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Women's knowledge of procreative health[1,2]

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Abstract: *Backround:* A unique type of health is procreation health, which represents the entirety of a person's physical, mental and social well-being, not just the absence of disease or disorder. Reproductive health refers to all issues related to the reproductive system and procreation of women and men in all phases of their lives. Consequently, it includes topics such as puberty and menopause, fertility and infertility, family planning, health during pregnancy, childbirth, and the post-partum period, as well as cancers of the reproductive organs and breasts. This paper presents results of on women's knowledge of reproductive health in several key areas: sources of information, understanding the concept of ovulation, awareness of factors that positively influence health, knowledge of the most and least fertile ages for women, and preventive measures related to the reproductive system. *The aim* of the study was to assess the knowledge of adult women aged 18 to 49 regarding reproductive health. *Method:* The study was based on a questionnaire survey analysed with the IBM SPSS Statistics 27 program. Results: The majority of surveyed women had knowledge about ovulation, with most obtaining their information from the Internet (22.3%). Nearly all female respondents (93.7%) knew what ovulation is. Most women do not use cycle self-observation (75.2%). The age of sexual initiation for most of the respondents was at 18. More than two sexual partners were reported by nearly 40% of women. *Conclusions:* The group of women studied was homogenous in terms of the selected qualification criteria, i.e.; all of them were of reproductive age. Fertility knowledge did not correspond with adolescent age of sexual initiation and declared number of partners, which is a risk factor for future reproductive health disorders.
Keywords: fertility, prevention, procreation health.

Introduction

As stipulated in a widespread definition by the World Health Organization (WHO), health is one of the most valuable assets a person can possess: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." This definition of health emphasises complexity and multidimensionality in which every element is equally important (Maszczak, 2005).

A unique type of health is procreation health. The Polish Journal of Laws (Dziennik Ustaw) of 16 September 2016 defines it as follows: "Procreation health constitutes an important element of the definition of health as complete physical, mental and social well-being and not merely the absence of disease or infirmity relating to the reproductive system and procreation in all phases of life. It covers puberty and menopause, fertility and infertility, family planning,

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health during pregnancy, childbirth and the postpartum period, genital and breast cancer" (Regulation of the Council of Ministers, 2016).

The term "procreation health" is, on the one hand, aimed at the promotion of fertility care and preventive measures, i.e. the prevention of fertility pathologies/disorders such as premature sexual initiation during adolescence and its consequences (such as sexually transmitted diseases), as well as preliminary diagnosis of endocrine disorders. During the period of family planning, it helps prepare future parents for conceiving a child ("dual parenthood"); during pregnancy it aids in preventing pathologies and after delivery it promotes natural feeding, etc. (Ślizień-Kuczapska, Sys, Baranowska, Czajkowski, 2017). At the same time, this concept refers to promoting health awareness, education and the use of a fertility awareness method (FAM) as a tool to understand body language. The FAMs include the following: symptothermal double-check method, Josef Rötzer's method, John and Sheila Kippley's method, the method developed in Poland by Teresa Kramarek, and single-indicator methods: strict thermal method, extended thermal method, and Billings' ovulation method (Kinle, Małecka-Holerek, 2009). These fertility awareness methods comprise a tool used for Natural Family Planning (NFP), defined by the World Health Organization as "methods of planning or preventing pregnancy based on observation of naturally occurring signs and symptoms of the fertile and infertile phases of the menstrual cycle" (World Health Organization, 1988). A woman's potential fertility is determined, among other things, by the presence of regular ovulation (Vigil, Lyon, Flores, Rioseco, Serrano, 2017). It is advisable that the observation of the menstrual cycle begin as early as during puberty. Every menstrual cycle can be observed and investigated using the so-called main fertility biomarkers (Ślizień-Kuczapska, et al. 2020) – basal body temperature (BBT), cervical mucus and the position of the cervix (Piasecka, Łyszczarz, Pytka, Ślizień-Kuczapska, Kanadys, 2022).

In the majority of NFP scenarios, women observe basal body temperature (BBT), cervical mucus and/or the position of the cervix (Kinle, Szymaniak, 2009; Piasecka, et al. 2022). Other characteristics of the menstrual cycle include, for example, the length of menstruation or the presence of pre- or post-menstrual spotting, etc. Their appearance may confirm the correctness of the cycle or its potential disruptions such as vaginal bleeding and ovulation pain, in addition to length and regularity of cycles, monitoring of sex hormone levels (Duane, Stanford, Porucznik, Vigil, 2022), e.g. progesterone based on the length of the luteal phase, as well as assessing breast soreness, body swellings and libido (Kinle, Szymaniak, 2009).

By applying observation with the use of biomarkers or indicators of fertility, a woman can assess her menstrual cycle. Understandably, observing just one cycle will not be sufficient to offer a comprehensive picture. The characteristics of a typical menstrual cycle were determined, including the length of the cycle, the two-phase PTC curve, etc. Atypicality recurring in successive cycles requires consultation with a physician, and thus FAMs to serve as a reproductive health diagnosing and monitoring tool.

The characteristics of a typical menstrual cycle are associated, among other things, with confirming that ovulation correctly occurs only once during a cycle. In accordance with scientific reports, ovulation is a sign of health (Vigil, et al. 2017; Duane, et al. 2022). Double ovulation, i.e. the release of two or more ova from the ovary over the course of 24 hours, is also physiological in nature, as evidenced, for example, by dizygotic twins. In studies conducted on animals, e.g. rabbits, it was found that ovulation occurs as a result of sexual stimulation. However, this is not the case in humans (Hilgers, 2018).

As mentioned above, FAM-oriented training serves the purpose of health monitoring and education. It is important for women to be aware that female fertility is age-dependent and lasts from 15 to 49 years. Peak fertility occurs at the age of 20 and starts to decline in the third and fourth decades of life (with a significant decline after year 35), (Drabik, Kubiak-Sokół, Sobol, 2021; Ślizień-Kuczapska, Sys, Baranowska, Czajkowski, 2017; Ford, Roman, McLaughlin, Beckett, Sutherland, 2020). According to the World Health Organization (WHO), a female adolescent is defined as a person aged between 10 and 19 years

(World Health Organization, 1999) and early sexual initiation is sexual activity initiated before the age of 18 (Mazengia, Worku, 2009). Another important question is to educate adolescent girls on sexual behaviours that are considered risky due to their negative consequences (Fetene, Mekonnen, 2018). Furthermore, young women undertaking FAM-based menstrual cycle observations should be considered a health-promoting behaviour (Pachecka, 2009).

As part of procreation health preventive measures, it is proposed that after their first sexual experience, all women aged 25 or younger undergo gynaecological examinations with a cytological check-up at least once a year. This offers the chance to detect, at an early stage, cervical cancer which is an infection-induced disease caused by an oncogenic type of human papilloma virus, as a result of premature sexual initiation (Gośliński, 2019). Measures which play a key role in improving and maintaining one's health include regular preventive check-ups and self-observation (Stępkowska, Przygodzka, 2020; Ślizień-Kuczapska, Sys, Baranowska, Czajkowski, 2017).

Women's knowledge about fertility is important for health literacy in the field of reproductive health. Consequently, health professionals should promote knowledge among women about health, fertility and risk factors to aid in maintaining and improving reproductive health (Mu, Hanson, Hoelzle, Fehring, 2019).

The aim of this study is to analyse the knowledge about procreation health among adult women aged between 18 and 49 years.

1. Method

A diagnostic survey method was used in this study. For this purpose, a questionnaire was drawn up based on the authors' design. This tool provided an opportunity to collect information on the sociodemographic characteristics of the study group and their familiarity with reproductive health. The study was carried out at the Władysław Stanisław Reymont Clothing and Textile School Complex in Lublin (48 questionnaires), the Stefania Sempołowska Secondary School No. 4 in Lublin (21 questionnaires), and the "Farmed" Non-Public Health Care Institution in Lublin (36 questionnaires). 105 paper and 210 online questionnaires were collected, of which 40 had been completed incorrectly. The research was conducted between April and May 2023 and involved female respondents aged from 18 to 49. The study group comprised 315 people. All results, together with multiple-choice questions, were counted up to 100%. The analysis was performed with IBM SPSS Statistics 27 software. Three levels of statistical significance were adopted, as indicated by the symbols $^{*}\ p < 0.05$, $^{**}\ p < 0.01$ and $^{***}\ p < 0.001$.

2. Results

A total of 315 women took part in the study. The mean age in the study group was 29.92 years with a standard deviation of 9.56. The respondents were divided into four age groups: 18-19 years (17.5%), 20-29 years (40.6%), 30-39 years (23.8%) and 40-49 years (18.1%). In the study group, 37.5% members came from a rural area, 36.8% from a large city (more than 100,000 residents) and 25.7% from a small or medium-sized town (less than 100,000 residents). The largest proportion of respondents had a university degree (67.3%), followed by secondary (20.6%) and primary education (11.4%). The smallest group was comprised of those with vocational education (0.6%). Most of the respondents were single (51.7%) or married (44.1%). Divorcees were a less numerous group at 3.5%, while widows accounted for 0.6%.

The question regarding resources on reproductive health in which the surveyed women acquired information was multiple-choice. Consequently, it was found that the respondents were most likely to obtain information from the Internet (242, 22.3%), professionals such as doctors, nurses or midwives (217, 20.0%), books (195, 18%), and social media (119, 11%). The fewest respondents reported that they learned about the topic from magazines (7.5%), family (7.3%), school (7.2%) or friends (6.6%) (Table 1).

Table 1. Sources of knowledge on reproductive health used by the respondents

	n	%
Social media (Facebook, Instagram)	119	11,0
Internet (search engines)	242	22,3
Books	195	18,0
Magazines	81	7,5
Professionals (physician, nurse, midwife)	217	20,0
Family	79	7,3
Friends	72	6,6
School	78	7,2
Total	1083	100,0

n – number of answers; % – percentage

Table 2. Women's knowledge of the key symptoms of ovulation

	n	%
Change in cervical mucus and basal body temperature	298	94,6
Increase in libido	7	2,2
Breast pain	9	2,9
Swellings	1	0,3
Total	315	100,0

n – number of answers; % – percentage

Table 3. Number of ovulations per menstrual cycle according to the respondents

	n	%
Any number of times, e.g. because of stress, nervousness or sexual activity	4	1,3
Only once. In exceptional situations, two, three or more ova can be released within a very short time span (which might result in a twin pregnancy)	245	77,8
Usually only once. Sometimes, due to various factors, additional ovulation may occur at any time	53	16,8
It is difficult to say when ovulation occurs	13	4,1
Total	315	100,0

n – number of answers; % – percentage

Almost all (291, 92.4%) respondents declared that they were aware of the fertility symptoms. 14 (4.4%) of them were unable to state with certainty if they had any knowledge of those symptoms, while 10 (3.2%) declared unfamiliarity in this area.

When asked about ovulation, 295 (93.7%) women said that it can be described as the release or expulsion of a mature ovum from the ovary. Three (1.0%) respondents disagreed and 17 (5.4%) were unable to provide an answer to this question.

In the opinion of 298 (94.6%) respondents, the most important symptom of ovulation is a change in cervical mucus and in basal body temperature. For 9 (2.9%) women this would be breast soreness and for 7 (2.2%) an increase in libido. According to one (0.3%) respondent, the most important symptom of ovulation is swellings (Table 2). In analysing the respondents' knowledge of key ovulation symptoms, we used only terms that could be found in popular phone apps, e.g. "menstrual calendar".

According to 245 (77.8%) women, ovulation occurs only once in a menstrual cycle. In exceptional situations, two, three or more ova can be released within a very short time span (which might result in a twin pregnancy). According to 53 (16.8%) respondents, ovulation usually occurs only once. Sometimes, due to various factors, additional ovulation may occur at any time. Four (1.3%) respondents believed that ovulation may occur any number of times, e.g. because of stress, nervousness or sexual activity. 13 (4.1%) women were unable to say when ovulation takes place (Table 3).

A significant correlation was observed between the respondents' age and the knowledge of how often ovulation occurs during the menstrual cycle ($\chi 2 = 19.87$; $p = 0.019$). The correct answer to this question is "Only once". Most correct answers were provided by 65 (86.7%) respondents aged between 30 and 39, 46 (80.7%) aged between 40 and 49, 98 (76.6%) aged between 20 and 29. The least likely to provide the correct answer were the youngest women (36, 65.5%) (Table 4).

A significant correlation was found between marital status and knowledge of how often gynaecological examinations should be performed ($\chi 2 = 10.23$; $p = 0.037$). A weak correlation was

Table 4. Respondents' knowledge of the number of ovulations per monthly cycle by age

	18-19 years		20-29 years		30-39 years		40 – 49 years	
	n	%	n	%	n	%	n	%
Any number of times, e.g. as a result of stress, nervousness or sexual activity	2	3,6	2	1,6	0	0,0	0	0,0
Only once. In exceptional situations, two, three or more ova can be released within a very short time span (which might result in a twin pregnancy)	36	65,5	98	76,6	65	86,7	46	80,7
Usually only once. Sometimes, due to various factors, additional ovulation may occur at any time	10	18,2	24	18,8	9	12,0	10	17,5
It is difficult to say when ovulation occurs	7	12,7	4	3,1	1	1,3	1	1,8
Total	55	100,0	128	100,0	75	100,0	57	100,0

χ^2 = 19,87; df = 9; p = 0,019*; n – number of observations; % – percentage; χ^2 – test result; p – relevance; df – levels of freedom;

established (V = 0.184) in this respect. The correct answer to this question was "Once a year". Correct answers were mostly given by married women (111, 79.9%) as compared to their unmarried peers (n = 107, 65.6%). Due to a too small study sample, divorcees (n = 11) and widows (n = 2) were not included, so the analysis covered a group of 302 women (Table 5).

Natural family planning methods (e.g. sympto-thermal methods) were used by 78 (24.8%) respondents; 237 (75.2%) women did not use them (Table 6).

According to 286 (90.8%) respondents, women are most fertile between the ages of 20-24, for 16 (5.1%) respondents this age is between 15-19, and 13 (4.1%) respondents believed that women are most fertile between the ages of 29-35.

98 (31.1%) respondents expressed the belief that women's ability to conceive decreases between the ages of 35-39, for 106 (33.7%) respondents this age is between 40-44, for 104 (33.0%) it is between 45-59. Seven (2.2%) of them were of the opinion that a decline in this respect occurs between the ages of 25-34.

The surveyed women were asked whether they monitor their menstrual cycle using the sympto-thermal double-check method or another fertility awareness method. Only 78 (24.8%) respondents used one of the several known FAMs for analysing fertility and 237 (75.2%) did not.

Out of 315 women, 269 (85.4%) had undergone sexual initiation, while 46 (14.6%) had not. Consequently, the analysis included the 269 respondents with a history of sexual activity. For the majority of women, sexual initiation took place at the age of 18, but this varied between 14 and 31 years of age (M = 19.07; SD = 2.82; Me = 18), (Table 7).

118 (43.9%) respondents had one sexual partner, two partners were reported by 45 (16.7%) women, and 106 (39.4%) had more than two sexual partners.

3. Discussion

The area of the research covered women's knowledge of procreation health. The following aspects were taken into consideration: the sources in which the respondents acquired information on reproductive health; their knowledge of the main symptoms of ovulation; the number of ovulations during the menstrual cycle and the manner of confirming that ovulation took place; the frequency of gynaecological examinations; the use of fertility awareness methods; and the age of sexual initiation.

The number of women who took part in the self-study was 315. The respondents were most likely to obtain information from the Internet (242, 22.3%), professionals such as doctors, nurses or midwives (217, 20%), and books (195, 18%). This means that online

Table 5. Knowledge of the frequency of gynaecological examinations among the respondents (by marital status)

	Single		Married	
	n	%	n	%
Never	1	0,6	0	0,0
Once in 3 months	8	4,9	1	0,7
Once in 6 months	40	24,5	22	15,8
Once a year	107	65,6	111	79,9
Once in 2 years	7	4,3	5	3,6
Total	163	100,0	139	100,0

$\chi^2 = 10,23$; df = 4; p = 0,037*; V = 0,184
n – number of observations; % – percentage; χ^2 – test result; p – relevance; df – levels of freedom; V – Cramér's V

Table 6. Reported use of natural family planning methods (e.g. symptothermal method)

	n	%
Yes	78	24,8
No	237	75,2
Total	315	100,0

n – number of observations; % – percentage

Table 7. Reported age of sexual initiation

	M	SD	Min	Max	Me	Mo
Sexual initiation	19,07	2,82	14	31	18	18

M – average; SD – standard deviation; Min – minimum; Max – maximum; Me – median; Mo – dominant

resources and books compete with the information shared by professionals – this might lead to confusion and inaccuracies, especially in a field such as human fertility. Magazines, family, school and friends were the least popular sources reported by the respondents. In a 2012 study by Muzyczka et al., 467 students declared the Internet to be their main source of information on the menstrual cycle (Muzyczka, Rząca, Deluga, Denisow, Janiec, Krzos, Oleszczuk, Przystupa, 2012). In a study conducted in 2020 among 231 secondary-school students, it was found that they obtained their knowledge from the Internet and from friends (Bączek, Padzik, Duda, Giermaziak, 2020). According to a 2015 study by Bień and Stadnicka, the sources used by young people to learn about pregnancy prevention methods include the Internet (74.0%), school (43%) and peers (40%) (Bień, Stadnicka, 2015). In their 2013 study among 104 girls aged 16-19, Sieńko-Hans found that teenagers derive their knowledge of contraception from the Internet (Sieńko-Hans, 2013). In a study by Hampton, Mazza and Newton, women of childbearing age were most likely to explore the topic, aided by the Internet (almost 50%), books (43%), a physician (30%) or friends (26%). Just slightly below 5% of the respondents declared having acquired information from a teacher of natural fertility awareness methods (Hampton, Mazza, Newton, 2012). Research has revealed that, for women, the Internet is the main source of knowledge on reproductive health. It is important to note, however, that not all the information available online is correct and factual, and it does not always come from a verified and trustworthy source.

Our own research suggests that 93.7% of women know the term "ovulation". In a study involving 231 school students, 52% of those aged 16-19 were familiar with the term (Bączek, et al. 2020).

According to our own research, 77.6% of women were able to correctly determine the number of ova released during the menstrual cycle. In a study by Bączek et al., out of 231 school students, 52% of those aged 16-19 could correctly state the number of ova released during the menstrual cycle (Bączek, et al. 2020).

Our own research revealed that 94.6% of the surveyed women could correctly identify a change in mucus and basal body temperature as symptoms of ovulation. In a study by Przestrzelska et al., among 257 students aged 15-16 years, 25% of the respondents stated that the symptom of ovulation was bleeding; for about 42% it was abdominal pain. Only 18% were aware of the symptomatic increase in body temperature and the day of expected ovulation. Despite these knowledge gaps, more than half of adolescent girls (55%) correctly recognise the symptoms of fertile days (Przestrzelska, Knihnicka-Mercik, Kazimierczak, 2011). However, this is possible through young women's use of mobile apps, which has nothing to do with FAMs.

As further results from our own research, the majority (218) of women believe that a gynaecological examination should be undertaken once a year. In a 2012 study, out of 100 women, those aged 18-39 reported undergoing this examination every six months, which accounted for 34.5% of the study sample. "Once a year" was the frequency reported by 24% and the least frequent option, "Once every two years", was chosen by 17% of the respondents (Kowalewska, Jankowiak, Oleszczuk, Rolka, Krajewska-Kułak, Klimaszewska, Łukaszuk, Gołębiewska, 2012). It should be emphasised that preventive check-ups should usually be performed once a year, but the regularity of gynaecological appointments can be also affected by women's needs and issues such as pain, abnormal vaginal bleeding, infections and other symptoms from the genitourinary tract, and problems regarding sexual activity or plans to conceive a child.

24% of the women participating in the study confirmed that they use the symptothermal method for self-observation. In the study by Simmons and Jennings, use of the symptothermal method was reported by less than 10 percent of the respondents (Simmons, Jennings, 2019).

Our own research shows that 286 (90.8%) respondents correctly pointed to the fact that women are most fertile between the ages of 20-24. According to a study by Walentynowicz-Moryl et al. from 2020, the vast majority (82.6%) of respondents correctly indicated the age at which a woman is most fertile (Walentynowicz-Moryl, Mianowska, 2020). In a study by Nouri et al., when asked about the age of the highest fertility in women, 89.4% chose the 20-25 age range (Nouri, Huber, Walch, Promberger, Buerkle, Ott, 2014). In contrast, in a study by Garcia et al., 63% of women responded that the most fertile age for a woman falls between the years 25 and 29 (Garcia, Brazal, Rodriguez, Prat, Vassena, 2018).

As revealed by the study, 98 (31.1%) of the respondents correctly indicated that women's ability to conceive decreases between the ages of 35-39. According to Walentynowicz-Moryl et al. in their study from 2020, 60.2% of respondents correctly indicated the age at which a woman's ability to conceive undergoes a significant decline (Walentynowicz-Moryl, Mianowska, 2020). In Hammarberg's study, when asked at what age female fertility begins to drop, respondents estimated it at 35-40 years (Hammarberg, Zosel, Comoy, Robertson, Holden, Deeks, Johnson, 2016). In Vassard's study, knowledge of reduced fertility between the ages of 35 and 39 was reported by 60% of women (Vassard, Lallemant, Nyboe Andersen, Macklon, Schmidt, 2016), similarly to Garcia's study with its 63% respondents (Garcia, Brazal, Rodriguez, Prat, Vassena, 2018).

In our own research, the earliest age at which women started sexual activity was 14 years. For the majority of women, it was the age of 19. In Filipp's study, the earliest reported age of sexual initiation was 15 years, and most women (52%) were aged 18-19 years (Filipp, Pawłowska, Wilczyńska, Kowalska, Niemiec, Raczyński, Kęsicka, 2005). In their study, Kowalewska et al. found that 25% of the respondents had undergone sexual initiation at the age of 20. The next largest group were women who started sexual activity at 18 and 21 years of age (17% and 10%, respectively). The lowest age of sexual initiation was 13 years (2% of respondents), while the highest 26 years (2% of respondents) (Kowalewska, et al. 2012).

Conclusions

1. Women are most likely to obtain information about procreative health from the Internet, professionals (doctors, nurses and midwives), and books. The least-reported resources on the topic included family, school, and friends. Most women were familiar with the term "ovulation" and could correctly answer the question of how often a gynaecological examination should be performed (once a year).
2. The majority of women, having observed cervical mucus and PTC, were able to identify the most fertile time during the menstrual cycle. They could also tell the age at which the ability to conceive declines significantly.
3. Most women do not perform self-observation of their menstrual cycle with the use of any fertility awareness method. The lack of observation in this

area makes it difficult to undertake early intervention steps as part of preventive reproductive health care.

4. The early age of sexual initiation of the surveyed women should be considered one of risk-inducing behaviours and can be linked to using the Internet as the primary source of information, potentially resulting in reproductive health disorders in the future.
5. For the sake of women's reproductive health in Poland, the authors suggest that, in addition to health care professionals, such as doctors, nurses, and midwives, also teachers of fertility awareness methods and school educators trained in this area should be involved in preventive health-promoting measures.

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