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Analysis of cycle observation sheets in a group of women of reproductive age

Analiza kart obserwacji cykli w grupie kobiet w wieku prokreacyjnym[1]

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Abstract: *Background:* Knowledge concerning the value of menstrual cycle observation and its use to monitor reproductive health is underestimated and limited in women's health promotion, education and health care. The American College of Obstetricians and Gynecologists and the Academy of Pediatrics recommend that observations of a developing cycle should start as early as during puberty in order to pre-screen girls for the risk of fertility disorders such as polycystic ovary syndrome. With numerous reports of fertility issues on the rise, such a simple tool as self-observation of the menstrual cycle becomes particularly useful as it provides an insight into the natural rhythm of fertility and, in the case of abnormalities, i.e. any deviations from its normal course, reduces the time until the first medical consultation. In Poland, there are several non-governmental and non-profit organisations which, through certified teachers of fertility awareness methods, can professionally support the educational process of adolescents and adults as well as health care professionals in the field of fertility awareness, health education, and natural family planning. *Aim:* The aim of the presented study was to analyse 105 menstrual cycle observation sheets among Polish women who did not use contraception in accordance with the principles of the symptothermal double-check method. *Method:* The study was performed using the documentation analysis method, with 105 menstrual cycle observation sheets and the SPSS Statistics software suite, version 25. The level considered statistically significant was $p < 0.05$. *Results:* The average age of the studied women was 29 years. The majority of them, i.e. more than 58%, were unmarried and childless (79.1%). The average length of the menstrual cycle was 28.6 days. The average duration of the luteal phase was nearly 13 days. The average number of days of highly fertile mucus was nearly 4 days. The average length of cycles in women over 35 years of age was 28.88 days, while in women under 35 years of age 28.48 days. The age of onset of the first menstrual period ranged between 10 and 17 years of age. *Conclusions:* The studied group of women was homogeneous in terms of the adopted eligibility criteria, i.e. they had typical cycles and did not use contraceptive methods. The examined parameters of the menstrual cycle – the average length of the cycle, the course of the luteal phase, and the average duration of highly fertile mucus – satisfied the criteria of a normal cycle according to the symptothermal double-check method.
Keywords: menstrual cycle, fertility awareness methods, reproductive health.

Abstrakt: *Wstęp:* Wiedza dotycząca wartości obserwacji cyklu miesiączkowego oraz jej wykorzystania do monitorowania stanu zdrowia prokreacyjnego jest niedoceniana i ograniczona w zakresie edukacji prozdrowotnej kobiet oraz służby zdrowia. Amerykańskie Towarzystwo Położników i Ginekologów oraz Akademia Pediatrii , komitet ds. młodzieży rekomenduje rozpoczęcie obserwacje kształtującego się cyklu już w okresie dojrzewania celem wstępnego przesiewu dziewcząt , z grup ryzyka zaburzeń płodności np. zespołu policystycznych jajników. Wobec licznych doniesień dotyczących narastania problemów z płodnością tak proste narzędzie jak samoobserwacja cyklu miesiączkowego staje się szczególnie przydatna do poznania naturalnego rytmu płodności a w przypadku nieprawidłowości tj. odbiegania od przebiegu typowego skraca czas do pierwszej konsultacji lekarskiej. W Polsce istniej kilka pozarządowych niedochodowych organizacji, które poprzez dyplomowanych nauczycieli metod rozpoznawania płodności mogą profesjonalnie wspierać nauczanie młodzieży, dorosłych oraz zainteresowanych osób pracujących w służbie zdrowia w zakresie rozpoznawania płodności , edukacji prozdrowotnej oraz naturalnego planowania rodziny. *Celem* prezentowanej pracy było analiza 105 kart obserwacji cykli miesiączkowych u polskich kobiet nie stosujących antykoncepcji zgodnie z zasadami metody objawowo-termicznej podwójnego sprawdzenia. *Metoda:* Badanie wykonano przy użyciu metody analizy dokumentacji, 105 kart obserwacji

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

cykli miesiączkowych z użyciem pakietu statystycznego SPSS Statistics w wersji 25. Za istotny statystycznie przyjęto poziom p < 0,05. *Wyniki:* Średni wiek badanych kobiet wynosił 29 lat. Większość badanych kobiet tj. ponad 58% było niezamężna i bezdzietna (79,1%). Średnia długość cyklu miesiączkowego wynosiła: 28,6 dni. Średni czas trwania fazy lutealnej wyniósł niemal 13 dni. Średnia długość dni występowania śluzu wysoce płodnego wyniosła blisko 4 dni. Średnia długość cykli kobiet powyżej 35 r. ż. wyniosła: 28,88 dni, natomiast u kobiet poniżej 35 r. ż. 28,48 dni. Wiek wystąpienia pierwszej miesiączki badanych kobiet wahał się pomiędzy 10-tym a 17-tym rokiem życia. *Wnioski:* Badana grupa kobiet była jednolita pod względem przyjętych kryteriów kwalifikacji tzn. posiadała cykle typowe i nie stosowała metod antykoncepcji. Zbadane parametry cyklu miesiączkowego tj.: średnia długość cyklu , przebieg fazy lutealnej oraz średnia długość występowania śluzu wysoce płodnego spełniały kryteria prawidłowego cyklu wg metody objawowo- termicznej podwójnego sprawdzenia.
Słowa kluczowe: cykl miesiączkowy, metody rozpoznawania płodności, zdrowie prokreacyjne

1. Introduction

During self-observation of menstrual cycle, the woman follows the fertility determination method of her choice based on a record of specific biomarkers (indicators, fertility symptoms). In this way, the cycle observation sheet can become a useful tool in the physician's daily work as well as an element of prevention of reproductive health disorders (Ślizień-Kuczapska, Smyczyńska, Rabijewski, 2020). In 1965, Josef Rötzer, having analysed females' menstrual cycles from different periods of their lives, was the first one to propose the so-called "sympto-thermal", multivariate method (Napiórkowska-Orkisz, Babińska, 2017). In 1988, the World Health Organization (WHO) published a guide to natural family planning (NPR) (World Health Organization, Geneva: Natural Family Planning: a guide to provision of services, 1988). As a definition of the concept of natural family planning, the WHO employed methods based on the consideration of the cyclical phases of fertility and infertility of a human couple. Fertility awareness allows a couple to engage in sexual intimacy in a responsible manner and in good conscience, taking into account their actual reproductive plans. NPR therefore provides options for those who are not interested in mechanical or pharmaceutical contraceptive methods or are prevented from using them due to specific contraindications.

For couples who follow the principles of cycle observation, sexual intercourse always remains an "intact act" (Fijałkowski, 2004).

In the case of the sympto-thermal method used as a means of conception prevention, its effectiveness exceeds 99% and with its correct (accurate) use, the Pearl index equals 0.4. When the method is used in a typical, error-laden (method error, teaching error, and user error) manner, the Pearl index reaches 1.8 (Duane, Stanford, Porucznik, Vigil, 2022).

It needs to be stressed, however, that in order to achieve such high effectiveness of NPR and to understand one's own fertility, the woman should contact a qualified and certified NPR teacher. For years, the Polish Association of Natural Family Planning Teachers (PSNNPR) has been offering various forms of education, including with the use of online means of communication and publicity campaigns[2].

According to WHO recommendations, natural family planning methods should be incorporated into health-promotion programmes for adolescents and adults and, most importantly, into regular training programmes for medical personnel (Troszyński, 2009).

Currently, the term "fertility awareness method" (FAM) is often used interchangeably with NPR. However, it is important to emphasise the wider significance of NPR, in particular with regard to adopting attitudes of responsible parenthood and the so-called "fertility lifestyle". FAM terminology is especially notable for facilitating the possibility of monitoring women's gynaecological health and might be a valuable aid in daily medical practice.

According to the definition offered in the guidebook, edited by Professor Michał Troszyński (2009), the menstrual cycle is a series of cyclical changes in the female body, occurring from the first day of menstruation up to and including the last day before the next menstrual bleeding (Kuźmiak, Szymaniak, 2014). The duration of a menstrual cycle depends on the woman's individual characteristics (Szymański, 2004) and, on average, is usually 26-28 days. 21-day cycles are considered to be short (Skręt, 2009), while cycles continuing for 26-30 days and more than 31

2 for example: www.pogaduchyozdrowiu.psnnpr.com

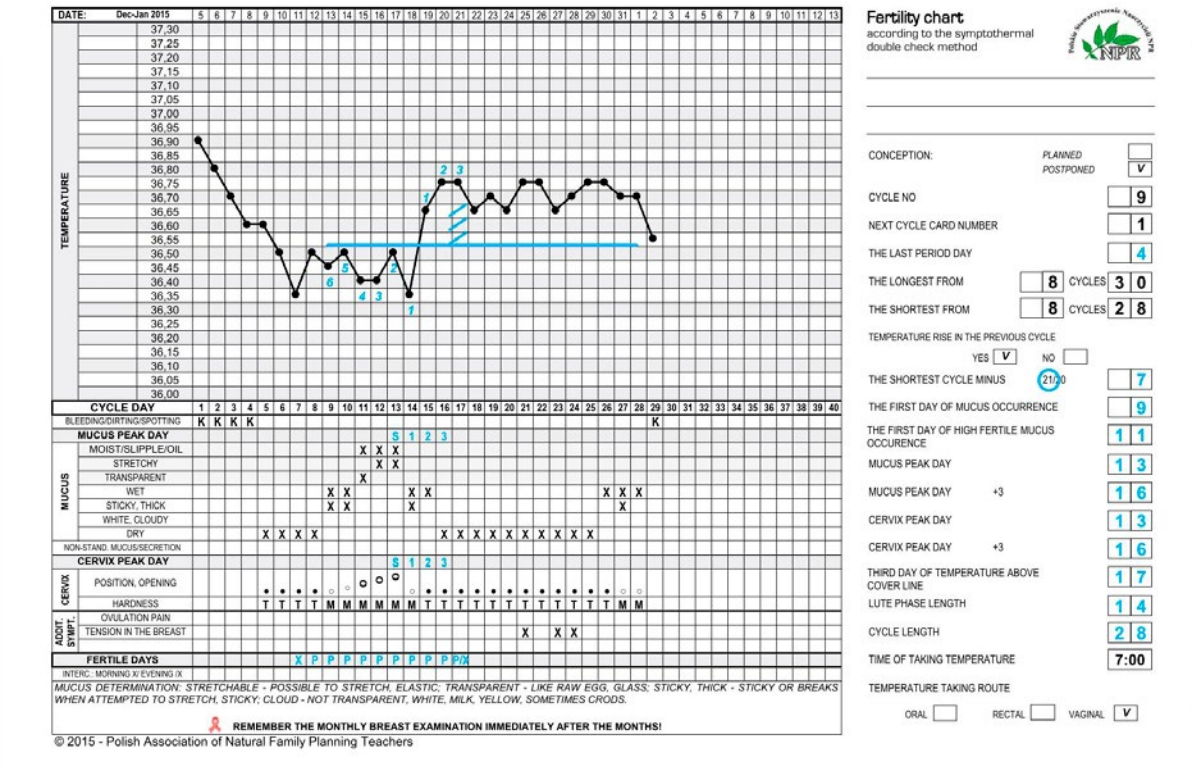

Figure 1. Typical menstrual cycle

days are of moderate and long duration, respectively (Jabłoński, Niewiadomska, 2014). In most women, cycle length tends to fluctuate to a certain extent. However, if the difference in the length of cycles from one month to the next does not exceed 5 days, such cycles are considered regular (Skręt, 2009). Normal menstrual bleeding lasts from 3 to 5 days and involves the removal of necrotic fragments of the functional part of the endometrium, which are excreted during menstruation (Bruska, 2003).

The primary biomarkers (Ślizień-Kuczapska, Smyczyńska, Rabijewski, 2020) of fertility in the double-check FAM, which can be examined in every woman's cycle, include basal body temperature (BBT), cervical mucus, and cervical position (Kuźmiak, Szymaniak 2014); these are subject to cyclical changes induced by ovarian hormones. The last of these symptoms is not observed in women who have not yet engaged in sexual activity (Kinle, Szymaniak, 2009). All major bio-indicators of fertility should be measured or analysed in accordance with specific rules. They are recorded on a standardised sheet in paper or electronic format (Kuźmiak, Szymaniak, Walczak, 2014). Accordingly, the cycle sheet should include the following information: in the morning – the BBT symptom; in the evening, after a whole-day observation – status of the cervical mucus; and once a day at any fixed time – self-examination of the cervix for changes (Kuźmiak, Szymaniak, Walczak, 2014).

The menstrual cycle typically exhibits a correlation of the main fertility symptoms: surge in BBT, the peak of cervical mucus, and the cervix peak (Kinle, Szymaniak, 2009). The occurrence of a correlation between fertility biomarkers means that the surge in BBT, the peak of the cervical mucus symptom, and the cervix peak occurred on the same day or the maximum interval between these symptoms did not exceed 3 days (Kuźmiak, Szymaniak 2014). A typical menstrual cycle is presented in Figure 1 (Cerańska-Goszczyńska, Ślizień-Kuczapska, Kinle, Walczak, 2015).

The ovulatory (typical) menstrual cycle begins and ends with a higher-temperature phase separated by a lower-temperature phase (Kinle, Szymaniak, 2009). The first part of the higher-temperature phase occurs during bleeding (Cerańska-Goszczyńska, Ślizień-Kuczapska, Kinle, Walczak, 2015). The second

part is called the "corpus luteum" or "luteal" phase (Kinle, Szymaniak, 2009) and should fall between 10 and 16 days (American Society for Reproductive Medicine, Birmingham, Alabama: Diagnosis and treatment of luteal phase deficiency: a committee opinion, 2021; Kinle, Szymaniak, 2009; Szymański, 2009). Its length does not usually vary between cycles. The first biomarker of fertility, the surge in BBT, involves an increase in basal body temperature – from lower to higher temperatures – occurring over a 24-hour period and is correlated with other symptoms (Kinle, Szymaniak, 2009).

The second bio-indicator of fertility is cervical mucus. Initially, the mucus has cloudy, viscous and glutinous consistency giving the woman a sensation of wetness in the vaginal vestibule – these are the characteristics of "less fertile mucus". As ovulation approaches, oestrogen levels go up and the mucus assumes the characteristics of "highly fertile mucus" – it becomes stretchy, transparent, glossy and shiny, resembling raw egg white. The associated sensation is that of wetness, slipperiness and oiliness in the vaginal vestibule. The peak of the mucus symptom is the day on which the features of highly fertile mucus occur for the last time before a rapid change in its quality and its complete disappearance (Kinle, Szymaniak, 2009).

The third key symptom of fertility is the repositioning of the height and texture of the cervix. The woman may check this symptom by self-examining the cervix and changes to its position, the degree of dilation, and the texture of its external outlet. The cervix peak is the last day when the cervix is at its highest position, most dilated and softest (Kinle, Szymaniak, 2009).

The woman's fertility during her menstrual cycle is considered to end on the third evening after the day of the BBT surge and the mucus or cervix peak. The deciding factor here is the last unaltered indicator (Cerańska-Goszczyńska, 2009).

On the basis of more than 30 years of work of the Polish Association of Natural Family Planning Teachers (PSNNPR) with women recording their cycle observations, the following criteria have been identified with respect to typical FAM double-check cycles:

- normal duration of the cycle,
- normal course of menstrual bleeding,
- normal development of the mucus symptom,
- normal biphasic BBT pattern,
- minimum 10 days of the luteal phase,
- convergence of the main fertility indicators,
- limited menstrual complaints, e.g. premenstrual syndrome (PMS), menstrual pain.

The present work addresses most of the above-mentioned parameters which meet the criteria of a typical cycle.

The aim of the study was to analyse 105 menstrual cycle observation sheets of Polish women who did not use contraception as prescribed by the sympto-thermal double-check method.

2. Method

The study used the documentation analysis method. Documentation for the study was obtained with the permission of the Polish Association of Natural Family Planning Teachers (PSNNPR). It covered seven years – from 2015 to 2022. A total of 56 women from the Lubelskie and Wielkopolskie voivodeships were included in the analysis. Ultimately, the statistical analysis covered 43 women who did not use any form of contraception and had typical menstrual cycles, i.e. were not in puberty, postpartum or menopause and were not breastfeeding. Every respondent kept track of her monthly cycle on three sheets for the sympto-thermal double-check method. The women had three complete observation sheets for a total of 129 sheets. In line with the adopted criteria, the following observation sheets were excluded: no. I – 10 sheets, no. II – 12 sheets, and no. III – 2 sheets. Eventually, 105 sheets submitted by the respondents were found eligible for the study. In order to ensure consistency across the studied group, all eligible sheets had to meet the following criteria: at least two main fertility biomarkers recorded (BBT – biphasic temperature pattern, notes on the observation of mucus), normal luteal phase, length of bleeding, and correlation of fertility symptoms.

Collecting such a large number of research sheets proved time-consuming as the documentation came from candidate method teachers whose task was to provide training on the sympto-thermal double-check method to three women from different backgrounds. Consequently, only those sheets that had been correctly filled in and met the criteria prescribed for typical cycles were admitted for statistical analysis. Sheets with deficiencies and atypical cycles were excluded from the study.

For the purposes of statistical analyses, the SPSS Statistics software suite, version 25, was used. The Shapiro–Wilk test allowed the verification of differences between the obtained result distributions and the normal distribution. The Mann-Whitney U test was utilised to compare cycle length between groups of women under and over 35 years of age. The level deemed statistically significant was $p < 0.05$. The results obtained are presented graphically in tables, bar charts and pie charts.

3. Results

The age of the women in our study ranged from 17 to 42 years, with the mean age of 29 years (Chart 1).

There were 25 (58.14%) unmarried women in our study and 18 (41.86%) respondents declared that they were married (Chart 2).

The percentage of women without children was 79.1% (n=34). Out of nine respondents with children, one respondent had six children, one respondent had four children, three respondents had three children, two respondents had two children, and other two had one child each (Chart 3).

Collectively presented were the characteristics of typical menstrual cycles of the respondents based on three menstrual cycle observation sheets using the sympto-thermal double-check method. On average, monthly bleeding lasted more than five days. The shortest bleeding continued for three days and the longest had a duration of eight days. The first mucus occurred around day 9 of the cycle, with highly fertile mucus on day 13 and the peak of the mucus symptom on day 16. On average, the day of peak mucus + 3 days was the 19th day of the cycle.

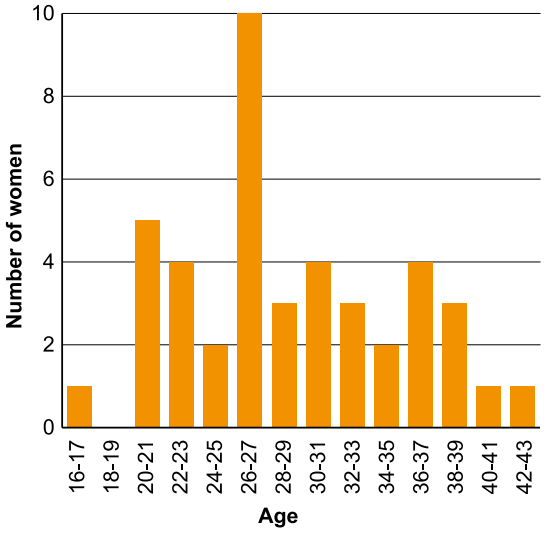

Chart 1. Age of respondent women

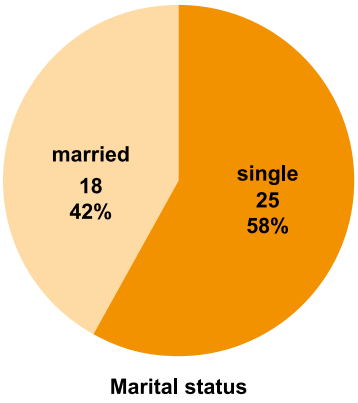

Chart 2. Marital status of respondent women

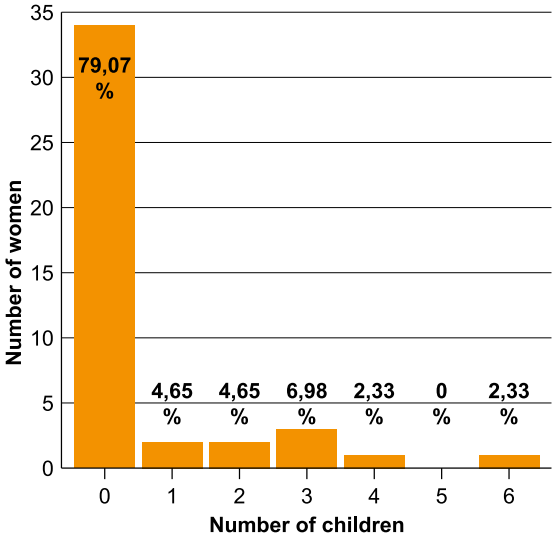

Chart 3. Number of children among respondent women

Table 1. Characteristics of typical menstrual cycles of respondent women in three observations carried out with the sympto-thermal double-check method (Shapiro–Wilka Test)

Property	Number of the menstrual cycle observation sheet																		I-III
	I						II						III						
	n	M	SD	min	max	Test S-W p	n	M	SD	min	max	Test S-W p	n	M	SD	min	max	Test S-W p	M
Last day of menstruation	33	5,55	1,03	4	8	0,001	31	5,65	1,14	4	8	0,004	41	5,40	0,96	3	7	0,001	5,53
Day of occurrence of first mucus	33	9,00	1,87	5	13	0,189	31	8,74	2,13	5	13	0,101	41	9,29	2,33	6	17	0,002	9,01
Day of occurrence of highly fertile mucus	33	12,94	3,43	7	22	0,064	31	13,26	2,90	8	23	0,011	41	12,95	3,66	7	29	0,000	13,38
Day of occurrence of peak mucus symptom	33	15,91	3,60	9	24	0,088	31	16,45	3,62	11	26	0,016	41	15,93	3,72	11	30	0,000	16,09
Day of occurrence of mucus symptom + 3 days	33	18,91	3,60	12	27	0,088	31	19,45	3,62	14	29	0,016	41	18,93	3,72	14	33	0,000	19,09
First day of temperature above the overlap line	33	16,97	3,42	11	26	0,034	31	17,19	3,45	13	27	0,001	41	16,83	3,11	12	29	0,000	16,99
Third day of temperature above the overlap line	33	18,67	3,02	13	28	0,150	31	19,19	3,45	15	29	0,001	41	18,83	3,11	14	31	0,000	18,89
Length of luteal phase	33	12,88	1,75	10	16	0,116	31	12,71	1,77	9	15	0,013	41	12,41	1,52	10	16	0,034	12,66
Length of cycle	33	28,39	2,84	23	38	0,007	31	28,90	2,66	25	36	0,080	41	28,39	3,15	24	42	0,000	28,56
Days of occurrence of less fertile mucus	33	8,52	5,24	3	21	0,000	31	8,16	5,15	2	21	0,003	41	7,93	5,80	1	29	0,000	8,20
Days of occurrence of highly fertile mucus	33	3,79	1,80	1	7	0,003	31	4,00	1,65	2	8	0,019	41	3,90	1,85	1	11	0,000	3,89
Number of days of absolute infertility	33	8,79	2,20	4	13	0,145	31	8,71	2,08	4	12	0,168	41	8,83	1,69	5	13	0,130	8,77

n – number of observations; M – mean; SD – standard deviation ; S-W –Shapiro–Wilka test

The first day of temperature above the overlap line was usually the 17th day of the cycle, while the third day of temperature above the overlap line was usually the 19th day of the cycle. The luteal phase lasted almost 13 days, the cycle length was about 28 days, and less fertile and highly fertile mucus occurred for 8 days and almost 4 days, respectively. The Shapiro–Wilk test revealed a number of statistically significant differences between the obtained result distributions and normal distribution. These differences were mostly found in the third and second measurements. Their absence in the third measurement only concerned the number of days of relative infertility and, in the case of the second measurement, also the day of the first mucus and the length of the cycle. As regards the first measurement, statistically significant differences in result distributions, as compared to normal distribution, were found in the last day of menstruation, the first day of temperature above the overlap line, the length of the cycle, and days of less fertile and highly fertile mucus (Table 1).

The biomarker of cervical changes was tested by only three women in sheet I, six women in sheet II and eight women in sheet III of cycle observation.

Table 2. Age of respondents versus mean lengths of menstrual cycle in individual observation sheets

Number of cycle n		I		II		III		I-III
		n	M	n	M	n	M	M
Mean cycle length in women aged over 35		7	28.14	6	30.17	9	28.33	28.88
Mean cycle length in women aged below 35		26	28.46	25	28.60	32	28.40	28.48
No data		10	-	12	-	2	-	-
Mann–Whitney U test	U	88.00		59.50		104.00		
	p	0.887		0.757		0.385		

n – number of observations; M – mean

On average, peak cervical symptom in sheet I occurred on day 11, in sheet II – on day 13, and in sheet III – on the 14th day of the cycle.

The mean lengths of the menstrual cycle, broken down by the respondents' age, were presented in the three sheets of menstrual cycle observation carried out with the sympto-thermal double-check method. In our study, the mean cycle length in women over 35 years of age was 28.88 days, while in women under 35 years of age it was 28.48 days. The analysis carried out did not show any statistically significant differences between younger and older women in successive measurements in terms of length of the monthly cycle (Table 2).

The results showed that, based on fertility biomarkers recorded in the observations sheets, the following factors, among other things, can be assessed: the regularity of biphasic menstrual cycles, duration of the different stages of the menstrual cycle, and the correlation of these bio-indicators. The observation sheets can therefore be used to endocrinologically diagnose the course of the cycle, as well as to determine the right day for hormonal tests.

4. Discussion

Although research on the analysis of observation sheets for the sympto-thermal method to double-check menstrual cycles was interesting, the literature on this subject is still very scarce. No mentions were found in the literature on any other research of this type with a similar group of respondents, i.e. one that would reflect the results obtained by the authors in the statistical analysis. For this reason, the researchers selectively compared the data with the available literature.

Documented records of 105 menstrual cycles were submitted for analysis by 43 women. The studies cited here were ranked according to their time of publication. Consequently, a 1983 study by the World Health Organization (WHO) was conducted among 725 women from whom 6 472 cycles were obtained (World Health Organization: A prospective multicentre trial of the ovulation method of natural family planning, 1983). In a study from 2000, the research group comprised 441 women and the number of menstrual cycles reached 1427 (Deluga, 2000). The 2002 study was based on an analysis of 108 menstrual cycles of 53 women (Fehring, 2002). The study from 2006 involved 141 women who monitored between 3 and 13 menstrual cycles (Fehring, Schneider, Raviele, 2006). The authors of work from 2012 conducted their research among 31 women with regular menstrual cycles (Tawara, Tamura, Suganuma, Kanayama, 2012). An assessment of surveyed women's knowledge of the menstrual cycle and ovulation was presented in 2016 in a study involving 125 women (Ayoola, Zandee, Adams, 2016). A study from 2017 examined 284 women and analysed 1635 cycles (Crawford, Pritchard, Herring, 2017). The 2021 study was conducted with the participation of five women who provided data on 30 cycles (Worsfold, Marriott, Johnson, Harper, 2021). In the same year, 528 women participated in a study with 2488 cycles analysed (Najmabadi, Schliep, Simonsen, Porucznik,

Egger, Stanford, 2021). In the majority of papers, the number of female respondents was larger than the group included in the our own analysis. However, two studies by Tawara and Fehring involved similarly sized groups: 31 and 53 participants, respectively.

The age range of the women in our study was between 17 and 42 years, with the mean age of 29 years. Deluga's study involved women aged between 18 and 49 (Deluga, 2000). In his study, Fehring described women with the mean age of 32 years (Fehring, 2002). Tawara et al. conducted their study with the participation of women with the mean age of 32 years (Tawara, et al., 2012). Respondents in the study by Najmabadi et al. were women aged between 18 and 40 years (Najmabadi, et al., 2021). The study by Crawford et al. involved women between the ages of 30 and 44 (Crawford, et al., 2017). In the study by Ayoola et al., the authors presented results obtained among women aged between 18 and 51 (Ayoola, et al., 2016). The women studied by Fehring et al. had the mean age of 29 years (Fehring, et al., 2006). The last presented results of age analysis are identical to those in our study.

In our study, 25 (58.14%) women were not married and 18 (41.86%) declared that they were married. In the study by Najmabadi et al., 320 women (60.6%) were married and 50 (9.5%) were unmarried (Najmabadi, et al., 2021). Ayoola et al. conducted a study in which 73 (58.4%) of the respondents were not married and 52 (41.6%) were married (Ayoola, et al., 2016). The results of our study are therefore closest to those obtained in the last above-mentioned research as regards the percentage of women who were unmarried.

In our study, the percentage of women without children was 79.1% (n=34). Such respondents in the study by Najmabadi et al. made up 70.8% (n=374) of the study group (Najmabadi, et al., 2021). In the study by Ayool et al., an opposite correlation was observed. The minority (13.6% / n=17) of respondents had no offspring and 69.6% (n=87) had one or more children, with 16.8% (n=21) of women having more than three children (Ayoola, et al., 2016). This difference most likely resulted from the fact that the study was conducted on another continent with the participation of women of different races.

The average duration of the luteal phase in our study was nearly 13 days. The same time frame was reported in Deluga's research as the average time of the luteal phase (Deluga, 2000). Fehring's research, in turn, showed an average of 12 days. The length of the luteal phase in the study by Najmabadi et al. averaged 11 days (Najmabadi, et al., 2021). In another study by Crawford et al., the luteal phase had the length of 14 days (Crawford, et al., 2017). In view of the fact that duration of the luteal phase, according to the sympto-thermal double-checking method, cannot be shorter than 10 days and longer than 16 (Szymański, 2009), the number of days of this phase provided in the literature cited here aligned with the norm across all the analysed studies.

The mean length of the menstrual cycle in our own research was 28.6 days. Almost identical results were obtained in Deluga's study, where the menstrual cycle had the mean length of 28.5 days (Deluga, 2000). In Fehring's results, the mean length of menstrual cycles was 29.4 days (Fehring, 2002). 28.4 days was the length recorded by Tawara (Tawara, et al., 2012). In the study by Worsfold et al. conducted on a very small group, one woman reported regular menstrual cycles lasting 28 days, one woman had irregular cycles with the mean length of 31 days, and in three other women cycles varied from 23 to 33 days on average (Worsfold, et al., 2021). In the WHO study, the average duration of menstrual cycles was 28.5 days (World Health Organization: A prospective multicentre trial of the ovulation method of natural family planning, 1983). The mean length of menstrual cycles in the study by Fehring et al. was 28.9 days (Fehring, et al., 2006). The analysis of the mean length of cycles in Deluga's and WHO studies has proven to reflect most closely the results of our study. In contrast, the results obtained by individual authors did not differ significantly from the mean recorded in our study.

The mean duration of highly fertile mucus in our study approached 4 days. In the study by Worsfold et al., highly fertile mucus continued for 6 days (Worsfold, et al., 2021). In the study by Najmabadi et al., the average number of days of highly fertile mucus per cycle during a year was 6.4 days (Najmabadi, et al., 2021). It follows from the results of

individual authors' research presented in this paper that, compared to our study, highly fertile mucus remained 2 days longer.

In our study, the mean cycle length in women over 35 years of age was 28.88 days, while in women under 35 years of age it was 28.48 days. According to Deluga, the woman's age plays an important role as far as the length of menstrual cycles is concerned, and the length of typical menstrual cycles varies in women depending on their age group. In her study, she found that menstrual cycles are shorter in women over the age of 35. The mean cycle length in the case of women aged over 35 was 27.9 days and 28.9 days for those under 35 (Deluga, 2000). Our own studies did not reveal a similar relationship, perhaps because due to the number of interviewed women.

The age at which the respondents reported to have had their first menarche ranged from 10 to 17 years. In the study by Najmabadi et al., this age was between 11 and 14 years (Najmabadi, et al., 2021). According to Pachecka, the age range for the first menarche varies from 10 to 16 years and is mainly dependent on genetic and environmental factors as well as the level of nutrition. Mental and physical stress may contribute to delayed menarche, which means that, e.g. female dancers and athletes are likely to experience pubescence later, with the onset of the first menstrual period at 19-20 years of age (Pachecka, 2009). Only one woman in our study declared a delayed onset of the first menstruation which occurred when she was 17.

The observation of menstrual cycles and their analysis in the study group confirmed the possibility of identifying and classifying cycles in accordance with specific (in this case typical) criteria. The rationale for conducting observations in this situation may be to confirm good reproductive health, i.e. the presence of hormonal homeostasis between the 1st (follicular) and the 2nd (luteal) phases of the cycle, which allows a mature woman to achieve emotional balance as well as mental and physical well-being. At the same time, for married women, determining the time of highest fertility in order to plan or postpone conception is simple and promotes dialogue and effective communication between spouses. However, given the increasingly-prominent issue of fertility disorders and abnormal menstrual cycles, the usefulness of knowledge and health awareness in this area should be adequately emphasised. Professor Vigil points out that 3 or more cycles per year that do not meet the aforementioned criteria for typical cycles or 2 disturbed cycles occurring successively should be considered abnormal and be the subject of further medical consultation. At the same time, around 30% of regular cycles are non-ovulatory (Vigil, Lyon, Flores, Rioseco, et al., 2017). Here, an indispensable role is to be played by a professionally trained teacher of the method in question, who can also serve as a 'liaison' between the patient (client) and the physician (Szymaniak, Ślizień-Kuczapska, 2016; Ślizień-Kuczapska, Żukowska-Rubik, Sys, 2018).

In conclusion, this study provides an opportunity to classify cycles according to the characteristics of specific biomarkers and thus supports the confirmation of reproductive health or the early recognition of possible deviations and abnormalities and their treatment. The sympto-thermal double-check method belongs to the family of multivariate methods and is based on the scientific research of Dr Anna Flynn and Prof. John Kelly from the Maternity Hospital in Birmingham. As has been demonstrated, it can serve the above-mentioned purposes (Flynn, Brooks, 1990). In addition, cycle observation sheets are a functional tool for individuals interested in pursuing responsible family planning which aligns with their reproductive plans, regardless of their personal values, beliefs or place of residence. The cycle observation sheet, by providing insight into normal or disturbed operation of female reproductive health, reduces the time until the first medical consultation held in the event of any irregularities in the cycle, aids the addition of clients/patients to co-partnership in the diagnostic and therapeutic process, increases precision in the ordering and interpretation of tests throughout the cycle, and helps track progress in the restoration of normal reproductive functions of the female body. These tasks require a certified NFP teacher who combines knowledge and experience with personal support for spouses using natural family planning and fertility recognition methods.

The researchers believe that this type of work needs to be expanded and further analysed.

Conclusions

The study group was homogeneous in terms of the eligibility criteria for the analysis of observed menstrual cycles defined as typical, i.e. characterised by normal mean cycle length and bleeding, normal length and course of the luteal phase determined by the biphasic BBT curve, normal mucus development pattern and convergence of fertility indices. This study indicates the need for further broadening of knowledge regarding the implementation of this type of research based on observable fertility bio-indicators.

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