

*Dr. J. Quinlivan, Clinical Senior Lecturer
Department of Obstetrics, Gynaecology and
Reproductive Medicine
Ph. 8204 5026 Fax 8204 5454
Email: Julie.Quinlivan@fmc.sa.gov.au*

18/5/00

Secretariat
Parliamentary Standing Committee on Family and Community Affairs
Parliament House
Canberra ACT 2600

To whom it may concern,

I have a long standing interest and expertise in the issue of drug use in pregnancy, particularly amongst younger mothers. I have worked as the principle obstetrician in charge of the chemical dependency clinics in Western Australia and recently in South Australia. It is clear to everyone working in the field that drug use, family violence, poverty and teenage pregnancy are tied together. Failure to intervene results in an ongoing cycle of poor self esteem and the same mistakes are carried forward into the next generation.

Whilst I could address several areas time constraints will let me focus on one major concern that I feel may not otherwise be brought to the attention of the committee. Marijuana is a drug of the younger addict and often becomes the lead drug into heavier addiction problems. Furthermore, whilst there has been considerable focus into the role of cigarettes and alcohol in pregnancy, little Australian data has explored the impact of marijuana.

I attach a copy of my recent Australian research study investigating the effects of marijuana upon pregnancy outcomes. A cohort of younger mothers were selected for the study as marijuana usage in young mothers is in epidemic proportions with nearly 30% using marijuana on a regular basis throughout their pregnancy.

A synopsis of the evidence-based research findings and a full research article are attached. If you have any further questions about drug use in pregnancy in Australia I would be happy to address them.

Yours sincerely

Dr Julie Quinlivan
Clinical Senior Lecturer in Obstetrics and Gynaecology

Keys findings with respect to marijuana usage in pregnancy include:

Australian data

- a) Marijuana use in young pregnant mothers is associated sub-optimal maternal growth with respect to gains in height and weight
- b) Marijuana users are more likely to have associated problems of homelessness, domestic violence and social isolation
- c) Marijuana users were more likely to have an associated psychosocial problem
- d) Marijuana users are significantly more likely to also abuse cigarettes and alcohol in pregnancy and are more likely to use other hard drugs such as amphetamines, heroin or solvents than nonusers
- e) Marijuana use in pregnancy is associated with a significant increase in the incidence of threatened preterm labour and a trend towards an increase in the incidence of preterm birth and the number of antenatal admission days
- f) Marijuana users and their infants are rated as being at increased risk of subsequent abuse and non-accidental injury significantly more frequently than nonusers
- g) Lifestyle risk factors in marijuana users results in an association between use and the development of sexually transmitted disease and pap smear abnormalities

Overseas data

- a) Newborns exposed to marijuana *in-utero* have evidence of EEG (brain wave) abnormalities in the newborn period and abnormalities in plasma catecholamine levels (stress responding hormones)
- b) Abnormalities in the EEG persist at 1 year of age and children subsequently have an increased incidence of language and verbal skills deficits
- c) At school, children exposed to marijuana *in-utero* have an increased incidence of cognitive and attentional deficits (*ie*: intellectual and behavioural problems)
- d) Marijuana exposure *in-utero* is associated with an increase in cell mutations that predispose to cancer in later life

(Australian data evidence and overseas references are attached)

Marijuana and Teenage Pregnancy

Julie A. Quinlivan FRANZCOG

Department of Obstetrics & Gynaecology, Flinders University and
Womens & Infants Research Foundation (3), Australia.

Grant support:

Innovative Funding for Homeless Youth Support services, Health
Department of Western Australia, Australia

Correspondence to:

Dr Julie Quinlivan

Department of Obstetrics, Gynaecology and Reproductive Medicine

Flinders Medical Centre

Bedford Park SA 5042, Australia

Telephone: 61-8-8204 4471

Fax: 61-8-8204 5454

Email: Julie.Quinlivan@fmc.sa.gov.au

Abstract:

We have conducted a multicentre prospective cohort study to evaluate the impact of marijuana use on teenage pregnancy outcomes. Teenage antenatal patients (n=295) were interviewed and completed questionnaires to establish their pattern of nonprescription drug use. Labour and delivery details were collated after discharge. Data were analyzed using an analysis of variance with a p-value of 0.05 considered significant. In the cohort, 24.8% of patients used marijuana and 75.2% did not and acted as the control group. Marijuana users were shorter and of lower weight. They were more likely to be homeless, a victim of domestic violence, socially isolated and have an associated psychosocial problem. There was a trend towards a lower mean weekly weight gain in pregnancy and a significant reduction in term pregnancy weight. There was a significant increase in the incidence of threatened preterm labour and a trend towards an increase in the incidence of preterm birth and number of antenatal admission days. Despite the caregiver team rating significantly more marijuana using mothers and their infants as being 'at risk' of subsequent abuse or neglect, there was no increase in mean hospital bedstay. Marijuana use in teenage pregnancy is associated with adverse outcomes that can negatively impact upon mother and neonate. The emphasis on planned discharge programs may be depriving healthcare professionals of the opportunity to address mothercrafting and safety issues in a preventative fashion with women and infants identified as being at-risk.

Keywords; Teenage pregnancy, Marijuana, Threatened preterm labour, Prospective controlled study

INTRODUCTION

In the last twelve years the incidence of pregnancy and drug use in the adolescent population has increased. A 1995 review found that 80% of teenagers reported being sexually active by age 19 years and 80% of high school seniors reported use of alcohol, 64% reported smoking and 41% reported use of marijuana (1). Marijuana is a particular problem in the setting of teenage pregnancy as it is a drug of choice in young patients with addiction problems. A study of 16 to 19 year olds in chemical dependency treatment programs described alcohol and marijuana as their drugs of choice. In contrast, older women in their 20s and 30s selected opiates and cocaine (2). Furthermore, marijuana use is linked to early discontinuation of schooling, which is a familiar companion to teenage pregnancy (3).

Cannabinoid receptors are expressed in the human placenta and play a role in the regulation of the serotonin transporter activity. The human placenta is therefore a target of cannabinoids and marijuana use during pregnancy is likely to affect the placental clearance of serotonin through the serotonin transporter (4). It is therefore likely that marijuana exerts a direct effect upon the developing human.

However, data on the specific impact of marijuana upon pregnancy outcomes is limited. The available reports have documented a number of adverse effects. Of note, prenatal marijuana exposure is linked to an increased incidence of preterm birth (5,6). Furthermore, its use has been associated with an increase in risk of psychosocial pathology, particularly postnatal depression and suicide and an increased incidence of infectious disease morbidity, particularly sexually transmitted diseases (7,8).

However, there is a lack of data on the effects of marijuana in teenager pregnancy, particularly the younger teenage group aged 12 to 17 years. When counseling pregnant teenagers, there are tremendous differences between 12 to 17 years olds and older teenagers and adults. The younger teenagers are less likely to appreciate the consequences of their lifestyle decisions. Furthermore, substance abuse in this setting is often a marker of disturbed family relationships or abuse (9).

We set out to prospectively audit data of the impact of marijuana upon pregnancy outcomes in a cohort of younger teenagers aged 12 to 17 years who delivered an infant at one of three Perth metropolitan hospitals between January 1st, 1998 and June 30th, 1999. We examined for the significant antenatal associations of marijuana usage in teenage pregnancy and the impact of marijuana upon pregnancy outcomes.

METHODS

A multicentre prospective cohort study was performed in Western Australia at the King Edward Memorial and Osborne Park hospitals, and the Joondalup Health Campus. All pregnant women aged 12 to 17 years of age who intended to continue with their pregnancy and did not intend to relinquish their infant were eligible for the study. Informed patient consent and multi-institutional ethics committee approval were obtained.

Patients were interviewed in the antenatal period to establish whether they used marijuana during their confinement. We have previously validated this interview technique for the detection of nonprescription drug use in teenage pregnancy (10). Patients also completed an antenatal questionnaire. Data derived from the questionnaire and interview were cross-referenced for validation. Labour and delivery details were independently collated after discharge for mother and infant. Teenage antenatal patients who admitted to marijuana use in interview and questionnaire were included in the study as the marijuana cohort. Teenage patients who did not admit to marijuana use in interview or questionnaire were included as the control group. Patients who used heroin, amphetamines, LSD or solvents were excluded

from analysis. At discharge, the attending care team provided an assessment of the risk-status of mother and infant for possible abuse or neglect in the postnatal period.

Data were analyzed using an analysis of variance (SAS, North Carolina, USA) to generate *p*-values. Chi square test was applied to discrete and Student *t*-test to continuous data. Maternal height, pre-pregnancy weight, age and race, newborn gestational age and gender and significant antenatal associations of marijuana such as smoking and alcohol use were included as covariates in the analysis. A *p*-value of 0.05 was considered significant.

RESULTS

Of the 295 patients enrolled in the study, 95 (32%) patients used marijuana during the antenatal period. However, 29 (10%) were excluded as they used marijuana in combination with heroin, solvents, amphetamines or LSD. Thus, of the remaining 266 patients, 66 (24.8%) used marijuana, and 200 (75.2%) did not and act as the control group in subsequent comparisons.

Table 1 summarizes the demographic data of the teenage antenatal patients who used marijuana during their pregnancy (marijuana) and the teenage antenatal controls (control). Of note, there were no significant differences between the two groups in terms of maternal age or race ($p > 0.21$).

However, teenage antenatal patients who used marijuana in pregnancy weighted significantly less than controls at their first antenatal visit ($p = 0.008$, weight adjusted for gestation of first visit) and there was a trend towards a reduction in height ($p = 0.08$). Furthermore, term weights were significantly lower in marijuana users ($p = 0.0002$ adjusted for gestation of final weight). The reduction in term weight arose as a result of a trend towards a significant reduction in mean weight gain per week of gestation in marijuana users compared to controls ($p = 0.08$).

Marijuana users were significantly more likely to smoke cigarettes or drink alcohol during the pregnancy than controls ($p < 0.0001$). Of note, 85% and 52% of marijuana users smoked or consumed alcohol compared to only 44% and 19% of controls respectively.

There was a trend for marijuana users to have an increased incidence of infections diagnosed on high vaginal swab or an abnormality detected on pap smear examination (High vaginal infection: $p = 0.07$; Pap smear abnormality: $p = 0.07$). However there were no significant differences between the two groups in the incidence of endocervical or chlamydial infection, rates of which were high in both groups. There were no significant differences between the two groups in the incidence of anaemia.

Table 2 outlines social morbidity in the two groups. Rates of social isolation, homelessness and domestic violence were 41%, 25% and 53% in marijuana users compared to 19%, 9%, and 26% in controls (all $p < 0.0001$). The incidence of DSM IV Psychosocial pathology was 77% in marijuana users compared to 50% in controls ($p < 0.0001$). Of note, there were no significant differences in the incidence of ongoing involvement by the father of the baby ($p = 0.33$).

Table 2 outlined antenatal morbidity between the two groups of teenager antenatal patients. The incidence of defined obstetric complications including preterm premature prolonged rupture of the membranes, pregnancy induced hypertension/pre-eclampsia and antepartum haemorrhage were not significantly different between the two groups (all $p > 0.05$). However, admission with a diagnosis of threatened preterm labour was significantly increased in marijuana users compared to controls ($p = 0.03$). Although there were no significant differences in the mean number of antenatal admissions between the two groups,

there was a trend towards an increase in the total number of antenatal admission days in marijuana users compared to controls ($p=0.06$), largely as a result of the increased incidence of threatened preterm labour.

Table 4 outlines outcome measures for the two groups of young adolescent mothers and their infants, after controlling for significant antenatal associations, gestational age and newborn gender. Marijuana users did not have an increase in puerperal morbidity compared to controls, nor was postpartum bed stay extended ($p>0.45$). Despite this, significantly more mothers using marijuana were assessed as being 'at-risk' upon discharge by the attending care team than controls ($p=0.001$).

Of note, there was a trend for more babies born to women who used marijuana to be preterm compared to newborns from control mothers ($p=0.09$). After controlling for gestational age, smoking, alcohol, maternal weight and height, and newborn gender, there were no significant differences in birthweight, length or head circumference between infants of the two groups of teenage mothers. There were also no significant differences in placental weight, the percentage of newborns diagnosed with a neonatal problem or total neonatal bedstay between the two groups ($p>0.21$). However, there was a trend towards a reduction in apgar score at 5 minutes in newborns of mothers who used marijuana compared to controls ($p=0.07$).

Of note, despite the equivalence in bedstay, significantly more newborns of women using marijuana were assessed as being 'at-risk' upon discharge by the attending care team compared with controls ($p=0.001$).

DISCUSSION

In the present study, 32% of pregnant teenagers aged 12 to 17 years used marijuana during the antenatal period, and of these, 10% used in combination with heroin, amphetamines, solvents or LSD. The remaining 25% of teenage antenatal patients used marijuana alone, or in combination with smoking or alcohol.

Marijuana use in adolescence is linked to increased levels of discontinuation of high school education and job instability (3). It is therefore perhaps not surprising to find high rates of usage in younger teenage antenatal patients. Of note, the figures in the present study agree with previously reported Australia data on nonprescription drug use in teenage pregnancy (1,10,11). A cohort study designed to assess the ability of staff at specialized adolescent and general antenatal clinics respectively to diagnose psychosocial problems reported that 38% of teenage mothers had used a nonprescription drug in pregnancy. Marijuana was used by 28% (10). The 1993 Australian National Campaign Against Drug Abuse household survey reported that 32% of 14 to 19 year olds had ever tried marijuana, but only 20% had used in the past year, and 3% within one week of the survey (11).

The results of this study indicate that the incidence of marijuana use in pregnant teenagers is not affected by age or race. However, marijuana users tended to be shorter and of lower weight than controls. They also tended to have a reduced rate of weight gain in pregnancy and a significant reduction in term weight compared to controls. The differences in body habitus and weight gain in pregnancy were not explained by differences in rates of anaemia. However, marijuana users had significantly more social problems and were more likely to be socially isolated, homeless, a victim of domestic violence and diagnosed with a major psychosocial pathology. It is possible that the stress of an adverse living environment compromised growth in the teenager and as a secondary effect, resulted in lower weight gain in pregnancy. As placental and infant weights were not significantly different, the deficit in weight gain may be accounted by reduced maternal growth. Adolescents in the first 2 years post-menarche need more nutrients and are in competition for those needed by the

developing fetus, and thus it is biologically plausible that there are growth risks for the mother associated with pregnancy in the early teenage years (12).

Marijuana users were significantly more likely to smoke or use alcohol in pregnancy compared to controls. The association between smoking and marijuana usage in teenage antenatal patients is so strong that a positive smoking history has been put forward as a possible preliminary screening test for substance use in pregnant adolescents. In a recent US study, smokers were four times more likely to use alcohol, marijuana or cocaine in pregnancy than controls (13).

In view of the significant increase in psychosocial pathology diagnosed in antenatal patients who used marijuana, it is possible that drug use represents an escape mechanism for the teenager who is confronted by an unsupported and abusive home environment. The adolescent may be reluctant to give up her escape route, despite being aware that marijuana may harm her developing baby (14-16). However, failure to adequately address major maternal psychosocial disorders co-occurring with marijuana use can result in increased maternal perceptions of behavioural difficulties in the newborn, disrupt parenting and infant bonding and may result in abnormalities in child development (17,18). The teenage mother under the influence of marijuana, and with few social supports, may be incapable of safely caring for her infant and an ongoing cycle of neglect may be precipitated.

We diagnosed 53% of pregnant teenagers using marijuana were victims of domestic violence. The association between pregnant teenagers with a history of physical or sexual abuse and marijuana and cocaine addiction has been previously documented. Of concern, in these teenagers were observed to be at particularly risk for postnatal depression and suicide (7).

Marijuana usage was associated with a significant increase in the incidence of vaginal infections and Pap smear abnormalities. Other researchers have found a link between marijuana use in teenage pregnancy and vaginal infections, particularly sexually transmitted diseases (8). We have previously documented high rates of chlamydial infection and pap smear abnormalities in pregnant teenagers and suggested that universal screening should be performed for all pregnant teenage women in order to minimise the sequelae of delayed diagnosis (19). The results of the present study reinforce this recommendation.

Marijuana usage was associated with a significant increase in the incidence of threatened preterm labour. This was supported by a trend towards an increase in the rate of preterm birth (marijuana 18% compared with control 11%, $p=0.09$) and in the mean number of antenatal admission days (marijuana 4.2 days compared with control 3.0 days, $p=0.06$). All rates were greater than the overall rate of preterm birth in the Australian adult population which is estimated at 7 to 8% (20). However, after controlling for the effect of maternal habitus, gestational age, newborn gender, and other significant antenatal associations of marijuana usage, there were no significant differences in birthweight data of infants from the two groups. Thus marijuana did not exert an independent effect upon fetal growth. These findings are consistent with a report from the United States. A study evaluating the effects of marijuana upon offspring gestational age, growth and morphology reported that prenatal marijuana exposure significantly reduced gestational age at delivery but did not have an adverse effect upon growth, once data were corrected for gestational age (5). A second study from Mississippi found a 21% incidence in the preterm birth rate in women using marijuana during their pregnancy (6).

Of note, rates of antepartum haemorrhage, pregnancy induced hypertension/pre-eclampsia and preterm birth were higher in both teenage groups compared to data reported from the general Western Australian population (20). These findings are consistent with research from the United Kingdom that have reported increased rates of hypertension, toxemia and

preterm delivery in young pregnant teenagers compared to the adult obstetric population (21-23)

In the present study, marijuana was not associated with increased rates of postpartum and neonatal morbidity, or in a prolongation of hospitalization. This was despite a significantly higher number of women and infants being identified by their care team as being at 'high risk' after discharge. The finding is of concern as many hospitals have postnatal care plans that encourage discharge of patients within a specified time frame and patients are often encouraged to comply. Furthermore, adolescent patients are often reluctant to accept hospitalization and are keen for early discharge. It is possible that some patients may be discharged before adequate care plans have been put in place to ensure safe and positive mothercrafting between mother and infant. Premature hospital discharge may not achieve a saving in public expenditure as immediate savings in postnatal hospitalization costs may be subsequently taken up by community-based emergency or crisis interventions and the compulsory involvement of government agencies to formally evaluate for neglect or inadequate care of either mother and/or newborn.

The newborns themselves may be more difficult to parent. Studies have found that newborns exposed to marijuana have elevated levels of plasma catecholamines, which is associated with neurobehavioural disturbances in the early postnatal period (24). Term infants exposed to marijuana in-utero have abnormalities in their EEG on the second day of life and the changes persist at one year of age (25). Abnormalities can persist as deficiencies in language and verbal skills. At school, children exposed to marijuana in-utero are reported to have cognitive and attentional deficits compared to controls (26).

Even more worrying are recent reports that marijuana exposure *in-utero* is associated with an increase in mutations within the lymphocyte hprt gene. Cord blood samples from newborns whose mothers used marijuana in pregnancy were observed to have a significant increase in the frequency of variant or mutant lymphocytes compared to controls (27). The link between increased rates of somatic mutations and the development of malignancies been well documented (27). Thus, marijuana may exert a genotoxic effect upon the fetus resulting in an increased risk of childhood or adult cancer.

In the present study we have reported that younger pregnant teenagers using marijuana are at risk of co-existing psychosocial pathology, poor maternal growth and reduced weight gain in pregnancy. Growth risks may be transferred from the fetus to the mother who is at a vulnerable stage of personal growth in her early teenage years. Marijuana use is also associated with an increased use of associated nonprescription drug activity ranging from smoking and alcohol through to heroin. Marijuana was linked to a rise in the incidence of threatened preterm labour that warranted admission and treatment, and a corresponding trend towards an increase in antenatal bed stay and preterm birth.

Further information is required on the immediate and long term impact of marijuana on teenage pregnancy outcomes, particularly upon childhood development and the risk of malignancy, in light of the high prevalence of usage in this setting.

REFERENCES

1. Bragg EJ. Pregnant adolescents with addictions. *J Obstet Gynaecol Neonat Nursing* 1997; 26: 577-84.
2. Farrow JA, Watts DH, Krohn MA, Olson HC. Pregnant adolescents in chemical dependency treatment. Description and outcomes. *J Substance Abuse Treatment* 1999; 16: 157-61.
3. Hall W. The public health significance of cannabis use in Australia. *Aust J Public Health* 1995; 19: 235-242.
4. Kenney SP, Kekuda R, Prasad PD, Leibach FH, Devoe LD, Ganapathy V. Cannabinoid receptors and their role in the regulation of the serotonin transporter in human placenta. *Am J Obstet Gynecol* 1999; 181: 491-7.
5. Cornelius MD, Taylor PM, Geva D, Day NL. Prenatal tobacco and marijuana use among adolescents: effects on offspring gestational age, growth and morphology. *Pediatrics* 1995; 95: 738-48.
6. Holland JG, Hume AS, Martin JN. Drug use and physical trauma: risk factors for preterm delivery. *J Mississippi State Med Assoc* 1997; 38: 301-5.
7. Bayatpour M, Wells RD, Holford S. Physical and sexual abuse as predictors of substance use and suicide among pregnant teenagers. *J Adol Health* 1992; 13: 128-32.
8. Amar H, Zuckerman B, Cabral H. Drug use among adolescent mothers: profiles of risk. *Pediatrics* 1989; 84: 144-51.
9. Emans SJ, Smith VAM, Laufer MR. Teenage pregnancy. In: Emans SJ, Laufer MR, Goldstein DP (Eds). *Pediatric and Adolescent Gynecology* 4th edition, Lippincott-Raven, Philadelphia, 1998.
10. Quinlivan JA, Petersen RW, Gurrin LC. Adolescent pregnancy – Psychopathology missed. *Aust NZ J Psychiatry*, 1999; 33: 864-868.
11. National Drug Strategy Committee. 1993 National Drug Household Survey. Canberra: Australian Government Publishing Services, 1993.
12. Goldenberg R, Klerman LV. Adolescent pregnancy – another look (editorial). *N Engl J Med* 1995; 332: 1161.
13. Archie CL, Anderson MM, Gruber EL. Positive smoking history as a preliminary screening device for substance abuse in pregnant adolescents. *J Ped Adol Gynecol* 1997; 10: 13-7.
14. Hall W. The public health significance of cannabis use in Australia. *Aust J Public Health* 1995; 19: 235-242.
15. Chadwick O, Anderson R, Bland J, Ramsey J. Neuropsychological consequences of volatile substance abuse: a population based study of secondary school pupils. *BMJ* 1989; 298: 1679-1684.
16. Whitfield CR. Miscellaneous Disorders Complicating Pregnancy. In: Whitfield CR (ed). *Dewhurst's Textbook of Obstetrics and Gynaecology for Postgraduates* 5th Edition, Blackwell Science, Oxford, 1995.
17. Zuckerman B, Bauchner H, Parker S, et al., Maternal depressive symptoms during pregnancy and newborn irritability. *J Develop & Behav Pediatrics* 1990; 11:190-194.
18. Murray L. Effects of postnatal depression on infant development: The contribution of direct studies of early mother-infant interactions. In: Eds. R Kumar and I Brockington. *Motherhood and Mental Illness*, London, John Wright, 2.
19. Quinlivan JA, Petersen RW, Gurrin LC. High prevalence of chlamydia and Papsmear abnormalities in pregnant adolescents warrants routine screening. *Aust NZ J Obstet Gynaecol* 1998; 38: 254-257.
20. Midwives Notification database 1997 Western Australia Health Department.
21. Elliott HR, Beazley JM. A clinical study of pregnancy in younger teenagers in Liverpool. *J Obstet Gynecol* 1980; 1: 16-19.

22. Beazley JM. Special circumstances affecting labour. In: Whitfield CR (Ed). Dewhurst's Textbook of Obstetrics and Gynaecology for Postgraduates 5th edition, 1995, Oxford: Blackwell Science 312-332.
23. Birch D. Schoolgirl pregnancies. In: Studd J (Ed). Progress in Obstetrics and Gynaecology, vol. 7, 1989, Edinburgh: Churchill Livingstone 75-90.
24. Mirochnick M, Meyer J, Frank DA, Cabral H, Tronick EZ, Zuckerman B. Elevated plasma norepinephrine after in-utero exposure to cocaine and marijuana. Pediatrics 1997; 99: 555-9.
25. Scher MS, Richardson GA, Day NL. Effects of prenatal cocaine/crack and other drug exposure on electroencephalographic sleep studies at birth and one year. Pediatrics 2000; 105: 39-48.
26. Leech SL, Richardson GA, Goldschmidt L, Day NL. Prenatal substance exposure: effects on attention and impulsivity of 6 year olds. Neurotoxicol & Teratol 1999; 21: 109-18.
27. Ammenheuser MM, Berenson AB, Babiak AE, Singleton CR, Whorton EB. Frequencies of hprt mutant lymphocytes in marijuana smoking mothers and their newborns. Mutation Research 1998; 403: 55-64.

Table 1. Demographics of the two groups of antenatal patients. Standard error of continuous variables is in brackets.

	Marijuana	Control	P-value
Percentage of group of aboriginal race	30%	26%	0.207
Age (years)	16.4 (1.0)	16.3 (0.1)	0.84
Maternal height (cm)	162.5 (0.8)	164.1 (0.4)	0.08
Maternal pre-pregnancy weight (kg)	61.5 (1.2)	66.0 (1.1)	0.008
Term weight (kg)	70.2 (1.3)	77.7 (1.4)	0.0002
Gestation of final weight (wks)	38.7 (0.6)	38.6 (0.2)	0.87
Mean weight gain per week of gestation (kg/wk)	0.44 (0.04)	0.54 (0.04)	0.08

Table 2. Social and antenatal morbidity of pregnant patients aged 12 to 17 years comparing those who used marijuana in pregnancy compared to control. Standard error of continuous variables is in brackets.

	Marijuana	Control	P-value
<u>Social morbidity</u>			
Social isolation (%)	41.1%	18.9%	<0.0001
Father involved (%)	76.3%	69.1%	0.33
Homeless (%)	25.4%	9.5%	<0.0001
Domestic violence (%)	53.5%	26.1%	<0.0001
Psychosocial problem (%)	77.5%	50.0%	<0.0001
<u>Antenatal morbidity</u>			
Threatened preterm labour (%)	23.4%	11.5%	0.02
Preterm prolonged premature rupture of the membranes (%)	3.2%	5.3%	0.74
Antepartum haemorrhage (%)	11.4%	11.1%	0.98
Pre-eclampsia or pregnancy induced hypertension (%)	15.0%	21.7%	0.36
Mean number of antenatal admissions (No)	0.61 (0.1)	0.51 (0.1)	0.53
Mean number of antenatal admission days (days)	4.2 (0.5)	3.03 (0.4)	0.06

Table 3. Pregnancy outcomes of mothers aged 12 to 17 years exposed to domestic violence and their newborns, compared to teenage pregnant controls. Standard error of continuous variables is in brackets.

Pregnancy Outcomes	Marijuana	Control	P-value
<u>MOTHER</u>			
% of group diagnosed with a puerperal problem (%)	59.5%	58.5%	0.98
Mean number of postpartum hospital days (days)	3.8 (0.2)	4.0 (0.3)	0.45
Assessment of risk (%)			
High	54.7%	25.8%	0.001
Intermediate	32.1%	29.4%	
Low	13.2%	44.8%	
<u>NEWBORN</u>			
Gestational age at birth (in wks)	38.1 (0.30)	38.6 (0.2)	0.21
% of infants in the group who were born between 20 and 37 weeks gestation (preterm birth) (%)	18.5%	11.3%	0.09
Birthweight (gms)	3097 (77)	3230 (42)	0.11
Length (in cm)	48.5 (0.4)	48.9 (0.2)	0.30
Head circumference (in cm)	33.7 (0.2)	34.2 (0.2)	0.08
Apgar score at 1 minute	7.8 (0.2)	7.8 (0.1)	0.96
Apgar score at 5 minutes	8.9 (0.1)	9.1 (0.1)	0.07
Placental weight (gms)	595 (13)	588 (11)	0.72
% of group diagnosed with a neonatal problem (%)	67.4%	56.1%	0.21
Mean number of postpartum hospital days (days)	4.7 (0.5)	4.0 (0.2)	0.25
Assessment of risk (%)			
High	50.9%	23.6%	0.001
Intermediate	35.9%	30.8%	
Low	13.2	45.6%	