Introduction
Consumption of illicit substances and drug use during pregnancy in general represent a major concern in public health policies as pregnant drug using women and their children are at high risk of developing a variety of adverse outcomes potentially entailing expensive and intensive medical care. Children with intrauterine exposure to illicit drugs, like cocaine and opioids, as well as licit substances, like alcohol and nicotine, are at increased risk of developing adverse somatic outcomes, and neurocognitive and attentional deficits (1). Recent publications within this field of interest indicate that gestational exposure to these substances is the single largest, preventable cause of intrauterine (2). According to these findings, scientific research spotlighted drug abuse during pregnancy to a higher extent within the last years, but, still, a lot more research is necessary to establish evidence-based guidelines for treatment of substance dependent women.

Facts about Cocaine and Ampethamine Abuse during Pregnancy
During the early 1980’s, cocaine was an “upper class drug” due to the fact that it was much more expensive than today. As the price markedly decreased, cocaine has become widely available. Still, there remains a big difference between Europe and the United States of America: “crack”, the free base form of cocaine, is still rare in Europe and mainly abused within the USA. Based on numerous surveys, about 2% of the population worldwide abuse
consequences of cocaine and amphetamine abuse during pregnancy

The adverse outcomes for the children with intrauterine cocaine or amphetamine exposure range from spontaneous abortion, preterm deliveries, placental abruption with increased risk of extensive bleeding, congenital anomalies to possible neurocognitive deficits, lethargy and seizures (5). Especially during the early months of pregnancy, cocaine and amphetamine use increases the possibility of miscarriage and spontaneous abortion whereas consumption of these substances in late pregnancy implicates a high risk for premature labour (6). Moreover, some studies suggest that children of cocaine abusing mothers have a greater risk of dying of sudden infant death syndrome (SIDS), since cocaine consumption and cigarette smoking represent major risk factors for this lethal pregnancy complication (7). Furthermore, it is well known that newborns of cocaine abusing pregnant women are more likely to have low birthweight and smaller head circumferences. A number of publications point out that neonates exposed to cocaine before birth tend to score poorly on tests given after birth to assess motor ability and reflexes as well attention and mood control. In addition, neonates exposed to cocaine prenatally can develop symptoms which are similar to withdrawal signs including crying, shivering, and irritability. This condition, in combination with a continuing dependence on cocaine or amphetamines of the mother, affects to a great extent the bonding between mother and child – which may have detrimental effects on the emotional development of the child (8).

Not only the outcome of the children, but also the negative influences of cocaine on the mothers have to be pointed out since cocaine dependence can cause psychiatric syndromes like psychosis including hallucinations, depressive episodes, anxiety disorders as well as somatic damages like necrosis of nasal septum and infections of the respiratory tract (9). Moreover, cocaine abusing women tend to neglect themselves in regard to nutrition and health care in general including an increase of promiscuity with a higher incidence of...
infectious and sexually transmitted diseases due to increased libido. Cocaine and amphetamines can also cause cardiovascular disorders and trauma-related injuries which lead to health damages for the mother with serious consequences for the neonates.

In addition, literature indicates that cocaine use during pregnancy is associated with low socio-economic status and poor social conditions (10). Regarding the environmental surroundings of many women in this special population, it has to be pointed out that punitive measures have been shown to be ineffective in reducing illegal drug consumption (11). Pregnant women who abuse licit or illicit substances need easy access to low-threshold facilities where they can get treatment including psychiatric and somatic therapy as well as psycho-social support.

**Treatment of Cocaine/Amphetamine Dependence**

Despite the fact that a lot of treatment approaches have been developed/applied for the therapy of cocaine abuse targeting especially cocaine-induced euphoria and craving, currently, the only recommendable therapy option remains cognitive behavioral psychotherapy (12). For example topiramate, an antiepileptic medication broadly used within the therapy of alcohol dependence, dopamine-agonists like amantadine and selective adrenalin and noradrenalin reuptake inhibitors like bupropion, were investigated regarding this indication, but at this point, there is only limited scientific knowledge about pharmacological therapy options for cocaine dependence and current evidence does not support the clinical use of these substances in the treatment of cocaine dependence (13,14,15). As there are no approved medications, psychological interventions build the basis of treatment, and seem to be well tolerated as well as moderately effective in achieving drug abstinence. Therefore, cognitive behavioral psychotherapy presently constitutes the best treatment option for cocaine addicted pregnant women, especially when combined with contingency management.

**Treatment Goals**

The treatment goals regarding cocaine/amphetamine consuming mothers have to be cessation of substance use and consequently withdrawal symptoms, easy access to multidisciplinary, comprehensive care including psychiatric therapy with the possibility to participate in an opioid maintenance program as most women abuse more than one substance. Furthermore, psychological/psychotherapeutic care, psychosocial support and, if needed, legal advice as
well as somatic therapy, for example obstetric observation and neonatal treatment should be provided to cocaine abusing women and their children (see image 1).

Termination of intoxication circles and achievement of stable intrauterine conditions as well as term deliveries and healthy neonatal parameters are important treatment goals regarding the children. Furthermore, improvement of mother-child-bonding and encouragement and support of the women within their environment helps them to assume responsibility and provide good care to their children.

Image 1: Comprehensive Care Model

**Comprehensive Care Model**

**General Practitioners**

Clinical pharmacist

Outpatient Addiction Clinic visits: 1-7 times a week

psychiatrists

social workers

psychologists

nurses

Local pharmacy

**Implications for the Future**

More scientific data to quantify health effects of cocaine abuse during pregnancy as well as more information regarding long-term effects on children with intrauterine cocaine or amphetamine exposure are needed for the establishment of treatment standards for cocaine.
abusing pregnant mothers. Therefore, improvement of knowledge within this field of interest through further research seems to be the best way to gather more specific information for the development of efficient prevention strategies as well as evidence-based guidelines for the therapy of this patient population. The initiation of routine screening and education of women of child bearing age are also ways to reduce drug intake during pregnancy. Furthermore, implementation of low-threshold treatment centres for substance abusing pregnant women are needed to offer rapid and comprehensive care.

Literature:


