

Childbirth Experience, Risk of PTSD and Obstetric and Neonatal Outcomes According to Antenatal Classes Attendance

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Abstract

Antenatal classes have evolved considerably and include now a discussion of the parents' birth plan. Respecting this plan normally results in a better childbirth experience, an important protective factor of post-traumatic stress disorder following childbirth (PTSD-FC). Antenatal class attendance may thus be associated with lower PTSD-FC rates.

This cross-sectional study took place at a Swiss University hospital. All primiparous women who gave birth to singleton from 2018-2020 were invited to answer self-reported questionnaires. Data for childbirth experience, symptoms of PTSD-FC, neonatal, and obstetrical outcomes were compared between women who attended (AC) or not (NAC) antenatal classes.

A total of 794/2876 (27.6%) women completed the online questionnaire. Antenatal class attendance was associated with a poorer childbirth experience ($p=0.03$). When taking into account other significant predictors of childbirth experience, only induction of labor, use of forceps, emergency caesarean, and civil status remained in the final model of regression. Intrusion symptoms were more frequent in NAC group ($M=1.63$ versus $M=1.11$, $p=0.02$). Antenatal class attendance, forceps, emergency caesarean, and hospitalisation in NICU remained significant predictors of intrusions for PTSD-FC. Use of epidural, obstetrical, and neonatal outcomes were similar for AC and NAC.

Background

Over the last decades, many changes have occurred in perinatal care. The arrival of the epidural in obstetrics in 1972 and its increasing access in the 1980s also profoundly modified the preparation for birth, previously mainly focused on pain management (Standing, el-Sabagh, & Brooten, 1998). Antenatal classes have integrated a psychological preparation of the woman and her partner in addition to the physical preparation (Betolli, 2003), as psychological preparation may improve mental health during pregnancy (Moghaddam Hosseini, Nazarzadeh, & Jahanfar, 2018). Furthermore, couples are encouraged to participate actively in their birth project, starting during pregnancy (HAS, 2005).

The "classical" preparation for birth is a legacy of the psycho-prophylaxis training introduced in France by Lamaze in the early 1950s. From 1955, this model of antenatal classes, also named "painless childbirth", was adopted in French-speaking Switzerland (Vuille, 2009). Partly because of the feminist movements and the decreasing length of stay in maternity wards, the future co-parent became an active participant of antenatal classes: he/she took on the role of supporter and coach during childbirth, as well as support for the return home after birth. The role of those in charge of birth preparation, often midwives, has also changed. Often employed by hospitals, their new teaching model is still based on informing future parents about pregnancy, childbirth, breastfeeding, and childcare. However, they must also promote the medical environment in which the birth will take place (Standing, el-Sabagh, & Brooten, 1998).

In Switzerland, the "classical" birth preparation today is still based on the teaching of theoretical knowledge about pregnancy and childbirth, breathing techniques, and postural labor combined with relaxation (Centre Hospitalier Universitaire Vaudois, 2020; Département de gynécologie et d'obstétrique Hôpitaux Universitaires de Genève, 2015; Fédération Suisse des Sages-femmes section des sages-femmes Vaud-Neuchâtel-Jura, 2020; Maffi, 2014). However, these courses are now integrated in the birth plan that parents are invited to draw up, as recommended by the Haute Autorité de Santé (HAS) (2005), so that the couple's expectations can be taken into account. In addition, future parents are expected to develop specific skills, such as understanding and using information, and developing personal resources throughout the courses, thus marking the definitive shift from an objective of pain-free childbirth to one of psychological preparation for childbirth and parenthood. In the canton of Vaud, the usual costs of in-hospital sessions range from 160 to 344 \$, while the Swiss compulsory health insurance reimburses 160\$ for an individual or group course given by a midwife (Office fédéral de la santé publique (OFSP), 2021). These costs can represent a barrier to accessing antenatal classes.

Although many women and their partners have a positive childbirth experience, approximately one-third perceive their childbirth to be traumatic (Soet, Brack, & Dilorio, 2003). Between 3–6% of women in community samples (low risk) and between 6–18% of women in high-risk groups (e.g., preterm birth, emergency cesarean section) develop post-traumatic stress disorder following childbirth (PTSD-FC) (Grekin & O'Hara, 2014; Yildiz, Ayers, & Phillips, 2017). PTSD-FC consists of four symptom clusters: re-experiencing of the traumatic event (intrusions), cognitive and behavioral avoidance, negative alterations in mood and cognitions, and hyperarousal (APA, 2013; Horesh, Garthus-Niegel, & Horsch, 2021). A recent study showed that intrusion is the most common symptom after a childbirth-related trauma (Harrison, Ayers, Quigley, Stein, & Alderdice, 2021). This may be due to the impact of pain, both in the bodily memory of the trauma but also as a reminder of the experience. The presence of the newborn near her mother can also be a constant reminder of the traumatic experience, thus triggering intrusions (Harrison, Ayers, Quigley, Stein, & Alderdice, 2021).

PTSD-FC can be influenced by a number of factors according to the diathesis–stress model of PTSD-FC (Ayers, Bond, Bertullies, & Wijma, 2016). Childbirth experience is one of these risk factors, as well as the mode of childbirth, the fear of childbirth, mental health status during pregnancy, and social support. The childbirth experience is a self-assessment of what a woman remembers about her birth (Taheri, Takian, Taghizadeh, Jafari, & Sarafraz, 2018), sometimes even many years later (Bernasconi et al., 2021; Simkin, 1991). More than just satisfaction with pain or care, the childbirth experience attempts to "measure feelings of control, expectancy satisfaction, confidence, and participation in decision making" (Taheri et al., 2018, p. 3). Questionnaires addressing the childbirth experience assess both maternal satisfaction with the provided care and experience of birth (Nilvér, Begley, & Berg, 2017). The childbirth experience can therefore hardly be considered without the provided care. This is why some authors describe the childbirth experience as a subjective experience of birth, whereas the provision of care (mode of delivery, mode of anaesthesia/analgesia, duration of labor, state of the child at birth, etc.) is described as an objective experience (Garthus-Niegel, von Soest, Vollrath, & Eberhard-Gran, 2013).

Recent studies have shown that antenatal classes could prevent PTSD-FC. A prospective study showed that participation in antenatal classes was a predictor of PTSD-FC symptoms at four months post-partum ($t = -2.15$, $\beta = -0.15$; $p < 0.05$) in a sample ($n=275$) of nulliparous and multiparous women, independent of the content of these antenatal classes (Denis, Parant, & Callahan, 2011). A randomised controlled trial highlighted that women who attended a specific

program of antenatal classes had less PTSD-FC symptoms (Gökçe İsbir, İnci, Önal, & Yıldız, 2016). However, these results are difficult to generalise due to the large differences in content, teaching methods, and populations (Brixval et al., 2015; Gagnon & Sandall, 2007). In this context, the aim of this study was to compare women who had participated in antenatal classes with those who had not regarding their childbirth experience, PTSD-FC, as well as their obstetric and neonatal outcomes.

Methods

Design

This cross sectional study took place at a Swiss university hospital.

Study procedure and participants

A Short Message Service (SMS) was sent to all primiparous women, 18 years or older, who gave birth to a single, alive, term baby (≥ 37 weeks of Gestational Age (GA) at the hospital between January 2018 to September 2020. This SMS invited them to participate in the study via an internet link after validation of an E-consent form. The SMS and the online questionnaires were available in French and English. Three reminders were sent from June 2020 to December 2020. Data were collected and managed using REDCap electronic data capture tools (Harris et al., 2019).

Ethical issues

This project was developed in accordance with the rules and regulations in force in Switzerland (research project within the meaning of the Ordinance on Research on Human beings, category A). Informed consent was obtained from all participants as an E-consent form where women must complete their name, surname, birth date, date of completion and validate with a radio button their participation in the study on the RedCap system. The E-consent form is saved in the RedCap system and the participant has the option of downloading it with the answers of the information that she had completed. The Ethical Committee of the Canton de Vaud approved the study protocol (n°2019-02228).

Measures

The primary outcome was the childbirth experience, as measured with the Childbirth Experience Questionnaire (CEQ-2) (Walker, Dencker, & Thornton, 2020). The English version of the questionnaire was translated into French using the forward-backward translation method and cultural adaptation proposed by Wild et al. (Wild et al., 2005). In this study, the Cronbach alpha was calculated as 0.93. This 22-item questionnaire was designed to evaluate different aspects of primiparous' childbirth experiences and has four subscales: Own capacity, Professional support, Perceived safety, and Participation. The CEQ2 is based on a four-point Likert scale ranging from 4 = "totally agree" to 1 = "totally disagree" for 19 questions and on visual analogue scales (VAS) from 0-100 for the last three questions.

The secondary outcome was PTSD-FC symptoms, assessed using the PCL-5, a 20-item scale based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (APA, 2013). Instructions were adapted to refer to the recent childbirth. A validated French version of this scale exists, with a good internal consistency (Ashbaugh, Houle-Johnson, Herbert, El-Hage, & Brunet, 2016). A total score ≥ 31 , is considered as the cut-off for a probable PTSD diagnosis. In this study, the Cronbach alpha was calculated as 0.89. Women also completed the Major Life Events Questionnaire (Koch, Sepa, & Ludvigsson, 2008; Obel et al., 2005) in order to identify cases of violence or abuse before birth, as this is a risk factor for PTSD (Ayers, 2016) and for negative childbirth experience (Smarandache, Kim, Bohr, & Tamim, 2016).

The third group of outcomes were obstetric outcomes (i.e., gravidity, maternal age at birth, induction of labor, oxytocin augmentation, analgesia, mode of birth) and neonatal outcomes (i.e., Apgar score at 1, 5 and 10 minutes, birth weight, and neonatal intensive care unit (NICU) admission), all of which were extracted from digital medical records.

Demographic information (country of origin, civil status, educational background, employment status, and Body Mass Index (BMI)) was collected via self-report questionnaires. Women were asked to report the number of antenatal sessions they had attended, if relevant.

Data analysis

Analyses were conducted with SPSS (Statistical Package for Social Sciences, version 26.0) or the R software (R Core Team, 2018). CEQ2, PCL-5, obstetric, and neonatal outcomes were compared between the two groups, participation in antenatal classes (AC) versus no participation in antenatal classes (NAC). Bivariate correlations were carried out to investigate which variables of interest (including post-hoc exploratory analyses) were related to the childbirth experience. Finally, regression analyses were conducted with all variables that were positively correlated by forcing the variable 'participation in antenatal classes (yes/no)' into the regression (stepwise hierarchical regression). For the regression of the CEQ-2 score (dependant variable), the variable 'participation in antenatal classes' was entered in the first step as independent variable. In the second step, the other independent variables were entered, including history of violence or abuse in the last two years, civil status, employment status, and time since birth, induction of labor, analgesia, forceps, emergency caesarean, operative delivery (all deliveries except spontaneous vaginal birth), Apgar score at 1 minute, Apgar score at 5 min, and NICU admission. For the regression of PCL-5, the same model was used, except for the time since birth, as this was not correlated with the PCL-5 total score.

Depending on the question, the rate of missing responses varied from 16–21.7% for the CEQ-2 and from 29–29.4% for the PCL-5. Missing data for PCL-5 or CEQ-2 were managed using pairwise deletion at item level. No missing data was replaced. No data were missing for demographic, obstetric or neonatal outcomes.

Results

Of the 2876 eligible patients contacted, 794 (27.6%) women completed the questionnaires. Non-responders were significantly younger than responders ($M=31.1$ years, $SD=5.1$ versus $M=32.5$ years, $SD=4.4$; $p<0.001$) and differed significantly regarding their employment status, i.e., non-responders were more likely to be unemployed (21.3% versus 5.1%), while responders were more likely to have white-collar jobs (66.9% versus 42.3%). Among the responders, 592 (74.46%) had attended antenatal classes.

Comparing those who had attended antenatal classes (AC) with those who had not (NAC), those in the AC group were older, with a lower weight ($p < 0.05$), more likely to have completed a university education, and to exercise an intellectual and scientific profession ($p < 0.01$; see Table 1).

Table 1
Sociodemographic sample characteristics and obstetric and neonatal outcomes (n= 795)

	AC (antenatal classes group) n=592	NAC (Non antenatal classes group) n=203		P value
Completion time from birth (days), M±SD	436.58±216.79	401.56±234.01	1.86 ¹	0.52
Maternal age at birth (years), M±SD	32.9±4.16	31.71±5.02	3.04 ¹	0.001
Gravidity, M±SD	1.31±.67	1.40±.92	-1.31 ¹	0.13
BMI at birth (weight at birth in kg/ (size in cm) ² , M±SD	27.29±9.36	28.31±4.92	-1.52 ¹	0.44
Country of origin, n (%)			7.72 ²	0.103
	Switzerland	128 (63.1%)		
	European Union (UE)	51 (25.1%)		
	Europe except UE	10 (4.9%)		
	Americas	6 (3%)		
	Other countries	8 (3.9%)		
Civil Status, n (%)			0.42 ²	0.811
	Single/ Separate/Divorced/Widow	60 (30%)		
	Married / In common-law	140 (70%)		
Educational background, n (%)			48.48 ²	0.000
	Primary education/ Secondary education or other level	18 (9%)		
	Apprenticeship	56 (27.9%)		
	Higher secondary education	18 (9%)		
	University or higher education	109 (54.2%)		
Employment status categorized according to Nomenclature suisse des professions CH-ISCO- 19, n (%)			42.65 ²	0.000
	Directors, executives managers	13 (6.8%)		
	Intellectual and scientific professions	82 (43.2%)		
	Intermediate professions	49 (25.8%)		
	Administrative type employees	5 (2.6%)		
	Staff in direct services to individuals, traders and salespeople	19 (10%)		
	Other professions	5 (2.6%)		
	No employment	17 (8.9%)		
Fertility treatment, n (%)	71 (12%)	21 (10.3%)	0.41 ²	0.522
Mode of delivery, n (%)			8.63 ²	0.071
	Elective caesarean	22 (10.8%)		
	Emergency caesarean	31 (15.3%)		
	Forceps	11(5.4%)		
	Vacuum extraction	14 (6.9%)		
	Spontaneous birth	125 (61.6%)		
Induction of labor, n (%)	190 (36.9%)	61 (36.1%)	0.04 ²	0.852

¹Independent sample t test; ²Chi2 test; ³Fischer exact test;

	AC (antenatal classes group) n=592	NAC (Non antenatal classes group) n=203		P value
Oxytocin augmentation, n (%)	105 (20.4%)	30 (17.8%)	0.56 ²	0.455
Analgesia, n (%)			2.2 ²	0.699
None	36 (6.1%)	11 (5.4%)		
Local anaesthesia, Pudendal Nerve Block, EMONO (Nitrous Oxide/Oxygen 50%/50%)	92 (15.5%)	28 (13.8%)		
Epidural	390 (65.95%)	131 (64.5%)		
Spinal anaesthesia	68(11.5%)	31 (15.3%)		
General anaesthesia	6 (1%)	2 (1%)		
Apgar at 1 min, M ± SD	8.13±1.95	7.84±2.38	1.57 ¹	0.084
Apgar <7 at 1 min, n (%)	112 (18.9%)	47 (23.1%)	1.69 ²	0.193
Apgar at 5 min, M ± SD	9.38±1.0	9.21±1.32	1.71 ¹	0.051
Apgar <7 at 5 min, n (%)	9 (0.01%)	8 (0.04%)	4.23 ³	0.0496
Apgar at 10 min, M ± SD	9.74±.71	9.67±.76	1.1 ¹	0.258
Birth weight (grams), M ± SD	3305.12±427.87	3283.10±438.25	0.63 ¹	0.530
¹ Independent sample t test; ² Chi2 test; ³ Fischer exact test;				

With regards to maternal age and migrant status, the study sample was representative of the population in the catchment area of the university hospital (Canton Vaud) (Vaud, 2021) (Bureau de l'égalité entre les femmes et les hommes & Statistique Vaud, 2018). The sample over-represented women who had a partner or were married (69.1% in our study versus 49% in the canton of Vaud), as well as women with a high level of education (71% in our study versus 42% in the canton of Vaud (Bureau de l'égalité entre les femmes et les hommes & Statistique Vaud, 2018).

Across the whole sample, the PCL-5 total score was negatively correlated with the CEQ-2 total score ($p < .001$) indicating that a better childbirth experience was associated with a lower risk of PTSD-FC symptoms.

Childbirth experience

The mean CEQ-2 total score was 3.06 ($SD=0.62$). The mean CEQ-2 total score ($p < .005$), and the mean CEQ-2 own capacity score ($p < .005$) were lower for the AC group compared to the NAC group, which means that women who attended antenatal classes reported a less positive childbirth experience than women who did not attend antenatal classes (see Table 2).

Table 2
Results of PCL-5 and CEQ-2 according to antenatal class attendance

	AC (antenatal classes group) Mean (SD)	NAC (antenatal classes group) Mean (SD)	<i>t</i> ¹	<i>P value</i>
CEQ-2 total score	3.03 (0.62)	3.16 (0.57)	-2.16	0.031
CEQ-2 own capacity	2.61 (0.68)	2.75 (0.67)	-2.22	0.026
CEQ-2 perceived safety	3.08 (0.75)	3.16 (0.71)	-1.3	0.195
CEQ-2 professional support	3.30 (0.69)	3.41 (0.62)	-1.86	0.063
CEQ-2 participation	3.11 (0.79)	3.20 (0.57)	-1.31	0.190
PCL-5 total score	7.50 (8.24)	8.68 (9.18)	-1.49	0.138
PCL-5 intrusion	1.11 (2.08)	1.63 (2.84)	-2.10	0.015
PCL-5 avoidance	0.40 (1.07)	0.55 (1.37)	-1.26	0.156
PCL-5 Negative alterations in cognitions and mood	2.78 (3.54)	2.80 (3.72)	-0.07	0.945
PCL-5 Alterations in arousal and reactivity	3.18 (3.40)	3.79 (4.04)	-1.70	0.065
¹ Independent sample t test				

When calculating bivariate correlations between all study variables, the CEQ-2 total score and CEQ-2 subscale scores "Own Capacity", "Perceived Safety", and "Participation" were negatively correlated with: the completion time from birth, induction of labor, forceps emergency caesarean, operative delivery, and low Apgar (<7) at 1 minute. Furthermore, the CEQ-2 total score was positively correlated with civil status. In addition, "Own Capacity" was positively correlated with increasing maternal age at birth. "Own Capacity" and "Perceived Safety" were significantly correlated with type of analgesia: the lower mean score of "Perceived Safety" was associated with rachi-anaesthesia (M = 2.95; SD = 0.72), while the higher mean score of intrusion was associated with Local anaesthesia, Pudendal Nerve Block, EMONO (Nitrous Oxide/Oxygen 50%/50%) (M = 3.45; SD = 0.55). No analgesia was associated with a mean score of perceived safety of 3.29±0.66, higher than the overall average score for the whole sample (3.09±0.74). Finally, "Perceived Safety" was also significantly associated with hospitalisation of the newborn in the NICU (see Table 3 for details).

Table 3

Bivariate Pearson correlations between the dependent variables (PCL-5, CEQ-2) and sociodemographic, as well as obstetric and neonatal variables

	CEQ-2 total score	CEQ-2 Own capacity	CEQ-2 Perceived safety	CEQ-2 Professional support	CEQ-2 Participation	PCL-5 total score	PCL-5 Intrusion	PCL-5 Avoidance	PCL-5 Cognitions	PCL-5 Arousal
Maternal age at birth	-0.05	-0.1**	-0.04	0.01	-0.05	-0.01	-0.05	0.01	-0.00	0.03
BMI at birth	0.02	0.05	-0.011	0.02	-0.01	0.04	0.02	0.02	0.04	0.03
Oxytocin augmentation	-0.02	-0.02	-0.00	-0.01	0.00	0.00	0.01	0.00	0.03	-0.03
Induction of labor	-0.20**	-0.25**	0.18**	-0.07	-0.12**	0.09*	0.13**	0.14**	0.05	0.07
Forceps	-0.14**	-0.18**	-0.13**	-0.03	-0.08*	0.07	0.12**	0.05	0.06	0.02
Emergency caesarean	-0.27**	-0.31**	-0.28**	-0.16**	-0.16**	0.09*	0.17**	0.20**	0.06	-0.00
Operative delivery	-0.31**	-0.33**	-0.30**	-0.12**	-0.13**	0.11	0.19**	0.151**	0.08*	0.03
Analgesia ¹	8.00	14.8**	8.64**	1.97	1.78	2.34	3.51**	2.36	2.02	0.45
Birth weight	0.00	0.01	0.02	0.00	-0.01	-0.02	-0.03	0.05	-0.00	-0.05
Low Apgar score <7 at 1 min	-0.09*	-0.12**	-0.11**	-0.03	-0.08*	0.05	0.07	0.08*	0.04	-0.01
Low Apgar score <7 at 5min	-0.02	-0.01	-0.06	0.01	-0.00	-0.02	0.04	0.05	-0.04	-0.04
Apgar score at 5 minutes	0.81*	0.07	0.11**	0.02	0.07	-0.05	-0.1*	-0.09*	-0.03	-0.01
NICU	-0.05	-0.04	-0.10**	0.00	-0.02	0.11**	0.14**	0.152**	0.05	0.05
Violence or abuse in the two years preceding the birth	0.06	0.03	0.04	0.07	0.02	-0.12**	-0.06	-0.03	-0.14**	-0.09*
Civil status	0.08*	0.05	0.06	0.09*	0.07	-0.04	-0.00	-0.00	-0.04	-0.05
Employment ¹	1.61	1.15	1.57	20.3	1.22	3.39**	2.02	4.01**	3.05**	1.77
Number of sessions	0.04	0.04	0.06	0.01	0.01	-0.05	-0.05	-0.02	0.02	-0.09
Completion time from birth (j)	-0.18**	-0.13**	-0.14**	-0.15**	-0.17**	0.01	0.04	0.05	0.01	-0.02
¹ One-way ANOVA										
*p <.0.05 ** p<0.0										

When entering all significant correlations with childbirth experience into a stepwise hierarchical regression, induction of labor, use of forceps, emergency caesarean section, and civil status remained significant negative predictors of childbirth experience, whereas antenatal class attendance was not retained (see Table 4).

Table 4
Results of multiple linear regression analyses for variables predicting CEQ-2

	CEQ-2 total score			CEQ-2 Own capacity			CEQ-2 Perceived safety			CEQ-2 Professional support			CEQ-2 Participatio		
	B	β	95% CI	B	β	95% CI	B	β	95% CI	B	β	95% CI	B	β	95% CI
Antenatal classes attendance	-0.10	-0.07	-0.21;0.02	-0.11	-0.07	-0.23;0.01	-0.09	-0.05	-0.22;0.04	-0.09	-0.06	-0.20;0.03	-0.07	-0.04	-0.16;0.05
Maternal age at birth				0.00	0.00	-0.01;0.01									
Induction of labor	-0.15	-0.12	-0.25;-0.05	-0.21	-0.15	-0.32;-0.10	-0.13	-0.08	-0.25;-0.01				-0.13	-0.08	-0.22;0.01
Forceps	-0.29	-0.14	-0.51;-0.06	-0.29	-0.13	-0.53;-0.05	-0.34	-0.14	-0.61;-0.08				-0.19	-0.07	-0.36;0.01
Emergency caesarean	-0.48	-0.24	-0.69;-0.26	-0.51	-0.23	-0.74;-0.27	-0.56	-0.25	-0.82;-0.31	-0.27	-0.14	-0.44;-0.11	-0.25	-0.11	-0.41;0.01
Operative delivery	-0.02	-0.02	-0.19;0.15	-0.18	-0.12	-0.36;0.01	-0.08	-0.05	-0.28;0.13	-0.05	-0.04	-0.17;0.07	-0.03	-0.02	-0.10;0.05
Analgesia	0.01	0.03	-0.01;0.03	0.02	0.07	-0.00;0.05	0.02	0.05	-0.01;0.05						
Low Apgar score <7 at 1 min	-0.03	-0.02	-0.17;0.12	-0.07	-0.04	-0.20;0.07	0.01	0.01	-0.16;0.18				-0.09	-0.05	-0.20;0.07
Apgar score at 5 minutes	0.03	0.04	-0.03;0.08				0.03	0.05	-0.03;0.10						
NICU							-0.13	-0.05	-0.32;0.06						
Violence or abuse in the two years preceding the birth															
Civil status	0.12	0.09	0.02;0.22							0.14	0.09	0.03;0.24			
Employment															
Completion time from birth	0.00	-0.16	-0.00;0.00	0.00	-0.10	-0.00;0.00	0.00	-0.11	-0.00;0.00	0.00	-0.14	-0.00;0.00	0.00	-0.14	-0.00;0.00
R ²	0.16			0.21			0.15			0.06			0.04		

B = unstandardized regression coefficient; β = standardized regression coefficient; 95% CI = 95% bias corrected and accelerated confidence intervals of unstandardized regression coefficient as estimated by means of bootstrapping. Bold regression coefficients are significantly different from 0 ($p < .05$). CEQ-2 Childbirth Experience Questionnaire 2

PTSD-FC

The mean PCL-5 total score was 7.89 (SD= .58). Twenty (3.26%) participants had a total score ≥ 31 , which represents the cut-off for a probable PTSD diagnosis. The mean Intrusion score was lower in the AC group ($p < 0.05$) compared to the NAC group (see Table 2). The total score and subscale scores Intrusion and Avoidance were positively correlated with an induction of labor, an emergency caesarean, and NICU admission. In addition, PCL-5 total score and subscale scores "Avoidance" and "Cognitions" were positively correlated with employment status. The PCL-5 total score and subscale scores "Cognitions" and "Arousal" were negatively correlated with violence or abuse in the last two years before birth. "Intrusion", "Avoidance", and "Cognitions" were positively correlated with operative delivery. "Intrusion" was correlated with analgesia: the higher mean score of intrusion was associated with general anaesthesia ($M = 1.83; SD = 1.94$), while the lower mean score of intrusion was associated with Local anaesthesia, Pudendal Nerve Block, EMONO (Nitrous Oxide/Oxygen 50%/50%) (0.55 ± 1.64). No analgesia during childbirth was associated to a mean score of intrusion ($M = 1.19; SD = 2.11$), lower than the mean score for the whole sample ($M = 1.28; SD = 2.34$); Avoidance was positively correlated with low Apgar (<7) at 1 minute, while Intrusion and Avoidance were negatively correlated with Apgar score at 5 minutes (see Table 3).

When entering all significant correlations with PCL-5 into multiple linear regressions (stepwise hierarchical regression), antenatal class attendance remained a significant predictor of the PCL-5 Intrusion score, as well as the use of forceps, emergency caesarean, and NICU admission (see Table 5).

Table 5
Results of multiple linear regression analyses for variables predicting PCL-5

	PCL-5 total score			PCL-5 Intrusion			PCL-5 Avoidance			PCL-5 Cognitions			PCL-5 Arousal		
	B	β	95% CI	B	β	95% CI	B	β	95% CI	B	β	95% CI	B	β	95% CI
Antenatal classes attendance	-1.35	-0.07	-3.31;0.61	-0.46	-0.09	-0.92;-0.01	-0.02	-0.01	-0.28;0.23	-0.02	-0.01	-0.24;0.20			
Induction of labor	1.44	0.08	-0.27;3.15	0.28	0.06	-0.14;0.70	0.23	0.10	0.00;0.45						
Forceps				0.93	0.12	0.00;1.85									
Emergency caesarean	1.41	0.05	-1.62;4.44	0.91	0.13	0.03;1.78	0.47	0.13	0.07;0.86						
Operative delivery	1.45	0.08	-0.64;3.54	0.33	0.06	-0.38;1.04	0.22	0.09	-0.56;0.50	0.37	0.16	0.19;0.57			
Analgesia				-0.08	-0.07	-0.17;0.02									
Low Apgar score <7 at 1 min							-0.08	-0.03	-0.40;0.24						
Apgar score at 5 minutes				-0.05	-0.02	-0.24;0.14	-0.04	-0.04	-0.16;0.08						
NICU	1.36	0.05	-1.41;4.14	0.85	0.11	0.17;1.52	0.30	0.07	-0.08;0.67						
Violence or abuse in the two years preceding the birth	-2.21	-0.12	-3.96;0.47				-0.1	-0.04	-0.32;0.16	-0.07	-0.03	-0.26;0.12			
Civil status															
Employment							0.10	0.16	0.04;0.16	0.10	0.16	0.05;0.15			
R ²	0.08			0.09			0.1			0.05					

B = unstandardized regression coefficient; β = standardized regression coefficient; 95% CI = 95% bias corrected and accelerated confidence intervals of unstandardized regression coefficient as estimated by means of bootstrapping. Bold regression coefficients are significantly different from 0 ($p < .05$). PCL-5 = Posttraumatic Stress Disorder Checklist for DSM 5

Obstetric and neonatal outcomes.

No significant differences were found between both groups (AC and NAC) regarding obstetric outcomes (fertility treatment, mode of delivery induction of labor, oxytocin augmentation) or neonatal outcomes (Apgar scores and the birth weight of the baby). Less newborns with low Apgar scores (<7) at 5 minutes were reported in the AC group, with a trend towards significance ($p=0.05$). Regarding especially the use of analgesia, no significant difference was found between the AC and NAC groups (see Table 1).

Discussion

This cross-sectional study compared women regarding their childbirth experience, their PTSD-FC symptoms, as well as their obstetrical and neonatal outcomes according to their participation or not in antenatal classes (AC vs. NAC). Women who attended antenatal classes had a poorer childbirth experience but were less likely to develop birth-related intrusion symptoms. Obstetric or neonatal outcomes were the same between both groups.

Women who had attended antenatal classes reported a more negative childbirth experience, even though most of the factors associated with the childbirth experience (frequency of induction of labor, use of forceps, and emergency cesarean section) did not differ between those two groups. Studies so far showed inconsistent results regarding the link between antenatal class attendance and childbirth experience (Maimburg, Vaeth, Dürr, Hvidman, & Olsen, 2010; Smarandache, Kim, Bohr, & Tamim, 2016; Waldenström, Hildingsson, Rubertsson, & Rådestad, 2004). There may be different explanations for this. First, data collection occurred at different time points in different studies, from five months to five years after the childbirth, and comparisons between studies are therefore difficult. Little is actually known about the role that time since childbirth plays in the reporting of the childbirth experience. Using a five-point Likert scale, Maimburg et al., showed that only 51% of women gave the same evaluation of their childbirth experience over time (from six weeks post-partum to five years post-partum); for 40% of them, the score decreased over time, while for 9% of participants, the childbirth experience score increased over time (Maimburg, Væth, & Dahlen, 2016). In our study, the data collection occurred from 45 days to two years after childbirth; this variability regarding time since childbirth may have influenced our results, as we find a negative correlation between CEQ-2 total score and suscales and completion time since birth. Second, differences in the content of the antenatal classes could contribute to explaining those differences in childbirth experience across the studies. For example, depending on the content of the antenatal classes, mothers' sense of control may be strengthened (Smarandache et al., 2016). However, if the content of the

antenatal classes is not matched with the reality of birth, mothers may develop unrealistic expectations (Smarandache et al., 2016); the non-fulfilment of these expectations may in turn negatively affect their childbirth experience (Chabbert, Panagiotou, & Wendland, 2021).

The prevalence of 3.26% of patients with PTSD-FC symptoms in our sample is in line with prevalence rates found in community samples (Grekin & O'Hara, 2014; Yildiz et al., 2017). Compared to women who did not attend antenatal classes, women who attended antenatal classes had less symptoms of Intrusion. Women in the NAC group in our study reported a significantly lower educational level, a factor also known to predispose them to a higher risk of PTSD-FC (Tang, Deng, Glik, Dong, & Zhang, 2017). In Switzerland, access to antenatal classes is not free of charge, which may have excluded women with lower financial means. Moreover, women in the AC group were older than those in the NAC group, which may have increased their risk of PTSD-FC (Grekin & O'Hara, 2014). However, we found higher PCL-5 scores (total and subscales) in the younger group (NAC) and no correlation between age and PCL-5 score. The link between birth preparation and PTSD-FC symptoms therefore appears to be very complex to measure, as many individual variables are involved.

No differences were found for obstetric or neonatal outcomes between the AC and the NAC groups, except for APGAR scores at 5 minutes of life which were better in the AC group. The overall rate of cesarean sections in the study sample was 21.6%. This is slightly lower than the hospital rate of 27% during the study period (Pernet, 2020), which comprises term and preterm, primiparous, and multiparous cesarean sections. Other studies have reported conflicting results about the associations between antenatal class attendance and the mode of delivery (Chen et al., 2018). This implies again that the format and content of the antenatal classes is important. Yet, it seems that the most optimal format has not yet been found and scientifically validated (Chen et al., 2018). Regarding the use of analgesia and particularly the use of an epidural, this study showed no significant differences between groups. Even if the main historical outcome of the antenatal classes was the management of pain, in this study, as well as in others, no significant associations between birth preparedness and reported pain level during labor or the use of analgesics during labor were found (Gluck et al., 2020; Kacperczyk-Bartnik et al., 2019; Yohai et al., 2018).

One of the strengths of this study is that it did not seek to evaluate a specific birth preparation program but investigated associations between antenatal classes whatever the type of antenatal classes and childbirth experience, PTSD-FC symptoms, obstetrical, and neonatal outcomes in a routine clinical context. Another strength of our study was the use of multiple validated questionnaires in French and English in order to access a larger population than only the French-speaking population. The large sample size is higher than the a-priori sample size calculation, which reinforces the power of the analysis.

However, this study has a number of limitations. First, it is a retrospective study, and a retrospective bias to the reporting of outcomes may therefore not be excluded. Second, given the cross-sectional design, no causal relationships could be investigated. Moreover, this design did not allow us to take into account an important variable: the emotional state of the women before the birth, including any previous traumatic experience or PTSD. Furthermore, this study included all the antenatal classes that women attended, regardless of their specific methods or settings (at the hospital or in private settings). Additionally, the low response rate (27.6%) is also an important limitation, although it is comparable to other questionnaire studies (Baud, Meyer, Vial, Hohlfeld, & Achari, 2011; Bernasconi et al., 2021; Eggel et al., 2021), particularly to online surveys (Nulty, 2008; Lambelet et al., 2021). It is possible that women with traumatic childbirth experiences, particularly following emergency caesarean sections, did not participate in this study. Of note, preterm deliveries, known to increase the risk of PTSD, were excluded from this study. Finally, the fact that the questionnaire was only proposed in two languages (French and English) excluded women who did not have sufficient mastery of those languages.

Future studies should prospectively investigate the effect of specific elements of antenatal classes (format, content, setting, etc.) on the risk of PTSD-FC, ideally employing a randomised controlled trial design.

Conclusion

This study shows that women who attended antenatal classes had a poorer childbirth experience but were less likely to develop birth-related intrusion symptoms. Obstetric or neonatal outcomes were similar between both groups. The result related to the childbirth experience raises questions about the match between the content of the sessions, the reality of the needs and expectations of women, and the possibilities offered by the birth centres. It seems necessary to define which methods, contents, and tools would promote a better childbirth experience.

Declarations

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