Basal Body Temperature (BBT) as an Indicator for Traditional Chinese Medicine (TCM) Diagnosis and Evaluation in Women’s Reproductive Health

By
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ABSTRACT

Basal body temperature (BBT) charting has been used by traditional Chinese Medicine (TCM) practitioners since thermometers were invented. Many practitioners explain how they incorporate BBT in terms of diagnosis and evaluation of their treatment. However, there is a lack of research and scientific study validating the efficacy of utilizing BBT. No investigations have demonstrated the reliability of using BBT for assisting with diagnosis and treatment evaluation. A retrospective chart review was designed to study this issue. Fourteen charts were selected from the researcher’s private practice according to established exclusion and inclusion criteria. All the patients were treated with acupuncture and Chinese herbal medicine over the course of two or more menstrual cycles. The BBT charts were evaluated and scored on a one to five point scale according to several specific criteria. The results showed that the overall average BBT score after the treatment is higher compared to the baseline or initial score from the first BBT chart by 29%. However, statistical analysis showed that deference was not significant ($P=0.25$). Consistent with the data generated from the study, the researcher was unable to conclude that BBT reading was a reliable tool for diagnosis and further evaluation of course of treatment. More objective clinical studies are needed preferably including randomized, controlled research involving larger numbers of cases.
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Chapter 1: Introduction

Basal Body Temperature (BBT) has been an aid for diagnosis and evaluation mainly for infertility with acupuncture and Chinese herbal treatments. However, there are no studies that have been completed to standardize and validate the use of BBT readings to assist in the determination of TCM treatments to facilitate fertility. Moreover, the literature in Eastern Medicine regarding BBT is limited. Some authors described in their books how to utilize BBT, yet most of them lack scientific backup. How do we know if BBT actually helps TCM practitioners to diagnose and evaluate their treatment?

Background

Many TCM practitioners in the Eastern world use BBT not only for ovulation, but also as a tool for the diagnosis and evaluation and the determination of treatment (Lyttleton, 2004; Chiu, 2012). When TCM practitioners make a diagnosis for infertility patients who are of a relatively young age, often traditional objective assessments such as pulse, tongue and abdominal palpitations are not significant enough to make a precise diagnosis. Adding a BBT reading for diagnostic purposes can be helpful. In addition, BBT can be used for confirmation of treatment effectiveness and evaluation of improvement even before the final outcome; pregnancy, which cannot be seen until biochemical tests are positive. However, before the standardization of BBT reading, those diagnoses from BBT can be the same as personal opinions. While there are several articles regarding BBT, few articles detail how to use BBT (Samples & Abrams, 1984; Chiu, 2012; Bauman, 1981). Most articles pertain to the application of BBT in relation to biphasic length of the follicular or luteal phase or rapid rise of ovulation (Yu, Zheng & Ping, 1989; Zhang, Yu & Wang, 1992). This study will seek to provide TCM practitioners with additional knowledge and techniques for treating reproductive health related cases. It will also seek to validate the utilization of BBT as a reliable tool for diagnosis and evaluation of treatment. This study will also seek to
assist in the process of standardizing the use of BBT readings in the processes of diagnosis and treatment of women’s reproductive conditions to be treated with Traditional Chinese Medicine.

Before “The First Test Tube Baby” was born in 1978, infertility and gynecology clinics in USA used BBT recording for not only the detection of anovulation but also the indication of defects in the cycle (Lenton, Weston, & Cooke, 1977). Since fertility technology progressed and IVF became a routine treatment, the usage of BBT has declined over time in the biomedical community. Unfortunately, BBT recordings have continuously been used by only a few TCM practitioners. As a result, we are losing an important communication tool to address patient care that spans both western and eastern medicine practices. Standardization of BBT readings and biochemical confirmations are essential to fulfill this gap. At first, studies are needed to discern if BBT is actually a valid indicator for treatment in TCM. This study has the potential to assist both TCM and western practitioners in diagnosis, by further refining the diagnostic meaning of basal body temperature, and exploring how BBT can be used in the determination of treatment.

**Research Questions/Objectives**

Is basal body temperature (BBT) an effective tool for diagnosis and evaluation of women’s reproductive health in the practice of Traditional Chinese Medicine?

**Definition of Terms**

- Basal Body Temperature: the lowest body temperature attained by the thermometer during sleep.
- Infertility: one year of unprotected intercourse without resulting conception (Speroff & Fitz, 2005).
- Follicular Phase: menstrual cycle phase from the first day of the period to the day of ovulation.
• Luteal Phase: menstrual cycle phase from the day of ovulation to a day before subsequent cycle.
• FSH: follicle stimulating hormone
• Estradiol: a type of estrogen
• LH: Luteinizing hormone
• One-way ANOVA: The one-way analysis of variance (ANOVA) is used to determine whether there are any significant differences between the means of three or more independent (unrelated) groups.
Chapter 2: Review of Literature

Overview

This chapter will discuss the current research studies, theory and practice regarding BBT based on existing studies/books that pertain to BBT. It will begin with a background and overview of BBT including its historical usage and application, current usage in both Western and Oriental Medicine, analysis of BBT in different phases which relate to diagnosis. The last section of this chapter will summarize the reviewed literature and will succinctly establish the foundation and parameters of the current study.

Resources/Databases

Quoted journals and publications regarding to BBT were gathered through online search engines including PubMed Central, Google Scholar, High Wire, Cochrane Reviews, and EBSCOhost.

Resources/Journals

All literature reviewed for this study was derived from the journals listed below:

- Fertility and Sterility
- Journal of Alternative and Complementary Medicine
- Chinese Journal of Integrative Medicine
- Journal of Chinese Medicine
- Examiner
- Journal of Gynaecology & Endocrinology
- Journal of Biosocial Science
- Zhong Xi Yi Ji He Za Zhi
- Journal of Biosocial Science
• Journal of Obstetric, Gynecologic & Neonatal Nursing
• Chung Kuo Chung His I Chieh Ho Tsa Chih
• British Medical Journal
• Obstetrics & Gynecology
• Journal of Educational Evaluation for Health Professions

Background and History

BBT Measurement

Basal Body Temperature (BBT) is the lowest body temperature attained by the thermometer during sleep (Chiu, 2012; Bauman, 1981). However, in practice BBT monitoring requires that the measurement to be taken immediately after awakening and before any physical activity has been undertaken. BBTs are taken by patients and are reported to the practitioner. The measurement of temperature is generally taken by oral method with a basal thermometer which provides accurate readings within 1/10th of a degree. Axillary temperature readings generally yield a lower reading than the oral method. Axillary readings are standard in some Asian countries, and are acceptable as long as they are consistently taken by a single method (Maciocia, 1998). There are variables of temperature reading that also need to be considered. For instance, if a waking temperature is taken earlier or later than the usual time, the reading may be altered. Other factors can include alcohol consumption the day before, or the night before, sickness, skipping evening meals, medications, and sleeping with an electric blanket or other warming mechanisms (Lyttleton, 2004). Subjects should inform the practitioner, and such factors need to be taken into consideration.

History of BBT

Prior to the 20th century, a great deal of superstition surrounded fertility and the menstrual cycle.
During the last century and a half, however, multiple observations from a variety of researchers contributed to our current understanding of the meaning of fertility signs (Ober, 1971).

Historically Basal Body Temperature (BBT) charting was initiated in the 1930s. Rev. Wilhelm Hillebrand, a Catholic priest in Germany, developed a system for avoiding pregnancy based on basal body temperature. This temperature method was found to be more effective in helping women avoid pregnancy than calendar-based methods. Over the next few decades, the BBT system became widely used especially among Catholic women. Two speeches delivered by Pope Pius XII in 1951 gave recognition and the Catholic Church’s approval to the BBT system for couples who needed to avoid pregnancy. This method was a good fit not only women with religious reasons, but also for those who wanted to avoid the usage of chemicals into their bodies to avoid pregnancy (Ober, 1971).

**Current Usage of BBT in Western Medicine**

Western Medicine has employed BBT as a method for predicting ovulation and therefore birth control. Since biochemical tests and medications and other more successful methods of family planning have been developed, BBT is no longer a primary family planning method. The usage of BBT as an ovulation predictor (or for confirming ovulation) has been controversial in biomedicine world. Lenton, Weston, & Cooke, (1977) had already questioned using BBT recording in fertility clinics in 1977. In 1981, Bauman studied BBT as ovulation predictor, and he reported that BBT was not reliable. On the other hand, some researchers found that BBT was useful. Guermandi and associates (2001) found a .74 correlation between BBT for ovulation detection and ultrasonography. The study also revealed a relationship between Urinary LH and ultrasonography (.97), as well as a correlation between serum progesterone and ultrasonography (.79). There is consensus that BBT is not reliable to predict the exact ovulation day. However BBT has the advantage as being cost effective, and it has the ability to monitor the entire menstrual cycle. Moreover, BBT monitoring may provide insights into abnormal lengths of
the follicular or luteal phases. This factor may provide clues of reproductive endocrine dysfunction and thyroid dysfunction.

**Current Usage of BBT in Eastern Medicine**

**Analysis of BBT at different times of the menstrual cycle**

Some Traditional Chinese Medicine (TCM) practitioners describe various aspects of BBT charting to be meaningful to diagnosis. Below is the list of each analysis of BBT at different times of the menstrual cycle by TCM practitioners and other authorities. Some of the factors described below were used in the current study to assign numerical values to BBT readings.

1. **Transition of the cycle to cycle**

   Two critical events occur in a single menstrual cycle. One is menstruation, and other is ovulation. These two related events refer to the times of the transition of Yin and Yang in TCM terms. BBT readings should drop the day before the first day of the menstruation. When BBT does not drop at the time of the beginning of the menstruation, it is considered to be a failure of Yang transforming in Yin. Noll and Wilms (2010) added that the failure of BBT to drop is sign of Blood stasis.

2. **Length of follicular phase**

   The length of the follicular phase is determined by the number of the days from the first day of the menstruation to the day of the ovulation, and the length is typically around 14 days.

   “If ovulation is delayed (long follicular phase), then one of the prerequisite substances or condition is absent or insufficient or the process of ovulation is obstructed (known as Qi stagnation) or the Shen or Heart is disordered (Lyttleton, 2004, p. 65)”. According to TCM theory, deficiency of the Kidney Jing, Kidney Yin and the Blood can lead to delayed ovulation since those are required for an egg to develop. On the other hand, a Heat related condition may
attribute consistent short follicular phase (Lyttleton, 2004). Maciocia (1998) also stated that “An irregular follicular phase length may indicate poor or suboptimal folliculogenesis (p. 738)”.

3. **BBT in follicular phase**

   The BBT during the follicular phase is 0.5-1.0 °F lower than the luteal phase (Flaws, 1993). The difference in BBT reflects a biphasic cycle. When BBT shows extremely low, i.e. below 96.8 °F, it may indicate a low metabolic condition such as lowered thyroid function. Conversely, when BBT is consistently high, it may indicate a high metabolic condition in hyperthyroidism. According to TCM, a low BBT is considered to represent Yang deficiency (or specifically Spleen and Kidney Yang deficiency). High BBT is considered to be a reflection of internal Heat in TCM (Lyttleton, 2004).

4. **Unstable follicular phase**

   BBT in the follicular phase must be stable, not varying by more than 0.5 °F. Occasional spikes may be caused by lack of sleep, a touch of upper respiratory infection (URI), or alcohol consumption the day before BBT was measured. In such a case, it should be reported to the practitioner. Unexplained unstable temperatures looking like a “saw-tooth” as seen in Fig.1 are described in TCM terms as Liver and Heart Fire (Lyttleton, 2004). Although she did not indicate a specific phase, Lewis (2004) stated in her book, “A saw-tooth, erratic pattern is a clear indication of Liver Qi stagnation (p.63)”.
5. Ovulation

BBT should show dramatic shifts around ovulation. As Estradiol (E2) peaks after stimulation of follicle stimulating hormone (FSH), temperature may drop slightly. Due to the small window of estradiol (E2) peak (about 12 hours), a temperature drop may not be detected depending on timing of temperature taking. Among different descriptions of the timing between the thermogenic shift in BBT and ovulation, it is quite difficult to pin point the actual ovulation date. The shift in BBT occurs when progesterone concentration arises above approximately 3-5 ng/mL, 1-5 days after the leutinizing hormone (LH) surge and up to 4 days after ovulation (Fritz & Speroff, 2005). Weschler (2006) stated that “Temperature typically rises within a day or so after ovulation (p.53)”. Indichova (2012) agreed stating that “The rise in basal temperature occurs 2-3 days after ovulation (p. 1)”. This is the moment of Yin turning into Yang according to the in TCM perspective.

6. Transition to Luteal Phase

An increase of BBT (up to 1 °F) after the ovulation happens remarkably within a day or two in most non-pathological charts. According to TCM theory, if the rise in temperature takes
more than 3 days, it is considered as a pathological sign caused by Kidney Yang deficiency combined with Spleen Qi and Yang deficiency (Lyttleton, 2004). This condition can have its root cause from original Yin deficiency, since Yin is necessary to form Yang. Moreover, Qi stagnation can prevent the transformation of Yin to Yang (Noll & Wilms, 2010). Lewis (2004) stated that a slow step-like rise of BBT after ovulation indicates Qi stagnation being caused by Blood Stasis or Kidney Yang deficiency. Flaws’ 1993 book describes Xia Gui-cheng’s six types of BBT anomalies. Flows (1993) reports that a prolonged (more than 3 days) transition to hyper thermal phase is referred to as Yang Qi insufficiency and Kidney/Spleen dual vacuity.

7. Length of luteal phase

After the adequate rise of temperature, BBT should maintain a higher level of at least 11 or 12 days. No matter the length of the cycle, the length of this half part is relatively steady as around at 14 days. The degree of Kidney Yang deficiency may depend on the length of the luteal phase (i.e. shorter is more severe) (Lyttleton, 2004). Noll & Wilms (2010) also stated that when an elevation of BBT is less than 12 days, it is a sign of corpus luteum insufficiency or Kidney Yang vacuity. Xia (1992) according to Flaws (1993) added the diagnoses of Spleen Yang vacuity to Kidney Yang vacuity in such cases. However, Lewis (2004) stated that a shortened luteal phase is due to excess heat, Kidney Yin deficiency or/ and Liver Qi stagnation.

8. BBT in luteal phase

Exhibiting low BBT as lower than 0.4 °F when compared to the Follicular phase represents “a failure of Kidney Yang to properly fulfill its function (Lyttleton, 2004, p. 71)” Noll & Wilms (2010) stated that lower than 0.5 °F BBT indicates a clear Kidney Yang vacuity. Xia (1992) again added Spleen Yang vacuity to Kidney Yang vacuity.

9. Unstable follicular phase

Unstable BBT can be seen as a saw-toothed pattern or saddle pattern.
A saw-toothed pattern represents instability of the Heart and Liver Qi with Kidney Yang deficiency. If temperatures are higher or consist of a number of high peaks, the diagnosis may be Liver Fire (Lyttleton, 2004). Xia (2001) attributes such conditions to Heart and Liver Fire. However, in Flaws’ book, in Xia Gui-cheng’s six types of BBT anomalies, a saw-toothed BBT is “Yang vacuity with loss of harmony of the Heart, Liver, Spleen, and Stomach: commonly Liver depression or Heart Liver depressive fire (Flaw, 1993, p. 88).” Lewis (2004) related saw tooth erratic patterns to Liver Qi stagnation.

In the saddle pattern BBT in the luteal phase is caused by the temperature rising after ovulation for about a week, as it should, but then drops suddenly and climbs again. This pattern creates two mountains like a horseback saddle (Figure 2). Lyttleton (2004) described this pattern as “both lack of firm Kidney Yang and instability in the Heart and Liver (p.74)” . A surge of estrogen at the time of the implantation that occurs may cause a significant temperature drop. Lyttleton (2004) states that it is not a severe impairment as concern to for fertility since the temperature recovers at the end of the cycle. Noll and Wilms (2010) have a different point of view as they interpret saddle patterns as a vacuity of Spleen and Stomach Qi or an insufficiency of corpus luteum function resulting lack of progesterone. Xia (1992) described this pattern as “Horse-shaped”, and it is accompanied by Yang Qi sufficiency, Kidney/Spleen dual vacuity.
Literature Review Integration

There is a long history of BBT charting in western world. Unfortunately the usage of BBT recording has declined, and the reliance of this variable tool has reached the point that it might disappear. As TCM practitioners rely more and more on biochemical/biomedical test results, they also will lose the knowledge and skills to effectively use this more than 2,000 year old TCM practice. More TCM practitioners and fertility specialists should employ BBT in order to develop a deeper understanding of fertility disorders. To bridge the gap between western medicine and eastern medicine, TCM practitioners must act now to save this variable fertility tool. Now is the time to research how TCM analyses of BBT reading are scientifically reliable. Therefore, it is the objective of the current study to explore further whether basal body temperature (BBT) is an effective tool for diagnosis and evaluation of women’s reproductive health in the practice of Traditional Chinese Medicine.
Chapter 3: Method

Retrospective chart review, which is defined as “a type of research design in which pre-recorded, patient-centered data are used to answer one or more research questions (Vassar, & Holzmann, 2013, p. 1),” was employed as the methodology for this study. The data for this study were extracted from the patient charts of RENKA Acupuncture & Herbal Clinic, Conroe, Texas. After charts to be reviewed were pulled, cases were selected or disregarded according to inclusion and exclusion criteria. Data from those selected cases were entered on chart abstraction forms (Appendix A) and entered on the BBT chart evaluation from (Appendix B).

A. Eligibility Criteria:

- Charts of reproductive age women who were treated in the professional practice of Shuko Ward.
- Charts indicative of the use of acupuncture or Chinese herbal medicine treatments for more than three menstrual cycles or more than two menstrual cycles with baseline BBT chart.
- Charts with two or three cycles of BBT data recorded.

B. Exclusion Criteria:

- Charts of women not of reproductive age
- Charts of women treated for less than three menstrual cycles without a baseline BBT chart.
- Charts of that include less than two consecutive records of BBT data.
- Cases where subject went under any biochemical treatment for the fertility during BBT recording.
C. Instruments:

The only instruments used in this study were the data collection forms that included the following:

- Pre-treatment status of Patient
  - Case code number
  - Patient’s age at the time of treatment
  - Patient’s gynecological history
  - Western pathology present
  - Number of cycles tracked
  - Length of each cycle
  - Baseline BBT readings (Initial cycle of BBT chart)

- TCM Diagnosis

- TCM treatments Rendered:
  - Acupuncture
  - Chinese herbal medicine
  - Dietary advice
  - Supplementation advice
  - Qi Gong/Tai Chi
  - Asian Body Work
  - Other treatments

- Post Treatment Status of Patient:
  - Outcome—Did the chart indicate that the patient became pregnant? Or any improvement concerning gynecological problem which might be preventing from pregnancy.
- Post treatment BBT readings (after 2 or more cycles)
- Other post-treatment observations
  - Social Interactions
  - Interests/Activities
  - Weight
  - Employment
  - Psychological status
    - Depression
    - Anxiety
    - Hyperactivity
    - Other

D. Procedures:

After cases were selected or disregarded according to inclusion and exclusion criteria, each case was carefully reviewed to extract data not only from BBT chart, but also from each patient’s medical history. Data gathered also included chief complaints and general history, and whether there was any improvements related to the complaint and history which were observed. All data were entered on the chart abstraction forms (Appendix A). Each cycle of BBT was evaluated by the various aspects of BBT and rated on a scale of five; the higher the score, the better the improvement. Those ratings were entered on the BBT chart evaluation from (Appendix B). In case of undetermined score; i.e. successful conception followed by positive pregnancy test, cells were filled in as “N/A” and other cells in the same row were excluded from the total. All scores were totaled at bottom row providing comparative data between baseline or 1st cycle BBT and subsequent BBTs.
The One-Way ANOVA was employed for this study for statistics analysis. The one-way ANOVA compares the means among the baseline or first cycle BBT and other cycles of BBT after the TCM treatment to determine whether any of those means are significantly different (improved) from each other.
Chapter 4: Results

In this chapter the results of the current study are presented in relation to the hypothesis “Is Basal Body Temperature (BBT) is an effective tool for diagnosis and evaluation of women’s reproductive health in the practice of Traditional Chinese Medicine?”

Data Overview

15 charts were selected according to exclusion and inclusion criteria. Three BBT charts for each case were examined and evaluated according the 11 aspects of BBT criteria using a 5 points scale. The totaled scores for each menstrual cycle in each case were compared for improvement. The means of all cases were computed to compare three cycles. Supplementing data (i.e. improvement of chief complaints, lab results, and general/psychological health) were also noted in Table 1.

Frequency distribution

1. Patients’(cases’) demographic data

1-1.Age

The mean age of 15 cases was 33.4 years old. The oldest patient was 43 years of age, and the youngest one was 26 years of age.

1-2.Chief complaints

Included secondary complaints related to chief complains were subfertility: 15, Recurrent miscarriages: 2, Dysmenorrhea: 2

1-3.Pathological underlying condition

PCOS: 5, Endometriosis: 2, Ovarian cysts: 1, Uterine fibroid: 1, Tubal blockage: 1, Diminished ovarian reserve: 3

2. Other variables relevant to the study

2-1. TCM treatment
• Acupuncture treatments

Acupuncture treatments were rendered for all 15 cases of patients by a single licensed acupuncturist. Patients were given Zhang-Fu treatment. The Mean frequency of treatments rendered was 17.8 times over duration of average 147.9 days (4.9 menstrual cycles).

• Chinese herbal medicine

Chinese herbal treatments were rendered all 14 cases of patients as form of formulated granules or patent herbs. Each patient was required take the formula every day.

• Other treatments

Tuina, nutritional advisement, life style advisement (including patient’s partner in cases of fertility treatment) were also rendered according to each patient’s needs.

3. Summary of BBT chart evaluation

The mean total baseline score for the first cycle BBT chart was 26.07; the second cycle BBT mean reading chart was 28.29; and the third was 31.29 across all 14 cases. The improvement of the BBT scores after two or more cycles of treatment is shown in Table 1 below with the average of all 14 cases manifesting 29% improvement.

<table>
<thead>
<tr>
<th>Case #</th>
<th>A: Total score of baseline 1st cycle BBT</th>
<th>B: Total score of 2nd cycle BBT</th>
<th>C: Total score of 3rd cycle BBT</th>
<th>Improvement from A to C</th>
<th>Other significant improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14</td>
<td>18</td>
<td>21</td>
<td>50%</td>
<td>Viable pregnancy</td>
</tr>
<tr>
<td>2</td>
<td>24</td>
<td>23</td>
<td>29</td>
<td>21%</td>
<td>Viable pregnancy</td>
</tr>
<tr>
<td>3</td>
<td>31</td>
<td>36</td>
<td>34</td>
<td>10%</td>
<td>Reduced dysmenorrhea pain</td>
</tr>
<tr>
<td>4</td>
<td>44</td>
<td>35</td>
<td>42</td>
<td>-5%</td>
<td>Reduced dysmenorrhea pain</td>
</tr>
</tbody>
</table>
The One-way ANOVA was computed to compare each different cycle (See Table 2 and Table 3).

An Analysis of Variance statistical test (ANOVA) was run regarding the data generated from the current study to discern if any of the differences in the observed means were statically significant, or whether the observed differences might possibly be due to chance. ANOVA tests the possibility of rejecting the null hypothesis that the differences in the observed means may have occurred by chance.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Count</th>
<th>Sum</th>
<th>Average</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total score of baseline or 1st cycle BBT</td>
<td>14</td>
<td>365</td>
<td>26.07</td>
<td>77.61</td>
</tr>
<tr>
<td>Total score of 2nd cycle BBT</td>
<td>14</td>
<td>396</td>
<td>28.29</td>
<td>76.99</td>
</tr>
<tr>
<td>Total score of 3rd cycle BBT</td>
<td>14</td>
<td>438</td>
<td>31.29</td>
<td>44.68</td>
</tr>
</tbody>
</table>

Table 2 : ANOVA: Single Factor
Table 3: ANOVA

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between cases</td>
<td>191.76</td>
<td>2</td>
<td>95.88</td>
<td>1.44</td>
<td>0.25</td>
<td>3.24</td>
</tr>
<tr>
<td>Within cases</td>
<td>2590.64</td>
<td>39</td>
<td>66.43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2782.40</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Although the results showed average 29% of improvement, the ANOVA test yielded a P-value of 0.25 did not reject null hypothesis. In another words, there is no significant differences between BBT charts of baseline or first menstrual cycle and BBT chart of last BBT charts.
Chapter 5: Discussion

Summary of Findings

The current study used retrospective chart review method to examine the impact of monitoring BBT for diagnostic purposes to discern improvement of several reproductive health and fertility factors. Twelve out of 14 BBT charts reviewed showed some improvement, with an average of 29% improvement when compared to baseline or initial recorded BBT chart and final BBT chart readings. However, a one-way ANOVA statistical test showed no significance difference among the means of the three cycles of the BBT charts.

Implications for Practitioners

Traditional Chinese Medicine has historically been said to be characterized as empirical. However, in reality, practice generally comes first, and is later backed up by scientific study. Though BBT reading didn’t start 2,000 years ago, TCM practitioners took advantage of their observation skills to correlate TCM diagnosis and temperatures throughout the menstrual cycle. Now, however, it is the time to study whether TCM theory is consistent with collected biochemical data. If temperature is relatively high during the follicular phase, then the diagnosis of Yang deficiency is given. In such a case, TCM practitioners may check patient’s thyroid function. If BBT does not drop at the end of the cycle, TCM practitioners suspect not only a “Failure of Yang transforming in Yin”, but they may check progesterone or HCG level.

Limitations of the Current Study

Obviously 14 cases were not enough cases for this kind of study to be considered definitive. Moreover, all cases were selected from single private practice which may not reflect general population. Retrospective chart review is convenient and inexpensive method for conducting initial research, and it can be done in the short period time. However, retrospective chart review method has the drawback of
often yielding a limited number of charts as a result of exclusions for so many variables, such as the manner/procedures of BBT charting, concurrent fertility medicine use, etc. In retrospective chart review studies there are no clinical trials, no randomization and no application of control or placebo groups.

Even though this study was designed to focus on diagnosis by the BBT reading, diagnoses should be made with other components such as nature of menstruation, observation of cervical fluid, pulse and tongue, abdominal palpitations and an inquiry (history). It is unethical to treat patients only on the basis of a diagnosis from the BBT reading. As a result, some cases in this study were diagnosed by not only BBT reading but also other diagnostic differentiation.

There are a set of acupuncture points and specific Chinese herbal formulas which treat specific TCM diagnoses (differentiation). However, most of the cases are more complex and involve overlying multiple diagnoses. There are always individual differences in some degree among TCM practitioners regarding to how to treat patients. Since this study involved only single practitioner, the variance of treatment deference by different practitioners are negligible. Nonetheless, variance of treatment of different patients sharing same TCM diagnosis exists due to the different conditions encountered across a wide range of patients.

In the current study the BBT charts were evaluated by the researcher. The sets of criteria for the each aspect of the BBT readings involved objective quantitative data, except for the factor of stabilization of both the follicular and luteal phases, where the patient reported the data subjectively. Though there are descriptors such as “saw-tooth” or “saddle pattern” for an unstable BBT, such descriptors can be biased by the practitioner. The day of ovulation can also be vary by a day or so. There are also the factors of the alternating length of follicular and luteal phases as well as mid-cycle sharp rise. BBT charts should be evaluated by several experts, rather than single person to avoid bias to the interpretation of BBT charts.
Recommendations for Future Research

The focus of future research should be on the standardization of the use of BBT for the diagnosis and evaluation of fertility and abnormal reproductive conditions. Clinical trials should constitute the next appropriate step in the research path. Future clinical trial research studies should recruit larger number of subjects and should seek to control variables more effectively. Such research may seek to compare groups with BBT utilization with a control group without BBT use.

Conclusion

The current study was unable to conclude that Basal Body Temperature (BBT) can be an effective indicator for TCM diagnosis and evaluation for women’s reproductive health, since statistics showed no significant deference between pre and post treatment. However, since the average score of post BT charts did manifest 29% improvement, further and more controlled study of BBT is warranted. Further investigation and research with controlled methods may clarify whether or not BBT is an effective indicator of reproductive health. If future research involves biochemical tests to confirm serial events and abnormalities in BBT during the menstrual cycle, the standardization of BBT as a diagnostic indicator can be advanced. Although current study was not conclusive, it should be considered a worthy step toward the standardization of the diagnostic use of BBT readings.
References


Appendix A:

**Chart Abstraction Form**

<table>
<thead>
<tr>
<th>Case Code Number__________________</th>
</tr>
</thead>
</table>

Length (number of cycle) of TX :

Cycle number of tracked BBT chart (correlated to TX) :

At the time of first treatment of subject’s age :

Gynecological C/C :

Significant western pathology of C/C if any :

General Medical HX:

TCM Dx :


Post /Middle TX data (General)

<table>
<thead>
<tr>
<th></th>
<th>Gyn C/C Improvement</th>
<th>Gyn other S/S Improvement</th>
<th>General Health Improvement</th>
<th>Psychological Improvement</th>
<th>Possible Adverse Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>End of 1\textsuperscript{st} cycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End of 2\textsuperscript{nd} cycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End of 3\textsuperscript{rd} cycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End of 4\textsuperscript{th} cycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Abbreviations*

TX: treatment,  C/C: chief complaint,  S/S: signs/symptoms,  HX: medical history,  Gyn: gynecological,  CD: cycle day
Appendix B:

BBT Chart Evaluation Form

<table>
<thead>
<tr>
<th>Aspect of BBT</th>
<th>Baseline</th>
<th>1&lt;sup&gt;st&lt;/sup&gt; cycle</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt; cycle</th>
<th>3&lt;sup&gt;rd&lt;/sup&gt; cycle</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Length of cycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5: 26-30 days, 4: ≤25 or ≥31 days, 3: ≤23 or ≥33 days, 2: ≤21 or 35 days, 1: ≤19 or ≥37 days</td>
</tr>
<tr>
<td>B: Biphasic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Average temp difference between follicular and luteal is 5: &gt;1°F, 3: 1°F - 0.5°F, 1: &lt;0.5°F</td>
</tr>
<tr>
<td>C: Length of follicular phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5: 14 days, 4: ≤13 or ≥15 days, 3: ≤11 or ≥17 days, 2: ≤9 or ≥19 days, 1: ≤7 or ≥21 days</td>
</tr>
<tr>
<td>D: Length of Luteal phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5: 14 days, 4: ≤13 or ≥15 days, 3: ≤11 or ≥17 days, 2: ≤9 or ≥19 days, 1: ≤7 or ≥21 days</td>
</tr>
<tr>
<td>E: CD1&amp;2 relative temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5: lower or equal to average of follicular phase temp, 3: lower than the last day of prior cycle but higher than average of follicular Phase temp, 1: higher or equal to average of prior cycle of luteal phase temp</td>
</tr>
<tr>
<td>F: Average of Follicular phase temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5: 97.2-97.4°F, 4: ≤97.1 or ≥97.5°F, 3: ≤96.9 or ≥97.7°F, 2: ≤96.7 or ≥97.9°F, 1: ≤96.5 or ≥98.1°F</td>
</tr>
<tr>
<td>G: Stability of follicular phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5: stable, 1: unstable:</td>
</tr>
<tr>
<td>H: Mid-cycle sharp rise in 2 days</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5: &gt;1°F shift, 3: 1-0.5°F shift, 1: &lt;0.5°F shift</td>
</tr>
<tr>
<td>I: Average of Luteal phase temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5: 97.7-98.4°F, 4: ≤97.6 or ≥98.5°F, 3: ≤97.4 or ≥98.7°F, 2: ≤97.2 or ≥98.9°F, 1: ≤97 or ≥99.1°F</td>
</tr>
<tr>
<td>J: Stability of Luteal phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5: stable, 1: unstable:</td>
</tr>
<tr>
<td>K: Temp drop at pre-mestruation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5: ≥0.5°F lower than average of luteal phase temp, 3: ≤0.4°F or same, 1: higher</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Abbreviations*

TX: treatment, C/C: chief complaint, S/S: signs/symptoms, HX: medical history, Gyn: gynecological, CD: cycle day
### Appendix C: BBT Chart Entry Form

<table>
<thead>
<tr>
<th>Date of the first day of Menstruation:</th>
<th>This cycle's Length:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cycle Day</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Date</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Day of Week</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Intercourse</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Time Temp</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### Waking Temperature

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

#### Cycle Day

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
Appendix D

Shuko Y. Ward LAc., Dipl. OM.

Curriculum Vitae

Education

Yo San University of Traditional Chinese Medicine: Doctoral Program, April 2015
American College of Acupuncture & Oriental Medicine, 2004
Jacksonville State University, 1998
Gadsden Community College, 1995
Hanada School of Acupuncture, Moxibustion and Physiotherapy, 1988

Degrees Earned

M.S. in Oriental Medicine, American College of Acupuncture & Oriental Medicine, 2004
B.S. in Psychology, Jacksonville State University, 1998
A.S. in Mental Health, Gadsden Community College, 1995

Professional Licenses and Certifications

Texas Acupuncture License, AC00815
NCCAOM Certification, 26719
Japan Acupuncture & Moxibustion License, 1988

Professional Experiences

2007– Present, Owner of RENKA Acupuncture & Herbal Clinic, Conroe TX
2006, Acupuncturist at Doctors Chiropractic Center, Houston TX
1988-1993, Chief Acupuncturist at Koganei Acupuncture & Moxibustion Clinic, Tokyo, Japan