

1 Point

Teenage Pregnancies and Obstetric Outcome

Terence T Lao, MBBS, MD, FRCOG, FHKCOG, FHKAM (O&G)



Are teenage pregnancies high risk?

In medical literature, it is usually stated that teenage pregnancies belong to a high-risk category, which is associated with increased adverse obstetric outcome. However, from a purely biological perspective, there is scant evidence to explain the association between teenage pregnancy and poor obstetric outcome. Most of the risk factors reported were in fact socioeconomic factors that can be changed or improved. Nevertheless, as the majority of these pregnancies are unplanned, and as unwanted therapeutic abortion is the management in the majority of cases, the pregnancies that continue to delivery represent a selected

group. There is now evidence that the obstetric performance of teenage gravidae and the pregnancy outcome are actually much better than expected if timely and appropriate prenatal care could be provided. In this article, the obstetric outcome of the teenage woman is reviewed.

DEFINITION OF TEENAGE PREGNANCY

Teenage pregnancy usually refers to pregnancy in women aged 19 years or less. It is sometimes stated that even though all women under 20 years of age are teenagers,

there may be significant biological differences between those aged 16 years or less compared with those aged 17 years or more, because these two groups of women are at different phases of growth and maturation. Some studies used the term "adolescent" to describe the teenager. Although often used to describe women aged 16 years or less, the term "adolescent" has also been used in other studies where the maternal age was not defined. To avoid confusion, this article adopts the term "teenage pregnancies" to describe pregnancies in women under 20 years of age.

RISK FACTORS ASSOCIATED WITH TEENAGE PREGNANCY

A number of risk factors have been identified in teenage pregnancies; these can essentially be classified into two groups – socioeconomic and biological. These factors are summarized in Table 1.

In general, most teenage women are psychologically immature and financially dependent. Many may be studying at school and living with their parents. To get married and raise a family is not yet in their immediate plans. Consequently, most teenage mothers are unmarried or in an unstable relationship. The pregnancy is mostly by accident and unwanted. These women risk losing social and economic support, and, sometimes, even accommodation

Table 1. Obstetric risk factors associated with teenage women

Socioeconomic	<ul style="list-style-type: none">• Unmarried or unstable relationship• Unplanned/unwanted pregnancy with dating problem• Lacking support from family and peers• Social stigma• Financially insufficient with no or low income• Problems with accommodation• Late or no antenatal care
Biological	<ul style="list-style-type: none">• Phase of active growth, risk of competing with fetus for nutrients• Immature physique, smaller pelvic size may affect vaginal birth• Nutritional deficiencies especially iron and calcium• Smoking• Substance abuse and possible exposure to other drugs• Sexually transmitted diseases

especially if they have run away from homes. They tend to seek antenatal care late in their pregnancy or not at all. All these conditions are well-known risk factors for adverse pregnancy outcome.

Biologically, many of the teenage mothers are still in the physical growth phase, and this could lead to competition with their fetus for nutrients. Theoretically, their smaller stature and immature physique could affect the performance of labour and delivery with respect to their smaller pelvic size. The lifestyle that many of these teenage mothers have adopted means the prevalence of smoking, alcohol consumption, substance abuse and sexually transmitted diseases tends to be high. However, these factors can be influenced by ethnic and cultural background in multiethnic populations,¹ and therefore their influences on pregnancy outcome could vary in different studies. There are often associated nutritional deficiencies, especially with respect to iron. Medications with unproven safety in pregnancy may also

have been prescribed or taken inadvertently because of unawareness either of the pregnancy state or the possible effects of medications on fetal development. Many of these risk factors can occur together. In one study, despite the availability of a Teen Pregnancy Clinic in a downtown health centre, there was a significant delay between the diagnosis of pregnancy and entry into obstetric care, and 50% of the gravidae had a sexually transmitted disease.² Thus overall, teenage pregnant women are predisposed to conditions that could have significant consequences on their pregnancy.

OBSTETRIC OUTCOME OF TEENAGE PREGNANCY

In general, teenage gravidae are similarly at risk as their older peers for obstetric problems that are influenced by parity status, a factor that should be taken into account since the great majority of teenage gravidae are nulliparous. However, certain

adverse pregnancy outcomes have been particularly associated with teenage pregnancies. These include preterm births,^{3,4} fetal growth restriction,^{4,5} low birth weight infants,^{3,6,8} perinatal mortality,^{3,8-10} operative delivery^{8,11} and caesarean section.^{12,13} (Table 2) Nevertheless, the occurrence of some of these complications, such as eclampsia, may be influenced by ethnicity, and pregnancy outcome is similarly affected by the lifestyle adopted by the teenage gravidae.¹

However, the extent to which teenage gravidae are biologically predisposed to these outcomes is disputable. It has been shown in a number of studies that the unsatisfactory pregnancy outcome could have been related more to the pre-existing socioeconomic and health problems, as well as the lack of prenatal care, than to the innate reproductive capability of the teenage gravidae. A more accurate indication of the obstetric performance of teenage gravidae could only be obtained if problems with psychosocial support and antenatal care are largely eliminated or improved. Indeed, some reports suggested that with good psychosocial support and appropriate and adequate prenatal care, the perinatal outcome of teenage pregnancies is comparable with that of older gravidae.¹⁴⁻¹⁷ Furthermore, the increased risks of instrumental delivery^{8,11} and caesarean section^{12,13} reported in some studies are refuted in other studies, and whether the mode of delivery is related more to the physical immaturity of these women or to the intervention following the development of complications remains controversial. The various obstetric outcomes are discussed in the following sections.

ANTENATAL COMPLICATIONS

In one study, primiparas less than 16 years of age were not found to have increased adverse obstetric outcome, including abruption placentae, pregnancy-induced hypertension or endometritis, compared with primiparas aged 20 to 24 years.¹⁸ In a later review over a 12-year period, teenage mothers aged 16 years or less were found to have significantly increased incidence of anaemia, urinary infection and gestational hypertension compared with mothers aged 20 to 24 years.¹¹ There was no difference in the incidence of pre-eclampsia, eclampsia or antepartum haemorrhage, while the incidence of prolonged pregnancy was significantly reduced. A later study in Hong Kong has shown that mothers aged 19 years and below had no increase in pregnancy complications except for preterm birth, when compared with their older peers who delivered in the same hospital.¹⁹ These findings were confirmed in a subsequent case-control study in which nulliparous teenage mothers were compared with

nulliparous women aged 20 to 34 years.²⁰ In this study, teenage mothers were found to have a similar incidence of antepartum haemorrhage and pre-eclampsia, but decreased incidence of prelabour rupture of membranes (RR 0.308) and gestational diabetes mellitus (RR 0.500). Since the provision of obstetric care in Hong Kong is free and easily accessible to all local residents, the findings in this study indicated that the increased antenatal complications in teenage mothers could largely be normalized with optimal prenatal care.

PRETERM LABOUR AND DELIVERY

One major complication that is almost consistently found in previous studies is an increased incidence of preterm birth. Investigators from Hong Kong also reported the same finding, which demonstrated that nulliparous mothers aged 19 years and below had no increase in adverse pregnancy outcome except for preterm birth.¹⁹ A Swedish study reported that the rates of

Obstetric problems that are influenced by parity status should be taken into account, since the great majority of teenage gravidae are nulliparous.

preterm birth at less than 32 weeks gestation were inversely correlated with age, being 5.9% at 13 to 15 years, 2.5% at 16 to 17 years, 1.7% at 18 to 19 years and 1.1% at 20 to 24 years, and that the increased risk in teenage gravidae remained essentially unchanged after controlling for the effect of possible confounders.¹⁰ However, after controlling for confounding variables, Scholl et al²¹ found a three-fold reduction in the odds of preterm birth with adequate prenatal care, and preterm delivery due to induction or caesarean section for complications was only 2.6%. Furthermore, another study in an urban American population did not find any difference in preterm birth rates for nulliparas under the age of 15 years.²² It is likely that the availability and quality of prenatal care may impact on the odds of preterm birth through the reduction of antenatal complications.

Nevertheless, there is evidence that teenage women appeared to have an inherent risk towards preterm births due to young maternal age, and this intrinsic risk has its greatest effect when the sociodemographic environment is unfavourable;⁴ what constitutes this inherent risk was not clearly defined in that study. Risk factors

Table 2. Pregnancy complications and adverse outcomes in teenage pregnancies

Risk increased	<ul style="list-style-type: none"> • Preterm labour and delivery • Low birth weight (<2,500 g) infants
Risk similar or increased	<ul style="list-style-type: none"> • Pre-eclampsia • Fetal growth restriction • Anaemia • Instrumental delivery • Perinatal mortality
Risk similar or decreased	<ul style="list-style-type: none"> • Caesarean section • Antepartum haemorrhage • Gestational diabetes mellitus

Because preterm birth in teenage pregnancies is largely unrelated to pathological conditions, perinatal outcomes are often satisfactory despite increased risk of preterm birth.



such as maternal smoking and substance abuse, nutritional deficiency, and the presence of other complications such as sexually transmitted diseases and vaginitis, anaemia, pre-eclampsia and psychological stress could all have contributed to the eventual preterm birth in teenage mothers. One possible risk factor that may be overlooked is the history of previous therapeutic abortion.²³⁻²⁵ However, in a case-control study, the presence of one or more therapeutic abortions before the index pregnancy did not appear to have any significant impact on the pregnancy outcome.²⁶ Therefore, the underlying or "inherent" risk factor may be the degree of physical development or maturation in the teenage women as suggested in the study of Olausson et al.¹⁰ Indeed, in this study, maternal height was inversely related to the incidence of preterm birth at

≤32 weeks and at 33 to 36 weeks. A study in Hong Kong has similarly found that when analysed according to maternal height expressed in quartiles, the incidence of preterm birth was inversely correlated with the height quartiles, with the highest incidence found in the lowest quartile.²⁷ Physical immaturity and short stature could therefore explain the observation that despite the increased risk of preterm birth, the perinatal outcome was satisfactory,^{20,27} because preterm birth in teenage pregnancies is largely unrelated to pathological conditions, which tends to be the case with pregnancy in older women.

The continuation of pregnancy in a teenage woman may be less hazardous than a therapeutic abortion under equally optimal conditions of care.

INSTRUMENTAL DELIVERY AND CAESAREAN SECTION

While it is generally stated in textbooks that teenage mothers have increased risk of instrumental and caesarean delivery, there is little evidence to support this statement. In a 12-year review in a UK centre, when mothers aged 16 years or less were compared with mothers aged 20 to 24 years, the former group had only about one-half of the incidence of caesarean section (6.3% vs. 11.3%), but that

for instrumental delivery was more than doubled (11.7% vs. 5.0%).¹¹ In a later study in an urban US population, no significant difference in overall labour performance was found, while, despite a shorter height, in nulliparas under 15 years the use of oxytocin was less common, the duration of the active phase of labour shorter, the rate of caesarean delivery lower, and no difference in the rate of forceps delivery was found when compared with those aged 20 to 29 years.²² In Hong Kong, mothers aged 19 years and below had lower rates of instrumental and caesarean deliveries than those in their older peers who were delivered in the same hospital.¹⁹ The same findings were obtained in nulliparous teenage mothers, who had decreased incidence of instrumental (RR 0.405) and caesarean delivery (RR 0.361) when compared with nulliparous women aged 20 to 34 years.²⁰

Why is it that the caesarean section rate was lower in teenage mothers even when they were shorter? When using a knee-height measuring device, which could detect small amounts of linear growth over short periods, to monitor the growth of the lower leg during pregnancy, it was found that between the second and third trimesters, there were average increases of 1.68 mm, 1.00 mm and 0.10 mm in 21 primigravidae aged 12 to 15 years, 24 multigravidae aged 15 to 18 years, and nine controls aged 18 to 29 years, respectively.²⁸ These findings indicated that linear growth continues in pregnancy in teenage women. As some of these teenage gravidae are not yet physiologically mature, there may also be growth in the bony pelvis in association with longitudinal growth. It was therefore proposed that

pregnancy itself may be the definitive stimulus for the bony pelvis to grow to maturation, which would then assume the best shape and size for the ultimate trial of vaginal birth.²⁰ This would have explained the reduced prevalence of caesarean section in teenage gravidae despite an apparently smaller stature and immature physique.

LOW BIRTH WEIGHT INFANTS AND FETAL GROWTH RESTRICTION

Two important determinants of birth weight are maternal prepregnancy weight and gestational weight gain. Low prepregnancy weight and gestational weight gain are more commonly found in teenage gravidae. However, even if the maternal weight at term is appropriate for height, the birth weight is still 200 to 400 g lower than in adults for all weight-for-height categories, indicating that teenage gravidae tend to have, on average, smaller babies.²⁹

However, birth weight is increased with improved prenatal care.²¹ Indeed, while the incidence of low birth weight at term was highest in mothers <17 years of age (3.2%) and declined with advancing age to reach a nadir for the 25-to-34-year age group, after adjusting for sociodemographic confounding factors, the odds ratio for low birth weight became lowest in teenagers, and it was concluded that poor sociodemographic and prenatal care status were largely responsible for the high incidence of low birth weight in teenage gravidae.⁷ Other studies also showed that, compared with mothers aged 20 to 24 years, mothers aged 16 or less had babies of

similar gestational ages at delivery and birth weights,¹¹ and that there was no difference in the mean birth weight or incidence of low birth weight in primiparas younger than 16 years.¹⁸ Furthermore, although the gestations were shorter in primigravidae under the age of 16 years compared with gravidae at 20 to 24 years, there was no significant difference in birth weight as the infants of adolescent gravidae were heavier at gestations of less than 37 weeks.³⁰ However, the subjects in some of these studies were delivered in the 1970s, when routine ultrasound dating was not available, and the accuracy of the estimated gestation for both adolescents and adults might have influenced the findings.

Nevertheless, more recent studies suggest that maternal immaturity does increase the risk of low birth weight and small-for-gestational age infants, as the incidence of these outcomes was inversely related with maternal height.¹⁰ Furthermore, despite the adjustment for various sociodemographic factors that included prenatal care, marital status, education and smoking, the risks of low birth weight and small-for-gestational age infants remained increased in teenage women, and adequate prenatal care could not completely eliminate the inherent risks in teenage pregnancy.⁴ In a study in Hong Kong,²⁰ nulliparous teenage mothers were found to have increased incidence of small-for-gestational age infants (RR 1.890), which was not unexpected because of the higher incidence of smokers (20.9% vs. 2.9%), and lower maternal body mass index (20.2 kg/m² vs. 20.9 kg/m²). However, unexpectedly, these mothers also had increased incidence of large-

for-gestational age and macrosomic (birth weight $\geq 4,000$ g) infants (RR 1.638 and 7.00, respectively), despite their lower body mass index and incidence of gestational diabetes mellitus. This finding suggests that in teenage gravidae, poor sociodemographic and prenatal care status have a greater impact on fetal growth and outcome than maternal habitus.

PERINATAL COMPLICATIONS AND MORTALITY

Few studies have examined the prevalence of perinatal complications in teenage pregnancies, but Sukanich et al¹⁸ reported no increase in perinatal morbidity or mortality in infants born to primiparas younger than 16 years compared with those aged 20 to

Contrary to common beliefs, the incidence of caesarean section may be lower in teenage mothers than in their older counterparts.



Practice points

- With optimal prenatal care, the increased antenatal complications observed in teenage mothers could largely be normalized.
- Poor sociodemographic and prenatal care status may have a greater impact on fetal growth and outcome than maternal habitus.
- The increased rates of very preterm birth in teenager mothers explain their increased risk of neonatal mortality.
- The available evidence suggests that there is no need to distinguish mothers aged less than 17 years as another high-risk group within the category of teenage mothers.
- By eliminating or controlling adverse environmental conditions and providing appropriate and timely prenatal care, the obstetric performance of teenage women would be comparable or even superior to that of older women.

24 years. Increased perinatal mortality in the form of late fetal death and infant mortality has been reported in teenage pregnancies, and the risk, which remained increased after controlling for the effect of socioeconomic characteristics, was also related to height, being highest in the mothers with short stature which was defined as <155 cm.¹⁰ In a follow-up report, the same group of investigators confirmed the significantly increased neonatal and postneonatal mortality, which was inversely correlated with maternal age from the youngest cohort (13-15 years) to the reference cohort (20-24 years), and further analysis indicated that the risk of neonatal mortality was largely explained by the increased rates of very preterm birth in the young teenagers.³¹

COMPARISON BETWEEN MOTHERS AT/ABOVE AND BELOW 17 YEARS OF AGE

It is generally agreed that teenage women under 17 years of age have not achieved mature weight and height, therefore,

theoretically, there is an increased risk of obstetric complications and difficult labour and delivery. Indeed, some studies did suggest that the prevalence of preterm birth and perinatal mortality are inversely related to maternal age.^{10,31} While adverse outcomes that include low birth weight, preterm birth and small-for-gestational-age infants were similarly increased in both the younger (≤ 17 years) and older (18-19 years) teenage gravidae, the risks appeared to be more significant in the younger group.⁴ Nevertheless, most of the aforementioned studies failed to find a significant difference between gravidae under 17 years and adult gravidae. The conventional belief is that the young adolescents are less mature physically, and the size of their bony pelvis might be smaller, so that they are at increased risk of instrumental and caesarean deliveries. However, in Hong Kong, no significant difference in the incidence of instrumental (16.1% vs. 19.3%) or caesarean (3.6% vs. 3.3%) deliveries was found between mothers younger than 17 years and mothers aged 17 years and above. This was unrelated to infant size since no

difference in the gestational age or mean birth weight was found between these two groups.²⁰ Therefore, the available evidence suggests that there is no need to use age less than 17 years to designate yet another high-risk group within the category of teenage mothers.

CONCLUSION

For the socially deprived teenage mothers with an unplanned and unwanted pregnancy without any antenatal care, it can be envisaged that their obstetric outcome is more likely to be unsatisfactory. However, once the adverse environmental conditions can be controlled or eliminated, and appropriate and timely prenatal care be provided, the obstetric performance of teenage women would be comparable, and in certain aspects, superior to that of older women. Early antenatal booking and attendance at clinics have rendered the obstetric outcome in women aged 16 years or less similar to their older peers.¹¹ In Hong Kong, teenage women who are local residents have unrestricted access to high-standard, free prenatal care in public hospitals, and social support, including accommodation, is readily available from government and charitable organizations. Thus, teenage mothers could enjoy a similar degree of prenatal care as their older peers should they choose to continue with their pregnancy and deliver in one of the public hospitals. These findings provided clear evidence that the obstetric performance of teenage mothers is on a par with, and in certain aspects better than, that of mothers

in the "low-risk" reproductive age group of 20 to 34 years. However, such good results as shown in some of the cited studies^{14-17,19,20} may not be achievable universally because of the differences in the provision of social and medical care in different countries.

Nonetheless, from the medical perspective, the continuation of pregnancy in a teenage woman may be less hazardous than a therapeutic abortion under equally optimal conditions of care. Such an option should be seriously considered where resources

are available for the care of the mother and her offspring.

About the Author

Dr Lao is Professor at the Department of Obstetrics and Gynaecology, The University of Hong Kong, Queen Mary Hospital, Hong Kong SAR, China.

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