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# Maternal satisfaction with group care: a systematic review



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**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.

**Key words:** antenatal care, CenteringPregnancy, Connecting Pregnancy, Expect With Me, G-ANC, Group Based Antenatal Care, group care, perinatal care, postnatal care, Pregnancy Circles, prenatal care, quality of care, satisfaction

## Introduction

Centering-based group care is a comprehensive model for maternal perinatal care.<sup>1</sup> It combines clinical care with health promotion, information, peer

support, social network, and community building. It is provided in interactive groups facilitated by health professionals of different backgrounds, most often midwives, using a facilitative

leadership style. There is a structured approach to topics to be discussed; however, the depth of the facilitated discussion depends on the group's interest.<sup>1</sup> Unlike in some models of group health

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## AJOG Global Reports at a Glance

**Why was this study conducted?**

Self-reported satisfaction has been an important outcome in the delivery of perinatal group care, because it affects willingness for service utilization and access to care. Therefore, we wanted to examine the relationship between group perinatal care and maternal satisfaction.

**Key findings**

Seventeen out of 20 studies report higher satisfaction with antenatal group care than with standard individual care. No studies reported satisfaction with postnatal or overall perinatal care.

**What does this add to what is known?**

This is the most extensive systematic review to date on maternal satisfaction and group perinatal care. The satisfaction with group care, often reported anecdotally in opinion articles and alongside trial reports, is reflected across a range of studies and healthcare and social contexts.

education, health assessment occurs within the group space, women engage in self-care, group sessions are planned, and groups remain stable throughout the provision of care.<sup>1</sup> The primary model developed by Rising in the United States in 2003 is CenteringPregnancy.<sup>1</sup> In many countries, this model is known as group antenatal care (G-ANC).<sup>2–6</sup> There are similar models that share a similar philosophy and derived from the original model, including Connecting Pregnancy, implemented in Canada,<sup>7</sup> Expect With Me, implemented in the United States,<sup>8</sup> Group Based Antenatal Care, implemented in Denmark and Sweden,<sup>9</sup> and Pregnancy Circles implemented in the United Kingdom.<sup>10</sup>

This model has attracted interest globally. Since its introduction in maternity care, the model has been adopted in many countries and settings worldwide, often as a service to marginalized groups, to provide effective and culturally appropriate care for pregnancy and postpartum.<sup>11–13</sup> With scale up, there has been a continuous interest and effort to understand its impact on maternal and newborn outcomes, resulting in many studies documenting the effects of group care.<sup>13–17</sup> Among them, self-reported maternal satisfaction has been one of the key outcomes of interest since the model's inception.<sup>1</sup>

Measurement of patient satisfaction is complex for any kind of healthcare

service.<sup>18</sup> Self-reported satisfaction with care is a subjective and patient-centered outcome of care delivery linked to willingness for service utilization and access to care. It is also thought to link with benefits on psychological, medical, and behavioral outcomes. It is valuable when the definition of satisfaction is clear, which is only sometimes the case.<sup>19,20</sup> This limits the measurement and interpretation of patients' satisfaction.<sup>21</sup> Satisfaction measurement is similarly complex in mother or child care,<sup>22,23</sup> and many factors play a role.<sup>24</sup> Despite these challenges, satisfaction is a frequent and vital measure of the quality of care,<sup>25,26</sup> essential for policymakers, administrators, providers, and patients who are part of quality assurance efforts.<sup>21,25,26</sup> In the case of group care practice, one of the first tools to measure satisfaction with group care is the Littlefield and Adams tool for measuring satisfaction and participation.<sup>14,27</sup> A review in 2015 focusing on assessing outcomes of group care from randomized clinical trials identified only 1 study examining satisfaction of care.<sup>14</sup>

**Objective**

Given the importance of satisfaction in understanding the impact of group care in efforts to expand and scale up the centering-based group care globally,<sup>11,28</sup> we examined the quantitative relationship between group care and overall maternal satisfaction compared with standard individual care.

**Methods**

We performed a systematic review according to the Preferred Reporting Items for Systematic Reviews (PRISMA),<sup>29,30</sup> Conducting Systematic Reviews and Meta-Analyses of Observational Studies of Aetiology (COSMOS-E),<sup>31</sup> and Meta-analysis Of Observational Studies in Epidemiology (MOOSE) guidelines.<sup>32</sup> The protocol specifying study aim and methodological design was submitted and registered with PROSPERO (International Prospective Register of Systematic Reviews),<sup>33</sup> registration number CRD42021249943.

**Search**

We systematically searched CINAHL, Clinical Trials, The Cochrane Library, PubMed, Scopus, and Web of Science. We limited the search from 2003 and onward because the first studies reporting outcomes on CenteringPregnancy were published then. The search strategy was constructed and adapted using search strategies used by Catling et al.<sup>14</sup> It included search terms related to care, that is, "Pregnancy," "Infant," "Newborn," "Peripartum," "Perinatal," "Antenatal," "Postpartum," "Postnatal," and terms related to intervention, ie, "centering," "centeringpregnancy," "Centering Pregnancy," "group care," "groupcare," "Group Prenatal Care," "Group Antenatal Care," and "Group Postnatal Care." Search strategies were adapted to each search engine ([Online Appendix](#)). MeSH terms were used in the case of The Cochrane Library and PubMed. We manually searched papers using references of included articles or previous reviews on group care. An additional manual search was performed via Google Scholar to find articles that have cited included articles. The search was last updated in June 2023.

**Screening for eligibility**

The screening was performed by 4 researchers (F.S., H.B., F.T., and I.H.). After removing duplicates, the articles were screened for eligibility by examining titles and abstracts, followed by a full-text review. The eligibility criteria

for papers to be considered for inclusion in the review are presented in [Table 1](#). To be included, studies had to report data on women receiving perinatal group care, that is, care within 1000 days of care from the start of the pregnancy<sup>11,28</sup>; the intervention was centering-based perinatal care,<sup>1</sup> or synonym model known as G-ANC,<sup>2–5</sup> or similar models like Group Based Antenatal Care,<sup>9</sup> Expect With Me,<sup>8</sup> Pregnancy Circles<sup>10</sup> or Connecting Pregnancy<sup>7</sup>; the control group was standard individual care; and, studies reported a measure of overall satisfaction with care. Group care is provided during antenatal and postnatal periods; therefore, it is important to examine satisfaction during all stages of perinatal care. Using a general definition of maternal satisfaction for the measurement of the effect of group care was intentional because we wanted to capture all studies that have used different methods to measure overall satisfaction and then consider and group them for analysis. We considered only papers that reported a quantitative association between satisfaction and perinatal group care and only studies published in English. Studies were excluded if they reported other group care models or provided information only on specific elements of satisfaction, that is, communication, materials, sessions, or providers, but provided no overall satisfaction rating. Studies were also

excluded if they measured a general perception of quality of care or other quality measures without specifying mothers' satisfaction as an outcome. We did not exclude studies based on study design, as in Catling et al.<sup>14</sup> We included observational studies and nonrandomized designs. Agreements for the inclusion of studies were reached via consensus among reviewers (F.S., H.B., F.T., and I.H.). In case of disagreement or doubts, the decision for inclusion was reached with input from senior researchers (M.R., C.M., and S.S.R.).

#### Data extraction

We extracted information on the general characteristics of the studies, setting, population, intervention, satisfaction measurement, study design, and effect measures.

#### Quality assessment of studies

Quality assessment was performed using the Cochrane tools for Clinical Trials (RoB2) and observational studies (ROBINS-I).<sup>34,35</sup> RoB2 assesses 5 main domains of quality, including the randomization process, deviations from intended interventions, missing outcome data, measurement of the outcome, and issues with the selection of the reported results.<sup>34</sup> The modification for cluster randomized trials includes the sixth domain, that is, the timing of identification or recruitment

of participants. ROBINS-I assesses biases because of confounding, selection of participants, classification of interventions, deviations from intended interventions, missing data, measurement of outcomes, and bias in selecting the reported results.<sup>35</sup> Both tools include an overall assessment of the risk of bias based on specific algorithms, which were closely followed.

#### Data analysis and presentation

First, we summarized the study characteristics. Then, we generated an overview of intervention characteristics for each study and satisfaction measurement specifics. We presented the effect estimates of each study descriptively using a forest plot without performing an overall meta-analysis. For 2 studies<sup>36,37</sup> that reported multiple effect estimates (odds ratios) for satisfaction, we performed a fixed-effect meta-analysis to merge them into a single effect estimate of overall mother satisfaction. We presented studies reporting mean values and odds ratios in 2 separate plots. The presentation of studies in forest plots is organized by type of study design. Meta-analysis could not be performed because of variations in study designs and methods used to measure satisfaction. All analysis was performed using STATA, release V.17 BE (StataCorp, College Station, TX).

**TABLE 1**  
**Inclusion and exclusion criteria**

Study	Inclusion	Exclusion
Participants	Women receiving antenatal or postnatal care within first 1000 days from onset of pregnancy	Women receiving care after 1000 days from the onset of pregnancy
Intervention	Centering-based antenatal or postnatal group care	Other noncentering-based group care
Comparison	Individual care	Other models of care, studies with no comparison groups, or pre- and post assessments of intervention group
Outcomes	Overall measure of satisfaction	Individual measures of satisfaction (ie, satisfaction with materials, space, provider); other measures of quality of care
Setting	All countries, all facilities	None
Other	Studies establishing quantitative relationship between intervention and satisfaction with care. English language	Qualitative studies; other languages

Sadiku. Maternal satisfaction with group care. *Am J Obstet Gynecol Glob Rep* 2024.

### Deviations from the protocol

In the initial protocol, there was no pre-specified time limit. However, we imposed one to reduce the number of studies identified during the search process using the 2003 limit as the year when the first CenteringPregnancy study was published. Quality assessment was intended to be performed using the Ottawa-Newcastle scale.<sup>38</sup> However, owing to the nature of the included studies, we decided to use RoB2 and ROBINS-I, which are recognized standard assessment tools.<sup>34,35</sup>

## Results

### Selection of studies

We identified 4486 articles across 6 databases (Figure 1). A total of 44 articles were found through manual search from references of included articles or previous reviews. An additional 506 articles were found via manual search in Google Scholar by looking for documents that cited included articles. A total of 817 duplicate papers were excluded before the screening. Four thousand two hundred and nineteen manuscripts were screened for eligibility by examining the title and abstracts. A total of 547 papers were reviewed in full text to assess eligibility. Finally, 18 articles, encompassing data from 20 studies, were included in evidence synthesis.<sup>6,7,9,36,37,39–51</sup>

### Study characteristics

Table 2 summarize the study characteristics of all included studies. Five out of 20 studies were randomized control trials, 4 were cluster randomized control trials, 1 was cluster nonrandomized control trial, 3 were quasi-experimental studies, and 7 were cross-sectional studies. A total of 7685 women participated in these studies. Studies included in the review were published between 2007 to 2023. Seven studies were from the United States; 2 each from Canada, Egypt, and Sweden; and 1 each was from Iran, Kenya, Malawi, Nepal, The Netherlands, Nigeria, and Tanzania. Most studies (ie, 9) reported data on a sample of the general women population. Six studies reported data on women with low or medium obstetrical

risk. Two studies reported data from a sample of African American women and 2 with a sample of Hispanic women. One study reported data from women serving in the military. The mean age of the population ranged from 20.3 to 33.1 years for the intervention group and 20.6 to 33.8 for the control group.

### Intervention characteristics

Table 3 highlights intervention characteristics. All studies reported antenatal group care. No studies reported satisfaction with postnatal group care or overall perinatal care. In 15 studies, the intervention was CenteringPregnancy; in 1, it was adapted CenteringPregnancy; in 2, the intervention was Group Antenatal Care; and in another 2, it was Group Based Antenatal Care. In 6 studies, group care was provided by midwives; in 12 studies, multiple providers provided group care; and in 2 other studies, it was unclear who provided the care. Studies varied regarding the start of group care sessions from 12 weeks of gestation and on, but most studies were in the range of 12 to 24 weeks of gestation. In 17 studies, group care started with the first regular visit after intake; in 2 studies, after the first visit; and in 1 study, it was unclear when it began. In different studies, the number of planned group care sessions ranged from 4 to 10 sessions, which lasted from 1.5 to 2 hours, with groups of 2 to 15 women. All studies had a very high attendance of women in group care except one.<sup>46</sup>

### Satisfaction measurement characteristics

Table 4 reports the satisfaction measurement specifics by studies. The studies used different methods and a number of questions to assess the overall satisfaction with care in intervention and control groups. In 6 studies, satisfaction was measured using, often modified, the Patient Participation and Satisfaction Questionnaire.<sup>27</sup> Other studies used the questionnaire for the assessment of hospital-based care for women,<sup>52</sup> with the questionnaire derived from the most recommended dimensions of satisfaction in antenatal

care,<sup>44</sup> the adapted Visual Analogue Scale for satisfaction,<sup>53</sup> a modified antenatal care questionnaire,<sup>54</sup> a modified quality of the antenatal care questionnaire and standard CenteringPregnancy,<sup>55</sup> or the TRICARE Outpatient Satisfaction Survey.<sup>41</sup> Other studies designed new instruments to measure satisfaction with care. Twelve studies used multivariable assessment systems for assessing satisfaction, whereas 8 used single-variable measurement systems. Studies also varied in how they processed the data to generate the study outcomes. Eleven studies reported mean values. Nine studies reported odds ratios or reported data that allowed its calculation. Six out of 20 studies reported adjusted estimates.

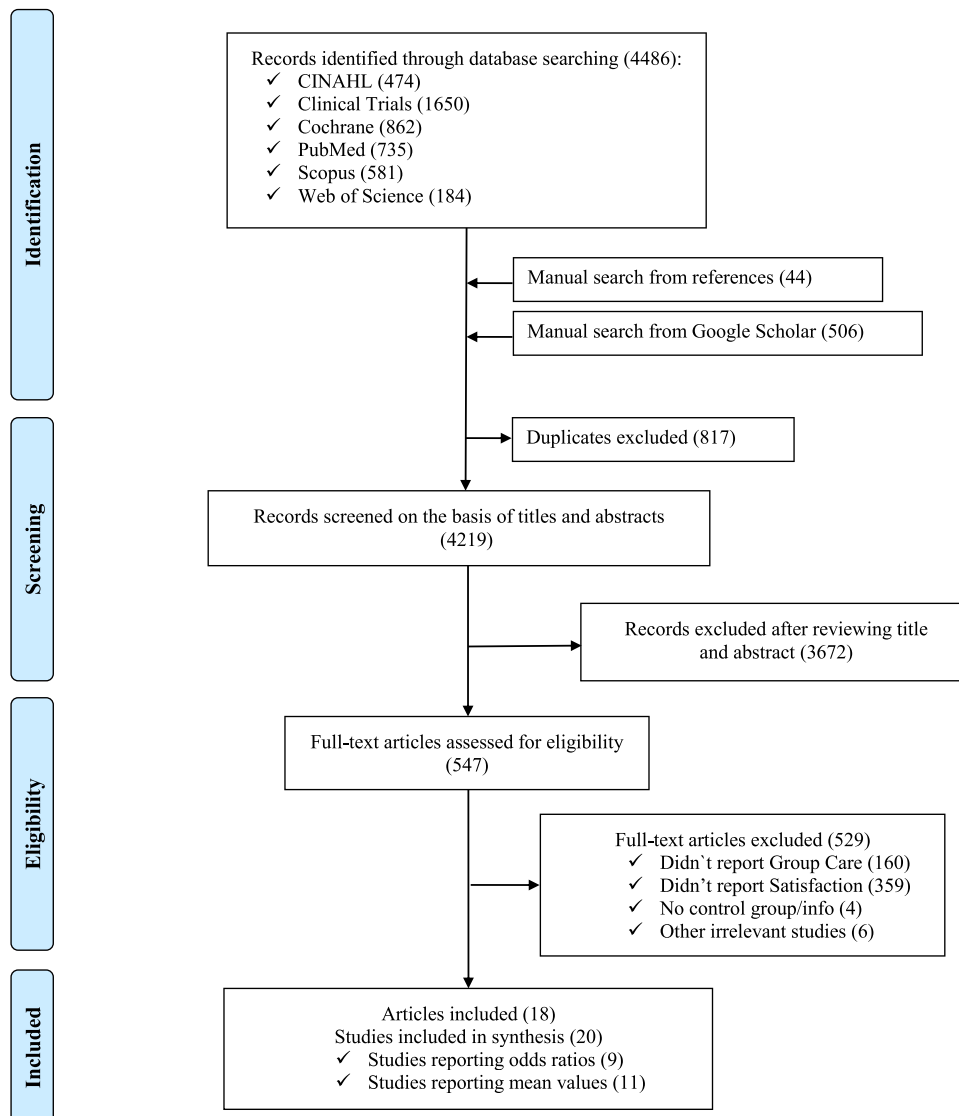
### Quality assessment of studies

The full quality assessment of studies is available in the Online Appendix. Three randomized control trials had a low risk of bias, 1 had some concerns, and another had a high risk of bias. All 4 cluster randomized trials had some concern about the risk of bias. For non-randomized studies, we found that 4 studies had a moderate risk of bias and 7 had a serious risk of bias (Online Appendix).

### Satisfaction with group care

Figure 2 shows the effect estimates of studies in the form of mean values or odds ratios. In the upper panel are studies reporting mean difference estimates and corresponding confidence intervals. Studies in the lower panel report odds ratios with their corresponding confidence intervals. In total, 17 out of 20 studies reported higher satisfaction with group care, and only 3 reported lower satisfaction. Some of the noted results are lower satisfaction with group care in both studies in Sweden and 1 of the 2 studies from Canada. Another interesting finding is the higher satisfaction in 14 out of 15 studies reporting CenteringPregnancy, Group Antenatal Care (1 study), and Adapted CenteringPregnancy (1 study).

**FIGURE 1**  
Study selection process



Sadiku. Maternal satisfaction with group care. *Am J Obstet Gynecol Glob Rep* 2024.

## Comment

### Principal findings

Most studies (ie, 17/20) report higher satisfaction with group care than individual care. Although indicative of higher maternal satisfaction, the results are often based on statistically insignificant effect estimates with wide confidence intervals and derived from small sample sizes. Three studies with randomized designs have a low risk of bias, 5 have some concerns about bias, and 1 has a high risk of bias. In nonrandomized studies, we found 4 studies with a

moderate risk of bias and 7 with a serious risk of bias.

### Comparison with the existing literature

In an integrative literature review, Manant et al first highlighted the impact of group care on maternal satisfaction.<sup>56</sup> Later on, based on 1 study, Catling et al<sup>14</sup> found that the mean difference of satisfaction with antenatal group care compared with standard care was 4.9 (95% confidence interval, 3.1–6.7), that is, 113.3 vs 108.4 of 125 maximum

scores. Other reviews have reported higher satisfaction with group care based on a few studies (1–5) and without reporting an overall effect from a meta-analysis.<sup>57–61</sup> Our analysis shows higher maternal satisfaction for group care for most identified studies.

### Strengths and limitations

One of the main strengths of this review is its rigorous execution. We have performed an extensive search and screening of papers by multiple reviewers. In addition, we conducted a thorough and

**TABLE 2**  
**Study characteristics**

Study	Year	Country	Study design	Location of study sites	Period of data collection	Number of hospitals/clinics	Total sample	Participants of the study	Mean age of study population <sup>a</sup>
Ickovics et al <sup>43</sup>	2007	United States	Randomized control trial	Urban	2001–2004	2	993	Women with low obstetrical risk	20.3 (2.6), 20.6 (2.7)
Andersson et al <sup>9</sup>	2013	Sweden	Randomized control trial	Urban and Rural	2008–2010	12	401	Women presenting for antenatal care	29.7 (19–44), 29.5 (17–44)
Patil et al A <sup>47</sup>	2017	Malawi	Randomized control trial	Rural	2014–2015	1	91	Women presenting for antenatal care	Unclear
Patil et al B <sup>47</sup>	2017	Tanzania	Randomized control trial	Urban	2014–2015	1	101	Women presenting for antenatal care	Unclear
Carter et al <sup>39</sup>	2020	United States	Randomized control trial	Unclear	Unclear	2	78	African American or Latina women with type 2 diabetes, no other comorbidities, and users of Medicaid	30.2 (5.6), 31.0 (5.4)
Jafari et al <sup>44</sup>	2010	Iran	Cluster randomized control trial	Urban	2007–2008	14	628	Women with low obstetrical risk	26 (5), 26.3 (4.7)
Grenier et al A <sup>6</sup>	2022	Nigeria	Cluster randomized control trial	Urban and Rural	2016–2018	20	1018	Women presenting for antenatal care	Unclear
Grenier et al B <sup>6</sup>	2022	Kenya	Cluster randomized control trial	Urban and Rural	2016–2018	20	826	Women presenting for antenatal care	Unclear
Wagjjo et al <sup>50</sup>	2023	Netherlands	Cluster randomized control trial	Unclear	2013–2016	15	1074	Women presenting for antenatal care	Unclear
Thapa et al <sup>37</sup>	2019	Nepal	Cluster nonrandomized control trial	Rural	2014–2016	13	114	Women presenting for antenatal care	25 (21–28)
Robertson et al <sup>48</sup>	2008	United States	Quasi-experimental study	Unclear	Unclear	1	49	Women of Hispanic ethnic group	24.6 (4.1), 26.5 (7.1)
El Sayed et al <sup>40</sup>	2018	Egypt	Quasi-experimental study	Unclear	2017–2018	1	150	Nuliparous women with a singleton pregnancy and low obstetrical risk	23.7 (2.3), 24.2 (1.5)
Marzouk et al <sup>46</sup>	2018	Egypt	Quasi-experimental study	Unclear	2016–2017	1	216	Women with low obstetrical risk	22.5 (1.7), 22.4 (1.8)
Klima et al <sup>45</sup>	2009	United States	Cross-sectional study	Urban	2004–2006	1	268	African American women with low	20.8–22.1

Sadiku. Maternal satisfaction with group care. *Am J Obstet Gynecol Glob Rep* 2024.

(continued)

**TABLE 2**  
**Study characteristics** (continued)

Study	Year	Country	Study design	Location of study sites	Period of data collection	Number of hospitals/clinics	Total sample	Participants of the study	Mean age of study population <sup>a</sup>
Wedin et al <sup>36</sup>	2010	Sweden	Cross-sectional study	Unclear	2005–2006	5	75	Women presenting for antenatal care	29.8–29.4
Tandon et al <sup>49</sup>	2013	United States	Cross-sectional study	Unclear	2008–2009	2	168	Hispanic or Mayan women	27.0 (6.4), 27.2 (6.4)
Hodgson et al <sup>7</sup>	2017	Canada	Cross-sectional study	Unclear	2012–2014	1	135	Women with low to medium obstetrical risk	33.1 (0.2), 33.8 (0.2)
Hetherington et al <sup>42</sup>	2018	Canada	Cross-sectional study	Urban	2015–2016	1	137	Women presenting for antenatal care	27.4 (30.3), 29.6 (31.4)
Walton et al <sup>51</sup>	2019	United States	Cross-sectional study	Rural	2017–2018	1	21	Women with low obstetrical risk	24.6 (3.8), 24.7 (3.9)
Fowler et al <sup>41</sup>	2020	United States	Cross-sectional study	Unclear	2014–2016	16	1142	Women serving military	Unclear

SD, standard deviation.

<sup>a</sup> Overall (if only 1 set of data reported), Group care, Individual care; mean (SD or range).

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**TABLE 3**  
**Intervention characteristics**

Study	Year	Model of care	Type of intervention	Type of care provider	Start of group care (gestation age, wk)	Start of group care (visit)	Planned sessions	Length of sessions (h)	Number of women enrolled per session	Attended sessions
Ickovics et al <sup>43</sup>	2007	Centering Pregnancy	Ongoing	Multiple	<24	First visit	10	2	8–10	Likely high or full attendance
Andersson et al <sup>9</sup>	2013	Group Based Antenatal Care	Ongoing	Midwife	≥20	First visit	10	2	Unclear	9.32 (3.44) <sup>a</sup>
Patil et al A <sup>47</sup>	2017	Centering Pregnancy	Pilot	Multiple	20–24	First visit	Up to 4	2	12	100% (4 sessions)
Patil et al B <sup>47</sup>	2017	Centering Pregnancy	Pilot	Multiple	20–24	First visit	Up to 4	2	12	100% (4 sessions)
Carter et al <sup>39</sup>	2020	Centering Pregnancy	Pilot	Multiple	22–34	First visit	5	2	2–10	Likely high or full attendance
Jafari et al <sup>44</sup>	2010	Centering Pregnancy	Pilot	Midwife	<24	First visit	10	1.5–2	8–10	92.8% (≥80% attendance)
Grenier et al A <sup>6</sup>	2022	Group Antenatal Care	Ongoing	Multiple	≤24	First visit	5	2	8–15	Likely high or full attendance
Grenier et al B <sup>6</sup>	2022	Group Antenatal Care	Ongoing	Multiple	≤24	First visit	5	2	8–15	Likely high or full attendance
Wagijo et al <sup>50</sup>	2023	Centering Pregnancy	Pilot	Multiple	~12	First visit	10	2	8–12	87% (≥7 sessions)
Thapa et al <sup>37</sup>	2019	Adapted Centering Pregnancy	Pilot	Midwife	<24	First visit	4	2	Unclear	96% (≥4 sessions)
Robertson et al <sup>48</sup>	2008	Centering Pregnancy	Ongoing	Midwife	24–26	First visit	At least 4	1.5	8–12	100% (≥4 sessions)
El Sayed et al <sup>40</sup>	2018	Centering Pregnancy	Pilot	Unclear	12–16	First visit	10	1.5	6–8	Likely high or full attendance
Marzouk et al <sup>46</sup>	2018	Centering Pregnancy	Pilot	Midwife	≤24	First visit	10	1.5–2	9	100% (≥4 sessions)
Klima et al <sup>45</sup>	2009	Centering Pregnancy	Pilot	Multiple	<18	Not with the first visit	10	2	4–10	9.7 (2.7) <sup>a</sup>
Wedin et al <sup>36</sup>	2010	Group Based Antenatal Care	Pilot	Midwife	Unclear	First visit	9	2	Unclear	97.1% (100% attendance)
Tandon et al <sup>49</sup>	2013	Centering Pregnancy	Pilot	Multiple	≤20	First visit	10	2	3–12	90.0% (≥80% attendance)
Hodgson et al <sup>7</sup>	2017	Centering Pregnancy	Ongoing	Multiple	18–20	Not with the first visit	9–10	2	11–12	Likely high or full attendance
Hetherington et al <sup>42</sup>	2018	Centering Pregnancy	Ongoing	Multiple	Unclear	First visit	10	Unclear	8–12	Likely high or full attendance
Walton et al <sup>51</sup>	2019	Centering Pregnancy	Ongoing	Unclear	≥16 (94.3% of the sample)	First visit	10	1.5–2	8–12	86.8% (≥80% attendance)
Fowler et al <sup>41</sup>	2020	Centering Pregnancy	Ongoing	Multiple	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear

<sup>a</sup> Mean number of sessions attended (standard deviation).

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**TABLE 4**  
**Measurement of maternal satisfaction specifics**

Study	Year	Method of measurement	Measurement variable/s	Measurement scale	Use/processing of measurement	Type of effect	Type of effect	Adjusting variables
Ickovics et al <sup>43</sup>	2007	Satisfaction was measured with the modified Patient Participation and Satisfaction Questionnaire. <sup>27</sup> Three items were added to the original instrument.	Multivariable measurement assessing multiple aspects of satisfaction with care.	Users rated satisfaction with care using a five-point Likert scale from “very dissatisfied” (1) to “very satisfied” (5).	Cumulative composite measure derived from multiple variables.	Mean	Adjusted	Age, history of preterm birth, prenatal distress, prior miscarriage, race, smoking, and stillbirth
Andersson et al <sup>9</sup>	2013	Satisfaction was measured using a question from the questionnaire for the assessment of hospital-based care for women. <sup>52</sup>	Single-variable measurement assessing the overall satisfaction with care.	Users rated satisfaction with care using a four-point Likert scale from “do not agree at all” (1) to “totally agree” (4).	Dichotomized measure from a single variable. Dichotomized comparison was “satisfied” vs “less than satisfied.”	Odds ratio	Adjusted	Parity and level of education
Patil et al A <sup>47</sup>	2017	Satisfaction was measured with the study-specific designed section of the questionnaire. A total of 10 questions measured satisfaction with care.	Multivariable measurement assessing multiple aspects of satisfaction with care.	Users rated satisfaction with care using a five-point scale from “poor” (1) to “excellent” (5).	Cumulative composite measure derived from multiple variables.	Mean	Unadjusted	None
Patil et al B <sup>47</sup>	2017	Satisfaction was measured with the study-specific designed section of the questionnaire. A total of 10 questions measured satisfaction with care.	Multivariable measurement assessing multiple aspects of satisfaction with care.	Users rated satisfaction with care using a five-point scale from “poor” (1) to “excellent” (5).	Cumulative composite measure derived from multiple variables.	Mean	Unadjusted	None
Carter et al <sup>39</sup>	2020	Satisfaction was measured with the study-specific designed question of the questionnaire.	Single variable measurement assessing the overall satisfaction with care.	Users rated satisfaction with care using a 10-point scale from “being least satisfied” (0) to “being most satisfied” (10).	Continuous measure from a single variable.	Mean	Unadjusted	None

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(continued)

TABLE 4

## Measurement of maternal satisfaction specifics (continued)

Study	Year	Method of measurement	Measurement variable/s	Measurement scale	Use/processing of measurement	Type of effect	Type of effect	Adjusting variables
Jafari et al <sup>44</sup>	2010	Satisfaction with prenatal care was measured using a question from the questionnaire derived from the most recommended dimensions of satisfaction in prenatal care by other. <sup>54, 68–70</sup>	Single-variable measurement assessing the overall satisfaction with care.	Users rated satisfaction with care using a four-point Likert scale from “very dissatisfied” (1) to “very satisfied” (4).	Continuous measure from a single variable.	Mean	Adjusted	Information received, communication, coordination
Grenier et al A <sup>6</sup>	2022	Satisfaction was measured with a study-specific designed question of the questionnaire.	Single-variable measurement assessing the overall satisfaction with care.	Users rated satisfaction with care by a dichotomous response as “yes” or “no.”	Dichotomized measure from a single variable. Dichotomized comparison was “yes” vs “no.”	Odds ratio	Unadjusted	None
Grenier et al B <sup>6</sup>	2022	Satisfaction was measured with a study-specific designed question of the questionnaire.	Single-variable measurement assessing the overall satisfaction with care.	Users rated satisfaction with care by a dichotomous response as “yes” or “no.”	Dichotomized measure from a single variable. Dichotomized comparison was “yes” vs “no.”	Odds ratio	Unadjusted	None
Wagijo et al <sup>50</sup>	2023	Satisfaction was measured with the modified Patient Participation and Satisfaction Questionnaire. <sup>27</sup>	Multivariable measurement assessing multiple aspects of satisfaction with care.	Users rated satisfaction with care using a five-point Likert scale from “very dissatisfied” (1) to “very satisfied” (5).	Average composite measure derived from multiple variables.	Mean	Adjusted	Age, alcohol use, smoking, dental hygiene, medication use, stress, eating behavior, physical activity, lifestyle, and pregnancy knowledge, coping mechanisms, support, weight and health-care use before pregnancy
Thapa et al <sup>37</sup>	2019	Satisfaction was measured with a study-specific	Multivariable measurement assessing multiple aspects of	Users rated satisfaction with care as “not useful,” “somewhat useful,”	Dichotomized composite measure derived from multiple variables.	Odds ratio	Unadjusted	None

TABLE 4

## Measurement of maternal satisfaction specifics (continued)

Study	Year	Method of measurement	Measurement variable/s	Measurement scale	Use/processing of measurement	Type of effect	Type of effect	Adjusting variables
		designed questionnaire.	satisfaction with care.	or “very useful.” For another variable, they rated care as “provided poor care,” “provided mediocre care,” or “provided excellent care.”	Dichotomized comparison was “very useful” and “provided excellent care” vs “somewhat useful” and “provided mediocre care.”			
Robertson et al <sup>48</sup>	2008	Satisfaction was measured with the modified Patient Participation and Satisfaction Questionnaire. <sup>27</sup> Three items developed by the Centering Pregnancy and Parenting Association (CPPA) were added to the original scale.	Multivariable measurement assessing multiple aspects of satisfaction with care.	Users rated satisfaction with care using a five-point Likert scale from “very dissatisfied” (1) to “very satisfied” (5).	Cumulative composite measure derived from multiple variables.	Mean	Unadjusted	None
El Sayed et al <sup>40</sup>	2018	Satisfaction was measured using the adapted Visual Analogue Scale for satisfaction. <sup>53</sup>	Single-variable measurement assessing the overall satisfaction with care.	Users rated satisfaction with care by making a vertical mark on the 10 cm horizontal line ranging from “dissatisfied” (0 cm) to “very satisfied” (10 cm).	Dichotomized measure from a single variable. This scale ranked as no satisfaction (zero), low satisfaction (1-3), moderate satisfaction (4-7), and high satisfaction (8-10). Dichotomized comparison was “high satisfaction” vs “low or moderate satisfaction.”	Odds ratio	Unadjusted	None
Marzouk et al <sup>46</sup>	2018	Satisfaction was measured with the modified Patient Participation and Satisfaction Questionnaire. <sup>27</sup>	Multivariable measurement assessing multiple aspects of satisfaction with care.	Users rated satisfaction with care using a five-point Likert scale from “very dissatisfied” (1) to “very satisfied” (5).	Cumulative composite measure derived from multiple variables.	Mean	Unadjusted	None

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(continued)

TABLE 4

## Measurement of maternal satisfaction specifics (continued)

Study	Year	Method of measurement	Measurement variable/s	Measurement scale	Use/processing of measurement	Type of effect	Type of effect	Adjusting variables
		Only the satisfaction subscale from the original instrument was used.						
Klima et al <sup>45</sup>	2009	Satisfaction was measured with the modified prenatal care questionnaire. <sup>54</sup> A total of 11 questions measured the technical quality, art, availability, and efficacy of care.	Multivariable measurement assessing multiple aspects of satisfaction with care.	Users rated satisfaction with care using a five-point Likert scale from “poor” (1) to “excellent” (5).	Average composite measure derived from multiple variables.	Mean	Unadjusted	None
Wedin et al <sup>36</sup>	2010	Satisfaction was measured with a study-specific designed section of the questionnaire. A total of 3 questions measured satisfaction with care.	Multivariable measurement assessing multiple aspects of satisfaction with care.	Users rated satisfaction with care using a dichotomous choice rating experience with care as “negative/dissatisfied” or “positive/satisfied”.	Dichotomized composite measure derived from multiple variables. Dichotomized comparison was “positive/satisfied” vs “negative/dissatisfied”.	Odds ratio	Unadjusted	None
Tandon et al <sup>49</sup>	2013	Satisfaction was measured with the Patient Participation and Satisfaction Questionnaire. <sup>27</sup> Only the satisfaction subscale with 17 items from the original scale was used.	Multivariable measurement assessing multiple aspects of satisfaction with care.	Users rated satisfaction with care using a five-point Likert scale from “very dissatisfied” (1) to “very satisfied” (5).	Cumulative composite measure derived from multiple variables.	Mean	Unadjusted	None
Hodgson et al <sup>7</sup>	2017	Satisfaction was measured with the modified Patient Participation and Satisfaction Questionnaire. <sup>27</sup> Three items were added	Multivariable measurement assessing multiple aspects of satisfaction with care.	Users rated satisfaction with care using a five-point Likert scale from “very dissatisfied” (1) to “very satisfied” (5).	Cumulative composite measure derived from multiple variables.	Mean	Adjusted	Age, effects of care, ethnicity, and parity

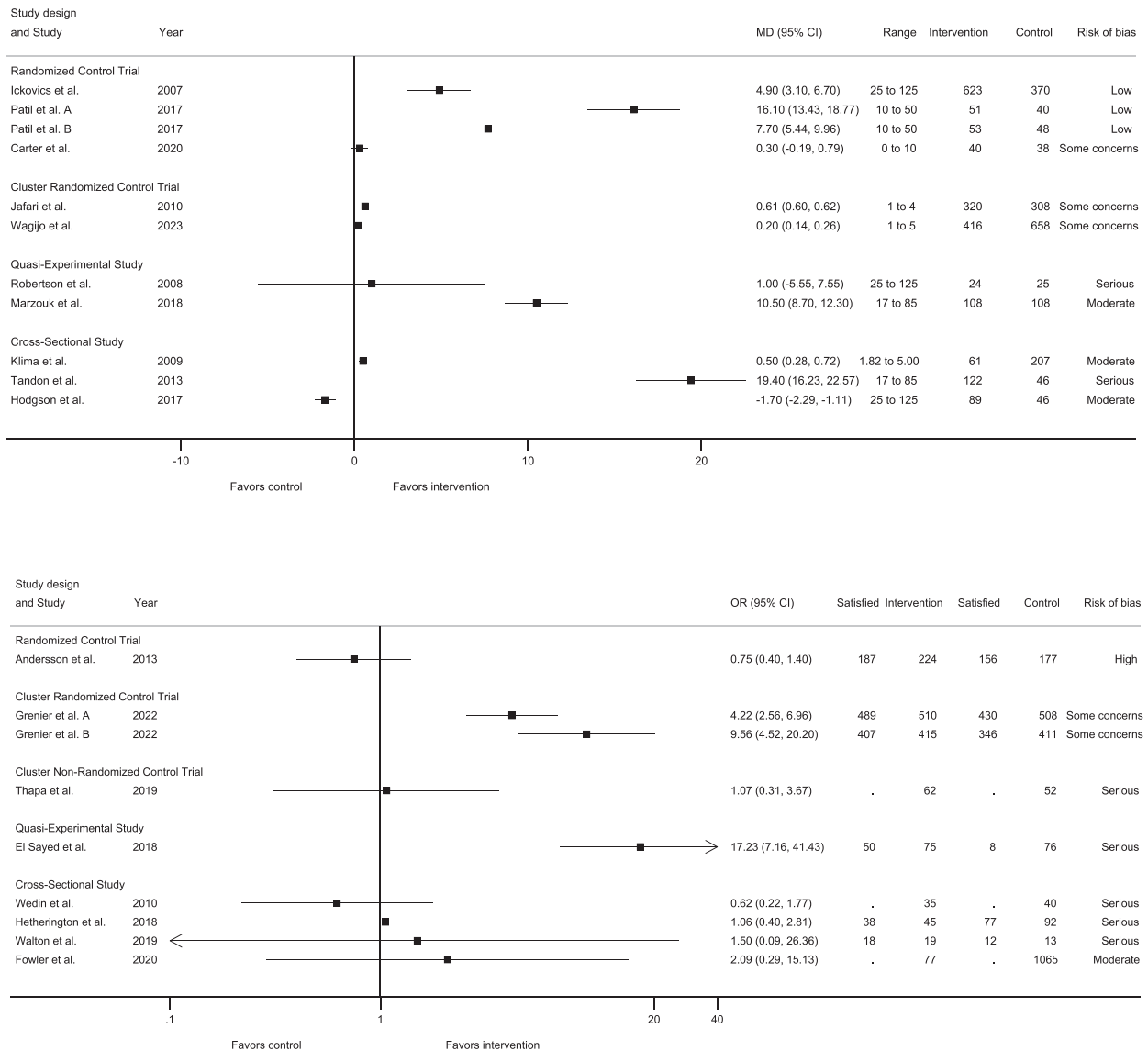
TABLE 4

## Measurement of maternal satisfaction specifics (continued)

Study	Year	Method of measurement	Measurement variable/s	Measurement scale	Use/processing of measurement	Type of effect	Type of effect	Adjusting variables
		to the original instrument.						
Hetherington et al <sup>42</sup>	2018	Satisfaction was measured with the modified quality of the prenatal care questionnaire and standard Centering Pregnancy program evaluation questions. <sup>55</sup>	Single-variable measurement assessing the overall satisfaction with care.	Users rated satisfaction with care using a three-point scale from “disagree” to “agree”.	Dichotomized measure from a single variable. Dichotomized comparison was “agree” vs “neutral/disagree.”	Odds ratio	Unadjusted	None
Walton et al <sup>51</sup>	2019	Satisfaction was measured with a study-specific designed question in the questionnaire.	Single-variable measurement assessing the overall satisfaction with care.	Users rated satisfaction with care using a five-point Likert scale from “extremely dissatisfied” (1) to “extremely satisfied” (5).	Dichotomized measure from a single variable. Dichotomized comparison was “satisfied” vs “not satisfied.”	Odds ratio	Unadjusted	None
Fowler et al <sup>41</sup>	2020	Satisfaction was measured with the TRICARE Outpatient Satisfaction Survey (TROSS).	Multivariable measurement assessing multiple aspects of satisfaction with care.	Users rated satisfaction with care using an 10-point scale from (0) to (10).	Dichotomized composite measure derived from multiple variables. Patient responses with scores of 9 or 10 indicating satisfaction were rescaled to a dichotomized measure.	Odds ratio	Adjusted	Age, beneficiary category, level of education, and self-rated health

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**FIGURE 2**  
**Descriptive Forest plot of maternal satisfaction with group care vs standard care**



**A**, Studies reporting mean difference (upper panel); **B**, Studies reporting odds ratios (lower panel).

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detailed review of study characteristics, intervention characteristics, and measurement of maternal satisfaction specifics. Finally, we assessed the quality of studies using recognized tools for risk of bias assessment.

Nonetheless, important limitations should be noted. The studies varied in design, satisfaction measurement, sample characteristics and statistical analysis specifics. The assessment of model fidelity, that is, the extent to which interventions follow group care model

criteria, which we attempted, was difficult to assess based on data provided by the studies. This is mainly because the studies do not report the details of the model of interventions but rather provide key information on the model they used. The judgment for inclusion was based on this key information. In addition, contextual factors such as the healthcare system and whether the group model also introduces other changes, such as midwife-led care, may impact satisfaction that is difficult to

disentangle. It is in the nature of complex interventions that the effect of different features may be greater than the sum of the parts. Complex person-centered interventions may also be more or less effective depending on implementation factors such as the level and quality of preparation and training for healthcare professionals and how they respond to the change. Furthermore, there is no data to assess the influence of providers' experience and skill sets in intervention and control groups on

satisfaction, especially given the heterogeneity of provider type among studies. Another important challenge is the measurement method of satisfaction, which not only differed, that is, was measured using different variables, scales, and a number of variables, but also included other effects in the composite measures, such as participation.<sup>27</sup> This, and study design variation, prevented us from conducting a formal meta-analysis that could lead to more conclusive results on the effect of group care on maternal satisfaction. However, it is worth noting that no matter which tools were used, the studies showed consistently higher satisfaction with group care. Moreover, one of the significant challenges and limitations associated with satisfaction studies lies in the complexity of measuring satisfaction. It is a subjective measure that often reflects individual expectations, among other factors. In addition, satisfaction does not explain the possible psychosocial benefits of different care models but only captures one dimension. However, despite the intricacy of the satisfaction measurement,<sup>22–24</sup> it is a frequent and important measure of the quality of care.<sup>21,25,26</sup> Finally, the results, although indicative of higher maternal satisfaction, are often based on statistically insignificant effect estimates or with wide confidence intervals and small sample sizes.

### Interpretation

A range of theories has been put forward to explain the observed satisfaction with the centering-based perinatal care model, including time for information exchange, a less didactic approach, peer support from the group, continuity of care through pregnancy, and enabling a more relational approach to care. Systematic review of provider experiences by Lazar et al<sup>62</sup> identified that group-care facilitators felt this approach gave women the care they wanted and needed. The review also highlighted professional satisfaction, which may in itself enhance the quality of care.<sup>62</sup> One of the explanations may be the “midwife effect” itself that results in better satisfaction. From early on to

recent times, we have seen a positive impact of midwife care in multiple birth care-related outcomes.<sup>63,64</sup> Even in this review, in most studies, we see midwives as a single provider or as one of the providers (in multiprofessional teams) of group care. To investigate the roots of satisfaction with this model, a systematic review and meta-synthesis of qualitative studies is in process.<sup>65</sup>

Centering-based models offer notable advantages over individual care, leading to higher satisfaction levels. The key benefits of these models include the provision of a supportive and interactive group environment that fosters strong connections between women and healthcare providers, promoting a sense of community and shared experiences. Moreover, these models encompass comprehensive care that addresses various pregnancy aspects, such as health education, individual assessments, and group discussions. This holistic approach ensures that women's diverse needs are met, contributing to increased satisfaction. In addition, the patient-centered approach actively involves women in decision-making, and tailors care to their preferences and needs, empowering women and promoting their active participation. These factors collectively contribute to the heightened satisfaction levels observed with these models.

Lower satisfaction in Swedish and Canadian studies may relate to the context where care was provided. The maternity care systems in Sweden and Canada have a relatively autonomous and established midwifery profession, and the quality of standard care is likely to be higher. However, the Netherlands, too, have a very autonomous midwifery profession, but group care yields higher satisfaction than traditional care.<sup>50</sup> It is worth noting that group care models applied in these countries were not strictly CenteringPregnancy models. Centering-based models strongly focus on appropriate training to learn facilitation and active group learning. Attitude change among care professionals is not easy, and stepping away from the didactic care delivery model and interaction with patients can be difficult.<sup>66</sup> The

power of those aspects may be underestimated in other models, potentially because it is more disruptive and harder to integrate into regular care. Furthermore, lower satisfaction may result from midwives' reservations or problems with organization and proper preparation of the intervention and the trial.<sup>9,67</sup> In the case of the study of Wedin et al,<sup>36</sup> it is interesting to note that qualitative data show higher satisfaction than quantitative data. This all illustrates the importance of context and the challenge of using satisfaction as a single measure.

### Implications

This review provides additional incentives and encouragement for the application and scale of group care globally. However, more high-quality studies are needed to conclusively establish the association between perinatal group care and mothers' satisfaction. Furthermore, a deeper understanding of factors underlying satisfaction with perinatal care, such as contextual, intervention, and measurement characteristics, is also important. When it comes to intervention factors, examining the role of essential elements in effective group care is particularly important. That would inform practice and efforts for implementing and scaling group care. The availability of various tools used to measure satisfaction is also helpful for any future effort to examine the impact of group care on maternal satisfaction. Some of the tools provide multivariable assessment systems that explore many aspects of satisfaction as well as domains related to it (ie, participation). Other tools offer simple measures for assessing overall satisfaction with care. Examination of specific domains of satisfaction and participation (ie, maternal isolation, building of long-lasting relationships) is also important because an overall composite measure of satisfaction will hide such effects. Finally, it should be understood that satisfaction is only one of the outcomes of group care. Other important clinical and behavioral maternal and newborn outcomes should be considered when

assessing the benefits of the centering-based group care models.

### Conclusion

Our review confirms higher maternal satisfaction with antenatal group care than standard individual care. This likely reflects group care methodology, which combines clinical care with health promotion and information efforts and peer support. It may also reflect the interactive learning environment and experience sharing embodied in the group care approach. This evidence is an important confirmation of the positive effects of group care, which should be used to improve the efforts for measuring maternal satisfaction with group care and advocacy efforts that promote group care. ■

### CRediT authorship contribution statement

**Fitim Sadiku:** Conceptualization, Data curation, Investigation, Methodology, Validation, Writing – original draft, Writing – review & editing. **Hana Bucinca:** Data curation, Investigation, Writing – review & editing. **Florence Talrich:** Data curation, Investigation, Methodology, Validation, Writing – review & editing. **Vlorian Molliqaj:** Conceptualization, Investigation, Methodology, Supervision, Validation, Writing – review & editing, Project administration. **Erza Selmani:** Data curation, Formal analysis, Methodology, Writing – review & editing. **Christine McCourt:** Methodology, Validation, Writing – review & editing. **Marlies Rijnders:** Methodology, Validation, Writing – review & editing, Funding acquisition, Project administration. **George Little:** Conceptualization, Validation, Writing – review & editing. **David C. Goodman:** Conceptualization, Methodology, Validation, Writing – review & editing. **Sharon Schindler Rising:** Conceptualization, Methodology, Supervision, Validation, Writing – review & editing. **Ilir Hoxha:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Software, Supervision, Validation, Visualization, Writing –

original draft, Writing – review & editing. ■

### Supplementary materials

Supplementary material associated with this article can be found in the online version at [doi:10.1016/j.xagr.2023.100301](https://doi.org/10.1016/j.xagr.2023.100301).

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