Illicit substance use in pregnancy – a review

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Summary: Illicit substance use is not uncommon in women of childbearing age. The direct effects of illicit substance use on the mother, pregnancy and the fetus are not well understood, in contrast to the indirect effects of social disadvantage and intercurrent medical and psychiatric illness, which are well documented. We have undertaken a review of the current literature regarding the effects of illicit substance use in pregnancy and include a suggested approach to identification and management of at-risk women.

Keywords: pregnancy, high-risk pregnancy, illicit substance use, drug use, amphetamine, cocaine, ecstasy, opioids, GHB, inhalants, cannabis, hallucinogens

INTRODUCTION

Illicit substance use is not uncommon in women of childbearing age. Reported rates of drug use are generally lower in pregnancy, which reflects maternal awareness of potential adverse outcomes but may also reflect under-reporting due to concerns regarding stigmatization or legal consequence (4.4% illicit substance use in pregnant versus 10% in non-pregnant women).¹ A particularly at-risk group is pregnant teenagers, as rates of drug use in the 15–17-year-old age group who are pregnant are significantly higher than in those who are not, 21.6% versus 12.9%.¹ A recent Australian study reported 5% of women screened were using cannabis and 2% were using other illicit drugs in pregnancy.² In population surveys including the National Household Drug surveys in Australia³ and New Zealand,⁴ there is a trend in the last decade to decreased drug use overall. This is related to reduction in use of cannabis, but conceals increases in ecstasy and cocaine use over the same time period. A similar trend has been noted in the UK⁵ with overall decrease related to lower cannabis use, but increased 'last year' use of cocaine, ecstasy and tranquillizers. US data show that incidence of substance use has remained essentially stable over the last decade, although also showing a trend to reduction in cannabis use.⁶ There are strong data that women decrease substance use during pregnancy, particularly for alcohol and 'party drugs', although rates of smoking and marijuana use may be sustained,⁷ and recommencement of substance use within three months postpartum is common.¹ The local incidence of drug use and user demographics in pregnancy will vary according to drug availability and cost.

Literature regarding the effects of illicit substances in pregnancy is limited by low rates of self-report and the presence of multiple significant confounders. It is difficult to distinguish single drug effects due to high rates of polysubstance use,

frequent concurrent use of alcohol and cigarettes, and adverse social circumstances with often limited antenatal care.^{8–11} A further layer of complexity in defining the effect of individual substances is added by the significant variation in active ingredient type and concentration when dealing with non-prescription drugs. While there are a number of large epidemiological studies that include data on drug use, case reports and case series inform the majority of our current understanding of the effects of illicit substances on pregnancy and the newborn. Despite these limitations it is recognized that illicit substances are detectable in the placenta as early as 12 weeks,¹² and that use in the periconceptional period and during pregnancy may be associated with increased risk of congenital or developmental abnormalities^{13–15} and with adverse obstetric outcomes.^{16,17}

Marijuana/cannabinoids

Marijuana is the most widely used illicit drug across all age groups.^{3–6} There are 60 phyto-cannabinoids derived from the *Cannabis sativa* plant, with the most potent psychotropic effects from 9-tetrahydrocannabinol (THC).¹⁸ When smoked or ingested, THC causes euphoric, sedative and hallucinogenic effects that are mediated through binding to endogenous cannabinoid receptors. These receptors are expressed in the central nervous system (CNS), are present from the fetal and early postnatal period and may have an effect on brain maturation.¹⁹ THC is lipophilic and redistributed into adipose tissue so that complete elimination may take up to 30 days. Cannabinoids freely cross the placental barrier and have been shown to increase blood flow in the bovine placenta, although fetal oxygenation is decreased, suggesting vasoconstrictive effects on the placental microcirculation.²⁰ Cannabinoids also reach the fetal brain in significant amounts due to their lipophilic nature and the immaturity of the blood–brain barrier. At a cellular level, THC has been shown to be toxic to neonatal cortical cells and in rodent studies prenatal exposure to cannabinoids has been associated with significant congenital malformations including spina bifida and exencephaly,^{18,19} as well as alterations in CNS development and long-term effects

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on behaviour.^{19,21} Retrospective and observational series in humans suggest an increased risk of the adverse birth outcomes of preterm delivery and low birthweight;^{16,22,23} however, in a prospective study of 12,000 singleton pregnancies in Britain, an apparent dose-dependent trend to lower birthweight and length in those infants exposed to marijuana antenatally was no longer statistically significant after adjustment for multiple potential confounders including smoking, caffeine, alcohol and 'hard drugs' intake, maternal age and education level.²² A recent Australian study, using record linkage between two hospital databases to identify the obstetric and perinatal outcomes for women with drug-related admissions during pregnancy, found that of the 416,834 live births analysed over a five-year period, there were 2172 pregnancies in women with ICD-10AM codes for cannabis use, and their neonates were reported to be diagnosed with a higher level of fetal distress.¹⁰ It was proposed those this may be due to fetal hypoxia, as marijuana has been shown to produce carbon monoxide levels five times higher than those produced by cigarette smoking.²⁴

In the Ottawa Perinatal Prospective Study, 13% of mothers interviewed reported cannabis use in the last year, with only 1% reporting ongoing use of marijuana during pregnancy.¹⁶ In this study there was no increase in major or minor malformations in the offspring of those women who had continued to use marijuana throughout pregnancy; however, an exaggerated startle and fine tremor was noted in the first week of post-natal life. These children developed normally through infancy, but at 48 months of age impairments were noted in memory and verbal development in children of mothers with heavy use during pregnancy.¹⁶ Similar effects on verbal memory, abstract reasoning and mood have been demonstrated in other follow-up studies.²¹

Cocaine

Cocaine use is associated with significant adverse pregnancy outcomes. Cocaine has indirect sympathomimetic activity predominantly via prevention of reuptake of noradrenaline and dopamine at nerve terminals, resulting in up to fivefold increase in circulating catecholamines,²⁵ which results in feelings of euphoria and boundless energy. Available in both powder and free base 'crack' forms, it is rapidly absorbed via mucous membranes so may be taken intranasally or transmucosally, and is less often injected. The teratogenic potential of cocaine is not completely defined, although cardiac, CNS, genitourinary and limb malformations have been reported in animal studies and similar abnormalities are noted in human epidemiological and case-control studies,^{14,26} as well as an association with gastroschisis.^{15,27} The majority of adverse maternal and pregnancy outcomes associated with cocaine use relate to the catecholamine surge and resultant hypertension and vasoconstrictive effects, which in the non-pregnant population may result in acute myocardial infarction, seizures or stroke.^{25,28} A case series documents 11 pregnant women who used cocaine in pregnancy and presented with a syndrome of hypertension and/or seizures and which strongly resembled preeclampsia/eclampsia.²⁹ During pregnancy significant maternal morbidity related to cocaine use including myocardial infarction, pulmonary oedema, aortic dissection and renal failure has been reported.³⁰ Cocaine has also been shown to have prothrombotic effects with increased platelet activation and elevated plasma plasminogen activator inhibitor levels (PAI-1).²⁸

With regard to the effect of cocaine on the pregnancy itself, cocaine has been shown to reduce uteroplacental blood flow in rats,³¹ and in human series effects include intrauterine growth restriction, premature delivery, placental abruption, fetal death and preeclampsia.^{14,32,33} Cocaine freely crosses both the placenta and the fetal blood-brain barrier and may accumulate in amniotic fluid.⁸ Infants exposed to cocaine *in utero* may be irritable with a shrill cry – the 'crack baby' phenomenon³⁴ – and some studies report an association with Sudden Infant Death Syndrome.²⁶ However, in a meta-analysis where three authors analysed 36 articles, after correction for multiple confounders cocaine exposure *in utero* was not associated with significant neurocognitive effects in infants and preschool age children.³⁵

Amphetamine/methamphetamine

Amphetamine is similar to cocaine in that it has indirect sympathomimetic activity and induces feelings of euphoria and energy, and due to potent vasoconstrictive effects can result in hypertension, tachyarrhythmias, myocardial infarction and even stroke.³⁶ Methamphetamine use is strongly associated with risky sexual behaviours³⁷ and increased risk of teenage pregnancy.³⁸ Maternal cardiovascular complications related to its use in pregnancy include myocardial infarction and hypertensive disorders of pregnancy.³² Amphetamine use has also been reported to present as an eclamptic syndrome in two cases.^{39,40}

Amphetamines act directly on both the serotonin and noradrenaline transporters in the placenta, resulting in placental vasoconstriction.⁴¹ Obstetric outcomes may be significantly compromised, with increased rates of premature rupture of membranes, placental abruption, premature delivery and intrauterine infections.^{32,42} Intrauterine growth restriction is common,^{32,42} and stillbirth may occur.⁴³ Amphetamine crosses the placenta, so may be detected in the meconium of exposed neonates.⁴⁴ There is evidence that prenatal exposure to amphetamines in rodents and humans is associated with abnormal neurological development with lower CNS striatal volumes.⁴⁵ As with other vasoconstrictive illicit drugs, an association between amphetamines and gastroschisis has been reported.^{15,27} Neonates exposed to amphetamine *in utero* display increased physiological stress, lethargy and lower arousal in the early post-partum period,⁴⁶ and long-term data suggest lower performance at 14 years of age⁴⁷ associated with smaller head circumference at birth, although overall follow-up data are limited.

Ecstasy (MDMA)

MDMA (3,4-methylenedioxymethamphetamine) causes release of endogenous catecholamines, particularly noradrenaline and dopamine, although is also structurally similar to serotonin. Ingestion causes feelings of increased energy, euphoria, friendliness and sexual disinhibition; it is not surprising then that MDMA use is associated with unplanned pregnancy.⁴⁸ The typical features of MDMA toxicity are similar to those of amphetamines with hypertension, tachycardia and CNS stimulation, but in addition there may be features of serotonin syndrome or syndrome of inappropriate antidiuretic hormone secretion (SIADH), which are the more common cause of morbidity and even mortality in MDMA users.⁴⁹

MDMA causes a small (0.6°C) rise in core body temperature,⁵⁰ which may contribute to the reported association with congenital abnormalities.^{13,51} There are very few reports

regarding the effect of ecstasy on human pregnancy and obstetric outcomes; however, MDMA has been shown to cross the placenta⁵² in rats and there are a number of rodent studies that report altered neurocognitive development related to *in utero* exposure to MDMA.^{53,54}

Opioids

Opioid abuse in pregnancy includes heroin, morphine, fentanyl and methadone. These drugs may be taken orally, subcutaneously, intramuscularly and intravenously.

Studies have reported that of those women who use illicit drugs in pregnancy, opioids are used most often.^{10,55}

Maternal complications of opiate abuse include infectious complications (cellulitis, abscesses, thrombophlebitis, blood-borne viral infections and endocarditis), poor nutrition, overdose or acute withdrawal. Symptoms of opioid overdose include slow respiratory rate, increased tidal volume and miotic pupils. Acute withdrawal is characterized by increased sympathetic nervous system activity including tachycardia, tachypnoea, restlessness, insomnia, hypertension and mydriasis as well as CNS manifestations ranging from bizarre behaviour and dysphoria to loss of consciousness.³⁰

For the neonates opioids have not been shown to be associated with teratogenic or cytotoxic effects.⁵⁶ A recent Australian study using linked population administrative data documented outcomes for 1974 opioid-related admissions in pregnancies, demonstrated adverse neonatal outcomes in offspring whose mothers used opioids.¹⁰ After adjustment for multiple confounders including use of other drug types, maternal age, smoking, indigenous status and private health insurance, maternal opioid use was associated with the neonates being 1.9 times more likely to be small for gestational age, 3.9 times more likely to have a gestational age less than 37 weeks, 5.8 times more likely to be admitted to a special care nursery and 3.6 times more likely to be admitted to a neonatal intensive care unit.¹⁰ A recent review¹⁷ noted that very few studies of opioid use in pregnancy controlled for other drug use, social and psychological factors, although overall the studies suggest an increased incidence of a reduction in fetal growth parameters in neonates exposed to opioids in pregnancy.^{17,30}

A major concern is the high rate of neonatal abstinence syndrome (NAS) in neonates who have been exposed to opioids *in utero*. The rate has been reported to be up to 94% for intra-uterine opioid exposure and 60–80% for methadone use in pregnancy.^{55,57,58} NAS has also been observed in infants of mothers with dependent patterns of alcohol and benzodiazepine use. Symptoms of NAS include neurological excitability, gastrointestinal dysfunction and autonomic signs. Infants of all mothers taking opioids for prolonged periods of time in pregnancy should be assessed for NAS using a validated assessment tool. Therapy for the infant includes adequate supportive care, as well as pharmacological therapy with morphine if necessary.⁵⁵ Studies have shown that enrolling the mother in an opioid replacement programme has been associated with a reduced rate of NAS.⁵⁵

All pregnant women who are opioid-dependent should be offered methadone replacement therapy. This has been shown in pregnancy to prevent acute withdrawal, improve maternal medical status, reduce the risky behaviours associated with illicit opioid use, and reduce fetal and neonatal morbidity and mortality.^{55,57,59} Review of the literature reveals three randomized control trials comparing buprenorphine to methadone

maintenance therapy with a total number of 104 patients enrolled. All three studies revealed that there was longer duration of therapy for NAS in the methadone group and that the NAS was more severe as determined by the Finnegan score in the methadone group as compared with the buprenorphine group. The studies suggest that buprenorphine maintenance therapy during pregnancy is safe and efficacious for mother and fetus and may be associated with less severe NAS.^{58,59,60} However, the numbers are small, and the need for a large-scale multicentre trial to confirm these findings is supported by a recent Cochrane review on the topic.⁶¹ Patients should continue to receive opioid replacement during labour and will often require a higher dose of analgesics postpartum. Women who are taking opioids in pregnancy may develop cross-tolerance to other CNS depressants including anaesthetic agents, particularly opiate analgesics and benzodiazepines.³⁰

Gamma-hydroxy-butyrate

Gamma-hydroxy-butyrate (GHB) and the GHB precursors gamma-butyrolactone (GBL) and 1,4-butanediol (1,4-BD) act at endogenous GABA receptors. Sodium oxybate is an equivalent but legal medication available for the treatment of narcolepsy.⁶² GHB is taken recreationally for effects including enhanced sexual desire and disinhibition, and reduced anxiety, with associated negative effects of incoordination and confusion,⁶³ and in more severe cases loss of consciousness and airway compromise.⁶⁴ Ingested GHB follows zero-order kinetics giving a narrow 'therapeutic' or recreational window.^{62,65} There is only one notification in the literature of GHB intoxication-related impaired consciousness in the peripartum period.⁶⁶ However, to date there are no reports related to the effects of illicit GHB use on pregnancy outcome. In rodent studies performed by the manufacturer, sodium oxybate has not been shown to cause congenital abnormalities or increased fetal loss.⁶⁷

Hallucinogens – LSD ('acid')/psilocybin ('magic mushrooms')

Hallucinogenic agents encompass a range of agents with different mechanisms of action, although most have some activity on the serotonergic and dopaminergic receptors. Psychedelic agents have been used to produce mystical experiences for hundreds of years, and became particularly popular during the 60s and 70s; they are still used by a small percentage of the population.^{3–5}

LSD is an agonist at both 5-HT₂ and dopamine receptors and accumulates in the placenta. In rodent studies, LSD has been shown to have vasoconstrictive effects on both the uterine arteries and umbilical arteries in pregnant ewes, with potential for significant compromise of fetal blood flow.⁶⁸ Further, LSD has been shown to have oxytocic effects on isolated rat uterine smooth muscle.⁶⁹ There are very limited reports of the effect of LSD on human pregnancy, with a number of reported cases of ocular abnormalities,⁷⁰ although in a single case series of 10 women known to have taken LSD during pregnancy, there were no adverse pregnancy outcomes or congenital abnormalities noted.⁷¹

Psilocybin is the active ingredient in *Psilocybe* mushrooms and is a 5HT-2A receptor agonist, which when ingested

causes altered perception of the demarcation between self and the surrounding environment, resulting in feelings of 'unifying with a higher reality' and visual hallucinations.⁷² Physiological effects are generally mild, including minor elevation in blood pressure and serum cortisol, with a return to baseline by two hours. In contrast, psychological effects may be pronounced with 'flashbacks' and long-term alterations in empathy and perception.⁷³ There are case reports of rhabdomyolysis, acute renal failure and a cardiomyopathy after ingestion of hallucinogenic mushrooms.^{74,75} There are no reports to date regarding the effects of psilocybin on pregnancy.

Volatile substances/inhalants

Defining effects of abused inhalants is even more challenging than for other drugs of abuse, as this group is so heterogeneous.⁷⁶ Abused inhalants can be sourced from a wide variety of legally available fuels, propellants and solvents, which when the vapours are inhaled cause variable mind-altering effects, most often similar to alcohol intoxication, but these may also include hallucinations.^{76,77} The use is more common in remote communities and among adolescents.⁷⁷ The chemical composition and pharmacokinetics of these substances is variable and there is very little evidence available regarding effects in pregnancy or placental passage of any individual agent.

Case series of maternal and neonatal outcomes related to petrol sniffing again showed that mothers who sniff petrol are more likely to present late for antenatal care, to use other substances and have medical co-morbidities including increased rates of sexually transmitted diseases, while neonatal outcomes were poor with increased rates of meconium-stained liquor, stillbirth, intrauterine growth restriction/small for gestational age and admission to the neonatal unit, with subsequent high infant rates of foster care or adoption.⁷⁸ One case report of congenital lead poisoning related to maternal petrol sniffing⁷⁹ highlights the importance of awareness of potential co-ingestion of heavy metals.

CONFOUNDERS, COMPLICATIONS AND CO-MORBIDITIES

Every case series, prospective study and discussion regarding the use and effects of illicit substance use in pregnancy highlights the multiple significant confounders and spiralling disadvantage faced by women who continue to use illicit substances during pregnancy, and therefore also by their offspring. Rates of concurrent smoking, alcohol use and polydrug abuse are high. Medical co-morbidities including anaemia, poor nutrition, underweight, psychiatric comorbidity, increased rates of sexually transmitted infection, hepatitis C, HIV and infectious complications related to injecting drug use are often reported. Social disadvantage is more prevalent including domestic violence, low socioeconomic status, low levels of family and social support, inadequate or unsafe accommodation or environment, relationship stress or violence, legal complications and frequently delayed or intermittent presentation to antenatal care.^{8-10,17,22,48,78,80} In many cases, women may already have children in care and fear of losing children related to drug use contributes to lower reporting rates. Previous studies have reported that greater than 50% of children of opiate-dependent women are not living with their biological parents by five years of age.^{81,82}

The National Institute on Drug Abuse Conference in 2004 concluded that further research into how the embryonic and fetal compartments are protected from toxic agents, the molecular and cellular mechanisms of placental transport, and effects of illicit drugs on endocrine, immune and angiogenic factors is required to start to address the deficiencies in our current level of knowledge.⁸

AN APPROACH TO THE PATIENT WITH SUSPECTED DRUG USE

Pregnancy represents an opportune time to undertake screening, education and offer intervention for risky lifestyle choices including drug taking, which will have benefits to the woman, her children and society. All health-care providers – midwives, obstetricians and general practitioners – who undertake obstetric care have an ethical obligation to provide universal screening in relation to alcohol, cigarettes, prescription drug and illicit drug use in pregnancy. Pregnancy is a strong motivator for change as most pregnant women wish to protect their baby and are receptive to offers of support and treatment.^{1,7}

All obstetric patients should be screened for alcohol and drug use at their initial antenatal visit, with questioning that is free from judgement, confidential and aims to engage the mother in the establishment of a therapeutic relationship. It is important to determine the pattern, route and frequency of drug use, and concomitant use of other drugs, which is best achieved through the use of an existing screening tool such as the ASSIST questionnaire,⁸³ or through development of a locally applicable screening questionnaire. Women who are identified as drug-dependent can then be referred to the appropriate model of care. The obstetrician or midwife interviewing the patient should be aware of factors in the history that may raise suspicion for drug use or dependence in pregnancy^{30,84} (Table 1), recognizing that illicit substance use in pregnancy is not uncommon, and often not disclosed.

Laboratory screening using blood or urine testing, hair samples from mother or neonate and meconium analysis can be used to detect illicit substance use in pregnancy.^{85,86} This type of screening can represent a violation of the patient's right to privacy, and can certainly strain the therapeutic relationship, so should ideally be performed with patient consent.⁸⁴ Exceptions to this may be made where a positive result would significantly alter management decisions and

Table 1 Potential warning signs of maternal drug use

Chaotic lifestyle
Lack of housing and inadequate nutrition
Recurrent injuries or presentations to the emergency department
Drug-seeking behaviours, requests for scripts for opioids or benzodiazepine
Past history of adverse obstetric outcome (IUFD, abruption, preterm delivery, SGA)
Previous child with fetal alcohol syndrome or neonatal abstinence syndrome
Previous child removed from parents care
History of sexually transmitted disease or blood born viral infections
Inappropriate behaviour during visits – intoxication, drowsiness
Failure to attend appointments or comply with therapy
Delayed presentation for antenatal care
Partner who is abusive or drug taking

IUFD = intrauterine fetal death
SGA = small for gestational age

Table 2 Overview of effects of illicit substance use in pregnancy

Effect	Marijuana	Amphetamines	Ecstasy	Hallucinogens (LSD)	Heroin	Methadone	Cocaine	GHB
Teratogenic	N	±	?	Y	N	N	±	?
				Ocular abn				
Microcephaly	±	?	?	?	Y	?	±	?
Miscarriage	N	??	?	±	?	N	Y	?
IUGR	Trend	Y	?	?	Y	±	Y	?
IUFD	N	??	?	?	?	N	Y	?
Placental abruption	N	Y	?	?	N	N	Y	?
Preeclampsia	N	Y	?	Perhaps	Y	N	Y	?
Premature delivery	±	N (±)	?	±	Y	±	Y	?
Neonatal withdrawal	N	?	?	?	Y	Y	±	?
Neonatal morbidity (incl. SIDS)	N	Y	?	?	Y	Y	Y	?
							Up to 15%	
Maternal infection	N	?	?	?	Y	N	N	?
Neurocognitive effects	Y	Y	Y	?	Y	?	±	?

N = no established association; Y = reported association; ? = uncertain/no evidence available; ± = conflicting report; GHB = gamma-hydroxy-butyrate
IUGR = intrauterine growth restriction; IUFD = intrauterine fetal death; SIDS = sudden infant death syndrome

there is a discrepancy between the clinical presentation and stated history of drug use in pregnancy.^{84,39,40}

Brief physician advice has been shown to be beneficial in reducing alcohol and drug use and yet health providers' concern regarding ethical obligations to the patient, and legal implications of screening and detection of drug use, have been described as one of the barriers to universal screening.⁸⁷ The American College of Obstetricians and Gynecologists (ACOG) have produced an Opinion Paper which provides guidelines for resolving common ethical dilemmas related to drug and alcohol use in the obstetric setting.⁸⁷ The ACOG have also collaborated with the Physician Leadership on National Drug Policy at Brown University to produce a slide-show presentation that addresses the identification and treatment of drug use for distribution to obstetric training programmes.⁸⁸

Substance abuse in pregnancy results in consequences for the mother and fetus both directly from the drug use and indirectly from the environment and social milieu associated with illicit drug use. Mothers therefore require care that is individualized, holistic and multidisciplinary. Women detected as having problematic drug use will benefit from referral to specialist alcohol and drug services in addition to standard midwifery and obstetric care. Multidisciplinary teams for women with drug abuse issues should include an obstetrician, midwife, neonatologist, addiction medicine specialist with expertise in pregnancy, community health-care worker, social worker, psychiatrist, drug and alcohol counsellor, dietician and others as required in each case. The rate of comorbid mental illness may be as high as 30%⁸⁰ in patients with dependent drug use, so referral to obstetric psychiatric services must be considered.⁸³

Women should be provided with up-to-date information regarding the potential effects of illicit drug use in pregnancy (Table 2) and given access to counselling, supportive care and pharmacotherapy or relapse prevention therapies as appropriate. Withdrawal treatments or pharmacotherapy maintenance regimens should be discussed with women with evidence of physiological dependence by a specialist experienced in this field, as rapid drug cessation and withdrawal may pose significant risks to the mother and fetus.⁸⁴ Pharmacotherapy for addiction may be used for both initial detoxification and ongoing maintenance; however, most pharmacological detoxification programmes can provoke marked withdrawal symptoms

and are not advised in pregnancy.^{84,89} Rayburn *et al.*⁸⁹ provide an excellent systematic review of current experience in pharmacotherapy for pregnant women with chemical addictions.

A chaotic lifestyle is a frequent association of illicit drug use. The multidisciplinary teams caring for the women with drug abuse are in a position to provide a comprehensive approach to guide the patient and family in addressing these issues and help her with solutions. Women should be offered assistance with employment and housing issues and may benefit from education in breast feeding and parenting skills. Patients may also be referred to agencies to help with financial advice and assistance. Where specific child protection issues are identified according to the mandatory reporting system in each state or territory, child protection agencies must be notified. It is important to inform the patient of the statutory obligations, unless doing so will risk increased harm to the fetus.^{83,84} Good communication and documentation of management and care plans, as well as appropriate discharge planning and follow-up including appropriate outreach support services, are vital components of care for mothers and their families.⁸³

CONCLUSION

Substance abuse and dependence in pregnancy are associated with significant maternal and fetal morbidity, and even mortality. Pregnancy is often the period in a woman's life where she is most motivated to change her lifestyle in order to benefit her unborn child. Drug use in pregnancy has adverse health consequences for both the mother and fetus, and is a marker for broader health problems and adverse social circumstances. All pregnant women should be offered screening and intervention for drug abuse and dependence in pregnancy. Midwives, obstetricians and primary care physicians are ethically obliged to undertake judgement-free questioning for possible drug use in pregnancy. An understanding of the potential effects of drug use in pregnancy will help ensure the best evidence-based or consensus management for this high-risk group of women throughout pregnancy and the postpartum period. Referral to appropriate agencies and multidisciplinary teams experienced in the management of these women has been shown to have beneficial outcomes for the mother, neonate, family and therefore society.

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