



Maternal and Neonatal Outcomes in Mothers Using Opioids

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Abstract

Background: Pregnancy may be the only time that a woman presents for medical care and when an opioid use disorder can be identified and treated.

Objectives: The aim of this study, determination of maternal and neonatal outcomes in mothers using opioids.

Methods: This prospective cohort study was carried out on 159 pregnant women who used opioids and 474 healthy subjects in Kamali Hospital in Karaj from 2014 to 2017. The data were collected using a checklist, containing social, midwifery, obstetric, and neonatal data. Data were analyzed by SPSS 19.

Results: In the present study, there were no significant differences between the two exposed and non-exposed groups in terms of mean age, pregnancy/maternal characteristics; however, there were significant differences in terms of weight gain and care services ($P < 0.001$). The frequency of all kinds of drugs; Methamphetamine with 27.7%; heroin with 25.8%; and opium with 24.5% were the most consumed drugs. Among the newborns in the two groups, the first and fifth minutes of Apgar score, weight, and admission were significant ($P < 0.001$). The prevalence of infants less than 2500 in the group faces 21.4% in contrast to 3.4% in the non-exposed group.

Conclusions: Given the increasing number of mothers consuming Opioids within pregnancy and the irreparable side effects of these drugs, it is important to pay attention to this and to provide coping strategies.

Keywords: Maternal, Neonatal, Outcomes, Opioids

1. Background

Nowadays, one of the most significant health problems in the world is addiction. The increasing use of opioids and psychedelic drugs among different classes, especially women, has led to undesirable outcomes in this particular group (1). On the other hand, substance abuse in pregnant women affects maternal and neonatal health (2, 3). The Australian Drug Study Center has estimated that the use of unauthorized drugs (opioids) in pregnancy and lactation was 6 percent in 2004 (4). In the United States, more than 4.4% of women have used drugs once or more during pregnancy (5). In Iran, in a study conducted at the Center for Research on Fertility and Infertility at Shahid Beheshti University between 2004 and 2009 among 100,620 cases of childbirth, 519 women (about 5%) were psychedelic drug users (6). According to the statistics provided, in some studies, women account for 9.6% of addicts (7). The use of various psychedelic drugs during pregnancy is accom-

panied with complications such as early childbirth; abortion; various types of bleeding and pairing (8); low birth weight; small for the gestational age; reduction of head circumference; short height; need for neonate intensive care, longer hospitalization of the neonate, and the increased incidence of complications due to the discontinuation of methadone treatment (NSA) (1, 8, 9). Therefore, it brings about screening, more special care and patient care costs, health organizations, therapists and insurers. However, the same group of pregnant women does not go for prenatal care for several reasons, such as lack of financing; lack of access to care centers; homelessness; lack of insurance services; and a lack of care for pregnancy (10). Due to the same problems and the resultant social stigma, they try to conceal it (6, 7), and this causes or exacerbates the complications for the mother and the neonate as well (10).

2. Objectives

Considering the issues raised and the necessity of recognizing and paying special attention to this group, the researchers decided to conduct a study aimed at determining the maternal and neonatal outcomes in the mothers who consumed opioids referring to the Kamali Hospital in Karaj.

3. Methods

This prospective cohort study was carried out in Kamali Hospital in Karaj, which is a central and referral center in Alborz province from 2014 to 2017.

3.1. Samples

According to the study carried out by Saleh Gargari et al. (6) and considering α equal to 0.05, β equal to 0.2 (power of 80%) and the mortality rate in the group using narcotic drugs of about 7% and in the control group equal to 1.8%, as well as the sample size formula in the non-exposure group 3 times the exposure group, a total of 159 pregnant women who used opioids and 474 healthy subjects were selected as the study samples.

$$n = \frac{\left[Z_{1-\frac{\alpha}{2}} + Z_{1-\beta} \right]^2 (P_0(1-p_0) + P_1(1-P_1))}{(P_1 - P_0)^2} \quad (1)$$

Pregnant women who met the inclusion criteria were entered into the study using convenient sampling technique and then according to the main criterion i.e. addiction to any drug, they were assigned to either the exposure or non-exposure group. In order to provide identical conditions for the two groups, the same inclusion criteria were taken into account. The inclusion criteria were being Iranian, 37 weeks of gestation, the absence of any specific and chronic diseases in the delivery part, with dilatation of 2-3 cm, single fetus pregnancy, and a cephalic presentation. The exclusion criteria were the suspicion of the response to the drug addiction test, lack of willingness to cooperate in the implementation of the plan, and dispatch to other health centers for any medical reasons.

3.2. Data and Measure

The data were collected using a checklist designed by the researchers for the same purpose. The checklist consisted of three sections: (1) demographic data, including age, marital status, smoking, type and method of drug use (in case group), starting time of care and number of care, number of abortions, childbirth and previous pregnancies; (2) the characteristics of the current pregnancy and

delivery, the duration of the first and second stages of labor, the type of delivery, and the rate of postpartum hemorrhage measured based on the number of pads used by the midwife and recorded in the profile. (3) Neonatal specifications (1st and 5th minute Apgar condition, need for special care, intubation and neonatal resuscitation, medication, duration of admission in the neonatal ward or NICU, and need for special care, which was documented according to the contents of the profiles.

3.3. Procedure

After obtaining the required permissions and obtaining the code of ethics from the Ethics Committee of Alborz University for Medical Sciences, No. Abzums.Rec.1393.7, the researcher was present in the maternity ward, and after identifying the qualified individuals, the study objective was explained to them. If they wished to participate in the study, they filled in the consent form. The researcher then monitored the individuals until discharge from the hospital. The individual, social, midwifery, obstetric and neonatal data in the patient profile were entered into the checklist by the researcher. For other information needed, whenever the mother felt comfortable, the researcher conducted an interview with them. In order to comply with the ethical requirements, mothers who used narcotic drugs were introduced to counseling centers for addiction treatment.

3.4. Statistical Analysis

Data were analyzed by SPSS 19 and descriptive statistics were used to determine frequencies, percentages, means, and standard deviations. Chi-square test, Fisher's exact test and in depended *t*-test were used to compare variables in the two groups.

4. Results

In the present study, there were no significant differences between the two exposed and non-exposed groups in terms of mean age, pregnancy/maternal characteristics (number of delivery and pregnancy, abortion and still-birth, hemodynamic changes, postpartum hemorrhage and delivery time); however, there were significant differences in terms of weight gain and care services ($P < 0.001$). In the use of opioids, 73.6% of drug users used it through inhalation and then oral administration with 13.2% and injectable and multiple ways were 6%. Furthermore, 12% of the exposed people did not respond to the method of use (Table 1). The frequency of all kinds of drugs, including methamphetamine (27.7%), heroin (25.8%), and

opium (24.5%) were the most consumed drugs. Meanwhile, methadone (5%), cannabis (4.4%), tramadol and opium extract (1.9%), and crack (6%) were among the next levels of exposure among the exposure group. Most smokers among the drug users were methamphetamine (28%), heroin (26%), and opium (25%). In other cases, tramadol, cannabis, methadone, opium extract, crack was a total of 10% of smokers, and 9% did not answer the question too. Among the newborns in the two groups, the first and fifth minutes of Apgar score, weight, and admission were significant ($P < 0.001$), with the first minute Apgar score less than 7 in the exposure group, and 11.9% in the non-exposure group. The prevalence of infants less than 2500 in the group faces 21.4% in contrast to 3.4% in the non-exposed group (Table 2). The result of relationship between mothers' sociodemographic factors of participants and birth weight are shown in Table 3. Accordingly, having prenatal care has a more predictive effect on birth weight ($B = 3.85$) and pregnancy weight gain has a more protective effect ($B = 0.997$).

5. Discussion

Substance abuse is still one of the most important problems in communities around the world. The findings of the current study indicated that the mean weight gain and the frequency of receiving prenatal care in mothers who consume drugs is significantly lower than that of healthy mothers. Also, the most consumed drug was methamphetamine then heroin and opium. Based on the results, the first and fifth minute Apgar and the weight of neonates born from addicted mothers were less than the counterpart.

The findings are consistent with the results of the study by Saedi et al. (2016). In their study, on 50 pregnant women who consumed narcotic drugs in Mashhad, they found that the first and fifth minute Apgar of the mothers' neonates were significantly lower than healthy mothers (11). Also, in a study by Jones et al. (2012) on pregnant women with drug dependence and smoking, they reported a negative and significant correlation between the uses of these substances with the fifth-minute neonate Apgar score. Moreover, the number of days the neonates of these mothers in the NIC were longer (12).

In terms of the type of substance used in this study, they were methamphetamine, heroin, and opium. In the study conducted in Mashhad, the highest consumed drugs were opium, methadone, and methamphetamine (11). However, in other studies conducted in southern London and Australia, heroin, cocaine, and marijuana were the

Table 1. Sociodemographic Factors of the Participants

| Variable | Addicted, Frequency (%) | Non Addicted, Frequency (%) | P Value |
|------------------------------|-------------------------|-----------------------------|----------------------|
| Age mother | | | 0.00 ^a |
| < 20 | 1 (0.6) | 32 (6.8) | |
| 21 - 35 | 110 (69.2) | 385 (81.2) | |
| ≥ 36 | 48 (30.2) | 57 (12.0) | |
| No answer | 0 (0) | 1 (0.2) | |
| Mean | 31.60 ± 5.9 | 27.84 ± 5.7 | |
| Marriage statuses | | | < 0.001 ^b |
| Married | 127 (79.9) | 472 (99.6) | |
| Divorce | 6 (3.8) | 0 (0) | |
| Widowed | 6 (3.8) | 0 (0) | |
| etc. | 20 (12.5) | 3 (0.6) | |
| Pregnancy smoking | | | < 0.001 ^c |
| Yes | 106 (66.6) | 4 (0.8) | |
| No | 51 (32.07) | 468 (99.15) | |
| No answer | 2 (1.2) | 3 (0.6) | |
| Prenatal care | | | < 0.001 ^a |
| Yes | 86 (54.1) | 469 (98.7) | |
| No | 71 (44.7) | 3 (0.06) | |
| No answer | 2 (0.01) | 2 (0.42) | |
| Start prenatal care | | | < 0.001 ^a |
| First trimester | 21 (13) | 447 (94.1) | |
| Second trimester | 22 (13) | 16 (3.36) | |
| Irregular | 44 (27) | 5 (1.05) | |
| etc. | 1 (0.006) | 2 (0.42) | |
| No answer | 71 (44) | 1 (0.21) | |
| Pregnancy weight gain | | | < 0.001 ^c |
| < 8 | 17 (10.7) | 38 (8.0) | |
| 8 - 14 | 41 (25.8) | 187 (39.5) | |
| 14.1 - 20 | 6 (3.8) | 201 (42.4) | |
| 20.1 - 35 | 1 (0.6) | 18 (3.8) | |
| Unknown | 94 (59.1) | 30 (6.3) | |
| Parity N. | | | 0.060 ^c |
| ≤ 3 | 130 (81.8) | 417 (88.0) | |
| ≥ 4 | 29 (18.2) | 57 (12.0) | |
| Drug usage type | | | 0.060 ^c |
| Smoke | 117 (73.6) | - | |
| Oral | 21 (13.2) | - | |
| Inject | 1 (0.6) | - | |
| Mixed | 1 (0.6) | - | |
| No answer | 19 (12) | - | |

^aIndependent t-test

^bFisher test

^cChi-square test

most consumed drugs among pregnant women (13). In a systematic review of 128 articles related to substance abuse,

Table 2. Characteristics of Newborns Referring to Kamali Hospital

| Variable | Addicted, Frequency (%) | Non Addicted, Frequency (%) | P Value (χ^2 Test) |
|----------------------------|-------------------------|-----------------------------|--------------------------|
| APGAR first | | | < 0.01 |
| < 5 | 8 (5.0) | 2 (0.4) | |
| 5 - 7 | 11 (6.9) | 4 (0.8) | |
| 7 - 10 | 130 (81.7) | 468 (97.7) | |
| APGAR fifth | | | < 0.01 |
| < 5 | 4 (2.5) | 1 (0.2) | |
| 5 - 7 | 3 (1.9) | 0 (0) | |
| 7 - 10 | 152 (95.6) | 473 (99.8) | |
| Resuscitation needs | | | < 0.001 |
| Yes | 24 (16.8) | 1 (0.021) | |
| No | 119 (83.2) | 463 (99.7) | |
| Birth weight | | | < 0.001 |
| < 2500 | 34 (21.4) | 16 (3.4) | |
| 2500 - 4499 | 104 (65.4) | 433 (91.4) | |
| \geq 4500 | 21 (13.2) | 25 (5.3) | |
| Birth length | | | < 0.001 |
| < 46 | 29 (18.2) | 10 (2.1) | |
| 46 - 56 | 107 (67.3) | 424 (89.5) | |
| Other | 23 (14.5) | 40 (8.4) | |
| Hospitalization | | | < 0.001 |
| No | 86 (54) | 375 (79.1) | |
| Yes | 73 (45.9) | 99 (20.8) | |

the highest consumed drug was alcohol (14). The reason for this difference pertains to the limited availability of these substances to other substances. Pregnancy is likely to be the only time when women have to go to health centers to receive medical care, but on the other hand, the fear of revealing drug addiction is preventing them from receiving adequate care (15). In the current study, the number of people in this group, referred to health centers for delivery of pregnancy services were significantly lower than those in the opposite group.

Drugs and substances can affect the embryo in many ways. In the organogenesis stage, the drugs have significant teratogenic effects on the fetus, after completing this stage, the substances produce subtler effects, for example, abnormal growth and changes in neurotransmitter and brain receptors. These are the direct effects of such substances; however, they have also indirect effects through the impact on the mother. For instance, having an effect on weight gain, it can indirectly affect the weight gain and nu-

trient intake of the fetus (16). Therefore, the timely identification of these individuals is very important. There are two ways to diagnose drug use in people: self-report and biologic samples. Although self-reporting is a cheap, practical and the only available method, the accuracy of the material provided by these individuals is one of the most important problems in this area (16), and this is one of the limitations of such studies.

5.1. Conclusions

Given the increasing number of mothers consuming opioids during pregnancy and the irreparable side effects of these drugs, it is important to pay attention to this and provide coping strategies. One of the effective ways of providing fertility health care is the presence of a health care person in the mobile caring team for street addicts and centers for providing support services to addicts.

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Footnotes

Authors' Contribution: Study concept and design: Katayoun Salehi, Zohreh Mahmoodi, Kourosh Kabir, Ali Reza Motlagh; acquisition of data: Katayoun Salehi; analysis and interpretation of data: Zohreh Mahmoodi; drafting of the manuscript: Zohreh Mahmoodi, Katayoun Salehi, Kourosh Kabir, Ali Reza Motlagh; critical revision of the manuscript for important intellectual content: Zohreh Mahmoodi; statistical analysis: Kourosh Kabir.

Conflict of Interests: The authors did not have any conflict interest.

Ethical Approval: This study was approved by the Ethics Committee of Alborz University for Medical Sciences, No. Abzums.Rec.1393.7.

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Table 3. The Relationship Between Mothers' Sociodemographic Factors of the Participants and Birth Weight

| Variable | B | SE | P | Odds | CI |
|------------------------------|--------|-------|--------|-------|---------------|
| Mothers age | -0.031 | 0.40 | 0.442 | 0.997 | 0.896 - 1.094 |
| Pregnancy weight gain | -0.041 | 0.02 | 0.008 | 0.96 | 0.93 - 0.99 |
| Parity number | 0.099 | 0.46 | 0.993 | 1.01 | 0.40 - 2.47 |
| Prenatal care | | | | | |
| Yes | | | | REF | |
| No | 1.24 | 0.38 | 0.001 | 3.85 | 1.8 - 8.1 |
| Marriage statuses | | | | | |
| Married | | | | REF | |
| Divorce | 0.02 | 0.02 | 0.041 | 1.03 | 1.01 - 1.07 |
| Widowed | 0.03 | 0.008 | 0.001 | 1.04 | 1.01 - 1.04 |
| etc. | -0.01 | 0.02 | 0.091 | 1.03 | 0.99 - 1.07 |
| Pregnancy smoking | | | | | |
| Yes | 0.03 | 0.01 | -0.041 | 1.044 | 0.93 - 0.99 |
| No | | | | REF | |

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