VOLUME - 10, ISSUE - 01, JANUARY - 2021 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Obstetrics & Gynecology

PREVALENCE AND EFFECTS OF METHAMPHETAMINE USAGE IN PREGNANT WOMEN IN UDON THANI PROVINCE, THAILAND

Wachirawut Klangburam*	M.D., Department of Obstetrics and Gynecology, Udonthani Hospital, Udonthani, Thailand-41000. *Corresponding Author
Srisuda Songthamwat	M.D., Department of Obstetrics and Gynecology, Udonthani Hospital, Udonthani, Thailand-41000.
Ueamporn Summart	Ph.D.,Department of Obstetrics and Gynecology, Udonthani Hospital, Udonthani, Thailand-41000.
Metha Songthamwat	M.D., Ph.D., Department of Obstetrics and Gynecology, Udonthani Hospital, Udonthani, Thailand-41000.

ABSTRACT

Objective: To determine prevalence and effects of Methamphetamine usage in pregnant women to maternal and neonatal outcomes.

Materials And Methods: A cross sectional study in four major hospitals: Udon Thani, Phen, Nonghan, Ban Dung Crown Prince Hospital) in UdonThani Province, Thailand, was conducted. All pregnant women, who were admitted in the labor room during February to August 2020, were interviewed by a self-responded questionnaire after counselling and consent. The baseline characteristics and history of Methamphetamine usage were asked. All participants were followed until delivery, the maternal and neonatal outcome were recorded and analyzed.

Result: There were 1,630 women participated in this study. The prevalence of Methamphetamine usage pregnant women was 6.1 %. The composite maternal complication (preterm birth, preeclampsia) was 32.3% in the Methamphetamine group compared with 13.3% in the non-Methamphetamine group (difference 8.8%, 95% CI 4.2-13.3, p <0.001). The composite neonatal complication (low birthweight, preterm birth, and birth asphyxia) was 33.3% in Methamphetamine group compared with 13.5% in the non-Methamphetamine group (difference 9.0%, 95% CI 4.5-13.5, p <0.001). The mean ± standard deviation (SD) for neonatal birthweight in the Methamphetamine group was 2818.4±481.0 grams that lower than the other group 3118.5±440.2 grams (mean difference 300.0, 95%CI 209.9-390.1, p <0.001). The mean ± SD for neonatal head circumference in the Methamphetamine group was 32.0±1.6 cm compared with 32.8±1.4 cm in the other group (mean difference 0.8, 95%CI 0.5-1.1, p <0.001). The mean ± SD for neonatal body length in the Methamphetamine group was 49.3±2.4 cm compared with 50.8±2.3cm in the other group (mean difference 1.4, 95%CI 0.9-1.9, p <0.001)

Conclusion: The prevalence of Methamphetamine usage in pregnant women in Udon Thani province is relatively high when compare with other reports. It increases both maternal and neonatal complications such as: preterm birth, decrease neonatal birthweight, head circumference and body length.

KEYWORDS : prevalence, methamphetamine, amphetamine, pregnant women, endemic

INTRODUCTION:

Substance abuse is a common global problem. The prevalence of its use is varied according to countries. Methamphetamine is one of the most commonly substance abused in the world. Not only the substance has been used in men, women, younger people but also in pregnancies [1]. The prevalence in pregnant women was estimated to be from 0.7% to 4.8% in endemic area [2]. Methamphetamine can cross the placenta[3] to fetus and play an important role in homeostasis that decrease blood supply carry oxygen to fetus[4] resulting in more adverse effects such as small size for gestational age (SGA), Preterm birth, abruptio placenta[5, 6], decrease in neonatal head circumference and body length[7] and low APGAR score[8].

A Thai study reported the prevalence of substance abuse in pregnant women is 6.4 per 1,000 births[9] and in the other is 3.4 per 1,000 births [10], Methamphetamine and smoking are 78 and 27 percent, respectively[9,10]. These women have increased risk for adverse pregnancy and neonatal outcome such as pre-eclampsia, preterm birth, low birth weight (< 2,500 gm) and small for head circumference [10]. In Udon Thani, Methamphetamine is also a common agent which is used illegally by pregnant women. This study's goal was to determine the prevalence and effects of Methamphetamine usage in pregnant women to maternal and neonatal outcomes.

MATERIALS AND METHODS:

This study is a cross sectional study in the four major hospitals in UdonThani Province, Thailand (Udonthani, Phen, Nonghan, Ban Dung Crown Prince hospital) during February 2020 – August 2020. It was conducted after the Human Research Ethical Committee of Udon Thani Hospital approved the protocol. The participants of study were the pregnant women who delivered in the hospitals during the study period. The study hospitals were selected by stratified random sampling by proportion of delivery cases and size of the hospitals, including one major hospital (Udonthani Hospital), two medium size hospitals (Nonghan and Ban Dung Hospitals) and one small size hospital (Phen Hospital). All participants received counselling by research nurses about the aim and process of the study. A self-report questionnaire was used for collecting the participant's information including history of substance usage. The questionnaire was dropped into a locked box by the participants that only the researcher could open. All participant's information in the questionnaire was disclosed. The questionnaire was tested for validity by 2 obstetricians, 1 psychiatrist and 2 nurses.

The delivery outcome, maternal and neonatal complications were recorded by the research nurses. The questionnaire 's boxes were opened by a researcher and the information was recorded and analyzed.

Statistical Analysis

The sample size was calculated by N4studies application for IOS using formula for estimating an infinite population

proportion. The proportion of 0.04, 0.01 acceptable error and 0.05 significance level were used for calculation. The calculated sample size was 1476 cases.

The patients' demographic data are presented as number and percentage for all categorical variables. The continuous variables were summarized by the mean, standard deviation (SD), median, and range (minimum and maximum). The data was collected for all participants and categorized for the Methamphetamine and the non-Methamphetamine groups.

The prevalence for Methamphetamine usage is presented as number and percentage. A crude analysis was performed to determine the risk factors and other clinical characteristics had on Methamphetamine usage. Binomial regression and logistic regression analysis were used to estimate the risk ratios and their 95% CI. The p-value <0.2 was used for selecting variable to multivariable analysis and p value < 0.5 was used for statistically significance.

The multiple logistic regression analysis and their 95% CI were performed to adjust the effect of other covariate factors with Methamphetamine usage. The magnitudes of effect are presented in terms of adjusted odds ratio (OR adjusted). All analyses were performed using Stata 13 (StataCorp, Stata Statistical Software: Release 13. College Station, TX). The significance level was set as p <0.05 and all statistical tests were two-sided.

RESULTS:

There were 1,650 pregnant women who delivered during the study period and of those 1,630 women participated in this study: 1,422 Udonthani, 60 Ban Dung, 29 Phen and 119 Nonghan. The prevalence of women who reported their Methamphetamine usage during pregnancy was 6.1 percent (99/1,630). There was no significant difference for maternal age between the Methamphetamine and the non-Methamphetamine groups (26.4±6.5 vs 27.3±6.5). The average maternal BMI and maternal income measurements were lower in the Methamphetamine group than in the non-Methamphetamine group with statistically significance (24.7±4.1 vs 27.9±4.6, p <0.001) and (10116.1±5260.4 vs 15998.5±12236.3, p <0.001) respectively (Table 1).

When using binomial regression and multivariable logistic regression analysis, the composite maternal outcome (preterm labor + preeclampsia) was statistically significant 32(32.3%) in the Methamphetamine group compared with 203(13.3%) in the non-Methamphetamine group [mean difference 8.8%, 95% CI (4.2-13.3), p <0.001] with the adjusted odd ratio was 3.5 (95% CI 2.2-5.6). Composite neonatal outcome (preterm birth + low birthweight + birth asphyxia) was statistically significant 33(33.3%) in the Methamphetamine group compared with 207(13.5%) in the non-Methamphetamine group [mean difference 9.0%, 95% CI (4.5-13.5), p <0.001] with the adjusted odd ratio was 2.6 (95% CI 1.6-4.0). The mean average: neonatal birth weight, body length, head circumference, APGAR score at 1 and 5 minutes in the Methamphetamine group compared with the non-Methamphetamine group were statistically significant difference (Table 2-4).

Table 1: Summary Of Demographic

Characteristics	Total (n=1,630)	Methamphetamine group (n=99)	Non-Methamphetamine group (n=1,531)	P Value*
Hospital				
Udonthani	1,422 (87.2%)	88 (6.2%)	1,334 (93.8%)	0.582
Ban Dung	60(3.7%)	4(6.7%)	56(93.3%)	
Phen	29(1.8%)	0	29(100.0%)	
Nonghan	119(7.3%)	7(5.9%)	112(94.1%)	
Age (year), mean±SD	27.3±6.5	26.4±6.5	27.3±6.5	0.171
Teenage (<20)	208 (12.8%)	14 (14.1%)	194 (12.7%)	0.671
Weight(kg)	69.7±12.3	61.9±10.8	70.2±12.2	<0.001
Height(cm)	158.5±5.9	158.2±6.1	158.5±5.9	0.595
BMI(kg/m^2)	27.7±4.6	24.7±4.1	27.9±4.6	<0.001
18.5 to<25	481 (29.5%)	56 (56.6%)	425 (27.8%)	<0.001
<18.5	8(0.5%)	3(3.0%)	5(0.3%)	
25 to <30	706 (43.3%)	29 (29.3%)	677 (44.2%)	
30 to <40	409 (25.1%)	10 (10.1%)	399 (26.1%)	
≥40	26(1.6%)	1(1.0%)	25(1.6%)	
Occupation				<0.001
Housewife	866 (53.1%)	73 (73.8%)	793 (51.8%)	
Employee	486 (29.8%)	21 (21.2%)	465 (30.4%)	
Marchant	163 (10.0%)	3 (3.0%)	160 (10.4%)	
Governmen t worker	70(4.3%)	0	70(4.6%)	
Farmer	45(2.8%)	2(2.0%)	43(2.8%)	
Income (baht/mont h)	15641.2±1 2011.1	10116.1±52 60.4	15998.5±12236 .3	<0.001

*p value was calculated by Pearson' s chi square for categorical data and by unpaired t test for continuous data.

Table 2: Maternal and Neonatal birth outcomes for Methamphetamine exposed pregnancies compared with non-Methamphetamine exposed pregnancies.

	Methamphetamine group (n=99)	Non-Methamphetamine group (n=1,531)	Difference (95% CI)	p-value
Composite maternal outcome	32 (32.3%)	203 (13.3%)	8.8% (4.2-13.3)	<0.001
Composite neonatal outcome	33 (33.3%)	207 (13.5%)	9.0% (4.5-13.5)	<0.001
Gestational age (weeks)	37.4±2.2	38.6±7.7	1.2 (-0.3-2.7)	0.116
Preterm birth, n (%)	25(25.2%)	135(8.8%)	16.3% (7.7-22.5)	<0.001
Birth weight (grams)	2818.4±481. 0	3118.5±440.2	300.0 (209.9-390.1)	<0.001
Low birth weight (BW<2,500), n (%)	22(22.2%)	96(6.2%)	15.9% (7.6-24.2)	<0.001
Length (cm)	49.3±2.4	50.8±2.3	1.4 (0.9-1.9)	<0.001
Head circumferen ce (cm)	32.0±1.6	32.8±1.4	0.8 (0.5-1.1)	<0.001
APGAR 1 minute	8.5±1.4	8.9±0.8	0.3 (0.2-0.5)	<0.001
APGAR 5 minute	9.6±0.9	9.8±0.4	0.2 (0.1-0.3)	<0.001
Birth asphyxia (Apgar1 <7) , n (%)	6(6.0%)	26(1.7%)	4.3% (-0.3-9.1)	0.002

Pre-eclampsia	13(13.1%)	89(5.8%)	7.3% (0.1-14.8)	0.003
GDM	1(1.0%)	90(5.8%)	-4.8% (-7.1- -2.5)	0.040
Blood loss (ml)	167.9±109.3	208.9±126.2	40.9 (15.5-66.4)	0.001

Composite maternal outcome = preterm labor + preeclampsia

Composite neonatal outcome = preterm birth + low birthweight + birth asphyxia

*p value was calculated by Pearson' s chi square for categorical data and by unpaired t test for continuous data.

Table 3: Adjusted Risk On Composite Maternal Complication

Factors	Composite maternal Complication (n=235)	No maternal complication (n=1,395)	Odd ratio (95% CI)	Adjusted Odd ratio (95% CI)	p-value*
Amphetamine use	32	67	3.1(1.9-4.8)	3.5(2.2-5.6)	<0.001
Age (year),mean ±SD	28.1±6.9	27.1±6.4	1.0(1.0-1.0)	1.0(1.0-1.1)	0.005
Weight(kg)	70.6±14.1	69.5±11.9	1.0(0.9-1.0)	NA	0.197
BMI(kg/m^2)	28.6±5.4	27.5±4.4	1.0(1.0-1.1)	1.1(1.0-1.1)	<0.001
Income (baht/month)	13574.4±9287.0	15989.3±12380.1	1.0(1.0-1.0)	1.0(1.0-1.0)	0.013

* p-value was calculated by multivariable logistic regression analysis

- p-value <0.2 was used for selecting variable to multivariable analysis and p value < 0.5 was used for statistically significance.

-The maternal weight was not included to multivariable analysis due to multicollinearity effect with BMI

Table 4: Adjusted Risk On Composite Neonatal Complication

Factors	Composite neonatal Complication	No neonatal complication	Odd ratio (95% CI)	Adjusted Odd ratio (95% CI)	p-value
Amphetamine use	33	66	3.2(2.0-4.9)	2.6(1.6-4.0)	<0.001
Age (year),mean ±SD	27.1±6.9	27.2±6.4	0.9(0.9-1.0)	1.0(0.9-1.0)	0.365
Weight(kg)	65.8±12.5	70.6±12.1	0.9(0.9-1.0)		<0.001
BMI(kg/m^2)	26.7±4.7	27.9±4.6	0.9(0.9-0.9)	0.9(0.9-0.9)	0.006
Income (baht/month)	13766.6±10178.5	15964.8±12274.2	1.0(1.0-1.0)	1.0(1.0-1.0)	0.032

* p-value was calculated by multivariable logistic regression analysis

- p-value <0.2 was used for selecting variable to multivariable analysis and p value < 0.5 was used for statistically significance.

DISCUSSION

Drug or substance abuse during pregnancy is a major problem in the world with increasing prevalence. The prevalence of Methamphetamine usage in pregnancy from this study is 6.1% which is a similar prevalence in nearly all participating hospitals (range 5.9-6.7%, except Phen Hospital). The result is higher than a previous Thai study which reported the prevalence as 6.4 per 1,000 births [9] and 3.4 per 1,000 birth [10] but similar to the 6% from an Australian report [11] and 5% from an United Kingdom report [12]. Globally, Methamphetamine is one of the most common substance abuse with a prevalence is from 0.7% to 4.8% in endemic area [2]. We believe that this prevalence is underestimated due to Methamphetamine use is a legal and ethical issue, therefore the history of Methamphetamine use may be concealed especially in some groups, such as government workers which has zero prevalence of Methamphetamine usage in this study.

Methamphetamine can cross the placenta to the fetus. The maternal and fetal effects of Methamphetamine were clearly demonstrated in this study. It has effect on fetal growth, preterm birth, and low birth weight rate. The study from Thailand found Methamphetamine effects to pregnancy outcome such preterm birth [9]. The neonates who were exposed to Methamphetamine during pregnancy had reduced birth weight, body length and head circumference. This result is similar to previous studies both in animals and humans [5, 6, 13, 14]. The long-term effects on children and teens was show the school performance below than non-Methamphetamine exposed children such as points in mathematics, language and sports [8], but in this study could not be demonstrated long-term effects.

The dosage and trimester of exposure might be important for fetal and neonatal outcome. In this study, most cases were exposed to Methamphetamine in all trimesters and the daily dosage was between 1-2 tablets of Methamphetamine (mean 1.5 tablet/day), therefore a larger sample size study is needed to answer this question. The clinical implication of this study is the endemic high prevalence of Methamphetamine usage in pregnancy in this area was clearly demonstrated and its effect to pregnancy and neonatal outcome, especially development and intelligence, is strongly suggested. Therefore, government health policy about this issue should be established.

This study has a limitation for proportion of Methamphetamine usage due to it depended on the acceptance of the patients, even the researcher confirmed that their responses were enclosed and no effect for their treatment and legal issue. Therefore, the Methamphetamine usage proportion in this study is only the least possible. The confirmation test for Methamphetamine usage such as urine test was not done in all cases. The test was done in only the consent cases due to the ethical issue of patient's right. We test urine Methamphetamine for 177 cases and positive test for 77 cases.

Further study is needed to evaluate the method to cope with methamphetamine usage in pregnant women. Drug withdrawal strategies, key factors to successful treatment and complication prevention still need further studies.

CONCLUSION

The prevalence of Methamphetamine usage in pregnant women in Udon Thani province is relatively high when compare with other reports. It increases both maternal and neonatal complications such as: preterm birth, decreased neonatal birthweight, head circumference and body length.

REFERENCES

1. Fedotov Y. Women and Drugs Booklet 5 World drug report 2018. Vienna Austria United Nations Office on Drugs and Crime; 2018.

2. Arria AM, Derauf C, LaGasse LL, Grant P, Shah R, Smith L, et al. Methamphetamine and other substance use during pregnancy: preliminary estimates from the Infant Development, Environment, and Lifestyle (IDEAL) study. Maternal and child health journal 2006;10:293.
3. Ganapathy V, Prasad PD, Ganapathy ME, Leibach FH. Drugs of abuse and placental transport. Advanced drug delivery reviews 1999;38:99-110.
4. Plessinger MA. Prenatal exposure to amphetamines: risks and adverse outcomes in pregnancy. Obstetrics and gynecology clinics of North America 1998;25:119-38.
5. Good MM, Solt I, Acuna JG, Rotmensch S, Kim MJ. Methamphetamine use during pregnancy: maternal and neonatal implications. Obstetrics & Gynecology 2010;116:330-4.
6. Nguyen D, Smith LM, LaGasse LL, Derauf C, Grant P, Shah R, et al. Intrauterine growth of infants exposed to prenatal methamphetamine: results from the infant development, environment, and lifestyle study. The Journal of pediatrics 2010;157:337-9.
7. Stek AM, Baker RS, Fisher BK, Lang U, Clark KE. Fetal responses to maternal and fetal methamphetamine administration in sheep. American journal of obstetrics and gynecology 1995;173:1592-8.
8. Cernerud L, Eriksson M, Jonsson B, Steneroth G, Zetterstrom R. Amphetamine addiction during pregnancy: 14-year follow-up of growth and school performance. Acta paediatrica 1996;85:204-8.
9. Phupong V, Darojn D. Amphetamine abuse in pregnancy: the impact on obstetric outcome. Archives of gynecology and obstetrics 2007;276:167-70.
10. Thaithumyanon P, Limpongsanurak S, Praisuwanna P, Punnahitanon S. Impact of prenatal illicit drug exposure on the mother and infant. 2004.
11. Dowling P. Statistics on drug use in Australia 2004. Australian Institute of Health and Welfare: Australian Institute of Health and Welfare; 2004.
12. Crome IB, Kumar MT. Epidemiology of drug and alcohol use in young women. In: Seminars in Fetal and Neonatal Medicine; 2007: Elsevier; 2007. p. 98-105.
13. Kalaitzopoulos D-R, Chatzistergiou K, Amylidi A-L, Kokkinidis DG, Goulis DG. Effect of methamphetamine hydrochloride on pregnancy outcome: a systematic review and meta-analysis. Journal of Addiction Medicine 2018;12:220-6.
14. Chomchai C, Manorom N, Watanarungsan P, Yossuck P, Chomchai S. Methamphetamine abuse during pregnancy and its health impact on neonates born at Siriraj Hospital, Bangkok, Thailand. Southeast Asian journal of tropical medicine and public health 2004;35:228-31.