



First-time mothers' birth beliefs, preferences, and actual birth: A longitudinal observational study



Heidi Preis^{a,*}, Michal Eisner^b, Rony Chen^b, Yael Benyamini^a

^a Bob Shapell School of Social Work, Tel Aviv University, Tel Aviv, 6997801, Israel

^b Department of Obstetrics and Gynecology, Helen Schneider Hospital for Women, Rabin Medical Center – Beilinson Hospital, Affiliated with Sackler Faculty of Medicine, Tel Aviv University, Israel

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ABSTRACT

Problem: Birth preferences, such as mode and place of birth and other birth options, have important individual and societal implications, yet few studies have investigated the mechanism which predicts a wide range of childbirth options simultaneously.

Background: Basic beliefs about birth as a natural and as a medical process are both predictive factors for childbirth preferences. Studies investigating birth beliefs, preferences, and actual birth are rare.

Aim: To test a predictive model of how these beliefs translate into birth preferences and into actual birth related-options.

Methods: Longitudinal observational study including 342 first-time expectant mothers recruited at women's health centres and natural birth communities in Israel. All women filled out questionnaires including basic birth beliefs and preferred birth options. Two months postpartum, they filled out a questionnaire including detailed questions regarding actual birth.

Findings: Stronger beliefs about birth being natural were related to preferring a more natural place and mode of birth and preferring more natural birth-related options. Stronger beliefs about birth being medical were associated with opposite options. The preferences mediated the association between the birth beliefs and actual birth. The beliefs predicted the preferences better than they predicted actual birth.

Discussion: Birth beliefs are pivotal in the decision-making process regarding preferred and actual birth options. In a medicalized obstetric system, where natural birth is something women need to actively seek out and insist on, the predictive powers of beliefs and of preferences decrease.

Conclusion: Women's beliefs should be recognized and birth preferences respected.

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Statement of significance

Problem or issue

The way women give birth has important social and health implications. Yet, most studies examine specific birth options and do not investigate predictive paths that include women's beliefs, preferences and the actualization of various birth options.

What is already known

Basic beliefs about the nature of the birth process are related to a wide range of childbirth preferences. Preferences are related to actual birth.

What this paper adds

The beliefs-preferences-actual birth path was affirmed among Israeli women. Preferences mediated the association between beliefs and actual birth. The beliefs are highly predictive of preferences but actual birth is less predictable.

1. Introduction

In the industrialized world, women have a right to choose how, where and with whom they wish to give birth. They are often expected to take an active part in decisions regarding different interventions during labour and birth. Birth preferences are often related to the actual birth, as in the case of having an elective caesarean birth (CB)¹ or desiring and receiving epidural analgesia.² Nonetheless, birth is often out of women's control: A medical emergency, a change of preference, or lack of support could lead to a mode of birth that differs from one's preference.^{3,4} Actual modes

* Corresponding author.

E-mail address: heidibracp@mail.tau.ac.il (H. Preis).

of birth (whether planned, such as vaginal birth using epidural, or unanticipated, such as emergency CB) could potentially affect a wide range of outcomes, including the psychosocial well-being of the mother and child and their physical health, legal matters, and financial issues. Because of the possible implications of the mode of birth and childbirth interventions, it is important to understand the factors that influence them.

Many qualitative and quantitative studies have examined factors related to women's childbirth preferences or actual birth. However, most of these studies examined specific childbirth preferences or outcomes, such as CB on maternal request,^{5,6} vaginal birth after CB,⁷ use of epidural analgesia,⁸ birthing at home⁹ or giving birth in a midwifery-led freestanding birth centre.¹⁰ These studies have found different psychological (e.g., fear of birth, self-efficacy and need for control), social (e.g., religiosity, preferred number of children, age, and culture) and obstetric (e.g., previous birth experience, fertility treatments) factors to be related to women's preferences. Although important, most of these studies have two main shortcomings that limit their theoretical implications. Firstly, they each focused on a specific choice or option such as mode of birth, place of birth, or use of analgesia. Secondly, they usually studied either predictors of preferences or predictors of actual birth, but not the predictors of both preferred and actual mode of birth. Thus, there is a lack of knowledge about the entire process that starts with predictive factors, continues with preferences and ends with actual mode of birth.

Recognizing the psychological and behavioural mechanisms that predict how women actually give birth, out of a wide range of possible birth options, could promote women's health and well-being. In the current study, we wished to better understand how first-time mothers' beliefs about birth related to a wide range of childbirth preferences and, consequently, to their actual childbirth-related options, places and modes of birth. We used the basic tenets of the Theory of Planned Behaviour¹¹ to investigate this mechanism. In this general theoretical framework, individual's beliefs (subjective norm, attitudes towards the behaviour, perceived controllability of the behaviour), affect the formation of behavioural intentions, which in turn mediate the path between beliefs and behaviour. This was the basic framework by which we examined how birth beliefs are associated with birth preferences, which are in turn associated with actual birth. Note that although our model follows the principles of the Theory of Planned Behaviour, the end point is the outcome in terms of various aspects of the actual birth and not specifically in terms of women's behaviour.

1.1. Beliefs about birth

The beliefs about birth as a medical or a natural process can be defined as the general view of the physical essence of the birth process. These beliefs are closely linked to the medical/technocratic birth model and the natural/social/midwifery birth model. The beliefs are two related yet separate concepts that do not form a bipolar continuum.^{12–15} These models are common cultural and social ways of thinking about birth, which are held by women, practitioners and are expressed in popular media,^{12,15} each convey ideas about what birth is and how it should be managed. Medical beliefs imply that birth is a liminal and dangerous process that should be controlled by medical professionals with the latest technology and that women no longer need to endure the pain of childbirth. Natural beliefs imply that birth is a normal, natural and safe process that should not be interfered with unless absolutely necessary and that pain is an intrinsic part of childbirth that should be accepted.

Recently, a measure was developed to assess beliefs about birth as a medical or natural process and quantify them separately from women's attitudes towards medicalization or preferences regarding childbirth.¹² The beliefs were found to be related to women's

main birth preferences (place and mode of birth): Women who intended to give birth at home had strong beliefs that birth is natural and weak beliefs that birth is medical; women who intended to give birth via an elective CB or to use epidural analgesia had strong beliefs that birth is medical and weak beliefs that it is natural.¹² The two beliefs had independent associations with a wide range of natural birth-related preferences and in their presence, fear of birth, which is usually associated with childbirth preferences, was no longer significantly related to them.¹⁶ These findings are similar to other studies that included aspects of birth beliefs and childbirth preferences, such as choosing vaginal birth, CB or homebirth.^{9,17–19}

1.2. Birth preferences and actual birth in Israel

Like other Western countries, birth in Israel has been medicalized²⁰: About 99% of births are in hospitals. All medical expenses surrounding childbirth in hospitals are fully covered by the national health insurance. The rates of CB exceed the recommended WHO 10%–15% rate and are around 20%.²¹ CB upon maternal request is a possible but marginal option, with fewer than 3% of CBs registered as such.²¹ Requesting epidural analgesia is much more common, with approximately 42.5% of births being vaginal birth with epidural.²¹ In some hospitals in Israel, epidural rates among primiparae are over 90%.²

On the other hand, there is also a strong movement toward demedicalization. Groups fighting for women's right to give birth naturally and safely have emerged in recent years. As a result, several hospitals have opened natural birthing centres or natural birth suites in their maternity wards. These centres or suites offer the service of a personal midwife and facilities to promote natural birth with minimal intervention. However, despite evidence that giving birth in a free-standing, midwife-led birth centre is related to fewer birth interventions, better obstetric outcomes, and greater satisfaction with birth,²² this option is not available in Israel. Additionally, while birth centres do exist in hospitals, they are scarce and are available only on a stand-by basis and with strict acceptance criteria (for example, excluding women who had a previous CB, BMI > 30, or meconium staining). Another possible but uncommon natural birth option in Israel is homebirth. Worldwide research²³ and findings in Israel²⁴ suggest that for low-risk pregnancies, homebirths assisted by trained professionals are a safe and healthy option and are associated with a more positive birth experience.²⁵ Nonetheless, Israel's Ministry of Health has set strict guidelines for conducting homebirths and unequivocally states that it does not support them.²⁶ Furthermore, as opposed to hospital births, homebirths are not covered by the state and women must finance them at least partially out-of-pocket.

Because the medical and financial systems do not offer alternative places in which to give birth, most women end up giving birth in hospitals in a very medical way.²⁰ Medicalized birth is the norm and women who seek natural childbirth have to be very determined and actively reject the use of standard technological birth practices.¹⁷ The degree to which women believe birth is natural, while rejecting the notion that birth is medical, influences women's childbirth preferences,¹⁶ and their attitudes towards medicalization predict modes of birth (even emergency modes).¹⁷

2. Design and aim

Our aim was to use a longitudinal observational design to test a predictive model of how beliefs about birth translate to birth preferences and to actual birth (place and mode of birth and birth-related options). As presented above, basic birth beliefs have only recently been operationalized; there is a dearth of knowledge about how they are associated with preferred and actual birth.

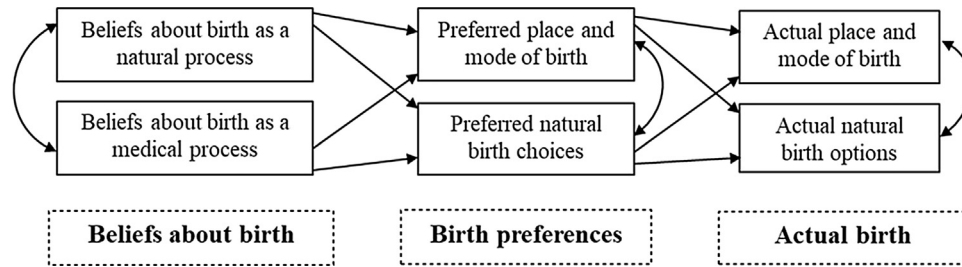


Fig. 1. Model predicting mode of birth by beliefs about birth and birth preferences.

Additionally, not many studies have investigated how preferences are associated with actual birth in the context of a range of birth options. Studies are needed that offer an empirical investigation into the mechanisms linking birth beliefs to birth preferences. Following the basic tenets of the Theory of Planned Behaviour¹¹ and previous studies on birth expectations and options,^{5–10} we hypothesized that: [1] stronger beliefs about birth as a natural process would be linked to a preference for natural places and modes of birth (such as homebirth/natural birth centres/standard birth rooms without analgesia) and to a preference for more natural birth-related options (such as the use of alternative methods of pain management, avoiding birth induction or continuous foetal heart rate monitoring); [2] stronger beliefs about birth as a medical process would be linked to a preference for medical places and modes of birth (such as vaginal birth with epidural or CB) and to fewer natural birth-related options; [3] these preferences would mediate the association between women's beliefs and their actual place and mode of birth and the number of natural birth-related options realized. These hypotheses form the theoretical model guiding the current study, which is presented in Fig. 1.

2.1. Procedure

The current paper focuses on 342 primiparae who took part in the first two time points of a longitudinal observational study. Women eligible to participate had singleton pregnancies which had reached at least 24 weeks gestation and for which vaginal birth was possible (such as no placenta previa). Exclusion criteria were: experiencing pain or a medical emergency. Participants had to be fluent in Hebrew. Cases in which women or their infants suffered severe morbidity or mortality were omitted from the study.

Recruitment of women for the study took place between February 2016 and January 2017 in three settings: (1) Four different women's health centres of Clalit Health Services (largest HMO in Israel) in the centre of Israel, while these women were waiting for their prenatal check-ups; (2) Rabin Medical Center (a large metropolitan hospital), mostly when coming for a prenatal class, hospital tour or check-up; (3) Purposeful sampling of women who preferred alternative modes of birth (e.g., homebirths or natural birth centres) through specific natural/homebirth Facebook groups, home midwives, or personal acquaintance. Recruitment was mostly done by trained social work and nursing graduate students (at the women's health centres and in the alternative sampling), with a small number of women recruited by midwives (at the hospital). Participants were also asked for their contact information for follow-up. At this point, they filled out the first questionnaire (T1). Women recruited in the purposeful, alternative fashion were offered a paper questionnaire or an identical online version.

Overall, 976 primiparae and multiparae women filled out the baseline questionnaire. Sixty-six percent were recruited at women's health centres, 22% in the alternative sampling and 12% at the hospital. Out of 1059 women who were approached in

the clinical settings and were eligible to participate in the study, 764 agreed to participate and filled out the first questionnaire (72.6% recruitment rate). The main reasons for not participating were disinterest, dislike of surveys, concerns about anonymity and lack of time. Two of the recruited women were later excluded because of perinatal infant mortality. Another 214 women were recruited in the alternative sampling. Since the invitation to the survey in the alternative sample was mostly online, we were unable to determine recruitment rates. Of all women participating at T1, 413 (42.3%) were primiparae.

Follow-up was conducted by the study team approximately two months postpartum (T2). Women who provided an email address were sent a unique link to the questionnaire two months after their due-dates using Qualtrics survey software. Women who did not complete the follow-up survey were sent a text message, a reminder email and a phone call. Women who did not use email were mailed a paper questionnaire with a return envelope. These women were contacted by phone prior to the mailing of the questionnaire and two weeks afterward to ensure it was received and filled out. Return rates of the second survey were high for the whole sample (80%) and even higher for the primiparae ($n = 342$, 82.8%).

2.2. Ethics

The study was approved by the Research Ethics Committees at Tel Aviv University, Clalit Health Services and Rabin Medical Center and was carried out according to the ethical standards for research involving human beings. Women who were recruited in clinical settings received an explanation of the study from a member of the study team. After being assured that the care they would receive would not be affected by their participation or lack thereof, the women were asked for their written informed consent. For the most part, the study team did not provide clinical care for the women recruited, except for a small number of women in our sample ($n = 40$, 15.4%) whom midwives recruited at the hospital before, after or during their shifts, according to a protocol approved by the ethics committee. Women who were recruited in the alternative fashion were asked to indicate their consent and give their contact information before filling out the survey.

2.3. Measurements

Socio-demographic and obstetric history were assessed at T1 and included basic socio-demographic questions such as age, education, income, religiosity, and country of origin. Basic information on obstetric history included: use of fertility treatments to achieve current pregnancy, previous pregnancy loss, self-reported pregnancy risk (due to current or previous pregnancy or chronic maternal conditions; reasons self-reported in response to an open-ended question), and gestational week.

Birth Beliefs were assessed at T1 with the Birth Beliefs Scale (BBS),¹² which includes 11 items in two subscales: Birth Belief Scale-Natural – five items indicating that the birth process is normal and

safe and should not be interfered with, for example: “A woman’s body knows how to birth”; Birth Belief Scale-Medical – six items indicating birth is a risky, dangerous process and that women do not need to suffer the pain of birth, for example: “Birth requires rigorous medical attention”. Women were asked to rate their agreement with each statement on a 1–5 Likert scale. The BBS has been previously found to be valid and reliable among Israeli women.¹² Internal consistency in the current sample for the medical and natural subscales proved to be sufficient ($\alpha = 0.77$ and $\alpha = 0.69$ respectively). Scores were derived by calculating the average for each subscale, with higher scores indicating a stronger belief.

Preferred place and mode of birth – Women were asked at T1 about their preferred place and mode of birth with the following options: (1) elective CB; (2) vaginal birth with epidural analgesia; (3) vaginal birth without epidural analgesia in a standard birth room; (4) birth in a natural birth centre; or (5) homebirth. A panel of seven experts (3 obstetricians and 4 midwives) assessed the face validity of these five, main birth preferences and were asked to rate them on a natural–medical continuum. There was an almost perfect agreement between the seven experts on all preferences (perfect agreement on almost all ratings except for two experts who ranked two adjacent preferences in the opposite order than the rest: ranked vaginal birth without epidural analgesia in a standard birth room ‘4’ and birth in a natural birth centre ‘3’). In those cases, we ranked according to the majority. Therefore, the variable was used as a 1–5 ordinal variable with higher scores indicating a greater preference for natural birth.

Preferred natural birth-related options were assessed at T1 using an adaptation of the Childbirth Choices Questionnaire.¹⁶ The scale includes 15 different natural options a woman can make regarding her birth (see Table 1). The options express different aspects of natural childbirth or objection to medical interventions. Participants were asked to what extent they preferred each specific option for their upcoming births on a 0–4 ordinal scale (0 = did not consider it at any stage, 1 = considered but there is no chance I will have this option, 2 = there is a small chance I will have this option, 3 = there is a medium chance I will have this option, 4 = high chance, I have decided to have this option). The scores for each item was dichotomized: The score 0 was assigned to women who were unlikely to choose this option (i.e., they marked between 0–2 for that option) and the score 1 was assigned to women who were likely to choose it (i.e., to those who marked 3 or 4 for that option). The

scale was developed with the help of a team of four Israeli midwives and tested on 120 pregnant Israeli women (unpublished Master’s thesis). Prior to the administration of the scale, its face validity was assessed by eight Israeli women who had recently given birth. Later, it was used in another Israeli study with 850 women and was found to be valid and reliable¹⁶. Internal consistency in the current sample for natural birth-related options was high ($\alpha = 0.90$). A count of the dichotomized scores was computed, ranging between 0–15, with a higher total score indicating a greater preference for natural birth-related options and fewer interventions.

Actual place and mode of birth was assessed at T2 similarly to the preferred place and mode of birth, with the addition of unanticipated modes of birth: emergency CB or assisted vaginal birth (vacuum extraction or forceps). Mode of birth was also rated by experts on a natural–medical continuum and there was an almost perfect agreement between all experts on all options except for two experts who ranked two adjacent options differently than the rest (ranked elective CB ‘1’ and emergency CB ‘2’). In those cases, we ranked according to the majority. Therefore, the variable was used as a 1–7 ordinal variable with a higher score indicating a more natural place and mode of birth.

Actual natural birth-related options – At T2, women were asked whether they have had each of the thirteen specific birth options or interventions that appeared in the Childbirth Choices Questionnaire (see Table 1; the remaining two items on the prenatal questionnaire were general options, such as making an effort not to have a CB). Women who reported actualizing a particular natural option or not receiving an intervention were scored “1” on that item. Women who did not actualize a natural option or did receive an intervention received a “0”. A count of the scores was computed, ranging between 0–13, with a higher total score indicating more natural birth-related options being actualized during labour and birth and fewer interventions. Women who ended up giving birth via CB did not receive a score on this measure since they could not receive many of the interventions in the questionnaire (but not necessarily because of their natural birth-related preferences).

2.4. Statistical analyses

To test our hypotheses, we initially conducted univariate analyses to test the association of birth beliefs with birth

Table 1
Specific natural birth-related options-preferences and actualization.

	Prenatal preferences (percent of all women) (n = 342)	Prenatal preferences (percent of those who later had a vaginal birth (n = 276))	Options actualized during childbirth (percent of those who prenatally preferred it and had vaginal births)
	n (%)	n (%)	
Birth with a doula	78 (22.9)	64 (23.2)	39 (60.9)
Vaginal birth if in breech presentation	58 (17.5)	–	–
Make every effort to avoid a cesarean birth	212 (62.9)	–	–
Use alternative methods for pain relief during birth (such as oils, massages, hot water etc.)	201 (59.1)	168 (60.9)	118 (70.2)
Not receive an enema	78 (23.1)	66 (23.9)	38 (57.6)
Not to have an intravenous line	75 (22.5)	64 (23.2)	30 (46.9)
Not receive labor induction	149 (44.5)	122 (44.2)	73 (59.8)
No continuous fetal heart-rate monitoring	111 (33.0)	97 (35.1)	49 (50.5)
Listen to music during the birth	178 (53.0)	150 (54.3)	64 (42.7)
Birth without epidural analgesia	169 (50.3)	141 (51.1)	63 (44.7)
Not to have amniotomy	100 (29.9)	80 (29.0)	47 (58.8)
Birth position of my choosing	153 (45.5)	127 (46.0)	60 (47.2)
Not to have an episiotomy	179 (53.9)	147 (53.3)	79 (53.7)
Not to have the umbilical cord immediately cut	152 (45.5)	128 (46.4)	86 (67.2)
Not to get a Pitocin injection after the birth	106 (32.0)	85 (30.8)	48 (56.5)

Note: Actualized natural option represents the number of women (excluding those who had cesarean birth) who prenatally preferred and intended to have this birth-related option and actually had it during labor and delivery.

Table 2
Maternal socio-demographic characteristics (N=342).

Socio-demographic	n (%)	Obstetric history	n (%)
Income		Previous pregnancy loss	
Below average	51 (15.1)	No	272 (80.5)
Average	175 (51.8)	Yes	66 (19.5)
Above average	112 (33.1)	Fertility treatments	
Education		No	298 (88.2)
High school	35 (10.2)	Yes	40 (11.8)
Professional school	39 (11.4)	Pregnancy risk	
Undergraduate	190 (55.6)	Low risk	296 (86.8)
Graduate	78 (22.8)	High risk	45 (13.2)
Country of origin			
Israel	295 (86.3)		
Outside of Israel	47 (13.7)		
Degree of religiosity			
Secular	234 (68.8)		
Traditional	60 (17.7)		
Religious	46 (13.5)		

Note: Income – Women were asked whether their income was below average, average, or above average. Education – Women were asked to indicate if their education level was high school level, professional (non-academic higher education), undergraduate (bachelor's degree) or graduate (Master's degree or higher).

preferences and actual birth using Pearson's and Spearman's correlations. We also compared women's preferred place and mode of birth to their actual place and mode of birth using crosstabulation. In the final analysis, we used Structural Equations Modeling (SEM) to examine the goodness of fit of the hypothesized model. Missing data on the main study variables ranged from 0.0% to 1.5%. Pairwise deletion was used in the univariate analyses, and Full Information Maximum Likelihood (FIML) was used in SEM. Sample size calculations showed that based on $\alpha=0.05$, desired power of 0.90 and a medium effect size $f^2=0.15$, a multivariate analysis such as linear regression with 5 predictors would require N=116. Our sample of 342 women exceeded this number in order to ensure sufficient sample size for testing the theoretical model with SEM. Analyses were performed using SPSS 24 and Mplus. A p value of <0.05, two-sided, was considered significant.

3. Results

3.1. Participants

Three-hundred forty-two first time mothers took part in the study. Their mean age when entering the study was 29.9 (± 4.6) and average gestational age was 31.7 (± 5.2) weeks. Participants were mostly Jewish (97.8%) and married or cohabiting (95.4%). Detailed obstetric and socio-demographic characteristics are presented in Table 2.

Although attrition between T1 and T2 was relatively low (17.2%), there were slight differences between women who completed and did not complete the second questionnaire. Women who did not complete T2 were less educated ($m=2.60 \pm 0.95$) compared to women who followed-up ($m=2.91 \pm 0.86$) ($t(93)=2.51$, $p < 0.05$).

Table 3
Comparison between preferred and actual place and mode of birth (n=337): Frequencies (and percent of row)

Preferred birth	Actual birth							Total
	Emergency CB	Elective CB	Instrumental birth	VB with epidural	VB w/o epidural	Natural birth centre	Homebirth	
Elective CB	1 (6.7)	12 (80.0)	0 (0.0)	2 (13.3)	0 (0.0)	0 (0.0)	0 (0.0)	15 (4.5)
VB with epidural	22 (13.0)	9 (5.3)	41 (24.3)	85 (50.3)	10 (5.9)	2 (1.2)	0 (0.0)	169 (50.1)
VB without epidural	5 (7.5)	3 (4.5)	14 (20.9)	32 (47.8)	11 (16.4)	2 (3.0)	0 (0.0)	67 (19.9)
Natural birth centre	10 (17.2)	2 (3.4)	7 (12.1)	17 (29.3)	13 (22.4)	9 (15.5)	0 (0.0)	58 (17.2)
Homebirth	1 (3.6)	0 (0.0)	2 (7.1)	5 (17.9)	1 (3.6)	0 (0.0)	19 (67.9)	28 (8.3)
Total	39 (11.6)	26 (7.7)	64 (19.0)	141 (41.8)	35 (10.4)	13 (3.9)	19 (5.6)	337 (100.0)

Abbreviations: CB – cesarean birth; VB – vaginal birth.

Note: Numbers in bold mark preferred birth options that were implemented.

Also, women who did not complete the T2 questionnaire (n = 71) had a higher Birth Belief Scale-Medical score ($m=3.75 \pm 0.68$), preferred a less natural place and mode of birth ($m=2.34 \pm 0.66$) and preferred fewer natural birth options ($m=3.52 \pm 3.01$) compared to women who completed the T2 questionnaire. These women had a lower Birth Belief Scale-Medical score ($m=3.30 \pm 0.84$), preferred a more natural place and mode of birth ($m=2.75 \pm 1.06$) and preferred more natural birth options ($m=5.86 \pm 4.55$) ($t's(119-146)=4.15-5.40$, $p < 0.001$).

3.2. Descriptive statistics of main study variables

The women in our study tended to view birth as a natural process ($m=4.09 \pm 0.59$). There was more variability in the tendency to view birth as a medical process, with a lower mean and larger standard deviation ($m=3.30 \pm 0.84$). The most common preferred mode and place of birth in our sample was vaginal birth in a hospital with epidural analgesia, followed by vaginal birth without epidural in a standard birth room or in a natural birth centre. Elective CB and homebirth were less common (less than 10% of the women preferred each of these options). As can be seen in Table 3, the most common actual mode and place of birth was vaginal birth in a hospital with epidural, followed by instrumental birth, emergency CB, and vaginal birth without epidural. Altogether, only 136 women (40%) gave birth in the mode and place that they preferred.

The percentages of women who preferred each natural option and the percentages of women who actualized each preferred option are presented in Table 1. There was great variability among the women regarding the number of natural birth-related options they preferred, spanning the entire range from 0 to 15 ($m=5.86 \pm 4.55$). There was also great variability regarding the natural birth-related options women actualized, covering the full range between 0–13 ($m=5.14 \pm 2.83$). For specific options, the rates of actualization ranged from 42.7% (preferring to listen to music and doing so) to 67.2% (preferring not to have the umbilical cord cut immediately after birth and doing so).

3.3. Univariate associations between birth beliefs, preferences and actual birth

Our hypotheses regarding the correlations between birth beliefs, birth preferences, and actual birth were supported by the data, as can be seen in Table 4. Beliefs about birth as a medical process were strongly correlated with preferring fewer natural birth-related options and to preferring a more medical place and mode of birth. Beliefs about birth as a natural process were moderately correlated with preferring more natural birth-related options and with preferring a more natural place and mode of birth. The number of preferred natural-birth options was strongly correlated with the number of actual natural birth-related options and weakly correlated with actual place and mode of birth. Preferred place and mode of birth was weakly correlated with

Table 4
Correlations between birth beliefs, preferences and actual birth.

	Birth beliefs – natural	Birth beliefs – medical	Preferred natural birth options	Preferred place and mode of birth	Actual natural birth options
Birth beliefs – natural	–				
Birth beliefs – medical	–0.46 ^a	–			
Preferred natural birth options	0.54 ^a	–0.76 ^a	–		
Preferred place and mode of birth	0.52 ^b	–0.65 ^b	0.74 ^b	–	
Actual natural birth options	0.43 ^a	–0.51 ^a	0.64 ^a	0.65 ^a	–
Actual place and mode of birth	0.29 ^b	–0.31 ^b	0.31 ^b	0.38 ^b	0.59 ^b

All correlations were significant at $p < 0.001$.

^a Pearson's correlation.

^b Spearman's Rho.

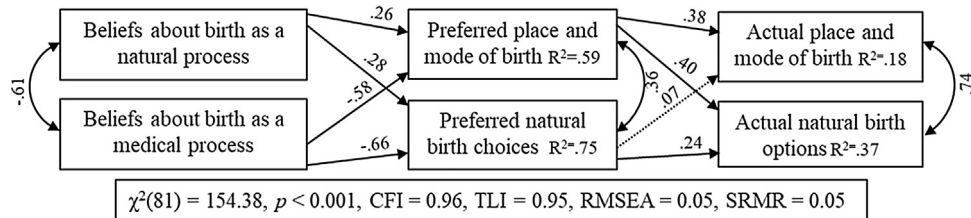


Fig. 2. Structural equations model predicting actual birth.

actual place and mode of birth. Both medical and natural beliefs were moderately correlated with the number of actual natural birth-related options realized (in the expected directions) and weakly correlated with the actual place and mode of birth.

Obstetric history and socio-demographic factors were unrelated to birth preferences and actual birth and therefore were not included in any further analyses.

3.4. Testing the hypothesized model

We tested the hypothesized model using SEM, which yielded good model fit ($\chi^2(81) = 154.38$, $p < 0.001$, CFI = 0.96, TLI = 0.95, RMSEA = 0.05, SRMR = 0.05). As can be seen in Fig. 2, all of the associations between variables in the hypothesized model were significant ($p < 0.001$) except for the association between the number of preferred natural birth options and actual place and mode of birth. The preferences were found to mediate the association between the beliefs and the actual birth. All of the direct and indirect effects were significant ($p < 0.001$) except for those including the non-significant association mentioned. The birth beliefs explained a large percentage of the variance in the number of preferred birth options (74.7%) and in the preferred place and mode of birth (58.9%). The model explained part of the variance in the actual place and mode of birth (18.4%) and in the number of actual natural birth options (37.0%). Since women who had CB ($n = 65$) did not receive a score on the number of natural birth options actualized during labor and birth (see methods), we also tested the model without them, which produced similar results.

4. Discussion

Our study confirmed the hypothesized model of associations between Israeli women's beliefs about birth, their childbirth preferences and their actual birth. The model indicated that childbirth preferences mediated the association between birth beliefs and the actual place and mode of birth and the number of natural birth-related options women implemented. Although this seems intuitive, it had not been previously demonstrated.

Beliefs about birth were strongly related to the women's childbirth preferences. These findings are in line with similar

studies that have incorporated aspects of birth beliefs into their questionnaires. Such studies have found that even among non-pregnant college students, the belief that birth is risky was related to preferring an obstetrician, a CB or an epidural,²⁷ while the belief that birth is natural was related to preferring a midwife and vaginal birth.²⁸ In the current study, birth beliefs explained a very high percentage of the variance in childbirth preferences. This attests to the pivotal role that basic birth beliefs have in women's decision-making process regarding birth.^{12,16}

In the full model, birth beliefs were strongly predictive of preferences. Although there was some incongruence between women's preferences and the actualization of birth options, childbirth preferences were predictive of actual mode of birth. These findings are similar to those of Haines et al.,¹⁸ who found that women's attitudes towards birth (and among them their birth beliefs) were related to preference for CB and also to having an elective CB. The prediction of actual birth was weaker than the prediction of preferences. Most studies based on the Theory of Planned Behaviour affirm that attitudes predict intentions for behaviour better than they predict actual behaviour.²⁹ In the case of childbirth, the link between intentions and actualization is further jeopardized by unforeseen events during labour and birth and the often-uncontrollable nature of the birth process.

The childbirth process could be unpredictable and what women had originally wished for could change following specific circumstances. This is obvious in the case of a medical emergency but is also true in other, more subjective cases. In a Canadian study, many of the women opposed labour induction when they were interviewed in their third trimester; but most of these women had an induction when they passed their due-dates.³⁰ Similarly, women might want to avoid epidural analgesia during labour, yet may not be adequately prepared to handle the labour pain or do not receive sufficient support during birth and end up having an epidural.⁸ In our study, it is not surprising that medical preferences (such as elective CB or vaginal birth with epidural) were more often realized compared to more natural preferences (such as vaginal birth without epidural or birth in a natural birth centre). In the case of the highly medicalized system in Israel,²⁰ medical births are the default and women are often pressured towards them. Conversely, women who wish to actualize their natural birth preferences have

to be very determined or maybe even fortunate. Their ability to achieve a natural birth as desired is often out of their control. Acceptance to natural birth centres is difficult to attain and in standard birth rooms, women do not know their midwives in advance and it is not certain that they will have a midwife who favours natural birth and is able to assist them with it. The obstetric system does not support and does not have enough staff to encourage natural birth; in 2015 there were 1710 Certified Nurse Midwives under the age of 65 and 180,785 births,³¹ with the standard ratio for midwives on shift to women giving birth 1:3, reducing the midwives' ability to adequately support women throughout their birth.³² Moreover, recently, the Ministry of Health published regulations regarding the circumstances in which women are allowed to have natural hospital births with minimum interventions.³³ In Section 5.1.1 of these regulations it is stated that prior to allowing a natural birth, the attending obstetrician must "emphasize to the parturient the dangers to her and her child involved in natural birth".

Our study has several strengths and limitations. It was based on a large sample of primiparae who could potentially all have a vaginal birth, and none had previous direct birth experience, so their preferences and actual birth are more varied. The sample was also intentionally heterogenous so that it would capture a wide range of preferred places and modes of birth. Women recruited in clinics were intrinsically different from women who were purposefully sampled in natural birthing communities in the main study variables. This was also confounded through the method of administering of the questionnaires. Thus, there was no way of knowing whether filling out the questionnaire on paper/in the clinic versus online made any difference in itself. For technical reasons, women who filled out the online questionnaire were easier to follow up with, which explains why more women who preferred a less natural place and mode of birth were lost in follow-up. Another sample-based limitation was that our participants were not representative of the entire population of pregnant Israeli women, given that they largely came from the Jewish urban population. This sample was, furthermore, not representative of the Israeli population from a socioeconomic standpoint. This is a limitation because homebirths are self-financed. At the same time, this bias is minimized because the cost of homebirth (~1500 USD) is most often partially reimbursed by the supplementary health insurance that most women have; the main barriers for homebirth are not financial but rather lack of support on the societal, political and health establishment levels.²⁰

There were also measurement-based limitations: Some of the instruments were relatively new and although they had been used and tested in several large Israeli studies, there is a need to further assess their validity and reliability, especially cross-culturally. Women were asked about their preferences when they were pregnant, and those could have changed over the course of their pregnancies. Additionally, some women were recruited very close to their actual birth which could have affected their preferences. To test for such bias, we examined the correlation between gestational week at T1 and incongruence between birth preference and actual birth and found it to be nonsignificant (not presented). Also, actual mode of birth and birth interventions were based on women's self-reporting and not on medical records (but it has been established in previous studies that women's recall of birth events is mostly accurate).³⁴

The current investigation can lead to further research and affect clinical practice. Studies around the world have found that incongruities between preferences for birth and actual birth experiences can lead to lower satisfaction with birth^{4,35} and might even increase the risk for postpartum post-traumatic stress.³⁶ Therefore, we suggest further investigation of the factors

related to the realization of birth preference and its associations with satisfaction. Since childbirth preferences can affect actual birth and actual birth may affect future childbirth preferences, such as repeat CB, it is important to conduct more longitudinal studies that investigate the predictors-preferences-actual birth-future preferences birth path. We suggest that such studies take place in a variety of cultures and include among the predictors basic beliefs about birth as a natural and medical process. Perinatal care providers should be more aware of women's beliefs, as they are important in predicting preferences and actual birth. The brevity of the Birth Beliefs Scale makes it possible to administer during check-ups; as such, it could be used as a tool to help facilitate discussion between women and their prenatal care providers. This is especially true for women who tend to have more medical and less natural beliefs, like those with more medicalized birth histories.¹² Health care providers should also be more aware of current evidence regarding the beneficial aspects of demedicalizing and naturalizing births and promote the translation of research evidence into practice.³⁷ Although having a birth plan (which articulates preferences) does not necessarily imply actualizing it, women should be encouraged to have one. It can be used as an opportunity to clarify their thoughts regarding their preferences and as a way to improve their communication with care providers.³⁸

5. Conclusion

Israeli women's beliefs are highly related to their childbirth preferences, which are subsequently related to the actual birth. At the same time, the predictive power of the beliefs regarding actual birth is moderate. This raises questions pertaining to fulfilment of expectations in a medicalized obstetric system that does not always support women's autonomy and preferences. Obstetric staff should recognize women's beliefs, learn of their preferences, and try to help them realize their wishes. Implementing these women-centred ways of operating as routine procedures would benefit women, as they would lower incongruence between preferences and actual birth.

Ethical statement

The current study (on first time mothers' beliefs about birth, their preferences and actual birth, first Author Heidi Preis) was approved by the Institutional Review Board at the Tel Aviv University (on December 17th, 2015), at the Clalit Health Services (120-15-COM2, on 15th, 2015) and Rabin medical center (339-15-RMC, on August 25th, 2015) and was carried out according to the standards of research with human subjects.

Conflict of interest

Authors have no financial or other conflict of interest to report.

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