

# Knowledge and Beliefs about Mechanism of Action of Birth Control Methods among European Women

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## Abstract

**Background:** Adequate knowledge is essential for making informed decisions. We attempted to determine the level of knowledge about mechanisms of action of birth control methods in five representative samples of European women.

**Study design:** Randomly selected women, aged 18-49 years, completed an anonymous survey in Germany, France, the UK, Sweden and Romania (N=1137). Participants were asked about how contraceptive methods work and if providers should inform them about this issue. Multiple linear regression was used to evaluate women's characteristics associated with their knowledge of mechanisms of action.

**Results:** The majority of women identified the unequivocal mode of action of condoms, sterilization and abortion. Less than 2% identified all possible mechanisms of action of hormonal contraceptives and intrauterine devices. Highly-educated women correctly identified the mechanism or mechanisms of action of more methods than less educated women ( $\beta$  coef.=0.22, 95%CI=0.01-0.43). Regardless of their sociodemographic characteristics and their belief about when human life begins, most women (75%) stated that the provider should inform them about possible postfertilization effects.

**Conclusions:** European women have low knowledge about mechanisms of action of several contraceptive methods. The majority want to be informed about possible postfertilization effects. Since adequate knowledge is essential for making informed decisions, providers are encouraged to inform women about all possible mechanisms of action of contraceptives.

**Key words:** mechanism of action, informed choice, birth control methods, oral contraceptives, EC pill, intrauterine devices.

## 1. Introduction

Family planning (FP) is widely practiced in Europe. Although different patterns are found among countries, male condoms, oral contraceptives (OCs) and intrauterine devices (IUDs) are the most popular methods [1, 2]. The choice of birth control method by couples depends on several factors. These include its features, such as effectiveness, possible adverse effects, or convenience, as well as the couple's medical conditions, sociocultural profile or reproductive intentions and beliefs [3, 4]. Physicians and providers are encouraged to discuss all these aspects with the couples in order to ensure an informed choice in FP [5, 6].

Mechanisms of action are not usually cited by women as an important feature when choosing a birth control method [7], but they may be important for some women and require some discussion in the contraceptive decision-making process [6]. Mechanisms of action can be classified according to the stage of human reproduction at which they take place. *Prefertilization effects* refer to mechanisms which prevent the egg from uniting with the sperm; they include inhibition of ovulation, restriction of sperm penetration through a physical barrier or by changing the cervical mucus, alterations in fallopian tubes that may impede gametes transport, and impairment of gametes viability through toxic agents. Some mechanisms take place after fertilization, but before successful implantation (*postfertilization effects*), while others disrupt an implanted embryo (*postimplantation effects*). Postfertilization effects encompass alterations of fallopian tube motility that affect embryo transport and biochemical or structural endometrial changes which impair embryo implantation. Postimplantation effects comprise blockage of the corpus luteum and endometrial changes that impede the viability of the pregnancy. Hormonal contraceptives, emergency contraceptive (EC) pill and IUDs act primarily by inhibiting fertilization but they may also exhibit postfertilization effects [8-14].

Mechanisms of actions which have postfertilization and postimplantation effects mean that they interfere with the development of an embryo. This can appear problematic to some women and couples, as shown in several studies [15-19]. A survey conducted in Spain found that 45% of women would not consider using a method that may work after fertilization but before implantation; 57% of women would not use a method which acts after implantation. Also, women who believe that human life begins at fertilization were less likely to consider the use of methods with postfertilization effects [15]. Similar results were found in another study carried out in the USA, where the majority of women believing that human life begins at fertilization reported that they would not use a method with postfertilization mechanisms [16]. Moreover, one of the reasons stated by women who refuse using the EC pill is the possibility of a postfertilization mechanism of action [17, 18].

Although there are many studies investigating women's beliefs and attitudes towards different aspects of FP methods, knowledge about their mechanisms of action has not been widely assessed. The present study was designed to assess European women's opinions and attitudes towards mechanisms of action of FP methods. Our specific objectives are: (1) to describe and compare women's knowledge about the mechanisms of action of several FP methods in a variety of European countries, taking into account sociodemographic characteristics and (2) to assess whether women wish to receive information about this issue from doctors and FP providers. Results from this study could help identify possible gaps in the current delivery of FP information and help ensure that couples are better able to make fully informed decisions.

## 2. Methods

### 2.1. Study design

We carried out a cross-sectional survey among women aged 18-49 years in five European countries (Germany, France, the UK, Sweden and Romania). We selected these countries on the basis of their different patterns of FP use and socio-cultural characteristics. Budgetary constraints prevented us from implementing the survey in more countries. We had previously conducted a similar survey in Spain [15].

This study was designed mainly to estimate the proportion of European women who would not consider using methods with postfertilization effects. In a previous study in Spain, this fraction was 45% for postfertilization effects and 57% for postimplantation effects [15]. For 45%, with a confidence level of 95% and a precision of  $\pm 6\%$ , the required sample size in each country was approximately 264. Due to budgetary constraints, the study included smaller samples ( $\approx 200$ ) with a resulting precision of  $\pm 6.9\%$ .

Exclusion criteria were: being under 18 or above 49 years of age, having had any surgery or pre-existing conditions resulting in infertility or sterility, being pregnant and trying to become pregnant.

The study was approved by the Institutional Review Board of the University of Navarra.

### 2.2. Sampling and Data collection

The sampling and the data collection was performed by an international market research company (GFK-Emer). To obtain a nationally representative sample in each country, recruitment quotas per sex and age were set according to country-specific official statistics. In France, Germany and Romania, after stratification by geographic location and population size of residence, researchers conducted a random selection of routes. Once in the route, women from households that met the criteria to enter the study were invited to participate and

computer-assisted personal interviews (CAPI) were conducted. In Sweden and the UK women were randomly selected from a panel, set by the research market company, and invited via email to participate in an online survey. When a woman declined to participate in the study, another woman was randomly chosen from the same strata, in accordance with rules previously established to fill the study size and representativeness.

The survey was conducted between October and December of 2008 as a part of an Omnibus or “multi-topic” survey. All participants were given a letter explaining that responding to the questionnaire implied voluntary participation. No incentives were given to participants in any country.

### *2.3. Questionnaire*

An anonymous 31-item questionnaire was administered to obtain the women’s beliefs, knowledge and opinions about mechanisms of action of FP methods as well as sociodemographic characteristics. Details of this questionnaire have been published elsewhere [16, 20]. Briefly, the questionnaire includes questions about reproductive history, past and current use of birth control methods and sociodemographic information. No information about sexual behavior was requested. A picture and a brief explanation about human reproduction were included. Women were asked to identify at which stage(s) of human reproduction several birth control methods could work (stage 1: before fertilization, stage 2: after fertilization but before implantation and stage 3: after implantation). Medical and surgical abortion was included in the questionnaire for completeness, but abortion is typically offered only in the case of unwanted pregnancy and not as a FP method [21]. Methods were listed in alphabetical order. According to best available scientific evidence, methods with unequivocal mechanism of action were: condoms, natural family planning (NFP) methods (Billings and symptothermal methods) and sterilization (acting before fertilization) and abortion (acting after implantation). Hormonal methods, the EC pill and IUDs have several possible

mechanisms of action. They may act before and after fertilization, although mainly before fertilization. None of them act after implantation [8, 13, 22, 23].

Women were also asked if doctors or providers should explain that some methods have mechanisms of action which take place after fertilization or implantation. No information about how specific FP methods work was provided in the questionnaire nor was any additional information given to the participants.

The original questionnaire was developed in English and previously validated by assessing consistency of responses [16]. Native speakers from a market research company (GFK-Emer) translated the questionnaire into local languages, using back translation to verify the accuracy. The questionnaire is available from the authors upon request.

#### *2.4. Analysis*

Data were analyzed using SPSS version 15.0. We calculated proportions and performed univariate tests such as the chi-square and linear trend test for ordinal variables and Fisher's exact test for dichotomous variables.

Women's responses about mechanisms of action were recoded as a continuous variable. There were a total of 10 methods to be identified. Women scored 1 point for each method when they identified the following mechanisms of action: only before fertilization for condom, NFP methods and sterilization; only after implantation for abortion; and before and after fertilization, but not after implantation, for hormonal methods, the EC pill and IUDs. We created a scale with values 0 to 10. Multiple linear regression was used to evaluate women's characteristics associated with their knowledge of mechanisms of action.

We used non-conditional logistic regression to assess the characteristics independently associated with having the opinion that the doctor or provider should inform women of postfertilization effects. Independent variables considered were age, education,

socioeconomic status, marital status, religiosity, country, opinion about when human life begins and current use of a highly effective method. Education was recoded in two categories (high school or less and university) because of differences in the educational systems across countries. Marital status was coded as a dichotomous variable (married/unmarried). Religiosity had three categories: no religious affiliation, low-middle and high. We classified women with a religious affiliation as “high religiosity” if women attended church or worship services weekly and considered faith to be an important influence in their life; and “low-middle” if they identified with a religion but attended church or worship services only occasionally (<1/month) or never and/or did not consider faith as an important influence in their life.

### **3. Results**

#### *3.1. Description of the sample*

A total of 1137 women participated in the study. The mean age for the entire sample was 32.4 years (SD=8.86). The French sample had the highest percentage of women with no children (66.8%) and the sample from the U.K. the lowest (29.6%) (Table 1). The Swedish sample had the largest proportion of university graduates, unmarried women and women without religious affiliation. On the other end of the spectrum, the Romanian sample had the largest proportion of married and religious women. The highest percentage of participants reporting having had induced abortions was found in Romania.

The most common methods currently used were OCs (36.3%), male condoms (24.1%) and IUDs (10.9%). At the time of the survey, 23% of women were not using any method.

#### *3.2. Knowledge about mechanisms of action*

Women’s beliefs about mechanisms of action of birth control methods and abortion are shown in Tables 2 and 3. For methods for which there is a single correct response: 61.5%



responded that condoms act only before fertilization, 72.4% that sterilization acts only before fertilization and 63.6% responded that abortion acts only after implantation. There was less familiarity with NFP methods, with only 45% of women responding that they act before fertilization.

Regarding the group of methods for which there are several possible mechanisms of action, the majority of women (62%) responded that OCs act before fertilization. For the EC pill, 43% responded that it acts before fertilization and 22% before implantation (Table 3). Only 1.8% of the sample marked both mechanisms (before fertilization and before implantation) for the OCs and the EC pill. Over one third of women (35%) responded “do not know” for mechanism of action of hormonal IUD, dropping to 0.8% women who chose the two possible mechanisms (before fertilization and before implantation).

In general, Romanian women were the least familiar with mechanisms of action of birth control methods. Swedish women had more correct responses than the rest of the countries, except for NFP methods, with a high percentage of “do not know” answers for the symothermal method.

We compared responses between women who had ever used the most popular methods (condoms, OCs and IUDs) and those who had not. Among ever users of condoms, the percentage of women who chose the single correct mechanism of action was higher than among women who had never used condoms (65.2% vs. 55%,  $p < 0.01$ ). The percentage of women identifying all the possible mechanisms for OCs was 1.8% for ever users and 1.4% for never users ( $p = 0.8$ ). Regarding hormonal IUD, 2.3% of ever users identified all mechanisms of action of IUD vs. 0.7% of never users ( $p = 0.14$ ).

In the multiple linear regression, highly-educated women correctly identified the mechanism or mechanisms of action of more methods than less educated women ( $\beta$  coef.=0.22, 95%CI=0.01-0.43), after adjusting for age, marital status, religiosity, and opinion

about when human life begins. That is, highly educated women obtained higher scores than less educated women. The rest of demographic characteristics were not significantly associated with women's knowledge of mechanisms of action (data not shown).

### *3.3. Opinion about being informed of postfertilization effects*

Most women stated that they would want to be informed by doctors or providers whether a FP method may act after fertilization (72.6%) or after implantation (75.3%). Percentages were below 70% only in Romania (65.2% if the method may act after fertilization and 63.9% if it may act after implantation).

In the univariate analysis, we found statistically significant differences in women's responses according to education, country, and opinion about when human life begins (Table 4). We performed a multivariate analysis taking into account all variables shown in Table 4. University graduates were more likely to report that they would want to be informed about postfertilization and postimplantation effects. Only women who were unsure about when human life begins were less likely to report that they would want to be informed about postfertilization effects, both after fertilization and after implantation (Table 4).

## **4. Discussion**

Our results show that European women have low knowledge about mechanisms of action of FP methods, even if they have used the method. These findings are consistent with other studies. A study conducted among Turkish women from primary health centers found that only 33.6% of barrier methods users and 5.7% of non-barrier methods users had correct knowledge about how their current method worked. It was not specified in the article what "correct knowledge" was for each method [24]. Another study, exploring beliefs about EC among female patients at two academic family medicine clinics in the USA, found that 24% of women responded that EC pill worked before fertilization, 36% before implantation, 6% after implantation and 34% were unsure about the mechanism of action [19]. Low knowledge

about EC is also frequent regarding indications, timing of administration, adverse effects or efficacy [17, 19, 25]. Studies about OCs and IUDs find that knowledge about risks, benefits and side effects are deficient [26-28]. Knowledge about mechanism of action is usually not addressed.

The primary mechanism of action of OCs, the EC pill and IUDs is avoiding fertilization, but scientific literature has not ruled out postfertilization effects prior to implantation [12, 13, 29, 30]. It is noteworthy that a very small percentage of women identified both mechanisms, as found in a previous study conducted in a region of Spain, where less than 5% of women correctly identified both possible mechanisms for OCs and IUDs, and only 7% for the EC pill [31]. We should also note that these methods do not disrupt an implanted embryo but, in our study, some women wrongly responded that these methods may act after implantation.

Highly educated women were significantly more likely to know the mechanisms of action of FP methods, which is supported by other studies. In the Topsever et al. study [24], having a high education level was shown to be significantly associated with knowing the mode of action of the contraceptive method used (OR=3.02, 95%CI=1.99-4.58). In addition, they found that knowledge about non-barrier methods such as hormonal methods, IUDs, or sterilization was lower than knowledge of barrier methods, even among highly educated women [24]. Heimberger et al. [32] also revealed that more education was significantly associated with better knowledge of EC among clients of FP clinics in Mexico.

Having adequate knowledge about how FP methods work – their mechanisms of action – is essential to making fully informed decisions. It is crucial that health care providers are encouraged to educate women and their partners about reproduction and fertility, regardless their social background. This basic health education will enable couples to better

understand how contraception works and the reasons for its failures, helping them to improve correct use of FP methods [33].

For some women, postfertilization and postimplantation effects are an important factor to consider when choosing a FP method [15-19]. The majority of women in our study indicated that they would want to be informed by health care providers about mechanisms of action taking place after fertilization and implantation, regardless of their religiosity or whether they believed that human life begins at fertilization or implantation. Highly educated women were more likely to report their desire to be informed about postfertilization effects. This was also found in a study among FP clients in Mexico. Although highly educated clients had better knowledge about the EC pill than their less educated counterparts, they nevertheless indicated that they wanted even more information about it [32].

Respect for patient's autonomy in making health care decisions implies good and thorough communication with patients or clients [34]. As Dehlendorf and Rinehart state in an editorial [35] *"appropriate communication, both within and outside of the health care system, is essential for people to make autonomous and informed decisions about contraceptive use"*. Health care professionals play an important role in women's decision-making processes, as they are one of the most preferred sources of information about FP [36]. But sometimes, health care professionals have inaccurate knowledge about contraception, including knowledge gaps about mechanisms of action [37]. A study among family medicine providers in the USA showed that 25% were unsure about the EC pill mechanism and 37% were wrong about the time interval for the initiation of EC [38]. Another study conducted in California (USA) among health care providers, including gynecologists, found that nearly 25% of them believed that EC could disrupt an implanted embryo [39]. Misconceptions about contraception among professionals may be transmitted to women, hindering informed choices.

In this context, it is important that physicians be aware of the best available medical evidence about methods that have an equivocal mode of action. But sometimes, evidence-based information about these methods is not available [30]. In that case, physicians should explain to women that pre-fertilization effects may be the dominant mechanism of action but that however, post-fertilization effects cannot be ruled out.

Some contraception providers might hold opinions that human life starts after implantation, which might make postfertilization effects not problematic as far as they are concerned. Or they might personally believe that there are no postfertilization effects at all. In such cases it is important that personal opinions do not hinder the process of informed choice, particularly since some women may hold different views. It also has to be highlighted that if essential information is missing, women's autonomy and her right to choose will be jeopardized.

There are some limitations in our study. Although our questionnaire was pilot tested for readability and previously used in other samples with similar characteristics [16, 20], less-educated women may have not fully understood it, thus increasing the low level of knowledge found in the study. But lack of knowledge of several methods was also high among highly educated women and our results regarding low level of knowledge are consistent with other studies, as explained above. False answers for condoms and abortion, both methods with a rather obvious mechanism of action, could mean that women answered randomly and/or they did not fully understand the different stages at which methods may act. But it has to be noted that the correct mechanism of these methods was also the option most frequently answered by women in each country, while the incorrect mechanisms for these methods were chosen by less than 10% of women. Regarding the issue of understanding there is further evidence that women understood the different stages. In the questionnaire, there were some questions about the intention to use FP methods depending on their mechanism of action (data not published

yet). We explored possible inconsistencies to these questions. For example, if a woman stated that she would not use a method acting after fertilization, it was expected that she would also not use a method acting after implantation. The contrary would be an inconsistency which might mean that women did not understand the concept of mechanism of action correctly. We only found inconsistencies in 9% of the sample. We repeated the analyses excluding inconsistent women and found essentially the same results as shown in this paper.

Another possible limitation has to do with sample sizes in each country and their representativeness. Due to budget constraints, a sample size of 200 per country, with a statistical accuracy of  $\pm 6.9\%$ , was estimated to be sufficient for our objectives. This accuracy is within acceptable ranges, usually from 3% to 10% [40]. In addition, our global sample size of 1137 was also sufficient to perform multivariate analysis adjusting for confounding. A size of 1137 with 30% of participants responding that a provider does not need to tell them about possible postfertilization effects of some FP methods yields about 330 in the least frequent outcome. That allows 33 independent variables in the model. We included 8 variables (24 parameters) in the multivariable model. Therefore, our sample size of 1137 was enough to perform this analysis [41].

In addition to the sampling strategy, demographic characteristics of our samples are consistent with other European data, thus showing that representativeness can be reasonably assumed. For example, figures of married women in our study were low in Sweden, where cohabitation is common [42]. On the contrary, marriage is part of Romanian culture [43], as shown in our study. Percentages of religious women in our samples were also consistent with those found in the European Mindset Study, being low in France and the U.K. [44]. According to the Organization for Economic Cooperation and Development (OECD), percentages of university women in Germany, France, U. Kingdom, Romania and Sweden are 21%, 33.2%, 33%, 10.6% and 44%, respectively [45]. These figures are similar to those found

in our study (it has to be noted that the OECD figures come from women aged 25-64 years and our study encompasses women aged 18-49 years). Also, the patterns of contraceptive use found in our study are consistent with other European surveys [1, 2] and with data from the United Nations [46].

To our knowledge, this is the first study which explores women's knowledge about the mechanisms of action of several FP methods in a representative sample of five European countries. The same questionnaire was used in each country and as it was self-administered, interviewer bias was avoided. To prevent unduly influenced responses, we neither mentioned what is known or unknown about any method nor indicated when human life begins. Also, the term "abortive" was avoided, using less value-laden words as "post-fertilization" or "post-implantation".

In conclusion, there is low knowledge about how FP methods work among women from five European countries. The majority of women want to be informed about possible post-fertilization mechanisms of action of the contraceptive method used, regardless of their religiosity, sociodemographic characteristics or their beliefs about when human life begins. Physicians are encouraged to inform women about all possible mechanisms of action of FP methods, since adequate knowledge is essential for women to make fully informed decisions. Physician counselling also includes identifying misconceptions about mechanisms of action of some FP methods.

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**Table 1. Characteristics of the participants**

Characteristics	Germany (N=199)	France (N=202)	UK (N=203)	Romania (N=227)	Sweden (N=306)	Total (N=1137)
<b>Age (years), mean (SD)</b>	34.5 (9.0)	30.6 (9.3)	34.4 (8.2)	32.2 (8.2)	31.2 (8.9)	32.4 (8.9)
<b>No. births</b>						
0	38.2	66.8	29.6	30.8	56.9	40.9
1+	61.8	33.2	70.4	69.2	43.1	59.1
<b>Education*</b>						
Primary, secondary	75.4	66.8	20.0	39.2	11.1	39.5
High school, professional	16.6	19.8	49.0	41.0	43.1	34.9
University	8.0	13.4	31.0	19.8	45.8	25.6
<b>Socioeconomic status<sup>†</sup></b>						
Low	3.5	15.8	22.8	23.3	46.4	23.3
Middle	77.4	67.3	70.8	60.4	42.3	62.8
High	19.1	16.8	6.4	16.3	11.3	13.9
<b>Marital status</b>						
Married	49.7	42.6	47.8	74.0	27.1	48.0
Unmarried	50.3	57.4	52.2	26.0	72.9	52.0
<b>Previous induced abortion<sup>‡</sup></b>	3.0	15.8	10.8	19.4	15.7	13.4
<b>Religiosity<sup>§</sup></b>						
No religion	33.2	55.4	60.6	0.4	59.8	42.7
Low-middle	63.8	40.6	34.5	89.0	39.2	52.9
High	3.0	4.0	4.9	10.6	1.0	4.5

Values are % except age. SD, standard deviation.

\*Missing data: 3 in UK and 11 in Sweden.

<sup>†</sup> Missing data: 1 in UK and 67 in Sweden.

<sup>‡</sup> Self-reported data.

<sup>§</sup> Low-middle: women who identify with a religion but attend church or worship services occasionally (<1/month) or never and/or do not consider faith as an important influence in their life. High: women who strongly identify with a religion (e.g., attend church or worship services weekly and consider faith to be an important influence in their life).

**Table 2. Beliefs of European women about mechanisms of action of birth control methods and abortion (*methods with unequivocal mechanism of action*)**

	Germany (n=199)	France (n=202)	UK (n=203)	Romania (n=227)	Sweden (n=306)	Total (n=1137)
<b>Condom</b>						
Before fertilization*	46.2	36.6	71.4	72.2	92.2	66.6
After fertilization	6.5	9.4	28.6	3.1	1.6	9.0
After implantation	1.5	2.0	17.7	2.6	0.7	4.5
Do not know	47.2	52.0	12.3	25.6	6.5	26.6
<b>Billings method<sup>†</sup></b>						
Before fertilization*	78.4	81.7	45.3	24.7	14.7	45.2
After fertilization	3.0	1.0	19.7	8.4	62.4	22.7
After implantation	3.0	1.5	10.3	2.6	18.0	8.0
Do not know	15.6	16.8	49.8	64.3	9.5	30.0
<b>Symptothermal method<sup>†</sup></b>						
Before fertilization*	72.4	74.8	42.4	43.2	10.5	44.9
After fertilization	3.5	5.9	21.7	4.0	1.3	6.7
After implantation	2.0	0.5	31.0	2.2	1.6	6.9
Do not know	23.1	19.8	45.3	50.7	86.6	49.1
<b>Sterilization</b>						
Before fertilization *	82.4	82.7	56.7	52.4	84.3	72.4
After fertilization	6.0	5.0	17.7	1.8	1.6	5.9
After implantation	2.0	1.5	20.2	3.1	2.0	5.4
Do not know	13.1	12.4	26.1	43.6	14.1	21.6
<b>Abortion</b>						
Before fertilization	10.6	3.5	6.9	10.1	1.6	6.2
After fertilization	22.1	20.3	25.6	9.7	5.9	15.6
After implantation*	56.3	67.8	55.2	48.0	85.0	64.2
Do not know	17.6	9.9	39.4	33.9	9.5	21.2

Values are %. Percentages do not add to 100% due to the selection of more than one mechanism of action as a response and rounding.

\* Mechanism of action of the method.

<sup>†</sup> Natural family planning method.

**Table 3. Beliefs of European women about mechanisms of action of birth control methods (*methods with several possible mechanisms of action*)**

Stages of human reproduction at which birth control methods may act	Germany (n=199)	France (n=202)	UK (n=203)	Romania (n=227)	Sweden (n=306)	Total (n=1137)
<b>Oral contraceptives</b>						
Before fertilization*	68.3	64.9	52.2	66.1	59.8	62.1
After fertilization*	6.5	7.4	19.7	5.3	19.3	12.2
After implantation	1.0	1.5	24.6	3.5	1.6	6.0
Do not know	27.1	27.2	38.9	27.8	22.5	28.1
<b>Copper IUD</b>						
Before fertilization*	61.8	60.4	28.1	50.7	74.2	56.6
After fertilization*	7.5	7.4	23.2	4.0	15.0	11.6
After implantation	1.5	1.5	6.9	3.1	2.0	2.9
Do not know	30.2	32.2	52.7	44.9	12.4	32.7
<b>Hormonal IUD</b>						
Before fertilization*	72.4	45.5	26.6	33.0	66.0	49.9
After fertilization*	7.5	8.9	13.8	4.8	10.1	9.1
After implantation	1.5	4.5	3.4	1.3	0.7	2.1
Do not know	20.6	42.6	61.0	60.8	24.2	40.7
<b>Emergency contraception pill</b>						
Before fertilization*	63.3	44.1	15.3	22.9	61.1	42.7
After fertilization*	12.6	20.3	32.0	40.1	10.1	22.3
After implantation	3.0	4.0	16.7	2.6	0.7	4.9
Do not know	24.1	32.7	49.3	36.6	29.4	34.0
<b>Lactational amenorrhea method</b>						
Before fertilization*	64.3	40.1	13.8	16.7	4.6	25.4
After fertilization*	8.5	15.8	3.4	3.1	19.0	10.6
After implantation	1.5	4.0	0.5	2.2	63.1	18.5
Do not know	28.6	42.6	82.3	78.0	18.6	47.8

Values are %. Percentages do not add to 100% due to the selection of more than one mechanism of action as a response and rounding.

IUD: intrauterine device.

\* Possible mechanisms of action of the method, described in scientific literature (see text for references).



**Table 4. Percentage and odds ratios of women stating that they want to be informed by doctors or providers about possible postfertilization effects of birth control methods, according to women's characteristics.**

Women's characteristics and opinions	Women indicating that they want to be informed about mechanisms of action taking place at different times			
	After fertilization		After implantation	
	n (%)	Adj.OR (95%CI)	n (%)	Adj. OR (95%CI)
<b>Age (years)</b>				
18-29	352 (72.4)	N.S.	361 (74.3)	N.S.
30-39	259 (73.6)		263 (74.7)	
40-49	215 (71.9)		232 (77.6)	
<b>Education</b>				
Primary/secondary/high school	602 (71.3)	Ref.	620 (73.5)*	Ref.
University	221 (76.2)	1.39 (1.03-1.88)	233 (80.3)	1.35 (1.0-1.85)
<b>Socioeconomic status</b>				
Low	179 (71.9)	N.S.	185 (74.3)	N.S.
Middle	484 (72.1)		499 (74.4)	
High	116 (77.9)		120 (80.5)	
<b>Marital status</b>				
Unmarried	410 (73.1)	N.S.	420 (74.9)	N.S.
Married	374 (72.3)		392 (75.8)	
<b>Religiosity ‡</b>				
No religion	351 (72.4)	N.S.	368 (75.9)	N.S.
Low-middle	437 (72.7)		448 (74.5)	
High	38 (74.5)		40 (78.4)	
<b>Country</b>				
Germany	154 (77.4)*	N.S.	156 (78.4)†	N.S.
France	151 (74.8)		163 (80.7)	
UK	155 (76.4)		162 (79.8)	
Romania	148 (65.2)		145 (63.9)	
Sweden	218 (71.2)		230 (75.2)	
<b>Current use of a highly effective method§</b>				
No	209 (73.9)	N.S.	213 (75.3)	N.S.
Yes	445 (75.2)		465 (78.5)	
<b>Opinion about when human life begins</b>				
Fertilization	271 (74.7)†	Ref.	279 (76.9)†	Ref.
Implantation	135 (77.6)	1.28 (0.82-2.00)	143 (82.2)	1.37 (0.86-2.18)
After implantation	226 (77.9)	1.18 (0.81-1.71)	238 (82.1)	1.37 (0.92-2.04)
Other#	194 (62.6)	0.57 (0.40-0.80)	196 (63.2)	0.52 (0.37-0.74)

Adj. OR: Odds ratio adjusted for all the variables shown in the table. Only statistically significant variables are displayed. N.S.: non significant.

\*p value <0.05 for chi-square test or Fisher's exact test if dichotomous variable.

† p value <0.01 for chi-square test.

‡ Low-middle: women who identify with a religion but attend church or worship services occasionally (<1/month) or never and/or do not consider faith as an important influence in their life. High: women who strongly identify with a religion (e.g., attend church or worship services weekly and consider faith to be an important influence in their life).

§ Highly effective method: hormonal contraceptives (oral, patch, vaginal ring, injectable and implant) or IUD (inert, copper and hormonal).

# Other: includes the other options in the questionnaire: "there is no exact time", "I do not know" and "at another moment".