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**YOUNG WOMEN'S FERTILITY KNOWLEDGE: PARTIAL KNOWLEDGE AND IMPLICATIONS FOR
CONTRACEPTIVE RISK-TAKING**

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Key Points

- Misunderstandings about fertility can result in pregnancy risk-taking. A more nuanced understanding of fertility and the menstrual cycle would help young women with pregnancy prevention.
- The efficacy of emergency hormonal contraception may be over-estimated.
- Increased provision of IUD as a method of EC should be available when the risk of unintended pregnancy is highest.

Abstract

Background: There is a lack of research on young women's fertility knowledge and awareness. This has implications for contraceptive risk-taking, including the use of Emergency Hormonal Contraception (EHC). By drawing on two research studies, this paper shows how greater fertility knowledge could benefit young women in terms of pregnancy prevention.

Methods: We draw on two qualitative research studies ('fertility study' and 'abortion study') resulting in a composite sample of 46 interviews with women aged 16-24. Focused secondary analysis was undertaken looking specifically at fertility knowledge in relation to contraceptive behaviour.

Findings: A lack of accurate knowledge about the menstrual cycle was evident in two ways: young women drew conclusions about their invulnerability to pregnancy if previous unprotected sex had not resulted in pregnancy; additionally, although participants were aware of EHC, there was no awareness of when it might fail other than after a certain time limit.

Conclusion: Young women would benefit from a more nuanced understanding of fertility. Episodes of unprotected sex that do not result in pregnancy can encourage a belief that 'it won't happen to me', and this has implications for taking chances with contraception. Partial knowledge about the effectiveness of EHC may also lead to unintended pregnancy. Calculating the number of hours following unprotected intercourse generates over-reliance on what is only one of the factors determining the effectiveness of EHC. Information regarding the link between EHC and failure rates near the day of ovulation needs to be more widely publicised.

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1 Introduction

Fertility knowledge has been identified as an important area for study and policy intervention[1,2]. Despite this, there is a lack of research focusing specifically on women's knowledge and awareness of fertility[3,4], particularly in relation to contraceptive behaviour. Calls for increased fertility knowledge among women have so far largely focused on planning for future pregnancies, driven by concerns about delayed motherhood, age-related fertility decline, and unintended childlessness[4]. Research considering fertility in relation to desired conception has established that there is an insufficient knowledge of fertility among women trying to conceive[5,6].

Fertility knowledge is equally important for pregnancy prevention. There is a paucity of research on young women's knowledge and awareness of fertility, particularly regarding women who do not wish to conceive. Research has shown how young people may be inclined to overestimate the possibility of becoming pregnant[7,8]. When contraception non-use does not result in a pregnancy they may come to believe that they are infertile, leading to further non-use of contraception[9]. Misunderstandings about fertility can result in pregnancy risk-taking behaviour, for example, to 'wait and see' if pregnancy occurs after unprotected sex rather than access Emergency Contraception (EC) [8-14].

This paper provides new insights into how young women understand fertility in relation to contraceptive risk-taking, with particular focus on accessing emergency contraception.

2 Methodology

We draw on two qualitative research projects, resulting in a composite sample of 46 interviews with young women aged 16-24. For the first project ('fertility study') 10 semi-structured interviews were conducted in 2011 with women attending a Contraception and Sexual Health clinic in London.

Interviews explored young women's perceptions about their own fertility and contraceptive use, and their general perceptions about pregnancy risk.

The second project ('abortion study') was a national qualitative longitudinal investigation using in-depth interviews with 36 young women who had had one or more abortions. Interviews were conducted 2-6 weeks post-abortion and again 5-8 months later during 2013-14. This paper largely focuses on data collected during the first interview when participants reflected on becoming pregnant unintentionally. Each project was approved by an NHS research ethics committee. Informed consent was undertaken by the researchers. Study participants have been given pseudonyms.

2.1 Patient and Public Involvement

Patients were not explicitly involved in the design of the research questions or set up of the studies. However, the fertility study helped inform the development of the abortion study research tools. If they consented, the draft findings of both studies were shared with participants by email and they were invited to comment on the reports, if they wished to do so.

2.2 Analysis

For both projects, initial data analysis was undertaken by the lead researcher, who used NVivo software to manage a form of thematic analysis[15]. For this paper, we combined the data sets and undertook a secondary analysis. We selected relevant codes focusing on fertility knowledge in relation to contraceptive behaviour before drawing out subthemes across the datasets. We examined these sub-themes alongside the primary project analysis to retain overall context. Secondary analysis is

useful for topics where research evidence is minimal or topics sensitive. It allows evidence to be maximised from existing data to address a knowledge gap in the absence of new research. The age of the original data is a limitation of our research. However, there is value in revisiting the data. Both studies were on sensitive topics and faced access and recruitment challenges. Secondary analysis enabled us to make best use of existing data to elucidate fertility understanding, and suggest areas for future action to help support young women's reproductive autonomy.

3 Results

3.1 [Mis]understanding: the menstrual cycle and pregnancy risk-taking

Despite being theoretically possible, probabilities of conception remain very low at certain times of the menstrual cycle[16]. However, misunderstandings about being 'constantly at risk' of pregnancy featured in participants' accounts of sexual behaviour and of becoming unintentionally pregnant.

Participants in both studies drew conclusions about their own invulnerability to pregnancy if they had previously engaged in unprotected sex and had not become pregnant. For some this belief then resulted in unintended pregnancy: *I thought that maybe I couldn't get pregnant, and I was planning to go to the doctor's... and then by the off-chance I got pregnant.* (MaryAnn,21 – abortion study).

In the fertility study, almost all participants spoke about occasions when they thought they had taken a risk with their contraception, though they often had difficulty understanding the nature or extent of the risk. This affected their approach to contraception: *I had sex with my boyfriend and I was going to get the pill (EHC) but I just came on my period but then I was like, do I still need to take the pill* (Aaila,20).

Although some participants in the fertility study identified a point in the menstrual cycle when they thought it might be easier to become pregnant, few had any comprehensive understanding of this. Tina and Gwen thought that it was possible to become pregnant at any time in the cycle: *I think she can get pregnant at any point* (Tina,20); *you get pregnant even when you're on your period* (Gwen,18).

Participants did not discuss the need to be more careful during their fertile window, and poor knowledge concerning fertility affected their understandings about pregnancy risk. Many expressed an anxiety or fear of becoming unintentionally pregnant at a point in their lives when they did not feel prepared for motherhood. This anxiety, however, did not necessarily translate into systematic attempts to control their fertility.

Perceptions about being at 'low risk' of pregnancy at certain times in the menstrual cycle did not feature in participant's accounts. For Fran (fertility study) an anxiety about infertility emerged following unprotected sex that had not resulted in a pregnancy. Rather than wondering whether she had been at 'low risk', Fran worried about whether her previous use of the contraceptive injection had affected her fertility: *I done like two pregnancy tests and they came back negative, I don't know if it was because I was on that injection* (Fran,20).

Such an outlook was evident in the abortion study. Although the majority of participants spoke of using contraception at the time they became pregnant, many described using it inconsistently or incorrectly. Others did not know why it had failed to prevent pregnancy. Fertility misperceptions contributed to the variety of scenarios women described around unintended pregnancy. Tara (20) suffered a health condition that affected her menstrual cycle. She had become unintentionally pregnant twice. The first time she had not been using contraception: *When I was 17, my periods stopped...I didn't even think that I'd be able to get pregnant*. At the time of her second unintended pregnancy she was using the pill, but erratically, which she had not thought would expose her to

pregnancy risk. Tara had absorbed messages about infertility and said: *I thought it was really hard to get pregnant.*

As this quote indicates, individual circumstances and experiences can combine to make it extremely difficult for women to judge their pregnancy likelihood. Tara's experience was not unique.

Stacie(19,fertility study) understood that it was difficult for her to get pregnant because she suffered from Polycystic Ovary Syndrome. When she did have an unintended pregnancy, she struggled with her decision to have an abortion: *I didn't think I could get pregnant because... I've got polycystic ovaries ... so it was a kind of a miracle but at the same time I had to get rid of it because I was so young.*

Such misunderstandings have implications for the use of emergency contraception.

3.2 Emergency contraception

Participants' knowledge about the effectiveness of emergency contraception centred around the number of hours it is taken post-intercourse: *you have up to three days of taking it and obviously the further you leave it, the less effective it is* (Stacie,19 fertility study).

Oral emergency contraception was generally over-estimated as a reliable and failsafe post-coital contraception. Natasha (24,abortion study) described how she was close to the 72 hour 'cut-off' point for the effectiveness of levonorgestrel EHC. She was not advised by the pharmacist that she could have an emergency intrauterine device (IUD) fitted elsewhere as a more reliable form of emergency contraception. Instead she was advised to buy a pregnancy test: *They asked me the date, and they just said "So you do realise that the longer you've left it, the less effective it is." So I said "Yeah." And they said "Take a pregnancy test in two or three weeks to be on the safe side." And that was all, really, there was no advice, no leaflet.*

Natasha later blamed herself for her situation, having not taken EHC sooner: *'when I took the emergency contraception it was late so I'd only got myself to blame.* However, she had underestimated her risk of pregnancy, based on the hope that her oral contraceptive pill might still be in her body. Natasha found out later that she could have had an emergency IUD fitted, which would probably have prevented her pregnancy. She felt aggrieved that not all her options for emergency contraception had been explained to her.

Scarlett (18, fertility study) was pregnant at the time of the interview. She had sought EHC after her contraceptive failed, but it had not worked for her, and she became pregnant: *The first time I had sex with my new boyfriend, the condom split....we came here [to the Clinic]... to take the morning after pill and then two weeks later I didn't come on my period.*

These participants expressed no awareness of an IUD as emergency contraception. After missing the window for taking EHC, participants in both studies recalled instances where they had no other option but to 'wait and see' whether they were pregnant.

One final worry concerned the belief that EHC could affect long-term fertility. A number of participants mentioned restrictions they thought existed for the number of times EHC could be used. These ranged from lifetime use, to multiple uses in one week: *I'm hesitant to use it, I feel it might reduce my chances of being able to have a baby in the long run. (Alex, 19, abortion study)*

Misunderstandings and anxieties about fertility thus mitigated against effective use of emergency contraception in a number of different ways that left these young women vulnerable to an unintended pregnancy.

4. Discussion

These findings reveal complex combinations of beliefs that affected women's capacity to avoid becoming unintentionally pregnant. For some women, partial fertility knowledge and their own

experiences of not becoming pregnant after unprotected sexual intercourse created a belief of infertility. We argue that this could be a consequence of pregnancy prevention messages being oversimplified, and young women drawing their own conclusions about what is happening to them based on their own experiences. Our research contributes towards a growing body of qualitative research[8,11,12] that shows how young women who engage in unprotected sex and do not become pregnant can draw the wrong conclusions about their fertility and ability to become pregnant. In some cases this led to participant's anxieties about their ability to have children. A better understanding about fluctuations in fertility across the menstrual cycle could empower young women to improve their reproductive control. Since our research was conducted (2011-2014) there has been increased popularity in period-tracking apps, many of which indicate ovulation and probable fertile days. Although apps may increase awareness about the point of ovulation in the cycle, we do not know to what extent they may mitigate this experiential based belief. Going forward, we suggest there is a need for additional research on women's fertility understanding, taking into consideration worn-technologies and period-tracking apps. These technologies are changing the landscape of fertility awareness and contraceptive practices, and with it how users understand their cycles.

Despite this, our findings have implications for all women accessing EHC as a reactive method of contraception. Across the cycle, pregnancy risk increases from negligible in the first few days to 30% around the time of ovulation. One study concluded that amongst healthy women trying to conceive, nearly all pregnancies could be attributed to intercourse during a six-day period ending in the day of ovulation[17]. When women are at the peak point of fertility in their cycle, EHC is more likely to fail, and they will not be aware of this.

A study reviewing meta-analyses[18] of women who had used EHC showed that women who have unprotected sex on the day prior to ovulation have a more than four-fold increased risk of failure of EHC compared with women having intercourse outside the fertile window. There are two oral

emergency contraceptive pills available, levonorgestrel and ulipristal acetate. The main mechanism of action is inhibition and delay of ovulation[19]. The closer to ovulation that the medication is given, the less likelihood there is that this process will be compromised. Ulipristal is more effective in the immediate pre-ovulatory period. [20]. Both oral methods are likely to be ineffective following ovulation, and it is likely that the timing of unprotected sex in relation to ovulation is more important than the number of hours which pass prior to taking emergency contraception[16]. After ovulation, a copper-bearing IUD is the only effective method of emergency contraception, but this is not always practical (or desired). If young women were better equipped to understand their fertility, the uptake of emergency IUDs could potentially be improved, especially where there is increased risk of EHC failure. Moreover, women who take emergency contraception, but then go on to have further unprotected intercourse in the same cycle, are at much higher risk of pregnancy since ovulation has been delayed[19] – the initiation of an IUD as an emergency contraceptive, but also as a long acting reversible contraceptive (LARC), would negate this risk[18].

5. Conclusion

Teaching young people that women are always at risk of becoming pregnant if they do not use contraception can lead to misunderstandings about fertility. Of course, the relationship between sexual activity – in popular imagination associated with desire and spontaneity – and a rational calculation of pregnancy-risk is fraught with difficulties. However, for most women a more nuanced understanding of when they might be more likely to become pregnant could help with contraceptive planning and emergency contraception. Improved education around fertility could provide young women with a more subtle understanding and with it the ability to recognise that if women have unprotected sex and do not become pregnant, this might just have resulted from having had unprotected intercourse on a low-risk day of their cycle.

Partial knowledge about the efficacy of EHC and over-reliance on calculating hours post unprotected intercourse may lead to unintended pregnancy, since timing is only one factor determining EHC efficacy. Cycle day in relation to ovulation is also highly important, and information regarding the link between EHC and failure rates near the day of ovulation needs to be more widely publicised. The data in these studies suggests that young women have digested the message about the decline in efficacy of EHC depending on the number of hours post-sex. Young women could therefore additionally be told about efficacy in relation to their cycle, and the value of an emergency IUD to ensure prevention of pregnancy[19].

We suggest that it would be empowering for young women to be taught a more comprehensive understanding of their fertility and pregnancy risk. In addition, a greater understanding of fertility in relation to emergency contraception would allow for better prescribing regarding the most effective methods of emergency contraception, since EHC taken near to ovulation is less effective[21,22]. The IUD as a method of emergency contraception should be made more readily available when the risk of unintended pregnancy is highest. To address these issues a public information campaign should be considered.

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