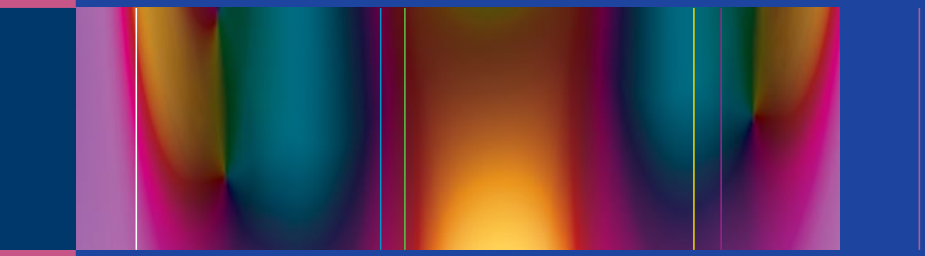
Byron C. Calhoun
Tammi Lewis
Editors



Tobacco Cessation and Substance Abuse Treatment in Women's Healthcare

A Clinical Guide

Springer

Tobacco Cessation and Substance Abuse Treatment in Women's Healthcare

Byron C. Calhoun • Tammi Lewis
Editors

Tobacco Cessation and Substance Abuse Treatment in Women's Healthcare

A Clinical Guide

Springer

Editors
Byron C. Calhoun
Department of Obstetrics and Gynecology
West Virginia University-Charleston
Charleston, WV, USA

Tammi Lewis
Family Resource Center
Women and Children's Division
Charleston Area Medical Center
Charleston, WV, USA

ISBN 978-3-319-26708-1 ISBN 978-3-319-26710-4 (eBook)
DOI 10.1007/978-3-319-26710-4

Library of Congress Control Number: 2016933484

Springer Cham Heidelberg New York Dordrecht London

Printed on acid-free paper

Springer International Publishing AG Switzerland is part of Springer Science+Business Media (www.springer.com)

Contents

Contributors

Denise Burgess, RN, BSN, MA, LPC, NBCC Charleston Area Medical Center, Charleston, WV, USA

Byron C. Calhoun, MD, FACOG, FACS, FASAM, MBA Department of Obstetrics and Gynecology, West Virginia University-Charleston, Charleston, WV, USA

Paul Dietz, MD, FACOG Department of Obstetrics and Gynecology, Charleston Area Women's Medicine Center, Medical Center, Charleston, WV, USA

Tammi Lewis, LPC, AADC, SAP Family Resource Center, Women's and Children's Division, Charleston Area Medical Center, Charleston, WV, USA

Chapter 1
Introduction: Abuse of Tobacco and Substances

Byron C. Calhoun

Introduction and Background

The substance abuse rates in the United States have been estimated to be between 2.8 and 19 % [1–3]. The most recent data available (2013 data) reported by the Substance Abuse and Mental Health Services Administration (SAMHSA) in 2015 found a 2.6 % rate of illicit drug use in the United States in 2013 [4]. However, most concerning are the much higher rates of substance use in the reproductive age cohorts. The rates at 12–17 years of age were 3.5 %; the 18–25 years of age an astonishing 7.4 %; and the 26–44 years of age 3.1 %. This data demonstrates the significant public health issue substance abuse and illicit drug use in women's reproductive health particularly in obstetrical care. SAMHSA depends heavily on the use of survey data, self-reporting, and reporting from healthcare entities. The data are not generally linked to actual substance testing or necessarily verified with biologic samples.

B.C. Calhoun, MD, FACOG, FACS, FASAM, MBA (✉)
Department of Obstetrics and Gynecology, West Virginia University-Charleston, Charleston, WV, USA
e-mail: Byron.calhoun@camc.org

B.C. Calhoun, T. Lewis (eds.), *Tobacco Cessation and Substance Abuse Treatment in Women's Healthcare*,
DOI 10.1007/978-3-319-26710-4_1

Reported rates vary based upon the population screened and the method of screening used. The lowest number reported in the study by Ebrahim and Gfroerer utilized a population survey of the entire United States [1] while the highest rates reported (19 %) by Azadi and Dildy utilized urine toxicology testing [3]. Chasnoff et al. 2005 developed a screening tool that estimated that 15 % of the population studied continued to use substances of abuse after becoming aware of the pregnancy [2]. The American Congress of Obstetricians and Gynecologists further affirms the validity and necessity of substance use and alcohol abuse screening in women's healthcare:

> Routine screening for substance use disorder should be applied equally to all people, regardless of age, sex, race, ethnicity, or socioeconomic status. Routine screening for substance use disorder can be accomplished by way of validated questionnaires or conversations with patients. Routine laboratory testing of biologic samples is not required [5].

Other screening recommendations in clinical practice that have proved useful include the use of the "4P's" [6]. This screening consists of asking specific questions about Parents (did any of the parents have a drug or alcohol problem); Partner (does their partner have a problem with alcohol or drug use); Past (have you ever had trouble in life because of alcohol or other drugs, including prescription medications); and Present (in the past month have you drunk any alcohol while pregnant or used other drugs) [6]?

Adolescents present a particularly vulnerable population and may need more detailed screening questions about alcohol and drug use with regard to driving, self-esteem, relaxation, interpersonal relations including family, and any type of trouble (school or legal). Adolescents also present issues in confidentiality that must be dealt with in the context of substance abuse. Consultation with various state guidelines and legislation is recommended.

Recent work published by Montgomery et al. 2006 compared the performance of meconium samples versus the testing of umbilical cord tissue [7]. This study showed concordance of the

testing methods that correlated at or above 90 % for all substances analyzed in both cord blood and meconium. Follow-up work included a study in which umbilical cord samples were collected and tested if high risk criteria for substance abuse were identified. Out of this cohort, 157 of 498 (32 %) cords tested positive for substances of abuse [8]. Stitely et al. 2010 found similar results in their study of a cohort of blinded umbilical cord blood samples in eight regional hospitals in West Virginia in 2009 with 146/759 (19.2 %) of umbilical cord samples collected at delivery that were positive for either illicit substances or alcohol [9]. In this study, no patient screened positive by risk criteria or admitted to use of any illicit substances or alcohol.

Data from our own state of West Virginia found the number of newborns treated for neonatal abstinence syndrome (NAS) has increased dramatically in our state. In data collected from the Cabell Huntington Hospital in Huntington, WV, the number of neonates treated for NAS increased from 25 in 2003 to 70 in 2007 [10]. Further, the cost difference in the care of an otherwise healthy neonate with NAS compared to a normal full-term healthy neonate was estimated to be $3934 in the Cabell Huntington cohort in 2007 dollars. Because of the added costs associated with the increased risk of prematurity, the average cost of hospitalization in all infants with NAS was $36,000 compared to $2000 for a normal neonate [9]. These hospital costs do not include the substantial increased need for resources to deal with the morbidity of prematurity with regard to additional therapies, medical costs, and burden on families due to prematurity and NAS.

Recent work by Hensel et al. 2012 found with universal urine screening for illicit substances in an obstetric and gynecologic residency clinic in West Virginia that 32 % of pregnant patients were positive for illicit substances including 11 % positive for multiple substances [11]. No patients in the study admitted to, or self-identified as, using illicit drug or ingesting alcohol.

The substance abuse literature previously described the avoidance of detoxification during the second and third trimesters of pregnancy due to concerns about harms to the fetus [12, 13]. These fears included the effects of acute opiate withdrawal on the fetus with possible increased risk of early pregnancy losses or fetal demise in later trimesters [12, 13]. Recent literature, however, does not substantiate these claims [14–16]. Careful detoxification of patients does not appear to increase the risk for early first trimester losses or stillbirths in the later trimesters [14–16]. Luty et al. 2003 studied 101 opiate-dependent women who underwent a gradual, controlled, and supervised 21-day opiate withdrawal with no adverse effects found [16]. Stewart et al. 2013 utilized a slow methadone taper for pregnant inpatients. They found that in 53/96 (56 %) of patients could successfully be detoxified [17]. Further, the hospital stays for patients with inpatient detoxification lasted 10 days longer than those who did not detoxify (25 versus 15 days). They also found that maternal demographics and drug histories did not influence successful detoxification. Their findings suggested that opiate detoxification ought to be offered to all pregnant women willing to undergo detoxification [17].

Finally, Hensel et al. 2015 cared for 92 urine substance screen-positive pregnant patients and achieved abstinence in 39/92 (42 %) patients at delivery with outpatient management with therapeutic substitution with decreasing dosages of oral opiates while including contingency addictions care [18]. They found collaborative and intense group therapy with a certified addictions counselor with the weekly group therapy was a mainstay of successful achievement of abstinence.

In contrast to abstinence in pregnancy, opioid dependence, including methadone maintenance, has been linked to fetal death, growth restriction, preterm birth, meconium aspiration, and NAS [12, 19]. NAS may be present in 60–90 % of neonates exposed in utero with up to 70 % of affected neonates with central nervous system irritability that may progress to seizures [20]. Up to 50 % of neonates may experience respiratory issues, feeding problems, and failure to thrive [21]. These issues are present as well in those infants whose

mothers' are on methadone maintenance [22]. However, with methadone, the onset of NAS may be delayed for several weeks [22]. Further, the withdrawal symptoms and signs may mimic other common neonatal maladies: upper respiratory infection, diarrheal diseases, and even colic. This confusion often leads to misdiagnosis and morbidity. Therefore, some authors recommend 5–8 days of maternal hospitalization while their neonates' undergo observation for NAS [23]. However, most insurance plans will not reimburse for the accompanying prolonged uncomplicated maternal stay.

The incidence of opioid relapse in pregnant opioid-abusing women is very high with 41–96 % relapsing [24]. This mirrors the relapse rate of the general population at 1 month of 65–80 % [24, 25]. Over 90 % of patients will relapse at 6 months after medication-assisted withdrawal [26]. Relapse constitutes the most difficult issue to be dealt with postpartum. Improved methods for maintenance of sobriety are sorely needed in the postpartum period and beyond. In spite of the hope of decreased incidence of NAS, Buprenorphine (Subutex™) appears to have no difference in outcomes with regard to treatment of opiate-addicted women. The same NAS and neonatal affects are present [27].

Anomalies associated with opioids appear to be related to first trimester use of codeine and an increased risk of congenital heart defects [28–31]. According to the literature, exposure to oxycodone, propoxyphene, or meperidine have not been linked to increased risk of congenital anomalies [32, 33]. There is a report from a single retrospective study that found an increased risk of birth defects with prescription opioids in women who took these medications in the month before or during the first trimester of pregnancy [34].

Use of heroin in pregnancy has been associated with an increased risk of fetal growth restriction, abruption placentae, fetal death, preterm labor and meconium in utero [35]. It is speculated that these issues arise from the repeated exposure of the fetus to opioid withdrawal and the effects of withdrawal on the placenta. Further, all the risk taking activities the patients engage in such as prostitution, theft, violence, and intimate partner violence accentuate the medical effects of addiction.

According to SAMHSA 2015 (using 2013 data as last completed year of analysis), over 6.9 million people age 12 years or older had illicit drug dependence or abuse [36]. Further, SAMHSA reports the dismal statistic that only 13.4 % (about some 917,000 treated/6.9 million people with a problem) received treatment. Most startling as well was that 8 out of 10 people with illicit drug dependence or abuse did not perceive a need for treatment for their illicit drug use. Considerable disconnect exists between people's perceptions of illicit drug use with addiction and the reality of addiction their lives. It is not clear from the SAMHSA data that treatment is not always available with a lack of services for addictions and mental health or that the individuals have never been questioned or confronted regarding their illicit substance abuse or addiction.

Treatment for alcohol dependence or abuse, according to the SAMHSA 2013 data, appears no better. SAMHSA reports some 17.3 million people greater than age 12 years have been found to have alcohol dependence or abuse [37]. Of that 17.3 million, only 1.1 million (6.3 %) received treatment. Nine out of ten individuals with alcohol dependence or abuse did not perceive a need for treatment for their alcohol use. There was no difference in treatment rates by health insurance status, socioeconomic status, or rural versus urban areas. Once again, perceptions by individuals is sorely lacking regarding the harmful effects of their alcohol dependence or abuse. Also, it is not possible from the SAMHSA data to determine if treatment is not available due to a lack of services for addictions and mental health, or, that the individuals have never been questioned or confronted regarding their illicit substance abuse or addiction.

Tobacco

Tobacco abuse continues to be a major problem among adolescents. SAMHSA 2015 (using 2013 data as last completed year of analysis), reported that 5.6 % of adolescents aged

12–17 (approximately 1.4 million adolescents) admitted to using cigarettes within a month of the 2013 survey [38]. Cigarette usage was also higher in metropolitan areas (8.4 %) compared to rural areas (5.1 %). SAMHSA further reported that the number of US adolescents using cigarettes had dropped from 9.0 to 5.6 % from 2009 to 2013. There were significant drops in usage reported in Whites, Blacks, and Hispanics.

West Virginia leads the nation in the percentage of women who smoke while pregnant (35.7 %) [39]. From 2000 to 2005, while most of the country experienced declines in smoking rates among pregnant women, West Virginia experienced an increase in smoking rates in all stages of reproduction. Smoking rates increased (36.2–45.8 %) prior to pregnancy, (29.4–35.7 %) during pregnancy and (1.6–39.3 %) postpartum [39]. Findings from the West Virginia Bureau for Public Health, Health Statistics Center indicated that during 2005, pregnant women in West Virginia who smoked were 63.2 % more likely than non smoking pregnant women to have their child die during his/her first year of life. In addition, they were 97.4 % more likely to give birth to a low birth weight baby and 282 % more likely to have a child die from Sudden Infant Death Syndrome within his/her first year when compared to those who did not smoke.

Research studies have well established that tobacco dependence during pregnancy increases the risk of poor fetal outcomes. Tobacco use during pregnancy is known to be related to small for gestational age infants (SGA) intrauterine growth retardation (IUGR), low birth weight [40–43], preterm birth [44, 45], and intrauterine death [46]. One study estimated that 5 % of infant deaths in the United States were attributable to maternal smoking while pregnant [47]. Smoking further affects the fetus and includes an increased risk for cryptorchism in males [48], orofacial clefts [49], decreased white cell precursors [50], and increased risk for asthma and bronchopulmonary hyperreactivity [51, 52]. Perinatal morbidities include an increased risk for placental abruption [53] and stillbirth [53–55]. Mental disorders are also increased

among women with nicotine dependence [56]. Recently findings about prenatal exposure to tobacco include an association of reduced brain growth in fetuses [57]; significant increase in attention-deficit/hyperactivity (ADHD), oppositional defiant disorder (ODD) and conduct disorder (CD); [58, 59] and risk of poor school performance during adolescence [60].

Multiple perinatal outcome variables have been examined and various conclusions have been drawn regarding the gestational age by which tobacco use should stop to ameliorate its deleterious effects [61]. Researchers examining the effects of smoking cessation during pregnancy concluded that pregnant women who quit during their first trimester had reductions in the proportion of preterm deliveries and low birth weight infants [62]. Another study concluded that maternal third-trimester cigarette use is a strong and independent predictor of birth weight percentile [63]. In examining growth retardation with tobacco exposure, Horta et al. noted that there is a direct dose-response association [64]. It was concluded in another study that if patients stop smoking before 20 weeks that the effects of tobacco may be ameliorated and the fetus will experience normal growth [61]. Further, patients with a previous history of tobacco use with a previous child with intrauterine growth restriction may have normal fetal growth and normal birth weight for their current tobacco free pregnancy [42]. These findings support continued attempts to influence patients to stop smoking even into the midtrimesters of gestation.

Alcohol

Staff of Charleston Area Medical Center (CAMC), West Virginia's only free-standing Women and Children's Hospital knew they were providing care to around 130 babies born annually with positive substance screens (4 % deliveries) based on risk factor screening at the time of presentation and delivery. However, the actual numbers were much more

alarming. We obtained new information for our hospital from Stitely et al. 2010 study of cord bloods that indicated a much higher abuse rate [9]. A cross-sectional hospital study was initiated in eight West Virginia hospitals in 2009 to examine the prevalence of substance use in pregnant patients at delivery and CAMC participated [9]. Segments of umbilical cords were collected anonymously from 759 deliveries (regardless of risk factors) at the eight regional hospitals during the month of August 2009. A reference laboratory screened all cord segments for the presence of substances using commercially available enzyme linked immunoabsorbent (ELISA) kits, with confirmatory testing by gas chromatography/mass spectrometry used for detection of 6 of the illicit drugs. Buprenorphine was tested using liquid chromatography/mass spectrometry (LCMSMS). Phosphatidylethanol (a metabolite of ethanol) testing was based on high pressure liquid chromatography/mass spectrometry (HPLCMS). CAMC's overall positive screening rate was 16 % for non-prescribed and illicit drugs and 8 % for alcohol out of the total of 133 patients screened. These findings were four times higher than our rate of 4 % positive tests when we screened patients based on risk factors alone. In addition, results from the study indicated that multiple drug use was common [9].

Recent screening for alcohol now includes the use of phosphatidylethanol (PEth). PEth is a group of glycerophospholipid homologs formed extrahepatically, in the red blood cell membranes, by the action of phospholipase in the presence of ethanol. PEth groups contain a common nonpolar phosphoethanol head group onto which tow saturated or unsaturated fatty acids, typically with a chain length of 16, 18, or 20 carbons are attached. Several different molecular types of PEth have been identified in blood collected from alcoholic subjects [65–67]. The most abundant subtypes are those containing a saturated fatty acid with a chain length of 16 carbons (PEth 16:0 species) and the 18 carbons and one double bound (PEth 18:1 species) [65, 66]. Kwak et al. 2012, previously reported in a small group of 13 pregnant patients with self-reported alcohol use, the usefulness of the PEth 16:0 and

PEth 18:1 as a reliable biomarker for alcohol ingestion [68]. The most recent study by Kwak et al. 2014 found in their study of 305 patients (117 self-reported users of alcohol/88 abstainers) that there is quantifiable PEth blood concentration after self-reported abstinence period of 3–4 weeks, and a dose-response increment of PEth blood concentrations in relation to alcohol consumption [69]. These findings are consistent with the findings of a half-life of total PEth blood concentration of approximately 4 days in chronic alcoholics while the half-life in healthy subjects varies from approximately 4.5–12 days. Therefore, PEth may be present up to 3–4 weeks after last alcohol ingestion and the correlation may be imprecise regarding last ingestion due to the varying half-life and kinetics in specific patients based on alcohol usage and clearance [70, 71]. Thus, PEth provides a means of screening for alcohol consumption in pregnant patients but should be used cautiously since it may be misleading if patients have only recently stopped using alcohol (within the last 3–4 weeks) upon ascertainment of pregnancy. Repeated samples during pregnancy may be necessary to validate abstinence from alcohol use. Optimal screening for alcohol with PEth in pregnancy and alcohol screening in general in pregnancy have not yet been established.

Amphetamines

Based on findings in humans and the confirmation of prenatal exposures in animals, amphetamines and methamphetamines increase the risk of an adverse outcome when abused during pregnancy. Clefting, cardiac anomalies, brain malformations, renal anomalies, gastroshisis, and fetal growth reduction deficits that have been seen in infants exposed to amphetamines during pregnancy [72–78]. These findings have all been reproduced in animal studies involving prenatal exposures to amphetamines [72]. The differential effects of amphetamines between different genetic strains of mice and between various species demonstrate that pharmacokinetics

and the genetic disposition of the mother and developing embryo can have an enormous influence on enhancing or reducing these potential risks [72]. The effects of prenatal exposure to amphetamines in producing altered behavior in humans appear less compelling when one considers other confounding variables of human environment, genetics, and polydrug abuse. In view of the animal data concerning altered behavior and learning tasks in comparison with learning deficits observed in humans, the influence of the confounding variables in humans may serve to increase the sensitivity of the developing embryo/fetus to prenatal exposure to amphetamines. These factors and others may predispose the developing fetus to the damaging effects of amphetamines by actually lowering the threshold of susceptibility at the sites where damage occurs. Knowledge of the effects of prenatal exposure of the fetus and the mother to designer amphetamines is lacking.

Treatment of amphetamine abuse with fluoxetine and imipramine may be useful but is not a panacea for treatment. A recent review by the *Cochrane Collaboration* in 2001 (reissued in 2009) noted that medications are of limited use in treatment of amphetamine abuse [79]. They note that there are very limited trials at this time to be able to suggest the best way to treat amphetamine abuse. Therefore, amphetamine use and abuse proves to be a difficult addiction to treat medically.

Benzodiazepines

Late third-trimester use and exposure during labor and delivery of benzodiazepines appears to be associated with greater risks to the fetus/neonate than earlier exposure in the first and second trimesters. Infants exposed in the third trimester, but by no means all infants, exhibit either the floppy infant syndrome, or marked neonatal withdrawal symptoms. Symptoms vary from mild sedation, hypotonia, and reluctance to suck, to apneic spells, cyanosis, and impaired metabolic responses to cold stress.

These symptoms have been reported to persist for periods from hours to months after birth. This correlates well with the pharmacokinetic and placental transfer of the benzodiazepines and their disposition in the neonate. However, there has been no significant increase in the incidence of neonatal jaundice and kernicterus in-term infants related to benzodiazepine use. The prolonged use of benzodiazepines throughout pregnancy has raised concerns that there may be altered transmitter synthesis and function, leading to neurobehavioral problems in the children. However, it is important to consider poor environmental and social factors when assessing the prenatal influence of the benzodiazepines on the postnatal health and development of the child. There is evidence that clonazepam, clorazepate, diazepam, lorazepam, midazolam, nitrazepam, and oxazepam are excreted into breast milk. The published data indicate that the levels detected in breast milk are low; therefore, the nursing infant is unlikely to ingest significant amounts of the drug in this way. However, problems may arise if the infant is premature or has been exposed to high concentrations of drug either during pregnancy or at delivery.

Benzodiazepine dependence and detoxification must be done gradually to reduce symptoms. Rapid detoxification has been linked to withdrawal seizures. Little has been written about benzodiazepine detoxification in pregnancy.

Marijuana

Animal research suggests that the brain's endocannabinoid system plays a significant role in the control of fetal brain maturation, particularly in the development of emotional responses. Therefore, THC exposure very early in life may negatively affect brain development. Research in rats suggests that exposure to even low concentrations of THC late in pregnancy may cause significant and long-lasting consequences for both the developing fetal brain and behavior of offspring [80]. Human studies have shown that babies