Attitudes and Practices Regarding Late Preterm Birth Among American Obstetrician-Gynecologists

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Abstract

Background: Late preterm birth (LPTB) accounts for most preterm births and has been increasing, associated with increases in cesarean sections and inductions at this gestational age.

Methods: A self-administered survey, consisting of questions about opinions, knowledge, and practices regarding LPTB, was mailed to 1232 American College of Obstetricians and Gynecologists (ACOG) Fellows and Junior Fellows in Practice in May–July 2010.

Results: Surveys were returned by 520 practicing obstetricians. Two thirds of respondents correctly defined LPTB (34–36 weeks completed gestation). Most responding physicians (87%) were aware of the evidence regarding morbidity and mortality of infants born at 34–36 weeks; 81% considered such evidence sufficient to make a clinical judgment. Although 84% were concerned about long-term health problems in these infants, many disagreed that LPTB infants were at increased risk of long-term neurodevelopmental outcomes. Most agreed that the increase in LPTB in the United States is due to increasing rates and complications of multifetal pregnancies and maternal disorders. Almost all responding physicians agreed that certain clinical indications (e.g., severe preeclampsia, placental abruption, premature rupture of the membranes [PROM]) were appropriate reasons for early delivery, and most disagreed with delivering late preterm infants for logistical reasons or convenience. Half of responding physicians reported that concerns about malpractice risks contribute to their decision to induce labor or perform a cesarean section at 34–36 weeks.

Conclusions: Many obstetricians underestimate long-term neurodevelopmental outcomes among infants born late preterm and may have a lower threshold to deliver some infants late preterm for indications that are not evidence based. Additional educational efforts regarding LPTB are needed.

Introduction

AMONG LIVE BIRTHS IN THE UNITED STATES, the proportion born preterm has steadily increased, reaching an all time high of 12.8% in 2006 before slightly declining to 11.99% in 2010.¹ More than two thirds of infant deaths in the United States occur in preterm infants, with almost 10% of infant deaths occurring among infants born late preterm (34–36 weeks gestation).² Infant mortality rates in the United States vary dramatically with gestational age, from approximately 178/1000 live births in very preterm infants (<32 weeks gestation) to 16/1000 at 32–33 weeks, 7.4/1000 at 34–36 weeks, and 3/1000 at 37–38 weeks, with the minimum mortality of about 2/1000 live births occurring in infants born at 39–41 weeks gestation.¹ Given these data, it is a disturbing trend that the proportion of births at 39–41 weeks of gestation has declined over the last two decades while the proportion of infants born between 34 and 38 weeks gestation has increased.

The increase in preterm births is mainly driven by the increase in late preterm births (LPTB) at 34–36 weeks gestational age, which rose to 9.1% in 2006, accounting for more than 70% of all preterm births in the United States.³ The subsequent small declines in 2007 and 2008 were caused by declines in LPTB. It is unclear whether the change in the rate of LPTB derives from changes in the incidence of spontaneous, indicated, or elective preterm births. However, the proportion of LPTB that were induced has more than doubled from 1990 to 2006, and there has been a marked increase in cesarean section deliveries as well.^{4,5} Moreover, whereas the cesarean section rate has increased among all gestational ages, the increase in LPTB can be explained by an excess of cesarean sections in this group.⁴ There is also evidence suggesting that some late preterm deliveries occur for soft or nonmedically indicated reasons and are potentially avoidable^{6,7}; they may unnecessarily expose women and infants to the potential morbidity and risk of mortality associated with cesarean delivery^{8–10} and LPTB.^{3,11}

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Little is known about physician perceptions about the underlying reasons for the increases seen in LPTB over the last decade or what their knowledge and practices are regarding this issue. In addition, it is unclear what factors contribute to a provider's decision to deliver an infant preterm and what role growing concerns about medical liability may play in those decisions. The American College of Obstetricians and Gynecologists (ACOG) published in 2008 (and reaffirmed in 2010) a Committee Opinion regarding late preterm birth.¹² In this study, we surveyed Fellows and Junior Fellows in Practice of ACOG to assess their knowledge about LPTB and consequences of delivery of late preterm infants and to determine current attitudes and clinical practices regarding indications to deliver preterm.

Materials and Methods

Data were collected through a self-administered mail survey, mailed in May 2010 to 1232 ACOG Fellows and Junior Fellows in Practice, with two additional mailings in July and August 2010 to recipients who had not yet responded. Six hundred were members of the ACOG Collaborative Ambulatory Research Network (CARN), and 632 were not members of CARN. Network members are ACOG Fellows or Junior Fellows in Practice who have volunteered to participate in ACOG Research Department surveys and are typically sent four or five surveys per year. The ACOG Research Department maintains CARN membership on an ongoing basis, with the goal of constituting a national group of practicing obstetrician-gynecologists reflective of practicing ACOG members as a whole.^{13,14}

The survey consisted of 35 questions and addressed topics including the demographic characteristics of the respondents; the characteristics of their primary practice site and patients; their knowledge, opinions, and practices regarding LPTB; and gestational age assessment opinions and practices. Responses to questions about knowledge, opinions, and practice were on a Likert scale (e.g., strongly agree, agree, neutral, disagree, and strongly disagree; or always, most of the time, sometimes, rarely, and never). Other questions allowed for open-ended responses to be entered by the respondent (e.g., percent of preterm births in their practice). Eligible clinicians were those currently in practice and who practiced obstetrics. Recipients were asked at the beginning of the survey to return the survey blank if they did not see obstetric patients. A cover letter outlined the purpose and benefits of the study and informed participants that their responses were anonymous and confidential. Response to the survey served as informed consent. This research was deemed to be exempt from review by the Institutional Review Board of Georgetown University as research involving the use of educational tests, survey procedures, interview procedures, or observation of public behavior.

Surveys received by November 20, 2010, were included in the analysis. Data were analyzed using a personal computer-based version of SPSS 16.0 (SPSS Inc., Chicago, IL). We computed descriptive statistics for the measures used in secondary analyses. Chi-square tests were used to assess the relationships between categorical parameters. A two-tailed probability of <0.05 was considered statistically significant.

Results

Of the 1232 surveys mailed, there were 695 respondents and 537 clinicians who refused or did not respond, resulting in

an overall response rate of 56% (CARN 66%, non-CARN 47%). Of those who responded, 175 were not currently practicing obstetrics, leaving 520 surveys eligible for analysis (313 of 396 from CARN members and 207 of 299 from physicians outside the network), for an estimated response rate from eligible recipients of 49% (520 of 1057), assuming all recipients who did not deliver babies returned a blank survey. Twenty-four of these 520 surveys (13 CARN and 11 non-CARN) were returned incomplete and were analyzed only for the questions that were completed. Respondents did not differ significantly from nonrespondents in terms of age or gender.

There were only two demographic differences between CARN and non-CARN physicians: CARN members were slightly but significantly older and were also more likely to practice in a multispecialty group (Table 1). There were no significant differences in responses between CARN and non-CARN physicians to any other question on the survey. The majority of respondents reported practicing general obstetrics and gynecology as their primary specialty, followed by maternal fetal medicine (MFM) specialists, with few practicing obstetrics only. Most respondents practiced in a single-specialty obstetrician-gynecologist partnership or group practice, followed by solo and university practice. Men accounted for 52% of returned surveys. The mean number of years in practice was 18, with the majority of respondents practicing >10 years. Respondents estimated that about 58% of their patients were white, 18% were Hispanic, and 16% were African American on average, and about a third (32%) of their patients received Medicaid for their health coverage. About 1 in 3 respondents (31%) considered their patient population to be at higher than average risk for preterm birth, with an estimated mean rate of preterm labor in those practices of 16% vs. 9% and 6% for practices with average or lower than average estimated risk, respectively ($p < 0.001$). Physicians who reported their patient population was at higher risk for preterm birth also reported significantly higher rates in their patients of a number of risk factors for preterm birth, as well as higher proportions of African American and Hispanic patients and patients eligible for Medicaid (Table 2).

Late preterm birth knowledge and opinions

A majority of responding physicians reported having read carefully the ACOG Committee Opinion regarding LPTB (19%) or having at least skimmed it (40%). Only 45.2% of

TABLE 1. PHYSICIAN DEMOGRAPHICS

Characteristic	All	CARN	non-CARN	p value
Age, years	50.0 ± 0.4	50.8 ± 0.5	48.6 ± 0.7	0.014
Years in practice	18.2 ± 0.4	18.7 ± 0.6	17.4 ± 0.7	0.128
Men	51.7%	52.4%	50.7%	0.707
General Ob-Gyn	88.0%	88.5%	87.3%	0.666
Ob-Gyn group practice	47.2%	45.7%	49.5%	0.390
Solo practice	17.2%	15.8%	19.4%	0.280
University	13.0%	13.2%	12.6%	0.852
Multispecialty group	10.4%	14.8%	3.9%	0.001

CARN, Collaborative Ambulatory Research Network; Ob-Gyn, obstetrician-gynecologist.

TABLE 2. PHYSICIAN ESTIMATES OF PERCENTAGE OF PATIENTS WITH RISK FACTORS FOR PRETERM BIRTH BY PHYSICIAN'S OPINION OF RELATIVE RISK OF PRETERM BIRTH FOR PATIENT POPULATION

<i>Risk factor</i>	<i>Higher than average risk for preterm birth %</i>	<i>Average risk for preterm birth %</i>	<i>Lower than average risk for preterm birth %</i>	<i>p value</i>
Smoking during pregnancy	21±1	12±1	8±1	<0.001
Diabetes	16±1	10±1	10±1	<0.001
Chronic high blood pressure	12±1	7±0.4	6±1	<0.001
Alcohol consumption during pregnancy	7±1	5±0.5	3±0.4	<0.001
Uterine infection	6±1	2±0.2	2±0.3	<0.001
Multifetal pregnancy	6±1	4±0.2	4±0.3	0.008
African American patients	24±2	13±1	10±1	<0.001
Hispanic patients	23±2	16±1	12±1	<0.001
Medicaid-eligible patients	52±2	27±2	16±2	<0.001

respondents correctly defined LPTB as birth between 34 and 36 completed weeks gestation, with another 14.6% answering 34–37 weeks gestation. The other most common responses were 35–37 weeks gestation (6.0%), 32–36 weeks gestation (5.0%), 32–37 weeks gestation (1.5%), and 34–38 weeks (1.3%). Those physicians who had read the Committee Opinion carefully were more likely to define LPTB as either 34–36 or 34–37 weeks gestation (71.0% vs. 62.9% who had skimmed the Committee Opinion and 55.4% who had not read the Committee Opinion, $p=0.030$). Most responding physicians (87%) answered that they were aware of the evidence about morbidity and mortality of infants born at 34–36 weeks completed gestation (100% of those who had read the Committee Opinion vs. 73% of those who had not, $p<0.001$). Virtually all respondents were convinced (74%) or somewhat convinced (21%) by the evidence regarding morbidity and mortality of late preterm infants, and most (81%) considered the evidence sufficient to make a clinical judgment. Again, those physicians who had read the Committee Opinion were more likely to be convinced ($p=0.024$) and to consider the evidence sufficient to make a clinical judgment ($p<0.001$).

Most respondents agreed (53%) or strongly agreed (23%) that LPTB is a public health problem. Respondents who estimated their patient population to be at above average risk for preterm birth were more likely to agree or strongly agree that LPTB is a public health problem (84%, $p<0.001$). Those physicians were also more likely to report an increase in LPTB in their practice (55% vs. 42% and 35% for average and lower than average risk patient populations, respectively, $p<0.001$). Most (72%) also agreed that late preterm infants comprise the majority of U.S. preterm births. Almost all respondents agreed that late preterm infants have increased risk of neonatal intensive care unit (NICU) admission and hospital readmission after birth (96%) compared with term infants. Most respondents believed that the increase in LPTB in the United States is due to complications of multifetal pregnancy (92%), increasing rates of multifetal pregnancy (88%), and increased maternal disorders (81%).

When asked about potential poor outcomes for infants born late preterm, the overwhelming majority of respondents agreed or strongly agreed that infants born late preterm are at increased risk of short-term poor outcomes, such as respiratory distress (96%), thermal instability (95%), hyperbilirubinemia (95%), feeding problems (94%), hypoglycemia (91%), and apnea (84%). More respondents were either neu-

tral or disagreed about the risk of long-term outcomes, such as learning disabilities, behavioral problems at school age, cerebral palsy, long-term disability, ADHD, and mental retardation (Table 3). Women were more likely to agree that LPTB increased risk for learning disabilities, attention deficit hyperactivity disorder (ADHD), and cerebral palsy ($p<0.01$), and all respondents who reported they were convinced by the evidence for increased risk of morbidity and mortality due to LPTB were more likely to agree that LPTB increases the risk for all these conditions ($p<0.01$). Respondents were more likely to respond that they were convinced by the evidence if they were female (80.6% vs. 68.3%, $p=0.012$) or if they had read the Committee Opinion carefully (87.1% vs. 72.2% who had skimmed the Committee Opinion and 69.3% who had not read it, $p=0.029$). These effects appeared to be independent, as there was no sex difference in the likelihood a respondent reported reading the Committee Opinion carefully. When asked separately how concerned they were about mortality and morbidity for late preterm infants, most respondents were concerned about neonatal (73%) and infant (71%) mortality and long-term health problems (84%) in babies born at 34–36 weeks completed gestation. There was no difference between men and women; physicians who had read the Committee Opinion carefully were significantly more likely to be very concerned about these outcomes for infants born late preterm (30.7% vs. 21.3%, $p=0.017$; 34.1% vs. 18.6%, $p=0.002$; and 40.9% vs. 26.9%, $p=0.003$, respectively).

TABLE 3. BABIES BORN BETWEEN 34 AND 36 COMPLETED WEEKS OF GESTATION ARE AT INCREASED RISK OF LONG-TERM OUTCOMES

<i>Outcome</i>	<i>Agree or strongly agree %</i>	<i>Neutral %</i>	<i>Disagree or strongly disagree %</i>
Learning disabilities at school age	41.0	41.6	17.4
Behavioral problems at school age	36.1	46.1	17.8
Cerebral palsy	31.2	40.8	28.0
Long-term disability	29.0	45.4	25.6
ADHD	26.2	50.5	23.3
Mental retardation	13.7	48.1	38.3

ADHD, attention deficit hyperactivity disorder.

Late preterm birth practices

Almost all responding physicians disagreed or strongly disagreed with logistical reasons or convenience as being appropriate for a delivery at <37 weeks completed gestation, including scheduling considerations (97%), patient preference (95.0%), and patients living a great distance from the hospital (87%). Most (>80%) physicians agreed that certain clinical indications (e.g., severe preeclampsia) are valid reasons for a delivery at <37 weeks (Table 4). Sizable proportions of the responding physicians also agreed that maternal renal disease, poorly controlled diabetes, oligohydramnios with otherwise normal antenatal testing, multifetal pregnancy, mild preeclampsia, and intrauterine growth retardation (IUGR) with otherwise normal antenatal testing were appropriate clinical indications for early delivery (Table 4). These responses did not differ by physician demographics or by the physicians' opinion of their patient population's preterm birth risk.

When asked if they offer tocolysis to patients in preterm labor at 34–36 weeks gestation, 60% reported that they would (17% always, 24% most of the time, 19% sometime, 24% rarely). Less respondents reported that they offer steroids for fetal lung maturation to patients who are at risk of delivery at 34–36 completed weeks of gestation (7% always, 10% most of the time, 11% sometimes, 30% rarely). Most responding physicians reported that they assess fetal lung maturity before induction or delivery for patients with planned, nonemergent

delivery prior to 39 weeks gestation (35% always, 23% most of the time, 14% sometimes, 20% rarely).

Half of the responding physicians reported that concerns about malpractice risks contribute to their decision to induce labor or perform a cesarean section at 34–36 weeks completed gestation (35.0% somewhat important, 15% very important). Over two thirds (69%) reported they have had a patient request to be induced or have a cesarean section before 37 weeks when not medically indicated; however, almost none (3 %) reported that they complied with such a request. The most commonly cited reason for such a patient request was discomfort or fatigue (66%).

Gestational age assessment

Only about a third of respondents (37%) believed that inaccurate gestational age assessment contributes to the increase in LPTB. When asked what methods are routinely used in their practice to assess gestational age, most responding physicians reported that they perform a first trimester ultrasound for gestational age assessment (75%), and slightly more (84%) reported performing a second trimester ultrasound for gestational age assessment. Most respondents chose first trimester ultrasound measurement of crown-rump length as both the most reliable measure of gestational age (85%) and the most useful in their practice (76%). About half of the respondents (48%) reported that an insurance company had denied reimbursement for a first trimester ultrasound for gestational age assessment, and 35% reported that an insurance company had denied reimbursement for a second trimester ultrasound for gestational age assessment. Just over half the respondents (52%) reported that performing a first trimester ultrasound affected reimbursement for a second trimester ultrasound.

Discussion

Preterm births cause significant societal burdens in both immediate healthcare costs and long-term health burdens of individuals born preterm. Reducing the incidence of preterm births requires efforts both to reduce risk factors associated with spontaneous preterm labor and to reduce the incidence of potentially avoidable late preterm inductions and cesarean deliveries. The purpose of this study was to understand more about physician knowledge, opinions, and practices that may play a role in how pregnancies during the late preterm period are managed. There were several key findings from this survey. The most concerning finding is that less than half of respondents were able to correctly define what gestational ages comprise the late preterm gestational period; if half of respondents do not know how this problem is defined, they may be managing pregnancies at this gestational age inappropriately.

Most responding physicians were aware that the incidence of LPTB has been increasing, and most respondents agreed that LPTB is a public health problem. It is interesting to note that respondents who estimated their population to be at higher risk of preterm birth were more likely to agree that LPTB is a public health problem. Most respondents believed that increases in LPTB rates are due in part to complications of and increases in multifetal pregnancies and increases in maternal disorders. This is consistent with what has been reported in the literature about indications for LPTB. Whereas

TABLE 4. CLINICIAN OPINION ABOUT WHETHER CLINICAL INDICATIONS ARE APPROPRIATE REASONS FOR DELIVERY BEFORE 37 WEEKS COMPLETED GESTATION

Clinical indication	Agree or strongly agree %	Neutral %	Disagree or strongly disagree %
Severe preeclampsia	99.6	0.2	0.2
Placental abruption	97.8	1.0	1.2
Nonreassuring fetal testing/fetal compromise	97.4	1.8	0.8
Placenta previa with bleeding	96.6	2.6	0.8
Bleeding/hemorrhage	94.3	4.5	1.2
PROM	87.7	5.1	4.6
Poorly controlled maternal hypertension	81.8	9.0	9.2
Maternal renal disease	66.5	23.0	10.5
Poorly controlled pregestational diabetes	56.8	12.0	31.2
Poorly controlled gestational diabetes	49.1	17.6	33.3
Oligohydramnios with otherwise normal antenatal testing	43.6	23.8	32.6
Multifetal pregnancy	32.2	21.3	46.5
Mild preeclampsia	25.4	16.4	58.25
IUGR with otherwise normal antenatal testing	22.6	18.0	59.4

IUGR, intrauterine growth retardation; PROM, premature rupture of the membranes.

spontaneous vaginal preterm deliveries have declined, inductions and cesarean deliveries for various maternal and obstetric complications account for the majority of LPTB,⁴ and there is evidence suggesting that most nonspontaneous LPTB are due to medically indicated deliveries.^{6,7,15}

An overwhelming majority of respondents reported they would not deliver a late preterm infant solely upon patient request; however, there were many medical and obstetric indications for delivery that respondents agreed would be acceptable reasons to deliver an infant late preterm. Severe preeclampsia, placenta abruption, placenta previa with bleeding or other hemorrhage, and fetal compromise were all clinical indications that $\geq 90\%$ of the respondents considered appropriate reasons for early delivery, which is in line with ACOG recommendations.¹⁶ There were only two clinical indications (mild preeclampsia and IUGR with otherwise normal antenatal testing) that a majority of physicians did not consider to be appropriate reasons for early delivery. Neither of these conditions is considered an appropriate indication for induction prior to 37 weeks¹⁷; however, about 1 in 4 respondents considered them to be appropriate reasons for early delivery. Although our study is based on self-report, there are several cohort studies in the literature that confirm our findings that some obstetricians will deliver late preterm infants for nonevidence-based reasons¹⁵ and that some LPTB may be potentially avoidable.¹⁸

Although most respondents were concerned about neonatal and infant mortality in LPTB infants, more reported being concerned about neonatal morbidity. Most respondents agreed that in addition to many poor short-term outcomes, LPTB infants are at increased risk of developmental delays and long-term health problems. However, less than half of respondents agreed that these infants are at increased risk of poor long-term neurodevelopmental outcomes. Recent evidence has indicated that LPTB infants are at increased risk of higher healthcare needs in the first year,¹⁹ stunted growth in the first 2 years of life,²⁰ cerebral palsy,^{21,22} and developmental delays²² that are associated with behavioral and educational problems in early school age.²³ The fetal brain undergoes rapid growth and development in the last few weeks of gestation, undoubtedly influenced by signaling from placenta and from the mother through the placenta. The premature severing of this maternal-placental-fetal connection may have consequences for brain development.²⁴ The long-term burdens experienced by LPTB babies may be greater than many obstetrician-gynecologists realize.

There are several limitations to this study. The results were not validated by a review of medical records or other clinical data; therefore, we cannot confirm if reported practice reflects actual practice. The response rate to this survey (56%) is not high enough to exclude the possibility of nonresponse bias, although respondents did not differ significantly from nonrespondents in age or gender, and the response rate for this survey is consistent with response rates for previous ACOG surveys. Other studies show that nonresponse bias tends to be less problematic among physicians than among other groups.²⁵ Selection bias as a result of the use of the ACOG CARN for part of the sample does not appear relevant, as the responses from members of CARN were not significantly different than those from non-CARN respondents. This result is consistent with many previous studies with both CARN and non-CARN ACOG Fellows, which generally found few if

any differences in demographic characteristics or responses to questions.¹⁴

Late preterm infants have often been thought of as comparable to term infants with respect to risks for poor birth outcomes, but the evidence is clear that late preterm infants are at increased risk for both short-term and long-term morbidity and neonatal mortality. Understanding physician perceptions about LPTB is essential for targeting knowledge gaps that may lead to unnecessary interventions. In this study, we found that respondents underestimated the impact of LPTB on long-term neurodevelopmental outcomes, and at least a quarter of respondents also appeared to have a low threshold for delivering an infant late preterm when faced with maternal or fetal conditions that may not warrant delivery.

Further research to better understand what factors contribute to a provider's decision to deliver an infant late preterm would help in the development of interventions to prevent LPTB that occur for soft or nonmedically indicated reasons. Evidence-based guidance for obstetrician-gynecologists regarding early delivery, especially for such indications as maternal diabetes, oligohydramnios, mild preeclampsia, and IUGR, also appears to be needed.

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Disclosure Statement

The authors have no conflicts of interest to report.

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