



# The history of Fertility Awareness Methods

## Historia Metod Rozpoznawania Płodności<sup>1</sup>

<https://doi.org/10.34766/fetr.v3i51.1093>

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**Abstract:** Fertility Awareness-Based Methods (FABM) are based on the observation of physiologically occurring symptoms, called fertility indicators, which include: cervical mucus, basal body temperature (BBT) and changes in cervical morphology. Observations of clinical symptoms, changing in a woman depending on periodic hormonal fluctuations, were used to determine the first and second phases of the menstrual cycle and the period around ovulation. For many years, FABM have been successfully used by women who would like to plan motherhood in accordance with their beliefs and chosen lifestyle, in an ecological manner, without pharmacological interference or unnecessary medical treatments. FABM have evolved over the centuries and are now a well-documented field of procreation medicine. Initially, FABM were solely used as a tool to plan or postpone conception of a child, while now they are increasingly seen as the effective mean for the diagnosis and treatment of cycle disorders and infertility, as well as monitoring the woman's reproductive health. The aim of this study is to describe the history of FABM development and to present groundbreaking discoveries and people to whom we owe the current state of knowledge about the symptoms of human fertility. We reviewed the medical literature, including historical works which included information on breakthroughs in the field of human fertility. The selection of literature was performed on the basis of original papers as well as review publications in the PubMed and Google Scholar databases with the use of the following keywords: "Fertility Awareness Methods", "Family Planning" and "Pearl index".

**Keywords:** treatment of infertility and cycle disorders, Fertility Recognition/Awareness-Based Methods, family planning, fertility

**Abstrakt:** Metody Rozpoznawania Płodności (MRP) opierają się na obserwacji występujących fizjologicznie objawów, nazwanych biopskaźnikami płodności, do których zaliczono: śluz szyjkowy, podstawową temperaturę ciała (PTC) oraz zmiany morfologii/konsystencji szyjki macicy. Obserwacje klinicznych objawów, zmieniających się u kobiety w zależności od okresowych fluktuacji hormonalnych, zostały wykorzystane do wyznaczania pierwszej i drugiej fazy cyklu miesięcznego oraz okresu okołooowulacyjnego. MRP od wielu lat z powodzeniem są wykorzystywane przez kobiety pragnące zaplanować macierzyństwo zgodnie z własnymi przekonaniami i obranym stylem życia, w sposób ekologiczny, bez ingerencji farmakologicznej lub zbędnych zabiegów medycznych. MRP rozwijały się na przestrzeni wieków i obecnie stanowią dobrze udokumentowaną dziedzinę medycyny prokreacji. Początkowo MRP były wykorzystywane jedynie jako narzędzie do planowania lub odkładania poczęcia dziecka, obecnie są coraz częściej postrzegane jako skuteczne narzędzie służące do diagnostyki i leczenia zaburzeń cyklu oraz niepłodności, a także monitorowania stanu zdrowia prokreacyjnego kobiety. Celem pracy jest przybliżenie historii rozwoju MRP, przedstawienie przełomowych odkryć oraz osób, którym zawdzięczamy obecny stan wiedzy na temat objawów ludzkiej płodności. Dokonano przeglądu literatury medycznej, sięgając również do prac historycznych, w których znalazły się informacje na temat przełomowych odkryć w dziedzinie ludzkiej płodności. Doboru piśmiennictwa dokonano na podstawie przeglądu prac oryginalnych i publikacji poglądowych w bazach danych PubMed oraz Google Scholar z zastosowaniem słów kluczowych: „Metody Rozpoznawania Płodności” (ang. Fertility Awareness Methods), „planowanie rodziny” (ang. Family Planning) oraz „wskaźnik Pearl” (ang. Pearl index).

**Słowa kluczowe:** leczenie niepłodności i zaburzeń cyklu, Metody Rozpoznawania Płodności, planowanie rodziny, płodność

## Introduction

The history of following the secrets of human fertility began with the discovery of reproductive cells: the sperm and the egg. The next step

to broaden this area of knowledge was to tie the symptoms of the fertile phase with the cyclic changes taking place in the ovary. From the design

1 Artykuł w języku polskim: <https://www.stowarzyszeniefidesetratio.pl/fer/2022-3-Stacho.pdf>

of the first, historical method of determining the fertile and infertile phase of the cycle based exclusively on calculations, through the development of single-index methods rules (based on the observation of one single bioindicator: basal body temperature (BBT) or cervical mucus) to the creation of multi-index methods, several dozen years have passed. From the 1770s, the knowledge about the physiological determinants of fertility significantly expanded. In the last few decades, modern FABM have been developed and objectively verified. The conducted research made it possible to use some FABM not only to assess the period of fertility and infertility in the female cycle, but also to use them in the diagnostic and therapeutic procedure in the case of infertility and in monitoring the health of a woman.

The aim of this work is to present the authors of groundbreaking discoveries and publications to whom we owe the current state of knowledge on human fertility. A review and analysis of the medical literature has been made, as well as historical works presenting the beginnings of human learning about the field of fertility. In order to present the progress of knowledge in this area, selected monographs related to fertility issues and the most up-to-date scientific publications were analyzed. Particular attention was paid to the chronology of breakthroughs and figures who have made milestones in the creation of modern FABM.

## **1. The progress of the state of knowledge**

Theories about human fertility have busied the minds of scholars and sages of various cultures and religions since the dawn of time. For centuries, fertility has been seen in the context of the gift. In the biblical Old Testament, the fertile woman and fertile soil were a sign of God's blessing that mankind was bestowed by the Creator in the Garden of Eden. The Israelites saw the womb of a woman as the soil, and the male seed as the seed containing a small man that grows in a woman's body like a plant. Infertility was considered a curse sent by God (Dynarski, Przybył, 2007).

The periodicity of human fertility was noticed and described by Indian doctors more than 1000 years ago. Chaarak Soranus of Ephesus (2<sup>nd</sup> century AD) recommended in his book intercourse before menstruation in order to avoid becoming pregnant. In the Talmud strongly emphasized, however, the necessity to use every possibility of reproduction. Sexual abstinence was recommended for the first 11 days of the menstrual cycle, i.e. the period of menstruation and the beginning of the first phase of the cycle, which are usually the period of infertility. For many centuries, however, humanity did not have any real knowledge of the essence of human reproduction (Obara, Szymankiewicz-Warenik, and Słomko, 1997). For over 1500 years, until the mid-16th century, the ancient conception formulated and described by the Roman physician Claudius Galen (129-200) was dominant, according to which fertilization took place as a result of fusing the sperm of a woman with that of a man, and the development of the embryo created in this way was ensured by menstrual blood.

Breakthroughs in this field turned out to be the discoveries of two Dutch: Antoine van Leeuwenhoek and Reinier de Graaf. Antoine van Leeuwenhoek was a merchant whose careful observation led to significant discoveries and ultimately to the award of an academic degree in science. In 1671 he constructed the first microscope, and in 1672 Reinier de Graaf used the microscope discovered a year earlier and found out the existence of ovulatory follicles in the ovaries, which were named after him as Graaf's follicles. Five years later, in 1677, medical student Johan Ham, with whom Leeuwenhoek collaborated, saw "little animals" in seminal fluid under a microscope. He supposed, however, that their presence was due to the rotting process of the mucus. Leeuwenhoek was of a different opinion and claimed that they are a normal component of semen and made the first detailed description of them, thanks to which he is considered to be the discoverer of the male sex cell. He was also the first to hypothesize that sperm penetrate the egg and this is how fertilization takes place. This was the reason for a conflict with

the famous scientist of the time, William Harvey, who argued that it is the female “egg” that is the sole source of new human life (Howards, 1997).

Another important event in the history of learning about human fertility was the discovery in 1826 of the existence of a female sex cell in a woman’s ovary by Karl Ernst von Baer (Hübner, 2009). In the early nineteenth century, mankind already knew two key cells involved in the fertilization process. However, only understanding that in order for an egg to be fertilized by a sperm cell an appropriate environment is necessary in a woman’s genital tract, turned out to be a milestone in understanding the processes that determine the periodicity of human fertility.

The proper environment for the transport of sperm in a woman’s reproductive tract and their ability to fertilize occurs cyclically. These facts were first described by William Tyler Smith and Mary Putnam Jacobi. Today, we call the clinical symptoms of fertility, which are the result of changes taking place in the female body related to the ovarian cycle, the fertility indicators. Probably at that time it was not expected that these two discoveries would become the basis for the development of methods for determining the fertile and infertile phases of the female cycle. In 1855, William Tyler Smith, a member of the Royal College of Physicians in London, was the first to describe the mucus produced by the cervix and listed its two most important functions. He argued that the cervical mucus closes the uterine cavity and thus protects it from the influence of the external environment. He compared the uterine cavity separated by the cervical mucus to a “closed bag”. In addition, he described the cervical mucus occurring in the fertile phase and gave its very important function, extremely important also in modern reproductive medicine. He found that it is the mucus produced by the cervix that creates the appropriate environment and allows sperm to pass from the vagina to the uterine cavity (Kippley, 2016). Dr. Marion Sims in 1868, describing the test for sperm viability (performed after sexual intercourse) indicated that such a test should be performed when the mucus becomes clear, transparent and resembles raw egg white. She thus hypothesized that it was in the mucus with such features that sperm would survive the longest. This historic discovery has

made it useful for determining the viability of a man’s sperm in the partner’s cervical mucus under the name of the “Postcoital Test” (PCT), also known as the Sims or Sims-Huhner Test. PCT was performed just before the expected ovulation in the mucus with the most fertile features and was used to determine if sperm migrated to the female reproductive system. Its negative result indicated possible problems with either sperm or female mucus, including the likelihood of the presence of adverse immune factors that inactivate sperm.

In current reproductive medicine, where fertility bioindicators are neglected, routine PCT testing is not recommended due to the uncertainty of performing it in the mucus from the periovulatory mucus cycle. However, to this day, it is performed among doctors who understand the purposefulness and legitimacy of carrying out this test in accordance with the principle of assessing sperm motility in the pre-ovulatory mucus, and not with the mucus picked up accidentally (unrelated to the actually approaching ovulation). It serves as an additional indicator of the likelihood of natural conception during normal intercourse. Often, in assisted reproductive clinics, after an incorrect PTC test, infertile couples are offered artificial insemination as an “antidote” to the so-called “hostility of partner’s cervical mucus”.

All of the following: problems with ovulation, inadequate intercourse technique or cervical infection, as well as incorrectly selected time in the female cycle to conduct this test, limited its credibility and unambiguous assessment. Although the PCT test is currently considered to have only a historical value, it is still used in the diagnostic process in a few infertility treatment centers (Practice Committee of the American Society for Reproductive Medicine, 2015). Cervical mucus has been forgotten for almost 100 years since the Sims time (Billings, Westmore, 1986).

Meanwhile, Mary Putnam Jacobi was the first to point out in the late 1800s that a woman’s basal temperature follows a cyclical pattern. She described these physiological changes very accurately: “A woman’s body temperature rises for about two weeks before menstruation, lowers during menstruation, and stays low until it starts to rise again”. Her book, *The Question of Rest for Women during Menstruation*

ation, won the Boylston Prize at Harvard University in 1876 and was published in 1877. These two discoveries by Sims and Jacobi show that by the end of the nineteenth century two of the most important indicators for determining the time of fertility and infertility in the female cycle. The 1855 discovery of cervical mucus as a mean enabling the migration of sperm and the 1877 description of an increase of the woman's body temperature following ovulation are certainly the "milestones" of modern FABM (Kippley, 2016).

The exact course of the thermal curve in the monthly cycle and the correct method of temperature measurement was described in 1905 by the Dutch gynecologist Theodor van de Velde. He noticed a relationship between the change in body temperature and the work of the corpus luteum. In his handbook, he recommended that women measure the temperature in order to determine the time of ovulation, which was the basis for the subsequent development of determining the period of highest fertility using the thermal method (Kinle, Małecka-Holerek, 2013).

The principle of variability and also the cyclicity of fertility in the female cycle was noticed and described at the beginning of the 20<sup>th</sup> century independently by two scientists: the Japanese gynecologist Kyusaku Ogino and the Austrian gynecologist-obstetrician Herman Knaus. They noticed and described a relationship between the timing of ovulation and menstrual bleeding. The cyclicity of these bleeding, physiologically repeated every 28 days, i.e. according to the time corresponding to the variability of the phases of the moon, was related by them and described as a determinant of the fertile and infertile period in a woman's body. However, the results obtained by the researchers differed from one another. Based on his clinical observations, Ogino published a paper on ovulation in Japan in 1923, in which he determined the probable time of ovulation. On the basis of his observations, he concluded that ovulation in the monthly cycle occurs between the 12<sup>th</sup> and the 16<sup>th</sup> day, counting from the end of a given cycle, and thus assuming that the luteal phase lasts 12-16 days. Knaus, on the other hand, assumed that ovulation occurs exactly 14 days before the coming menstruation, and only one day

earlier in cycles longer than 28 days. Gynecologists created the first historical scientific basis for the cyclic method of birth control by establishing the fertile and infertile days in the course of a woman's sexual cycle (Fijałkowski, 2004).

The formula proposed by Ogino and Knaus aroused interest among contemporary doctors and was perfected by the Dutch: Jan Nikolaus Smulders and Jan Gerhard Holt. It was the basis for the development of the periodic sexual abstinence method described in a book published in the Netherlands in 1930, also known as the Ogino-Knaus method, the rhythm method, the calendar method, or simply the "marriage calendar". Due to the fact that it was based solely on calculations, it worked mainly in women with regular cycles. However, it showed unreliability in the event of postponement of ovulation (Kinle, Małecka-Holerek, 2013).

However, the method proposed by Ogino and Knaus, popularly known as the "marriage calendar", did not work in practice. For scientific reasons which are already clear to us today, these calculations failed, and couples using this method as birth regulations experienced unplanned pregnancies. Although modern medicine has completely rejected calculation methods as a reliable tool for planning or avoiding pregnancy, unfortunately also among medical practitioners and health care professionals, the term "marriage calendar" is misused on a par with FABM to this day. This causes a lot of confusion and is often a reason to criticize the use of cycle observation by means of BBT and mucus observations to determine the actual "fertility window", as well as abandoning FABM in the case of diagnosis and treatment of infertility and cycle disorders, feeling that they are inadequate and unchecked. It should be noted, however, that modern FABM based on the observation of fertility bioindicators are scientifically developed and well documented. Such a situation regarding the incorrect use of terminology and equating modern methods with the archaic calendar method results in a negative approach to the use of FABM in modern medicine (Targan et al., 2018).

As already described, life quickly verified the failure of the so-called "marriage calendar", which was based on the assumptions of Ogino and Knaus.

Therefore, a few years later, this method, called the “Ogino-Knaus method” after both discoverers, was replaced by more modern, closer to today’s FABM, methods of family planning. Undoubtedly, an interesting example of this phenomenon is the attitude of a German priest, resulting from a practical approach to family planning. In giving pastoral advice to couples who were experiencing the hardships of unplanned pregnancies, Father Wilhelm Hillebrand, citing van de Velde’s research, advised women to measure their temperature every day, rather than using unreliable calculations. In 1959, this observant priest received an honorary doctorate from the University of Cologne, Germany, and became known as the “father of the thermal method”. It is thanks to him that modern FABMs based on the first clinical trials began to develop intensively. Father Hillebrand consulted all the collected charts with doctors, including Gerhard Karl Döring, who used them to create the rule for determining the infertile days before ovulation, known as the Döring rule. It is used in some FABMs to this day.

In 1945, Mary Burton and B.P. Wiesner presented a breakthrough in recognizing fertility phases based on body temperature. They found that the fertile days in the course of a woman’s monthly cycle should be determined on the basis of waking temperature, which is, as we understand it today, measured under BMR (basal metabolic rate) conditions, and not on the basis of previously used casual temperature measurement, i.e. measurement during the day, regardless of the time of day (Kinle, Małecka-Holerek, 2013).

1962 marked yet another discovery in the history of learning about naturally occurring fertility symptoms was the description of changes in the topography and consistency of the cervix in the course of a woman’s menstrual cycle, by Edward Keefe and Vaclav Insler. These scientists have demonstrated the possibility of self-observation of the cervix in order to identify the phases of a woman’s sexual cycle. Currently, monthly cervical changes are used as a fertility bioindicator in symptothermal methods which also take into account changes in basal body temperature and cervical mucus. Scientists observed that in the first days of the cycle, the cervix is positioned low in the vagina, its feel

is described as “hard” (for pragmatic purposes: like the tip of the nose), and that its outer opening is closed. The closer to the period of fertility, the more it rises, becomes progressively softer (from the educational materials for patients: like an ear lobe or lower lip of the mouth), its external opening gradually dilates. The last day with the cervix positioned highest, being the softest and open, was called the cervical peak day. After ovulation, the cervix hardens under the influence of progesterone, closes and returns to its original form and position. A speculum examination during ovulation shows that on the 7-9th day of the cycle (in the case of a 28-day cycle), clear mucus appears in the dilated external cervix. An open neck filled with glassy, slippery, transparent mucus resembles the “pupil of a fish eye” (Obara, Szymankiewicz-Warenik and Słomko, 1997). This phenomenon was used in the so-called Insler test, which was used to clinically evaluate the quality of cervical mucus. Four parameters were scored in the test: cervical external dilation, mucus amount, its ductility and crystallization. The obtained result translated into the assessment of the influence of the tested mucus on sperm penetration (Insler et al., 1972).

In 1964, the Australian neurologist John Billings and his wife Evelyn, based on the observation of her monthly cycles and the fluctuations in vaginal discharge, together with the collected observations of the cycles of other women, formulated the principles of observing cervical mucus as the only indicator of the fertility phase in female cycle. More in-depth analyzes of vaginal discharge were subsequently performed based on a study by a couple of Billings on changes in the characteristics of cervical mucus over the menstrual cycle. In 1965, Prof. Josef Rötzer from Austria proposed to combine the observation of cervical mucus with the daily measurement of body temperature, thus creating the first symptothermal method, the so-called Rötzer method (Fijałkowski, 2004).

At the end of the 1950s, a gynecologist and biophysicist, prof. Eric Odeblad and his colleagues at the University of Umea in Sweden began pioneering research into the biological and physical properties of cervical mucus using an electron microscope.

They showed that during the menstrual cycle, different types of mucus with different functions are produced in separate parts of the cervix, and its secretion is controlled by the sex hormones estrogen and progesterone (Billings, Westmore, 1986). Odeblad was the first to distinguish the cervix as a separate organ, emphasizing the complexity of its function and sensitivity to internal factors, such as e.g. hormonal or external changes, such as infections (Odeblad, 1994). The above-mentioned studies by this Swedish gynecologist constitute the basis for the use in clinical practice of the assessment of vaginal discharge and recorded according to standardized methods, and on this basis for the diagnosis and therapy of infertility.

In 1967, the World Health Organization (WHO) issued a report confirming the effectiveness of the FABM. In five places around the world, 869 women of reproductive age were surveyed, differing significantly in terms of living conditions, level of education and socioeconomic status. It turned out that regardless of these factors, as many as 93% of the surveyed women were able to identify the symptom of fertile mucus just before ovulation during the observation of their cycle. Subsequent detailed analyzes of the studies cited here have shown the potentially high effectiveness of observing mucus symptoms in the context of postponing or planning the conception of a child. The probability of pregnancy during intercourse outside the fertile phase was determined to be 0.004, which means a very low risk of unplanned pregnancy (WHO, 1967).

An important event that had a significant impact on the development of science in the field of FABM was the publication by Pope Paul VI in 1968 of the encyclical "Humanae vitae" (On moral principles in the field of transmitting human life). The Pope asked people of science to develop a method of family planning, which, based on the understanding and use of physiological phenomena occurring in the woman's body, would give the spouses the opportunity to make decisions about planning or postponing the conception of a child. This call was answered by a young adept of medical art – Dr. Thomas Hilgers from Omaha, Nebraska (USA). As a practicing gynecologist-obstetrician,

he created a team that began research on fertility at the Pope Paul VI Institute for the Study of Human Reproduction he founded. At the same time, he worked at Creighton University School of Medicine, where he became a member of the American Society of Reproductive Surgeons. Hilgers began an in-depth analysis of vaginal discharge based on previous studies of changes in cervical mucus properties during the menstrual cycle conducted by the Billings couple (Czerniak, 2017). He and his team developed a new FABM called the Creighton Model FertilityCare System (CrMS) after Creighton University. This standardized tool for observing the menstrual cycle was based on a woman's system of assessing symptoms such as cervical mucus, vaginal discharge, intensity of menstrual bleeding, occurrence of periodic and inter-menstrual spotting and soiling. The observed symptoms are recorded on a form specially created for this purpose, giving them appropriate symbols and colors. Women learn the assessment and notification system during individual training with CrMS instructors. Cycle observation using CrMS is the basis of a diagnostic and therapeutic algorithm for disorders of the menstrual cycle and infertility, the so-called Naprotechnology (NaProTECHNOLOGY – Natural Procreative Technology) (Dereń, Woźniak, Simińska, 2016). In 2004, the textbook "The Medical and Surgical Practice of NaProTECHNOLOGY" was published for the first time, and in 2011 reissued, which is a summary of many years of work and research by Hilgers and his team (Czerniak, 2017).

FABM are divided into single-indicator and multi-indicator methods. The single-index methods include the strict thermal method based only on the measurement of the basal body temperature (BBT) and the Billings and CrMS ovulation method, in which the determination of the fertility phases is based only on the observation of the cervical mucus. The multi-index methods include the extended thermal method and symptothermal methods in various studies: Polish modification – by Teresa Kramarek, Austrian modification – by Josef Rötzer, American modification – by John and Sheila Kippley as well as the multi-index method of double checking, also known as the English method. The recently published

method of observing the monthly cycle is the two-factor method called InVivo. It was developed by Dr. Aleksandra Kicińska together with her team as part of research on the female cycle among patients at the infertility and cycle disorders Treatment Center in cooperation with the Medical University of Gdańsk, Poland. The InVivo Fertility Recognition Method is used primarily in the process of diagnosis and therapy of women with infertility and menstrual cycle disorders. It is based on the measurement of BBT and the assessment of vaginal secretions on the basis of a “picture dictionary” created especially for this purpose. The picture dictionary is an organized and precisely described collection of pictures of vaginal discharge. This is the first two-factor method in which a standardized description of cervical mucus was developed based on photos of vaginal discharge collected during clinical examinations, so that the record of this symptom, on a specially created card, was unambiguous and precise. The novelty of the InVivo method consists in the first ever FABM combination of an in-depth observation of mucus according to a pictorial dictionary with the course of the BBT curve. None of the above-mentioned methods – Billings or Hilgers, relates the changes, growth and course of the cycle or mucus cycles in each and every female cycle to fluctuations in the temperature curve and, depending on their coincidence, considering a given mucus cycle as the actual cycle of follicle growth that leads to ovulation (Kicińska, Stachowska, Wierzba, 2020).

## **2. FABM Effectiveness**

The Pearl Index is used to determine the effectiveness of methods of preventing pregnancy, parenting planning or the FABM effectiveness. It is a tool designed to estimate the number of unplanned pregnancies among 100 women using a given method of contraception for one year. In the case of an ideal method of using a contraceptive as prescribed, the so-called perfect use for the symptothermal method is 0.4, which gives a result comparable to the effectiveness of the use of contraceptive pills (Pearl Index at perfect use 0.3) (WHO, 2016). A more reliable

indicator of unplanned pregnancies for FABM is the Pearl Index with the so-called typical use, i.e. a situation where the user’s error of a given measure or method is taken into account. For one of the most commonly used FABM – symptothermal method, this indicator is, according to many studies conducted, among others in Europe and India from 1% to 3% (Pallone, Bergus, 2009). On the other hand, the rate of unplanned pregnancies after one year of FABM use according to the research conducted by Hassoun in the case of perfect use is 0.4% for the symptothermal method, 3% for the Billings ovulation method, 4% for the two-day method and 5% for the standard day method. For typical use, the ratio is 8% (Hassoun, 2018).

Factors increasing the effectiveness of a given FABM include the appropriate education of the couple, both the woman and the man, before starting their use in order to postpone conception. With the proper involvement of the couple and daily observations of fertility bio-indicators, the effectiveness of the symptothermal method can be as high as 99% (NHS, 2021). The awareness of the need for periodic sexual abstinence when choosing FABM as a means of family planning or birth control always concerns the decisions of both partners, spouses. However, this is not a negative aspect, because psychological studies have shown that couples using FABM are more conscious of their actions, pregnancy and conception of a child are their joint decision, and the relationships of these couples turn out to be more durable (Unselde et al., 2017).

Still, the prevalence of FABM use is low (4.6% of users) and has remained stable over the years (Hassoun, 2018). This is because most physicians are currently unaware of the FABM effectiveness, leaving couples unaware of this family planning option (Manhart et al., 2013). In order to improve the knowledge of health care workers, WHO published in 1993 a special manual “Natural Family Planning—what health care workers should know about” (Kinle, 2012), and in 2018, “Family Planning: A Global Handbook for Providers”, which gathered all the knowledge on all possible ways of family planning (WHO, 2018).

### 3. Advantages and disadvantages of FABM

The opinions of the users of these methods form a valuable reference on the FABM application. On their basis, we present a summary of conclusions.

Women using FABM list the following advantages of these methods:

- help you learn about your own body as well as your fertility;
- can be used to identify fertile days by both women who are planning pregnancy and women who want to postpone conception;
- allow couples to respect their religious or cultural beliefs related to conceiving a child (WHO, 2018);
- do not require pharmacotherapy, therefore their use is not associated with the risk of side effects;
- thanks to daily careful observation of fertility bioindicators, women using FABM notice disturbing symptoms from their genital system earlier than in the case of not following them, which may help identify disease onset or progress, including cancer, which means reporting to a clinician sooner than otherwise;
- couples using FABM report better interpersonal communication and accountability related to the emergence of unplanned conception;
- there are no medical contraindications to their use;
- they do not require the participation of medical personnel or medical supervision during their use (Liji, 2019);
- they are cheap (the only tools needed are: a thermometer, a notebook for observations and the cost of completing the course with a qualified instructor);
- the need to involve both partners in understanding the symptoms of fertility and mutual consent to temporary sexual abstinence leads to the strengthening of ties among the majority of couples using them (Department of Health, 2022).

The difficulties associated with the use of FABM and their disadvantages include:

- the need for mutual consent to periodic sexual abstinence – both for men and women;

- the need for several months of training and close supervision by the instructor in the first phase before couples can independently use FABM as a reliable tool to predict fertile and infertile days;
- some difficulty in applying FABM rules in the case of irregular cycles (however, this does not exclude the possibility of using these methods in dysregulated, abnormal cycles or in chronically ill people taking medications that affect the image of fertility indicators);
- require investing time and effort in the observation of fertility bioindicators, which may cause additional difficulties for very active women (Liji, 2019);
- require regularity in the daily observation of fertility bioindicators;
- acute or chronic stress, illness, travel, inappropriate lifestyle and medication can interfere with the symptoms of fertility indicators (NHS, 2021);
- increased body temperature / fever in various diseases, infections in the genitourinary system, especially the vagina, may affect the cervical mucus image and the BBT curve, and thus make it difficult to determine the phases of the cycle and the fertility / infertility period (Department of Health, 2022).

An interesting proposition and the possibility of eliminating some of the disadvantages as well as a way to increase the comfort of using FABM are new information technologies. These are various electronic devices and applications that facilitate the recording of the observed fertility bio-indicators (Judáková, 2020). The undoubted advantage of these devices is their easy and female-friendly use, e.g. BBT measuring devices are designed in the form of attractive gadgets, and they measure at the same time and do not require interrupting sleep. However, only those applications which collect data and generate it in graphical form allowing the user to interpret it independently are recommended and they include, forms with a BBT chart and the mucus cycle. Some IT software, through the analysis of previous cycles, may suggest the probable day of the beginning and end of fertile days, but by showing a clear form of visualization of the entered data, they allow the



user to make the final decision on the determination of the fertile and infertile phase either on their own or with the help of a qualified instructor (Berglund Scherwitzl et al., 2016).

However, the algorithms used by applications supporting FABM, unfortunately, often replace the need for users to analyze their fertility data themselves, and thus increase the likelihood of failure. This is due to certain assumptions based on the statistics of the obtained data, and not on the actual, currently running cycle, which may be different from the others. For this reason, the estimation of the ovulation date by a given application often misses the actual time of its occurrence. This leads to incorrect determination of the fertile and infertile phase in the user of a given application, and thus reduces its effectiveness. Reduced effectiveness of the so-called modern technologies will also occur in the case of short cycles (less than 23 days), long cycles (more than 37 days), as well as in the postpartum cycles, after the use of contraception or in the premenopause period.

## **Summary**

The history of FABM is closely related to the progress of medicine and the knowledge of human procreation. The scientific basis for learning about human fertility began with the discovery of the reproductive cells – the sperm in 1677 and the ovum in 1826. Another important element was the observation and description of specific clinical symptoms, natural fertility indicators allowing the diagnosis of fertile and infertile phases in the monthly cycle. Fertility bioindicators used in different FABM include cyclic changes in basal body temperature, changes in the appearance of cervical mucus and changes in the cervix. Before the use of the term FABM in medicine for the clinical purpose of describing cyclical changes in fertility indicators, the term Natural Family Planning (NFP) was first used. This is due to the undoubted contribution to the development of these organizational methods and people involved in the search for such solutions for the regulation of conception that would not raise moral objection in the area of procreation. The names NFP and Responsible

Parenting focus on family planning and have a much broader meaning than FABM. FABM is mainly a tool that can be used in family planning as the so-called “Natural contraception” meanwhile, NFP is a lifestyle in harmony with fertility and treating it with respect as an integral part of health and every human being, especially in the prenatal phase, with respect and dignity.

As the NFP developed, the awareness about the usefulness of information gathered from daily observations and notes of fertility indicators prepared by a woman progressively increased in both groups, the female patients as well as medical personnel of midwives and physicians. We are currently observing the increase of use of modern FABM in the reproductive medicine. It has been noticed that cycle observation cards, but only those carried out professionally and reliably, can constitute an invaluable supplement to a medical history concerning fertility disorders. The abnormalities and disorders of the cycle are reflected in specially developed forms, filled in under the supervision of a qualified instructor on the basis of daily observations of fertility indicators carried out by women according to standardized methods. Modern FABM, based on conscious fertility, according to WHO can be used to recognize fertility by both, women who want to become pregnant, as well as to avoid pregnancy. In addition, their use allows women to learn about the physiology of their body, react earlier to disturbing symptoms and, in addition, do not give any side effects (Polis, Jones, 2018).

The first method of birth control proposed in history was the Ogino-Knaus method, or “marriage calendar”. It is worth noting, however, that the principles of this method do not fall within the WHO definition of FABM. This definition says that FABM are methods of planning or avoiding pregnancy that consist of observing the symptoms and signs of the fertility or infertility phase of the menstrual cycle, without intercourse in the fertile period, if the pregnancy is not planned, and not on the calculations themselves (Targan et al., 2018). Therefore, as mentioned earlier, the term FABM is incorrectly equated with the so-called “marriage calendar”. In social media, as well as in medical publications, information about a high Pearl index in

women who used methods of preventing unplanned pregnancy based on their own observations of selected physiological fertility indicators is often cited. A significant number of authors of these reports do not distinguish the traditional thermal and symptom-thermal method from the “calendar” method, the effectiveness of which is lower than that of the more complex and standardized FABM. The implication of this unfortunate confusion is that physicians are reluctant to promote them and patients are reluctant to use them. Research shows that the knowledge of people involved in health care in the field of FABM is quite low, and the main source of this knowledge is school or university education (Bączek, Manista, Tataj-Puzyna, 2017). In view of such a situation, it seems necessary that the knowledge of medical university students, as well as medical practitioners, midwives and nurses, should be much greater in this respect. The survey research carried out shows that there is a need to raise the knowledge and awareness of fertility and the methods of its recognition among people from the health care department. This requires the verification of curricula, extending their scope and improving the quality of education in the area of FABM during studies at medical universities (Targan et al., 2018).

For many years, FABM have only been used for responsible parenting planning and the identification of fertility stages in order to postpone conception of a child. Currently, professionally conducted cycle observation forms are a valuable

source of information on the reproductive health of a woman, and are also used in the process of diagnosis and treatment of menstrual disorders or infertility. They are primarily used for the proper targeting of diagnostics, in accordance with the observed disturbances in fertility bio-indicators, and for determining the appropriate day of hormonal tests, in accordance with the patient's individual cycle, as well as the correct initiation of treatment with hormones of the first and second phase of the cycle (Kicińska, Stachowska and Wierzbka, 2020; Danis, Kurz, Covert, 2017).

The dynamic development of reproductive medicine based on the observation of fertility bio-indicators according to the standardized FABM is a new challenge and an interesting subject for healthcare professionals to learn about. Infertility is a growing medical, social and demographic problem in today's culture of Europe and highly developed countries. According to estimates, the problem of infertility affects approximately 20% of couples of reproductive age. In Poland, about one million couples are struggling with it (PTMRiE and PTGP, 2018). For this reason, conducting an interdisciplinary treatment of reproductive health disorders with the use of modern methods of repair surgery along with the use of hormonal, immunological and pharmacological measures, but always based on the patient's individual cycle, as observed in FABM, creates the possibility of an effective and accessible method of management for many patients.

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