

Review Article

Health of Pregnant Women with Substance-related Disorder, A Neglected Global Health Issue Requiring Combined Maternity Care Units

Nooshin Nikoo, MD

School of Population and Public Health, University of British Columbia, Canada, E-mail: nooshin.nikoo@ubc.ca

Anastasia Frank, MPH

Department of Psychiatry, University of British Columbia, Canada, E-mail: afrank@cheos.ubc.ca

Mohammad Ali Nikoo, MD

Department of Psychiatry, Institute of Mental Health, University of British Columbia, Canada, E-mail: mohammadali.nikoo@alumni.ubc.ca

Kerry Jang, PhD

Department of Psychiatry, University of British Columbia, Canada, E-mail: kerry.jang@ubc.ca

Ron Abrahams, MD, CCFP, FCFP

Sheway Maternity Clinic, Sheway Community Program, Down Town Eastside (DTES), Vancouver, BC, Canada, E-mail: rabrahams@cw.bc.ca

Michael Krausz, MD, PhD, FRCPC

Department of Psychiatry, Institute of Mental Health, University of British Columbia, Canada, Email: michael.krausz@ubc.ca

ABSTRACT

Background: Pregnant women using substances (PWUS) are defined as women in the pregnancy and postpartum period (pregnancy to 8 weeks after the delivery) that use illicit drugs. Health of PWUS is a hidden global epidemic, becoming visible in part due to increasing numbers of street children. Lack of awareness and stigma contributes to the scarcity of research for PWUS. Combined maternity care units (CMCU) have been proposed as standard of care for PWUS and their newborns.

Objective: This review aims to evaluate global awareness of PWUS's health and proposes CMCU as an effective integrated part of the continuum of care through a health systems approach.

Methods: The authors completed a critical narrative review of the available evidence about the health of PWUS and based on that, provided recommendations for health care delivery using a systems thinking approach.

Findings: Determinants of health for PWUS's and their children include: economic disadvantage, poverty, homelessness, stigma, violence, sexual and emotional abuse, mental co-morbidities, history of childhood abuse and disrupted family structure, and trans-generational trauma. Although there is a scarcity of data on trends of substance use among PWUS in many regions of world, there is sufficient evidence to demonstrate the need for a standard of care.

Conclusions: Increasing awareness of and providing new care options for mothers suffering from substance-related disorder- including by opening more CMCU- can help families, lower maternal and child morbidities and mortalities, and achieve Millennium Development Goals.

MeSH Headings/Keywords: Pregnancy, substance-related disorders, rooming-in care, global policy

Introduction

The United Nations 2015 Millennium Development Goal 3 (to promote gender equality and empower women) and Goal 5 (to improve maternal health) are still largely unmet¹. The fact persists that, worldwide, many women are marginalized and vulnerable and due to lack of equity and equality remain underserved. Additionally, when the social determinants of health inclusive of housing status, employment/income, nutrition, and gender based violence adds to the global burden of maternal health through their use of substances², additional concerns related to health, treatment, and stigma arise for pregnant women who use substance (PWUS) during pregnancy and postpartum period^{3, 4}. Pregnant women using substances

(PWUS) are defined as women who use illicit drugs during pregnancy or postpartum period (pregnancy to 8 weeks after the delivery). These periods are considered as the critical interval of time that a concentrated care is required the use of alcohol and drugs due to their significant effects on maternal, fetal, and neonatal morbidity^{3,4,5}.

Separation of mother from newborn in the early postpartum period is reported to be a predictive factor for infant's abandonment, abuse and neglect⁶⁻¹⁰. Hence, rooming in has become a standard care in maternity setting which is not usually offered to PWUS and their newborns.

Combined Maternity Care Units (CMCU) has been demonstrated to facilitate the smooth transition to extra uterine

life for substance exposed newborns by decreasing Neonatal Intensive Care Unit (NICU) admissions and NICU length of stay, encouraging breastfeeding, and increasing maternal custody of infants at discharge^{4,11}.

The first part of this paper aims to raise awareness of the hidden population of PWUS in a global health context. The second part of this paper recommends CMCU, as the effective intervention to address this incremental global health issue through systems thinking approach.

Methodology

Critical Review: This paper begins with a critical review on pregnant women who use substances (PWUS), with a focus on major gaps in the literature.

Through a systematic literature search of Embase, and Medline, studies were included to demonstrate the current available evidence on the health of pregnant women who use illicit substance across the globe and the status of the care delivery to this population. Since alcohol and tobacco are legal, less stigmatized, and considered separate from illicit substances according to the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) criteria, they are not included in this review.

Systems Thinking Framework: The methodology used in the second part of this paper utilizes the systems thinking approach and provides recommendations for health service delivery to PWUS based on the most effective intervention model of care during perinatal and immediate postnatal period. A systems thinking framework with its 10 steps (Table 1) is a powerful tool to decode the complexity of a health system with six building blocks or subsystems (Figure 1.2), the interactions between these blocks and their effects on the behavior of the whole system. Then it applies the results of such analysis to design more effective interventions that not only strengthen the system, but also increase the care coverage and improve the health. Such designed intervention is connected more explicitly to its evaluation in the context of a more functional healthcare system¹². The World Health Organization's (WHO) framework for the health system describes the architecture, and its six building blocks, called subsystems. This framework explains the opportunity to apply systems thinking in a constructive way through the crucial step of anticipating an intervention's flow by assessing the reaction with, and impingement on these subsystems. (Figure 1.2)¹².

Literature Review

Global Substance Use

According to the United Nations Office on Drugs and Crime (UNODC) about 230 million people, or 5% of the global adult population, used an illicit drug at least once in 2010. The number of problem drug users worldwide is roughly 27 million, which is 0.6% of the worldwide adult population. Across the globe, illicit drug use appears to be generally stable, though it continues to rise in several developing countries. The use of heroin, cocaine and other illicit substances is responsible for the annual death of millions of people: around 0.2% of the global population. Illicit drugs undermine economic and social development and



32 ■ SYSTEMS THINKING FOR HEALTH SYSTEMS STRENGTHENING

Figure 1.2: The dynamic architecture and interconnectedness of the health system building blocks (subsystems) [12]: [Quoted from reference 12: De Savigny D, Adam T. Systems thinking for health systems strengthening: World Health Organization; 2009.]

contribute to crime, instability, insecurity and the spread of HIV¹³.

While cannabis is the most widely used illicit substance, opiates constitute the most serious problem substance worldwide and generate the most illicit drug treatment demand overall¹⁴. Opioids continue to be the dominant drug type accounting for treatment demand in Asia and Europe. Opioids also contribute considerably to treatment demand in Africa, North America and Oceania.

Around 10-13% of drug users worldwide are users with drug dependence and/or drug-use disorders. The prevalence of HIV (approximately 20%), Hepatitis C (46.7%) and Hepatitis B (14.6%) among injecting drug users continues to add to the global burden of disease, and roughly 1 in every 100 deaths among adults is attributed to illicit drug use¹³.

Women with Substance Use Disorder

The United Nations report on Global Illicit Drug Trends indicates that women represent an estimated 10% of substance users in some Asian societies, 20% in both the former Union of Soviet Socialist Republics (USSR) and Latin America, and about 40% in North America and some European countries^{13,14}. One publication, *Revisiting "The Hidden Epidemic": a Situation Assessment of Drug Use in Asia in the Context of HIV/AIDS*¹⁵, also reports an increase in substance use among Asian women¹⁶⁻¹⁹.

Outside high-income countries, data is scarce on women who use illicit drugs with many studies having so few women that analyses of the effects of gender are unreliable, while others do not mention gender at all. UNODC's 2006 World Drug Report¹⁶, which relies in large part on national self-reporting, makes more references to the "female cannabis plant" than to "female drug users." This is despite the assertion in its 2005 report that the number of women drug users was increasing and that women who injected drugs were at heightened risk of HIV²⁰ and higher mortality rates¹⁷.

Table 1: Ten Steps to Systems Thinking in Health Systems.***I-Intervention Design***

1. Convene stakeholders
2. Collectively brainstorm
3. Conceptualize effects
4. Adapt and redesign

II-Evaluation Design

5. Determine indicator
6. Choose methods
7. Select design
8. Develop plan
9. Set budget
10. Source funding

* Table quoted from Reference 12. De Savigny D, Adam T. Systems thinking for health systems strengthening: World Health Organization; 2009.

Epidemiological studies, program evaluation, and research on intervention models—as well as discussion at the UNODC meeting in Vienna in 2003—identified a paucity of information regarding women suffering from substance use disorders¹⁷. The need for more research is clear, and a call for rigorous collection methods of both qualitative and quantitative data has been made¹⁷.

More often than men, women can be introduced to substances by their spouses or partners and continue to use substances with them, and sometimes physically or sexually abused in this context. Women find it extremely difficult to enter and remain in treatment, given limited emotional support and financial resources to pay for treatment, childcare, or transportation. Women also have more severe problems at treatment entry than men¹⁷. Many have used substances to cope with traumatic experiences. They are more likely than men to have mental health problems such as anxiety, depression, or post-traumatic stress disorder. Women also have fewer resources in terms of education, employment, and finances. At the same time, because more men use illicit substances and other substances of abuse, most treatment has been designed around men and does not take gender differences into account¹⁷.

Women who use substance seem to be under-represented in treatment settings¹³. Their substance use disorder is often not acknowledged by themselves, their families, or the helping professionals who could support them in seeking treatment. Pregnant and parenting women using substances face particular societal condemnation, and pregnant women often delay seeking services which has serious implications for the mother and the fetus¹⁷. Global reported trends of substance use are compiled in (Table 2).

Pregnant Women with Substance Use Related Disorder

There is a scarcity of data on trends of substance use among the pregnant population in many regions of world¹⁷. However, one can assume that the trends are the same as trends for women before discovering their pregnancy.

PWUS are usually parents with primary responsibility for childcare and household responsibilities. However, few treatment services provide childcare, and in some cultures it is very difficult for women to leave their homes and familial responsibilities to seek treatment¹⁷.

Among the determinants of PWUS's health are economic recession, poverty, homelessness, societal stigma, violence, sexual and emotional abuse, mental co-morbidities, history of childhood abuse, and disrupted family structure in childhood, and trans-generation trauma^{2,17}. Furthermore, the concurrent state of homelessness, violence, and mental health diseases that some PWUS live in obscure the burden of PWUS in global health contexts where those issues are more visible². Inadequate housing is a major environmental determinant of health for this population, with the largest impact in terms of size and severity of impact compared to other environmental determinants of health²⁹. Mothers who use substance often live in the vicinity of a partner or spouse with substance use and live in inadequate housing, if not in hostels, temporary accommodation, or on the street.

Impacts on mother and child

It is difficult to get a complete picture of women's substance use, since international, national and local studies on the prevalence of substance use and associated problems do not often address gender issues¹⁸ (Table 3). Women with substance use disorder may not show up in official statistics in some countries, such as India, because of their comparatively small numbers and subordinate position in the drug culture, as compared to men with substance use disorders²¹. This is consistent with the historical focus on men in the arena of substance abuse³⁰. Furthermore, pregnant women who use substance (PWUS) has had less access to care due to societal and health care workers' stigma, as well as the mothers' fear of child apprehension. Hence, there is a paucity of available statistics on this vulnerable population. Cultural, societal and familial barriers have also led to avoidance of entry into treatment programs by PWUS despite their need and desire to be cured of their condition. However, there is evidence enough to indicate that this vulnerable population is in dire need of a continuum of care¹⁷.

A Systems Thinking Approach to Possible Options of Care

There are numerous personal barriers to seeking health care such as: shame, stigma, guilt, lack of family support, substance using (and sometimes abusive) partner, fear of losing children, and concomitant psychosocial issues (e.g., transportation, childcare)³¹⁻³⁷. Lack of self-esteem in Pregnant Women Who Use Substance (PWUS), augments their barriers to access and advocate for resources that could enhance their health, and contributes to their exposure to suboptimal perinatal health care³⁸. Furthermore, the potential size of PWUS's population and the current limited number of health care centers caring for PWUS, and the lack of resources make it difficult to receive care even for women prepared to seek it^{17,24}. Hence, systemic factors such as lack of appropriate treatment services for PWUS and

Table-2: International Trends of Substance Use in Women.***Afghanistan***

There has been a reported rise in substance use in Afghan women, particularly among refugees, many using a daily combination of different preparations of eaten, drunk or smoked opium. These substances are readily available in Afghanistan and in the Afghan refugee camps in Pakistan, and may also be used to self-medicate physical and mental health problems. More than 60% of Afghan female substance users are under the age of 50 [22].

China

The number of registered drug users in the overall population of China has risen rapidly since the 1990s [15], with the actual number of users believed to be much higher than those registered. Rates of injecting range from 50% to as high as 80-90% of registered drug users in some provinces. The number of women using substances is also increasing. The most frequently used illicit substances overall are opiates: primarily heroin, followed by opium. No gender breakdown has been reported by type of drug [23]. In some provinces (Yunnan and Guangxi), women make up to 16-25% of those in treatment. The age of women in treatment has become consistently younger in some provinces. In Guangxi, for example, many of these women are as young as 17-18 years of age.

India

Substantiated use of heroin has increased among women in different cities in India since 1990s. According to regional and national surveys reflected in UNODC reports, women substance users represent a mean 7.9% of a sample of 14 cities in India; with heroin being among the dominant substances of abuse [24]. The primary reasons for initiating substance use reported by participating women were: influence of friends, stress and tension, and influence of spouse or partner. In substance treatment centers, the proportion of women ranged from 1 to 10%. This may be an underrepresentation, because greater stigma on women compared to men, as well as childcare responsibilities, may result in fewer women seeking treatment .

Iran

A rapid situational assessment of drug use in Iran , carried out by the United Nations Office on Drugs and Crime and the Islamic Republic of Iran in year 1999, estimated that 6% of the 800,000-1,200,000 substance users were women [25]. It is also believed that substance use among women is increasing rapidly in Iran [15]. Common substances of abuse are opium, opium residue, heroin, and cannabis.

Kenya

A study of heroin users in one Kenyan coastal town [26, 27] estimated the ratio of women to men heroin users to be 1:20. Many of the women heroin users worked in the sex trade industry. The same study estimated that, overall, 50% of heroin users injected heroin.

Russian Federation

Official statistics indicate that the annual number of women first registered with a diagnosis of drug addiction increased 10 times in the Russian Federation and 16 times in Moscow during the 1990s. Women were four times more likely than men to have used heroin as their initial substance of abuse and often proceeded to injecting without prior intranasal use [28].

stigmatizing attitudes of health care providers also play roles as determinants of these health conditions. Low income and lack of access to vocational training and employment further contribute to suboptimal care during the prenatal period³⁸.

Cultural taboos and societal standards further block PWUS access to care, due to women's desire to maintain custody of their child/children^{17,24}. Child safety laws and criminalization of drugs in many countries is a strong barrier against PWUS seeking health care. PWUS who overcome these barriers are admitted into hospitals and yet restricted from rooming-in with their infant, hence deprived from a normally standard postnatal care of the mother-child unit. This makes the management of the withdrawal symptoms of the neonate and treatment of the mother more painful and less successful⁴. Systems that lack postnatal care and support for the family of mother, child, and the father put family in more jeopardy. This renews a vicious cycle, with the child potentially experiencing trans-generational trauma in the custody of the mother or being apprehended. Child apprehension and lack of support to family as a unit, contribute to the propagation of substance use and related catastrophes through generations to come. The cycle of substance use damages the structure of the nuclear family units on a local and global scale.

Scarcity of data and lack of needs assessment for treatment of substance use in high, (low and middle income countries) has

led to suboptimal health care. This is both in terms of service provision and budgeting for infrastructure of hospital units or out-patient clinics, which should be equipped to provide equal health care to all pregnant women through the perinatal period. PWUS and their families worldwide, experience deteriorating health possibly of being overlooked, if not stigmatized, by their local health-care system. Hence, it is apparent that health care systems have been presented with an opportunity to provide comprehensive care and support to highly motivated PWUS and their families. There is an obvious need for a call to action regarding perinatal care for PWUS on both a local and global scale. Local interventions can serve as models for innovation, building a global knowledge base. However, each locality manifests its own unique demands, so vigorous needs assessments must be incorporated into implementation.

Many of the health conditions attributed to antenatal exposure to maternal substance use stems from suboptimal perinatal medical care, and lack of early mother-child bonding due to isolation of babies in specialized units¹⁷. Good antenatal care, a healthy diet, drug treatment and other forms of support allow PWUS to give birth to healthy babies, which is a first step on the way of recovery from the complexity of their life status. Medication assisted treatment with methadone, which is safe for use during pregnancy, is essential in helping opiate users

Table 3: Impacts of illicit drug use on mother and child.***Fertility/Reproduction***

Heroin interferes with women's menstrual cycle. Women using opioid drugs may experience secondary amenorrhea and be at risk for unplanned pregnancies [17]. Because these women may be unaware that they are pregnant, they may not know to seek prenatal care (31)

Fetal Development

Substance use during pregnancy can result in low birth weight, early delivery, and poor nutritional status [17, 32]. For women who use heroin or other opioids during pregnancy, changes in the level of opioids in the blood can result in the experience of withdrawal, the risk of miscarriage, preterm delivery or a small for gestational age baby, and neonatal abstinence syndrome [17, 32]. Suboptimal or complete lack of prenatal care can lead to health conditions such as spontaneous loss, premature labor/premature rupture of membrane (PROM), abruption, precipitous delivery, and infections [2]. It must also be remembered that some of these same effects on the mother and the fetus may also be attributed to the lifestyle associated with illicit substance use [17].

Media rhetoric, popular belief and some health care providers promote the idea that any drug use precludes the possibility of a healthy pregnancy, despite available evidence that secondary factors often have a more profound effect than drug use [17]. Many of the health problems and behaviors once attributed to antenatal exposure are, in fact, are the result of malnutrition, lack of sleep, lack of medical care, tobacco and alcohol use, and lack of early mother-child bonding due to isolation of babies in specialized units [17, 23]. The stigma of drug use during pregnancy also encourages women to conceal their drug use from providers, limiting the options for mitigating harm.

Mortality and Morbidity

The state of pregnant women who use substance (PWUS) is a hidden global epidemic. Maternal and child morbidity rates are health metrics affected by PWUS's state of health, which in turn affects Millennium Development Goals (MDG) for maternal health and reduction of child mortality worldwide [13].

Epigenetics

As Physicians, we need to recognize PWUS and their children as a comprehensive environmental unit. The epigenetic factors are defined as the factors that indirectly influence the expression of key genes in a living organism altering its homeostasis so profoundly that they contribute to pathophysiologic processes without actually changing the sequence of the gene itself. [33-36] Different parenting style in rats, on the other hand has been demonstrated to alter the non-coding chemistry of the DNA of the genes involved in various stress responses. As a result, a nurturing bonding of mother and newborn rats resulted in a decrease in stress hormone production through effects on gene expression [37]. Additionally, newborns exposed in utero to opiates, had fewer withdrawal symptoms when they were roomed in with their mothers. This can be an equivalent of the epigenetic process seen in rat models [4,5] While, Further research is required to link the environment to gene expression and guide modulation of these key biologic processes, we must take into account and advocate for improving the overall "fitness" of environment for PWUS inclusive of the rooming in for maternal infant bonding, safe adequate housing, improved nutrition, sanitation, community support/feeling of being safe, sense of well-being, self-esteem, treatment of their experienced trauma and childhood abuse. This can improve PWUS's and their children's health status through epigenetics. CMCU, in this regard, can play an important intervention, with positive impact reversing the possible epigenetics effects of substance use in this environmental unit.

to avoid withdrawal, overdose, HIV transmitted through unsafe injection and other drug-related risks that endanger the health of a woman and her fetus.

Late detection of pregnancy, stemming from a mixture of opioid use and complex concurrent situation of PWUS, delays access to perinatal health care sometimes till third trimester. By then, perinatal health care would improve mother's health and fetus through stabilization medication assisted treatment and standard rooming in for withdrawal symptoms in newborn⁴. In many countries, cultural, religious and legal policies of health care system prevents an abortion in the third trimester, should they wish to do so¹⁷. Furthermore, the societal stigma of drug use during pregnancy encourages women to conceal their drug use from providers while receiving outpatient perinatal health care. In developing and transitional countries, PWUS male counterparts influence the access to an informed perinatal health care, often in a negative way if not neutral and non-supportive¹⁷.

Opioid substitution treatment is defined as replacing the used drug, under medical supervision, with or without psychosocial

support, with a similar substance with or without a different intake method such as sublingual instead of injection method³⁹. Opioid substitution treatment is the treatment of choice for opioid-dependent pregnant women. However, opioid substitution treatment should not stand alone, but rather be complemented by other services that address women's needs⁴⁰. Engaging and retaining pregnant and parenting women in treatment requires collaboration between the substance abuse treatment sectors of prenatal care and child welfare. Appropriate interventions for pregnant and parenting women can reduce substance use and improve outcomes for pregnant women and increase treatment retention for women who retain custody of their children and/or have their children with them in treatment. Ideally, services should be accessed through a single site⁴¹.

Combined Maternity Care Units (CMCU)

Rooming-in, the practice of caring for mother and newborn together in the same room immediately from birth, is the standard of care for mothers and their infants. However, unfortunately it is not the standard practice of care for newborns of women

Table 4: Combined Maternity Care Unit (CMCU) Characteristics.

<i>Input</i>
A CMCU intervention would require budgeting and assignment of special wards in hospitals as well as trained human resource of health workers to provide the continuum of care to this unit.
<i>Output</i>
CMCU can upgrade the quality of the perinatal service delivery to this marginalized and stigmatized subpopulation to the standard level of achieving the beneficence pillar of medial ethics.
<i>Outcomes</i>
Initial outcomes include basic medical care and referral services for PWUS and their children, quality service delivery and coverage of substance use treatment in mothers and exposed fetus and newborns, and provision of an empowering environment to chemical-dependent women and their children. The immediate outcome would be valuable data on CMCU practices that could be applied to increase effectiveness of policies and services. Eventual outcomes include strengthened family structure in the PWUS population, empowered women being aware of their rights and encouraged to make independent decisions, reduction of societal stigma towards women who use substance and their families, equity of health care, reduced maternal and child mortality and morbidity in PWUS and their families.
<i>Evaluation</i>
The intervention could be evaluated through indicators such as reported medical expenditures for PWUS and their children, postpartum outcomes such as treatment retention rate for mothers, rate of children in maternal custody, annual shift of budgets towards CMCU and cost effectiveness analysis compared to perinatal emergency and NICU admission of substance exposed mothers and their children.
<i>Conceptualized Effects</i>
A functioning CMCU has the potential to strengthen the commitment of healthcare staff contributing to a more efficient system in perinatal healthcare service delivery to PWUS and their families. Moreover it would contribute towards control of infectious disease especially HIV infection as a large subpopulation of the urban PWUS are involved in sex market. The healthcare system can benefit from a reduction in burden of infectious disease control and prevention, emergency and NICU unwanted admissions, unequal healthcare delivery, protection of unwanted exposure of healthcare workers to undisclosed substance use in PWUS with concurrent infections such as HIV, Hepatitis B, Hepatitis C.
<i>Health System Dynamics</i>
Principal potential effects of a combined maternity care unit (CMCU) intervention on service delivery may include the improved accessibility of perinatal health care services due to a higher standard of care and a less judgmental and stigmatizing attitude from health workers. These positive effects should result in increased utilization and coverage. However, potentially negative effects may arise if lack of adequate CMCU in the assigned hospitals will translate into a negative feedback for those consumers (PWUS) who will be turned away from admission to that healthcare facility. High-performing health workers may already be assigned to other units of the hospital and also maternity units and beds may be lent more to non-substance using mothers in need of obstetrics' care, further increasing the inequities among the served populations. On the other hand, equity might be improved if dedicated trained healthcare workers are assigned to maternity care units where starting a stabilization phase of treatment for PWUS yields a higher rate for complete abstinence, more bonding of mother and child and thus higher long term success rate. The intervention may improve the information sub-system to monitor admission as a key means of assessing capacity of the maternity units for PWUS in hospitals. However, given existing gaps in the health information system, improvements may be biased and over reported by compassionate caregivers due to their commitments and anti-stigmatizing intentions before actual data is gathered. The current information system may not be capable of providing sufficiently sensitive estimates of the conditional indicator (effective coverage of PWUS for admission, perinatal healthcare and stabilization phase), and may need direct improvements to support the CMCU use and expansion. Potential positive effects on the human resources sub-system might be improved by providing education, training, motivation, including an increased professional ethics in service delivery and willingness to work in maternity care units. Conversely, intrinsic motivation might be eroded to the point where healthcare workers are burnt out due to difficulty in handling PWUS situational and infectious risk factors. Staff conflicts may arise among the team if only some members qualify for receiving financial or nonfinancial compensation for their high-risk position and if it is unclear how annual leaves, working shifts are set and monitored. Additionally, there may be hospital healthcare workers' union impediments to this sort of employee compensation. Governance factors that may change over time, including decreased stigmatizing behavior and a less judgmental punitive attitude, will change the pattern of policy making on supply and subsequently on demand. Challenges in meeting public accountability and transparency for providing healthcare from a resource constraint hospital beds to a societal stigmatized population may arise. New modalities for compensations for staff serving in CMCU in health facilities may be needed.

Finally, for the financing sub-system, there might be shift of funding, incrementally more funding, but also an increased fragmentation of funding modalities – potentially running counter to sector-wide (whole health care facility, obstetrics' wards) and budget support principles. Assigning separate care units for SUPW in healthcare facilities has both financing and governance implications. On the other hand, potential decrease in emergency admission of exposed neonates to NICU can contribute positively to the budget of the whole system.

Stakeholders can prioritize potential effects of maternity care unit according to the importance of these effects and likelihood of success as a basis for a conceptual framework.

Table 5: Barriers for CMCU implementation and access.

Systemic Barriers to Access CMCU

As previously established, women are often underrepresented in positions of power especially in developing countries which leads to less advocacy for gender sensitive health-care issues. Such deficiency at level of policy making and resource allocation for CMCU, affects implementation and sustainability of this intervention (41). Related to these power structures, women generally have lower incomes than men which can affect their ability to pay for their health care, contraception and protection during their high risk behaviors such a exposure to partner with substance use or sex market employment . Lack of awareness of these gender related limitations leads to unrecognized need for CMCU for PWUS living in urban areas by policy makers. It leads to scarcity of data collection, and of planning for implementation of CMCU in the health care facilities.

There is a lack of systemic research on PWUS and their needs. Paucity of research on need of PWUS and their children makes it difficult for health care system to defragment or shift part of their budget towards assigning specialized CMCU in hospitals. In addition, lack of coordination among different stakeholders, amidst different mandates, can reduce acceptability of implementing CMCU intervention.

Structural Barriers to Access CMCU

Access to childcare is a major barrier to seek treatment by many PWUS. PWUS are likely living with their dependent children and they are more likely to live with a substance-using partner. Also, many cultures do not condone PWUS leaving their community to be hospitalized. Transportation and health care cost can be an extra barrier to access CMCU. In the context of the poverty, which has led urban women who use substance to sex market and substance trading, the same lack of financial support prevents them to receive the care in CMCU.

Punitive approaches from the legal system and health care providers are a major concern, too. Treatment-seeking PWUS their risk child's custody by disclosing their substance use. In addition, urban PWUS may work in the sex trade or engage in other illegal activities and face imprisonment for substance use and these tertiary behaviors.

Within the health system, long waiting time in emergency rooms, lack of critical and unbiased consciousness in health care workers regarding the issue of substance use combined with fear of disclosure of substance use by PWUS makes strong barrier to access to perinatal care preventing the required referral to health care facilities with CMCU. Additionally, possible disconnect between the front desk of health care facility and the CMCU ward can result in lost opportunities in service delivery to the PWUS who sought help. Poor linkage and coordination between key subsystems in the health care facilities with CMCU can arise from different understanding of substance use, stigmatizing health care providers' attitude, territoriality (who owns the client), and different non-harmonized policies and procedures. Lack of identification, referral from primary care and other sectors, either through suboptimal knowledge and training on situational risk factors for PWUS, unprofessional service delivery is a substantial barrier to access CMCU. Given the unawareness of PWUS of their concurrent illnesses, a considerable portion of the clients will be missed by this suboptimal service delivery.

Barriers to Implementation of CMCU

Lack of available data and vigorous studies makes it difficult to establish the need for funding, as well as the proper structure for governance. Financing the CMCU will be complex, and would require health-care worker training sessions, compensations for a high risk work environment of CMCU for HIV and Hepatitis transmission, allocation of bed and separate specialized ward for CMCU, and budgets for a continuum of care including parenting and nutritional training for PWUS.

Lack of understanding of substance use being a symptom rather a disease that should be cured with a holistic approach leads to a stigmatizing punitive attitude in the governance level. It can play as a major barrier at all levels of planning, implementation, evaluation and redesign of interventions. Governance subsystems often would encounter resistance from other blocks in system or the external stakeholders. This can be due to the same misperception about addiction and considering PWUS as criminals who are jeopardizing their children. This in return, can affect CMCU at all levels of service delivery, i.e., efficiency of service, effectiveness and impact.

Proper staffing and training of personnel is a significant challenge. In order to provide a continuum of care to PWUS and their families through CMCU, health care workers should be trained in professional and ethical conduct principles in caring for PWUS. Furthermore, they are required to deliver a culturally safe and critically conscious perinatal health care to this marginalized and stigmatized population. These trainings require the healthcare system to finance, and monitor quality of the service delivery in CMCU by a coordinated information and governance subsystem performance. Lack of above mentioned skills and competencies might lead to low effectiveness and impact on PWUS health care outcomes despite investing in CMCU.

Health care facilities also have the constraints of a limited number of beds assigned to obstetrician and neonatal wards. This can affect resource allocation and implementation of having a CMCU for PWUS in each hospital or even one hospital in the whole city.

who use substance⁵. Such newborns are usually separated from their mothers and admitted to a neonatal intensive care unit and treated for substance withdrawal if necessary.

Evidence shows that an interdisciplinary rooming-in model of care for substance-exposed newborns decreases neonatal admission to NICU, length of hospital stay, and increased odds of the baby being discharged home with the mother. Combined maternity care unit (CMCU) are hospital units that such type of rooming-in can be provided to PWUS and their children. CMCU may facilitate a smooth transition to extra uterine life for substance-exposed newborns by decreasing NICU admissions and NICU length of stay for term infants, encouraging breastfeeding. CMCU is both safe and beneficial for substance-exposed babies^{4,5}.

CMCU can promote early bonding by providing pregnant women with opportunities to see the developing fetus through use of ultrasound. Women who are mothers and retain custody of their children and/or have their children with them in treatment remain in treatment longer than those who do not, and evidence shows a significant relationship between treatment retention and positive outcomes^{4,5}. Details of CMCU are provided in table 4. Barriers to implement and to access to CMCU are demonstrated in table 5.

Discussion

Because women are responsible for bearing children, reaching women and offering harm reduction and/or treatment will not only help them as individuals but also help families and future generations⁴². Many countries do not have treatment that is designated for women who use substance. If they do, this treatment is not typically sensitive to the contextual factors that reinforce women's vulnerability⁴³⁻⁴⁵.

Lack of resources, lack of awareness, and negative attitudes particularly towards women's substance use may contribute to the scarcity of gender-related epidemiological data and other research on women's substance use health issues. In most countries of the world, women are underrepresented in positions of power required to influence awareness of gender differences, policy development and resource allocation¹³. There is also a lack of accurate epidemiological data on the prevalence of substance use among women, which makes it difficult for stakeholders to become convinced of the need to address this problem¹⁷.

CMCUs are required to be an integrated unit of the ante natal and post- natal care provided to PWUS and their families. CMCU with its holistic approach will be focused on and inclusive of addressing the "social determinants of health" as the main cause of substance use. Hence CMCU combines the essentials of a standard treatment for substance use disorder, with the required services of perinatal care, medical care, parenting education, family planning, and attention to nutrition and housing needs and counseling on violence, HIV prevention, contraception methods, and relationship issues⁴⁶ in the setting of the continuum (COC) for PWUS. CMCU can function best as a unit of "one-stop

shopping" inside a well-integrated core community program for Mothers and children affected by substance use disorder, a setting of a comprehensive care.

Literature limitations: The major limitation of this assessment is the significant gap in medical and epidemiological research data related to PWUS. While we completed a near exhaustive review of literature and used a systems thinking approach to discuss CMCU as a standard of care, lack of sufficient original research on this subject, limits our ability to advocate as strongly as it is required for CMCU for PWUS. While we included available evidence on the efficacy of CMCU for PWUS and their newborns, this review is only an initial attempt to introduce the necessity of incorporating CMCU in the continuum of care for this vulnerable population. This review aims to raise awareness of the global health issue surrounding PWUS and their families and the efficacy of CMCU to address this state. Much is required, however from the future research to assess CMCU's efficacy and its effect on the trend of health of such vulnerable families worldwide.

Conclusion

CMCU brings a standard to the perinatal care of PWUS and their families. We can no longer approach PWUS, as a "drug" issue since substance use is a symptom of a broader condition of this population and not the cause. The emerging field of epigenetics requires us to look at drug use in the environmental context and its social determinants of health. The behavior (s) that PWUS are forced into is a result of being criminalized, a cause for negative outcomes.

CMCU is a model of care based on trauma informed harm reduction and results in improved outcomes compared to the outcomes of the current perceived solutions such as practice of prejudice, judgment, and criminalizing.

The emerging well-controlled evidence demonstrates that the harm associated with drug use is not specific to the drug but to "epigenetic" pressure exerted by a criminalizing society. Hence, the current use of substitution treatments such as heroin-assisted treatment inclusive of the "prescription" of heroin should be considered as one of the recommended alternatives to criminalizing. There is obvious need of further research on the efficacy of CMCU as one of the effective interventions to bring standard of care to PWUS and their families.

REFERENCES

1. Economic UNDo. The Millennium Development Goals Report 2015: United Nations Publications, 2010.
2. Greaves L, Poole N. Highs & lows: Canadian perspectives on women and substance use. *Centre for Addiction and Mental Health/Centre de toxicomanie et de santé mentale*; 2007.
3. Wong S, Ordean A, Kahan M. Substance use in pregnancy. *Journal of Obstetrics and Gynaecology Canada* 2011; 33.
4. Abrahams RR, MacKay-Dunn MH, Nevmerjitskaia V, MacRae G, Payne S, et al. An evaluation of rooming-in among substance-exposed newborns in British Columbia. *J Obstet Gynaecol Can* 2010; 32: 866-71.

5. Abrahams RR, Kelly SA, Payne S, Thiessen PN, Mackintosh J, et al. Rooming-in compared with standard care for newborns of mothers using methadone or heroin. *Canadian Family Physician* 2007; 53: 1722-30.
6. Vandad Sharifi M, Hajebi A, Radgoodarzi R. Twelve-month prevalence and correlates of psychiatric disorders in Iran: The Iranian Mental Health Survey, 2011. *Archives of Iranian medicine* 2015; 18: 76.
7. Council LIE, Jeannette C, Klaus PH, Klaus MH. # 6: No Separation of Mother and Baby with Unlimited Opportunity for Breastfeeding. *The Journal of Perinatal Education* 2004; 13: 35.
8. Kennell JH, Klaus MH. Bonding: recent observations that alter perinatal care. *Pediatrics in review/American Academy of Pediatrics* 1998; 19: 4-12.
9. O'Connor S, Vietze PM, Sherrod KB, Sandler HM, Altemeier WA. *Reduced incidence of parenting inadequacy following rooming-in. Pediatrics* 1980; 66: 176-82.
10. Maza PL. Boarder babies and placement in foster care. *Clinics in Perinatology* 1999; 26: 201-11ix.
11. Emily Carson J, Dean Jarvis, Bridget Mudge, Buffy Meliment, John Matulis, et al. Neonatal Abstinence Syndrome: A Quality Improvement Initiative across Three Hospital Units - 2015.
12. De Savigny D, Adam T. Systems thinking for health systems strengthening: World Health Organization 2009.
13. Ctr UNOoDCVI. World Drug Report 2011.
14. Crime UNOoD. Global Illicit Drug Trends 2003: United Nations Publications; 2003.
15. Reid G, Costigan G. Revisiting" The Hidden Epidemic": A situation assessment of drug use in Asia in the context of HIV/AIDS: Centre for Harm Reduction, Macfarlane Burnet Institute for Medical Research & Public Health; 2002.
16. Crime UNOoD. World Drug Report 2006.
17. Crime UNOoD. Substance abuse treatment and care for woman: case studies and lessons learned. 2004.
18. United Nations Office on Drugs & Crimes VWdr. Substance abuse treatment and care for women. Xinhua News Agency. Female IDUs, key population for fighting AIDS in China: experts. 2005.
19. (WHO) WHO. Where sex work, drug injecting and HIV overlap, Practical issues for reducing vulnerability, risk and harm. 2005.
20. Choi SY, Cheung YW, Chen K. Gender and HIV risk behavior among intravenous drug users in Sichuan Province, China. *Social science & medicine*. 2006; 62: 1672-84.
21. Murthy P. Women and drug use in India, Substance, Women and high Risk Assessment Study. 2008.
22. AFGH/C29 UDDRSP. AFGHANISTAN, COMMUNITY DRUG PROFILE #2, Opium and Other Problem Drug Use in a Group of Afghan Refugee Women. 1999.
23. Hao W, Xiao S, Liu T, Young D, Chen S, et al. The second National Epidemiological Survey on illicit drug use at six high prevalence areas in China: prevalence rates and use patterns. *Addiction* 2002; 97: 1305-15.
24. Murthy P. Women and Drug Abuse: The Problem in India. Ministry of Social Justice and Empowerment, Government of India and United Nations Office on Drugs and Crime, Regional Office for South Asia. 2002.
25. Razzaghi E, Rahimi A, Hosseini M, Chatterjee A. Rapid Situation Assessment (RSA) of drug abuse in Iran. Prevention Department, State Welfare Organization, Ministry of Health, IR of Iran and United Nations International Drug Control Program. 1999.
26. Beckerleg S, Hundt GL. The characteristics and recent growth of heroin injecting in a Kenyan coastal town. *Addiction Research & Theory* 2004;12: 41-53.
27. Beckerleg S. How'cool'is heroin injection at the Kenya coast. *Drugs: Education, Prevention, and Policy*. 2004; 11: 67-77.
28. Finkelstein NB. Substance Abuse Treatment: Addressing the Specific Needs of Women: DIANE Publishing.
29. Patterson M, Somers J, McIntosh K, Shiell A, Frankish CJ. Housing and support for adults with severe addictions and/or mental illness in British Columbia. 2008.
30. Lynch WJ, Roth ME, Carroll ME. Biological basis of sex differences in drug abuse: preclinical and clinical studies. *Psychopharmacology* 2002;164: 121-37.
31. Models of Care for Treatment of Adult Drug Misusers: Update 2006.
32. Fischer G, Bitschnau M, Peterzell A, Eder H, Topitz A. Pregnancy and substance abuse. *Arch Womens Ment Health* 1999; 2: 57-65.
33. Weaver IC, Cervoni N, Champagne FA, D'Alessio AC, Sharma S, et al. Epigenetic programming by maternal behavior. *Nature neuroscience* 2004; 7: 847-54.
34. Harper L. Epigenetic inheritance and the intergenerational transfer of experience. *Psychological bulletin*. 2005; 131: 340.
35. Reik W, Dean W, Walter J. Epigenetic reprogramming in mammalian development. *Science* 2001; 293: 1089-93.
36. Archer TK, Wade PA. Perspectives Editorial. 2006.
37. Meaney MJ, Szyf M, Seckl JR. Epigenetic mechanisms of perinatal programming of hypothalamic-pituitary-adrenal function and health. *Trends in molecular medicine* 2007; 13: 269-77.
38. Hagan TA, Finnegan LP, Nelson-Zlupko L. Impediments to comprehensive treatment models for substance-dependent women: Treatment and research questions. *Journal of Psychoactive Drugs* 1994; 26: 163-71.
39. Kumar MS. Opioid Substitution Treatment (Buprenorphine). In: United Nations Office on Drugs and Crime RO/SA, editor.: United Nations Office on Drugs and Crime, Regional Office for South Asia; 2012.

40. Health WHODoM, Abuse S, Organization WH, Board INC, Drugs UNOo, Crime. Guidelines for the psychosocially assisted pharmacological treatment of opioid dependence: World Health Organization; 2009.
41. Bank UW. Gender Equality and the Millennium Development Goals. 2005.
42. Wechsberg WM, Luseno W, Ellerson RM. Reaching women substance abusers in diverse settings: Stigma and access to treatment 30 years later. *Substance use & misuse* 2008; 43: 1277-9.
43. Wechsberg WM, Luseno W, Riehman K, Karg R, Browne F, Parry C. Substance use and sexual risk within the context of gender inequality in South Africa. *Substance use & misuse* 2008; 43: 1186-201.
44. Riehman KS, Wechsberg WM, Zule W, Lam WK, Levine B. Gender differences in the impact of social support on crack use among African Americans. *Substance use & misuse* 2008; 43: 85-104.
45. Wechsberg WM, Lam WK, Zule W, Hall G, Middlesteadt R, Edwards J. Violence, homelessness, and HIV risk among crack-using African-American women. *Substance use & misuse* 2003; 38: 669-700.
46. Poole N. Evaluation report of the Sheway Project for high-risk pregnant and parenting women: British Columbia Centre of Excellence for Women's Health Vancouver, British Columbia; 2000.

ADDRESS FOR CORRESPONDENCE

Nooshin Nikoo, MD, Department of Psychiatry, University of British Columbia, 430- 5950 University Blvd David Strangway Building Vancouver, BC, Canada, V6T 1Z3, Tel: 778-919-2575; Fax: 604-827-3373; E-mail: nooshin.nikoo@ubc.ca

Submitted June 01 2015

Accepted september 01 2015