Women and Birth 34 (2021) 381–388

Contents lists available at ScienceDirect

Women and Birth

journal homepage: www.elsevier.com/locate/wombi

Enhanced Antenatal Care: Combining one-to-one and group Antenatal Care models to increase childbirth education and address childbirth fear

Emma Marie Swift[a,*], Helga Zoega[b,c], Kathrin Stoll[d], Melissa Avery[e], Helga Gottfreðsdóttir[a,f]

[a] Faculty of Nursing/Department of Midwifery, University of Iceland, Eirberg við Eiríksgötu, 101 Reykjavík, Iceland
[b] Centre of Public Health Sciences, Faculty of Medicine, University of Iceland, Sturlugata 8, 101 Reykjavík, Iceland
[c] Centre for Big Data Research in Health, Faculty of Medicine, University of New South Wales, Sydney, NSW 2052, Australia
[d] Division of Midwifery, University of British Columbia, Vancouver, Canada
[e] University of Minnesota, School of Nursing, Minneapolis, MN, USA
[f] Women's Clinic, Landspitali University Hospital, 101 Reykjavik, Iceland

ARTICLE INFO

Article history:
Received 21 April 2020
Received in revised form 23 June 2020
Accepted 25 June 2020

Keywords:
Enhanced Antenatal Care
Group antenatal care
Fear of birth
Education
Pregnancy

ABSTRACT

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.

Statement of significance

Issue

Education and support are important to women, but antenatal appointments are often focused on screening and physical assessment and there may not be time to discuss topics in depth.

What is already known

Group antenatal care include increased contact time and unique opportunities for expanding knowledge, building skills, receiving reassurance, sharing information and developing relationships with other expecting parents and maternity care providers

What this paper adds

Evidence that Enhanced Antenatal Care, a model combining one-on-one and group antenatal care may be beneficial in terms of providing education and support, as well as lowering childbirth fear.

* Corresponding author.
E-mail address: emmas@hi.is (E.M. Swift).

http://dx.doi.org/10.1016/j.wombi.2020.06.008

Introduction

Group antenatal care models have been implemented in various settings around the world [1–3]. They generally include increased contact time with the midwife and unique opportunities for expanding knowledge, building skills, receiving reassurance, and developing relationships with other expecting parents and maternity care providers [4,5]. Group antenatal care models usually include a group of women of similar gestational age who follow a facilitative discussion format emphasizing the collective importance of health assessment, education and community support. However, models differ in terms of the length of each session, the number of women in each group and whether partners are invited to the groups [1,5,6]. Group models also differ on whether self-assessments and one-on-one health assessments with the midwife are included within the group space or in private.

While group antenatal care models offer many benefits, one-to-one midwifery care provides opportunities to tailor care to each individual or couple. However, one-on-one care may not meet women's needs for information about the upcoming birth and parenthood [7–10] as antenatal appointments are often focused on screening and physical assessment and there may not be time to discuss topics in depth. There is a gap in the literature about how best to create opportunities within antenatal care to discuss pregnancy, birth and parenting related topics. Recent research suggests that women find informal support from peers as well as professional support important, and antenatal education should include strategies for women to access appropriate sources of support, to gain knowledge to form realistic expectations, and to mobilize and strengthen personal resources [10]. Specifically, women report that insufficient time is spent on preparing for birth [7] and parenthood [10].

We designed and implemented a new model of antenatal care (Enhanced Antenatal Care, EAC) at three clinics in the Iceland capital area, offering a combined approach with six one-to-one antenatal visits and four group sessions over the course of pregnancy. EAC is intended to provide opportunities for individual care plus opportunities for positive and informative dialogue about pregnancy, birth and parenthood in a group setting with peers and two midwives. The enhancements of EAC are increased contact time for expecting parents with their primary midwife (compared to usual care), discussion sessions with topics relevant to pregnancy, birth and parenthood as well as opportunities for one-on-one contact and continuity of care. Antenatal care in Iceland is midwifery-led and women with low to moderate risk pregnancies receive antenatal care from midwives in neighborhood healthcare clinics [11]. In this study we took advantage of the unique and homogenous midwifery setting in Iceland and conducted a quasi-experimental study comparing EAC to usual antenatal care.

The aim of this study was to test the assess EAC in terms of (1) participants' satisfaction with care, (2) autonomy in decision-making, and (3) its effectiveness in lowering childbirth fear.

Methods

This was a quasi-experimental controlled trial with two arms (intervention and active comparison arm). Women were allocated to the intervention and comparison group according to an intention to treat approach.

Setting

In Iceland, all maternity care services are publicly funded and free of charge to pregnant women. Antenatal care for women with low to moderate risk pregnancies is provided by midwives in primary healthcare clinics, in collaboration with general practitioners and obstetricians when needed. Women with high-risk pregnancies receive shared antenatal care from midwives and obstetricians at Landspitali University hospital.

Clinical guidelines offer guidance about appropriate screening and education throughout pregnancy and recommend that nulliparous women with low to moderate risk pregnancies have ten clinical visits during pregnancy [11,12]. The initial visit (usually at 8−12 weeks) las ts about one hour and subsequent visits about 20−30 min [11]. In addition, the majority (80%) of nulliparous women in Iceland attend birth education and breastfeeding classes in their 3rd trimester, which are offered by public and private organizations for a fee [7]. The format of these classes is similar in both settings, and usually taught by a midwife in one evening to a group of expecting parents. The focus of each class is either labour and birth or breastfeeding. The high rates of women seeking birth education outside of antenatal care may indicate their perceived need for increased information about birth-related topics, but may also just be a reflection of what is the norm in Iceland [13].

Procedure

The study was conducted in 2017−2018. Three healthcare clinics served as intervention sites (H1-H3) and three clinics as comparison sites (H4-H6) providing antenatal care as usual. The six healthcare clinics (H1-H6) were similar in size, served a similar client demographic, with two or three midwives providing antenatal care for women with low or moderate risk pregnancies living in the neighborhoods surrounding the clinics [11]. Assignment to intervention or comparison site was random. Prior to implementation, midwives at implementation sites attended a four-hour workshop on providing group antenatal care and received binders with the study protocol and EAC educational material. They also received informational leaflets to hand out to participants as well as information about the study, including informed consent forms for participants. Midwives at comparison sites received information about obtaining informed consent from eligible participants. EAC was provided at intervention clinics (H1–H3) and clinics providing usual care (H4-H6) did not introduce new models of antenatal care during the study period.

During the first antenatal visit, midwives provided eligible participants with written and verbal information about the study purpose and informed them that they could withdraw from the study at any time. Eligible participants then received an email with a link to the baseline online survey. Two reminder emails were sent, three and six days later, and subsequent surveys were sent using the same method.

Our data collection involved two surveys: pre-intervention at 12–16 weeks and post intervention at 36–40 weeks. The two surveys included 45 and 73 items, respectively. The objective of the baseline survey (T1) was to assess socio-demographic characteristics of the participants, as well as sense of coherence and childbirth fear in early pregnancy. The post intervention survey (T2) collected data in late pregnancy on childbirth fear, childbirth intentions and attitudes towards birth and parenthood along with participant's experience of antenatal care including their sense of autonomy and respectful care. Each survey took about 10−15 min to complete.

Participants

Nulliparous women receiving antenatal care at one of the six participating healthcare clinics were invited to participate by midwives providing antenatal care. Inclusion criteria were ability to communicate in Icelandic and age over 18 years. No other

inclusion or exclusion criteria were applied. The study design excluded women with high-risk pregnancies, such as those with chronic illnesses, drug or alcohol abuse problems and severe mental illness [11,12] as women with high-risk pregnancies received antenatal care elsewhere (at Landspitali University hospital). Using repeated sample ANOVA (within-between interaction), and assuming a medium effect size, 5% significance level and 80% power, a sample of 32 participants in each arm was required.

The intervention

Enhanced Antenatal Care (EAC) is a combined approach to antenatal care with six individual antenatal visits and four group sessions over the course of pregnancy. The individual EAC visits are provided in the 1st and 2nd trimesters of pregnancy and allow enough time for screening and testing for disease, as well as designing and implementing care plans for women with risk factors (Fig. 1). The first visit is an hour long and subsequent visits 20-min. The four 90-min group sessions are offered every two weeks between gestational weeks 25–36, providing ample time for discussion about pregnancy, birth and parenthood. After 36 weeks, women continue their antenatal care with individual visits with their midwife. Similar to Scandinavian models of group care, a group is formed with four to six nulliparous women (and their partners) expecting a baby within the same calendar month [6].

For each group expecting parents, the group sessions were facilitated by the same two midwives; at least one was the primary midwife providing antenatal care throughout pregnancy. In contrast to antenatal classes, EAC promotes continuity of care and increases opportunities for expecting parents to discuss the pregnancy, birth and parenthood with their midwife and a small peer group.

When attending the group sessions, women were provided with a 10−15 min private antenatal check-up with their primary midwife to assess fetal and maternal wellbeing according to the Icelandic national guidelines on antenatal care [11]. To empower women to take ownership of their health, they were encouraged to engage in self-assessment activities during the group session, such as measuring their own blood pressure and writing results of the check-up in their handheld maternity record. The midwives assisted with health assessments as needed.

The increased contact time between woman and midwife within EAC (ten hours compared to four to five hours in usual care) is further enhanced through facilitated conversation. While each group session varied depending on the group needs, the EAC protocol outlined a recommended structure and discussion topics for each session (Table 1). The topics included physiology and anatomy of labor and birth, coping with labour pain, breastfeeding, postpartum depression, newborn care and parenting. The midwives presented these topics within the framework of the midwifery model of care, which assumes that pregnancy and birth are normal processes. The group discussions were intended to increase interest in topics the participants may have not previously considered and enhance the educational discussion beyond what is possible in one-on-one midwifery visits. Furthermore, expecting parents have a unique opportunity to recognize the shared experience of pregnancy and birth, which in turn may normalize the childbearing process and reduce childbirth fear [14]. Hands-on educational material such as books and pictures, a doll and models of a pelvis, uterus and placenta was provided to engage participants further and enrich the conversation (Table 1). A healthy snack was also provided at each group session to model healthy eating and encourage discussion about diet in pregnancy.

Partners' involvement in childbirth has shown a wide range of benefits for the whole family [15,16] such as a more positive birth

Week	Type of appointment	Health assessments	Education	Contact time with midwife
8-12	One-to-one	Detailed health assessment including blood pressure, weight and height, urine sample and blood sample	Folic acid, fetal screening and ultrasound, smoking and nutrition during pregnancy	60 min
16	One-to-one	Discuss previous health assessments. Blood pressure and urine sample		20 min
25	One-to-one	Fundal height, blood pressure and urine sample		20 min
28	Group session	Fundal height, blood pressure, urine and blood sample	Overview of the physiology and anatomy of labor. Signs of labor and an overview of the stages of labor. Props: A model of pelvis, baby, placenta and uterus. Pictures and books on anatomy. Books on the birth process and birth stories.	90 min*
31	Group session	Fundal height, blood pressure and urine sample	Place of birth. Breastfeeding. The first days after giving birth. Support in the early days. Newborn care. Home visits from the midwife; when, how and what. Props: A model of pelvis, baby, placenta and uterus. Pictures and books on anatomy. Books on parenting and birth stories.	90 min*
34	Group session	Fundal height, blood pressure and urine sample	Comfort during labor and managing pain during labor with and without medication. Early labor – when to call. Packing a birth bag. Writing a birth plan.	90 min*
36	Group session	Fundal height and fetal position, blood pressure and urine sample. Blood sample for women who are Rh negative.	Pregnancy to parenting transition. Emotional adjustments, baby blues and postpartum depression. Newborn care and safety. Seeking support. Birth control. Breastfeeding.	90 min*
38	One-to-one	Fundal height and fetal position, blood pressure and urine sample	Provide opportunity for discussion and questions	20 min
40	One-to-one	Fundal height and fetal position, blood pressure and urine sample	Provide opportunity for discussion and questions	20 min
41	One-to-one	Fundal height and fetal position, blood pressure and urine sample. Offer to sweep membranes.	Provide information about induction of labor and offer membrane sweep.	20 min

Fig. 1. Enhanced Antenatal Care schedule outlining health assessments, education and midwife contact time for each appointment.

Table 1
Enhanced Antenatal Care schedule outlining health assessments, education and midwife contact time for each appointment.

Week	Type of appointment	Health assessments	Education	Contact time with midwife
8–12	One-to-one	Detailed health assessment including blood pressure, weight and height, urine sample and blood sample	Folic acid, fetal screening and ultrasound, smoking and nutrition during pregnancy	60 min
16	One-to-one	Discuss previous health assessments. Blood pressure and urine sample		20 min
25	One-to-one	Fundal height, blood pressure and urine sample		20 min
28	Group session	Fundal height, blood pressure, urine and blood sample	Overview of the physiology and anatomy of labor. Signs of labor and an overview of the stages of labor. Props: A model of pelvis, baby, placenta and uterus. Pictures and books on anatomy. Books on the birth process and birth stories.	90 min[a]
31	Group session	Fundal height, blood pressure and urine sample	Place of birth. Breastfeeding. The first days after giving birth. Support in the early days. Newborn care. Home visits from the midwife; when, how and what. Props: A model of pelvis, baby, placenta and uterus. Pictures and books on anatomy. Books on parenting and birth stories.	90 min[a]
34	Group session	Fundal height, blood pressure and urine sample	Comfort during labor and managing pain during labor with and without medication. Early labor – when to call. Packing a birth bag. Writing a birth plan.	90 min[a]
36	Group session	Fundal height and fetal position, blood pressure and urine sample. Blood sample for women who are Rh negative.	Pregnancy to parenting transition. Emotional adjustments, baby blues and postpartum depression. Newborn care and safety. Seeking support. Birth control. Breastfeeding.	90 min[a]
38	One-to-one	Fundal height and fetal position, blood pressure and urine sample	Provide opportunity for discussion and questions	20 min
40	One-to-one	Fundal height and fetal position, blood pressure and urine sample	Provide opportunity for discussion and questions	20 min
41	One-to-one	Fundal height and fetal position, blood pressure and urine sample. Offer to sweep membranes.	Provide information about induction of labor and offer membrane sweep.	20 min

[a] In conventional care these visits would be one-to-one visits, about 20 min long including the same physical assessments per national guidelines on antenatal care.

experience and increased involvement in parenting. Fathers want to participate in the process [15], and they also need to feel prepared for this life changing time in their life to provide effective support [17,18]. EAC aimed to meet both parents' educational needs and partners were encouraged to attend all antenatal visits, individual and group sessions.

Measures

Baseline characteristics

To describe socio-demographic characteristics of participants, we used questions from *Childbirth and health*. We also used Antonovsky's 29-item *Orientation to Life Questionnaire* to assess sense of coherence (SOC) among participants in the pre-test survey. The SOC measures an individuals' view of the world and the environment as comprehensible, manageable and meaningful, claiming that the way people view their life has a positive influence on their health [19,20]. We included SOC as a measure of factors associated with overall perceived health, especially mental health, thought to have a moderating or mediating role in health promotion within the Salutogensis framework [20]. The Orientation to Life Questionnaire has been used in over 33 languages in 32 countries and deemed a reliable, valid and cross-culturally applicable instrument measuring how people manage stressful situations and stay well [21]. The scale was previously translated to Icelandic and validated in a population of parents of young children with high internal consistency (Chronbach's alpha = 0.90) [22]. The scale ranges from 29 to 203 and a high score is associated with good health [20] and improved health behaviors [21].

Satisfaction with care and autonomy in decision making

In the post-intervention survey, satisfaction with care among all study participants was assessed with ten separate survey statements such as "I received education about the pregnancy/childbirth", "the midwife provided encouragement", and "the midwife paid close attention to my health/the babies health" with answer options agree, somewhat agree, somewhat disagree and disagree. Satisfaction with how time was spent within antenatal care was assessed with eight questions about how much time participants thought the midwife spent on various aspects of care, such as health assessments, information about pregnancy, birth and the postpartum period with answer options too little time, appropriate amount of time and too much time. Satisfaction with group antenatal care was further assessed with five statements about the groups, such as "I would recommend EAC to a friend", "I was interested in hearing other peoples' questions in the group" with answer options options agree, somewhat agree, somewhat disagree and disagree. Answer options *agree* and *somewhat agree* were recoded as "agreement" and answer options *somewhat disagree* and *disagree* were recoded as "disagreement" with each statement.

The *Mothers Autonomy in Decision Making* (MADM) [23] assessed whether women received respectful maternity care and whether they were able to make autonomous decisions about their care. These are important markers of quality antenatal care [24]. MADM includes seven items on a six-point Likert scale for women to indicate their experience when making decisions and choosing options for care (i.e. My midwife told me there are different options for my maternity care; My midwife helped me understand the information; My midwife respects my choices). Higher scores indicate that women have greater agency and autonomy when engaging in a shared decision-making process with a maternity care provider. The scale has been deemed valid and reliable (Chronbach's alpha >0.90), measuring a single construct [23].

Childbirth fear

The two item, standardized, patient rated *Fear of Birth Scale* (FOBS) assessed childbirth fear in early and late pregnancy [25]. The two-item 100 mm visual analog scale is simple and easy to use

and asks participants to respond to the question "How do you feel right now about the approaching birth?". The anchors are defined as a) "calm" and "worried" and b) "no fear" and "strong fear" [25]. The two scores are averaged to create a score ranging from 0 to 100, with higher scores indicating higher levels of childbirth related fear [25]. When used in a large Australian study the FOBS was found to have a sensitivity of 89% against the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ), the most commonly used fear of birth scale with considerable evaluation of its reliability and validity [26,27]. Using a cut-off point of 54 correctly identified the majority of women who were classified as highly fearful using the WDEQ-A [27]. More recently, feedback from clinical practice has indicated that a FOBS score of ≥60 had better clinical utility than ≥54 [28]. The FOBS has been previously translated to Icelandic and used in the Icelandic survey *Childbirth and health*.

Data analysis

Categorical demographic characteristics of participants were analyzed using absolute and percentage frequencies for categorical variables and the mean and standard deviation (sd) for continuous variables. Categorical characteristics included women's citizenship (Icelandic/other), completed education (primary, secondary, university), occupation (employed, student, on sick leave/unemployed), marital status (cohabiting/married, single) and class attendance alongside antenatal care (yes/no); continuous characteristics were women's age, gestational age (in weeks) and SOC. To assess differences between the intervention and comparison arms in terms of these baseline characteristics, we used chi-square (for categorical variables) and student t-test (for continuous variables).

We then compared women's satisfaction with care and autonomy in decision making by model of care (EAC versus usual care) using the chi-square test.

We calculated absolute and percentage frequencies for women with high childbirth fear in each group using a cut-off score of 60 points on the FOBS to define high childbirth fear [28]. We further described women's childbirth fear in each group in terms of range, mean and standard deviation at both time points and calculated change scores (childbirth fear at T2 – childbirth fear at T1).

We assessed the effectiveness of EAC in reducing childbirth fear in two ways: 1) We used a one-way between groups analysis of covariance where the independent variable was group allocation and the dependent variable was the difference in participants fear score at T2 and T1; 2) We determined the effect size (Cohen's d) by subtracting the mean change score for the two groups and dividing by the pooled baseline standard deviation [29].

To control for the potential effect of attending classes alongside antenatal care, we restricted the main analysis to women who had not attended classes alongside antenatal care (i.e. excluding women who attended parenting/birth/breastfeeding and yoga classes alongside antenatal care). The same statistical analysis as described above was repeated for this subgroup.

We collected all data using the Research Electronic Data Capture (REDCap) tool hosted at the University of Iceland [30] and used Rstudio for statistical analysis [31]. An alpha level of 0.05 was used to for all statistical tests. Ethical approval for the study was obtained from the Icelandic National Bioethics Committee (VSNb2017030007/03.01).

Findings

Baseline characteristics

In the intervention group, 34 women started EAC, and two were unable to attend group sessions because of pregnancy-related complications (preterm labour and bedrest). The remaining 32 participants attended three or more sessions and completed both the pre- and post-intervention questionnaires. Within the same timeframe, 60 participants completed both questionnaires in the comparison group. At baseline, no significant differences were found between EAC (n = 32) and usual care (n = 60) in terms of socio-demographic variables, sense of coherence (Table 2) or childbirth fear (Table 4). However, on average women in EAC answered the baseline survey later in pregnancy compared with women in usual care (at 14 and 17 weeks of gestation, respectively; $p < 0.05$).

Satisfaction with care and autonomy in decision making

When asked whether women and their partners felt comfortable participating in group sessions, 31 woman answered that they felt comfortable and 30 answered that their partners had felt comfortable as well. The majority (27 women, 96%) felt that it was interesting to hear the questions posed by others and most women (20 women, 74%) reported receiving support from other group members. All but one reported receiving the support she needed from her midwife in EAC. The majority of women would recommend EAC to a friend (26 women, 93%).

Women's satisfaction with antenatal care in terms of monitoring their health and the health of their baby was similar in both models (Table 3). Similarly, women in both models reported that they had received enough information about pregnancy and birth (Table 3). However, women in EAC were more likely to find that their antenatal care model had provided enough information about the postpartum period and parenting compared with women in usual care (<0.001; Table 3). A higher number of participants in usual care sought classes alongside antenatal care compared with EAC participants although the difference was not significant (78.3% vs. 59.4%; Table 3). There was no difference between the groups in terms of autonomy in decision making (29.62 vs 28.93 in EAC and usual care, respectively; Table 3).

Childbirth fear

At baseline, a higher proportion of EAC participants reported high fear (>60 points) compared with women in usual care (28% and 21%, respectively). By T2 fewer women reported high fear of birth in EAC compared with usual care (9.4% and 15.0%, respectively). In absolute numbers, the number of women in

Table 2
Baseline characteristics among women in Enhanced Antenatal Care (EAC) and usual antenatal care in Iceland (N = 92).

	EAC	Usual care	p-value[a]
	n = 32	n = 60	
Age (mean, sd[b])	28.3 (5.1)	27.9 (4.4)	0.76
Gestational age in weeks (mean, sd)	17.9 (6.9)	14.3 (2.7)	0.01
Icelandic citizenship	31 (96.9)	59 (98.3)	1.00
Marital status (n, %)			1.00
Married/cohabiting/in a relationship	29 (90.6)	56 (93.3)	
Single	3 (9.3)	4 (6.7)	
Completed education (n, %)			0.15
Primary education	3 (9.4)	2 (3.3)	
Secondary education	5 (15.6)	19 (31.7)	
University education	24 (75.0)	39 (65.0)	
Employment status (n, %)			0.84
Employee	24 (75.0)	44 (73.3)	
Student	7 (21.8)	15 (25.0)	
Sick leave	1 (3.1)	1 (1.7)	
Sense of coherence (mean, sd)	146.3 (24.9)	137.5 (21.3)	0.09

[a] We used chi-square (for categorical variables) and student t-test (for continuous variables) to assess statistical differences between baseline characteristics.
[b] Standard deviation (sd).

Table 3
Participants' agreement with the following statements about antenatal care at the end of pregnancy (N = 92).

	EAC[a] n = 32	Usual care n = 60	p-value[b]
My midwife paid close attention to, n (%)			
My baby's health	29 (90.6)	54 (90.0)	1.00
My health	31 (98.9)	59 (98.3)	1.00
I received enough information about, n (%)			
The pregnancy	32 (100)	58 (96.7)	0.77
The birth	32 (100)	58 (96.7)	0.77
The postpartum period	24 (75.0)	18 (30.0)	<**0.001**
Parenting	29 (90.6)	33 (55.0)	<**0.001**
I attended classes alongside antenatal care, n (%)	19 (59.4)	47 (78.3)	0.09
Autonomy in decision making, mean (range)	29.6 (19–40)	28.9 (12–41)	0.56
My midwife asked me how involved in decision making I wanted to be	17 (53.1)	32 (53.3)	1.00
My midwife told me that there are different options for maternity care	29 (90.6)	47 (78.3)	0.23
My midwife explained the advantages and disadvantages of the maternity care options	23 (71.9)	31 (51.7)	0.10
My midwife helped me understand all the information	29 (90.6)	47 (78.3)	0.23
I was given enough time to thoroughly consider the different maternity care options	24 (75.0)	48 (80.0)	0.77
I was able to choose what I considered to be the best care options	30 (93.8)	50 (83.3)	0.28
My midwife respected that choice	30 (93.8)	59 (98.3)	0.57

[a] Enhanced Antenatal Care.
[b] We used chi-square to assess statistical differences between models of care.

Table 4
Childbirth fear among women in Enhanced Antenatal Care (EAC) and usual care (N = 92), as well as among a subgroup of women who did not attend classes alongside antenatal care.

	EAC			Usual care				
	Mean childbirth fear (sd)[a]			Mean childbirth fear (sd)				
	T1	T2	Change score (sd)	T1	T2	Change score (sd)	p-value[b]	Effect size[c]
All (N = 92)	41.9 (27.7)	34.4 (20.9)	−7.2 (17.4)	42.4 (21.4)	39.4 (20.3)	−3.0 (21.3)	0.315	−0.21*
Subgroup (n = 26)[d]	44.12 (32.6)	30.0 (22.7)	−14.1 (18.1)	56.50 (18.6)	54.50 (13.3)	1.2 (18.8)	0.003	−0.83**

* small effect size.
** large effect size.
[a] Standard deviation (sd).
[b] We used one-way between groups analysis of covariance to assess statistical differences between groups.
[c] Cohen's D for effect size.
[d] Women who opt to take no classes alongside antenatal care (n = 13 in EAC and n = 13 in usual care).

EAC with high fear decreased from 9 to 3 women and in usual care from 13 to 9 women.

For the full sample, the mean childbirth fear change score was −7.2 points among women in EAC and -3.0 points among women in usual care (p = 0.315; Table 4). Based on Cohen's criteria the effect of participating in EAC on the reduction in mean childbirth fear was small (Cohen's d = −0.21) [29]. Restricting the main analysis to women who had not attended classes alongside antenatal care (n = 26) resulted in a large effect size difference in fear change between women in EAC and usual care (Cohen's d=-0.83), with a change score of -14.1 points among women in EAC and a slight increase in fear among women in usual care (1.2 points; p = 0.003; Table 4).

Discussion

This quasi-experimental study is the first to report findings on combining one-on-one midwifery care with group care to enhance opportunities for education and dialogue between expecting parents and midwives. While the study was small, it does suggest that this may be a beneficial form of care in terms of providing education and support, as well as lowering childbirth fear.

Overall, women identified that the care they received in EAC was positive and satisfying. The majority felt comfortable in the groups and would recommend participating in EAC to a friend. This is consistent with previous studies about group care [1,3,32] and is likely the result of increased social support, education, continuity of care and personal connection with midwives which women value in antenatal care services [33].

The models performed equally in terms of women's satisfaction with health assessment for mother and baby as well as satisfaction with educational needs for pregnancy and birth. Interestingly, EAC participants were significantly more likely to find that they were satisfied with antenatal care in terms of education about the time after birth and parenthood. This difference may be explained by the high number of participants in both groups attending educational classes alongside antenatal care. The focus of such classes if often almost exclusively on birth related topics [9], and may therefore have positively affected how well prepared for birth women felt at the end of pregnancy. However, the alongside educational classes generally do not focus on parenthood or the postpartum period, and this is where the difference becomes apparent between the two models [9,34]. The difference may further be explained by the structure of the group setting which involved a variety of learning strategies encouraging problem-solving skills, such as brainstorming solutions and recognizing community resources, in addition to providing information. Problem solving skills and providing access to appropriate sources of support has been emphasized in previous studies as an important factor in how well prepared women have felt for other areas of parenthood, such as breastfeeding [9].

The two models performed equally in terms of mothers' autonomy with decision making (MADM). Interestingly, compared to MADM scores in Canada and the Netherlands, the score in Iceland is low [23,35]. Worldwide, midwives have been recognized for prioritizing the importance of shared decision making, and woman-centered care [36,37]. However, shared decision-making

requires taking the time and willingness to engage in evidence-based discussions with women about the pros and cons of different care options. Shared decision making furthermore requires training in woman-centered decision making and further development of EAC should emphasize this.

EAC was effective in lowering childbirth fear. This was especially evident among women who did not attend any educational classes outside of antenatal care. This important finding may have far reaching consequences such as a lower likelihood of caesarean delivery [38–43] and lower induction of labour rates [42] which could be examined in larger studies. High childbirth fear is furthermore associated with a longer active stage of labour [44,45] and an increase in the total amount of pain relief needed during active labour [45], as women with high childbirth fear are significantly more likely to prefer (OR = 4.2; 95% CI: 3.0–5.8) [46] and use epidural analgesia during labour [41,47].

Strengths and limitations

The main strength was that we used a pre-post intervention design as well as a comparison group in our quasi-experimental design. While the inability to randomly assign participants to intervention or comparison group affects conclusions about causality, obtaining pretest measurement on both intervention and comparison groups allowed us to assess difference among groups. The pretest survey revealed that the intervention and comparison groups were similar in terms of all socio-demographic factors. However, the groups answered the pre-intervention survey at different time points in pregnancy. The EAC group answered later in pregnancy, compared with the comparison group (17 weeks vs 14 weeks gestation). This was likely to due to midwives having greater difficulty recruiting for the intervention group than the comparison group. We adjusted our analysis for this difference between the groups, by adding women's gestational age when answering the pre-intervention survey as a covariate to the regression model.

We used a standardized, patient-rated instrument to measure childbirth fear [25,27], which further strengthens our design and provides for possibilities to compare results across studies. But the scale only assesses general fear and future studies might consider using the recently developed Childbirth Fear Questionnaire (CFQ), a 40-item measure that assesses the full range of women's childbirth fears as well as interference in daily life as a result of childbirth fear [48,49]. This scale was not yet available when we designed our study.

Generalizability of our results is limited by our small and homogenous sample size and replications with larger as well as more diverse samples would improve generalizability of our results. Nevertheless, while external validity was limited by our homogenous sample (all Icelandic speaking women, expecting their first baby and attending antenatal care at a clinic for women with low to medium risk pregnancies), fewer confounding factors due to heterogeneity among women in the sample may have strengthened internal validity of the sample. Some studies have suggested that childbirth fear has a natural pattern of decreasing at the end of pregnancy, compared to early or mid pregnancy. Therefore, future studis should include a larger study sample, as well as a more diverse group of participants, to further assess whether EAC is effective in lowering childbirth fear.

Our results furthermore indicate that future development of the model should include training in shared decision making among midwives in Iceland as well as emphasize shared decision making within the EAC model.

Conclusion

Enhanced Antenatal Care is an innovative model which offers increased contact time for expecting parents with their primary midwife, discussion sessions as well as opportunities for one-on-one contact with a primary midwife and continuity of care. This Icelandic study was the first study to assess the model in terms of participants' satisfaction with care, autonomy in decision-making, and childbirth fear. The results of the study propose that EAC was an acceptable model of care for the women in this study, especially in terms of satisfying women's need for information about parenthood. Women in EAC were furthermore more likely to have lower fear at the end of pregnancy, compared with women in usual care.

Ethical statement

Ethical approval for the study was obtained from the Icelandic National Bioethics Committee (VSNb2017030007/03.01) on April 25th, 2017.

Funding

This study was financially supported by the Doctoral Grants of the University of Iceland Research Fund (Rannsóknarsjóður Háskóla Íslands).

Conflict of interests

All authors declare that there are no competing interests.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Acknowledgement

We thank the midwives for providing EAC and the women for participating in this project by attending EAC, answering surveys and providing feedback

References

[1] E. Andersson, K. Christensson, I. Hildingsson, Parents' experiences and perceptions of group-based antenatal care in four clinics in Sweden, Midwifery 28 (4) (2012) 502–508.
[2] C.J. Catling, N. Medley, M. Foureur, et al., Group versus conventional antenatal care for women, Cochrane Database Syst. Rev. (2) (2015).
[3] A. Teate, N. Leap, S.S. Rising, C.S. Homer, Women's experiences of group antenatal care in Australia—the CenteringPregnancy pilot study, Midwifery 27 (2) (2011) 138–145.
[4] Z. Massey, S.S. Rising, J. Ickovics, CenteringPregnancy group prenatal care: promoting relationship-centered care, J. Obstet. Gynecol. Neonatal Nurs. 35 (2) (2006) 286–294.
[5] S.S. Rising, H.P. Kennedy, C.S. Klima, Redesigning prenatal care through CenteringPregnancy, J. Midwifery Womens Health 49 (5) (2004) 398–404.
[6] K. Wedin, J. Molin, E.L.C. Svalenius, Group antenatal care: new pedagogic method for antenatal care-a pilot study, Midwifery 26 (4) (2010) 389–393.
[7] Helga Gottfreðsdóttir, Þóra Steingrímsdóttir, Amalía Björnsdóttir, Embla Ýr Guðmundsdóttir, Hildur Kristjánsdóttir, Content of antenatal care: does it prepare women for birth? Midwifery 39 (2016) 71–77.
[8] B.M. Lagan, M. Sinclair, W.G. Kernohan, What is the impact of the internet on decision-making in pregnancy? A global study, Birth 38 (4) (2011) 336–345.
[9] P. Pålsson, L.J. Kvist, E.K. Persson, I.K. Hallström, M. Ekelin, A survey of contemporary antenatal parental education in Sweden: what is offered to expectant parents and midwives' experiences, Sex. Reprod. Healthc. 20 (2019) 13–19.
[10] P. Pålsson, L.J. Kvist, M. Ekelin, I.K. Hallström, E.K. Persson, "I didn't know what to ask about": first-time mothers' conceptions of prenatal preparation for the early parenthood period, J. Perinatal Educ. 27 (3) (2018) 163.
[11] Directorate of Health [Landlæknisembættið]. Antenatal care for healthy women with uncomplicated pregnancies. Clinical guidelines [Meðgönguvernd heildbrigðra kvenna í eðlilegri meðgöngu. Klínískar leiðbeiningar] 2008.
[12] National Institute for Clinical Excellence, Antenatal care for uncomplicated pregnancies, NICE Clinical Guidelines Updated Edition London, (2008) .
[13] E.R. van Teijlingen, V. Hundley, A.M. Rennie, W. Graham, A. Fitzmaurice, Maternity satisfaction studies and their limitations: "what is, must still be best", Birth 30 (2) (2003) 75–82.

[14] E.C. Heberlein, A.H. Picklesimer, D.L. Billings, S. Covington-Kolb, N. Farber, E.A. Frongillo, The comparative effects of group prenatal care on psychosocial outcomes, Arch. Womens Ment. Health 19 (2) (2016) 259–269.
[15] M. Johansson, J. Fenwick, Å. Premberg, A meta-synthesis of fathers' experiences of their partner' s labour and the birth of their baby, Midwifery 31 (1) (2015) 9–18.
[16] A. Wöckel, E. Schfer, A. Beggel, M. Abou-Dakn, Getting ready for birth: impending fatherhood, Br. J. Midwifery 15 (6) (2007) 344–348.
[17] M. Steen, S. Downe, N. Bamford, L. Edozien, Not-patient and not-visitor: a metasynthesis fathers' encounters with pregnancy, birth and maternity care, Midwifery 28 (4) (2012) 422–431.
[18] L. Plantin, A.A. Olukoya, P. Ny, Positive health outcomes of fathers' involvement in pregnancy and childbirth paternal supoort: a scope study literature review, Fathering 9 (1) (2011) 87.
[19] A. Antonovsky, Health, Stress, and Coping, The University of Michigan: Jossey-Bass, 1979.
[20] M. Eriksson, B. Lindström, Antonovsky's sense of coherence scale and the relation with health: a systematic review, J. Epidemiol. Community Health 60 (5) (2006) 376–381.
[21] M. Eriksson, B. Lindström, Validity of Antonovsky's sense of coherence scale: a systematic review, J. Epidemiol. Community Health 59 (6) (2005) 460–466.
[22] E.K. Svavarsdóttir, M.K. Rayens, American and Icelandic parents' perceptions of the health status of their young children with chronic asthma, J. Nurs. Scholarsh. 35 (4) (2003) 351–358.
[23] S. Vedam, K. Stoll, K. Martin, et al., The Mother's Autonomy in Decision making (MADM) scale: patient-led development and psychometric testing of a new instrument to evaluate experience of maternity care, PLoS One 12 (2) (2017) e0171804.
[24] World Health Organization, WHO Recommendations on Antenatal Care for a Positive Pregnancy Experience, World Health Organization, 2016.
[25] H. Haines, J.F. Pallant, A. Karlström, I. Hildingsson, Cross-cultural comparison of levels of childbirth-related fear in an Australian and Swedish sample, Midwifery 27 (4) (2011) 560–567.
[26] K. Wijma, B. Wijma, M. Zar, Psychometric aspects of the W-DEQ; a new questionnaire for the measurement of fear of childbirth, J. Psychosom. Obstet. Gynecol. 19 (2) (1998) 84–97.
[27] H. Haines, J. Pallant, J. Fenwick, et al., Identifying women who are afraid of giving birth: a comparison of the fear of birth scale with the WDEQ-A in a large Australian cohort, Sex. Reprod. Healthc. 6 (4) (2015) 204–210.
[28] I. Hildingsson, C. Rubertsson, A. Karlström, H. Haines, Exploring the Fear of Birth Scale in a mixed population of women of childbearing age—a Swedish pilot study, Women Birth 31 (5) (2017) 407–413.
[29] L.E. Kazis, J.J. Anderson, R.F. Meenan, Effect sizes for interpreting changes in health status, Med. Care (1989) S178–S189.
[30] Paul A. Harris RT, Robert Thielke, Jonathon Payne, Nathaniel Gonzales, Jose G. Conde, Research electronic data capture (REDCap) - a metadata-driven methodology and workflow process for providing translational research informatics support, J. Biomed. Inf. 42 (3) (2009) 377–381.
[31] R. Team, RStudio: Integrated Development for R MA URL, RStudio, Inc, Boston, 2015. http://www.rstudio.com.
[32] J.R. Ickovics, T.S. Kershaw, C. Westdahl, et al., Group prenatal care and perinatal outcomes: a randomized controlled trial, Obstet. Gynecol. 110 (2 Pt 1) (2007) 330.
[33] B.T. Edmonds, M. Mogul, J.A. Shea, Understanding low-income African American women's expectations, preferences, and priorities in prenatal care, Fam. Community Health 38 (2) (2015) 149–157.
[34] R. Lau, A. Hutchinson, A narrative review of parental education in preparing expectant and new fathers for early parental skills, Midwifery (2020)102644.
[35] E. Feijen-de Jong, M. van der Pijl, S. Vedam, D. Jansen, L. Peters, Measuring respect and autonomy in Dutch maternity care: applicability of two measures, Women Birth (2019) In press.
[36] P. ten Hoope-Bender, L. de Bernis, J. Campbell, et al., Improvement of maternal and newborn health through midwifery, Lancet 384 (9949) (2014) 1226–1235.
[37] J. Sandall, H. Soltani, S. Gates, A. Shennan, D. Devane, Midwife-led continuity models versus other models of care for childbearing women, Cochrane Database Syst. Rev. (4) (2016).
[38] S. Räisänen, S. Lehto, H. Nielsen, M. Gissler, M. Kramer, S. Heinonen, Fear of childbirth in nulliparous and multiparous women: a population-based analysis of all singleton births in Finland in 1997–2010, BJOG 121 (8) (2014) 965–970.
[39] J.E. Handelzalts, S. Fisher, S. Lurie, A. Shalev, A. Golan, O. Sadan, Personality, fear of childbirth and cesarean delivery on demand, Acta Obstet. Gynecol. Scand. 91 (1) (2012) 16–21.
[40] E.L. Ryding, M. Lukasse, A.S.V. Parys, et al., Fear of childbirth and risk of cesarean delivery: a cohort study in six European countries, Birth 42 (1) (2015) 48–55.
[41] H.M. Haines, C. Rubertsson, J.F. Pallant, I. Hildingsson, The influence of women's fear, attitudes and beliefs of childbirth on mode and experience of birth, BMC Pregnancy Childbirth 12 (1) (2012) 55.
[42] G. Sydsjö, A. Sydsjö, C. Gunnervik, M. Bladh, A. Josefsson, Obstetric outcome for women who received individualized treatment for fear of childbirth during pregnancy, Acta Obstet. Gynecol. Scand. 91 (1) (2012) 44–49.
[43] E.M. Swift, H. Gottfredsdottir, H. Zoega, M.M. Gross, K. Stoll, Opting for natural birth: a survey of birth intentions among young Icelandic women, Sex. Reprod. Healthc. 11 (2017) 41–46.
[44] G. Sydsjö, L. Angerbjörn, S. Palmquist, M. Bladh, A. Sydsjö, A. Josefsson, Secondary fear of childbirth prolongs the time to subsequent delivery, Acta Obstet. Gynecol. Scand. 92 (2) (2013) 210–214.
[45] S.S. Adams, M. Eberhard-Gran, A. Eskild, Fear of childbirth and duration of labour: a study of 2206 women with intended vaginal delivery, BJOG 119 (10) (2012) 1238–1246.
[46] V. Sitras, J.Š Benth, M. Eberhard-Gran, Obstetric and psychological characteristics of women choosing epidural analgesia during labour: a cohort study, PLoS One 12 (10) (2017)e0186564.
[47] W.A. Hall, K. Stoll, E.K. Hutton, H. Brown, A prospective study of effects of psychological factors and sleep on obstetric interventions, mode of birth, and neonatal outcomes among low-risk British Columbian women, BMC Pregnancy Childbirth 12 (1) (2012) 78.
[48] N. Fairbrother, D. Thordarson, K. Stoll, J. Sakaluk, The childbirth fear questionnaire (CFQ): a new measure of fear of childbirth, Australasian Marce Society for Perinatal Mental Health Conference in Brisbane (2017) 2017.
[49] N. Fairbrother, D.S. Thordarson, K. Stoll, Fine tuning fear of childbirth: the relationship between Childbirth Fear Questionnaire subscales and demographic and reproductive variables, J. Reprod. Infant Psychol. 36 (1) (2018) 15–29.