

Waiting for Baby: A Study on Women's Perceptions Of Due Dates and Stress

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Abstract

At the start of pregnancy estimated due dates are given to women routinely. Care providers assign due dates to a mother as a measure of the length of time she should expect to be pregnant and to identify when a medical intervention is necessary in the case of preterm or postterm deliveries. However, research has shown that great variability exists in the length of human gestation, and technological advances in determination of gestational age do little to help predict a baby's readiness to be born. The purpose of this study is to investigate the association between due dates, stress in women, and labor inductions. This study considers how due dates might affect women whose babies are born in the range of dates known as "term". Women over the age of 18 who were not pregnant at the time of the survey were asked 41 questions to determine demographic information, pregnancy history, situations surrounded their most recent pregnancy and birth, and whether they experienced stress during their pregnancy. The survey was administered online and subjects were recruited by social media and email. Data from 1136 women reveals that attitudes toward due dates vary (just 50.68% of women respond that they like having a due date), implying an opportunity for a shift in the way that the medical community views and talks about the estimated due date to women. Over half of respondents (53.74%) report feeling stress about when the baby would arrive, yet a great majority (86.81%) never felt that it was unsafe for their baby to remain unborn at the end of their pregnancy. These attitudes show a dichotomy between the intuition of a mother carrying a child and the medical standards to which pregnancy is subject. The results of the study suggest a need for review of the culture of childbirth as it applies to due dates as well as the pressure placed on women to birth "on time".

Keywords: Pregnancy, Due Dates, Prenatal Care

1. Introduction

Over the last 100 years, birthing a baby has gone from a natural, normal process to a highly medicalized one⁷. Undoubtedly, the improvements that modern medicine has made on lowering rates of infant and maternal mortality and morbidity are marked and fitting to the current scientific and technological paradigm¹⁵. However, this paradigm tends to excuse itself from the realm of childbirthing traditions and the individual experience of the mother. It has resulted in a sharp increase in planned and unnecessary cesareans and other interventions which call into question the true purpose of these procedures⁷. Common terms like "failure to progress" and "macrosomia" and CPD (a condition under which the baby cannot pass through the mother's pelvis due to size and shape of the mother) can lead to interventions and are frequently misdiagnosed⁵.

The benefits associated with medical interventions in childbirth are undeniable, as evidenced by improvements in fetal and maternal mortality rates in the last century. However, according to the the WHO Global Health Observatory

Data, maternal mortality rates have risen since the 1980s, even in a technologically advanced country like the United States¹⁶. The medicalization of childbirth often trumps informed decision-making in the delivery room. Fetal monitoring and other devices used for close watch over the vitals of mother and baby can lead to fear and detachment from a woman's natural sense of her body and the baby within⁷. Due dates potentially bring about ultimatums as to when the baby will be taken by induction or cesarean. It is unclear the true cost of medical childbirth and the traumatic loss of agency on the mother or the child.

Currently there is a lack of research pertaining to how women perceive due dates in pregnancy and the relationship to stress at the end of pregnancy. In the US and around the world EDDs, or estimated due dates, are given routinely, many calculated by Naegele's Rule which was developed in the 1830's by a male obstetrician⁶. With current ultrasound technology that can measure the size of a fetus in utero, science still has not been able to predict a baby's delivery date without error⁴, which points to great variability in human gestation. Research now shows that even in cases when scientists can pinpoint the exact date that an embryo implants into the womb, the length of pregnancy can vary as much as 5 weeks⁹. Findings of our study may suggest a shift in the way that due dates are talked about during pregnancy.

Doctors and midwives continue to assign a due date to each mother as a measure of the length of time she should expect to be pregnant as well as to identify when a medical intervention is necessary in the case of preterm (before 37 weeks) or post term (after 42 weeks) deliveries¹³. Western medicine has improved birth outcomes for preterm and postterm women and babies and may be aided by due dates to predict which interventions are needed.

Despite mounting evidence that cognitive development continues during the weeks described here as "term"² the medical community is seeing a sharp rise in the amount of inductions at and even before 40 weeks gestation. Studies show a shift in the average gestational age from 40 to 39 weeks due to increased amounts of planned births⁸. Reduced morbidity and mortality, and increased gray matter and myelination in the fetal brain are related to longer gestational age even within the period clinically defined as "full term"². Gestation length in children born after 37 weeks predicts executive function in early childhood and is associated with fetal growth¹¹. Full development in the fetal stage is imperative to the health of the infant at birth as well as the physical and mental health throughout the lifespan².

Existing evidence suggests that due dates are given routinely even though they are not accurate predictors of the exact day the baby will be born, with currently the most common cause of prolonged pregnancy being inaccurate dating³. Additionally, planned births are not only increasing significantly, but the point in gestation at which they are happening is decreasing⁸. Women's perception of due dates may be associated with increased stress and an increase in the prevalence of birth interventions¹⁴. The purpose of this study is to investigate the relationship that exists between the estimated due date during pregnancy and the actions of care providers at the end of a woman's pregnancy. Studies show that estimated due dates (EDD's) are inaccurate to the timing of birth¹⁰, however the psychological effects of EDD's on women during their gestation have not to our knowledge been studied. The researcher has surveyed women to determine an association between due dates and stress at the end of pregnancy. The researcher's primary outcome was to determine the relationship between a woman's experience of stress at the end of pregnancy and the use of labor induction by her care provider(s). An additional outcome is to investigate the accuracy of due dates with current technology and the help of ultrasound dating, as well as look at the different attitudes women have toward due dates depending on whether their babies were born before, on, or after the date given.

2. Methodology

In order to investigate the associations between due dates, stress, and induction of labor, this study involved a cross-sectional survey design. A convenience sample of 1199 women was reached using an online survey consisting of 41 questions. Eligible participants were women 18 years or older at the time of their most recent delivery who were not pregnant when the survey was given. Recruitment took place using the online social media website, Facebook, as well as by emails sent by investigators with the purpose of informing mothers of the need for volunteer participants. Recipients of the email and Facebook messages were asked to forward the message to qualified individuals at their discretion. A link to the survey was included in the message, which accessed the questionnaire at SurveyMonkey.com. Recruitment began February 11th, 2016 and the link closed March 4th, 2016 (23 days). No personally identifying information was collected and each participant was given an ID number by SurveyMonkey.com. This study was subject to the standards and approval of the University of North Carolina Asheville IRB. Subjects with gestational diabetes, pre-eclampsia, high blood pressure and other self-reported health conditions were included in the study in order to assess women's experiences in all types of pregnancies.

Questions on the survey related to gestation length, birth weight, and stress and pertained only to the most recent pregnancy which ended in a live birth (Was your most recent baby born before or after the “due date”?) Stress was assessed to determine (1) if stress is present at the end of pregnancy, (2) the magnitude to which it was experienced, (3) at what point in pregnancy the stress began. Questions relating to women’s attitudes toward the experience of pregnancy and birth as well as the perceived cause of stress yielded qualitative responses which will not be discussed in this report, and require further analysis. Magnitude of the self-reported stress is measured using a modified version of the Cohen Scale. Dr. Sheldon Cohen’s work is commonly known as a Perceived Stress Scale (PSS) and has been used in research to determine disease risk by measuring the participant’s frequency of inquired-about emotions¹. This scale aims to measure a subjective insight with quantitative format. Participants in this study rate stress and worry from 1-7 with “1” being the least amount and “7” being an extreme amount. Findings of the scales will be discussed in future reports.

Only completed and partial responses were used in the study analysis. Incomplete responses were determined by SurveyMonkey.com standards. Microsoft Excel version 14.5.2 was used to determine the impact that ultrasound technology has on predicting the time of a baby’s birth. A total of 1138 (94.91%) responses were kept to be used in the data analysis. Participants reported giving birth between the ages of 18 and 45 (age 18-24 10.5%, age 25-34 70.41%, age 35-44 18.82%). The majority of women (76.95%) reported giving birth to their most recent child within 5 years of completing the survey. A total of 92.50% reported white race. 3.06% reported mixed race, 1.38% reported black race, and 0.99% reported Hispanic race. Of the 1,053 women who reported on the region their most recent child was born 744 were in the eastern United States, 171 in the western United States, and 53 reporting births in countries outside the United States.

The study aims to establish a conversation in the medical and midwifery communities regarding the usefulness of due dates as compared to potential harmful effects on mothers. This will be done by looking closely at the association between due dates and self-reported stress the mother felt in relation to the date. Additional results of the study include an analysis of the relationships between due dates, birth interventions, gestational length, number of pregnancies, health of the mom and baby and women’s attitudes toward the use of EDD’s.

3. Results

3.1 Accuracy of Technology in Determination of Due Dates

Those who responded were able to indicate if more than one method applied for determining their most recent baby’s due date. Of 998 women reporting on the methods, 762 (76.35%) indicated using the Last Menstrual Period (LMP) and 665 (66.63%) reported using ultrasound. Those who answered both LMP and ultrasound were 45.09% of the total women reporting. Of those who reported on the method of determining due date, 976 also reported on the accuracy of the due date prediction. Of the women who used LMP only (n=311), 7.40% had their baby on the predicted due date. Those who used LMP and ultrasound (n=450) had babies on the due date 6.44% of the time. A chi square test of the findings shows no statistical significance in the use of ultrasound technology to predict the date a baby will be born (p-value=.6092).

Women whose dates were determined using LMP only reported giving birth within one week of the due date 56.91% of the time. Women whose dates were determined by LMP and ultrasound combined reported giving birth within one week of the due date 57.11% of the time. A chi square test of the findings shows no statistical significance in the use of ultrasound technology in predicting the week the baby will be born (p-value=.9568).

Some respondents chose to add their thoughts to the survey regarding the accuracy of dating. One woman whose baby was born at the given date of 41 weeks said, “I knew it was probably off by about 3 days because I charted my temperatures and my cycles were not ‘normal’ as I was still breastfeeding my first child.” Another woman whose baby was born at the given date of 38 weeks and 4 days stated, “The due date changed three times during the first few months of pregnancy.”

Table 1. Comparison of accuracy of Last Menstrual Period and Ultrasound dating on due date

	ON DUE DATE	NOT ON DUE DATE	TOTAL
LMP ONLY	23 (7.40%)	288 (92.60%)	311
LMP + ULTRASOUND	29 (6.44%)	421 (93.56%)	450
ULTRASOUND ONLY	10 (4.65%)	205 (95.35%)	215
TOTAL	62 (6.38%)	914 (93.65%)	976

Table 2. Comparison of accuracy of Last Menstrual Period and Ultrasound dating within one week

	WITHIN ONE WEEK	NOT WITHIN ONE WEEK	TOTAL
LMP ONLY	177 (56.91%)	134 (43.09%)	311
LMP + ULTRASOUND	257 (57.11%)	193 (42.89%)	450
ULTRASOUND ONLY	129 (60.00%)	86 (40.00%)	215
TOTAL	563 (57.68%)	413 (42.32%)	976

3.2 Presence of Stress During Pregnancy

The experience of stress at the end of pregnancy was measured by a series of questions regarding four potential stressors: general pregnancy worry, worry over the timing of the birth, a feeling that the baby is unsafe if it remains unborn, and the concern of people in the mother's life. Overall, women report being stressed about timing of the birth (53.74% said they were stressed about when the baby would arrive) more than any other potential stressor. The least reported stressor was a feeling at the end of pregnancy that the baby is unsafe if it remains unborn (11.73% of women).

Some women chose to respond to the open ended question asking what they felt was the cause of their stress at the end of pregnancy. One woman responded, "All of my live births have been over 41wks. This is my normal so I'm sick of being told 'you are over do. Start thinking about induction'." Another woman stated, "I was in a car accident, but the "surprise" of when baby would come is always a little nerve wracking. I just wanted to get labor over with."

Table 3. Indicators of stress in a woman’s most recent pregnancy

	YES	NO	I DON’T KNOW	TOTAL
During your most recent pregnancy, did you ever feel more worried than usual?	454 (47.14%)	467 (48.49%)	42 (4.36%)	963
In the final month of your pregnancy, did you ever feel stressed about WHEN the baby would arrive?	517 (53.74%)	432 (44.91%)	13 (1.35%)	962
During the last month of your pregnancy, did you ever feel it was unsafe for your baby to remain unborn?	113 (11.73%)	836 (86.81%)	14 (1.45%)	963
During the last month of your pregnancy, did others ever express concern about the length of your pregnancy? (family, friends, care providers, strangers, etc.)	219 (22.77%)	721 (74.95%)	22 (2.29%)	962

3.3 Labor Inductions and Stress

Of 1,007 women reporting, 420 (41.71%) indicated that their labor and birth started with an induction from the care provider. Of the four types of stress, the highest rate of induction was among those who felt it was unsafe for their child to remain unborn (74.11%), followed by 45.56% of women who reported that they felt more worried than usual, women who reported that others expressed concern over the length of their pregnancies (42.66%), and those who felt stressed about when the baby would arrive (42.35%). (see Figure 1)

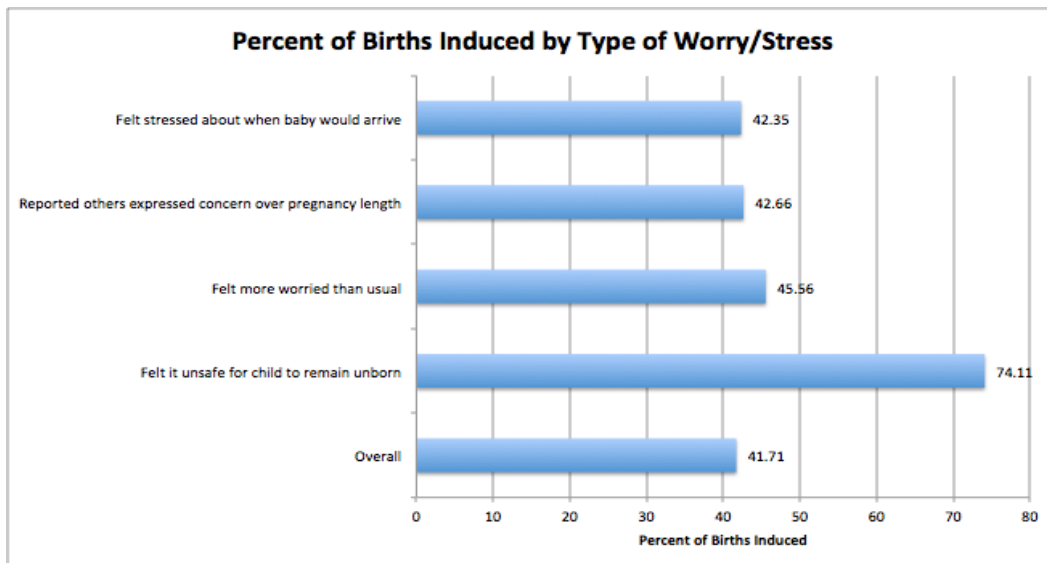


Figure 1. Respondents who reported the experience of stress and prevalence of induction of labor.

Some women whose labors were induced chose to respond to the open-ended question regarding the reason for their stress at the end of pregnancy. One respondent answered, “A desire for labor to begin on its own and a strong desire for a natural birth juxtaposed with my providers rules/fears about going past the due date. Also my birth center closed 9 days before my due date, so I had to rethink my entire birth plan -- stressful!” Another woman said, “Working fulltime with a deployed husband and a two year old.”

3.4 Effect of Birth Timing on Attitudes Toward Due Dates

Women’s attitudes toward due dates were assessed using a multiple choice question regarding their preference toward a due date like the one traditionally given, or a less traditional option. Of the 959 responses, 44.63% of women said that they would have preferred a range of dates in either a 2-week or one month spread. Half of women (50.68%) said they liked having a due date. Seven women prefer no dates at all. (See Figure 2) The length of a mother’s gestation showed to have an influence on her preference. Of the women who liked having a due date, 76.50% gave birth on or before their due dates, compared to 23.51% whose babies were born after. (See Figure 3) Of the women who prefer a range of dates, 58.45% gave birth on or before their due dates, a significant difference from the 41.55% whose babies were born after ($p < .05$). (See Figure 2)

Qualitative data suggest that women whose babies come after the given due date can feel open to changing the way that gestation length is talked about. One woman spoke about how using a range of dates would have been a better option. She stated, “My first was 39+3. I knew every pregnancy is different, but I thought first time moms tended to go past 40, not second go round! I did not at all expect to go to 41+2. I hated inducing, but my husband had to leave town. Maybe with a range we would have been more cautious scheduling work.” Another respondent discussed the feelings associated with the passing of her due date. She said, “Both my children came after their due dates. I was okay with it for my first and mostly until 40w2d with my second. After that, I got really fed up. It’s hard to see friends who go before their due date so often. A range of weeks might help me or other moms who fixate on that date or going early or comparing themselves to peers...”

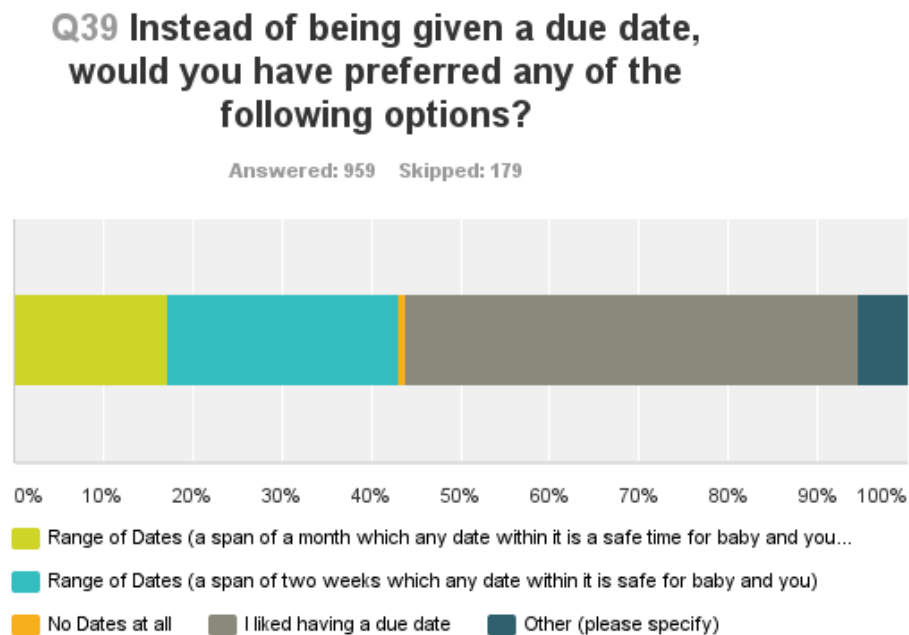


Figure 2. All women’s attitudes toward due dates.

Of those who responded, about half would have preferred a range of dates and half liked the use of traditional due dates. A small amount of women would have preferred no dates at all. Women who chose “other” typed in their own unique preferences, which are not discussed here.

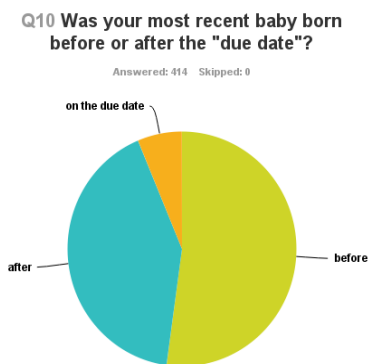


Figure 3. Accuracy of due dates in women who Prefer a range of dates

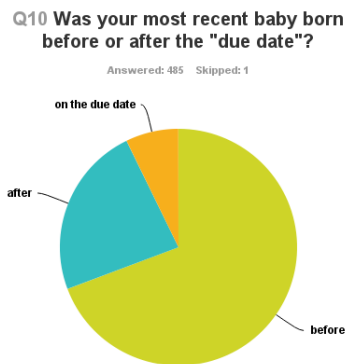


Figure 4. Accuracy of due dates in women who like having a due date

Figures 3. and 4. Graphs of the association between whether the baby was born before, on or after the due date and a woman's attitude toward due dates.

Women are more likely to have had their child before the due date if they "like" having a due date.

4. Discussion

This study reinforces the notion that due dates are variable, and unless there is a use of interventions, are not predictable with precision. Use of the most up-to-date technology can give parents a snapshot of the gestational age of the fetus but cannot, with certainty, predict the date of birth. Due dates were no more predictable with the use of ultrasounds in conjunction with LMP than with LMP alone, which is in agreement with research done on the methods of gestational dating⁴. Additionally, qualitative data shows incidents of women's due dates changing a number of times throughout pregnancy. These findings could explain why about half of women report wanting to see a change in the language surrounding due dates. A range of dates within which the baby is considered "term" has potential to decrease stress associated with the timing of the baby's birth. This study finds that less than 12% of women reported that the cause of stress at the end of pregnancy is due to a fear of the baby remaining unborn, yet a higher percentage (41.71%) of labors are induced by care providers. This could indicate a disconnect between actions of care providers and the intuition of mothers.

Women who had a child on or before the due date are more likely to respond that they like having a due date. This was significantly different from women who gave birth after the date, which points to a shift in attitude as the date comes and goes. Implications for this finding point to women's feelings of the uncertainty around the 40 week average gestation length. A woman whose baby comes before the date may feel rewarded with an "early" delivery, while a woman whose baby arrives after the given date is more likely to express a desire to have had her time frame stretched beyond a single day. This may indicate a growing desire for women to have choices regarding the way the care provider talks about "due dates".

Stress relating to due dates and pregnancy does not appear to have an effect on the prevalence of induction, except if the mother felt it was unsafe for her baby to remain unborn. Further analysis into the reasons mothers may feel this way is needed to determine the role of the care provider and/or health of the mother and baby in a woman's labor starting with induction.

Potential limitations of this study include the lack of diversity in the sample, limited information on demographics such as income level, number of babies in utero, and the age of the woman reporting. There is also an inherent bias that exists in convenience sampling in regards to gaining representative data, since the population was not chosen at random.

Strengths of the study include the large sample and the presence of quantitative and qualitative data. The high number of questions relating to many different aspects of gestation and health as well as opinion information helps the researchers to understand the dynamic and complicated relationship between women and pregnancy. The large

data set will be represented in future analyses. Cross-disciplinary review of the responses given by 1,136 women who have experienced childbirth in its variety of forms has potential to yield unique results which could play a role in the choices that women are given regarding prenatal care.

Further research is necessary to determine the potential cognitive effects on children delivered from the womb before the natural process of labor begins. It is unclear what the cumulative impact of unnecessary inductions of labor has on children and families. Future papers on the data collected in this study will report both quantitative and qualitative data regarding the psychological impact of pregnancy on women and the role of health status, experience in previous pregnancies, stress, and quality of care regarding pregnancy choices.

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