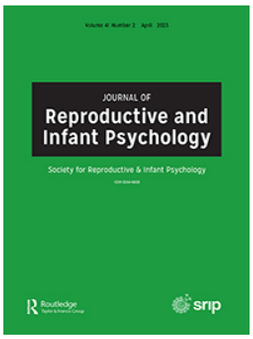

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Fertility and fertility preservation knowledge in Portuguese women

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ABSTRACT

Background: Knowledge about fertility and factors affecting it, for example, the impact of age, seem to be lacking, even in highly educated populations. The same applies to fertility preservation knowledge, pointing to the relevance of increasing fertility preservation awareness and education among young women.

Objective: To describe general fertility knowledge and factors affecting fertility, fertility preservation knowledge and attitudes, and the desire to access more information on this topic in a sample of reproductive-age Portuguese women.

Methods: The sample comprised 257 Portuguese women aged 18–45, mostly single and nulliparous. A questionnaire was developed explicitly for this study and disseminated through social media advertisements.

Results: Career building/development and financial stability were the more endorsed options for delaying childbearing, with 90 (35%) and 68 (26.5%), respectively. Most participants considered becoming a mother important ($n = 185$; 72%). More than halve provided an incorrect answer regarding the age range of women being more fertile ($n = 132$; 51.4%) and the age range of fertility decline ($n = 168$; 65.4%). Participants were aware of the influence of lifestyle and sexual health factors as well as the effect of age. Oocytes cryopreservation was the technique participants knew more ($n = 206$; 80.1%), but 177 (68.9%) showed no interest in using it. Most participants agreed that fertility and fertility preservation information should be provided during medical consultations or at school.

Conclusions: More information regarding fertility and fertility preservation is relevant to ensure that more women can make informed decisions concerning their reproductive life.

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Fertility; fertility preservation; knowledge; attitudes; women

Introduction

Fertility knowledge/awareness can be defined as 'the understanding of reproduction, fecundity, fecundability, and related individual risk factors (e.g. advanced age, sexual

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health factors such as sexually transmitted infections, and lifestyle factors such as smoking, obesity) and non-individual risk factors (e.g. environmental and workplace factors); including the awareness of societal and cultural factors affecting options to meet reproductive family planning, as well as family building needs' (Zegers-Hochschild et al., 2017, 1793).

Overall, in western societies, women are currently postponing childbearing and having children at increasingly older ages (Wyndham et al., 2012). In Portugal, in 2000, the mean age for the first child's birth was 26.47 years old; in 2021, it was 30.19 (Mendes et al., 2022). The average age at first birth has increased, and much of that increase is due to births happening among women over age 35 (Mathews & Hamilton, 2016; J. A. Martin et al., 2019).

Portugal, as well as countries such as Greece, Spain, Italy, Cyprus, Luxembourg, Austria, Switzerland and Norway, revealed a greater than average mean age of women at the birth of their first child and simultaneously a lesser total fertility rate than the European Union average (European Commission, 2022). This circumstance, along with the delay of motherhood, is due to several factors (e.g. the evolution of contraceptive methods, focus on academic and professional pursuits, a more active role of women in the labour market, decrease in infant mortality, changes in the value of the child) (Freitas et al., 2022; Rosa & Tiago de Oliveira, 2021). Postponing childbearing has significant repercussions on pregnancy rates, given that female fertility decreases over time, especially after the age of 32 and substantially after age 37 (American College of Obstetricians and Gynecologists Committee on Gynecologic Practice and Practice Committee, 2014; Martinez et al., 2017; Wyndham et al., 2012).

The decrease in fertility is due to several factors. There are ageing processes that occur in female gametes, such as a reduction in the number of oocytes and their quality, which translates into high complications in gametes and embryos, leading to a decrease in reproductive success and a high probability of at-risk pregnancy (Pal & Santoro, 2003). Over the past 60 years, major advances in assisted reproductive technologies have increased women's reproductive options (Milman et al., 2017). Fertility preservation covers various procedures, interventions, and technologies, including cryopreservation of oocytes, embryos, and ovarian and testicular tissue (Zegers-Hochschild et al., 2017).

Cryopreservation involves the slow freezing or vitrification of biological material at extremely low temperatures (Zegers-Hochschild et al., 2017). Oocyte cryopreservation encompasses ovarian stimulation to perform an oocyte retrieval and for these to be cryopreserved. It is a safe procedure and takes approximately two weeks (Harada & Osuga, 2019). Although a controversial aspect within the area of assisted reproductive technology, oocyte freezing for non-medical reasons is considered the main option for preventing age-related fertility decline in women intending to have biological children (Chronopoulou et al., 2021). This option may be especially relevant for those who do not have a male partner, do not intend to use donor sperm, and have religious or ethical disputes about embryo cryopreservation (Chronopoulou et al., 2021; Dolmans & Manavella, 2019; Platts et al., 2021).

Cryopreservation of embryos consists of ovarian stimulation, followed by oocyte retrieval and subsequent fertilisation with a partner or donor semen. This process has a duration of approximately two weeks and will result in embryos being cryopreserved (Wyndham et al., 2012). Although this technique is a reliable method, with established

success rates, being used for medical reasons, it may not be a viable option for women in need of immediate cancer treatment, for those without a partner or when there are ethical issues related to embryo disposition (Del Pozo Lérida et al., 2019). Moreover, in Portugal, the legal framework defines this fertility preservation option is not allowed (Anderson et al., 2020).

Ovarian tissue cryopreservation is performed using laparoscopy, resulting in the cryopreservation of the ovarian tissue. This procedure lasts a few days and is considered an experimental technique; no semen is required or ovarian stimulation is used; however, there is a risk of minimal residual disease (Harada & Osuga, 2019).

Women increasingly seek fertility preservation techniques to reduce the effects of age on fertility due to a longing to postpone pregnancy, the lack of a partner, financial reasons, self-accomplishment, and career development (Dolmans & Manavella, 2019). In these cases, it was suggested by Stoop et al. (2014) to use the term 'AGE banking' or 'anticipation of gamete exhaustion banking'.

A recent systematic review pointed out that age-related fertility decline knowledge is insufficient, especially in determining when female fertility significantly decreases (Garcia et al., 2018). According to Hickman et al. (2018), women showed a lack of knowledge regarding reproductive ageing, however, they were familiar with primary fertility preservation methods, and those who were>30 years were significantly more likely to consider pursuing fertility preservation in the future. In another study by Hammer et al. (2018), the results revealed a substantial difference between single and committed women, with single women showing less knowledge about the effects of ageing on fertility and less knowledge regarding fertility preservation techniques.

In Portugal, previous studies have found that the general population's knowledge regarding fertility issues was low, despite the participants' desire to become parents (Almeida-Santos et al., 2017). A similar pattern was found by Conceição et al. (2017), with these authors reporting a remarkable lack of awareness concerning age-related infertility, an overestimation of the pregnancy chances during ovulation in women under 26 years of age, an overestimation of age-related fertility decrease, and of chances of becoming pregnant both spontaneously and through fertility treatment, and an average knowledge of infertility risk factors.

Furthermore, a systematic review revealed that although there is a high heterogeneity concerning the assessment of fertility awareness, people of reproductive age present low to moderate fertility awareness (Pedro et al., 2018). This study revealed that people knew that despite an age-related fertility decline, they considered this occurring later than the actual age, and they overestimated the chances of spontaneous or assisted conception (Pedro et al., 2018).

In this context, the current study aimed to describe general fertility and factors affecting fertility knowledge, fertility preservation knowledge, attitudes towards fertility preservation and the desire to get more information on this topic in a sample of reproductive-age Portuguese women. Fertility preservation knowledge must be addressed with the female population to enhance health literacy on this topic and allow for more informed decision-making. Therefore, this is a timely and innovative study due to the scarcity of studies conducted in Portugal addressing fertility knowledge and fertility preservation knowledge in reproductive-age women.

Materials and methods

Participants

The current sample comprised 257 Portuguese women of reproductive age, between 18 and 45 years old, with a mean age of 25.98 ($SD = 6.06$). Twenty (9.2%) women were older than 35 years old. The more frequent age groups were 25 (10.5%), followed by 21 (10.1%) and 22 (10.1%). Regarding years of education ranged between 9 and 19, with a mean of 14.13 ($SD = 1.97$). Concerning marital status, 77.4% ($n = 199$) were single, 21% ($n = 54$) were married or living with a partner, and 1.6% ($n = 4$) were divorced or separated. The majority of participants were nulliparous ($n = 225$; 87.5%), and 190 (73.9%) would like to get pregnant and have children or more children in the future, whereas 35 (13.6%) would like to remain childless in the future. Of the 32 women (12.5%) who had children, 15 (5.8%) would like to have more children in the future, and 17 (6.6%) did not express the desire for more children.

Procedures

The Ethics Committee of (blind for review) approved the study (reference CE-P03-22). Inclusion criteria were sex (self-describing as a woman) and age (18–45 years old). Participants' recruitment was set through online advertisement, using social media platforms and private messages, and participants were solicited to share the study link with two more women (Exponential Non-Discriminative Snowball Sampling method). The online advertisement comprised detailed information about the study's aims and procedures, inclusion criteria, and the voluntary and anonymous nature of the participation. The advertisement also included an Internet link, redirecting potential participants to an online research protocol on the Google Forms platform. Informed consent was obtained from all individual participants. Data collection took place between March and May 2022.

Instruments

A sociodemographic questionnaire encompassing the variables age, years of education, marital status, parenthood status, and desire for children or more children was used to describe the sample. A questionnaire was specifically developed to address the aims of the current study. The questions included in the survey were partially compiled and adapted from the studies of Santo et al. (2017), Hammer et al. (2018) and Hickman et al. (2018). The questions were selected according to the study aims and were translated by an English native speaker, fluent in Portuguese and working as an English teacher in a language school. In the second step, the research team executed a back-translation to English and inspected each item's content correspondence (Erkut, 2010). Minimal modifications were completed for the items to match the original version. Five master's students (women of reproductive age) were invited to comment on the items' intelligibility and comprehensibility and did not report difficulties or inconsistencies.

The questionnaire encompasses a total of 20 questions in different answer formats: yes/no, multiple-choice, and questions rated on a five-point scale, ranging from *strongly agree* (1) to *strongly disagree* (5). These questions aimed to address: a)

attitudes towards motherhood (e.g. factors contributing to the delay of motherhood; the extent to which motherhood is considered important); b) general knowledge regarding fertility (e.g. In what age range do you think women are most fertile?); c) factors affecting fertility (e.g. Do you think that lifestyle factors, such as smoking habits and obesity, can influence fertility?); d) knowledge concerning fertility preservation (e.g. Are you aware of any of the following fertility preservation options?); e) attitudes towards fertility preservation (e.g. Would you consider any of the following fertility preservation techniques?); and f) whether they would like to get more information on this topic (e.g. Would you like to receive more information about fertility preservation options?).

Statistics analysis

Statistical analyses were conducted using the software IBM SPSS Statistics v.28. Mean and standard deviations were computed to describe participants' age and years of education. Frequencies and percentages were calculated to describe the marital status and desire to have children or more children in the future. Variables related to attitudes towards motherhood, fertility knowledge, fertility preservation knowledge, attitudes facing fertility preservation and information about fertility preservation were analysed in terms of frequencies and percentages. Independent samples t-tests were computed to compare the age and years of education of participants considering the use of fertility preservation and those not considering it, as well as participants who would like to have more information regarding fertility preservation and those not interested in accessing more information. To compare women who reported wanting to have children in the future and those who do not want to have children or more children, and women in a relationship and those not mentioning a partner, concerning their intention of using fertility preservation techniques and desire to have more fertility preservation information, chi-squared tests were calculated.

Results

Attitudes towards motherhood

Participants were presented with several possible factors frequently found in the literature to assess the main factors contributing to the delay of motherhood or the delay of having more children. Career building/development and financial stability were the ones more endorsed by the participants, with 90 (35%) and 68 (26.5%), respectively. The remaining options were not having a partner ($n = 21$; 8.2%), only recently considering the possibility of becoming a mother ($n = 9$; 3.5%), currently trying to get pregnant for less than a year ($n = 8$; 3.1%), medical or health reasons ($n = 5$; 1.9%), trying to get pregnant for more than a year and currently considering to seek or already pursuing medical treatment ($n = 4$; 1.6%). Results regarding the extent to which motherhood is considered important for participants and the extent to which they worry about the possibility of facing infertility problems are displayed in Table 1.

Table 1. Attitudes facing motherhood. Frequencies and percentages regarding the degree of importance of motherhood and the degree of worry about facing difficulties in getting pregnant.

How important is it for you to become a mother?		
	n	%
Extremely important	67	26.1
Very important	66	25.7
Important	52	20.2
Not very important	20	7.8
Not important at all	0	0
How worried are you about the possibility of facing difficulties in getting pregnant and becoming a mother?		
	n	%
Extremely worried	44	17.1
Very worried	63	24.5
Worried	60	23.3
Not very worried	33	12.8
Not worried at all	5	1.9

Fertility knowledge

Results concerning the fertility knowledge of the participants are presented in Table 2. When considering fertility knowledge regarding the age range women are more fertile, 132 (51.4%) participants provided an incorrect answer, and 125 (48.6%) answered correctly. As for the question on the age group women's fertility significantly decreases, a similar pattern was found, with 168 (65.4%) answering incorrect age groups and 89 (34.6%) answering the correct age group of 35–39 years old. Regarding the knowledge about fertility decrease after age 35 and the risk of miscarriage after age 42, lifestyle factors, sexual health factors, and individual factors, such as age, the majority of the participants provided correct answers.

Fertility preservation knowledge

To understand the knowledge regarding fertility preservation in Portuguese women, participants were presented with questions addressing fertility preservation techniques (e.g. oocytes, embryos, and ovarian tissue cryopreservation). Eighty-eight (34.2%) participants were aware of the oocytes and embryos cryopreservation techniques, 60 (23.3%) only knew the oocytes cryopreservation technique, 58 (22.6%) participants were aware of oocytes, embryos, and ovarian tissue cryopreservation, 37 (14.4%) did not know any of the previously mentioned techniques, three (1.2%) participants were aware of oocytes and ovarian tissue cryopreservation and one (0.4%) participant was only aware of the ovarian tissue cryopreservation.

Attitudes towards fertility preservation

The participants were asked whether they would consider any of the fertility preservation techniques (oocytes, embryos or ovarian tissue cryopreservation), 177 (68.9%) answered that they were not actively considering any of the techniques, 36 (14.0%) would consider oocyte cryopreservation, 34 (13.2%) would be willing to pursue any of the techniques mentioned, but they would need more information, nine (3.5%) would consider embryos cryopreservation and one (0.4%) participant would consider ovarian tissue cryopreservation.

Table 2. Fertility knowledge.

In what age range do you think women are most fertile?		
	n	%
Under 20 years	15	5.8
20–24 years	125	48.6
25–29 years	104	40.5
30–34 years	10	3.9
35–39 years	2	0.8
40–44 years	0	0
45–49 years	1	0.4
50 years or more	0	0
In what age group do you think the fertility of women decreases significantly?		
	n	%
Under 20 years	1	0.4
20–24 years	2	0.8
25–29 years	0	0
30–34 years	19	7.4
35–39 years	89	34.6
40–44 years	78	30.4
45–49 years	42	16.3
50 years or more	26	10.1
Are you aware that a woman's fertility decreases after the age of 35 and that at the age of 42, the risk of miscarriage is approximately 50%?		
	n	%
Yes	169	65.8
No	88	34.2
Do you think that lifestyle factors, such as smoking habits and obesity, can influence fertility?		
	n	%
Yes	255	99.2
No	2	0.8
Do you think that sexual health factors, such as sexually transmitted diseases, can influence fertility?		
	n	%
Yes	231	89.9
No	26	10.1
Do you think that individual factors, such as advanced age, could influence fertility?		
	n	%
Yes	256	99.6
No	1	0.4

Note. Correct answers are presented in bold.

Of the participants stating they would consider performing fertility preservation, 45 (56.3%) would do it to prevent the effect of age on oocyte quantity and quality, 21 (26.3%) would do it due to the absence of a partner, and six (7.5%) would consider doing it due to current or possible cytotoxic treatment. Regarding the concerns about fertility preservation, the participants were worried about the costs ($n = 26$; 32.5%), age ($n = 25$; 31.3%), hormonal injections and other fertility drugs ($n = 10$; 12.5%) and the desire for spontaneous pregnancy ($n = 8$; 10%).

The participants that did not consider preserving their fertility mentioned that the main reasons were that they never thought about it ($n = 56$; 31.6%), did not have the intention of getting pregnant ($n = 34$; 19.2%), age ($n = 32$; 18.5%), the desire for spontaneous pregnancy ($n = 28$; 15.8%) and the costs ($n = 16$; 9%).

No significant differences were found between women considering fertility preservation and those not considering it regarding age ($t_{(255)} = .64$, $p = .524$) and years of education ($t_{(255)} = -.78$, $p = .437$). When comparing women who want to have

Table 3. Degree of agreement regarding the provision of fertility preservation information.

Fertility-related aspects (e.g. decline with age, the influence of lifestyle factors such as smoking, being overweight or obese) should be discussed during medical consultations and addressed at school to prevent infertility situations.		
	n	%
Totally agree	173	67.3
Agree	72	28.0
I neither agree nor disagree	9	3.5
Disagree	2	0.8
Totally disagree	1	0.4
Reliable sources of information should be available so that young women can make choices regarding their fertility, possibly including cryopreservation of their oocytes, before they are older.		
	n	%
Totally agree	179	69.6
Agree	69	26.8
I neither agree nor disagree	6	2.3
Disagree	2	0.8
Totally disagree	1	0.4

children in the future and those not having this motherhood desire, no significant differences were found in their intention of using fertility preservation techniques ($X^2_{(1)} = 1.74$; $p = .187$). A similar result was found concerning relationship status ($X^2_{(1)} = 1.71$; $p = .426$).

Information about fertility preservation

The results concerning the degree of agreement regarding the provision of fertility preservation information by health professionals or at school and the availability of reliable information sources are presented in Table 3.

The majority of the participants totally agree or agree that fertility-related aspects should be discussed during medical consultations and addressed at school, aiming to prevent infertility situations. A similar pattern was found regarding the availability of reliable information sources for young women to make informed decisions.

Participants indicated that the sources they would use to get more information about fertility preservation were physicians or other health care professionals ($n = 205$; 79.8%), the Internet ($n = 42$; 16.3%), and eight (3.1%) participants were not interested in getting information. Of the 257 participants, 159 (61.9%) would like to receive more information about fertility options, and 98 (38.1%) would not. Participants interested in having more information were significantly younger ($t_{(255)} = -2.80$, $p = .005$; $M = 25.16$, $SD = 5.19$) than those not interested in receiving further fertility preservation information ($M = 27.32$, $SD = 7.08$), but no significant differences were found between these two groups concerning years of education ($p = .602$). Participants wanting to have children in the future were the ones stating they would like to receive more information about fertility preservation options compared to those not wanting children ($X^2_{(1)} = 11.27$; $p < .001$). Participants without a partner were also the ones reporting the desire to have more fertility preservation information ($X^2_{(1)} = 7.03$; $p = .008$).

To the question of whether they would like their doctor/gynaecologist/obstetrician to discuss the different fertility preservation options, 211 (82.1%) responded affirmatively, and 46 (17.9%) responded negatively.

Discussion

This study sought to explore the general fertility knowledge and factors affecting fertility, fertility preservation knowledge, attitudes towards fertility preservation and the desire to get more information about fertility preservation options in a sample of reproductive-age Portuguese women.

The current sample characteristics, with the majority of the women being in their mid-twenties, nulliparous and highly educated, pointed to a possible pattern of childbearing delay. For those who intend to have children in the future, career-building/development, financial stability, and not having a partner were the main reasons for postponing motherhood, which is in line with other studies' results mentioning the same factors (Adachi et al., 2020; Azhar et al., 2015; L. J. Martin, 2021). It is also worth noting that motherhood was regarded as an important role and facing fertility problems was identified as a concern. Another study also found similar results (Hickman et al., 2018).

Regarding fertility knowledge, although most participants knew that age is a factor that may influence fertility, specific knowledge about the more fertile age and the age group where there is a significant decrease in fertility is still lacking. More specifically, participants incorrectly estimated that the more fertile period in women's life and the age range where there is a significant fertility decline were higher than the correct ones. These results align with other international studies (Adachi et al., 2020; Hammer et al., 2018; Hickman et al., 2018; Keurst et al., 2016; Peterson et al., 2012) and Portuguese studies (Almeida-Santos et al., 2017; Conceição et al., 2017) demonstrating low fertility literacy in the population and the overestimation of the age for fertility decline. Moreover, it is relevant to highlight that lifestyle factors (e.g. smoking, obesity) and sexual health factors (e.g. sexually transmitted infections) were identified by the respondents as having an impact on fertility. This may be explained by the assumption that the participants had previously been conscious that such factors are risk factors for health in general (Pedro et al., 2018).

Overall, the current study highlights the relevance of developing interventions aiming to enhance fertility-related knowledge among reproductive-age women. However, as Boivin et al. (2018) recommended, these interventions benefit from being tailored and delivered to particular age groups to promote their optimal use and decrease the probability of eliciting avoidable feelings of anxiety and stress.

A high percentage of participants had already heard about fertility preservation techniques, with only a small percentage stating that they did not know about them. When questioned about whether they would consider performing some of these techniques, the majority answered negatively, and the most frequent reasons mentioned were having never thought about these techniques before, not wanting to get pregnant and ageing. No significant differences were found between women considering fertility preservation and those not considering this option regarding age, years of education, marital status or wanting to have children or more children in the future. One may hypothesise that these participants, despite knowing the referred techniques, may not have enough information to pursue an informed decision. Therefore, it may be pertinent to disseminate more detailed information at an early age, given that these techniques should be performed at fertility ages to enhance their effectiveness (Sousa Leite et al., 2019). In fact, several studies showed an insufficient knowledge of the population regarding cryopreservation techniques, their implications, and benefits, as well as studies with

a high percentage of participants who do not consider using fertility preservation due to lack of knowledge and information regarding fertility (Hammer et al., 2018; Hickman et al., 2018; Keurst et al., 2016; Peterson et al., 2012).

The participants who claimed they would use fertility preservation techniques mentioned age and the fact that they had no partner as the main reasons, while concerns were related to costs, age, and medical procedures. The costs are one of the main concerns, as fertility preservation involves high financial costs, making it less accessible to the population (Santo et al., 2017).

Contrary to the study conducted by Hickman et al. (2018), with interest in obtaining more knowledge regarding fertility preservation being noticeable, in the present study, a considerable percentage of participants mentioned having no interest in obtaining information about the available fertility preservation options. This group was older, with a partner, and did not wish to have children or more children in the future. It is possible that despite participants agreeing that information should be provided in medical consultations and schools and that reliable sources of information should be available to the public, participants did not see themselves as potential users of these techniques, given their age and the fact that they wanted to remain childless or already had children and did not want to have more children. The current study results are partially aligned with the ones reported by Hickman et al. (2018) regarding the wish to have children or more children in the future being related to the desire to have information about fertility preservation options. Nevertheless, in our study, younger women were more interested in having more fertility preservation information, whereas in Hickman et al. (2018)'s study, the opposite pattern was found (women older than 30 years old were the ones wanting more fertility preservation education). One may hypothesise different motivations for wanting information. Younger women may be interested in having more information due to the possibility of using fertility preservation techniques in the future and preventing age-related fertility issues.

It is worth mentioning that fertility preservation techniques are considerably recent and constantly evolving, being an important and necessary measure to be discussed and debated (Sousa Leite et al., 2019). Several individual risk factors affect fertility, such as age, medical conditions and medical treatments, particularly those involving cytotoxic treatment (Martinez et al., 2017).

Some limitations should be considered when interpreting the current study results. The recruitment and data collection process (social media and online survey) have some limitations, such as sampling bias, self-selection concerns, or under-representation of the population (e.g. exclusion of participants not using social media or online platforms), and thus limits the chance of making generalisations (Wright, 2005). Data were collected by a self-report instrument, and other assessment procedures may capture more comprehensive information, for example, structured interviews or focus groups.

Overall, one may conclude that although women seem to be aware that age is a factor influencing fertility, they are not well informed about the age ranges when women are more fertile and when fertility significantly declines. Therefore, providing more accurate information on this topic is relevant, given that fertility preservation techniques can be used to prevent fertility issues in the future. These techniques increase the possibility of conceiving a biological child later, whether for social or medical reasons, but it should be noted that they do not totally ensure success (Cobo et al., 2021; Varlas et al., 2021).

Another important aspect is to make available more information regarding fertility preservation to ensure that more women have the opportunity to consider this option and make informed decisions regarding their reproductive life. This is clearly highlighted in the European Society for Human Reproduction and Embryology (Anderson et al., 2020) Guideline for female fertility preservation providing recommendations on information provision and support targeting four populations (women diagnosed with cancer undertaking gonadotoxic treatments; women with benign diseases undergoing gonadotoxic treatments or with conditions associated with premature loss of fertility; transgender men (assigned female at birth); and women contemplating oocyte cryopreservation for age-related fertility decline.

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Data availability statement

The data that support the findings of this study are openly available in (blind for review) at http://doi.org/ (blind for review) https://data.mendeley.com/datasets/hc8jzfh899/1.

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