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Factors Influencing Contraceptive Use in Women Seeking First-Trimester Abortion Care: An Austrian Cross-Sectional Survey

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ABSTRACT

Background: Coined the Contraceptive Paradox, unwanted pregnancies and abortions remain stable in most West-European countries despite the wide availability of highly effective contraception. Demographic and contextual reasons for ineffective (or no) contraceptive use in couples with no desire for a child have been described, yet data on women's concerns are scarce.

Objective: This study evaluates a broad range of individual factors potentially determining insufficient/less or ineffective contraceptive use.

Methods: $N = 399$ women post abortion in Vienna, Austria answered a questionnaire assessing demographics, use of contraception, fertility perception, desire to avoid a pregnancy, influence of family and friends, and attitudes toward hormones, the pharma industry, and naturalness. We used multivariate ordinal logistic regression (OLR), reporting Odds Ratios (OR) to identify factors determining contraceptive use (none vs. moderately effective vs. highly effective contraception). Additionally, decision trees served as a basis for hypothesis generation.

Results: Hormone skepticism (OR when compared with no skepticism ranged from 0.07 for very large to 0.20 for low skepticism), a moderate desire to avoid a pregnancy (1.43), older age (0.98), being unemployed (1.93) and being single (OR = 2.63 for unstable relationship and 1.73 for stable relationship when compared with no relationship, respectively), were all associated with using no contraception. Decision trees suggested perceiving oneself and the partner as fertile and knowing that hormone-free contraception was important for friends and family as additional factors.

Conclusions: Our findings may assist clinicians in better understanding women's attitudes and misconceptions. However, further research is needed to address potential dilemmas in women's contraceptive decision-making processes.

1 | Introduction

Despite the availability of highly effective contraceptives, around half of all pregnancies worldwide are unintended [1, 2], and half of those result in abortion [3]. While the introduction of effective contraceptive methods like the pill has led to a decrease in abortions until the mid 1990s, the probability of terminating an unwanted pregnancy has since increased or remained stable [4]. This contradiction—also referred to as the "Contraceptive Paradox" [5]—is particularly relevant to public health debates, where preventing unintended pregnancies is prioritized.

Yet, terminating an unwanted pregnancy represents only the end point of a complex, multifaceted process [2, 6] which includes the choice of (or against) a contraceptive method, its consistent or inconsistent use (or non-use), the occurrence of an unwanted pregnancy, and the decision to terminate it [4]. Contraceptive counseling lies at the intersection of public health goals—such as preventing unintended pregnancies—and contraceptive autonomy [7], which may not always align with using what is considered the most effective contraception from a medical standpoint. Understanding the reasons behind unwanted pregnancies due to contraceptive failure [8, 9] is therefore essential for providing counseling within the reproductive justice framework—one that respects women's preferences, addresses their concerns, and avoids contraceptive coercion [10]. This includes addressing unmet need [11]—defined as the discrepancy between the intention to avoid or postpone pregnancy and the lack of contraceptive use to meet that need.

Several factors have been found to influence women's contraceptive preferences and subsequent use or non-use of these methods (see review [12]). These include method-specific characteristics [12] such as side effects [13], safety, effectiveness [14, 15], ease of use, cost, and noninterference in sex/partner relations, as well as demographic factors (i.e., socioeconomic status, education, age [14, 16, 17]), familiarity with the method, i.e., informed by the experiences of friends and family [6, 18–20], partnership characteristics [21, 22], and the desire to avoid a pregnancy (e.g., meta-analysis by [23]). Additionally, women's attitudes and beliefs have been reported to impact contraceptive choice and use [6]. For instance, positive beliefs regarding unprotected sex were found to be associated with omitting contraception [24, 25]. Similarly, underestimating one's factual risk of pregnancy is linked to less consistent contraceptive use as well as choosing a less effective method and engaging more in unprotected sex [6, 26–28].

More recently, negative attitudes toward hormonal contraceptives have gained attention. This has been associated with the so-called "pill scare"—a decline in oral contraceptive pill use partially attributed to negative media coverage of side effects [29, 30]—as well as with the emergence of the term "hormonophobia," which some authors have used to describe a fear of hormones, amplified by social media [31]. However, it is important to highlight that studies [32] have found no evidence of an excessive fear of hormones. Instead, interview studies [8, 9, 19, 33–35] and reviews [12, 32] identify a range of concerns regarding hormonal contraception, including concerns about side effects and negative effects on mental health, sexuality, and future fertility [32]. A recurring theme is the perception that hormonal methods interfere with the "natural body" [9, 36, 37]. Commonly expressed concerns include the belief that hormones are "unnatural" [38], manipulate the body, disrupt ovulation and menstruation [39], and pose health risks. Additionally, distrust in the pharmaceutical industry has been cited as a reason for avoiding hormonal contraceptives [35].

In sum, while the body of data on demographic and contextual factors may be regarded as satisfactory, less is known about the link between women's specific attitudes and usage or non-usage of effective (hormonal) contraception. Past studies examining concerns about hormones, the desire for naturalness and distrust in pharmaceutical companies have mostly relied on small samples and qualitative interview methods with limited generalizability. In order to complement existing data [12, 32] and to derive recommendations for counseling individuals at risk of unwanted pregnancy, we adopted a comprehensive quantitative approach, focusing on a predictive model for contraceptive use, while respecting the ordinal nature of contraception effectiveness according to the typical-use Pearle Index (i.e., none vs. moderately effective vs. highly effective [40]). Also, we conducted additional in-depth analyses to estimate the influence of hormone skepticism on the use of hormonal vs. hormone-free contraceptive methods in our sample.

Located in Vienna, Austria, we chose to study women undergoing first-trimester abortion, as this group is particularly relevant for examining contraceptive behavior. Their experience of an unintended pregnancy—resulting either from non-use, use of less effective methods, or inconsistent use of effective contraception—reflects a contraceptive failure despite an apparently strong intention to avoid pregnancy. This contradiction makes the group particularly valuable for understanding the barriers that may prevent women from choosing a contraceptive method that both meets their needs and effectively protects against unwanted pregnancy. Clinical guidelines [41] recommend contraceptive counseling in abortion care as well as the timely initiation of the chosen method post-abortion. However, a meta-analysis [42] has shown that such counseling alone does not significantly improve contraceptive uptake or continuation. It is essential to understand the reasons why women may reject or hesitate to use effective, particularly hormonal, methods—and to tailor counseling accordingly to help prevent future unintended pregnancies.

2 | Materials and Methods

2.1 | Procedure

This cross-sectional survey was conducted between August 2016 and December 2018 at a private abortion clinic in Vienna, Austria. We recruited participants among women who sought instrumentation or medication abortion during the first trimester. Inclusion criteria were sufficient language skills and the completion of the abortion. Accordingly, study personnel approached potential participants only when their treatment was finalized. The implementation of the study closely adhered to the Declaration of Helsinki; hence, consent was obtained from participants (and from legal guardians in case of minors) prior to their voluntary participation. We anonymized all data using a numeric code, did not provide

remuneration, and allowed participants to withdraw from the study at any time. Upon consenting, we asked participants to fill out a paper-pencil questionnaire on site (duration: 20–30 min).

2.2 | Measures

Based on an extensive review of the relevant literature [6, 18, 20], we developed a self-report questionnaire. A first draft was pre-tested using the methods of cognitive interviewing and respondent debriefing [43, 44]. Traditionally, these methods are applied with target populations to identify potential problems such as unclear language, misinterpretations, and omissions at an early stage of questionnaire development [44]. For the current pre-test, three female patients seeking an abortion at the private clinic filled out the first draft after completion of their treatment. Subsequently, they answered follow-up questions in a standardized interview. Based on their feedback, we adapted the questionnaire, arriving at a final version of 18 items (incl. sub-questions) of different scaling, targeting the following key constructs:

2.2.1 | Demographics

Nine items assessed age, education (high vs. low), relationship status (no vs. stable vs. unstable relationship), occupation (y/n), prior pregnancies (y/n), own children (y/n) and number of children, and importance of religious values (4-pt Likert scale: 0 = none—3 = high importance).

2.2.2 | Use of Contraception

We asked participants to indicate which method/s of contraception they had been using in the 12 months prior to the abortion (multiple selections were allowed for this question). Additionally, we invited participants to rate the subjectively perceived effectiveness of the contraception on a 4-pt Likert scale (very low—very high). Based on the typical-use Pearl Index (PI) (see [45]) and a cut-off of 10, we classified answers into three effectiveness groups: (1) *no contraception*, (2) (PI > 10) *moderate effectiveness* (e.g., barrier methods like diaphragm, self-observation methods and withdrawal), and (3) *high effectiveness* (PI < 10) (e.g., intrauterine devices (IUDs), long-acting and short-acting hormonal contraceptives). For additional analyses, we assigned contraceptive methods to three groups based on hormonal content: (1) hormonal, (2) non-hormonal, and (3) no contraception (see Table 1).

2.2.3 | Fertility Perception

To assess women's perception of their own and their partner's fertility, we presented participants with six statements (e.g., "I thought my partner was infertile"). One additional question ("How often do you think a woman gets pregnant in her lifetime if she does not use contraception?") with the answer options 0–3 times, 4–7 times, 8–11 times, and 12–15 times, assessed realistic fertility perception. The response "12–15 times" [46] was considered correct—assuming a woman engages in regular heterosexual intercourse [47]—and reflected participants' realistic perception of female fertility in this study.

2.2.4 | Desire to Avoid Pregnancy

The desire to avoid a pregnancy was measured using five statements which reflected a continuum ranging from a high desire ("I did not want to get pregnant—this pregnancy occurred unintentionally") to a low one ("I was ambivalent or undecided whether I wanted to get pregnant"). Accordingly, we divided answers into two groups: (1) *strong desire* vs. (2) *moderate to low desire* to avoid the pregnancy.

2.2.5 | Attitudes

We assessed attitudes regarding the following issues: (1) *Hormone skepticism* (see Supplement Table A for more details) The importance of using hormone-free contraception (4-pt Likert scale: 3 = very important–0 = not important), the estimated danger (not dangerous vs. dangerous), one's avoidance of hormonal contraception (y/n), and one's attitudes toward hormonal intervention were all combined into a categorical variable ranging from 0 = no hormone skepticism to 6 = very large hormone skepticism. (2) *Naturalness*. Four statements (Table A) were summed up to represent attitudes toward naturalness, with a higher score indicating a stronger desire for "natural" remedies/contraception. (3) *Pharma distrust*. Three statements (Table A) were summed up to reflect the extent to which participants distrusted the pharma industry, with higher scores reflecting more distrust.

2.2.6 | Influence of Friends and Family

Three items assessed the perceived influence of significant others, including the degree to which hormone-free contraception was important for friends and family, whether unwanted pregnancies had occurred in the social environment, and whether this had impacted the participant's own contraceptive use.

2.3 | Statistical Analysis

We analyzed data using R version 4.0.3. (R Foundation for Statistical Computing, Vienna, Austria), considering a significance level of $p < 0.05$ for all analyses. We used ANOVAs and χ^2-tests to test for differences, and Spearman correlations to depict associations between study variables. We fitted a multivariate Ordinal Logistic Regression (OLR) model to predict contraceptive behavior. First, we analyzed all variables univariately; then we selected the best predictive model using stepwise selection (backward and forward) with the AIC criteria (R: with function step() from package "stats"). OLR follows the proportional odds assumption, stating that the relationship between each pair of outcome groups (here: no contraception vs. moderately and highly effective contraception; no contraception and moderately effective vs. highly effective contraception) is the same [48]. Therefore, only one set of coefficients is reported. Additionally, we used a supervised machine learning algorithm called "Decision Tree" (CART: Classification and Regression Tree algorithm) to provide an alternative prediction model (using the function rpart() from package rpart). Decision trees give a highly interpretable method

TABLE 1 | Characteristics of women seeking first trimester abortion care in Vienna, Austria ($N = 399$).

	Use of contraception[a]			
	No contraception	Moderately effective	Highly effective	
	($n = 56$)	($n = 254$)	($n = 89$)	Group differences
Age in years, *M* (SD)	30.55 (6.37)	29.04 (7.16)	28.69 (6.67)	$F(2,398) = 1.376$, $p = 0.254$
Range	18–45	13–47	17–49	
Education—high, *n* (%)[b]	25 (44.6%)	144 (57.6%)	31 (36.0%)	$\chi^2(2) = 12.959$, $p < 0.002$
Occupation—yes, *n* (%)	45 (80.4%)	186 (74.1%)	74 (85.1%)	$\chi^2(2) = 4.757$, $p = 0.093$
Relationship status, *n* (%)				
No relationship	9 (16.1%)	33 (13.3%)	9 (10.5%)	
Unstable relationship	4 (7.1%)	33 (13.3%)	13 (15.1%)	$\chi^2(4) = 2.710$, $p = 0.607$
Stable relationship	43 (76.8%)	183 (73.5%)	67 (74.4%)	
Prior pregnancies—yes, *n* (%)	34 (60.7%)	131 (51.8%)	48 (55.2%)	$\chi^2(2) = 1.559$, $p = 0.459$
Children—yes, *n* (%)	29 (51.8%)	101 (39.9%)	43 (49.4%)	$\chi^2(2) = 4.116$, $p = 0.128$
Number of Children, *M* (SD)	0.85 (1.01)	0.68 (0.96)	0.90 (1.07)	$F(2,393) = 1.831$, $p = 0.162$
Importance of religion, *M* (SD)[c]	1.00 (1.01)	0.74 (0.87)	0.84 (0.92)	$F(2,396) = 1.974$, $p = 0.140$
Type of contraception, *n* (%)				
No contraception	56 (100%)			
Condom		206 (81.1%)		
Periodic abstinence (calendar)		25 (9.8%)		
Withdrawal		15 (5.9%)		
Morning after pill[d]		4 (1.6%)		
Self-observation		4 (1.6%)		
Pill[d]			66 (74.2%)	
Copper IUD			7 (7.9%)	
Injectables[d]			6 (6.7%)	
Hormonal IUS[d]			3 (3.4%)	
Hormonal ring[d]			3 (3.4%)	
Hormonal patch[d]			2 (2.2%)	
Implant[d]			1 (1.1%)	
Vasectomy			1 (1.1%)	

[a]Use of contraception: categorization into the three groups: no contraception, Practical Pearl Index > 10 (=moderately effective) and < 10 (=highly effective).
[b]Education: high education included upper secondary and a university education.
[c]Religious values: the importance of religious values was assessed on a 4-pt-Likert scale (0 = none, 3 = very large).
[d]Hormone-based contraceptive methods.

of classification, that can easily be applied in clinical practice. The main purpose of this descriptive approach was to generate hypotheses for future research and derive suggestions for clinical practice [49]. Finally, to compare levels of hormone skepticism between contraceptive groups (hormonal methods, non-hormonal methods, no method), we used a Kruskal-Wallis test and post hoc pairwise Wilcoxon rank-sum tests with Bonferroni correction for multiple comparisons.

3 | Results

3.1 | Sample

The current study was part of a larger project in which 486 women completed the anonymized questionnaire (see [50]). We excluded 64 women with partner data because they were recruited under different conditions (dyadic participation vs.

individual); they will be reported in a separate publication. Of the remaining 422 participants, we excluded 23 cases from the analysis due to missing values in the aggregated outcome variable on contraceptive use and in the age variable (see Supplement Figure A for patient flow). We replaced missing values in explanatory variables using the mode for variables with < 5% missing values or using OLR for variables in the naturalness group, hormone skepticism group, and pharma distrust group with > 5% missing values.

The final sample was $N = 399$ women participants after an abortion. Age ranged between 13 and 49 years, with a mean age of M = 29.17 years (SD = 6.95) for the overall sample. Half of the sample (50.1%) reported being highly educated (incl. upper secondary or university education), and 76.4% reported being employed. Most women (72.7%) were in a stable relationship, around 12% reported being in an unstable relationship and 12% being single. Fifty-three percent of participants had been pregnant before and 43.4% reported having children (range: 1–4 children). Religious values were not important for 46.4% of women, while 32.6% indicated a small and 14.5% a large importance of religion. For a more detailed account of the sample characteristics, divided according to the type of contraceptives used (none vs. moderately effective vs. highly effective) see Table 1. (See Table D for correlations among all study variables).

For the results of the a priori univariate ordinal logistic regressions for "pharma distrust" and "naturalness" see Tables B and C.

3.2 | Multivariate Ordinal Logistic Regression

Multivariate OLR with *contraception* as the ordinal outcome variable (none vs. moderate vs. high effectiveness) resulted in the predictive model as depicted in Table 2. According to this model, participants' age, relationship status, occupation, desire to avoid pregnancy and hormone skepticism, all predicted the use of contraception (for the purpose of more stringency, only one side of the OR is presented below, as the other side is interpreted in the same way; see the proportional odds assumption [47]).

For women in *occupation*, the odds of using effective contraception were 1.93 times higher than those of women with no occupation (OR = 1.93, 95% CI 1.14–3.28; Confidence Intervals (CI) for further variables are reported in the table only). For women in an *unstable relationship*, the odds of using more effective contraception were 2.63 times (*stable relationship:* 1.73) that of women in no relationship. For every unit (i.e., year) increase in *women's age*, the odds of using more effective contraception (i.e., moderate or high contraception vs. none) decreased by 2%, holding all other variables constant.

Among the factors assessing attitudes, two remained in the model: For women who had a *strong desire to avoid the pregnancy*, the odds of using more effective contraception were 1.43 times that of women with a moderate desire. Also, the higher a woman's *hormone skepticism*, the lower the chance of her using effective contraception: The odds of using effective contraception were 80% lower for women with low hormone skepticism (moderate: 84%, large: 91%, very large: 93%) than for women who were not skeptical of hormones at all. For the models' prediction probabilities see Figure 1.

3.3 | Decision Trees

The Decision Tree computations resulted in a tree with two subbranches and eight leaves (see Figure 2). According to this tree, the presence or absence of *hormone skepticism* in combination

TABLE 2 | Results of the multivariate ordinal logistic regression after model selection with AIC criteria.

Variables	Value	SE	*t*	*p*	OR	2.5%	97.5%
Age	−0.02	0.02	−1.50	0.13	0.98	0.94	1.01
Unstable relationship	0.97	0.42	2.32	< 0.05	2.63	1.16	5.97
Stable relationship	0.55	0.32	1.70	0.09	1.73	0.92	3.25
Occupation—yes	0.66	0.27	2.43	< 0.05	1.93	1.14	3.28
Strong desire to avoid pregnancy	0.36	0.25	1.44	0.15	1.43	0.88	2.34
Hormone skepticism							
Low	−1.61	0.52	−3.10	< 0.01	0.20	0.07	0.54
Moderate	−1.83	0.58	−3.19	< 0.01	0.16	0.05	0.48
Large	−2.39	0.52	−4.60	< 0.01	0.09	0.03	0.25
Very large	−2.71	0.54	−5.04	< 0.01	0.07	0.02	0.19
No contraception|moderate effectiveness	−3.44	0.70	−4.93	< 0.01			
Moderate effectiveness|high effectiveness	−0.09	0.68	−0.14	0.89			

Note: The OR indicate the relative odds of a higher-level response; the displayed OR are interpreted relative to (a) no relationship, (b) no occupation, (c) moderate desire to avoid pregnancy, and (d) no hormone skepticism.
Abbreviations: AIC, akaike information criterion; dependent ordinal variable, contraception group (no contraception vs. moderate effectiveness vs. high effectiveness); OR, odds ratio; SE, standard error.

with the estimation of one's *own fertility* and the *partner's fertility*, the perception of whether hormone-free contraception is important for *friends and family*, and one's *age* influences women's use of contraceptives.

Overall, 46% of women who reported large to very large hormone skepticism and think that they themselves and their partners are fertile had a 79% chance of using moderately effective contraception. In comparison, only 17% of women who indicated that they were not or only moderately skeptical of hormones, who were younger than 41, and for whose friends using hormone-free contraception was similarly important, had a 66% chance of using moderately effective contraception. Similarly, 28% of women who indicated being not or moderately skeptical of hormones, who were older than 19, and for whose friends using hormone-free contraception was more important (or not known), had a 45% chance of using highly effective contraceptives, and a 43% chance of using moderately effective contraceptives.

3.4 | Additional Analyses

The Kruskal-Wallis Test revealed significant differences in hormone skepticism across contraceptive method groups, i.e., between hormonal, non-hormonal and no contraception ($\chi^2 = 45.18$, $p < 0.001$). Post hoc pairwise Wilcoxon rank-sum tests (Bonferroni corrected) indicate that women using hormonal contraception reported significantly lower skepticism compared to non-hormonal users ($p < 0.001$) and those using no contraceptive method ($p < 0.001$). We observed no significant difference between non-hormonal and no contraceptive method users ($p = 1.0$). Median hormonal skepticism scores (coded: 0 = "not at all",1 = "small", 2 = "moderate", 3 = "large", 4 = "very large") were lowest among hormonal contraception users (median = 1, interquartile range, IQR: 1–2, corresponding to "small"), and higher among both non-hormonal contraception users (median = 3, IQR: 1–3, corresponding to "large") and non-contraception users (median = 3, IQR: 1–4, corresponding to "large"), See Supplement E for further details.

4 | Discussion

Younger age, being employed and in a relationship, a strong desire to avoid a pregnancy, and a positive attitude toward hormones were all associated with the use of more effective (based on typical-use PI) contraceptive methods. Older age, being unemployed and single, having a moderate desire to avoid a pregnancy, and being a hormone skeptic all predicted the use of no contraception. As such, our results largely support prior findings, particularly if each factor is considered individually.

Consistent with our findings, older age has been related to using less (or no) contraception in a large body of literature [21, 51]. Some authors assume that age may mask the influence of other factors like poor health status, which is also thought to impact contraceptive use in women aged 35 years and over [52]. However, others suggest that perceiving one's fertility as

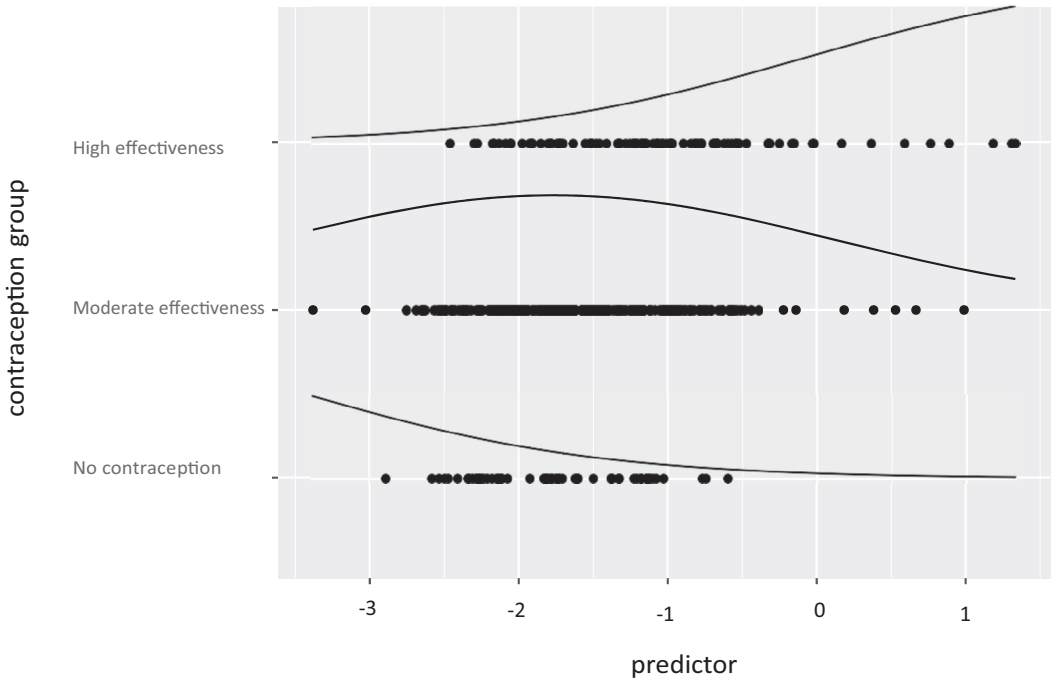

FIGURE 1 | Prediction probabilities of women belonging to different contraception groups depending on predictors. *Note:* This figure illustrates the predicted probabilities of women belonging to different contraception groups based on the linear predictor (latent variable) derived from the final multivariable ordinal logistic regression model. Black dots represent individual participants, indicating their observed contraception category at their respective linear predictor scores. Curved lines show the probabilities estimated by the model for membership in each contraception category as a function of the linear predictor. *Interpretation:* Lower values of the linear predictor are associated with higher probabilities of no contraception usage ("no contraception"). Intermediate values correspond to higher probabilities of using contraception with moderate effectiveness ("moderate effectiveness"). Higher linear predictor values strongly correspond to the use of highly effective contraception ("high effectiveness"), as demonstrated by the upward-sloping probability curve in the top panel.

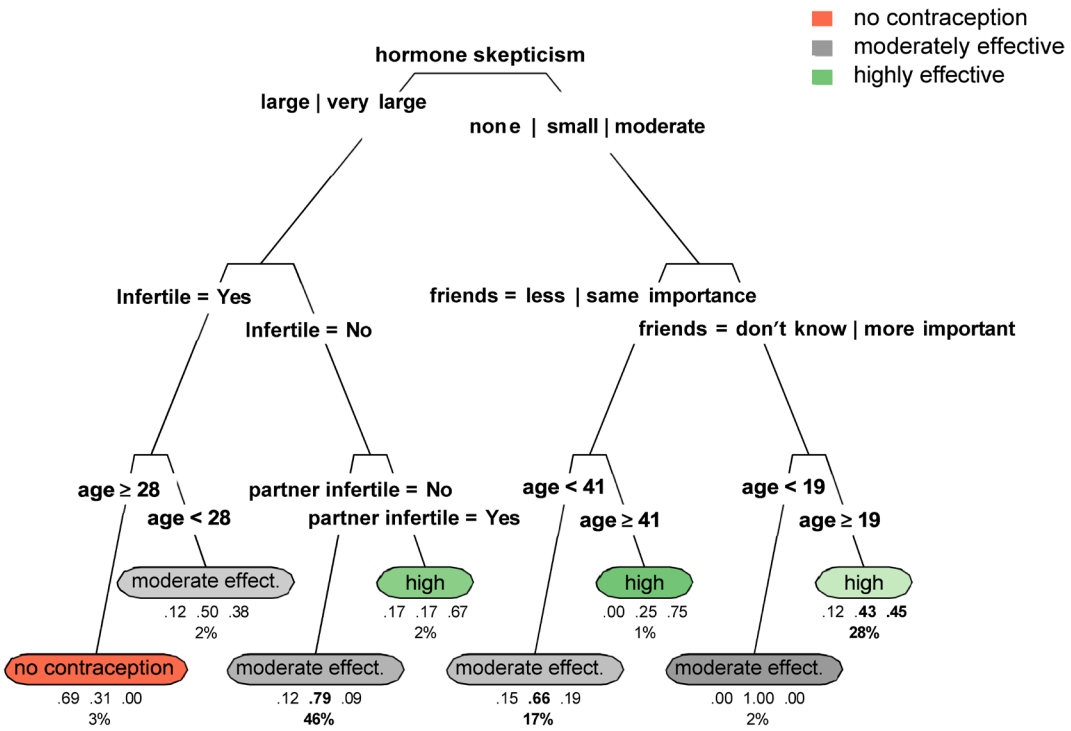

FIGURE 2 | Decision trees of women belonging to different contraception groups. *Note:* Depicted is 1 root node (hormone skepticism) which is the first decision point where the data is split based on reported hormone skepticism; each branch shows the outcome of the split (e.g., large/very large vs. none/small/moderate), leading to further internal decision nodes (e.g., fertility status, friends and family, age) or to terminal nodes (leaves). Leaves represent the predicted contraceptive group: Red = no contraception, gray = moderately effective, green = highly effective. The percentage under each leaf indicates the proportion of women from the total sample represented by the leaf, and the values above show the predicted class probabilities (estimated distribution across outcome categories within that node) for three contraceptive groups (from left to right: No contraception, moderately effective, highly effective).

reduced (i.e., from the mid 30s and onwards), and having less sexual intercourse may contribute to a less rigorous contraceptive regime [53].

Apart from age, we found that a stable relationship contributes to a higher likelihood of using effective contraception than being single (see [27] for similar results). However, our results suggest that women in an unstable relationship have the highest probability of using effective protection compared to those without a relationship. As this group tends to be more frequently involved in unprotected sex than those in stable or no relationships (according to the findings by [27]), this result may reflect a particularly high motivation (or need) for reliable protection. In contrast, single women with less opportunity for sexual intercourse may not perceive this need. Furthermore, having an occupation was associated with using more effective contraception. This may reflect the reported positive link between higher economic status (i.e., higher income) and effective contraception [27]. It is assumed that a lower income may pose a significant challenge in obtaining highly effective contraceptives, particularly in Austria where contraceptives are not covered by health insurance [46, 54]. At the same time, contraceptive care is widely available, with a well-established infrastructure that includes a sufficient number of gynecologists, general practitioners who frequently provide contraceptive services, and around 400 state-sponsored family planning counseling centers across the country (see familienberatung.at). This accessibility creates favorable conditions for obtaining information and services; however, financial barriers may still limit actual access to contraception, especially to the highly effective long-acting reversible contraceptive methods and for lower-income groups.

Another predictor in our model was the desire to avoid a pregnancy. Women with a distinct wish to avoid childbearing tended to use a more effective contraceptive method (in terms of the typical-use PI) than ambivalent women. These results contradict the unmet need concept [11] which assumes a discrepancy between the desire to avoid conception and failure to use contraception. But they support a recent meta-analysis [23] which also found women with a strong desire to avoid a pregnancy to be more likely to use effective contraception. Women with an ambivalent wish for a child or another child tend to use less effective or no contraception. Yet, as the relationship between contraceptive use, unintended pregnancy, and abortion is highly complex [2], it remains unclear how likely it is for women with an ambivalent attitude to choose an abortion if an unintended pregnancy occurs [21]. Here, the role of the partner could prove insightful. Men's perceptions have largely been neglected in prior research [23], but they may be crucial for the decision of whether to continue or terminate a pregnancy, particularly among those who are ambivalent. Past studies indicate that, if there is disagreement, men and women equally influence reproductive choices [2].

Finally, hormone skepticism emerged as a relevant predictor for contraceptive use. Rooted in a comprehensive, quantitative

approach, the current finding constitutes a strong affirmation of prior qualitative data [8, 9, 19, 34, 35]. In accordance with these past studies, we found women with higher levels of hormone skepticism to have a higher probability of using moderately effective (i.e., predominantly hormone-free methods like condom, withdrawal, self-observation) or no contraception. Subsequent analyses further substantiate this finding, indicating that hormone skepticism is associated with the use of non-hormonal methods or the absence of contraception. Reasons for hormone skepticism are wide-ranging, including the perception that hormones are inherently harmful, the fear of side effects, a preference for more natural, hormone-free contraceptive methods, and a general reluctance to interfere with the body's "natural" state. This aligns with findings from previous studies, which frequently cite numerous concerns about hormonal contraception [12, 32], one of which is disrupting the menstrual cycle [39], although our study did not specifically assess this concern. Findings imply that it is particularly relevant among women who attribute symbolic value to regular bleeding, viewing it as a form of bodily cleansing and as an indicator of health and non-pregnancy [32]. The perception of regular (monthly) and prolonged menstruation over many years as "natural" likely reflects a socially constructed notion of female biology. In reality, prior to the widespread availability of contraceptives, women typically experienced significantly fewer menstrual cycles due to more frequent pregnancies and long periods of breastfeeding [55, 56]. This knowledge could help women develop a more nuanced and realistic understanding of their bodies and could enable them to make decisions about their reproductive health that are more centered around their individual needs and perceptions.

The widely observed rejection of hormonal contraception [32] and the decline in pill usage in countries like Germany and Austria [57], can be attributed to a variety of complex factors—one of which is the historic "pill scare" starting in 1995 [58], which was driven by negative media coverage of potential adverse effects. Since then, a broader culture shift has occurred, transforming health consumers into proactive agents of their own well-being [31]. Increasingly, individuals seek contraceptive information independently, often bypassing medical professionals. This reflects a growing trend toward individual empowerment, with social media playing a central role in shaping, and often reinforcing, negative attitudes toward hormonal contraception [31].

Overall, our study highlights a dilemma faced by women who are skeptical of hormonal contraception: they tend to seek a method that aligns with their desire for a "natural", hormone-free approach, yet simultaneously value high contraceptive efficacy—which, from today's medical standpoint, is most reliably achieved through (principally) hormonal methods. This inherent tension reflects the difficulty some women face in making fully satisfying contraceptive choices. In our study, most women (64%) used moderately effective, hormone-free methods like condoms (about 80% in this group), periodic abstinence, and withdrawal—reflecting a trend toward hormone-free methods [57]. These methods however, require considerable skill, discipline, and memory, and consequently carry a higher risk of failure [2].

While our research highlights the relevance of several key factors—such as older age, being unemployed and single, a moderate desire to avoid pregnancy, and skepticism toward hormones—in the use of moderately effective or no contraception, and thereby contributes to the growing body of evidence [12, 32], it does not explore causal relationships in depth. To advance this field, a longitudinal approach would be highly valuable. Such a design could assess actual contraceptive use or non-use, objectively measured side effects, involvement with related social media content, negative experiences with medical counseling, switching between contraceptive methods, as well as the emergence of fears and concerns related to hormonal contraception.

4.1 | Implications for Clinical Practice and Research

Given the challenges of contraceptive counseling of effective methods that are tailored to women's individual needs [42], our results may help implement a more coordinated approach which specifically targets the above-mentioned factors. Clinicians or service providers may better assist women in their choice of contraceptive methods by considering their age, their relationship status, their income, and whether they are ambivalent about getting pregnant and skeptical about hormones. Addressing individual reasons for avoiding hormonal contraceptives seems of particular importance, as those reasons may range from concerns with adverse effects to the desire for a "natural" (untouched) body. Especially with regard to a "natural body," different perceptions between health care professionals and patients seem to exist. Past studies found service providers to discredit the natural body idea of patients and instead perceive contraceptive decision-making as a mere risk–benefit-analysis [8]. These different conceptualizations may create misunderstandings, and, in the worst case, create contraceptive coercion [10] and decrease adherence to the contraceptive regimen.

Additionally, two more factors—as yielded by the decision trees—may also be promising for consideration in both future studies and counseling. One was the influence of friends and family on contraceptive use. In contrast to prior research [6], which evaluated more general preferences, like the parent's wish for a grandchild or overall disapproval of contraception, we focused on family's and friends' attitudes toward hormones and on whether an unwanted pregnancy had occurred in the participant's social environment. Given that women prefer methods that are familiar [2], the experiences and opinions of those closest likely influence contraceptive choice and should thus be factored in family planning service provision.

The other factor which is recommended for closer consideration for clinical practice and research, is the perceived risk of pregnancy. Assuming that one is infertile, that intercourse is happening at a "safe" time, or that the partner is infertile, all may increase the probability of skipping contraception. Particularly the group of women seeking abortions has been shown to largely perceive their risk for pregnancy as low [27], highlighting even more the need for educating women and their partners about the variability of menstrual cycles and the true risk of pregnancy if no contraception is used during the long period of fertility in a woman's life.

5 | Limitations

Asking participants about their attitudes and beliefs regarding contraception after just having had an abortion could generate a response bias. At the same time, this approach is preferred over conducting the study prior to the abortion, as the latter may constitute an undue influence, in that women may feel coerced to participate to receive their treatment. Preferably, longitudinal designs should be implemented to learn more about how attitudes (i.e., opinions about hormones) influence not only behavioral intentions (i.e., the desire to avoid a pregnancy) but also actual behavior (i.e., use of effective contraception; see theory of reasoned action [59]). Moreover, we did not ask explicitly for consistent or inconsistent use of a contraceptive method in our questionnaire, as this may have increased the response burden in the contraceptive use variables group. However, inconsistent use is among the leading causes of contraceptive failure and hence, unintended pregnancy [60], it could be considered in future analyses.

In sum, this analysis adds sustenance to the significance of considering personal attitudes and beliefs when evaluating contraceptive use. However, women's choice and use of contraceptives are dynamic and complex, and future research is challenged to expand our understanding not only of personal factors, like hormone skepticism, but also of their social dimension, and—most importantly—of their interplay in the context of contraception, unintended pregnancy, and abortion.

Author Contributions

Christian Fiala and **Franz Piribauer:** conceptualization. **Lusine Yeghiazaryan** and **Anna Felnhofer:** data curation and analysis. **Christian Fiala** and **Franz Piribauer:** methodology. **Anna Felnhofer:** writing – original draft. **Christian Fiala:** supervision. **Christian Fiala:** project administration and resources. **Anna Felnhofer**, **Lusine Yeghiazaryan**, **Franz Piribauer**, and **Christian Fiala:** investigation, validation, writing, review and editing.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data will be shared upon reasonable request to the corresponding author.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** Supporting Information.