

Cross-sectional survey of antenatal education attendance among nulliparous pregnant women in Sydney, Australia

Bronwyn Lewis-Jones^{a,*}, Timothy C. Nielsen^b, Jane Svensson^a, Natasha Nassar^b, Amanda Henry^{c,d}, Anne Lainchbury^a, Sara Kim^c, Isabelle Kiew^c, Sarah McLennan^c, Antonia W. Shand^{a,b}

^a Royal Hospital for Women, Randwick, Sydney, NSW, Australia

^b Children's Hospital at Westmead Clinical School, The University of Sydney, Sydney, NSW, Australia

^c School of Women's and Children's Health, UNSW Medicine and Health, Sydney, NSW, Australia

^d Department of Women's and Children's Health, St George Hospital, Sydney, NSW, Australia

ARTICLE INFO

Keywords:

Antenatal education
Pregnancy
Labour
Childbirth
Parenting

ABSTRACT

Background: Antenatal education aims to provide expectant parents with strategies for dealing with pregnancy, childbirth and parenthood and may have the potential to reduce obstetric intervention and fear of childbirth. We aimed to investigate antenatal education attendance, reasons for and barriers to attending, and techniques taught and used to manage labour.

Methods: Antenatal and postnatal surveys were conducted among nulliparous women with a singleton pregnancy at two maternity hospitals in Sydney, Australia in 2018. Classes were classified into psychoprophylaxis, birth and parenting, other, or no classes. Reasons for and barriers to attendance, demographic characteristics, and techniques taught and used in labour were compared by class type, using Pearson's Chi Squared tests of independence.

Findings: 724 women were surveyed antenatally. The main reasons for attending classes were to better manage the birth (86 %), feel more secure in baby care (71 %) and as a parent (60 %); although this differed by class type. Reasons for not attending classes included being too busy (33 %) and cost (27 %). Epidural, breathing techniques, massage and nitrous oxide were the most common techniques taught. Women who attended psychoprophylaxis classes used a wider range of pain relief techniques in labour. Women found antenatal classes useful preparation for birth (94 %) and parenting (74 %). Women surveyed postnatally wanted more information on baby care/sleeping and breastfeeding.

Conclusion: The majority of women found antenatal education useful and utilised techniques taught. Education providers should ensure breastfeeding and infant care information is provided, and barriers to attendance such as times and cost should be addressed.

Statement of Significance

Problem

Antenatal education may have the potential to reduce obstetric intervention and fear of childbirth. However, the optimal content and format of antenatal education is unknown.

What is Already Known

Previous studies have demonstrated benefits of antenatal classes including higher rates of breastfeeding, and lower rates of

depression, fear of childbirth and obstetric intervention. However, these outcomes are not consistent throughout the literature.

What this Paper Adds

In this paper, we investigate whether women attended antenatal education and why/why not, what women's views of antenatal education are, and women's views on the content of antenatal education and its usefulness.

* Correspondence to: Department of Maternal Fetal Medicine, Level 0, Barker Street Randwick, Locked Bag 2000, Randwick, NSW 2031, Australia.

E-mail address: bronwynlewisjones@gmail.com (B. Lewis-Jones).

<https://doi.org/10.1016/j.wombi.2022.08.003>

Received 2 May 2022; Received in revised form 7 August 2022; Accepted 7 August 2022

Available online 17 August 2022

1871-5192/Crown Copyright © 2022 Published by Elsevier Ltd on behalf of Australian College of Midwives. All rights reserved.

Introduction

Antenatal education aims to provide expectant parents with strategies for managing pregnancy, childbirth and parenthood [1]. Antenatal education typically contains information about pregnancy, labour and birth, infant and postnatal care, breastfeeding and parenting skills [1]. However when examined there is significant variation between class content, mode of presentation and group size [2]. Women attend antenatal education, in addition to antenatal care, as antenatal care may not provide sufficient information on pregnancy, birth and parenthood [3]. Furthermore, many find the social interaction from attending education with other prospective parents important [2].

Previous studies have demonstrated benefits of antenatal classes including higher rates of breastfeeding [4], lower rates of depression [5], lower rates of fear of childbirth [6], and lower rates of obstetric intervention [7–9]. However, these outcomes are not consistent throughout the literature [8,10–12], although this may be a result of the variable nature of class content and format. The optimal type of antenatal education is also not known, with systematic reviews finding insufficient evidence as to whether antenatal classes are effective in improving obstetric and psychosocial outcomes [11,12]. Recently, a Sydney-based randomised controlled trial compared a specific labour and birth preparation course (which taught visualisation, yoga postures, breathing techniques, massage, acupressure and facilitated partner support) with routine hospital-based antenatal education, and found reduced use of epidural analgesia and obstetric intervention including caesarean birth and augmentation of labour [9].

The World Health Organisation (WHO) 2018 recommendations for reducing unnecessary caesarean births specify that health education is an “essential component of antenatal care” [13]. They recommend that education interventions and support programmes, such as childbirth training workshops, nurse-led applied relaxation training programmes, psychosocial couple-based prevention programmes and psycho-education for women with fear of pain and childbirth, be used with targeted monitoring to reduce caesarean births [13].

Currently it is not known what percentage of women attend antenatal education in Australia or elsewhere, indeed anecdotal evidence suggests that the percentage varies greatly. As antenatal education may be delivered by a range of public and private providers, often for a fee, and with women from various multicultural backgrounds [14], common barriers to antenatal education may include cost, language and culture—although the degree of these barriers is unknown.

Given the above limitations, we aimed to investigate antenatal education attendance, type of classes attended, reasons for and barriers to attending, techniques taught and used to manage labour and satisfaction with content of classes.

Participants, ethics and methods

Study population

A cross-sectional survey was conducted between July 2017 and December 2018 among pregnant women planning to have their first baby at two maternity hospitals in Sydney, Australia: The Royal Hospital for Women (RHW) and St George Hospital (SGH). Nulliparous women greater than 28 weeks’ gestation expecting to have a singleton live birth were eligible. Women attending antenatal education classes run at RHW and SGH were invited to participate by email after registration into classes if they had consented to participate in research. Women attending the hospitals’ antenatal clinics, inpatient wards, or day assessment units were also invited to participate by email link to an online or paper survey.

Study design and recruitment

The study consisted of an antenatal and postnatal survey. The

surveys were self-administered and developed based on a review of literature, existing surveys [7,10,15], and discussion with researchers, educators, obstetricians and midwives (Appendix 1) [1]. Prospective participants were provided with a participant information leaflet and informed consent to participate was obtained at the beginning of the first survey. After completion of the first survey, women could opt to receive a follow-up survey after birth, and/or to their hospital birth data being provided to researchers. Data collection for the antenatal survey was either on paper which could be returned to the researcher or locked box, or via an online survey. Those women who consented to receiving a postnatal survey and were known to have a live baby were sent an online survey at around 6 weeks after the expected due date, with a reminder after 3 days. Online surveys were collected using REDCap software, a secure web application for building and managing online surveys and databases [16].

Data collection

In the antenatal survey, women were asked about their plans for antenatal education: whether they were planning to attend antenatal education or not, what influenced these choices and socio-demographic characteristics. If attending antenatal classes, women were asked about type of class attended and what they hoped to learn or, if not attending were asked reasons for their decision.

In the postnatal survey, women were asked if they attended classes, and how well they felt their antenatal education prepared them for labour and birth, and for parenting. Women were also asked what techniques to help with labour were taught in antenatal classes and what techniques they used. Finally, women who attended classes were asked what information they thought there should have been more or less of in the antenatal classes they attended.

Data about class attendance was taken preferentially from the postnatal survey if women completed both surveys. Types of classes offered at the hospitals and the community are outlined in Table 1. Women reporting attendance at multiple classes were assigned into mutually exclusive groups using a hierarchical ranking system (“She Births” > “Calmbirth” > “Having a Baby” RHW or “Having Your Baby” SGH > “Birth Intensive” > midwife > other). The type of class was categorised into four groups for analysis: psychoprophylaxis classes; birth and parenting classes; other classes; none (for women who reported not having attended any formal antenatal education). We categorised classes as psychoprophylaxis if the primary focus of the class was teaching women strategies and techniques for use in labour that may also be useful to manage stress or pain. Available classes which aimed to teach and equip women for pregnancy, birth and parenting were categorised as birth and parenting classes. Analysis was also performed with grouping into a dichotomous variable of any class vs no classes.

Outcomes

The study outcomes included reasons for attending or not attending classes, labour analgesia techniques taught and used, and for those who attended classes feedback on usefulness of class content. Socio-demographic characteristics collected included maternal age, country of birth, language spoken at home, income, level of education, hospital of birth and model of antenatal care.

Sample size

We aimed to recruit at least 100 women attending each main type of class at the Hospitals (Having a Baby at RHW, Calmbirth, Having Your Baby at SGH, and Birth Intensive) and 100 women from each hospital who planned not to attend classes. A sample size calculation was not performed. It was not known prior to the study how many women were doing antenatal education, as antenatal education is undertaken by both hospital and non-hospital providers, and we purposefully wanted to

Table 1
Antenatal education at The Royal Hospital for Women, St George Hospital and in the community.

Psychoprophylaxis classes		
She Births (Community)	2 × 7 h	Comprehensive labour and birth program that provides couples with a toolkit of skills to support them through pregnancy, labour and also parenthood.
Calmbirth (RHW and Community)	2 × 6 h	Calmbirth strives to reframe birth & empower women to work with their bodies, their partners and caregivers to create an environment that allows for the best outcome. This skills-based program includes psychological and emotional preparation for childbirth and parenthood.
Birth and parenting classes		
Having a Baby (RHW)	6 × 2.5 h or 2 × 8 h	Interactive, small group, comprehensive pregnancy, labour, birth, and parenting program aiming to prepare couples for this vital time in their childbearing year.
Having Your Baby (SGH)	6 × 2 h	Similar to RHW's Having a Baby program, although slightly shorter.
Other classes		
Birth Intensive (RHW)	1 × 4 h	Lecture-style labour and birth class, for those who are short of time, with minimal time given to experiential learning.
Active Birth (SGH)	1 × 3 h	One session to support and help empower women to achieve a normal birth using active birth techniques
Motherhood Myths and Challenges (RHW)	4 × 3.5 h	A specific stress management program for women only. Ideal for those with a history of anxiety and/or depression.
Prenatal Yoga (RHW)	1 × 1 h	An ideal preparatory exercise whilst pregnant, combining the building of strength with the opportunity to relax and let go.
Private classes (Community)	Variable lengths	Provided by independent Midwife or educator and mainly focussed just on labour and birth preparation.

survey women undertaking no education, and to survey a range of different education types. RHW and SGH have approximately 3800 and 2500 births per annum, respectively [14], and within their local health district 51.7 % of women were nulliparous [17]. We continued to recruit women who were not attending antenatal classes and who were attending classes not undertaken at the hospitals by recruiting face to face in antenatal clinics at both hospitals after we had ceased online recruitment at RHW for the most utilised antenatal classes. Recruitment ceased due to resource availability prior to the anticipated recruitment of the number of women attending no antenatal classes.

Statistical methods

De-identified data was stored in the REDCap database. A study number was generated for each woman so that the initial and follow-up surveys could be linked to the hospital data, and pre- and post-birth comparisons could be performed. Women who were parous or did not have a singleton pregnancy were excluded.

The demographic characteristics of women in the study were compared by type of antenatal classes attended, as well as between those who did and did not complete the postnatal survey to examine differential loss to follow-up. Among women attending antenatal classes, reported reasons for class attendance were compared by type of class attended. Among women not attending antenatal classes, reported barriers to attendance were described, which included reasons from a supplied multiple-choice list and recoded free-text responses. Among women completing both surveys, pain management techniques taught, techniques used, and course feedback were compared by type of birth classes attended. All comparisons were assessed using Pearson's Chi

Squared tests of independence (p-value < 0.05 considered statistically significant) and analyses were performed using SAS version 9.4 (SAS Institute Inc., Cary, NC, USA). Ethics approval was obtained from the South Eastern Sydney Local Health District Human Research Ethics Committee (Ref no: 17/090 (LNR/17/POWH/198)) with site specific approval for both sites.

Results

Overall, 745 women were surveyed. After exclusions, 724 women, 575 (79.4 %) from RHW and 149 (20.6 %) from SGH were included. Of these, 456 (63.0 %) women completed the antenatal survey only and 268 (37.0 %) women completed both the antenatal and postnatal surveys (Fig. 1).

Types of antenatal classes accessed and demographics of attendees

Demographic characteristics of the women by antenatal class attendance are presented in Table 2. The most common type of antenatal classes attended were birth and parenting classes (n = 274, 37.8 %), followed by other classes (n = 201, 27.8 %) and psychoprophylaxis classes (n = 154, 21.3 %); with 13.1 % (n = 95) of women attending none. The median age group was 30–34 years and 40 % of women were born in Australia. Compared to women who attended antenatal classes, a higher proportion of women who did not attend classes had a household income of < \$50,000 (16.8 % vs 6.7 %, p < 0.001) and did not complete education beyond year 12 equivalent (14.7 % vs 3.8 %, p < 0.001), and a lower proportion were Caucasian (39.0 % vs 70.3 %, p < 0.001).

Motivations and barriers to antenatal class attendance

The main reasons women listed for attending classes were to better manage the birth (86 %), to help me feel more secure in taking care of the baby (71 %), and to feel more secure as a parent (60 %), although this differed by class type (Table 3). A higher proportion of women who attended psychoprophylaxis classes reported “to make me better able to manage the birth” than women who attended birth and parenting classes and other classes (94 % vs 87 % vs 79 %, respectively, p < 0.001). Less women attending psychoprophylaxis classes listed “to feel more secure as a parent” than women attending birth and parenting classes and other classes (51 % vs 67 % and 58 %, respectively, p = 0.003). Reasons women reported not attending classes included being too busy (32.6 %), cost (26.3 %) and that classes were not right for me (12.6 %) (Table 4).

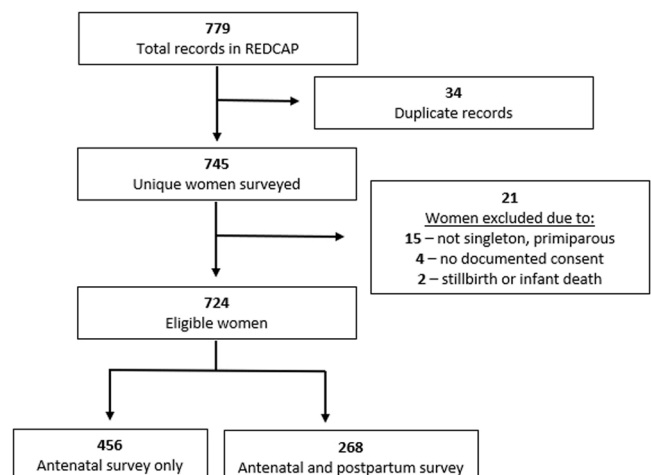


Fig. 1. Flowchart of the participants in the study.

Table 2
Maternal Demographics by antenatal class attendance and class type (N = 724).

Characteristic		Psychoprophylaxis classes (n = 154) n (%)	Birth & parenting classes (n = 274) n (%)	Other Classes (n = 201) n (%)	None (n = 95) n (%)	Any Class (n = 629) n (%)	Total (n = 724) n (%)	P-value ^a	P-value ^b
Hospital	RHW	138 (89.6)	203 (74.1)	176 (87.6)	58 (61.1)	517 (82.2)	575 (79.4)	< 0.001	< 0.001
	SGH	16 (10.4)	71 (25.9)	25 (12.4)	37 (39.0)	112 (17.8)	149 (20.6)		
Maternal Age* (years)	< 25	0 (0.0)	3 (1.1)	7 (3.5)	3 (3.2)	10 (1.6)	13 (1.8)	0.005	0.064
	25–29	17 (11.0)	49 (17.9)	30 (14.9)	18 (19.0)	96 (15.3)	114 (15.8)		
	30–34	61 (39.6)	89 (32.5)	58 (28.9)	21 (22.1)	208 (33.1)	229 (31.6)		
	35–39	37 (24.0)	46 (16.8)	29 (14.4)	11 (11.6)	112 (17.8)	123 (17.0)		
	> =40	2 (1.3)	8 (2.9)	7 (3.5)	4 (4.2)	17 (2.7)	21 (2.9)		
BMI (kg/m ²)	Missing	37 (24.0)	79 (28.8)	70 (34.8)	38 (40.0)	186 (29.6)	224 (30.9)	0.153	0.503
	< 18.5	5 (3.3)	12 (4.4)	10 (5.0)	4 (4.2)	27 (4.3)	31 (4.3)		
	18.5–24.9	120 (77.9)	192 (70.1)	132 (65.7)	58 (61.1)	444 (70.6)	502 (69.3)		
	25–30	24 (15.6)	41 (15.0)	39 (19.4)	19 (20.0)	104 (16.5)	123 (17.0)		
	> 30	3 (2.0)	20 (7.3)	15 (7.5)	8 (8.4)	38 (6.0)	46 (6.4)		
Model of Care	GP Shared Care	73 (47.4)	175 (63.9)	120 (59.7)	38 (40.0)	368 (58.5)	406 (56.1)	< 0.001	< 0.001
	Midwifery Group Practice	60 (39.0)	43 (15.7)	40 (19.9)	17 (17.9)	143 (22.7)	160 (22.1)		
Country of Birth	Other Models	21 (13.6)	56 (20.4)	41 (20.4)	40 (42.1)	118 (18.8)	158 (21.8)	< 0.001	< 0.001
	Australia/New Zealand	73 (47.4)	100 (36.5)	76 (37.8)	39 (41.1)	249 (39.6)	288 (39.8)		
Income	UK/Ireland	32 (20.8)	54 (19.7)	40 (19.9)	6 (6.3)	126 (20.0)	132 (18.2)	< 0.001	< 0.001
	Americas	14 (9.1)	24 (8.8)	14 (7.0)	7 (7.4)	52 (8.3)	59 (8.2)		
	Asia/Pacific	10 (6.5)	61 (22.3)	47 (23.4)	37 (39.0)	118 (18.8)	155 (21.4)		
	Europe/Russia	17 (11.0)	28 (10.2)	19 (9.5)	4 (4.2)	64 (10.2)	68 (9.4)		
	Middle East/Africa	8 (5.2)	6 (2.2)	4 (2.0)	2 (2.1)	18 (2.9)	20 (2.8)		
Ethnicity	< \$50,000	7 (4.6)	14 (5.1)	21 (10.5)	16 (16.8)	42 (6.7)	58 (8.0)	< 0.001	< 0.001
	\$50–80,000	7 (4.6)	30 (11.0)	27 (13.4)	20 (21.1)	64 (10.2)	84 (11.6)		
	\$81–125,000	18 (11.7)	50 (18.3)	36 (17.9)	8 (8.4)	104 (16.5)	112 (15.5)		
	> \$125,000	104 (67.5)	138 (50.4)	78 (38.8)	23 (24.2)	320 (50.9)	343 (47.4)		
	prefer not to say	17 (11.0)	40 (14.6)	36 (17.9)	27 (28.4)	93 (14.8)	120 (16.6)		
Language	Caucasian	126 (81.8)	183 (66.8)	133 (66.2)	37 (39.0)	442 (70.3)	479 (66.2)	< 0.001	< 0.001
	Asian	10 (6.5)	54 (19.7)	42 (20.9)	31 (32.6)	106 (16.9)	137 (18.9)		
	Indian subcontinent	6 (3.9)	14 (5.1)	9 (4.5)	8 (8.4)	29 (4.6)	37 (5.1)		
	Other	12 (7.8)	20 (7.3)	14 (7.0)	18 (19.0)	46 (7.3)	64 (8.8)		
Education	English	143 (92.9)	212 (77.4)	159 (79.1)	66 (69.5)	514 (81.7)	580 (80.1)	< 0.001	0.004
	Less than or up to Year 12 or equivalent	4 (2.6)	8 (2.9)	12 (6.0)	14 (14.7)	24 (3.8)	38 (5.3)		
	Trade/ Diploma	21 (13.6)	48 (17.5)	35 (17.4)	22 (23.2)	104 (16.5)	126 (17.4)		
	Undergraduate	60 (39.0)	91 (33.2)	75 (37.3)	32 (33.7)	226 (35.9)	258 (35.6)		
	Postgraduate	69 (44.8)	125 (45.6)	76 (37.8)	27 (28.4)	270 (42.9)	297 (41.0)		

Abbreviation GP- general practitioner

Sums of categories may not equal totals due to missing values

*Maternal age only available for women who provided a birthdate who completed the postpartum survey

^a p-value from Pearson’s Chi Squared test assessing overall difference between class types for each characteristic

^b p-value from Pearson’s Chi Squared test for Any Class vs None

Table 3
Reasons for attendance at antenatal classes by class type in those who attended classes.

Reasons for attendance ^a	Psychopro-phylaxis (n = 154) n (%)	Birth and parenting (n = 274) n (%)	Other Classes (n = 201) n (%)	Total (n = 629) n (%)	p-value
To feel more secure as a parent	78 (50.7)	184 (67.2)	116 (57.7)	378 (60.1)	0.003
To help me feel more secure in taking care of the baby	103 (66.9)	221 (80.7)	122 (60.7)	446 (70.9)	< 0.001
To make me better able to manage the birth	145 (94.2)	239 (87.2)	159 (79.1)	543 (86.3)	< 0.001
I want to meet other parents-to-be	51 (33.1)	116 (42.3)	42 (20.9)	209 (33.2)	< 0.001
To decrease my fear of birth	89 (57.8)	161 (58.8)	93 (46.3)	343 (54.5)	0.017
I think it can provide support to a couple’s relationship	63 (40.9)	98 (35.8)	48 (23.9)	209 (33.2)	0.002
It is expected that parents-to-be will take them	30 (19.5)	53 (19.3)	34 (16.9)	117 (18.6)	0.758
General understanding	69 (44.8)	119 (43.4)	76 (37.8)	264 (42.0)	0.337

^a Not mutually exclusive

Labour management techniques taught in antenatal classes

Epidural, breathing techniques, massage and nitrous oxide were the most common techniques taught to women attending classes to manage labour (Fig. 2). Breathing techniques (68 %), nitrous oxide (59 %), and epidural (52 %) were the most common labour techniques used (Fig. 2). Acupressure, TENS machine, breathing techniques and visualisation

were more commonly used by women who attended psychoprophylaxis classes than by women who attended birth and parenting classes, other classes, and women who did not attend classes (p < 0.001; Table 5).

Women’s views on content of antenatal classes

Women who attended any antenatal class reported they were more

Table 4
Reasons women who did not attend classes reported why they did not attend classes (N = 95).

Reasons for not attending antenatal classes ^a	n (%)
I am too busy	31 (32.6)
Classes are too expensive	25 (26.3)
Classes were not right for me	12 (12.6)
I don't know about these	10 (10.5)
Classes were full ^b	8 (8.4)
Classes are not needed	7 (7.4)
Admitted early / Medical reason ^b	6 (6.3)
Doing my own research ^b	5 (5.3)
Classes are too overwhelming ^b	4 (4.2)
Classes were not in my language	2 (2.1)
Other reason	7 (7.4)

^a Not mutually exclusive

^b Reason based on free-text responses

useful preparation for birth than useful preparation for parenting (94 % vs 74 %) (Table 6). This was most marked for women attending psychoprophylaxis classes with a lower proportion reporting this was useful preparation for parenting compared to women attending birth and parenting classes or other classes (with 56.8 % vs 82.8 % vs 79.3 %, respectively, reporting classes useful preparation for parenting, $p < 0.001$). Over half (56.8 %) of women who attended classes stated more information about baby care/sleeping would have been useful, when surveyed postnatally.

Discussion

The majority of women attended a wide range of antenatal classes types, with their main reasons for attending to manage the birth and to feel more secure taking care of the baby. Women found them useful preparation for birth, and to a lesser extent parenting. When surveyed postnatally, women stated that more information on baby care/sleeping and breastfeeding would have been useful. Women used a variety of techniques to manage pain in labour which were taught in the classes, if

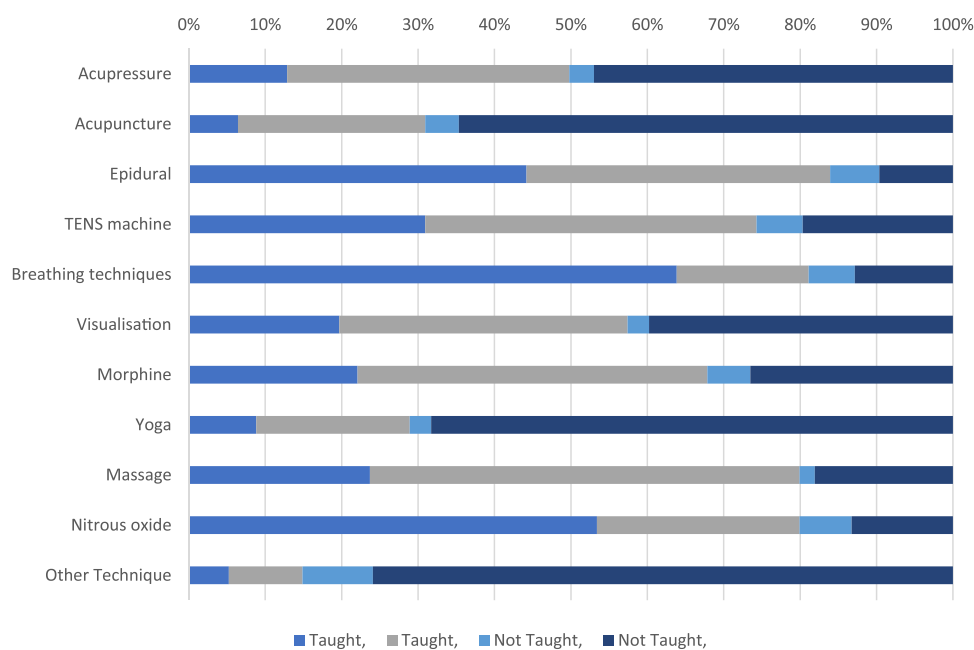


Fig. 2. Techniques taught and used to manage labour by women who attended antenatal education, as reported in the postnatal survey.

Table 5
Non-pharmacological techniques taught in antenatal education and used in labour for pain management in labour.

Techniques taught	Psychoprophylaxis (n = 74) n (%)	Birth and parenting (n = 122) n (%)	Other Classes (n = 53) n (%)	Total (N = 249) n (%)	p-value
Acupressure	59 (79.7)	51 (41.8)	14 (26.4)	124 (49.8)	< 0.001
Acupuncture	32 (43.2)	32 (26.2)	13 (24.5)	77 (30.9)	0.023
TENS machine	61 (82.4)	91 (74.6)	33 (62.3)	185 (74.3)	0.037
Breathing techniques	72 (97.3)	94 (77.1)	36 (67.9)	202 (81.1)	< 0.001
Visualisation	69 (93.2)	56 (45.9)	18 (34.0)	143 (57.4)	< 0.001
Yoga	31 (41.9)	29 (23.8)	12 (22.6)	72 (28.9)	0.013
Massage	66 (89.2)	102 (83.6)	31 (58.5)	199 (79.9)	< 0.001
Other Technique	11 (14.9)	19 (15.6)	7 (13.2)	37 (14.9)	0.922
Techniques used	Psychoprophylaxis (n = 74) n (%)	Birth and parenting (n = 122) n (%)	Other Classes(n = 53) n (%)	Total (N = 268) n (%)	p-value
Acupressure	24 (32.4)	10 (8.2)	6 (11.3)	40 (14.9)	< 0.001
Acupuncture	12 (16.2)	11 (9.0)	4 (7.6)	28 (10.5)	0.270
TENS machine	46 (62.2)	28 (23.0)	18 (34.0)	95 (35.5)	< 0.001
Breathing techniques	67 (90.5)	78 (63.9)	29 (54.7)	183 (68.3)	< 0.001
Visualisation	28 (37.8)	18 (14.8)	10 (18.9)	57 (21.3)	< 0.001
Yoga	11 (14.9)	14 (11.5)	4 (7.6)	30 (11.2)	0.495
Massage	20 (27.0)	30 (24.6)	14 (26.4)	67 (25.0)	0.780
Other Technique	7 (9.5)	21 (17.2)	8 (15.1)	43 (16.0)	0.034

Table 6
Education course feedback of usefulness, on postnatal survey.

Feedback on antenatal classes	Psychoprophylaxis (n = 74) n (%)	Birth and parenting (n = 122) n (%)	Other (n = 53) n (%)	Total (N = 249) n (%)	p-value
Useful preparation for birth ^a	70 (94.6)	113 (92.6)	51 (96.2)	23 (93.6)	0.632
Useful preparation for parenting ^a	42 (56.8)	101 (82.8)	42 (79.3)	185 (74.3)	< 0.001
Needed more information about pregnancy?	0 (0.0)	1 (0.8)	2 (3.7)	3 (1.2)	0.136
Needed more information about birth?	10 (13.5)	20 (16.4)	7 (13.2)	37 (14.9)	0.800
Needed more information about breastfeeding?	28 (37.8)	40 (32.8)	19 (35.9)	87 (34.9)	0.763
Needed more information about baby care/sleeping?	42 (56.8)	70 (57.4)	28 (52.8)	140 (56.8)	0.851
Needed more information about parenting?	27 (36.5)	35 (28.7)	16 (30.2)	78 (31.3)	0.511
Needed more information to meet other parents?	7 (9.5)	19 (15.6)	11 (20.8)	37 (14.9)	0.201

^a responses of "Very useful" and "Useful" grouped together

they attended them. Women who attended psychoprophylaxis classes used more non-pharmaceutical pain relief techniques in labour.

Women who did not attend classes reported barriers to attendance including being too busy, cost and feeling antenatal classes were not right for them. Despite the passage of more than 25 years, in 1991 Redman et al. found women reported similar reasons for non-attendance including feeling already prepared, not having time, and leaving arranging classes too late [18]. In a secondary analysis of data from a longitudinal study in Buffalo USA, women who were white, more educated, not living in a high crime neighbourhood, and privately insured were more likely to attend antenatal education [19]. Classes in our New South Wales state hospitals are frequently run on a cost-recovery mode or in the private sector. Women who did not attend classes were more likely to have lower income, lower education and be of extremes of age (<25 or over 40 years). These demographic characteristics are associated with increased rates of caesarean birth, obstetric intervention and adverse perinatal outcomes in Australia [20]. To overcome barriers to antenatal education attendance and improve equity of access, classes could be incorporated into a part of standard antenatal care with funding available for those with low income, and to provide classes suited to attendees' cultural background and primary language.

We found women who attended psychoprophylaxis classes were more likely to use acupuncture, TENS machine, breathing techniques and visualisation than women who attended birth and parenting classes, other classes, and women who did not attend classes. Other studies assessing psychoprophylaxis classes reported increased use of non-pharmacological analgesia techniques in labour. Levett et al. found women randomised to their labour and birth preparation course used an average of 3.94 (SD=1.4) complementary medicine techniques in labour, compared to < 5 % of women in the control group [9]. In another study, Citak et al. compared women receiving weekly three-hour childbirth education sessions over five weeks to routine antenatal care and found women in the education group were more likely to use non-pharmacological methods of pain relief [4]. A national prospective cohort study in Sweden found women who attended antenatal classes utilised more pharmacological and non-pharmacological pain relief techniques in labour compared to non-attendees including nitrous oxide, bath/shower, and psychoprophylaxis [10]. Maimburg et al. performed a randomised controlled trial assessing cervical assessment on presentation, use of pain relief and medical interventions in labour, with the intervention group attending a three-session course on labour and birth, newborn care and parenthood. They found a reduction in use of epidural analgesia but no difference in other pharmacological options or non-pharmacological pain relief techniques [7]. It may be not possible to determine whether one or more specific techniques improve birth and parenting outcomes as antenatal education is a complex intervention. We have recently published the birth outcomes from this study which showed a trend toward higher rates of vaginal birth in women who attended psychoprophylaxis education compared to women who attended birth and parenting, other or no education [21]. Further high quality randomised controlled trials are necessary to evaluate the

effectiveness of psychoprophylaxis education on birth and parenting outcomes.

When surveyed postnatally, a significant proportion of women stated that they would have liked more information about breastfeeding, baby care/sleeping and parenting than pregnancy or birth. Similarly, a survey of Swedish women demonstrated 74 % of women found education helpful in preparing for childbirth whereas only 40 % found education helpful in preparing them for early childhood [10]. In a Brazilian qualitative study where women were interviewed antenatally regarding antenatal education, all participants reported a desire for guidance on non-pharmacological pain relief strategies for use in labour [22]. In a review of qualitative studies regarding antenatal education by Nolan it was noted that information overload was an issue in several studies and that women were concerned they could not recall everything taught and practiced in the education sessions [23]. Education being too birth-focused was the most disliked element in a randomised trial comparing two antenatal education programmes in Australia [24]. This incongruity between what women wanted from antenatal education when pregnant compared to after birth, challenges whether education regarding birth and early parenting should be delivered at different times when women are more accepting of, and ready for, each. This is consistent with Malcolm Knowles' theory of adult learning, which assumes that one of the key characteristics for learning is 'readiness to learn' produced by being confronted with developmental tasks by the evolution of social roles [25]. Extrapolating from this theory, during pregnancy, women's readiness to learn is aligned with their focus on the upcoming task of labour and birth. Once this occurred their focus and therefore readiness to learn is transferred to breastfeeding and care of the newborn. The complicating challenge here is that some knowledge of breastfeeding and newborn care is required immediately after birth at a time when providing that care directly impedes opportunities for formal or group education sessions. Maimburg et al. found no difference in women's self-reported birth experience between women who received nine hours of antenatal education vs no formalised training [7]. In a Swedish national cohort observational study Fabian et al. found no difference in experience of labour pain, or birth experience between attendees and non-attendees of antenatal childbirth and parenthood education classes [10]. Other studies found antenatal education reduced the fear of childbirth [5,6]. Svensson et al. found women prioritised social support as an important component of antenatal education [15], which poses a challenge to providing staggered or online learning. If psychoprophylaxis classes prove effective in reducing caesarean birth rates it will be important when incorporating these strategies into antenatal education that baby care and parenting education are not overlooked.

Strengths and limitations of the study

This study has many strengths, including surveying a large number of women before and after birth, including those attending a variety of models of antenatal care at two maternity hospitals in a large geographical area of Sydney. The study was restricted to primiparous

women with singleton pregnancies to reduce the influence of previous birthing experience on their opinions and outcomes. We surveyed women who attended a range of formats of antenatal education available to women/couples in Australia, and we also surveyed women who did not attend classes. However, the study also has some limitations. The demographics of women who did not attend classes were different to attendees and a relatively small number of women surveyed did not attend classes. Women were also highly educated, and of high income. Despite having the survey translated into two different languages, all responses were in English. The reasons for this are not known, however we did not have interpreters and our recruiting team did not speak the two languages that we had the survey translated into. In addition, a large proportion of women either did not agree to complete the postnatal survey, and of those who did consent, a number did not complete the postnatal survey. Other limitations included observational study design and the method of recruitment, as by purposely aiming to recruit a similar number of women who attended different types of classes or no classes, we are unable to determine the percentage of women who did not attend classes overall.

Conclusion

Women report antenatal education is useful preparation for birth and to a lesser extent parenting. Women who attended psychoprophylaxis classes were more likely to use a wider range of pain relief techniques in labour. When asked postnatally women would like more information on infant care and breastfeeding from antenatal education. Education providers should ensure enough breast feeding and infant care information is provided, and determine whether this should be antenatally or postnatally. Barriers to attendance at antenatal education such as cost, language and times should be addressed.

Ethical statement

The name of the ethics committee:
South Eastern Sydney Local Health District Human Research Ethics Committee.

The approval number

17/090 (LNR/17/POWH/198).

The date of approval

12/05/17.

Acknowledgements

Alana-Jane Hurst, Michelle Everleigh, Virginia Spear, Zhuoran Chen, Helen Rogers.

The authors would like to thank and acknowledge the women who participated in this study and the parent education teams at Royal Hospital for Women and St George Hospital. There has been no financial assistance with the project.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.wombi.2022.08.003](https://doi.org/10.1016/j.wombi.2022.08.003).

References

- [1] I. Ahlden, S. Ahlehagen, L.O. Dahlgren, A. Josefsson, Parents' expectations about participating in antenatal parenthood education classes, *J. Perinat. Educ.* 21 (1) (2012) 11–17.
- [2] A. Berlin, L. Tornkvist, M. Barimani, Content and presentation of content in parental education groups in Sweden, *J. Perinat. Educ.* 25 (2) (2016) 87–96.
- [3] H. Gottfredsdottir, T. Steingrimsdottir, A. Bjornsdottir, E.Y. Guethmundsdottir, H. Kristjansdottir, Content of antenatal care: does it prepare women for birth? *Midwifery* 39 (2016) 71–77.
- [4] N. Citak Bilgin, B. Ak, F. Ayhan, F. Kocyigit, S. Yorgun, M.A. Topcuoglu, Effect of childbirth education on the perceptions of childbirth and breastfeeding self-efficacy and the obstetric outcomes of nulliparous women, *Health Care Women Int* 41 (2) (2020) 188–204.
- [5] S. Cankaya, B. Simsek, Effects of antenatal education on fear of birth, depression, anxiety, childbirth self-efficacy, and mode of delivery in primiparous pregnant women: a prospective randomized controlled study, *Clin. Nurs. Res.* 30 (6) (2021) 818–829.
- [6] O. Karabulut, D. Coskuner Potur, Y. Dogan Merih, S. Cebeci Mutlu, N. Demirci, Does antenatal education reduce fear of childbirth? *Int Nurs. Rev.* 63 (1) (2016) 60–67.
- [7] R.D. Maimburg, M. Vaeth, J. Durr, L. Hvidman, J. Olsen, Randomised trial of structured antenatal training sessions to improve the birth process, *BJOG* 117 (8) (2010) 921–928.
- [8] J. Fenwick, J. Toohill, J. Gamble, et al., Effects of a midwife psycho-education intervention to reduce childbirth fear on women's birth outcomes and postpartum psychological wellbeing, *BMC Pregnancy Childbirth* 15 (2015) 284.
- [9] K.M. Levett, C.A. Smith, A. Bensoussan, H.G. Dahlen, Complementary therapies for labour and birth study: a randomised controlled trial of antenatal integrative medicine for pain management in labour, *BMJ Open* 6 (7) (2016), e010691.
- [10] H.M. Fabian, L.J. Radestad, U. Waldenstrom, Childbirth and parenthood education classes in Sweden. Women's opinion and possible outcomes, *Acta Obstet. Gynecol. Scand.* 84 (5) (2005) 436–443.
- [11] C.S. Brixval, S.F. Axelsen, S.G. Lauemoller, S.K. Andersen, P. Due, V. Koushede, The effect of antenatal education in small classes on obstetric and psycho-social outcomes - a systematic review, *Syst. Rev.* 4 (2015) 20.
- [12] A.J. Gagnon, J. Sandall, Individual or group antenatal education for childbirth or parenthood, or both, *Cochrane Database Syst. Rev.* 3 (2007), CD002869.
- [13] World Health Organization. WHO recommendations non-clinical interventions to reduce unnecessary caesarean sections, 2018.
- [14] Centre for Epidemiology and Evidence. New South Wales Mothers and Babies 2019: NSW Ministry of Health, 2021.
- [15] J. Svensson, L. Barclay, M. Cooke, The concerns and interests of expectant and new parents: assessing learning needs, *J. Perinat. Educ.* 15 (4) (2006) 18–27.
- [16] P.A. Harris, R. Taylor, R. Thielke, J. Payne, N. Gonzalez, J.G. Conde, Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support, *J. Biomed. Inf.* 42 (2) (2009) 377–381.
- [17] Centre for Epidemiology and Evidence. HealthStats NSW. Sydney: NSW Ministry of Health. 2019. Available at: (www.healthstats.nsw.gov.au) (Accessed 24th June 2022).
- [18] S. Redman, S. Oak, P. Booth, J. Jensen, A. Saxton, Evaluation of an antenatal education programme: characteristics of attenders, changes in knowledge and satisfaction of participants, *Aust. N. Z. J. Obstet. Gynaecol.* 31 (4) (1991) 310–316.
- [19] M. Sperlrich, C. Gabriel St, N.M. Vil, Preference, knowledge and utilization of midwives, childbirth education classes and doulas among U.S. black and white women: implications for pregnancy and childbirth outcomes, *Soc. Work Health Care* 58 (10) (2019) 988–1001.
- [20] Australian Institute of Health and Welfare. Stillbirths and neonatal deaths in Australia 2017 and 2018. Canberra: AIHW, 2021.
- [21] Shand A.W., Lewis-Jones B., Nielsen T., et al. Birth outcomes by type of attendance at antenatal education: An observational study. *Australian and New Zealand Journal of Obstetrics and Gynaecology*; In press.
- [22] M.A. Heim, M.A. Miquelutti, M.Y. Makuch, Perspective of pregnant women regarding antenatal preparation: a qualitative study, *Women Birth* 32 (6) (2019) 558–563.
- [23] M.L. Nolan, Information giving and education in pregnancy: a review of qualitative studies, *J. Perinat. Educ.* 18 (4) (2009) 21–30.
- [24] J. Svensson, L. Barclay, M. Cooke, Randomised-controlled trial of two antenatal education programmes, *Midwifery* 25 (2) (2009) 114–125.
- [25] M.S. Knowles, *The Modern Practice of Adult Education: From Pedagogy to Andragogy*, The Adult Education Company, Cambridge, 1980 (Revised and Updated).