VALIDITY OF THE CHINESE LUNAR CALENDAR TO PREDICT GENDER

A THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF MASTER OF SCIENCE

IN THE GRADUATE SCHOOL OF THE

TEXAS WOMAN'S UNIVERSITY

COLLEGE OF NURSING

BY

OPHELIA O'SHEA

DENTON, TEXAS

AUGUST 2003

TEXAS WOMAN'S UNIVERSITY
DENTON, TEXAS

July 3, 2003
Date

To the Dean of the Graduate School:

I am submitting herewith a thesis written by Ophelia O'Shea entitled "Validity of the Chinese Lunar Calendar to Predict Gender." I have examined this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science with a major in Nursing.

Peggy Mancuso

Peggy Mancuso, Major Professor

We have read this thesis and recommend its acceptance:

Susan Chaney

Susan Sheriff

Accepted:

Jennifer Martin

Dean of the Graduate School

ACKNOWLEDGMENTS

I am deeply grateful to John Michael O'Shea, my husband and friend, who provided me with much support and love during my journey.

A special thanks to Dr. Peggy Mancuso for her positive energy and her ability to encourage a desire for knowledge.

ABSTRACT

OPHELIA O'SHEA

VALIDITY OF THE CHINESE LUNAR CALENDAR

TO PREDICT GENDER

AUGUST 2003

The purpose of this study was to examine the validity of gender prediction using the Chinese lunar calendar. Analyses of data from 1,005 births were used to evaluate if gender at birth could be predicted using maternal age at conception and the month in which the woman conceives, as proposed in the Chinese lunar calendar.

The study was a retrospective, nonexperimental design with quantitative analyses. Data were interpreted using chi-square statistic. Findings from this research supported the results of previously performed studies used to evaluate the use of the Chinese lunar calendar to predict gender that there is no correlation between gender predicted using the Chinese lunar calendar and actual gender at birth.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

Chinese mythology indicates that a lunar calendar designed to predict the gender of a woman's unborn child is sequestered inside a royal tomb near Beijing. The basis of this prediction is the convergence of the pregnant woman's age at conception with the month of conception (Chinese Lunar Calendar, 2002). This calendar can be accessed by the general public through the World Wide Web. One documented study in western scientific literature has evaluated the accuracy of gender prediction of the newborn using the Chinese lunar calendar. No value for predicting fetal sex was determined in a study conducted by Ostler and Sun (1999) of a convenience sample of 20. In addition to the Chinese lunar calendar, the study also evaluated the relationship of fetal heart rate and the Draino test on gender prediction of the neonate (Ostler & Sun, 1999). Ostler and Sun (1999) stated that, "No formal studies have been done on the predicative value of the Chinese calendar method" (p. 1525) and the validity of using the lunar calendar to control gender prior to fertilization has not been assessed.

The ability to predict or control the gender of a child would have many psychological, physiological, and sociological implications. For example, gender specific diseases could be decreased. Women with known X-linked diseases could avoid having male children. Families could choose their ideal gender configuration with each pregnancy, and this ability might decrease the incidence of multiparous pregnancies, which are attempted in order to conceive a wanted son or daughter. "Although offspring gender is not a genetic disease, a couple's willingness to reproduce might well depend on the gender of the expected offspring" (Robertson, 2001, p. 4).

Due to contraceptive technology and increased knowledge about reproductive physiology, many women can choose when they will conceive and how many children they will have (Speroff, Glass, & Kase, 1999). The personal decision to select the gender of the unborn child is a small extension of the right of each woman to choose conception or contraception. The Chinese calendar method of gender prediction would not compromise either the maternal health or fetal well being. Malpani (2002) responded to an article on preconceptual sex selection by stating, "If we allow people to choose how many babies to have and when to have them and even to terminate pregnancies if they wish, then we should allow them to select the sex of their child if they wish" (p. 301). Although there are a number of tools available to families to facilitate gender selection, these methods are expensive. Some of these methods include chromosome separation, cell sorting, and in vitro fertilization, with subsequent diagnosis of the gender of the embryo after fertilization. In vitro fertilization itself imposes physiological risk for the woman. In addition, families wanting to dispose of unwanted, gender specific embryos creates an ethical, moral dilemma (Malpani, 2002).

The medical and nursing professions are challenged by a number of diseases that are gender specific. About 5,000 single-gene defects are known, which are due to recessive or dominant gene mutations both on autosomes and heterosomes (Nagy, Man, Ruibal, & Lints, 1998). Examples of these disorders include the muscular dystrophies, hemophilia, the Fragile X Syndromes, Lesch-Nyan syndrome, Hunter's syndrome, Testicular Feminization Syndrome, and Fabry Disease. If reliable gender prediction was available, incidence of these diseases could be decreased. The quality of life for these families would be improved without the use of expensive tests and procedures. Even if the Chinese lunar calendar predictions are slightly more accurate than gender predictions by chance, use of the Chinese lunar calendar to time fertilization would be beneficial. In addition, this non-invasive calendar predictor is innocuous and harmless.

The Chinese lunar calendar also could help families attain ideal family configuration. Gottlieb (2001) described the concept of gender variety as the tendency for parents to select embryos that are the opposite sex of the child or children their families are already comprised of. With the use of the Chinese calendar, families could determine the number of boys and girls. In the past, this type of gender selection was only encouraged when families were attempting to avoid a sex-linked genetic anomaly. Recently, "The American Society for Reproductive Medicine, however, has stated that it is proper and ethical to help couples choose the sex of their babies" (Gottlieb, 2001, p. 828).

Since 1979, legal prohibitions exist in China if families have more than one child; the cultural preference is for that child to be male. A result of this situation is that infanticide of female newborns has increased (Reubinoff & Scheneker, 1996). In India, tradition demands that every couple produce a male child; and even today, many Indian couples will go to any extent in order to have a biological, male heir. In fact, the social pressure to have a male child is so immense that in 1994 a law was established by the Supreme Court of India to prohibit Indian doctors from conducting sex-determination tests if female fetuses would be aborted as a result (Ghoshal, 2002). A noninvasive method of gender prediction, such as the Chinese lunar calendar, could produce a positive change in practice, corresponding with a decrease in infanticide or abortion of female fetuses.

Purpose of the Study

The purpose of this study was to examine the validity of the Chinese lunar calendar to predict gender of newborns in a population of 1,005 women who gave birth in a private hospital in Dallas, Texas. Analyses of the data will be used to answer the question, "Does the Chinese lunar calendar predict gender of the newborn?"

Justification for the Project

Avoiding X-linked diseases is the most important reason for the use of gender prediction. According to the National Center for Vital Statistics (2002), the sex ratio in the United States in 2000 was 1,048 male births to every 1,000 female births. This trend has not changed in the last 60 years and more males are born in the United States. In general, there are more boys born during the first 6 years of marriage because father are more likely to present younger male populations. The ratio of males to females is also increased in years following World Wars I and II (Graffelman & Hoekstra, 2000). This tendency is probably due to an increase in amorous relationships during these periods. Several factors have been proposed as affecting the sex ratio. Graffelman and Hoekstra (2000) proposed that these variables could include the following considerations:

> Among these are family size, age of parents, age difference of parents, birth order of the child, race, incest, blood groups, season, frequency of sexual intercourse, socioeconomic status of the parents, legality of the child, climatological conditions, professions of the parents, pollution, use of contraceptive pill, nutrition, hormonal treatments, type and timing of fertilization, urbanity, several diseases, handedness of the parents, and stress. (p. 434)

Sex determination becomes more important when a family has a history of X-linked recessive disorders. The ultimate goal would be to prevent the birth of a male child to a mother who is a carrier of an X-linked condition. The only true way to avoid having an affected child would be to have a female child. This could be possible if sex determination could be accomplished before conception. The psychological burden would be alleviated in those families with a history of X-linked genetic pathology. Many diseases could be eradicated if conception and birth of a male child to a mother, who is a carrier of a X-linked condition, could be prevented (Reubinoff & Scheneker, 1996).

Theoretical Framework

Edward Deci's (1980) theory of self-determination is used to explain the use of gender selection. Self determination has been defined as using one's will. Deci defined will as the capacity of humans to choose how to satisfy needs. Before people can make choices, they must first be able to be self-determining. Self-determination involves being motivated.

People can be motivated by two means: intrinsic motivation and extrinsic motivation. Intrinsic motivation occurs when a person does something without an apparent external reward. A behavior that was motivated through extrinsic means was performed because of associated rewards or to avoid retribution. Deci (1980) proposed that intrinsically motivated behaviors, those that were not performed for reward, were based on people's needs to be competent and self determining in relation to their environment. When people have an intrinsic need "they seek out and conquer challenges that are optimal to their capacities" (Deci, 1980, p. 33).

External factors can affect intrinsic motivation by two processes. The first involves the development of an instrumental change in locus of causality (Deci, 1980). The locus of causality refers to why an activity is performed. One performs an activity either to attain a reward or to avoid retributions. The second factor that can affect intrinsic motivation concentrates on change in perceived competence (Deci, 1980). A person's perception of competence will either enhance or diminish a behavior.

Deci proposed that there are three motivational subsystems: intrinsic, extrinsic, and motivational. "A motivational subsystem is a set of affective experiences, beliefs, and attitudes about oneself, the environment, and others, and programs for interacting with one's environment" (Deci, 1980, p. 41). The intrinsic motivation subsystem will be based on the need for competence and self-determination. It will involve decision making, a perceived locus of causality, and perceived competence. Behaviors will be performed for the attainment of feelings of self-determination and competence. Extrinsic subsystems will involve external motivation. Behaviors will be controlled by rewards or contingencies rather than competence and self-determination. A motivational subsystem will be associated with non-activity and a relationship will not exist between performed behaviors and their outcomes.

For this study, the theory of self-determination details are adapted for women who have X-linked recessive genes and are considering utilizing the results of this study. The extrinsic motivation is to avoid conceiving a male child who may have an

X-linked genetic disease. The locus of causality is to avoid conceiving a male child. The couples' competence in knowledge of X-linked genetics will enhance their behavior to seek every alternative to bearing a male child. The intrinsic subsystem involves deciding to have control over fertility (decision making), taking action to avoid having a male child affected by disease (perceived locus of causality), and being qualified to make decisions because one has knowledge of the situation (perceived competence).

Deci's theoretical framework clarifies why couples would seek a method, such as the Chinese lunar calendar, to assist in predicting gender of future offspring. Current scientific perspectives do not provide an explanation for how the month of conception correlated with the mothers age at conception would predict gender. However, simply because current scientific knowledge does not account for efficacy of an intervention, does not mean that the intervention would not be effective. Couples want to be able to control the gender of their offspring. A study of the Chinese lunar calendar prediction of gender would enable couples to make educated decisions about ways they could use it to control the gender of their child.

Assumptions

For the purpose of this study, the following assumptions were made:

1. The last menstrual period is correct for the birth being studied.
2. Identification of gender at birth is correct.

3. Birth distribution between male and female is approximately 105 males to 100 females in the United States.

4. Gender distribution at birth for the sample of convenience used typifies gender distribution of U.S. births.

Limitations

The following were limitations to the study:

1. All subjects were between 18 and 45 years old.
2. All subjects were female.
3. All subjects had their delivery information recorded by the labor and delivery nurse into the Watch Child software system.
4. All multiple births were considered one birth for study statistics.

Research Questions

The following were the research questions for the study:

1. Can maternal age at conception and the month in which the woman conceives predict gender at birth, as determined by the Chinese lunar calendar?
2. Is there a statistical difference between actual gender of the newborn and the gender of the newborn as predicted by the Chinese lunar calendar as compared to the natural gender proportions that would naturally occur in a population of 1,000 births in the United States?

Definition of Terms

The following are the definition of terms:

1. Gender--sex, male or female. A classification according to sex (Cunningham et al., 1997). For this study, gender is the assigned sex at birth based on physical appearance. Operationally defined, it is the determination for the use of the Chinese lunar calendar.

2. Chinese Lunar Calendar--chart that can predict gender based on a woman's age at the time of conception and the month that conception occurred (Chinese Lunar Calendar, 2002). For this study, the validity of the proposed Chinese lunar calendar will be decided.

3. LMP "last menstrual cycle"--refers to the date of the last reproductive cycle of female humans (Speroff et al., 1999). Operationally defined, it is a value used to determine the time of conception.

4. Conception--the onset of pregnancy (Cunningham et al., 2001). Operationally defined, it is the last recorded LMP with the addition of 14 days.

5. Age--that part of duration of a being which is between its beginning and any given time. Operationally defined, it is the time from a mother's birth day to time of her conception.

6. Calendar month--one of 12 portions into which the year is divided. For this study, a calendar month can help determine the gender of a child based on a mother's age during the month in which she conceived.

CHAPTER II

REVIEW OF THE LITERATURE

Although the idea of gender selection could be considered controversial, humans have attempted to produce a son a daughter through the use of folklore since Biblical times (Pini, 1994). "Couples have attempted sex preselection by precoital douching with alkalinized or acidified solutions or timing of intercourse close to ovulation to increase the likelihood of a female or male" (Zarutskie, Muller, Magone, & Soules, 1989, p. 891). Folk methods include reciting chants during intercourse, timing coitus to wind direction, rainfall, temperature, or phases of the moon. There is a folk belief that burying a placenta under a nut tree will ensure a male child next time (Pini, 1994).

There is a collection of writings of Folk Medicine in Scotland that described how male and female children are conceived. A woman who had only daughters explained that she believed the child she was expecting was a boy because at the time of conception, sex had been performed with pillows at the foot of the bed. She believed her daughters had been conceived in the usual position of the bed and a reversal of this behavior would reverse the sex of that child. Birth of male children are believed to be "gotten under a tree." Trees were thought to have a fertilizing effect on women. Boys also could be conceived if the woman anointed her underwear with the "juice and seed of male mercury having round seeds hanging in pairs," because these seeds looked like male gonads (Pini, 1994, p. 251).

A more modern gender prediction method involved Draino, a caustic substance used to clean plumbing pipes. A small amount of crystal Draino is added to 2 ml of the pregnant woman's urine and agitated for 1 minute. If the urine turns blue the woman will have a boy. If the urine turns from yellow to amber, the mother will have a girl (Fowler, 1982).

Stolkowski and Choukroun (1981) have investigated the influence of dietary factors on gender selection. They proposed that sex determination is influenced by ionic factors in diets. "It is known from studies in in vitro fertilization procedures that ionic factors and, more importantly pH, do influence fertilization of the oocyte" (Batzofin, 1987, p. 615). High values of potassium and sodium in the diet lead to increases in male births. Diets with increased calcium and magnesium directed more female births (Batzofin, 1987).

Scientific Techniques to Determine Gender

In most regions, including the United States, the sex ratio favors males (Zarutskie et al., 1989). Changes in the sex ratio have been attributed to genetics, diet, and the environment. A study done by Ericsson, Langerin, and Nishino (1973) found that the number of offspring in a family and advanced paternal age increases the ratio of female to male births. Currently, there are several medical techniques to promote sex selection. "A number of studies suggested that more females are conceived when coitus occurs in close proximity to ovulation" (Zarutskie et al., 1989, p. 894). The assumption is that the X-bearing sperm swim slower than the Y-bearing sperm. "More males were conceived when the sperm or egg is in the reproductive tract for a relatively longer time before conception" (Zarutskie et al., 1989, p. 903).

Shettles and Rorvik (1984) hypothesized that the timing of intercourse on ovulation, among other techniques, correlated with the sex of offspring. Shettles and Rorvik's method of gender preselection relies on timing of intercourse, length of abstinence, scrotal temperature, stress prior to intercourse, douching, timing of female orgasm in relation to male, intercourse position, and vaginal penetration. The reported efficacy, on 3,000 couples, using the Shettles and Rorvik method was 80%-85% male infants and 75%-80% female infants.

Ovulation induction also has been proven to have an effect on sex ratio. Women who have used clomiphene citrate, human menopausal gonadotropins, or human chorionic gonadotropin in assisting ovulation have produced a decrease in the sex ratio, resulting in an increase of female births (Zarutskie et al., 1989). The same trend has been noted in men who receive clomiphene citrate to promote steroidogenesis. Women who had inseminations with fresh sperm samples birthed more males compared to those who were inseminated with cryopreserved specimens (Zarutskie et al., 1989).

Studies also have been executed to promote sperm separation. Sperm has been separated through electrophoresis, cell sorting, and immunological techniques. The swimming ability of X-bearing and Y-bearing sperm has also been tested (Zarutskie et al., 1989). Early studies performed proposed that X- and Y-bearing sperm carry opposite electrical charges. By way of electrophoresis, the sperm could then be separated and used to encourage a pregnancy of the desired sex. Unfortunately, the motility of the sperm was significantly reduced with electrophoresis, and they were not able to accomplish fertilization (Zarutskie et al., 1989).

Sperm separation by immunological techniques is based on the discovery of Y-linked histocompatibility (H-Y) antigen. The proposed thought is that "selective binding of anti-H-Y antiserum would inactivate most Y-bearing sperm" (Zarutskie et al., 1989, p. 901). This technique proved to be ineffective due to an insignificant number of X-bearing sperm and their brief time of existence.

Cytometry to separate X- and Y-bearing sperm has been successful at producing semen composed of either X or Y sperm. The cells are studied and separated based on weight. Robertson (2001) has reported that X-bearing spermatozoa contain 3% more chromosomal activity than Y-bearing sperm. The sperm then can be separated based on mass, and gender selected semen can be used for insemination. Therefore, insemination can be performed with the desired "bearing" sperm. Robertson (2001) stated that the use of flow cytometry "would make safe, effective, and relatively inexpensive means of non-medical preconception gender selection available for selecting female, if not also for male, offspring" (p. 7). This procedure is experimental and is not available to the general population.

With the use of DNA probes, Johnson et al. (1993) attempted to separate human X and Y sperm based on the idea that there is a difference in sperm mass. Cell sorting identifies DNA on the head of the sperm via fluorescent dye. The sperm is first fluorescent stained and then sorted. The results indicate several problems related to head morphology of sperm, dissimilarities of chromatin staining in human sperm, and the small difference in DNA required a precise measuring instrument.

> The morphological shape of the human head is smaller than the head of many domestic animals. Since the original modifications to the flow cytometer cell sorter were designed to take advantage of the flatness and paddle shape of animal spermatozoa, the consistency of human sperm orientation was a problem. (Johnson et al., 1993, p. 1737)

The idea of separating human X and Y bearing chromosome by DNA difference is probable in theory, but it is not useful in separating living cells for insemination because the sperm must be killed before staining and separating (Zarutskie et al., 1989). Therefore, this technique is not practical for insemination use.

The swim-up separation technique also has been studied as a means of determining gender. This technique involves transferring a semen specimen into a centrifuge tube and centrifuging the sample for 10 minutes. The solution is then incubated for 1 hour. The sperm that swim to the top, and those that remain at the bottom are evaluated. Khatamee et al. (1999) hypothesized that the slower swimming sperm were X-bearing and the faster swimming sperm were Y-bearing. Therefore, the female sperm would remain at the bottom while the male sperm would swim-up. The sperm that concentrated at the top of the tubes would be Y-bearing, and those that remained at the bottom would be X-bearing. The study of swim-up technique to determine selected gender was successful in 86.7% of women desiring females and 89.2% of those desiring male progeny. The study done by Khatamee et al. (1999) "offers the possibility of a safe, relatively successful and noninvasive techniques of sex preselection that does not require manipulation of the zygote or costly in vitro fertilization techniques" (p. 12). Although the swim-up technique is used in assisted reproductive technologies (ART), it has not yet been offered for gender selection, and it is an expensive technique.

In 1973, the first report of sperm density and motility was completed by Ericsson et al. A recovery of rich Y sperm (up to 85%) was produced after layering washed sperm over columns of bovine serum albumin (Beernink & Ericsson, 1982). The sperm were detected using staining with quinacrine mustard. "The sperm, which had an F-body at the center of the head, were assumed to be Y-bearing, and those without such a body were assumed to be X-bearing" (Zarutskie et al, 1989, p. 900). To assess whether the method was effective in influencing the sex ratio, a study was performed on 1,400 patients who desired sex preselection. Inseminations with sperm treated with albumin gradient were performed the day after the luteinizing hormone surge. The LH surge occurs prior to ovulation, at which time insemination is optimal. Of the 1,034 births occurring after insemination, 72% were male and 28% were female. "The results with the albumin column separation suggest that sperm bearing a Y chromosome move more quickly in this environment than do sperm bearing an X chromosome" (Beernink & Ericsson, 1993, p. 385). This would favor male offspring. The authors of this study did note that the timing of the insemination may have influenced the sex ratio, rather than the sperm separation. There have been reports that insemination at the time of ovulation increases the percentage of male offspring by 60% (Glass, 1977).

Ericsson et al.'s results were examined by Claassens, Franken, Oosthuizen, Kruger, and Brusnicky in 1995. Using human serum albumin 4,200 sperm were evaluated before and after separation. The findings included 50.3% Y: 49.7% X before separation and 53.4% Y: 46.6% X after separation. The 3% increase in Y-bearing sperm is statistically significant but Claassens et al. stressed the importance of a randomized controlled clinical study to clarify the results.

Sephadex®, culture media, is another method used to separate X- and Y-bearing sperm. The procedure is performed by filling 1 inch diameter glass columns, with 12 cm of Sephadex®. One to two milliliters of fresh semen is then added to the column and centrifuged. After 1 hour the semen samples are examined for Y-chromosomes. The results of a study performed by Quinlivan, Preciado, Long, and Sullivan (1982) produced a 14% increase in Y-chromosome sperm and a 22%

increase in sperm motility, after using Sephadex® for sperm separation. The rates obtained suggest that the Sephadex® method has a place in "a program of therapeutic insemination with the husband's semen when an infant of a particular sex is desired" (Quinlivan et al, 1987, p. 107).

Kaneko, Yamaguchi, Kobayashi, and Iizuka (1983) attempted to develop a chromosome separation method that could be used to separate sperm without losing motility and viability. Percoll® density gradient centrifugation media was used to accomplish this goal. The average number of sperm recovered after the Percoll® separation was 98%, indicating adequate viability. The motility decreased slightly but remained congruent with 85% of original semen sample motility. The findings of the study suggest that Percoll® provides viable X- or Y-bearing sperm without the loss of motility. Percoll® can be useful in IVF where separated sperm would prove to be valuable in preventing sex-linked genetic disease.

Check and Katsoff (1993) performed a study to examine if the swim-up technique would provide a higher ratio of male births. The patients included in this study were infertility patients who were not seeking sex pre-selection. Three control groups were developed. The groups consisted of sperm preparation using swim-up technique, Percoll®, and no sperm preparation. The sperm that was prepared using the swim-up technique revealed the highest percentage, 88.5%, of male births. The Percoll® prepared group had a 57.1% outcome and the semen without preparation produced 54.5% male births.

Contrary to the results from the study performed by Check and Katsoff (1993), another study found there was no relationship between X- and Y-bearing sperm following the swim-up procedure. Han, Flaherty, Ford, and Matthews (1993) assessed the ratio of X- and Y-bearing sperm by using the swim-up technique. Semen samples used for this study were obtained from 10 healthy donors. "The overall ratio of X- to Y-bearing sperm in the semen samples was 47.3:46.9, which was not significantly different from a 1:1 ratio" (Han et al, 1993, p. 1047). These sex ratio results are reassuring to those who participate in IVF and intracytoplasmic sperm injection (ICSI), because the swim-up method is routinely used in these procedures.

Preimplantation genetic diagnosis has been used to determine gender prior to pregnancy in couples who are undergoing IVF to obtain a pregnancy. In January 1997 a committee was formed to identify genetic diagnosis on female embryos in hopes of identifying embryos at risks for X-linked diseases (Geraedts et al., 1999). While analyzing single cells, a discovery of common autosomal dominant and recessive single gene defects, structural chromosomal abnormalities, and aneuploidy could be identified (Handyside & Delhanty, 1997). "PGD should be regarded as an option for couples at high risk of having a genetically abnormal child. PGD is an extra alternative, since couples can also opt for prenatal diagnosis, donor insemination, or refrain from having children" (Geraedts et al., 1999, p. 3145). The author further discussed that PGD has an advantage over prenatal diagnosis because couples can avoid selective termination of pregnancy. The greatest challenges of PGD are its accuracy, safety, and value to patients who are considering prenatal diagnosis.

Since initiating the PGD committee in 1997, a yearly report of the data collected using PGD has been published by the special interest group on reproductive genetics. The data represented in the May 2001 report featured a striking feature: gender screening on implantation embryos for social reasons (Sermon et al., 2002). A 35% pregnancy rate was achieved in this group, which is higher than any other PGD pregnancy rate. This difference is probably related to the majority of the patients being fertile, with low risk for having a child with a genetic abnormality. "The main argument put forward by the center, which is performing social sex selection, was that elimination of embryos of the unwanted sex was better than to perform an abortion" (Sermon et al., 2002, p. 245). In summary, exploratory studies of gender determination have been done in populations of couples who are having ART, all of which are expensive and must require ovum harvest and ICSI fertilization.

Other techniques are available to determine gender; however, these techniques have to be performed after a pregnancy has been established. Amniocentesis, chorionic villi sampling, DNA of peripheral maternal blood, and sonography provide the ability to determine fetal gender, but are not useful when trying to avoid conceiving a child of a specific gender. Sonography assigned and real gender has been achieved earliest at 9 weeks and 6 days of fetal development (Mazza et al., 2001). Fetal sex also can be determined from maternal blood DNA at 9 weeks and 6 days of fetal gestation (Falcinelli et al., 1999). The availability of these tests is mentioned because they can provide a means of gender expectation for couples who are at risk for conceiving a child with gender related abnormalities.

Ethical Considerations

Sex determination becomes problematic when it is implemented for social reasons. An ethical dilemma does exist and societies have addressed concerns. Ethical questions regarding the use of sex selection for non-medical use have been documented. The fear of gender discrimination, inappropriate control over nonessential characteristics of children, unnecessary medical burdens and costs, and inappropriate use of limited medical resources have been identified as potential problems by the Ethics Committee of the American Society for Reproductive Medicine (ASRM) (as cited in Gottlieb, 2001).

The support against gender selection relies on potential concerns regarding the increase or reinforcement of gender discrimination, the welfare of children born resulting from predetermined gender determination (PGD), and a potential sex ratio imbalance. Currently, some parts of India and China are experiencing sex ratio imbalance due to female infanticide, gender-driven abortions, and one-child family policies (ASRM, as cited in Gottlieb, 2001). Hanson, Hamberger, and Janson (2002) identified the interest that western culture has had in sex selection. The authors supported the use of sex selection for prevention of X-linked disease. Because of the potential of misuse, the authors did not support the idea of PGD for social purposes.

Dickens (2002) asserted there is a possibility that the sex ratio would become unbalanced, with an increase in male births, if gender selection were available to the general public. The use of techniques of sex selection might reinforce male dominated sexism and females' subordination (Dickens, 2002). The characteristic of gender itself would receive more attention and potentially result in general sex discrimination. Children born as a result of PGD might be expected to behave in gender-specific ways.

The arguments for gender selection for non-medical purposes revolve around the idea of couples having the ability to determine the gender of their offspring. "Couples would be able to satisfy their wishes for the size and composition of their family and the children might benefit by being wanted, not only for themselves but also for their gender" (Reubinoff & Scheneker, 1996, p. 348). Families with a strong desire for first-born child's gender have the option of choice with non-medical PGD. "The effect of predetermined gender might even reduce (*taxpayer-borne*) government spending on health and human services over the long run (Hill, Surrey, & Danzer, 2002, p. 439).

Rhodes (2001) stated that providers must resist the idea of prohibiting sex selection. Rhodes proposed that our society has a commitment to freedom. Individuals have been allowed to make choices based on their own rights, and there has been no validation for denying people gender determination options. Reproductive freedom is a societal value. Throughout history people have had the ability to choose their own partners, when they would start families, and how many children they would include. "Exercising the right to choose family planning and/or balancing would, we believe, have a positive effect on the quality of life of the parents and the children delivered unto them" (Hill et al., 2002, p. 439).

Summary

The art of attempting to discover noninvasive, sex determining techniques has been explored for several decades. The ideas expand from folk tales to documented scientific studies. The problems associated with X-linked genetic diseases present challenges in women born with X-linked recessive disorders. Through predetermined sex determination these women can benefit from technologic advances during childbearing years. Although methods of gender selection of sperm have been developed for couples undergoing ART, they remain cumbersome and inaccessible to the general public. The ethical dilemma concerning utilizing sex determination techniques for non-medical purpose continues to be debated.

CHAPTER III

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

The study was a retrospective, nonexperimental design with quantitative analyses. A quantitative study involves the systematic collection and evaluation of information (Polit & Hungler, 1998). Nonexperimental designs are used when there is no manipulation of variables, the researcher does not involve a comparison group, and subjects are not randomly assigned (Nieswiadomy, 2002). The dependent variable was the gender of the newborn. The independent variables were maternal age at the time of conception and the month in which conception occurred.

Setting

The setting for this study was a private, not-for-profit hospital that provides obstetrical care in Dallas, Texas. The hospital has 10 laboring rooms and 2 operating suites in which deliveries of newborns occur.

Population and Sample

A non-probability convenience sample is applied to the group of women in this study. The population consists of 1,005 females who gave birth between May 3, 2001 and April 30, 2002 in a private hospital in Dallas, Texas. The selected sample were all at least 18 years old. The births consisted of both vaginal and cesarean section deliveries.

Protection of Human Subjects

Written permission for the use of birth data was obtained from the Obstetric Director of the Dallas hospital before collecting information (see Appendix A). The data for the study were collected anonymously and did not involve any risks or infringement of confidentiality. The study qualified as a Level I study and approval was obtained from the Texas Woman's University Institutional Review Board (see Appendix B). The data contained maternal date of birth, first day of last normal menstrual period, and gender of newborn. This information was used to describe the sample and answer the research questions. No other identifying data were included in collection or analyses.

Instrument

A data collection form designed by the researcher was used to collect and organize the existing data for the study (see Appendix C). This form was used to categorize data obtained from the Watch Child statistics. The 8-item data collection form included the following: numeric assigned identification number, first day of last menstrual period, maternal date of birth, sex of child, calculated date of conception, maternal age in years, and month of conception. Predictions of gender from the Chinese lunar calendar were obtained from http://thelaboroflove.com/chart.

Data Collection

Prior to data collection the researcher obtained permission to utilize delivery information from the Obstetrical Director of the selected hospital and the Texas Woman's University Institutional Review Board. In the selected hospital, the birth statistics were compiled into a computer software system, Watch Child, specifically designed for labor and delivery. The information obtained included maternal date of birth and first day of last menstrual period. At delivery, assigned gender of newborn was recorded. The researcher accessed birth statistics using an assigned login code within the Watch Child system. The researcher accessed data beginning May 1, 2001 and recorded birth entries from May 1, 2001 until 1,000 birth entries were obtained. Each delivery was coded numerically for data processing and analyses. Only previously collected data were accessed and no individual could be identified from the data set. A formula was derived to calculate probable day of conception and mother's age at time of conception. This calculation provided information needed to obtain gender prediction from the Chinese lunar calendar.

Treatment of Data

Chi-square statistic was used to analyze the data. The chi-square statistic is calculated when comparing two sets of frequencies (Polit & Hungler, 1998). The two frequencies that were used in this study were (a) gender of newborn predicted by the Chinese lunar calendar, and (b) gender of newborn not predicted by the Chinese lunar calendar. A percentage was then calculated to determine how many of the births coincided with the gender prediction of the Chinese lunar calendar and what, if any, difference is compared to sex ratio occurring naturally. Multiple births were counted as one birth. The Chinese lunar calendar does not provide a prediction for women younger than 18 years old. Births to mothers younger than 18 years old, therefore, were not included in the analysis.

CHAPTER IV

ANALYSIS OF DATA

The purpose of this study was to examine the validity of the Chinese lunar calendar to predict gender of newborns in a population of 1,005 women who gave birth in a private hospital in Dallas, Texas. This study evaluated if gender at birth could be predicted using maternal age at conception and the month in which the patient conceives, as proposed in the Chinese lunar calendar. The study also determined if a statistical difference existed between actual gender of the newborn and the gender of the newborn as predicted by the Chinese lunar calendar. A description of the sample, findings of the study, and a summary of the findings will be presented.

Description of the Sample

A non-probability convenience sample was obtained from a group of women who delivered in a private hospital in Dallas, Texas. The population consisted of 1,005 females who gave birth between May 3, 2001 and April 30, 2002 in a private hospital in Dallas, Texas. The Chinese lunar calendar does not provide a prediction for women younger than 18 years old, therefore 74 births to mothers younger than 18 years old could not be included in the analysis. Multiple births were considered one birth while compiling the statistics. There were four sets of twins and one set of triplets whose births were counted as one occurrence. All multiple births were one gender sets of twins or triplets.

Findings of the Study

The first research question to be answered was: Can maternal age at conception and the month in which the woman conceives predict gender at birth, as determined by the Chinese lunar calendar? Chi-square statistic was used to analyze the data. This statistic was used to determine whether two variables are contingent with one another. The chi-square statistic is calculated when comparing two sets of frequencies (Polit & Hungler, 1998). The two frequencies that were used in this study were (a) gender of newborn predicted by the Chinese lunar calendar, and (b) gender of newborn not predicted by the Chinese lunar calendar. For the purpose of this study, significance was defined as $p < 0.05$. The obtained p value of this case was 0.367. Therefore, there is no evidence to support the proposed predicted gender, as determined by the Chinese lunar calendar, correlates with assigned gender at birth.

The percentage of the births that coincided with the gender prediction of the Chinese lunar calendar was determined. As stated previously, 74 of the women were younger than 18 years old and were disqualified from the sample. There were five sets of multiple births (four sets of twins and one set of triplets) in which the birth data were considered one episode. Of the 920 births that qualified for the study, 444 of these births were newborns whose gender coincided with the Chinese lunar calendar gender prediction.

Table 1 illustrates the case processing summary that determined the total number of cases used in this study (N = 925). All the cases selected were used, and there were no missing or unselected cases that were deleted. The N of 925 was obtained from the original sample of 1,005 births. Six birth entries were from multiple births of the same gender. These were counted as one birth, with subsequent siblings deleted from the original sample. Seventy-four births were deleted because the mother was less than 18 years of age.

Table 1

Case Processing Summary

Unweighted Cases	*N*	Percent
Selected Cases:		
Included in Analysis	925	100
Missing Cases	0	0
Unselected Cases	0	0
Total	925	925

Binary logistic regression was used to analyze gender. The outcome variable, gender, had only two values, male or female. With dependent variable encoding, the original values and internal values are the same. The original value is that which the researcher gives the dependent variable. For this study, "1" was given for female newborns and "2" was given for male newborns. The internal value assigned by the computer was 0 for female newborns and 1 for male newborns, as indicated in Table 2.

Table 2

Dependent Variable Encoding

Original Value	Internal Value
1	0
2	1

All the variables were entered together in each step and not entered in a stepwise fashion. Step, block, and model are all the same because the variables were entered at one time. Chi-square determined p value of $p = 0.367$, which is a nonsignificant goodness of fit. This finding indicates that the data fit the model. Goodness of fit compares the observed probabilities to those predicted by the model (Munro, 2001). Therefore, $p = 0.367$, $p > 0.05$ is not a significant finding and predicted gender using the Chinese lunar calendar is no greater than would be assumed to occur through chance.

Table 3

Classification Table

		Predicted		
		Gender		
Observed		1	2	Percentage Correct
Step 1:				
Gender	1	126	321	28.2
	2	127	351	73.4
Overall Percentage				51.6

Note. The cut value is .500.

The second research question addressed in this study was: Is there a statistical difference between actual gender of the newborn as predicted by the Chinese lunar calendar as compared to the national gender proportions that would naturally occur in a population of 1,000 births? Logistic regression was used to determine actual gender and predicted gender. All cases that were evaluated were included. Table 4 represents the percentage of female births, percentage of male births, and percentage of total number of births. In this study, 48.3% of the births were female, 51.7% of the births were male. As noted in Table 4, these percentages were not statistically significant from those births that occur naturally in the general population in the United States.

Table 4

Gender Predicted Group Cross Tabulation

			Predicted Group		
			1	2	Total
Gender	1	Count	126	321	447
		% of Total	13.6%	34.7%	48.3%
	2	Count	127	351	478
		% of Total	13.7%	37.9%	51.7%
Total		Count	253	672	925
		% of Total	27.4%	72.6%	100.0%

Additional Findings

The classification table noted that the Chinese lunar calendar model predicted 28.2% of the female births in this study (see Table 3). Of the male births, 73.4% were predicted correctly. The overall prediction was 51.6% using maternal age at conception and month in which the infant was conceived, through the Chinese lunar calendar.

Summary of the Findings

This retrospective, nonexperimental study consisted of the records of 1,005 deliveries in a private hospital in Dallas, Texas. Data were collected and analyzed to determine the validity of the Chinese lunar calendar to predict gender. The dependent variable was the actual gender of the newborn. The independent variables were maternal age at the time of conception and the month in which conception occurred, which is the basis for gender prediction used by the Chinese lunar calendar.

The findings of this study indicated that predicted gender using the Chinese lunar calendar did not have a relationship to assigned gender at birth. Furthermore, 48.3% of the predicted gender from the Chinese lunar calendar coincided with actual gender. According to the National Center for Vital Statistics (2002), the sex ratio in 2000 was 1,048 male births to every 1,000 female births. As noted in Table 5, this sample consisted of 447 females and 478 males, which reflects national gender ratio in the United States in 2000.

Table 5

Sex Ratio Summary

	Sex Ratio in the Gender Predicted Group		U.S. Sex Ratio in Year 2000	
Female births	48.3%	447	48.9%	1,968,011
Male births	51.7%	478	51.1%	2,057,922
Total births		925		4,025,933

CHAPTER V

SUMMARY OF THE STUDY

The purpose of this study was to determine the validity of the Chinese lunar calendar to predict gender of the newborn. The following chapter discusses the summary of the study, implications of the findings, and the results. Recommendations for further studies on the subject of gender prediction are addressed.

Summary

A retrospective, non-experimental design with quantitative analyses was conducted. The quantitative study involved the systematic collection and evaluation of birth information to assess the validity of the Chinese lunar calendar. There was no manipulation of variables, and the study did not involve a comparison group. The dependent variable was the gender of the newborn. The independent variables were maternal age at the time of conception and the month in which conception occurred, which were used to obtain predicted gender through the Chinese lunar calendar. The data of 1,005 births were evaluated, with 925 included in the data analyses. Permission was obtained from Texas Woman's University IRB to conduct this study. No identification of any subject was obtained, and data were amalgamated. The sample consisted of females, 18 years or older, who delivered their newborns in a private hospital in Dallas, Texas.

The Chinese lunar calendar prediction of gender was obtained from http://thelaboroflove.com/chart. Delivery data were acquired through the Watch Child system. The birth data consisted of the patient's current age, the last menstrual period, and the gender of the newborn. The data were organized using a data flowsheet designed by the researcher. The mother's age at time of conception and month in which she conceived were calculated.

Discussion of the Findings

Maternal age at conception and the month in which the woman conceived did not predict gender at birth as determined by the Chinese lunar calendar. The percentage of correct gender predictions using the Chinese lunar calendar was 51.6%. Findings from this study supported the results obtained by Ostler and Sun in 1999, that the Chinese lunar calendar does not predict gender of the newborn. Chi-square was .367 indicating that the model fits the data and that there was no difference between predicted birth gender and actual birth gender. Therefore the null hypothesis could not be rejected.

The review of the literature indicated that several folk methods have been used in an attempt to determine or predict gender at birth. These include the Draino test, fetal heart rate correlations to gender, diet during pregnancy, position during intercourse, timing intercourse with ovulation, precoital douching, chanting, timing coitus to various weather factors, or burying the placenta from female births to ensure that the next offspring would be male. The only way to determine the validity of these cultural beliefs is through scientific examination of evidence. This retrospective study examined the validity of gender prediction using the Chinese lunar calendar. Findings from this study indicated that the Chinese lunar calendar was no better at predicting gender than chance. This information could be helpful to couples who might rely on this method to determine the sex of their child.

Conclusion

Only scientific inquiry can determine the validity of folk beliefs, and these practices need to be objectively analyzed. Although use of the Chinese lunar calendar to predict gender during pregnancy is not physiologically harmful, there could be psychological ramifications if the newborn's gender was not desired or predicted.

Implications

The implications drawn from this study suggest that the area of gender prediction is complex and difficult to achieve.

1. Gender prediction cannot be predicted by evaluating maternal age and month of conception, as predicted by the Chinese lunar calendar.

2. Scientific technology does exist to help predict gender of a child, but it is reserved for the use of families at risk for having a child born with a genetic abnormality.

3. The idea of predicting gender has intrigued different societies throughout history.

4. Many ethical implications surround the topic regarding using gender prediction techniques for non-medical use.

Recommendations for Further Studies

Further research is needed on other folk methods that are used to predict gender of the newborn to determine the validity of these methods. The following research recommendations include:

1. A study could be conducted to determine if the sex ratio is affected by the lunar cycle.

2. A study assessing if the use of clomiphene citrate affects the sex ratio among fertility patients.

3. A study evaluating the percentage of male and female births to couples who conceive using specific positions during coitus.

4. Study evaluating pH of vaginal flora during conception and resulting gender of newborn.

5. An anonymous study of first born gender preference, if couples had the option of choice.

6. Differences in sex ratio among a variety of groups.

REFERENCES

Batzofin, J. H. (1987). XY sperm separation for sperm selection. *Urologic Clinics of North America, 14*(3), 609-618.

Beernink, F. J., & Ericsson, R. J. (1982). Male sex preselection through sperm isolation. *Fertility and Sterility, 38*(4), 493-495.

Check, J. H., & Katsoff, D. (1993). A prospective study to evaluate the efficacy of modified swim-up preparation for male sex selection. *Human Reproduction, 8*(2), 211-214.

Chinese lunar calendar. (2002). Retrieved June 23, 2002, from the World Wide Web: http://thelaboroflove.com/chart

Claassens, O. E., Franken, D. R., Oosthuizen, C. J. J., Kruger, T. F., Brusnicky, J. (1995). Fluorescent in situ hybridization evaluation of human Y-bearing spermatozoa separated by albumin density gradients. *Fertility and Sterility, 63*(2), 417-418.

Cunningham, F. G., Gant, N. F., Leveno, K. J., Gilstrap, L. C., Hauth, J. C., & Wenstrom, K. D. (1997). *Williams obstetrics* (20th ed.). Stamford, CT: Appleton & Lange.

Deci, E. L. (1980). *The psychology of self-determination.* Lexington, MA: D.C. Heath.

Dickens, B. M. (2002). Can sex selection be ethically tolerated? *Journal of Medical Ethics, 28*(6), 335-336.

Ericsson, R. J., Langerin, C. N., & Nishino, M. (1973). Isolation of fractions rich in human Y sperm. *Nature, 246,* 421-424.

Falcinelli, C., Battafarano, S., Neri, C., Mazza, V., Rantzi, A., Volpe, A., & Forabosco, A. (1999). First trimester fetal sex prediction by deoxyribonucleic acid analysis of maternal peripheral blood. *American Journal of Obstetrics and Gynecology, 181*(3), 675-680.

Fowler, R. M. (1982, August). The "Draino Test" [Letter to the editor]. *Journal of American Medical Association,* p. 831.

Geraedts, J., Handyside, A., Harper, J., Liebaers, I., Sermon, K., Straessen, C., Thornhill, A., Vanderfaeillie, A., & Vivelle, S. (1999). ESHRE preimplantation genetic diagnosis (PGD) consortium: Preliminary assessment data from January 1997 to September 1998. *Human Reproduction, 14*(12), 3138-3148.

Ghoshal, S. (2002). India cracks down on sex-determination tests. *JAMC, 166,* 800.

Glass, R. H. (1977). Sex preselection. *Obstetrics and Gynecology, 49,* 122-126.

Gottlieb, S. (2001). US doctors say sex selection acceptable for non-medical reasons. *BMJ, 323*(7317), 828.

Graffelman, J., & Hoekstra, R. F. (2000). A statistical analysis of the effect of warfare on the human secondary sex ratio. *Human Biology, 72*(3), 433-435.

Han, T. L., Flaherty, S. P., Ford, J. H., & Matthews, C. D. (1993). Detection of X- and Y-bearing human spermatozoa after motile sperm isolation by swim-up. *Fertility and Sterility, 60*(6), 1046-1051.

Handyside, A. H., & Delhanty, S. D. A. (1997). Preimplantation genetic diagnosis: Strategies and surprises. *Trends in Genetics, 13,* 270-275.

Hanson, C., Hamberger, L., & Janson, P. O. (2002). Is any form of gender selection ethical? *Journal of Assisted Reproduction & Genetics, 19*(9), 431-432.

Hill, D. L., Surrey, M. W., & Danzer, H. C. (2002). Is gender selection an appropriate use of medical resources? *Journal of Assisted Reproduction & Genetics, 19*(9), 438-439.

Johnson, L. A., Welch, G. R., Keyvanfar, K., Dorfmann, A., Fugger, E. F., & Schulman, J. D. (1993). Gender preselection in humans? Flow cytometric separation of X and Y spermatozoa for the prevention of X-linked diseases. *Human Reproduction, 8*(10), 1733-1739.

Kaneko, S., Yamaguchi, J., Kobayashi, T., & Iizuka, R. (1983). Separation of human X- and Y- bearing sperm using percoll density gradient centrifugation. *Fertility and Sterility, 40*(5), 661-666.

Khatamee, M. A., Horn, S. R., Wesley, A., Farooq, T., Jaffe, S. B., & Jewelewicz, R. (1999). A controlled study for gender selection using swim-up separation. *Gynecological Obstetrical Investigation, 48*(1), 7-13.

Malpani, A. (2002). Preconceptional sex selection [Letter to the editor]. *CMAJ, 166,* p. 301.

Mazza, V., Falcinelli, C., Paganelli, S., Contu, G., Mantuano, S. M., Battafarano, S. D., Forabosco, A., & Volpe, A. (2001). Sonographic early fetal gender assignment: A longitudinal study in pregnancies after in vitro fertilization. *Ultrasound in Obstetrics & Gynecology, 17*(6), 513-516.

Munro, B. H. (2001). *Statistical methods for health care research* (4th ed.). Philadelphia: Lippincott Williams & Wilkins.

Nagy, A. M., Man, X. D., Ruibal, N., & Lints, F. A. (1998). Scientific and ethical issues of preimplantation diagnosis. *Annals of Medicine, 30*(1), 1-6.

National Center for Vital Statistics, (2002, December 18). *National vital statistics reports, 51*(2). Retrieved January 5, 2003 from the World Wide Web: http://www.cdc.gov/nchs/data/nvsr/nvsr51/nvsr51_02.pdf

Nieswiadomy, R. M. (2002). *Foundations of nursing research* (4th ed.). Upper Saddle River, NJ: Prentice-Hall.

Ostler, S., & Sun, A. (1999). Fetal sex determination: The predictive value of three common myths. *CMAJ, 161*(12), 1525-1526.

Polit, D. F., & Hungler, B. P. (1998). *Nursing research: Principles and methods* (6th ed.). Philadelphia: J. B. Lippincott.

Pini, P. (1994). Folk tradition and folk medicine in Scotland. *Lancet, 344*(8917), 251.

Quinlivan, W. L. G., Preciado, K., Long, T. L., & Sullivan, H. (1982). Separation of human X and Y spermatozoa by albumin gradient and sephadex chromatography. *Fertility and Sterility, 37*(1), 104-107.

Reubinoff, B. E., & Scheneker, J. G. (1996). New advances in sex preselection. *Fertility and Sterility, 66*(3), 343-350.

Rhodes, R. (2001). Ethical issues in selecting embryos. *Annals of the New York Academy of Sciences, 943,* 360-367.

Robertson, J. A. (2001). Preconception gender selection. *The American Journal of Bioethics, 1*(1), 2-9.

Sermon, K., Harper, J., Geraedts, J., de Die-Smulders, C., Handyside, A., Hussey, M., Munne, S., Ray, P., Santalo, J., Staessen, C., Thornhill, A., Vivelle, S., & Wilton, L. (2002). ESHRE preimplantation genetic diagnosis consortium: Data collection III: May 2001. *Human Reproduction, 17*(1), 233-246.

Shettles, L.B., & Rorvik, D. M. (1984). *How to choose the sex of your baby: The best method supported by scientific evidence.* New York: Doubleday.

Speroff, L., Glass, R. H., & Kase, N. G. (1999). *Clinical gynecologic endocrinology and infertility* (6th ed.). Baltimore: Lippincott Williams & Wilkins.

Stolkowski, J., & Choukroun, J. (1981). Preconception selection of sex in man. *Israel Journal of Medical Sciences, 17,* 1061-1067.

Zarutskie, P. W., Muller, C. H., Magone, M., & Soules, M. R. (1989). The clinical relevance of sex selection techniques. *Fertility and Sterility, 52,* 891-905.

APPENDIX A

Hospital Permission to Conduct Study

From: Crawford, Penny
To: O'Shea, Ophelia
Cc:
Subject: Watchchild Data
Sent: 2/17/2003 3:02 PM Importance: Normal

February 17, 2003

To Whom it May Concern:

Ophelia O'Shea may access and utilize Watchchild statistics to include patient's DOB, LMP and newborn gender to complete research for her masters program. This information will not include patient's name or other identification data, nor will it include any identifying data for the facility itself.

Penny Crawford RNC, CNM
Director Women's Services

APPENDIX B

Institutional Review Board Permission to Conduct Study

TWU
TEXAS WOMAN'S UNIVERSITY
DENTON DALLAS HOUSTON

College of Nursing
1810 Inwood Road, Dallas, TX 75235-7299
214-689-6510 Fax 214-689-6539

Ophelia O'Shea
School of Nursing
Parkland Campus

May 7, 2003

Dear Ophelia O'Shea,

The study entitled "Validity of Gender Prediction in 1000 Pregnant Women Using the Chinese Lunar Calendar" has been reviewed by the members of the Institutional Review Board and in their judgment meets requirements in regard to protection of individuals' rights. The Institutional review board approves collection of data for this project. This approval is granted for one year.

For this study signatures indicating informed consent from human subjects is not required. You are responsible for updating the committee concerning the status of this project should it continue past the expiration date of May 7, 2004. You are also responsible for keeping the committee informed of any changes in the study, which affect human rights. Otherwise this study is exempt from further review by the committee.

If you have any questions concerning this review I may be contacted at (214) 689-6522 or by e-mail, SSheriff@twu.edu. The Institutional review board is pleased to acknowledge your sense of responsibility for ethical research.

Sincerely,

Susan Sheriff

Susan Sheriff, PhD, RN
Chair, IRB - Dallas
Institutional Review Board, Dallas

Simply the **BEST**

APPENDIX C

Data Collection Form

id	lmp	dob	sex	lmp.jul	LMPPLS14	MAGEYRS	mnthconc
1	4/22/01	8/13/80	1	01112	5/6/01	20	5
2	4/15/01	6/6/83	1	01105	4/29/01	17	4
3	7/23/01	2/21/78	2	01204	8/6/01	23	8
4	5/25/01	12/4/70	1	01145	6/8/01	30	6
5	4/29/01	9/9/83	2	01119	5/13/01	17	5
6	4/24/01	6/30/82	2	01114	5/8/01	18	5
7	7/13/01	7/6/65	2	01194	7/27/01	36	7
8	6/24/01	1/11/82	1	01175	7/8/01	19	7
9	5/13/01	6/22/80	1	01133	5/27/01	20	5
10	5/10/01	5/14/85	2	01130	5/24/01	16	5
11	7/16/01	4/1/60	2	01197	7/30/01	41	7
12	6/12/01	4/12/84	2	01163	6/26/01	17	6
13	6/22/01	8/12/66	2	01173	7/6/01	34	7
14	5/13/01	2/16/76	2	01133	5/27/01	25	5
15	6/21/01	6/17/69	1	01172	7/5/01	32	7
16	6/2/01	8/30/73	2	01153	6/16/01	27	6
17	5/28/01	1/7/82	2	01148	6/11/01	19	6
18	8/30/01	4/22/85	2	01242	9/13/01	16	9
19	6/20/01	10/28/74	2	01171	7/4/01	26	7
20	6/20/01	10/28/74	2	01171	7/4/01	26	7
21	6/30/01	2/15/84	1	01181	7/14/01	17	7
22	6/12/01	2/2/83	1	01163	6/26/01	18	6
23	5/11/01	10/10/77	2	01131	5/25/01	23	5
24	5/16/01	6/16/82	1	01136	5/30/01	18	5
25	4/1/01	1/8/83	1	01091	4/15/01	18	4
26	6/25/01	6/30/81	2	01176	7/9/01	20	7
27	7/5/01	3/15/81	2	01186	7/19/01	20	7
28	4/1/01	2/20/80	1	01091	4/15/01	21	4
29	3/27/00	5/27/65	2	00087	4/10/00	34	4
30	8/15/00	6/30/79	2	00228	8/29/00	21	8
31	1/15/01	5/23/72	1	01015	1/29/01	28	1
32	11/23/00	1/23/79	2	00328	12/7/00	21	12
33	1/17/01	4/11/70	2	01017	1/31/01	30	1
34	3/24/01	10/14/81	1	01083	4/7/01	19	4
35	9/2/01	2/4/71	2	01245	9/16/01	30	9
36	12/12/00	8/4/63	1	00347	12/26/00	37	12
37	12/4/00	11/13/66	2	00339	12/18/00	34	12
38	11/28/00	11/21/70	2	00333	12/12/00	30	12
39	12/27/00	6/19/73	1	00362	1/10/01	27	1
40	9/4/00	9/22/77	2	00248	9/18/00	22	9
41	2/7/01	5/10/69	1	01038	2/21/01	31	2
42	1/30/01	1/6/72	1	01030	2/13/01	29	2
43	1/21/01	3/13/68	2	01021	2/4/01	32	2
44	10/15/00	3/31/82	2	00289	10/29/00	18	10
45	3/10/01	6/24/75	1	01069	3/24/01	25	3
46	1/5/01	5/3/70	2	01005	1/19/01	30	1
47	12/15/00	10/5/74	1	00350	12/29/00	26	12
48	2/15/01	6/20/77	2	01046	3/1/01	23	3
49	1/21/01	11/3/66	2	01021	2/4/01	34	2
50	2/28/01	5/11/78	1	01059	3/14/01	22	3
51	12/1/00	6/22/80	2	00336	12/15/00	20	12

Chinese I ar Calendar

MONTH OF CONCEPTION	WOMAN'S CONCEIVING AGE													
	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1 January	G	B	G	B	G	B	B	G	B	G	B	G	B	B
2 February	B	G	B	G	B	B	G	B	G	B	G	B	G	G
3 March	G	B	G	G	B	G	B	B	B	G	B	G	G	B
4 April	B	G	B	G	G	B	B	G	G	B	G	G	G	G
5 May	B	G	B	G	B	B	G	G	G	G	G	B	G	G
6 June	B	B	B	G	G	G	B	B	B	G	G	B	G	G
7 July	B	B	B	G	G	B	B	G	G	B	B	B	G	G
8 August	B	B	B	G	B	G	G	B	B	B	B	B	G	G
9 September	B	B	B	G	G	B	G	B	G	B	B	B	G	G
10 Gctober	B	B	G	G	G	B	G	B	G	B	B	G	G	G
11 November	B	G	B	G	G	B	G	B	G	G	G	G	B	G
12 December	B	G	B	G	G	G	G	B	G	B	G	G	B	B

MONTH OF CONCEPTION	WOMAN'S CONCEIVING AGE													
	32	33	34	35	36	37	38	39	40	41	42	43	44	45
1 January	B	G	B	B	G	B	G	B	G	B	G	B	B	G
2 February	G	B	G	B	B	G	B	G	B	G	B	G	B	B
3 March	B	B	B	G	B	B	G	B	G	B	G	B	G	B
4 April	G	B	G	B	G	B	B	B	B	G	B	G	B	G
5 May	G	G	G	G	B	G	B	B	G	B	G	B	B	G
6 June	G	G	G	G	G	B	G	G	B	G	B	G	B	G
7 July	G	G	G	G	G	G	B	G	B	B	G	B	G	B
8 August	G	B	G	B	G	B	G	B	G	B	B	G	B	G
September	G	G	G	G	B	G	B	G	B	G	B	B	G	B
10 Gctober	G	G	G	G	B	B	G	B	G	B	G	B	B	G
11 November	G	G	B	B	B	G	B	G	B	G	B	B	G	B
12 December	B	B	B	B	B	B	G	G	G	B	G	B	G	B