

INTERNATIONAL REVIEW OF

NATURAL FAMILY PLANNING

*To Jim,
with kindest regards,
R. Vollman, 05/13.*

Rudolf F. Vollman

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Assessment of the Fertile and Sterile Phases of the Menstrual Cycle

Rudolf F. Vollman

NATURAL FAMILY planning through periodic abstinence depends on scientific knowledge of human reproductive physiology. I shall first describe some of the important facts of woman's reproductive physiology. Then I shall critically analyze their significance in respect to natural family planning.

In 1923 and 1924 Ogino published two short papers in which he summarized his observations made on the ovaries and uterus in the course of 118 laparotomies. Whenever he discovered follicles only, the corresponding endometrium was in the proliferative phase; however, whenever he found a corpus luteum in the ovaries, the corresponding endometrium had been transformed into the secretory phase. Comparing the corpora lutea according to the day of operation, he found them widely distributed, from the eleventh to the forty-first day of the menstrual cycle. These findings seemed to confirm the prevailing theory that ovulation in woman may occur at any time during the menstrual cycle; women were consequently considered to be fertile on any day of the cycle.

The result of his studies must not have pleased Ogino too much. He argued that ovulation potentially means the beginning of pregnancy, which is initially guarded by a functional corpus luteum. If conception does not occur, the corpus luteum breaks down and thus initiates the next menstruation. Therefore, "it is reasonable that the 'ovulation period' should be calculated from the next-coming menses" (Ogino). When he retabulated his data according to the reverse order of days from the approaching menstruation instead of progressively from the previous menstruation, as is done conventionally, Ogino suddenly "introduced order into this confusion."

By the simple device of adequately tabulating the data, he demonstrated that all early corpora lutea (proliferation stage) were found between the twelfth and sixteenth days, inclusive, before the day of onset of the succeed-

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ing menstruation. Basing his conclusion on the histology of the early corpora lutea, he defined a five-day interval from the twelfth through the sixteenth day as woman's "ovulation period."

Ogino further recognized that the range of the ovulation period, in the sample of data available to him, is independent of the length of the menstrual cycle. Finally, he keenly spelled out a practical application of his findings: if the ovulation period in woman is known, her fertile and sterile days are simultaneously defined.

Ogino knew from the literature on animal husbandry and on experimental fertilization of laboratory animals that the unfertilized oocyte has a very short life span, probably only a few hours. He therefore postulated that a premenstrual phase of sterility extending from the eleventh through the first day before the onset of the next menstruation follows the ovulation period (sixteenth through twelfth day). As evidence Ogino presented a tabulation of 754 sterile intercourses reported by 96 fertile women in 424 menstrual cycles (table 1).

Because of the unknown duration of the survival of fertilizable spermatoocytes in the female genital organs, Ogino extended the five-day ovulation period (sixteenth through twelfth day) by three days and called the eight-day span (nineteenth through twelfth day) the conception period (table 2, Miller's case). This table illustrates at the same time one of the main technical difficulties of the so-called Calendar Method of family planning. According to the author, this couple was well instructed, intelligent, and strongly motivated to prevent a further pregnancy. However, in a total of 53 menstrual cycles intercourse was reported 22 times during the conception period—17 times at its beginning and 5 times at its end (table 2). That no conception occurred may be considered circumstantial evidence of the brevity of woman's fertile time.

TABLE I

Distribution of Sterile Intercourses by Days before the Next Menstruation, Reported by 96 Fertile Couples

Author	No. of Women	No. of Menstrual Cycles	Days before Next Menstruation											Totals
			11	10	9	8	7	6	5	4	3	2	1	
Ogina	6	142	23	6	24	26	31	26	34	30	32	30	36	300
Miller	88	258	15	5	16	13	21	44	50	44	47	64	82	401
Knaus	2	24	4	4	11	1	3	3	7	6	7	3	4	53
Totals	96	424	42	17	51	40	55	74	91	80	86	97	122	754

Source: Ogino, "Conception Period of Women," 1934. (Rearranged by R.F.V.)

TABLE 2
Distribution of Intercourse by Length of Menstrual Cycles
as Reported by a Fertile Couple

Cycles Length No.	Days of Menstrual Cycle In Reverse Order																															
	33-30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	Totals	
27									1																							4
28							1	3	3	3	2	4	5	1										1	4	4	4	4	6	2		47
29							5	2	5	4	2	3	2										7	3	1	6	3	2	4			49
30						2	1	4	2	2	1	1										2	3	1	4	1	4	2				30
31				4	2	3	4	4	3	3											2	1	6	3	2	7	1	2	1			48
32				2	2	2	2	4	1											1	4		2	3	3	2	1					29
33		1	5	2	3	2	1	4	1											1	3	1	2	3	2	1	1					38
Totals	53	1	5	8	7	9	14	21	16	12	5	9	7	1					2	9	4	20	14	16	22	14	10	11	3		245	

Ogino's Conception Period

Arranged from the original data published by A. G. Miller, 1938.

Approximately ten years after Ogino's publication, Knaus began to publish a series of articles on the contractility of the uterus induced by oxytocin, a pituitary hormone. During the postmenstrual phase the uterus reacts with contractions to an oxytocin injection; during the premenstrual phase, however, the uterus is refractory and does not contract. Knaus deduced from his experiments that the reactivity of the uterus is blocked by the activity of the corpus luteum, which begins shortly after ovulation. He performed an unknown number of tests in healthy women and concluded: "Ovulation occurs spontaneously on the fifteenth day before the onset of the next menstruation." Knaus believed that his "Law of Ovulation" applied to all women of all ages. As Ogino had done shortly before, Knaus prepared a formula for calculation of the woman's fertile and sterile days (table 3).

Knaus published many individual records on the distribution of sterile intercourses by the days of the menstrual cycle (table 4). That the couples frequently deviated from the strict rule of abstinence is documented in Knaus's records as well as in Ogino's. The Calendar Method of family planning is obsolete today, but the extant records on intercourse have a high research value for the estimation of the likelihood of conception during the postmenstrual days.

Simultaneously with Knaus's publications, the original discovery of the biphasic course of woman's basal body temperature during the menstrual cycle (Mary Putnan Jacobi, van de Velde, Hansen) was independently unearthed by five researchers (Rubenstein, Palmer and Devillers, Zuck, Vollman). The basal body temperature runs at a low level during the postmenstrual phase, i.e., from the onset of menstruation through the day before the shift of the temperature. The premenstrual temperature, from the day of the shift through the day before the onset of the following menstruation, runs at an elevated level. The phase of elevated temperature is concordant with an increased concentration of progesterone in the plasma and of progesterone metabolites in the urine of women. Consequently, it was concluded that the elevated basal body temperature indicates the presence of an active corpus luteum following ovulation. Empirically, the days of the elevated temperature proved to be sterile (table 5). From my study group, 74 couples who had for some time used the temperature curve for spacing pregnancies agreed to have intercourse only once in the cycle for the next planned pregnancy. So far, forty-three conceptions have been observed in this experiment (table 5). The distribution of the conceptions stretches from the ninth day before through the first day after the shift of the temperature. In these fertile couples all acts of intercourse from the second day after the temperature shift to the approaching menstruation and from the tenth day before the shift to the preceding menstruation have been sterile. Similar data have been presented by Marshall, Doering, and Roetzer.

TABLE 4
 Distribution of Intercourse by Length of Menstrual Cycles
 as Reported by a Fertile Couple

Cycles Length No.	Days of Menstrual Cycle in Reverse Order																															Totals			
	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1				
23														1																				4	
24													1													1									6
25											6	7	2											2	3	3	6	3	6	10	6	6	6	60	
26										4	9	6												6	7	6	8	2	8	9	5	6	76		
27										5	7	3											1	5	8	3	4	10	3	10	6	5	6	76	
28										1	2	2											2	2	1	1	4	2	1	2	1	1	2	25	
29										2	1												2		2		2	2	2	1	1	2	16		
30										1													1				1	1	1				6		
31																																		2	
Totals	56					1	3	8	13	18	13	2	1	1							4	5	8	17	17	20	29	12	29	28	19	23	271		

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Knaus's Conception Period

Arranged from the original data published by H. Knaus, 1955.

TABLE 5
 Distribution of Sterile and Single Fertile Intercourses by Days before and after
 the Shift of the Basal Body Temperature Curve:
 1,438 Intercourses Reported by 74 Parous Women

Outcome of Intercourse	Days before the BBT Shift										Days after the BBT Shift						Total Inter-courses	Total Cycles
	149-10	9	8	7	6	5	4	3	2	1	1	2	3	4	5	6-16		
Sterile	236	36	38	36	38	35	40	36	34	36	60	49	78	59	69	515	1,395	561
Conception	-	1	-	-	4	4	5	9	6	10	4	-	-	-	-	-	43	43
Totals	236	37	38	36	42	39	45	45	40	46	64	49	78	59	69	515	1,438	604
Conception Rates (%)	0	3	0	0	10	10	11	20	15	22	6	0	0	0	0	0	3	

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With the help of her own biphasic basal body temperature graph, a woman can easily determine her premenstrual sterile days in each menstrual cycle, whatever its length may be. If, in addition, she observes intermenstrual pain or cervical mucorrhea she may use these signs to forecast the pending shift of her temperature curve. Because of their variability and inconsistency she cannot use these signs by themselves to identify her sterile days.

Recently a new system has been developed which depends solely on qualitative characteristics of the cervical mucus for the estimation of the sterile and fertile days (Billings). This is a categorical approach which neither implies quantitative-measurement data nor requires any reference to the post- and pre-menstrual phases of the cycle.

The calendar methods developed by Ogino and Knaus have become the first historic approach to natural family planning. Both methods are based on the limited factual knowledge of their time about human reproductive physiology and on some courageous though reasonable extrapolations. Both methods are obsolete today because of their high failure rates.

Natural Family Planning founded on the basal body temperature curve is well established, because the method is technically very simple and the couple are assured of its practically 100 percent effectiveness during the premenstrual phase of the cycle. At the present time the sterile days during the postmenstrual phase can only be estimated (cycle day of the earliest observed shift minus 9 gives the number of postmenstrual sterile days).

"Wanted: An Easily Detected Sign of Impending or Just Completed Ovulation" was the title (1965) of one of the last papers Carl G. Hartment wrote. Research on this problem is still urgently needed today.

Note

For references see Rudolf F. Vollman, *The Menstrual Cycle* (Philadelphia: W. B. Saunders, 1977). (This definitive, remarkably researched volume is must reading for anyone serious about NFP—P. Marx.)