discomforts (8.06 ± 2.40 vs. 15.42 ± 3.84 respectively; t = 16.89 & p < .001), reported higher engagement to pregnancy-relevant health behaviors (37.71 ± 2.91 vs. 29.78 ± 4.3 respectively; t = 15.59 & p < .001), and higher satisfaction with and participation in care (80.8 ± 10.4 and 68.8 ± 11.1 respectively, t = 11.62 & p < .001). Conclusions: Hypotheses of the current study were accepted where CPM of prenatal care was associated with increased women adoption to the pregnancy-relevant healthy behaviors, reduced women distress about the experienced pregnancy physical discomforts and increased women participation and satisfaction about prenatal care.

Masters, C., Carandang, R. R., Lewis, J. B., Hagaman, A., Metrick, R., Ickovics, J. R., & Cunningham, S. D.. (2024). Group prenatal care successes, challenges, and frameworks for scaling up: a case study in adopting health care innovations. *Implementation Science Communications*, *5*(1). https://doi.org/10.1186/s43058-024-00556-1

Background: Group prenatal care enhances quality of care, improves outcomes, and lowers costs. However, this healthcare innovation is not widely available. Using a case-study approach, our objectives were to (1) examine organizational characteristics that support implementation of Expect With Me group prenatal care and (2) identify key factors influencing adoption and sustainability. Methods: We studied five clinical sites implementing group prenatal care, collecting qualitative data including focus group discussions with clinicians (n= 4 focus groups, 41 clinicians), key informant interviews (n = 9), and administrative data. We utilized a comparative qualitative case-study approach to characterize clinical sites and explain organizational traits that fostered implementation success. We characterized adopting and non-adopting (unable to sustain group prenatal care) sites in terms of fit for five criteria specified in the Framework for Transformational Change: (1) impetus to transform, (2) leadership commitment to quality, (3) improvement initiatives that engage staff, (4) alignment to achieve organization-wide goals, and (5) integration. Results: Two sites were classified as

adopters and three as non-adopters based on duration, frequency, and consistency of group prenatal care implementation. Adopters had better fit with the five criteria for transformational change. Adopting organizations were more successful implementing group prenatal care due to alignment between organizational goals and resources, dedicated healthcare providers coordinating group care, space for group prenatal care sessions, and strong commitment from organization leadership. Conclusions: Adopting sites were more likely to integrate group prenatal care when stakeholders achieved alignment across staff on organizational change goals, leadership buy-in, and committed institutional support and dedicated resources to sustain it.

McDonald, S. D., et al. (2016). "Why Are Half of Women Interested in Participating in Group Prenatal Care?" Matern Child Health J **20**(1): 97-105.

OBJECTIVE: To determine the likelihood of participating in group prenatal care (GPC) and associated factors among low-risk women receiving traditional prenatal care from obstetricians, family physicians or midwives, and to determine factors associated with likelihood of participating. METHODS: Prior to completing a self-administered questionnaire, a 2-min compiled video of GPC was shown to pregnant women receiving traditional prenatal care. Data were collected on opinions of current prenatal care, GPC, and demographics. Biologically plausible variables with a p value </=0.20 were entered in the multivariable logistic regression model and those with a p value <0.05 were retained. RESULTS: Of 477 respondents, 234 [49.2%, 95% confidence interval (CI) 44.6-53.6%] reported being "definitely" or "probably likely" to participate in GPC. Women were more likely to participate in GPC if they had at least postsecondary education [adjusted odds ratio (aOR) 1.84, 95% CI 1.05-3.24], had not discussed labour with their care provider (aOR 1.67, 95% CI 1.12-2.44), and valued woman-centeredness ("fairly important" aOR 2.81, 95% CI 1.77-4.49; "very important" aOR 4.10, 95% CI 2.45-6.88). Women placed high importance on learning components of GPC. The majority would prefer to

be with similar women, especially in age. About two-thirds would prefer to have support persons attend GPC and over half would be comfortable with male partners. CONCLUSION: Approximately half of women receiving traditional prenatal care were interested in participating in GPC. Our findings will hopefully assist providers interested in optimizing satisfaction with traditional prenatal care and GPC by identifying important elements of h and thus help engage women to consider GPC.

McDonald, S. D. S., W.; Eryuzlu, L. E.; Biringer, A. B (2014). "A qualitative descriptive study of the group prenatal care experience: perceptions of women with low-risk pregnancies and their midwives." BCM Pregnancy and Childbirth **14**(334).

Background: Group prenatal care (GPC) originated in 1994 as an innovative model of prenatal care delivery. In GPC, eight to twelve pregnant women of similar gestational age meet with a health care provider to receive their prenatal check-up and education in a group setting. GPC offers significant health benefits in comparison to traditional, one-on-one prenatal care. Women in GPC actively engage in their healthcare and experience a supportive network with one another. The purpose of this study was to better understand the GPC experience of women and care providers in a lower risk group of women than often has been previously studied. Methods: This qualitative descriptive study collected data through three focus group interviews - two with women who had completed GPC at a midwifery clinic in Ontario, Canada and one with the midwives at the clinic. Data was analyzed through open coding to identify themes. Results: Nine women and five midwives participated in the focus groups, from which eight categories as well as further subcategories were identified: The women and midwives noted reasons for participating (connections, education, efficiency). Participants suggested both benefits (learning from the group, normalizing the pregnancy experience, preparedness for labour and delivery, and improved relationships as all contributing to positive health outcomes) and concerns with GPC (e.g. sufficient time with the midwife) which generally diminished with experience. Suggestions for change focused on content, environment, partners, and access to the midwives. Challenges to providing GPC included scheduling and systems-level issues such as funding and regulation. Flexibility and commitment to the model facilitated it. Comparison with other models of care identified less of a relationship with the midwife, but more information received. In promoting GPC, women would emphasize the philosophy of care to other women and the midwives would promote the reduction in workload and women's independence to colleagues. Conclusions: Overall, women and midwives expressed a high level of satisfaction with their GPC experience. This study gained insight into previously unexplored areas of the GPC experience, perceptions of processes that contribute to positive health outcomes, strategies to promote GPC and elements that enhance the feasibility of GPC.

McKinnon, B., et al. (2020). "Feasibility and preliminary effectiveness of group antenatal care in Senegalese health posts: a pilot implementation trial." Health Policy Plan **35**(5): 587-599.

Almost all pregnant women in Senegal receive some antenatal care (ANC), yet only around half receive four or more visits and provision of education and counselling during ANC is often inadequate and, in some cases, non-existent. This results in missed opportunities to provide support and to counsel women regarding appropriate care-seeking practices and health behaviours during pregnancy and across the continuum of care. This pilot effectiveness-

implementation randomized controlled trial explored whether group ANC (G-ANC), a model that integrates standard individual pregnancy care with facilitated participatory group education activities and peer support, could potentially address some of these challenges. The G-ANC model adapted for Senegal builds on local healthcare delivery systems and aligns with World Health Organization recommendations for a shift towards women-centered models of maternity services. It was implemented at the health post level, and a total of 330 pregnant women participated in the study, of whom 85% were followed up at 6-10 weeks post-delivery. We assessed implementation outcomes (e.g. acceptability, cost) to establish the feasibility of the model in Senegal and explored effectiveness outcomes related to maternal and infant health for the planning of a large-scale trial. Results indicate that women and ANC providers were overwhelmingly enthusiastic about the G-ANC model, and exploratory analyses suggested improvements in exclusive breastfeeding, intention to use family planning, birth preparations and knowledge around maternal and newborn danger signs. This article provides timely and relevant evidence on the feasibility of G-ANC as an alternative model of care during pregnancy and a solid basis for recommending the conduct of a large-scale implementation study of G-ANC in Senegal.

McNeil, D. A. V., M.; Dolan, S. M.; Siever, J.; Horn, S.; Tough, S. C. (2012). "Getting more than they realized they needed: a qualitative study of women's experience of group prenatal care." BCM Pregnancy and Childbirth **12**(17).

Background: Pregnant women in Canada have traditionally received prenatal care individually from their physicians, with some women attending prenatal education classes. Group prenatal care is a departure from these practices providing a forum for women to experience medical care and child birth education simultaneously and in a group setting. Although other qualitative studies have described the experience of group prenatal care, this is the first which sought to understand the central meaning or core of the experience. The purpose of this study was to understand the central meaning of the experience of group prenatal care for women who participated in CenteringPregnancy through a maternity clinic in Calgary, Canada. Methods: The study used a phenomenological approach. Twelve women participated postpartum in a one-on-one interview and/or a group validation session between June 2009 and July 2010. Results: Six themes emerged: (1) "getting more in one place at one time"; (2) "feeling supported"; (3) "learning and gaining meaningful information"; (4) "not feeling alone in the experience"; (5) "connecting"; and (6) "actively participating and taking on ownership of care". These themes contributed to the core phenomenon of women "getting more than they realized they needed". The active sharing among those in the group allowed women to have both their known and subconscious needs met. Conclusions: Women's experience of group prenatal care reflected strong elements of social support in that women had different types of needs met and felt supported. The findings also broadened the understanding of some aspects of social support beyond current theories. In a contemporary North American society, the results of this study indicate that women gain from group prenatal care in terms of empowerment, efficiency, social support and education in ways not routinely available through individual care. This model of care could play a key role in addressing women's needs and improving health outcomes.

McNeil, D. A. V., M.; Dolan, S. M.; Siever, J.; Horn, S.; Tough, S. C. (2013). "A qualitative study of the experience of CenteringPregnancy group prenatal care for physicians." BCM Pregnancy and Childbirth **13**.

Background: This study sought to understand the central meaning of the experience of group prenatal care for physicians who were involved in providing CenteringPregnancy through a maternity clinic in Calgary, Canada. Method: The study followed the phenomenological qualitative tradition. Three physicians involved in group prenatal care participated in a one-on-one interview between November and December 2009. Two physicians participated in verification sessions. Interviews followed an open ended general guide and were audio recorded and transcribed. The purpose of the analysis was to identify meaning themes and the core meaning experienced by the physicians. Results: Six themes emerged: (1) having a greater exchange of information, (2) getting to knowing, (3) seeing women get to know and support each other, (4) sharing ownership of care, (5) having more time, and (6) experiencing enjoyment and satisfaction in providing care. These themes contributed to the core meaning for physicians of "providing richer care." Conclusions: Physicians perceived providing better care and a better professional experience through CenteringPregnancy compared to their experience of individual prenatal care. Thus, CenteringPregnancy could improve work place satisfaction, increase retention of providers in maternity care, and improve health care for women.

McNeil, J. A. R., K. M. (2014). "Rethinking Prenatal Care Within a Social Model of Health: An Exploratory Study in Northern Ireland." Health Care for Women International.

Implementation of maternity reform agendas remains limited by the dominance of a medical rather than a social model of health. This article considers group prenatal care as a complex health intervention and explores its potential in the socially divided, postconflict communities of Northern Ireland. Using qualitative inquiry strategies, we sought key informants' views on existing 1prenatal care provision and on an innovative group care model (CenteringPregnancy) as a social health initiative. We argue that taking account of the locally specific context is critical to introducing maternity care interventions to improve the health of women and their families and to contribute to community development.

Miller, K. E. and D. L. Billings (1994). "PLAYING TO GROW: A Primary Mental Health Intervention With Guatemalan Refugee Children." American Journal of Orthopsychiatry **64**(3): 346-356.

Adaptation and implementation of a primary mental health project based on work with children affected by political repression in Guatemala and Argentina are described. This intervention model utilizes a variety of expressive arts techniques to help children express their thoughts and feelings about growing up in exile. The model emphasizes the training of community members in the theory and methods of the intervention.

Musabyimana, A., et al. (2019). "Before and after implementation of group antenatal care in Rwanda: a qualitative study of women's experiences." Reprod Health **16**(1): 90.

BACKGROUND: The Preterm Birth Initiative-Rwanda is conducting a 36-cluster randomized controlled trial of group antenatal and postnatal care. In the context of this trial, we collected qualitative data before and after implementation. The purpose was two-fold. First, to inform

the design of the group care program before implementation and second, to document women's experiences of group care at the mid-point of the trial to make ongoing programmatic adjustments and improvements. METHODS: We completed 8 focus group discussions among women of reproductive age before group care implementation and 6 focus group discussions among women who participated in group antenatal care and/or postnatal care at 18 health centers that introduced the model, approximately 9 months after implementation. RESULTS: Before implementation, focus group participants reported both enthusiasm for the potential for support and insight from a group of peers and concern about the risk of sharing private information with peers who may judge, mock, or gossip. After implementation, group care participants reported benefits including increased knowledge, peer support, and more satisfying relationships with providers. When asked about barriers to group care participation, none of them cited concern about privacy but instead cited lack of financial resources, lack of cooperation from a male partner, and long distances to the health center. Finally, women stated that the group care experience would be improved if all participants and providers arrived on time and remained focused on the group care visit throughout. DISCUSSION: These results are consistent with other published reports of women's perceptions of group antenatal care, especially increased pregnancy- and parenting-related knowledge, peer support, and improved relationships with health care providers. Some results were unexpected, especially the consequences of staff allocation patterns that resulted in providers arriving late for group visits or having to leave during group visits to attend to other facility services, which diminished women's experiences of care. CONCLUSION: Group antenatal and postnatal care provide compelling benefits to women and families. If the model requires the addition of human resources at the health center, intensive reminder communications, and large-scale community outreach to benefit the largest number of pregnant and postnatal mothers, those additional resources required must be factored into any future decision to scale a group care model. TRIAL REGISTRATION: This trial is registered at clinicaltrials.gov as NCT03154177 .

Musange, S. F., et al. (2019). "Group antenatal care versus standard antenatal care and effect on mean gestational age at birth in Rwanda: protocol for a cluster randomized controlled trial." Gates Open Research **3**: 1548.

Background: Group antenatal care has demonstrated promise as a service delivery model that may result in improved outcomes compared to standard antenatal care in socio-demographic populations at disparately high risk for poor perinatal outcomes. Intrigued by results from the United States showing lower preterm birth rates among high-risk women who participate in group antenatal care, partners working together as the Preterm Birth Initiative - Rwanda designed a trial to assess the impact of group antenatal care on gestational age at birth. Methods: This study is a pair-matched cluster randomized controlled trial with four arms. Pairs randomized to group or standard care were further matched with other pairs into quadruples, within which one pair was assigned to implement basic obstetric ultrasound at the health center and early pregnancy testing at the community. At facilities randomized to group care, this will follow the opt-out model of service delivery and individual visits will always be available for those who need or prefer them. The primary outcome of interest is mean gestational age at birth among women who presented for antenatal care before 24 completed weeks of pregnancy and attended more than one antenatal care visit. Secondary outcomes of

interest include attendance at antenatal and postnatal care, preterm birth rates, satisfaction of mothers and providers, and feasibility. A convenience sample of women will be recruited to participate in a longitudinal survey in which they will report such indicators as self- reported health-related behaviors and depressive symptoms. Providers will be surveyed about satisfaction and stress.
Discussion: This is the largest cluster randomized controlled trial of group antenatal and postnatal care ever conducted, and the first in a low- or middle-income country to examine the effect of this model on gestational age at birth.

Nasir, N., et al. (2022). "Scoping review of maternal and newborn health interventions and programmes in Nigeria." BMJ Open **12**.

Objective: To systematically scope and map research regarding interventions, programmes or strategies to improve maternal and newborn health (MNH) in Nigeria.
Design: Scoping review.
Data sources and eligibility criteria: Systematic searches were conducted from 1 June to 22 July 2020 in PubMed, Embase, Scopus, together with a search of the grey literature. Publications presenting interventions and programmes to improve maternal or newborn health or both in Nigeria were included.
Data extraction and analysis: The data extracted included source and year of publication, geographical setting, study design, target population(s), type of intervention/programme, reported outcomes and any reported facilitators or barriers. Data analysis involved descriptive numerical summaries and qualitative content analysis. We summarised the evidence using a framework combining WHO recommendations for MNH, the continuum of care and the social determinants of health frameworks to identify gaps where further research and action may be needed.
Results: A total of 80 publications were included in this review. Most interventions (71%) were aligned with WHO recommendations, and half (n=40) targeted the pregnancy and childbirth stages of the continuum of care. Most of the programmes (n=74) examined the intermediate social determinants of maternal health related to health system factors within health facilities, with only a few interventions aimed at structural social determinants. An integrated approach to implementation and funding constraints were among factors reported as facilitators and barriers, respectively.
Conclusion: Using an integrated framework, we found most MNH interventions in Nigeria were aligned with the WHO recommendations and focused on the intermediate social determinants of health within health facilities. We determined a paucity of research on interventions targeting the structural social determinants and community-based approaches, and limited attention to pre-pregnancy interventions. To accelerate progress towards the sustainable development goal MNH targets, greater focus on implementing interventions and measuring context-specific challenges beyond the health facility is required.

Nicolau, P. R., S.; Maso, P.; Agramunt, S.; Garcia, E.; Sala, A.; Vernet-Tomas, M.; Paya, A. (2018). "Impact of Group Prenatal Care Support on Breastfeeding Initiation Rates and Other Maternal and Perinatal Outcomes." Obstetrics and Gynecology Research **1**(2): 38-44.

Group prenatal care support has been studied in order to increase maternal and neonatal benefits, such as breastfeeding initiation rates, in front of standard care. In our area, especially in some high risk sub-groups, it could be an important intervention to improve individual care. The aim of the pilot initiative is to compare the effect of group prenatal care support versus only standard individual care on breastfeeding initiation rates and other perinatal outcomes. A retrospective cohort study was made analyzing all deliveries at Hospital del Mar in Barcelona during 1 year. All pregnant women were compared depending on whether they had received the group prenatal care support by midwifes or only standard care. 1383 women gave birth at Hospital del Mar in Barcelona in 2015. 207 received group prenatal care support (15% of total). In group prenatal care there significantly were more nulliparous and native women. Breastfeeding initiation rate was higher in group prenatal care women (94.2% vs. 86.7%, p=0.01). Other outcomes like cesarean section rates, prematurity and low birth weight rates also improved in group prenatal care support in front of standard care. Our study suggests that group prenatal care support improves breastfeeding initiation rates and some other maternal and perinatal outcomes.

Noguchi, L., et al. (2020). "Effect of group versus individual antenatal care on uptake of intermittent prophylactic treatment of malaria in pregnancy and related malaria outcomes in Nigeria and Kenya: analysis of data from a pragmatic cluster randomized trial." Malar J **19**(1): 51.

BACKGROUND: Every year, malaria in pregnancy contributes to approximately 20% of stillbirths in sub-Saharan Africa and 10,000 maternal deaths globally. Most eligible pregnant women do not receive the minimum three recommended doses of intermittent preventive treatment with Sulfadoxine-pyrimethamine (IPTp-SP). The objective of this analysis was to determine whether women randomized to group antenatal care (G-ANC) versus standard antenatal care (ANC) differed in IPTp uptake and insecticide-treated nets (ITN) use. METHODS: Prospective data were analysed from the G-ANC study, a pragmatic, cluster randomized, controlled trial that investigated the impact of G-ANC on various maternal newborn health-related outcomes. Data on IPTp were collected via record abstraction and difference between study arms in mean number of doses was calculated by t test for each country. Data on ITN use were collected via postpartum interview, and difference between arms calculated using two-sample test for proportions. RESULTS: Data from 1075 women and 419 women from Nigeria and Kenya, respectively, were analysed: 535 (49.8%) received G-ANC and 540 (50.2%) received individual ANC in Nigeria; 211 (50.4%) received G-ANC and 208 (49.6%) received individual ANC in Kenya. Mean number of IPTp doses received was higher for intervention versus control arm in Nigeria (3.45 versus 2.14, $p < 0.001$) and Kenya (3.81 versus 2.72, $p < 0.001$). Reported use of ITN the previous night was similarly high in both arms for mothers in Nigeria and Kenya (over 92%). Reported ITN use for infants was higher in the intervention versus control arm in Nigeria (82.7% versus 75.8%, $p = 0.020$). CONCLUSIONS: G-ANC may support better IPTp-SP uptake, possibly related to better ANC retention. However, further research is needed to understand impact on ITN use. Trial registration Pan African Clinical Trials Registry, May 2, 2017 (PACTR201706002254227).

Patel, S. J., et al. (2018). "Providing support to pregnant women and new mothers through moderated WhatsApp groups: a feasibility study." mHealth **4**: 14-14.

Background: Group-based health services can improve maternal and newborn health outcomes. Group antenatal care and participatory learning and action cycles (PLA) with women's groups have been cited by the WHO as health systems interventions that can lead to improvements in adherence to care and health outcomes in pregnancy and the postpartum period.
Methods: We used a mixed-methods approach to assess the feasibility of a light touch group-based support intervention using the WhatsApp text-messaging platform. Pregnant women were enrolled at Jacaranda Health (JH), a maternity center in peri-urban Kiambu County, Kenya. Their phone numbers were added to WhatsApp groups consisting of participants with similar estimated due dates. The WhatsApp group administrator was a JH employee. Acceptability, demand, implementation, and practicality of this service were evaluated through in-depth interviews (IDIs), surveys, chart review, and analysis of group chats. Limited analysis of program efficacy (ANC visits, any PNC, and post-partum family planning uptake) was assessed by comparing participant data collected through chart review using a concurrent comparison of the general JH patient population.
Results: Fifty women (88%) of 57 eligible women who were approached to participate enrolled in the study. Five WhatsApp groups were created. A total of 983 messages were exchanged over 38 weeks. No harms or negative interactions were reported. Participants reported several benefits. Participants had differing expectations of the level of the group administrator's activity in the groups. ANC and PNC attendance were in line with the hospital's metrics for the rest of JH's patient population. Higher rates of postpartum long acting reversible contraception (LARC) uptake were observed among participants relative to the general patient population.
Conclusions: A moderated mobile-based support group service for pregnant women and new mothers is safe and feasible. Additional research using experimental designs to strengthen evidence of the effectiveness of the support intervention is warranted.

Patil, C. L., et al. (2013). "CenteringPregnancy-Africa: a pilot of group antenatal care to address Millennium Development Goals." Midwifery **29**(10): 1190-1198.

BACKGROUND: severe health worker shortages and resource limitations negatively affect quality of antenatal care (ANC) throughout sub-Saharan Africa. Group ANC, specifically CenteringPregnancy (CP), may offer an innovative approach to enable midwives to offer higher quality ANC. OBJECTIVE: our overarching goal was to prepare to conduct a clinical trial of CenteringPregnancy-Africa (CP-Africa) in Malawi and Tanzania. In Phase 1, our goal was to determine the acceptability of CP as a model for ANC in both countries. In Phase 2, our objective was to develop CP-Africa session content consistent with the Essential Elements of the model and with national standards in both Malawi and Tanzania. In Phase 3, our objective was to pilot CP-Africa in Malawi to determine whether sessions could be conducted with fidelity to the Centering process. SETTING: Phases 1 and 2 took place in Malawi and Tanzania. Phase 3, the piloting of two sessions of CP-Africa, occurred at two sites in Malawi: a district hospital and a small clinic. DESIGN: we used an Action Research approach to promote partnerships among university researchers, the Centering Healthcare Institute, health care administrators, health professionals and women attending ANC to develop CP-Africa session content and pilot this model of group ANC. PARTICIPANTS: for Phases 1 and 2, members of the Ministries of Health, health professionals and pregnant women in Malawi and Tanzania were introduced to and

interviewed about CP. In Phase 2, we finalised CP-Africa content and trained 13 health professionals in the Centering Healthcare model. In Phase 3, we conducted a small pilot with 24 pregnant women (12 at each site). MEASUREMENTS AND FINDINGS: participants enthusiastically embraced CP-Africa as an acceptable model of ANC health care delivery. The CP-Africa content met both CP and national standards. The pilot established that the CP model could be implemented with process fidelity to the 13 Essential Elements. Several implementation challenges and strategies to address these challenges were identified. KEY CONCLUSIONS: preliminary data suggest that CP-Africa is feasible in resource-constrained, low-literacy, high-HIV settings in sub-Saharan Africa. By improving the quality of ANC delivery, midwives have an opportunity to make a contribution towards Millennium Development Goals (MDG) targeting improvements in child, maternal and HIV-related health outcomes (MDGs 4, 5 and 6). A clinical trial is needed to establish efficacy. IMPLICATIONS FOR PRACTICE: CP-Africa also has the potential to reduce job-related stress and enhance job satisfaction for midwives in low income countries. If CP can be transferred with fidelity to process in sub-Saharan Africa and retain similar results to those reported in clinical trials, it has the potential to benefit pregnant women and their infants and could make a positive contribution to MGDs 4, 5 and 6.

Patil, C. L., et al. (2017). "Randomized controlled pilot of a group antenatal care model and the sociodemographic factors associated with pregnancy-related empowerment in sub-Saharan Africa." BMC Pregnancy Childbirth **17**(Suppl 2): 336.

BACKGROUND: The links between empowerment and a number of health-related outcomes in sub-Saharan Africa have been documented, but empowerment related to pregnancy is under-investigated. Antenatal care (ANC) is the entry point into the healthcare system for most women, so it is important to understand how ANC affects aspects of women's sense of control over their pregnancy. We compare pregnancy-related empowerment for women randomly assigned to the standard of care versus CenteringPregnancy-based group ANC (intervention) in two sub-Saharan countries, Malawi and Tanzania. METHODS: Pregnant women in Malawi (n = 112) and Tanzania (n = 110) were recruited into a pilot study and randomized to individual ANC or group ANC. Retention at late pregnancy was 81% in Malawi and 95% in Tanzania. In both countries, individual ANC, termed focused antenatal care (FANC), is the standard of care. FANC recommends four ANC visits plus a 6-week post-birth visit and is implemented following the country's standard of care. In group ANC, each contact included self- and midwife-assessments in group space and 90 minutes of interactive health promotion. The number of contacts was the same for both study conditions. We measured pregnancy-related empowerment in late pregnancy using the Pregnancy-Related Empowerment Scale (PRES). Independent samples t-tests and multiple linear regressions were employed to assess whether group ANC led to higher PRES scores than individual ANC and to investigate other sociodemographic factors related to pregnancy-related empowerment. RESULTS: In Malawi, women in group ANC had higher PRES scores than those in individual ANC. Type of care was a significant predictor of PRES and explained 67% of the variation. This was not so in Tanzania; PRES scores were similar for both types of care. Predictive models including sociodemographic variables showed religion as a potential moderator of treatment effect in Tanzania. Muslim women in group ANC had a higher mean PRES score than those in individual ANC; a difference not observed among Christian women. CONCLUSIONS: Group ANC empowers pregnant women in some contexts. More

research is needed to identify the ways that models of ANC can affect pregnancy-related empowerment in addition to perinatal outcomes globally.

Patil, C. L., et al. (2017). "Implementation challenges and outcomes of a randomized controlled pilot study of a group prenatal care model in Malawi and Tanzania." Int J Gynaecol Obstet **139**(3): 290-296.

OBJECTIVE: To identify implementation challenges associated with conducting a randomized controlled trial (RCT) of group prenatal care (PNC) and report outcomes of the pilot. METHODS: A multi-site randomized pilot was conducted in Malawi and Tanzania between July 31, 2014, and June 30, 2015. Women aged at least 16 years with a pregnancy of 20-24 weeks were randomly assigned using sealed envelopes (1:1) to individual or group PNC. Structured interviews were conducted at baseline, in the third trimester and 6-8 weeks after delivery. The primary outcomes were attendance at four PNC visits and attendance at the 6-week postnatal visit. RESULTS: The pilot showed that an RCT with individual randomization can be conducted in these two low-resource settings. Significantly more women in group PNC than in individual PNC completed at least four PNC visits (96/102 [94.1%] vs 53/91 [58.2%]) and attended the postnatal visit (76/102 [74.5%] vs 45/90 [50.0%]; both P<0.001). CONCLUSION: Group PNC was feasible and associated with an increase in healthcare utilization and improved outcomes in Malawi and Tanzania. Lessons learned should be considered when designing large RCTs to determine efficacy. ClinicalTrials.gov: NCT02999334.

Penna, L. H. G., et al. (2008). "Collective prenatal consultation: a new proposal for comprehensive health care." Revista Latino-Americana de Enfermagem **16**(1): 158-160.

This article describes the Collective Prenatal Consultation as a new healthcare methodology, which is performed according to government standards, but collectively. Relaxation and sensitization techniques are used, as well as group dynamics, including a collective exam of the pregnant women. The Collective Consultation is carried out in a welcoming environment, which provides clarification and socialization of experiences and information, centered on those women. The healthcare professional records every obstetric parameter and behavior in the patient's prenatal card and history file. Priority is given to the principle of integrality and citizenship, with the aim to break the biomedical care paradigm, thus favoring humanized and comprehensive care to the women.

Ratzon, R., et al. (2022). "Impact of Group vs. Individual Prenatal Care Provision on Women's Knowledge of Pregnancy-Related Topics: An Open, Controlled, Semi-Randomized Community Trial." Journal of Clinical Medicine **11**(5015).

The importance of acquiring knowledge of pregnant women on prenatal care lies in its leading to confidence and ability in decision-making. There is a growing need for a model of prenatal care that will allow nurses to provide the most efficient pregnancy-related guidance with minimum need for additional staff. This study compares the level of knowledge on subjects pertaining to pregnancy and birth in low-risk pregnancies when delivered in group versus individual settings. The study is an open, controlled, semi-randomized community trial. The intervention arm received prenatal care services in a group setting led by a nurse. The control arm received prenatal care services in routine individual meetings with a nurse. Knowledge of prenatal subjects was evaluated by questionnaires. The level of knowledge of the women in the

group setting for the pre-service questionnaire was lower than that of the women in the individual group, but higher for the final questionnaire. After accounting for a starting point difference (the women in the individual care arm started with a higher knowledge score), the women in the group setting had a three-fold improvement in score compared to the women inthe individual setting (p = 0.043). Prenatal care provided in a group setting may lead to better knowledge acquisition, leading to better awareness of pregnancy-related medical conditions and to enhanced adherence to recommended pregnancy tests and healthy lifestyle.

Raymond, J. E. F., M. J.; Davis, D. L. (2014). "Gestational Weight Change in Women Attending a Group Antenatal Program Aimed at Addressing Obesity in Pregnancy in New South Wales, Australia." Journal of Midwifery Womens Health **59**(4): 398-404.

Introduction: The prevalence of obesity in Australia among women of childbearing age has doubled over the past two decades. Obesity is associated with complications for women and their babies during pregnancy and birth. Limiting gestational weight gain can reduce perinatal complications and postnatal weight retention, but evidence supporting interventions designed to assist obese pregnant women to manage their weight gain in pregnancy is inconclusive. The aim of this paper is to describe the gestational weight change of a cohort of obese pregnant women enrolled in a group antenatal program, aimed at assisting them to limit their weight gain in pregnancy to levels recommended by the US Institute of Medicine. Methods: The program was jointly developed by two metropolitan maternity services in New South Wales (NSW), Australia. This is a descriptive study that presents select data for women enrolled in the program. Body mass index (BMI), pre-pregnancy weight, last pregnancy weight and select clinical outcomes were recorded for 82 obese women enrolled in the program during the evaluation period of 14 months. Data were analysed using non-parametric tests; Chi Square and Mann-Whitney U. Results: Parity was associated with pre-pregnancy BMI, with women of higher parity having higher BMIs. Women with higher BMIs had a significantly lower gestational weight gain than women with lower BMIs. Overall, 27% of women enrolled in the program gained the recommended 5-9kg, 27% gained less than this amount and 46% gained more.
Discussion: Evidence supporting interventions designed to assist obese pregnant women to manage their weight gain in pregnancy is lacking. This innovative, collaborative program shows promise as early results compare favourably with international comparisons.

Riggs, E. Y., Jane; Mensah, Fiona K.; Gold, Lisa; Szwarc, Josef; Kaplan, Ida; Small, Rhonda; Middleton, Philippa; Krastev, Ann; McDonald, Ellie; East, Christine; Homer, Caroline; Nesvadba, Natalija; Biggs, Laura; Braithwaite, Jeffrey; Brown, Stephanie J. (2021). "Group Pregnancy Care for refugee background women: a codesigned, multimethod evaluation protocol applying a community engagement framework and an interrupted time series design." BMJ Open.

Introduction: Pregnancy and early parenthood are key opportunities for interaction with health services and connecting to other families at the same life stage. Public antenatal care should be accessible
to all, however barriers persist for families from refugee communities to access, navigate and optimise healthcare during pregnancy. Group Pregnancy Care is an innovative model of care codesigned with a community from a refugee background and other key stakeholders in Melbourne, Australia. Group Pregnancy Care aims to provide a culturally safe and supportive

environment for women to participate in antenatal care in a language they understand, to improve health literacy and promote social connections and inclusion. This paper outlines Group Pregnancy Care and provides details of the evaluation framework.
Methods and analysis: The evaluation uses community-based participatory research methods to engage stakeholders in codesign of evaluation methods. The study is being conducted across multiple sites and involves multiple phases, use of quantitative and qualitative methods, and an interrupted time series design. Process and cost-effectiveness measures will be incorporated into quality improvement cycles. Evaluation measures will be developed using codesign and participatory principles informed by community and stakeholder engagement and will be piloted prior to implementation.
Ethics and dissemination: Ethics approvals have been provided by all six relevant authorities. Study findings will be shared with communities and stakeholders via agreed pathways including community forums, partnership meetings, conferences, policy and practice briefs and journal articles. Dissemination activities will be developed using codesign and participatory principles.

Rijnders, M. E. J., S.; Aalhuizen, I.; Detmar, S.; Crone, M. (2018). "Women-centered care: Implementation of CenteringPregnancy in The Netherlands." Birth.

Rijnders, M. E. v. d. P., K.; Aalhuizen, I. (2012). "CenteringPregnancy biedt zwangere centrale rol in Nederlandse verloskundige zorg."

Ruiz-Mirazo, E. L.-Y., M.; McDonald, S. D. (2012). "Group Prenatal Care Versus Individual Prenatal Care: A Systematic Review and Meta-Analyses." Journal of Obstetrics and Gynaecology Canada **34**(3): 223-229.

Objective: To compare the effects of group prenatal care (GPC) and individual prenatal care (IPC) on perinatal health outcomes, including our primary outcomes of preterm birth (PTB < 37 weeks) and low birth weight (< 2500 g). Data Sources: We searched Medline, Embase, CINAHL, and the references of selected articles. Study Selection: Two reviewers independently performed each step of the systematic review. Of the 4178 non-duplicate titles and abstracts identified, 77 were selected for full-text review. An additional eight full-text articles were selected from reference lists. Overall, 85 full-text articles were reviewed. Studies included assessed maternal or infant health outcomes. Data Extraction and Data Synthesis: Two reviewers independently extracted data from eligible full-text articles. Statistical analyses were completed using Review Manager, version 5.0 (Copenhagen: The Nordic Cochrane Centre, Cochrane Collaboration, 2011), whereby dichotomous variables and continuous outcomes were analyzed using relative risk and mean difference, respectively. The random effects model was employed to pool data. Where available, adjusted data were used to assess the independent effect of GPC. Eight studies of mostly low quality (three randomized controlled trials and five cohort studies) were included, involving 3242 women, most at high risk. Women randomized to GPC had lower rates of PTB (RR 0.71; 95% CI 0.52 to 0.96), no difference in rates of LBW (RR 0.91; 95% CI 0.65 to 1.27) or IUGR (RR 0.85; 95% CI 0.61 to 1.19), fewer Caesarean sections (RR 0.80; 95% CI 0.67 to 0.93), and slightly higher rates of breastfeeding (RR 1.08; 95%CI 1.02 to 1.14).

Sadiku, F., et al. (2024). "Maternal satisfaction with group care: a systematic review." AJOG Global Reports **4**(1).

OBJECTIVE: This review examined the quantitative relationship between group care and overall maternal satisfaction compared with standard individual care.
DATA SOURCES: We searched CINAHL, Clinical Trials, The Cochrane Library, PubMed, Scopus, and Web of Science databases from the beginning of 2003 through June 2023.
STUDY ELIGIBILITY CRITERIA: We included studies that reported the association between overall maternal satisfaction and centering-based perinatal care where the control group was standard individual care. We included randomized and observational designs.
METHODS: Screening and independent data extraction were carried out by 4 researchers. We extracted data on study characteristics, population, design, intervention characteristics, satisfaction measurement, and outcome. Quality assessment was performed using the Cochrane tools for Clinical Trials (RoB2) and observational studies (ROBINS-I). We summarized the study, intervention, and satisfaction measurement characteristics. We presented the effect estimates of each study descriptively using a forest plot without performing an overall meta-analysis. Meta-analysis could not be performed because of variations in study designs and methods used to measure satisfaction. We presented studies reporting mean values and odds ratios in 2 separate plots. The presentation of studies in forest plots was organized by type of study design.
RESULTS: A total of 7685 women participated in the studies included in the review. We found that most studies (ie, 17/20) report higher satisfaction with group care than standard individual care. Some of the noted results are lower satisfaction with group care in both studies in Sweden and 1 of the 2 studies from Canada. Higher satisfaction was present in 14 of 15 studies reporting CenteringPregnancy, Group Antenatal Care (1 study), and Adapted CenteringPregnancy (1 study). Although indicative of higher maternal satisfaction, the results are often based on statistically insignificant effect estimates with wide confidence intervals derived from small sample sizes.
CONCLUSION: The evidence confirms higher maternal satisfaction with group care than with standard care. This likely reflects group care methodology, which combines clinical assessment, facilitated health promotion discussion, and community-building opportunities. This evidence will be helpful for the implementation of group care globally.

Sawtell, M., et al. (2023). "Group antenatal care: findings from a pilot randomised controlled trial of REACH Pregnancy Circles." Pilot and Feasibility Studies **9**(1).

Background Antenatal care has the potential to impact positively on maternal and child outcomes, but traditional models of care in the UK have been shown to have limitations and particularly for those from deprived populations. Group antenatal care is an alternative model to traditional individual care. It combines conventional aspects of ante- natal assessment with group discussion and support. Delivery of group antenatal care has been shown to be successful in various countries; there is now a need for a formal trial in the UK.
Method An individual randomised controlled trial (RCT) of a model of group care (Pregnancy Circles) delivered in NHS settings serving populations with high levels of deprivation and diversity was conducted in an inner London NHS trust. This was an external pilot study for a potential fully powered RCT with integral economic evaluation. The pilot aimed to explore the

feasibility of methods for the full trial. Inclusion criteria included pregnant with a due date in a certain range, 16 + years and living within specified geographic areas. Data were analysed for completeness and usability in a full trial; no hypothesis testing for between-group differences in outcome measures was undertaken. Pre-specified progression criteria corresponding to five feasibility measures were set. Additional aims were to assess the utility of our proposed outcome measures and different data collection routes. A process evaluation utilising interviews and observations was conducted.
Results Seventy-four participants were randomised, two more than the a priori target. Three Pregnancy Circles of eight sessions each were run. Interviews were undertaken with ten pregnant participants, seven midwives and four other stakeholders; two observations of intervention sessions were conducted. Progression criteria were met at sufficient levels for all five measures: available recruitment numbers, recruitment rate, intervention uptake and retention and questionnaire completion rates. Outcome measure assessments showed feasibility and sufficient completion rates; the development of an economic evaluation composite measure of a 'positive healthy birth' was initiated.
Conclusion Our pilot findings indicate that a full RCT would be feasible to conduct with a few adjustments related to recruitment processes, language support, accessibility of intervention premises and outcome assessment.

Sayed, H. A. E. A.-E., E. M. (2018). "Effect of Centering Pregnancy Model Implementation on Prenatal Health Behaviors and Pregnancy Related Empowerment." American Journal of Nursing Science **7**(6): 314-324.

Background: Centering pregnancy model has been associated with motivating behavior change, increasing women's empowerment and satisfaction in comparison to standard, individual prenatal care. Aim of the present study was to evaluate the effect of centering pregnancy model implementation on prenatal health behaviors and pregnancy related empowerment. Research design: A quasi-experimental (pre-postest comparison group). Sample: A purposive sample of 151 pregnant women was recruited for the study and divided into centering pregnancy group was (75 women) and individual prenatal care group was (76 women). Setting: The study was conducted at Obstetrics and Gynecology Outpatient Clinic along with meeting room at Outpatient Clinics' floor affiliated to Benha University Hospital. Tools used for data collection were a structured self-administrating questionnaire, prenatal health behaviors scale, pregnancy-related empowerment scale, and women's satisfaction visual analogue scale. Results: post intervention, the total mean self-reported health behaviors score in the centering pregnancy group was higher than individual prenatal care group (18.13 versus 13.11) respectively. The mean pregnancy related empowerment score centering pregnancy group was significantly higher than individual prenatal care group (54.32 ± 3.28 versus 40.13 ± 7.74, p 0.0001) respectively. Two-thirds of the centering pregnancy group reported high satisfaction level compared to one-tenth of individual prenatal care group. Conclusion: A positive effect of centering pregnancy model, including a greater engagement in favorable health behaviors, a higher pregnancy-related empowerment, and higher satisfaction compared to individual prenatal care. Recommendation: Implementing centering pregnancy model of care more widely for promoting healthy behaviors and empowering pregnant women.

Sayinzoga, F., et al. (2018). "Use of a Facilitated Group Process to Design and Implement a Group Antenatal and Postnatal Care Program in Rwanda." J Midwifery Womens Health.

INTRODUCTION: The government of Rwanda is exploring strategies that may reduce the incidence of prematurity and low birth weight. Large-scale implementation of group antenatal care (ANC) and postnatal care (PNC) within the context of the Rwanda national health care system is under consideration. To launch a cluster randomized controlled trial of group ANC and PNC in 5 districts in Rwanda, the implementation team needed a customized group care model for this context and trained health care workers to deliver the program. PROCESS: Adapting the group ANC and group PNC model for the Rwandan context was accomplished through a group process identical to that which is fundamental to group care. A technical working group composed of 10 Rwandan maternal-child health stakeholders met 3 times over the course of 3 months, for 4 to 8 hours each time. Their objectives were to consider the evidence on group ANC, agree on the priorities and constraints of their ANC delivery system, and ultimately define the content and structure of a combined group ANC and PNC model for implementation in Rwanda. The same group process was employed to train health care workers to act as group ANC facilitators. OUTCOMES: A customized group ANC and PNC model and guidelines for its introduction were developed in the context of a cluster randomized controlled trial in 36 health centers. Descriptions of this model and the implementation plan are included in this article. DISCUSSION: Our experience suggests that the group process fundamental to successful group ANC and PNC is an effective method to customize and implement this innovative health services delivery model in a new context and is instrumental in achieving local ownership.

Sharma, J., et al. (2018). "Group antenatal care models in low- and middle-income countries: a systematic evidence synthesis." Reprod Health **15**(1): 38.

In high-income countries, group antenatal care (ANC) offers an alternative to individual care and is associated with improved attendance, client satisfaction, and health outcomes for pregnant women and newborns. In low- and middle-income country (LMIC) settings, this model could be adapted to address low antenatal care uptake and improve quality. However, evidence on key attributes of a group care model for low-resource settings remains scant. We conducted a systematic review of the published literature on models of group antenatal care in LMICs to identify attributes that may increase the relevance, acceptability and effectiveness of group ANC in such settings. We systematically searched five databases and conducted hand and reference searches. We also conducted key informant interviews with researchers and program implementers who have introduced group antenatal care models in LMICs. Using a pre-defined evidence summary template, we extracted evidence on key attributes-like session content and frequency, and group composition and organization-of group care models introduced across LMIC settings. Our systematic literature review identified nine unique descriptions of group antenatal care models. We supplemented this information with evidence from 10 key informant interviews. We synthesized evidence from these 19 data sources to identify attributes of group care models for pregnant women that appeared consistently across all of them. We considered these components that are fundamental to the delivery of group antenatal care. We also identified attributes that need to be tailored to the context in which they are implemented to meet local standards for comprehensive ANC, for example, the number of sessions and the session content. We compiled these attributes to codify a

composite "generic" model of group antenatal care for adaptation and implementation in LMIC settings. With this combination of standard and flexible components, group antenatal care, a service delivery alternative that has been successfully introduced and implemented in high-income country settings, can be adapted for improving provision and experiences of care for pregnant women in LMIC. Any conclusions about the benefits of this model for women, babies, and health systems in LMICs, however, must be based on robust evaluations of group antenatal care programs in those settings.

Singh, K., et al. (2023). "Utilizing a mixed-methods approach to assess implementation fidelity of a group antenatal care trial in Rwanda." PLoS ONE **18**(7).

Background: The Preterm Birth Initiative (PTBi)–Rwanda conducted a cluster randomized controlled trial to assess the impact of group antenatal care (group ANC) on preterm birth, using a group ANC approach adapted for the Rwanda setting, and implemented in 18 health centers. Previous research showed high overall fidelity of implementation, but lacked correlation with provider self-assessment and left unanswered questions. This study utilizes a mixed-methods approach to study the fidelity with which the health centers' implementation followed the model specified for group ANC.

Methods: Implementation fidelity was measured using two tools, repeated Model Fidelity Assessments (MFAs) and Activity Reports (ARs) completed by Master Trainers, who visited each health center between 7 and 13 times (9 on average) to provide monitoring and training over 18 months between 2017 and 2019. Each center's MFA item and overall scores were regressed (linear regression) on the time elapsed since the center's start of implementation. The Activity Report (AR) is an open-ended template to record comments on implementation. For the qualitative analysis, the ARs from the times of each center's highest and lowest MFA score were analyzed using thematic analysis. Coding was conducted via Dedoose, with two coders independently reviewing and coding transcripts, followed by joint consensus coding.
Results: A total of 160 MFA reports were included in the analysis. There was a significant positive association between elapsed time since a health center started implementation and greater implementation fidelity (as measured by MFA scores). In the qualitative AR analysis, Master Trainers identified key areas to improve fidelity of implementation, including: group ANC scheduling, preparing the room for group ANC sessions, provider capacity to co-facilitate group ANC, and facilitator knowledge and skills regarding group ANC content and process. These results reveal that monitoring visits are an important part of acquisition and fidelity of the "soft skills" required to effectively implement group ANC and provide an understanding of the elements that may have impacted fidelity as described by Master Trainers.
Conclusions: For interventions like Group ANC, where "soft-skills" like group facilitation are important, we recommend continuous monitoring and mentoring throughout program implementation to strengthen these new skills, provide corrective feedback and guard against skills decay. We suggest the use of quantitative tools to provide direct measures of implementation fidelity over time and qualitative tools to gain a more complete understanding of what factors influence implementation fidelity. Identifying areas of implementation requiring additional support and mentoring may ensure effective translation of evidence-based interventions into real-world settings.

Somji, A. R., K.; Dryer, S.; Makokha, F.; Ambasa, C.; Aryeh, B.; Booth, K.; Xueref, S.; Moore, S.; Mwenesi, R.; Rashid, S. (2022). "“Taking care of your pregnancy”: a mixed-methods study of group antenatal care in Kakamega County, Kenya." BMC Health Serv Res **22**(969).

Background: Traditional antenatal care (ANC) models often do not meet women’s needs for information, counseling, and support, resulting in gaps in quality and coverage. Group ANC (GANC) provides an alternative, person-centered approach where pregnant women of similar gestational age meet with the same health provider for facilitated discussion. Few studies show associations between GANC and various outcomes.

Methods: We employed a pre-post quasi-experimental design using mixed methods to assess a GANC model (Lea Mimba Pregnancy Clubs) at six health facilities in Kakamega County, Kenya. Between April 2018 and January 2019, we tracked 1652 women assigned to 162 GANC cohorts. Using an intention-to-treat approach, we conducted baseline (N = 112) and endline surveys (N = 360) with women attending immunization visits to assess outcomes including experience of care, empowerment and self-efficacy, knowledge of healthy practices and danger signs, and practice of healthy behaviors, including ANC retention. At endline, we conducted 29 in-depth interviews (IDIs) and three focus group discussions with women who were currently and previously participating in GANC, and 15 IDIs with stakeholders.

Results: The proportion of survey respondents with knowledge of three or more danger signs during pregnancy more than tripled, from 7.1% at baseline to 26.4% at endline (OR: 4.58; 95% CI: 2.26–10.61). We also found improvements in women’s reports about their experience of care between baseline and endline, particularly in their assessment of knowledge and competence of health workers (OR: 2.52 95% CI: 1.57–4.02), respect shown by ANC providers (OR: 1.82, 95% CI: 1.16–2.85), and women’s satisfaction with overall quality of care (OR: 1.62, 95% CI: 1.03–2.53). We saw an increase from 58.9% at baseline to 71.7% at endline of women who strongly agreed that they shared their feelings and experiences with other women (OR: 1.73, 95% CI: 1.1–2.7). The mean number of ANC visits increased by 0.89 visits (95% CI: 0.47–1.42) between baseline (4.21) and endline (5.08). No changes were seen in knowledge of positive behaviors, empowerment, self-efficacy, and several aspects related to women’s experience of care and adoption of healthy behavior constructs. Qualitatively, women and stakeholders noted improved interactions between health providers and women, improved counseling, increased feelings of empowerment to ask questions and speak freely and strengthened social networks and enhanced social cohesion among women.

Conclusions: GANC offers promise for enhancing women’s experience of care by providing improved counseling and social support. Additional research is needed to develop and test measures for empowerment, self-efficacy, and experience of care, and to understand the pathways whereby GANC effects changes in specific outcomes.

Sultana, M., et al. (2019). "Group prenatal care experiences among pregnant women in a Bangladeshi community." PLoS ONE **14**(6): e0218169.

BACKGROUND: Complications during pregnancy, childbirth, and following delivery remain significant challenges that contribute to maternal morbidity and mortality, thus affecting health systems worldwide. Group prenatal care (GPC) is an integrated approach incorporating peer support and health education that provides prenatal care in a group setting. The GPC approach

was piloted in a district of Bangladesh to measure the feasibility and effectiveness of GPC compared to individual care. Understanding the experiences of women of receiving this grouped care approach is crucial to understand the perspectives, perception, and acceptability of the programme among mothers, which are lack in Bangladesh. The objective of the present study was to understand the core experiences and perspectives of mothers who participated in GPC sessions during their pregnancy period. METHODS: A qualitative research approach was used to understand the experiences of women receiving GPC. A total of 21 in-depth interviews were conducted in this study targeting pregnant mothers who attended all recommended GPC sessions. Face-to-face interviews were conducted by trained and experienced interviewers using a specific interview guideline to achieve detailed responses. Thematic analysis was conducted to analyse the data. RESULTS: Mothers appreciated receiving pregnancy care in group setting and expressed their preferences towards GPC compared to individual care. Themes included the comprehensiveness of GPC, prescheduled appointments and reduced waiting time, social gathering, coping with common discomforts, relationship with service providers, birth preparedness, and recommendations from participating mothers. The themes conveyed overall positive experiences of the participating mothers, with suggestions for the betterment of the programme. Nevertheless, the reported experiences of women involved in the study suggests that the inclusion of a specialist in group care, post-partum care, and family planning advice will be more beneficial in the GPC model. CONCLUSIONS: The overall experiences of the women in the present study suggest that GPC is helpful for them, and it is useful to reduce complications during pregnancy. The GPC model promises movement towards family-supported care, as explained by the participants.

Sultana, M., et al. (2017). "The effectiveness of introducing Group Prenatal Care (GPC) in selected health facilities in a district of Bangladesh: study protocol." BMC Pregnancy Childbirth **17**(1): 48.

BACKGROUND: Despite high rates of antenatal care and relatively good access to health facilities, maternal and neonatal mortality remain high in Bangladesh. There is an immediate need for implementation of evidence-based, cost-effective interventions to improve maternal and neonatal health outcomes. The aim of the study is to assess the effect of the intervention namely Group Prenatal Care (GPC) on utilization of standard number of antenatal care, post natal care including skilled birth attendance and institutional deliveries instead of usual care. METHODS: The study is quasi-experimental in design. We aim to recruit 576 pregnant women (288 interventions and 288 comparisons) less than 20 weeks of gestational age. The intervention will be delivered over around 6 months. The outcome measure is the difference in maternal service coverage including ANC and PNC coverage, skilled birth attendance and institutional deliveries between the intervention and comparison group. DISCUSSION: Findings from the research will contribute to improve maternal and newborn outcome in our existing health system. Findings of the research can be used for planning a new strategy and improving the health outcome for Bangladeshi women. Finally addressing the maternal health goal, this study is able to contribute to strengthening health system.

Sultana, M., et al. (2017). "Cost of introducing group prenatal care (GPC) in Bangladesh: a supply-side perspective." Safety in Health **3**(1).

Background: Progress towards Millennium Development Goals (MDG) 5 is uneven across different countries. Maternal and neonatal deaths occur mainly in developing countries especially in rural areas and among the poor communities due to underutilization of maternal services. It is evident that group prenatal care (GPC) model could improve health-care utilization among pregnant women that suit in developing countries. The GPC model has introduced in a public facility in the context of Bangladesh, and this study intended to estimate the incremental cost of introducing GPC model over the existing government health-care facility. Methods: Activity-based costing method was employed for analysis of cost during 2015–2016 in a selected Maternal and Child Welfare Centre (MCWC) in Bangladesh. Cost information was collected by applying ingredients approach considering supply-side perspective. Results: The total cost of integrating GPC model over the government service delivery system was estimated to be BDT 1,186,868 (US$15,216.3). The proportion of cost for the start-up period and implementation cost covered approximately 24% and 76% of the total intervention costs, respectively. Considering the total number of per session beneficiary (N =844), the average cost of the per-beneficiary per-GPC session was BDT 1406 (US$18.0) while cost per beneficiary (N = 300) was estimated to be BDT 3956 (US$50.7) and cost per session (N = 125) was BDT 9495 (US$121.7). Conclusions: It appears from the findings that the built-in interventions of GPC model are doable in the existing government settings at the grass-root level and perhaps at a lower cost if adjusted with the existing government and NGO functionaries.

Switi, E. M., et al. (2020). "Enhanced Antenatal Care: Combining one-to-one and group Antenatal Care models to increase childbirth education and address childbirth fear." Women Birth.

BACKGROUND: We designed and implemented a new model of care, Enhanced Antenatal Care (EAC), which offers a combined approach to midwifery-led care with six one-to-one visits and four group sessions. AIM: To assess EAC in terms of women's satisfaction with care, autonomy in decision-making, and its effectiveness in lowering childbirth fear. METHODS: This was a quasi-experimental controlled trial comparing 32 nulliparous women who received EAC (n=32) and usual antenatal care (n=60). We compared women's satisfaction with care and autonomy in decision-making post-intervention using chi-square test. We administered a Fear of Birth Scale pre- and post-intervention and assessed change in fear of birth in each group using the Cohen's d for effect size. To isolate the effect of EAC, we then restricted this analysis to women who did not attend classes alongside maternal care (n=13 in EAC and n=13 in usual care). FINDINGS: Women's satisfaction with care in terms of monitoring their and their baby's health was similar in both groups. Women receiving EAC were more likely than those in usual care to report having received enough information about the postpartum period (75% vs 30%) and parenting (91% vs 55%). Overall, EAC was more effective than usual care in reducing fear of birth (Cohen's d=-0.21), especially among women not attending classes alongside antenatal care (Cohen's d=-0.83). CONCLUSION: This study is the first to report findings on EAC and suggests that this novel model may be beneficial in terms of providing education and support, as well as lowering childbirth fear.

Talrich, F., et al. (2023). "It takes two to tango: the recruiter's role in accepting or refusing to participate in group antenatal care among pregnant women—an exploration through in-depth interviews." Family Medicine and Community Health **11**(3): e002167.

Objective The purpose of this study was to explore how women are recruited for group antenatal care (GANC) in primary care organisations (PCOs), what elements influence the behaviour of the recruiter, and what strategies recruiters use to encourage women to participate.

Method Using a qualitative research design, we conducted 10 in-depth interviews with GANC facilitators working in PCOs. Selected constructs of the domains of the Consolidated Framework for Implementation Research and the Theoretical Domains Framework helped to develop interview questions and raise awareness of important elements during interviews and thematic analyses. GANC facilitators working in multidisciplinary PCOs located in Brussels and Flanders (Belgium) were invited to participate in an interview. We purposively selected participants because of their role as GANC facilitators and recruiters. We recruited GANC facilitators up until data saturation and no new elements emerged.

Result We identified that the recruitment process consists of four phases or actions: identification of needs and potential obstacles for participation; selection of potential participants; recruitment for GANC and reaction to response. Depending on the phase, determinants at the level of the woman, recruiter, organisation or environment have an influence on the recruitment behaviour. Conclusion Our study concludes that it takes two to tango for successful recruitment for GANC. Potential participants' needs and wishes are of importance, but the care providers' behaviour should not be underestimated. Therefore, successful recruitment may be improved when introducing a multidisciplinary recruitment plan consisting of specific strategies, as we suggest.

Talrich, F., et al. (2023). "How to Support the Referral Towards Group Antenatal Care in Belgian Primary Healthcare Organizations: A Qualitative Study." International Journal of Women's Health **Volume 15**: 33-49.

Introduction: Group Antenatal Care (GANC) is an alternative for traditional antenatal care. Despite the model is well accepted among participants and is associated with positive effects on pregnancy outcomes, recruitment of participants can be an ongoing challenge, depending on the structure and financing of the wider health system. This is especially the case for primary care organizations offering GANC, which depend on other health care providers to refer potential participants. The main objective of this study is to understand what determinants are at play for health care providers to refer to GANC facilitators in primary care organizations. Accordingly, we make recommendations for strategies in order to increase the influx of women in GANC. Methods: Qualitative findings were obtained from 31 interviews with healthcare providers responsible for the referral of women to the GANC facilitators working in primary care organizations, GANC facilitators and stakeholders indirectly involved in the referral. The domains of the Consolidated Framework for Implementation Research (CFIR) and the Theoretical Domains Framework (TDF) helped to develop interview questions and raise awareness of important elements during interviews and thematic analyses.

Results: The findings show that before health care providers decide to refer women, they undergo a complex process that is influenced by characteristics of the potential referrer, GANC

facilitator, woman, professional relationship between the potential referrer and the GANC facilitator, organization and broader context.
Discussion: Based on these findings and current literature, we recommend that the GANC team implements strategies that anticipate relevant determinants: identify and select potential referrers based on their likelihood to refer, select champions, invest in communication, concretise the collaboration, provide practical tools, involve in policymaking.

Teasdale, C. A., et al. (2022). "Group antenatal care for improving retention of adolescent and young pregnant women living with HIV in Kenya." BMC Pregnancy and Childbirth **22**(1).

Background: Pregnant and breastfeeding adolescents and young women living with HIV (AYWLH) have lower retention in prevention of mother-to-child transmission (PMTCT) services compared to older women.
Methods: We evaluated a differentiated service model for pregnant and postnatal AYWLH at seven health facilities in western Kenya aimed at improving retention in antiretroviral treatment (ART) services. All pregnant AYWLH<25 years presenting for antenatal care (ANC) were invited to participate in group ANC visits including self-care and peer-led support sessions conducted by health facility nurses per national guidelines. ART register data were used to assess loss to follow-up (LTFU) among newly-enrolled pregnant adolescent (< 20 years) and young women (20–24 years) living with HIV starting ART in the pre-period (January-December 2016) and post-period (during implementation; December 2017-January 2019). Poisson regression models compared LTFU incidence rate ratios (IRR) in the first six months after PMTCT enrollment and risk ratios compared uptake of six week testing for HIV-exposed infants (HEI) between the pre- and post-periods.
Results: In the pre-period, 223 (63.2%) of 353 pregnant AYWLH newly enrolled in ANC had ART data, while 320 (71.1%) of 450 in the post-period had ART data (p = 0.02). A higher proportion of women in the post-period (62.8%) had known HIV-positive status at first ANC visit compared to 49.3% in the pre-period (p < 0.001). Among pregnant AYWLH < 20 years, the incidence rate of LTFU in the first six months after enrollment in ANC services declined from 2.36 per 100 person months (95%CI 1.06–5.25) in the pre-period to 1.41 per 100 person months (95%CI 0.53–3.77)
in the post-period. In both univariable and multivariable analysis, AYWLH < 20 years in the post-period were almost 40% less likely to be LTFU compared to the pre-period, although this finding did not meet the threshold for statistical significance (adjusted incidence rate ratio 0.62, 95%CI 0.38–1.01, p = 0.057). Testing for HEI was 10% higher overall in the post-period (adjusted risk ratio 1.10, 95%CI 1.01–1.21, p = 0.04).
Conclusions: Interventions are urgently needed to improve outcomes among pregnant and postnatal AYWLH. We observed a trend towards increased retention among pregnant adolescents during our intervention and a statistically significant increase in uptake of six wk HEI testing.

Teate, A., et al. (2013). "Midwives' experiences of becoming CenteringPregnancy facilitators: a pilot study in Sydney, Australia." Women Birth **26**(1): e31-36.

BACKGROUND: A pilot study was undertaken between 2006 and 2008 to explore the feasibility of implementing the CenteringPregnancy model of group antenatal care in Australia. The study

was undertaken at two hospital antenatal clinics and two community healthcare centres in southern Sydney. This paper reports on one arm of the pilot study, known as the 'Midwives' Study', which aimed to explore the experiences of the midwives as they moved from providing traditional one-to-one antenatal care to facilitating group antenatal care. METHODS: The Australian pilot study used Action Research. Eight midwives, the group facilitators, and three researchers formed the Action Research group. A qualitative descriptive approach was undertaken to describe the experiences of the midwives. Data were collected using focus groups, surveys and checklists and analysed using thematic content analysis. FINDINGS: The midwives' initial fears and misgivings about undertaking the new role of group antenatal care gave way to a growing confidence in their abilities and group facilitation skills. They appreciated: the benefits of the CenteringPregnancy model for pregnant women; new opportunities to develop positive relationships with women and their colleagues; and the structured support and education throughout all stages of the Action Research process. CONCLUSION: The midwives were enthusiastic about their experiences of becoming CenteringPregnancy facilitators and described the benefits of this model of care compared to traditional one-to-one antenatal care. Support and education of the midwives through structured Action Research cycles enhanced the effective implementation of this new model

Teate, A. L., N.; Rising, S.; Homer, C. S. E. (2011). "Women's experiences of group antenatal care in Australia – The CenteringPregnancy Pilot Study." Midwifery **27**(2): 138-145.

Objective: To describe the experiences of women who were participants in the Australian CenteringPregnancy Pilot Study. CenteringPregnancy is an innovative model of care where antenatal care is provided in a group environment. The aim of the pilot study was to determine whether it would be feasible to implement this model of care in Australia. Design: A descriptive study was conducted. Data included clinical information from the hospital records and antenatal and postnatal questionnaires. Setting: Two metropolitan hospitals in Sydney, Australia. Participants: Thirty-five women were recruited to the study and 33 ultimately received all their antenatal care (8 sessions) through five CenteringPregnancy groups. Findings: Difficulties with recruitment within a short study timeline resulted in only 35 (20%) of 171 women who were offered group antenatal care choosing to participate. Most women chose this form of antenatal care in order to build friendships and support networks. Attendance rates were high and women appreciated the opportunity and time to build supportive relationships through sharing knowledge, ideas and experiences with other women and with midwives facilitating the groups. The opportunity for partners to attend was identified as important. Clinical outcomes for women were in keeping with those for women receiving standard care however the numbers were small. Conclusion: The high satisfaction of the women suggests that CenteringPregnancy is an appropriate model of care for many women in Australian settings, particularly if recruitment strategies are addressed and women's partners can participate. Implications for practice: CenteringPregnancy group antenatal care assists women with the development of social support networks and is an acceptable way in which to provide antenatal care in an Australian setting. Recruitment strategies should include ensuring that practitioners are confident in explaining the advantages of group antenatal care to women in early pregnancy. Further research needs to be conducted to implement this model of care more widely.

Thapa, P., et al. (2019). "The power of peers: an effectiveness evaluation of a cluster-controlled trial of group antenatal care in rural Nepal." Reprod Health **16**(1): 150.

BACKGROUND: Reducing the maternal mortality ratio to less than 70 per 100,000 live births globally is one of the Sustainable Development Goals. Approximately 830 women die from pregnancy- or childbirth-related complications every day. Almost 99% of these deaths occur in developing countries. Increasing antenatal care quality and completion, and institutional delivery are key strategies to reduce maternal mortality, however there are many implementation challenges in rural and resource-limited settings. In Nepal, 43% of deliveries do not take place in an institution and 31% of women have insufficient antenatal care. Context-specific and evidence-based strategies are needed to improve antenatal care completion and institutional birth. We present an assessment of effectiveness outcomes for an adaptation of a group antenatal care model delivered by community health workers and midwives in close collaboration with government staff in rural Nepal. METHODS: The study was conducted in Achham, Nepal, via a public private partnership between the Nepali non-profit, Nyaya Health Nepal, and the Ministry of Health and Population, with financial and technical assistance from the American non-profit, Possible. We implemented group antenatal care as a prospective non-randomized, cluster-controlled, type I hybrid effectiveness-implementation study in six village clusters. The implementation approach allowed for iterative improvement in design by making changes to improve the quality of the intervention. We evaluated effectiveness through a difference in difference analysis of institutional birth rates between groups prior to implementation of the intervention and 1 year after implementation. Additionally, we assessed the change in knowledge of key danger signs and the acceptability of the group model compared with individual visits in a nested cohort of women receiving home visit care and home visit care plus group antenatal care. Using a directed content and thematic approach, we analyzed qualitative interviews to identify major themes related to implementation. RESULTS: At baseline, there were 457 recently-delivered women in the six village clusters receiving home visit care and 214 in the seven village clusters receiving home visit care plus group antenatal care. At endline, there were 336 and 201, respectively. The difference in difference analysis did not show a significant change in institutional birth rates nor antenatal care visit completion rates between the groups. There was, however, a significant increase in both institutional birth and antenatal care completion in each group from baseline to endline. We enrolled a nested cohort of 52 participants receiving home visit care and 62 participants receiving home visit care plus group antenatal care. There was high acceptability of the group antenatal care intervention and home visit care, with no significant differences between groups. A significantly higher percentage of women who participated in group antenatal care found their visits to be 'very enjoyable' (83.9% vs 59.6%, $p = 0.0056$). In the nested cohort, knowledge of key danger signs during pregnancy significantly improved from baseline to endline in the intervention clusters only (2 to 31%, $p < 0.001$), while knowledge of key danger signs related to labor and childbirth, the postpartum period, and the newborn did not in either intervention or control groups. Qualitative analysis revealed that women found that the groups provided an opportunity for learning and discussion, and the groups were a source of social support and empowerment. They also reported an improvement in services available at their village clinic. Providers noted the importance of the community health workers in identifying pregnant women in the

community and linking them to the village clinics. Challenges in birth planning were brought up by both participants and providers. CONCLUSION: While there was no significant change in institutional birth and antenatal care completion at the population level between groups, there was an increase of these outcomes in both groups. This may be secondary to the primary importance of community health worker involvement in both of these groups. Knowledge of key pregnancy danger signs was significantly improved in the home visit plus group antenatal care cohort compared with the home visit care only group. This initial study of Nyaya Health Nepal's adapted group care model demonstrates the potential for impacting women's antenatal care experience and should be studied over a longer period as an intervention embedded within a community health worker program. TRIAL REGISTRATION: ClinicalTrials.gov Identifier: NCT02330887 , registered 01/05/2015, retroactively registered.

Tiwarıl, A. T., A.; Choudhury, N.; Khatri, R.; Sapkota, S.; Wu, W. J.; Halliday, S.; Citrin, D.; Schwarz, R.; Maru, D.; Rayamazi, H.J.; Paudel, R.; Bhat, L.D.; Bhandari, V.; Marasini, N.; Khadka, S.; Bogati, B.;Saud, S.; Kshetri, Y.K.B.; Bhata, A.; Magar, K.R.; Shrestha, R.; Kafle, R.; Poudel, R.; Gautam, S.; Basnet, I.; Shrestha, G.N.; Nirola, I.; Adhikari, S.; Thapa, P.; Kunwar, L.; Maru, S. (2023). "A Type II hybrid effectiveness-implementation study of an integrated CHW intervention to address maternal healthcare in rural Nepal." PLOS Global Public Health.

Skilled care during pregnancy, childbirth, and postpartum is essential to prevent adverse maternal health outcomes, yet utilization of care remains low in many resource-limited countries, including Nepal. Community health workers (CHWs) can mitigate health system challenges and geographical barriers to achieving universal health coverage. Gaps remain, however, in understanding whether evidence-based interventions delivered by CHWs, closely aligned with WHO recommendations, are effective in Nepal's context. We conducted a type II hybrid effectiveness-implementation, mixed-methods study in two rural districts in Nepal to evaluate the effectiveness and the implementation of an evidence-based integrated maternal and child health intervention delivered by CHWs, using a mobile application. The intervention was implemented stepwise over four years (2014–2018), with 65 CHWs enrolling 30,785 families.

We performed a mixed-effects Poisson regression to assess institutional birth rate (IBR) pre-and post-intervention. We used the Reach, Effective- ness, Adoption, Implementation, and Maintenance framework to evaluate the implementation during and after the study completion. There was an average 30% increase in IBR post- intervention, adjusting for confounding variables ($p<0.0001$). Study enrollment showed 35% of families identified as Dalit, janjati, or other castes. About 78–89% of postpartum women received at least one CHW-counseled home visit within 60 days of childbirth. Ten (53% of planned) municipalities adopted the intervention during the study period. Implementation fidelity, measured by median counseled home visits, improved with intervention time. The intervention was institutionalized beyond the study period and expanded to four additional hubs, albeit with adjustments in management and supervision. Mechanisms of intervention impact include increased knowledge, timely referrals, and longitudinal CHW interaction. Full-time, supervised, and trained CHWs delivering evidence-based integrated care appears to be effective in improving maternal healthcare in rural Nepal. This study contributes to the growing body of evidence on the role of community health workers in achieving universal health coverage.

Tsiamparlis-Wildeboer, A. H. C., et al. (2023). "Self-management support by health care providers in prenatal Shared Medical Appointments (CenteringPregnancy©) and prenatal individual appointments." Patient Education and Counseling **107**.

Objective: This cross-sectional questionnaire study investigates if there a difference in the extent to which health care providers in prenatal Shared Medical Appointments (CenteringPregnancy©) and in prenatal individual appointments support self-management in patient education. It also investigates if there is a difference in the extent to which health care providers in CenteringPregnancy@ and in individual appointments pay attention to the factors of the Integrated Model for Behavioral Change (I-Change) in supporting self-management.
Methods: Dutch health care providers in prenatal care were invited to fill out a questionnaire. Respondents who provided care in CenteringPregnancy© formed the CenteringPregnancy© group, the others were categorized in the individual appointments' group. After a definition of self-management and an introduction of the I-Change model, respondents were asked if they supported self-management and if they paid attention to the I-Change model for each of 17 themes of prenatal patient education. Pearson's chi-squared tests and Fisher's Exact tests were performed to compare both groups.
Results: We included 133 respondents. Health care providers in the CenteringPregnancy@ group supported self- management to a higher extent compared to the individual appointments group. This difference was statistically significant for eight themes (body position and exercises, oral health, domestic violence, birth mechanism and pre- mature birth, postnatal period, transition from pregnancy to parenthood, taking care of the baby and newborn's safety). In both groups, health care providers paid most attention to information or to awareness factors instead of motivation factors.
Conclusion: We found a first prove that health care providers in CenteringPregnancy@ support self-management to a higher extent than health care providers in individual appointments. This could be explained by factors as time, feelings of safety and bonding, continuity of care and emphasis on future health behaviour changes. For effective self-management support, attention to motivation factors is important. However, we found that health care providers in both groups paid more attention to information or to awareness factors than to motivation.
Practice implications: Health care providers in prenatal individual appointments should be aware of the fact that they possibly support self-management less than health care providers in CenteringPregnancy@ . Health care providers in both types of prenatal care should be aware of the fact that they pay little attention to motivation factors. They might need some skills to change their role from teaching professional to supportive leader.

van Zwicht, B. S., et al. (2016). "Group based prenatal care in a low-and high risk population in the Netherlands: a study protocol for a stepped wedge cluster randomized controlled trial." BMC Pregnancy Childbirth **16**(1): 354.

BACKGROUND: CenteringPregnancy (CP) is a multifaceted group based care-model integrated in routine prenatal care, combining health assessment, education, and support. CP has shown some positive results on perinatal outcomes. However, the effects are less obvious when limited to the results of randomized controlled trials: as there are few trials and there is a variation in reported outcomes. Furthermore, former research was mostly conducted in the United States of America and in specific (often high risk) populations. Our study aims to

evaluate the effects of CP in the Netherlands in a general population of pregnant women (low and high risk). Furthermore we aim to explore the mechanisms leading to the eventual effects by measuring potential mediating factors. DESIGN: We will perform a stepped wedge cluster randomized controlled trial, in a Western region in the Netherlands. Inclusion criteria are <24 weeks of gestation and able to communicate in Dutch (with assistance). Women in the control period will receive individual care, women in the intervention period (starting at the randomized time-point) will be offered the choice between individual care or CP. Primary outcomes are maternal and neonatal morbidity, retrieved from a national routine database. Secondary outcomes are health behavior, psychosocial outcomes, satisfaction, health care utilization and process outcomes, collected through self-administered questionnaires, group-evaluations and individual interviews. We will conduct intention-to-treat analyses. Also a per protocol analysis will be performed comparing the three subgroups: control group, CP-participants and non-CP-participants, using multilevel techniques to account for clustering effects. DISCUSSION: This study contributes to the evidence regarding the effect of CP and gives a first indication of the effect and implementation of CP in both low and high-risk pregnancies in a high-income Western society other than the USA. Also, measuring factors that are hypothesized to mediate the effect of CP will enable to explain the mechanisms that lead to effects on maternal and neonatal outcomes. TRIAL REGISTRATION: Dutch Trial Register, NTR4178 , registered September 17(th) 2013.

Vandermorris, A. M., Brit; Sall, Mohamadou; Witol, Adrian; Traoré, Mahamadou; Lamesse-Diedhiou, Fatma; Bassani, Diego G. (2021). "Adolescents' experiences with group antenatal care: Insights from a mixed-methods study in Senegal." Tropical Medicine International Health **26**: 1700-1708.

Objectives: Group antenatal care (G-ANC) is an innovative model in which antenatal care is delivered to a group of 8–12 women of similar gestational age. Evidence from high-income countries suggests G-ANC is particularly effective for women from marginalised populations, including adolescents. The objective of this study was to examine the experiences of Senegalese adolescents engaged in group antenatal care.

Methods: This convergent parallel mixed-methods study is derived from a larger effectiveness–implementation hybrid pilot study conducted in Kaolack district, Senegal. Quantitative data for adolescent participants were collected through baseline and post- natal surveys and descriptively analysed. One-on-one interviews and focus-group discussions were conducted with adolescent participants, and qualitative data were ana- lysed using qualitative descriptive analysis.

Results: Forty-five adolescents aged 15–19 participated in G-ANC, with a median age of 18 years. The majority (93.3%) were married, and 64.4% were nulliparous. Findings indicated similar levels of G-ANC participation for adolescent and adult women. The majority (93.1%) of participants who had previously attended individual ANC indicated they would prefer G-ANC to individual care for a future pregnancy. Qualitative findings indicated key facets of consideration relevant to G-ANC for adolescents include social connectedness, the influence of social norms and the opportunity for engagement in healthcare.

Conclusions: This study suggests that G-ANC has the potential to be an adolescent- responsive and culturally appropriate method of delivering antenatal care in Senegal.

Venturelli, N., et al. (2017). "Could group prenatal care work by improving maternal health literacy?" Clinical Obstetrics, Gynecology and Reproductive Medicine **3**(4): 1-4.

Introduction: Studies comparing the group prenatal care (GPC) model to individual prenatal care have found a significant reduction in risk for preterm birth in infants born to mothers who participated in group care. The cause of this observed effect has never been fully explained. Methods: We reviewed the literature examining extrinsic factors that could lead to improved maternal-fetal health outcomes, focusing specifically on health literacy, and then mapped the components of group prenatal care to improved health literacy to consider the effects on the physical and psychological wellbeing of women and their children. Results: GPC may function to reduce rates of preterm birth through intervening at the level of health literacy. By synthesizing leading models of GPC with literature on the effects of improved health literacy on health outcomes, we propose a framework by which rates of preterm birth are reduced by specifically targeting improvement of health literacy as a means of intervention. Discussion: GPC effectively targets all aspects of health literacy and improves patients' access to healthcare, patient-provider interactions, and patient self-care practices. Further research will be required to evaluate the change in health literacy that patients in GPC undergo and whether health literacy lies on the causal pathway between GPC and improved health outcomes. Significance: The literature suggests that improvements in health literacy positively affect health outcomes. Research has also demonstrated that group prenatal care significantly reduces preterm birth and maternal psychosocial stress. However, maternal health literacy has not been evaluated before in regard to affecting birth outcomes, specifically preterm birth. We propose a framework that suggests a potential health literacy explanation for the observed reduction in preterm birth rates.

Vogel, J. P., et al. (2013). "Antenatal care packages with reduced visits and perinatal mortality: a secondary analysis of the WHO Antenatal Care Trial." Reprod Health **10**: 19.

BACKGROUND: In 2001, the WHO Antenatal Care Trial (WHOACT) concluded that an antenatal care package of evidence-based screening, therapeutic interventions and education across four antenatal visits for low-risk women was not inferior to standard antenatal care and may reduce cost. However, an updated Cochrane review in 2010 identified an increased risk of perinatal mortality of borderline statistical significance in three cluster-randomized trials (including the WHOACT) in developing countries. We conducted a secondary analysis of the WHOACT data to determine the relationship between the reduced visits, goal-oriented antenatal care package and perinatal mortality. METHODS: Exploratory analyses were conducted to assess the effect of baseline risk and timing of perinatal death. Women were stratified by baseline risk to assess differences between intervention and control groups. We used linear modeling and Poisson regression to determine the relative risk of fetal death, neonatal death and perinatal mortality by gestational age. RESULTS: 12,568 women attended the 27 intervention clinics and 11,958 women attended the 26 control clinics. 6,160 women were high risk and 18,365 women were low risk. There were 161 fetal deaths (1.4%) in the intervention group compared to 119 fetal deaths in the control group (1.1%) with an increased overall adjusted relative risk of fetal death (Adjusted RR 1.27; 95% CI 1.03, 1.58). This was attributable to an increased relative risk of fetal death between 32 and 36 weeks of gestation (Adjusted RR 2.24; 95% CI 1.42, 3.53) which was statistically significant for high and low risk groups. CONCLUSION: It is plausible the increased

risk of fetal death between 32 and 36 weeks gestation could be due to reduced number of visits, however heterogeneity in study populations or differences in quality of care and timing of visits could also be playing a role. Monitoring maternal, fetal and neonatal outcomes when implementing antenatal care protocols is essential. Implementing reduced visit antenatal care packages demands careful monitoring of maternal and perinatal outcomes, especially fetal death.

Wadsworth, K. H., et al. (2019). "Shared medical appointments and patient-centered experience: a mixed-methods systematic review." BMC Fam Pract **20**(1): 97.

BACKGROUND: Shared medical appointments (SMAs), or group visits, are a healthcare delivery method with the potential to improve chronic disease management and preventive care. In this review, we sought to better understand opportunities, barriers, and limitations to SMAs based on patient experience in the primary care context. METHODS: An experienced biomedical librarian conducted literature searches of PubMed, Cochrane Library, PsycINFO, CINAHL, Web of Science, ClinicalTrials.gov , and SSRN for peer-reviewed publications published 1997 or after. We searched grey literature, nonempirical reports, social science publications, and citations from published systematic reviews. The search yielded 1359 papers, including qualitative, quantitative, and mixed method studies. Categorization of the extracted data informed a thematic synthesis. We did not perform a formal meta-analysis. RESULTS: Screening and quality assessment yielded 13 quantitative controlled trials, 11 qualitative papers, and two mixed methods studies that met inclusion criteria. We identified three consistent models of care: cooperative health care clinic (five articles), shared medical appointment / group visit (10 articles) and group prenatal care / CenteringPregnancy(R) (11 articles). CONCLUSIONS: SMAs in a variety of formats are increasingly employed in primary care settings, with no singular gold standard. Accepting and implementing this nontraditional approach by both patients and clinicians can yield measurable improvements in patient trust, patient perception of quality of care and quality of life, and relevant biophysical measurements of clinical parameters. Further refinement of this healthcare delivery model will be best driven by standardizing measures of patient satisfaction and clinical outcomes.

Wagijo, M., et al. (2023). "Contributions of CenteringPregnancy to women's health behaviours, health literacy, and health care use in the Netherlands Effect of CenteringPregnancy on women's health behaviours, health literacy and healthcare use." Preventive Medicine Reports.

The objective of this study was to assess the effects of CenteringPregnancy (CP) in the Netherlands on different health outcomes. A stepped wedged cluster randomized trial was used, including 2132 women of approximately 12 weeks of gestation, from thirteen primary care midwifery centres in and around Leiden, Netherlands. Data collection was done through self-administered questionnaires. Multilevel intention-to-treat analysis and propensity score matching for the entire group and separately for nulliparous- and multiparous women were employed. The main outcomes were: health behaviour, health literacy, psychological outcomes, health care use, and satisfaction with care. Women's participation in CP is associated with lower alcohol consumption after birth (OR=0.59, 95%CI 0.42-0.84), greater consistency with norms for healthy eating and physical activity (β=0.19, 95%CI 0.02-0.37), and higher knowledge about pregnancy (β=0.05, 95%CI 0.01-0.08). Compared to the control group, nulliparous

women who participating in CP reported better compliance to the norm for healthy eating and physical activity (β=0.28, 95%CI0.06-0.51)) and multiparous CP participants consumed less alcohol after giving birth (OR=0.42, 95%CI 0.23-0.78). Health care use and satisfaction rates were significantly higher among CP participants. A non-significant trend toward lower smoking rates was documented among CP participants. Overall, the results of this study reveal a positive (postpartum) impact on fostering healthy behaviours among participants.

Wagijo, M., et al. (2023). "Contributions of CenteringPregnancy to women's health behaviours, health literacy, and health care use in the Netherlands." Prev Med Rep. **35**.

The objective of this study was to assess the effects of CenteringPregnancy (CP) in the Netherlands on different health outcomes. A stepped wedged cluster randomized trial was used, including 2132 women of approximately 12 weeks of gestation, from thirteen primary care midwifery centres in and around Leiden, Netherlands. Data collection was done through self-administered questionnaires. Multilevel intention-to-treat analysis and propensity score matching for the entire group and separately for nulliparous- and multiparous women were employed. The main outcomes were: health behaviour, health literacy, psychological outcomes, health care use, and satisfaction with care. Women's participation in CP is associated with lower alcohol consumption after birth (OR = 0.59, 95 %CI 0.42-0.84), greater consistency with norms for healthy eating and physical activity (β = 0.19, 95 %CI 0.02-0.37), and higher knowledge about pregnancy (β = 0.05, 95 %CI 0.01-0.08). Compared to the control group, nulliparous women who participating in CP reported better compliance to the norm for healthy eating and physical activity (β = 0.28, 95 %CI0.06-0.51)) and multiparous CP participants consumed less alcohol after giving birth (OR = 0.42, 95 %CI 0.23-0.78). Health care use and satisfaction rates were significantly higher among CP participants. A non-significant trend toward lower smoking rates was documented among CP participants. Overall, the results of this study reveal a positive (postpartum) impact on fostering healthy behaviours among participants.

Wagijo, M.-a. R., et al. (2022). "CenteringPregnancy in the Netherlands: Who engages, who doesn’t, and why." Birth: 1-12.

Background: CenteringPregnancy (CP), a model of group antenatal care, was implemented in 2012 in the Netherlands to improve perinatal health; CP is as- sociated with improved pregnancy outcomes. However, motivating women to participate in CP can be difficult. As such, we explored the characteristics associated with CP uptake and attendance and then investigated whether participation differs between health care facilities. In addition, we examined the reasons why women may decline participation and the reasons for higher or lower attendance rates.

Methods: Data from a stepped-wedge cluster randomized controlled trial were used. Univariate and multivariate logistic regression models were used to deter- mine associations among women's health behavior, sociodemographic and psychosocial characteristics, health care facilities, and participation and attendance in CP.

Results: A total of 2562 women were included in the study, and the average participation rate was 31.6% per health care facility (range of 10%-53%). Nulliparous women, women <26 years old or >30 years old, and women reporting average or high levels of stress were more likely to participate in CP. Participation was less likely for women who had stopped smoking before

prenatal intake, or who scored below average on lifestyle/pregnancy knowledge. For those participating in CP, 87% attended seven or more out of the 10 sessions, and no significant differences were found in women's characteristics when compared for higher or lower attendance rates. After the initial uptake, group attendance rates remained high. Conclusion: A more comprehensive understanding of the variation in participation rate between health care facilities is required, in order to develop effective strategies to improve the recruitment of women, especially those with less knowledge and understanding of health issues and smoking habits.

Wiggins, M., et al. (2020). "Group antenatal care (Pregnancy Circles) for diverse and disadvantaged women: study protocol for a randomised controlled trial with integral process and economic evaluations." BMC Health Serv Res **20**(1): 919.

BACKGROUND: Group antenatal care has been successfully implemented around the world with suggestions of improved outcomes, including for disadvantaged groups, but it has not been formally tested in the UK in the context of the NHS. To address this the REACH Pregnancy Circles intervention was developed and a randomised controlled trial (RCT), based on a pilot study, is in progress. METHODS: The RCT is a pragmatic, two-arm, individually randomised, parallel group RCT designed to test clinical and cost-effectiveness of REACH Pregnancy Circles compared with standard care. Recruitment will be through NHS services. The sample size is 1732 (866 randomised to the intervention and 866 to standard care). The primary outcome measure is a 'healthy baby' composite measured at 1 month postnatal using routine maternity data. Secondary outcome measures will be assessed using participant questionnaires completed at recruitment (baseline), 35 weeks gestation (follow-up 1) and 3 months postnatal (follow-up 2). An integrated process evaluation, to include exploration of fidelity, will be conducted using mixed methods. Analyses will be on an intention to treat as allocated basis. The primary analysis will compare the number of babies born "healthy" in the control and intervention arms and provide an odds ratio. A cost-effectiveness analysis will compare the incremental cost per Quality Adjusted Life Years and per additional 'healthy and positive birth' of the intervention with standard care. Qualitative data will be analysed thematically. DISCUSSION: This multi-site randomised trial in England is planned to be the largest trial of group antenatal care in the world to date; as well as the first rigorous test within the NHS of this maternity service change. It has a recruitment focus on ethnically, culturally and linguistically diverse and disadvantaged participants, including non-English speakers. TRIAL REGISTRATION: Trial registration; ISRCTN, ISRCTN91977441 . Registered 11 February 2019 - retrospectively registered. The current protocol is Version 4; 28/01/2020.

Wiggins, M., et al. (2018). "Testing the effectiveness of REACH Pregnancy Circles group antenatal care: protocol for a randomised controlled pilot trial." Pilot Feasibility Stud **4**: 169.

Background: Antenatal care is an important public health priority. Women from socially disadvantaged, and culturally and linguistically diverse groups often have difficulties with accessing antenatal care and report more negative experiences with care. Although group antenatal care has been shown in some settings to be effective for improving women's experiences of care and for improving other maternal as well as newborn health outcomes, these outcomes have not been rigorously assessed in the UK. A pilot trial will be conducted to

determine the feasibility of, and optimum methods for, testing the effectiveness of group antenatal care in an NHS setting serving populations with high levels of social deprivation and cultural, linguistic and ethnic diversity. Outcomes will inform the protocol for a future full trial. Methods: This protocol outlines an individual-level randomised controlled external pilot trial with integrated process and economic evaluations. The two trial arms will be group care and standard antenatal care. The trial will involve the recruitment of 72 pregnant women across three maternity services within one large NHS Acute Trust. Baseline, outcomes and economic data will be collected via questionnaires completed by the participants at three time points, with the final scheduled for 4 months postnatal. Routine maternity service data will also be collected for outcomes assessment and economic evaluation purposes. Stakeholder interviews will provide insights into the acceptability of research and intervention processes, including the use of interpreters to support women who do not speak English. Pre-agreed criteria have been selected to guide the decision about whether or not to progress to a full trial. Discussion: This pilot trial will determine if it is appropriate to proceed to a full trial of group antenatal care in this setting. If progression is supported, the pilot will provide authoritative high-quality evidence to inform the design and conduct of a trial in this important area that holds significant potential to influence maternity care, outcomes and experience. Trial registration: ISRCTN ISRCTN66925258. Registered 03 April 2017. Retrospectively registered.

Wiseman, O., et al. (2022). "The challenges and opportunities for implementing group antenatal care ('Pregnancy Circles') as part of standard NHS maternity care: A co-designed qualitative study." Midwifery **109**: 103333.

OBJECTIVE: To identify the challenges and opportunities for rolling out a bespoke model of group antenatal care called Pregnancy Circles (PC) within the National Health Service: what kind of support and training is needed and what adaptations are appropriate, including during a pandemic when face-to-face interaction is limited. DESIGN: Exploratory qualitative study (online focus group). Study co-designed with midwives. Data analysed thematically using an ecological model to synthesise. SETTING: Five maternity services within the National Health Service. PARTICIPANTS: Seven midwives who facilitated PCs. Three senior midwives with implementation experience participated in the co-design process. FINDINGS: Three themes operating across the ecological model were identified: 'Implementing innovation', 'Philosophy of care' and 'Resource management'. Tensions were identified between group care's focus on relationships and professional autonomy, and concepts of efficiency within the NHS's market model of care. Midwives found protected time, training and ongoing support essential for developing the skills and confidence needed to deliver this innovative model of care. Integrating Pregnancy Circles with continuity of carer models was seen as the most promising opportunity for long-term implementation. Midwives perceived continuity and peer support as the most effective elements of the model and there was some evidence that the model may be robust enough to withstand adaptation to online delivery. KEY CONCLUSIONS: Midwives facilitating group care enjoyed the relationships, autonomy and professional development the model offered. Harnessing this personal (micro-level) satisfaction is key to wider implementation. Group care is well aligned with current maternity policy but the challenges midwives face (temporal, practical and cultural) must be anticipated and addressed at macro and meso level for wider implementation to be sustainable. The PC model may be flexible

enough to adapt to online delivery and extend continuity of care but further research is needed in these areas. IMPLICATIONS FOR PRACTICE: Implementation of group care in the NHS requires senior leadership and expertise in change management, protected time for training and delivery of the model, and funding for equipment. Training and ongoing support, are vital for sustainability and quality control. There is potential for online delivery and integrating group care with continuity models.

Wiseman, O. H., L.; Robinson, H.; Mackeith, N.; Leap, N. (2017). "Advancing Practice: Facilitating group antenatal care: a new way of working." The Practising Midwife **20**(9): 18-20.

This article outlines the principles and evidence behind group antenatal care and explores how developing group facilitation skills can enhance midwifery practice. The authors discuss the impact of different training models developed by the REACH Pregnancy Programme to support the implementation of 'Pregnancy Circles' as part of a randomised controlled trial of group antenatal care within an NHS context.

Yang, X., et al. (2023). "Effects of the online and offline hybrid continuous group care on maternal and infant health: a randomized controlled trial." BMC Pregnancy and Childbirth **23**(1).

Background The group care is a well-established maternal care model that has been widely used in many developed countries, but in China, it is confined to prenatal care services. In addition, affected by traditional
birth culture, Chinese women tend to focus more on their fetuses and newborns but lack attention to their own intrapartum and postpartum care. The aim of this study was to construct and implement a prenatal, intrapartum, and the postpartum continuous group care model that combines online and offline service in Hainan Province, China, and to evaluate the effect on maternal women and newborns.

Methods This study was a randomized controlled trial involving 144 pregnant women in a first-class tertiary general hospital in Hainan Province, China. Women were divided into an intervention group and a control group using the random number table, with 72 women in each group. The control group received routine maternal care services, and the intervention group received the continuous group care based on the routine maternal care services. Count data such as rate of cesarean section and incidence rate of fetal macrosomia were analyzed with the chi-square test or Fisher's exact test, and the General Self-efficacy Scale scores were analyzed by repeated measures ANOVA. $P < 0.05$ was considered statistically significant, with two-sided probability values.

Results Compared with the control group, the rate of excessive prenatal weight gain, cesarean section, and 42-day postpartum depression were significantly lower in the intervention group ($P < 0.05$), and higher General Self-efficacy Scale scores (in the expectant period and 42 days postpartum) and exclusive breastfeeding rate (42 days postpartum) ($P < 0.05$). The incidence of fetal macrosomia was significantly lower in the intervention group ($P < 0.05$). But there was no significant difference in birth weight, preterm birth, the incidence of low-birth-weight infants and 1-min Apgar score ($P > 0.05$).

Conclusion The continuous group care with online and offline service can effectively control the gestational weight gain, reduce the rate of cesarean section, macrosomia, and postpartum

depression. It can improve the self-efficacy of women and the rate of exclusive breastfeeding effectively.