

Ovulation Monitors

Introduction

Rapid developments in medical technology in the 1990s have led to the development of a number of computerized devices for identifying the fertile window in the menstrual cycle. Such devices may be a useful adjunct to natural family planning to clarify a difficulty in interpreting the mucus symptom or the basal body temperature (BBT) chart,¹¹ or as a teaching aid to help identify the fertile phase. The use of such devices may increase the confidence of the NFP beginner when learning to observe the fertility indicators to define the limits of the fertile phase.¹¹

Can these devices be used instead of NFP?

The Natural Family Planning Teachers' Association of Ireland recommend that these devices should not be used alone, but should be used only as an adjunct with the 'symptothermal double-check method' of natural family planning taught by a qualified NFP teacher.

Question: Can all ovulation monitors be used to avoid pregnancy?

Answer: Please NOTE –

The answer is **NO**. The 'LH Dipsticks' are designed to be used by women who are planning to achieve pregnancy only. The 'LH Dipsticks' **should not** be used by women who wish to avoid pregnancy. (see paragraph B (iii) below).

The 2 main types of devices are:

- (A) Temperature computers
- (B) Hormonal computers to detect hormone levels in the urine

Tests on saliva are unreliable methods of indicating ovarian activity, and are not discussed here.^{1,4}

(A) Temperature computers

Temperature computers are devices using computer programs based on the basal body temperature (BBT) method, and the calculation rule. A computerised thermometer is a battery-operated electronic thermometer which by means of a micro-chip uses the 'calendar calculation' to detect the **onset** of the fertile phase, and the shift of BBT to determine the **end** of the fertile phase in the cycle. Examples of these devices include:

- 'Ladycomp/Ladycomp'^{1, 11, 15}
- 'Cyclotest 2 plus'¹

(B) Hormone measurement computers

Hormone computers read the colour signals of **dipsticks** which **measure metabolites** of luteinizing hormone (LH), oestrogen, or progesterone **in urine**, either alone or in various combinations. Some of these hormone computers, e.g. 'persona', 'clearplan' etc are listed below with the hormone metabolites that they measure:

Persona² measures oestrogen, LH

Clearplan^{13, 14, 15} measures oestrogen, LH

Oviquik¹² measures LH

Brown's Ovarian Monitor⁵⁻⁹ measures oestrogen, progesterone

Oestradiol and LH surge measured – Persona

Persona is a personal hormone monitor which consists of a hand held monitor and disposable test sticks which measure changes in concentrations of oestrone-3-glucuronide (E3G), and luteinizing hormone (LH) in morning urine (EMU) to identify the limits of the fertile phase of the cycle.² The start of the fertile phase is pinpointed by the rise in E3G, and the end of the fertile phase by allowing a period for ovum release and survival after detection of the LH surge.² "Studies that have investigated the efficacy of the *hormonal kit Persona* and the *Computer thermometers* have found that the effectiveness is not as high as the sympto-thermal double-check method of NFP".¹⁰

Oestrogen & progesterone metabolites – Brown's ovarian monitor

Brown's ovarian monitor which was developed in Melbourne by Prof James Brown, is not available in Europe.¹ It measures the rise in the urine metabolites of oestrogen to mark the beginning of the fertile phase and the rise in progesterone metabolites in urine to mark the end of the fertile phase.^{3, 5-9}

Prof Brown in his article,⁶ comments that on comparing the quantitative results from the laboratory with an *eye test* to assess hormone level, that the human eye has a remarkable ability to distinguish between relatively small changes in pregnanediol concentration over the crucial range of interest.⁶

LH surge measured

Luteinising hormone (LH) triggers ovulation and the LH surge lasts for 48 hours. Home assay kits to measure LH concentration in urine are designed to indicate the time of maximum fertility and are aimed solely at women who want to conceive, those who may be subfertile or have an unclear mucus symptom. **LH kits should not be used by couples who want to avoid pregnancy** as they do not predict ovulation sufficiently early to allow for the fertilizing life-span of the sperm in fertile-type mucus, or for the fertilizable life-span of the ovum after ovulation.

In pre-menopause, LH detection kits are not reliable

LH surge detection kits which identify elevated levels of urinary LH, may not be a valid predictor of ovulation in older women, and may produce a false positive surge detection result. This is because in many anovulatory perimenopausal women the LH levels in the urine are elevated and variable.

Ultrasound

The development of ultrasound has played an important role in providing basic information on all phases of ovarian activity and is the most accurate method of timing ovulation but is not practical for daily application.⁹

Conclusion

Comparison of the efficacy in avoiding pregnancy of different ovulation monitors with that of the symptothermal double-check method of NFP, by Freundl et al¹¹ showed that the most efficient was the symptothermal method (STM) of NFP followed by the temperature computers and Persona.¹¹ Mini-microscopes are not recommended. In summary, the symptothermal method is the most effective as it has the lowest false negative (not fertile in the true fertile phase) rate among all the methods tested,¹¹ but the period of abstinence required is somewhat longer compared to other monitors.¹¹

References:

1. Freundl G, Godehardt E, Kern PA, et al; "Estimated maximum failure rates of cycle monitors using daily conception probabilities in the menstrual cycle"; Human Reproduction, (2003), vol 18, no. 12, p2628-2633.
2. Bonnar J, Flynn A, Freundl G et al; "Personal hormone monitoring for contraception"; Br J Fam Plann. 1999 Jan 24 (4): 128-134.
3. Cavero, C; "Using an ovarian monitor as an adjunct to natural family planning"; Journal of Nurse-Midwifery, vol 40, no 3, 1995; p269-276
4. Guida, M et al; "Efficacy of methods for determining ovulation in a natural family planning program; Fertil& Steril;vol 72, no 5, Nov 1999, p 900-904.
5. Blackwell LF, Brown JB, Vigil P et al; "Hormonal monitoring of ovarian activity using the ovarian monitor, Part 1. Validation of home and laboratory results obtained during ovulatory cycles by comparison with radioimmunoassay"; Steroids, 68, 2003, p 465-476.
6. Brown JB, Blackwell LF, Billings JJ et al; 'Natural Family Planning' Am J Obstet Gynecol; 1987; 157: 1082-9
7. Brown JB, Blackwell LF, Holmes J, Smyth K; 'New assays for identifying the fertile period'; Int J Gynecol Obstet; 1989; Suppl 1: 111-122
8. Brown JB, Holmes J, Barker G; 'Use of the Home Ovarian Monitor in pregnancy avoidance'; A J Obstet Gynecol 1991; 165; 2008-2011.
9. Brown JB; 'Ovarian activity and fertility and Billings Ovulation Method, 2005; available on the internet if you google 'Billings ovulation method.'
10. Frank-Herrmann P. et al; 'The effectiveness of a fertility awareness based method to avoid pregnancy in relation to a couple's sexual

behaviour during the fertile time: a prospective longitudinal study'; Human Reproduction; Feb 2007; page 9; p1-10. *The study referred to is Freundl G et al (2003) cited as the first reference on this list.*

11. **Freundl G**, Frank-Herrmann P, Gnoth Ch; 'Cycle Monitors and Devices in Natural Family Planning; J Reproduktionsmed Endokrinol 2010; 7 (special issue 1): 90-96. Journal of Reproductive Medicine and Endocrinology. **(excellent review article, in English, on internet; google Freundl, NFP)**
12. Miller PB, Soules MR; 'The usefulness of a urinary LH kit for ovulation prediction during menstrual cycles of normal women'; Obstet Gynecol 1996; 87; 13-17.
13. Fehring RJ, Raviele K, Schneider M; 'A comparison of the fertile phase as determined by the Clearplan Easy Fertility Monitor and self - assessment of cervical mucus'; Contraception, 2004 ; 69(1): 9-14
14. Fehring RJ, Schneider M, et al; 'Efficacy of cervical mucus observations plus electronic hormonal fertility monitoring as a method of natural family planning'; J Obstet Gynecol Neonatal Nurs; 2007 ;36(2):152-160.
15. Bachhofer M, Freundl G, Frank-Herrmann et al; 'Retrospective clinical trial of contraceptive effectiveness of the electronic fertility indicator Ladycomp/Babycomp'; 1998; (text in English, on internet).
16. Behre HM, Kuhlage J, Gassner C, Sinntag B et al; 'Prediction of ovulation by urinary hormone measurements with the home use of ClearPlan Fertility Monitor: comparison with transvaginal ultrasound scans and serum hormone measurements; Hum Repro 2000; Dec 15(12): 2478-82