

The Effect of Environmental Manipulation on  
Methadone Withdrawal Infants:  
A Descriptive Case Study

by

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A Thesis

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## CHAPTER I

## INTRODUCTION

Narcotic addiction is a serious problem in the United States, a problem that nurses are faced with almost daily. Women who are abusing narcotics while pregnant put their infant at risk. In 1988, statistics for the State of Oregon indicate that 295 infants were born to women who used drugs or alcohol during their pregnancy (Oregon State Health Division, 1989.) The neonatal nurse is faced with caring for the infant after delivery, when the child is withdrawing from the drug or drugs the mother was abusing while pregnant. An infant withdrawing from narcotics requires intensive nursing care and interventions.

The purpose of this project is to study the effect of environmental manipulation on infants withdrawing from methadone. A review of the literature discusses substance abuse in general, as well as the work that has been done regarding the care of narcotic withdrawal infants and the current nursing interventions used to care for these infants. A theoretical framework and a beginning conceptual framework is suggested regarding the care of narcotic withdrawal infants. A study question is proposed for a nursing intervention to be used with these infants. The research methodology used

is discussed, as will the results of the study. The discussion section includes interpretation of the findings and the theoretical and practical implications of the study.

## Review of the Literature

### Substance Abuse in General

Substance abuse is defined by Naegle (1988) as the compulsive, repetitive use of a drug despite detrimental social, physical, and psychological effects. People use and abuse a variety of chemicals for a variety of reasons, the most common reason being for the drug's psychoactive effect. Drugs can elevate one's mood or depress it, decrease fatigue or induce sleep. Caffeine and nicotine are the two most commonly used drugs, yet they are accepted by society and their use is not considered abuse. This discussion will focus on the abuse of prescription and illicit drugs, while recognizing that alcohol is also a common drug of abuse.

There are many theories on the etiology of substance abuse. Theories of substance abuse are categorized into several models that reflect the current views of professionals involved in the field and current research. Naegle (1988) divides the theories into three categories: 1. person and family, expressed in generic/biologic, psychological and family

models; 2. environmental situations, best described in sociopsychological models; and 3. multiple interacting factors, incorporated in interactive and Rogerian models. An example of the first theory, generic/biological, can be found in programs that address the notion that there is a genetic predisposition to the development of addictions. The sociopsychological models stress the interaction between social forces and view the sociocultural environment as etiologic. The interactive and Rogerian models acknowledge that specific factors of a variety of origins cannot predict the onset of substance abuse illness, but it is through the interaction of the above characteristics (familial, individual, sociopsychological and environmental) that alcoholism and drug addictions occur. These models help guide the professional in determining the appropriate treatment for substance abuse.

#### Substance Abuse During Pregnancy

Current statistics on the prevalence of substance abuse vary from study to study, with the incidence of substance abuse during pregnancy being even more difficult to determine. In a study published in 1988 by Frank et al of 679 pregnant urban women, 17% used cocaine, 59% consumed alcohol, 4% used opiates, and 3% used other illicit drugs at some time during their

pregnancy, as determined by self-report and/or urine assay. Women substance abusers often do not seek prenatal care or initiate prenatal care very late in pregnancy. They are reluctant to inform their health care provider about their drug use or minimize their use when admitting to their provider. This makes identifying the pregnant substance abuser very difficult.

The dangers of substance abuse during pregnancy are many. They include risks to the mother such as infections (Hepatitis, HIV), premature onset of contractions, abruptio placentae, poor nutrition and spontaneous abortions (Frank et al, 1988.) Dangers to the fetus and infant include prematurity, low birth weight, small for gestational age, microcephaly, neonatal abstinence syndrome, infections (hepatitis, HIV), asphyxia, meconium aspiration and delayed development (Frank et al, 1988 and White, 1987.) The goal of methadone maintenance in pregnant women is to decrease the incidence of infections from intravenous drug abuse and provide stability of lifestyle for the addicted pregnant woman. This in turn improves compliance with prenatal care and nutrition, thereby decreasing some of the problems associated with lack of prenatal care such as prematurity and low birth weight. Methadone maintenance is also used to prevent erratic

Risks



maternal drug levels so that the fetus is not vulnerable to repeated episodes of withdrawal (Kaltenbach & Finnegan, 1987.)

#### Impact of Maternal Substance Abuse on the Infant

Health care providers have recognized the effects of maternal narcotic addiction on the newborn since the 1950's (Goodfriend, Shey & Klein, 1956, Shenk, 1958.) Neonatal narcotic abstinence syndrome was first identified by Hill and Desmond in 1963. Methadone use in pregnancy began in the mid-1960's, but the effects of methadone withdrawal on the newborn were not widely known until a study comparing infants withdrawing from heroin to infants withdrawing from methadone was published in 1972 (Rajegowda, Glass, Evans, Maso, Swartz & Leblanc, 1972.) The investigators noted that the incidence of irritability and tremulousness was significantly greater in the methadone group and that withdrawal symptoms also lasted longer (Rajegowda, et al, 1972.) The introduction of polydrug addiction in the 1980's adds a new complication to the care of the withdrawal infant, in that the infant has a biphasic withdrawal pattern. Often the infant will complete the withdrawal from one drug, only to begin withdrawing from another (American Academy of Pediatrics, 1983.) Only one study by Chasnoff et al (1982) involving comparison of methadone- and polydrug-addicted newborns

could be found in the literature. This study which compared intrauterine growth and neonatal behavior in three groups (methadone-addicted, polydrug addicted and a normal control group) indicated that infants from the methadone group had significantly lower mean birth weights and head sizes than the other groups and that both the methadone and polydrug-addicted infants had significant behavioral risks as identified by the Brazelton Neonatal Assessment Scale (Chasnoff, Hatcher & Burns, 1982.) Comparison of the effects of heroin and cocaine abuse upon the neonate are examined by Flandermeyer (1987) who found that although cocaine poses a higher risk to the fetus in utero (urinary anomalies, fetal tachycardia and hypertension), the withdrawal from heroin is more severe than that from cocaine. The above studies and articles discuss the diagnosis of neonatal addiction and the risks involved, but do not discuss the treatment of the infant with narcotic withdrawal syndrome.

#### Methadone Treatment Programs

Because this paper focuses on infants of women who used methadone during their pregnancy, the focus of methadone treatment programs will be discussed in more detail using one of the categories described previously.

The rationale of treatment with methadone is to

prevent physical and psychological discomfort associated with narcotic withdrawal and to create stability for the individual to make the necessary transition from an addict to a socially acceptable lifestyle (Chenitz & Krumenaker, 1987.) This appears to follow the interactive model described previously (Naegle, 1988), in which there are both biological, sociopsychological and environmental components to addiction and recovery. Methadone maintenance is defined as the legal administration of an oral, pharmacologically stable, synthetic narcotic once a day for more than 21 days (U.S. Food and Drug Administration, 1983.) Methadone treatment programs also include counseling, group and individual therapy and other forms of social rehabilitation (Dy, 1975.) For the pregnant women there are often groups that address the specific needs of the pregnant woman on methadone.

#### Medical Management of the Infant Withdrawing from Methadone

The medical management of the infant withdrawing from passive methadone addiction has changed very little over the past thirty years, with new medications tried and discarded. Paregoric (0.04 % morphine) has been used in withdrawal infants in varying dosages for over 80 years (U.S. Dept. of Health Education and

Welfare, 1979.) Paregoric acts on the gastrointestinal tract to inhibit motility, thereby decreasing the diarrhea associated with neonatal narcotic withdrawal (Finnegan & MacNew, 1974.) Paregoric also lacks the side effect of severe sedation, thereby promoting better feeding and maternal-infant attachment. Usually, the infant is started on 0.2 ml. orally per dose, every three to four hours, increasing as necessary by 0.05 ml per dose until symptoms disappear (U.S. Dept. of Health Education and Welfare, 1979.) The Finnegan Neonatal Abstinence Score is used to determine if the dosage is controlling the withdrawal symptoms, with a score of "8" being the determining factor as to when to increase or decrease the Paregoric dosage (Finnegan et al, 1975), this will be described in more detail on page 9 of this paper. Phenobarbital has also been used in varying amounts, and current recommendations are that phenobarbital be used if seizures are present. There is some indication that phenobarbital, even at therapeutic blood levels does not fully control the withdrawal symptoms, and has no effect on the gastrointestinal symptoms. Large doses of phenobarbital may also significantly suppress the central nervous system of the infant, causing an impaired suck reflex and may delay bonding between mother and infant (American Academy of Pediatrics,

1983.) Other drugs that have been tried include diazepam, clonidine, chlorpromazine, and even methadone (Hill & Desmond, 1963; U.S. Dept. of H.E.W., 1979; American Academy of Pediatrics, 1983.) These are now rarely used, mainly due to the side effects which often outweigh the benefits.

#### Neonatal Abstinence Syndrome

Although neonatal abstinence or withdrawal syndrome was identified in 1963 (Hill & Desmond) there has been very little nursing research published regarding the nursing care of drug withdrawal infants. In 1975 a scale was published by Finnegan, that provided a gauge of how severe of a withdrawal the infant was exhibiting (Appendix A.) This Scale enables nurses to obtain a quantitative or number score to determine the severity of withdrawal. The major clinical signs and symptoms of narcotic withdrawal are related to increased levels of CNS excitation and include a group of readily observable characteristics, which range from mild tremors to seizures (Finnegan et al, 1975.) The tool identifies 20 signs and symptoms commonly found in narcotic withdrawal infants. The symptoms are ranked in groups with those having the least pathological significance given a score of "1"; those with the greatest potential for clinically adverse effects are scored as "5"; while others are

given intermediate point values (Finnegan et al, 1975.) A score is calculated every four hours, with all the behaviors that were observed in the previous four hours receiving points. A total score of eight is considered withdrawal, and should be evaluated for pharmacologic intervention (Finnegan et al, 1975.) The current practice at Oregon Health Sciences University is to base the decision to use either paregoric or phenobarbital on the specific withdrawal symptoms the infant is exhibiting. For example, the infant with diarrhea would be treated with paregoric, and the infant with severe tremors or seizures would be treated with phenobarbital.

#### Nursing Care of the Withdrawal Infant

Nursing has the potential to impact upon the initial care of the drug withdrawal infant, as it is nurses who provide the comfort measures that are used as part of the treatment of these infants. Specific nursing measures such as swaddling, decreased noise, decreased light, rocking and pacifiers have been suggested (Finnegan & Macnew, 1974; Kantor, 1978; Merker, Higgins & Kinnard, 1985; Marty, 1987; & Flandermeyer, 1987) with little research to back up these suggestions. There have been no studies published in the nursing literature on the efficacy of any of these nursing measures. One study, published by

a group of physicians, measured the impact of manipulating the environment on the severity of neonatal narcotic withdrawal (Ostrea, Chavez & Strauss, 1976.) In this study the experimental group was moved to a quiet, darkened nursery, which was separate from the main nursery. The infants were placed in isolettes and heat was maintained to keep the infants axillary temperatures stable at 97.5 to 98.5. The control group infants were placed in open cribs, in the normal nursery, with no controls placed on light or noise. The results of the study indicated that there was no significant difference in the two groups in the severity of withdrawal symptoms, as measured by the "mild, moderate or severe" scale used by these researchers. The only significant factor the researchers could find influencing the severity of withdrawal, was the methadone dose of the mother prior to delivery, with a higher maternal methadone dosage (greater than 20 mg per day) correlating positively with more severe withdrawal symptoms ( $p < 0.025$ .) This study consisted of 196 infants, who were randomly assigned to the control or experimental groups. Although the measures appear logical, the scale used to quantify the withdrawal symptoms lacked the clear cut definition found in the Finnegan scale previously described. The researchers classified the infants

withdrawal symptoms as mild, moderate and severe, with a lack of clear definition of what determined placement in each of these categories. Also, the feasibility and cost of having a separate nursery for drug withdrawal infants is unsuitable in the current economic climate and may be irrelevant since they had no significant findings. There appears to be a need for this study to be replicated by nursing, using a more feasible intervention strategy. Also this author's clinical experience with methadone withdrawal infants has indicated that decreasing the light and noise stimuli to the infant seems to decrease the abstinence score.

#### Noise in the Intensive Care Unit

Many authors have suggested that infants who are withdrawing from narcotics be placed in a quiet place, with decreased overall stimuli (Finnegan & Macnew, 1974; Kantor, 1978; Marty, 1987; & Flandermeyer, 1987.) The average neonatal care unit is far from a quiet place of low stimuli. The impact of the intensive care unit (ICU) environment on the patient has been studied by nurse researchers. The impact of noise on adults has been studied and definite physiological and sleep state changes measured as the noise level increases (Miller, 1974.) The noise level of the average adult ICU has been measured by a number of researchers (Hilton, 1985, 1987; Snyder-Halpern, 1985; Woods &



Falk, 1974) with agreement that the intensive care setting has a high noise level on the average and that the noise level can affect the patients ability to sleep and to recover from illness. Although there has been little research as to the light and noise stimuli in the Neonatal Intensive Care Unit, there are the same variety of ventilators, alarms and monitors in both settings, creating increased stimuli. Therefore the research regarding the light and noise stimuli in the adult ICU can be generalized to the Neonatal Intensive Care setting.

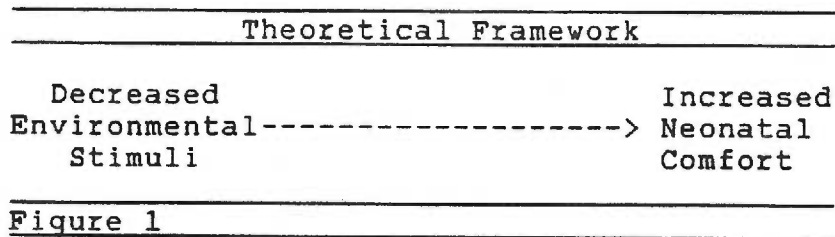
In summary, there appears to be a consensus in the literature that maternal drug use does adversely impact the infant and that most infants of drug using mothers will have some sort of withdrawal or abstinence syndrome identified. Methadone use is currently recommended for pregnant addicts to decrease complications associated with illicit intravenous drug use. The literature is in agreement that infants born to mothers on methadone or other drugs must be monitored in the hospital for neonatal narcotic abstinence syndrome. Nursing measures appear to help decrease the severity of the infant's withdrawal, yet there has been no nursing research to document the effectiveness of the nursing measures. The intensive care environment has been identified as a bright and

noisy place, the opposite of what is suggested for the infant exhibiting neonatal narcotic abstinence syndrome. Therefore there appears to be a need for additional nursing research in this area.

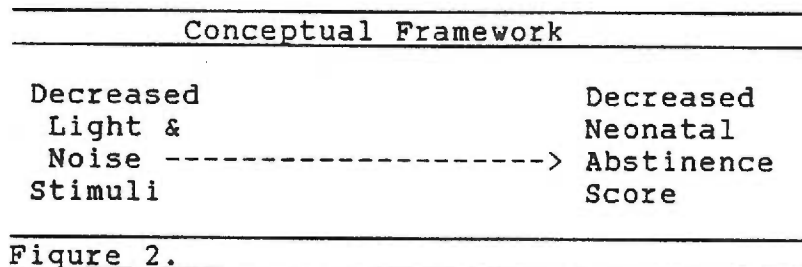
### Conceptual Framework

Nursing has been concerned with the impact of the environment on the patient since Florence Nightingale published her Notes on Nursing in 1859. Other nursing theorists have examined the relationship between the environment and the patient. Myra Levine stated that "the nurse creates an environment where healing could occur" (1966.) This author believes that the environment has an enormous impact on the patient, especially when the patient is a newborn infant withdrawing from passive narcotic use.

Studies have shown that the adult intensive care environment is noisy and this can be easily generalized to the neonatal unit. Nursing can help create an environment for the infant in which the infant can potentially be more comfortable. This can be incorporated into a beginning theoretical framework (Figure 1) in which decreased environmental stimuli leads to increased neonatal comfort.



This theoretical framework can be translated into a conceptual framework, with decreased environmental stimuli becoming decreased light and noise stimuli (Figure 2.)



A decreased neonatal abstinence score is viewed as being more comfortable for the infant, in that the infant is having fewer symptoms of withdrawal.

#### Study Question

The question for this study is as follows: What is the experience of methadone withdrawal infants who are placed in an environment with decreased light and noise stimuli as compared to those who are not.

## CHAPTER II

## METHODS

Subjects and Setting

The subjects were term (37 to 42 weeks gestation) infants born to mothers who were on a methadone maintenance program and who gave birth at Oregon Health Sciences University Hospital, in Portland, Oregon during the data collection period of September 1, 1988 to February 28, 1989. The infants considered were healthy except for their withdrawal problem. Infants requiring intensive resuscitation or supplemental oxygen were excluded. Infants on prophylactic antibiotics were included, but infants with overt sepsis were excluded. At OHSU all infants of drug-abusing mothers routinely receive urine drug screens at birth. The results of the urine screen identified potential subjects for the study. There was no exclusion for race, sex or social economic status.

Procedures

This researcher decided to use infants withdrawing from methadone rather than other drugs because women who are on a methadone maintenance program have had a measurable amount of narcotic ingestion. Whereas women on heroin, cocaine, or other street drugs have had varied drug intake, and there is no effective way to compare the influence of the various drugs.

The first step in selection of the sample for this study was for the Intermediate Neonatal Care Unit (INCU) admissions nurse to identify women in labor who were on a methadone maintenance program. The admissions nurse in the INCU is a rotating position, equally shared by all staff members. When a staff nurse is assigned to admissions, she or he is given a lighter assignment to be able to assist the pediatrician in high risk deliveries, and to be available to admit any infants to the unit. All the INCU staff were briefed on the criteria for inclusion in the study prior to and during the data collection period. The Labor and Delivery staff and the Mother Baby Unit (postpartum) staff were also informed about the study. The nursing staff contacted the researcher with possible candidates for the study. The researcher then reviewed the maternal history and infant's urine drug screen to determine if the infant qualified for the study. The infants had to be withdrawing from methadone only. If other drugs were identified, they were not included in the study.

If the infant qualified for the study, the researcher approached the mother on the Mother Baby Unit regarding her infant's participation in the study. After a thorough description of the study which included the risks and benefits of the study, the

mother was asked to sign an informed consent form (Appendix B) for her infant to participate in the study. All of the women whose infants were born during the data collection period, and who qualified for the study, agreed to have the infants participate in the study.

All of the infants initially went to the Mother-Baby Unit until they began to exhibit withdrawal symptoms. This time period varied for each of the infants. When the infants in the study began to exhibit withdrawal symptoms, they were transferred to the Intermediate Neonatal Care Unit (INCU) at OHSU. The infants were randomly assigned to either the experimental or control group on admission to the INCU. Random assignment was used because initially it was planned that more infants would qualify for participation in the study. The original study plan will be addressed further in the Discussion section. Infants assigned to the control group were placed in the standard open crib used on the unit. Those infants assigned to the experimental group were placed in an isolette covered with a quilted blanket, designed by the investigator for use in this study. The infant in the experimental group remained in the covered isolette for seven days, except when being fed, bathed, weighed or examined. This infant was coincidentally discharged

on day 9 of life, after exactly seven days in the isolette. Extended periods out of the isolette were recorded on the bedside flow sheet (Appendix C.)

Both the experimental group and the control group received the current standard of care given to infants withdrawing from passive methadone addiction. This standard care consists of providing comfort measures as needed. Most of the infants are swaddled and are moved to a quiet room or swing as needed to provide comfort. If rocking seems to comfort the infant, then a staff member or parent will rock the baby. It was explained to the staff of the INCU that these standard care measures were not to be withheld from the infants in the experimental group, but to be recorded on the bedside flow sheet to maintain a written record of these additional comfort measures.

#### Environmental Control

In order to document the differences in light stimuli in the covered and uncovered isolette, a light meter was utilized to determine the exact amount of light stimuli in the covered isolette and the average light in the room where the open cribs would be placed (Figure 3.)

Place of Measurement	Reading (footcandles)
Inside covered isolette	5 fc
Open crib	60-70 fc
Darkened room	10 fc
<b>Figure 3</b>	

Audiometry equipment measured the noise level in the isolette and in the area of the open cribs, for three different time periods in a 24 hour period; day, evening and night (Figure 4.) This was at a time of high census for the Intermediate Neonatal Care Unit (21 infants.) There was also no measurable difference in the readings between day, evening and night.

Place of Measurement	Reading (decibels)
Room noise	55-65 db
Covered open crib	55-65 db
Inside isolette (heater off)	48-55 db
Inside covered isolette (heater off)	40-45 db
Darkened room	48-50 db
<b>Figure 4.</b>	



The overall room noise in the unit was measured in the area of the infants' crib or isolette. It is noted that being in the isolette with out a cover does decrease the overall noise, yet the cover did decrease it slightly more. The "darkened room" described above consists of a small room located within the unit that is set aside for families to have privacy when visiting their infant or breastfeeding. This room is also used by the staff to decrease the environmental stimuli withdrawal infants receive. As noted above, the "darkened room" does have decreased light and noise stimuli when compared to the unit.

#### Measurement Tools

##### Neonatal Abstinence Score

The neonatal abstinence scoring system was developed by Finnegan in the early 1970's. The tool was developed as a quantitative measure of infant withdrawal (Finnegan et al, 1975.) During tool development, Finnegan found a high inter-rater reliability coefficient among the nursing staff (mean of 0.82) using the tool. Validation of the tool was attempted by measuring nutritive sucking behavior in methadone withdrawal infants and comparing sucking behavior with the abstinence score (Finnegan, Kron, Connaughton & Emich, 1975.) It was found that infants with poor sucking technique also had higher abstinence

scores.

For this study, both the experimental and the control groups had the neonatal abstinence score determined every four hours while withdrawal symptoms were present. The mean daily score for each infant was determined and this was used to indicate the severity of withdrawal. Although the Finnegan Neonatal Abstinence Score sheet (Appendix A) is routinely used on the unit, a review of the tool and inconsistencies in the use of the scale was addressed with the staff prior to the beginning of data collection.

The staff inservice (see Appendix E) consisted of both written and oral instructions as to the qualifications for the study and the use of the Finnegan Neonatal Abstinence Scale. A copy of the written staff inservice instructions (Appendix E) was posted on the unit throughout the data collection period. To minimize the inconsistencies in the use of the scale the following issues were addressed: 1) scoring the infant every four hours; 2) not giving the infant a "0" score if the infant is sleeping and 3) reminding the staff that there must be six scores daily in order to obtain a mean daily abstinence score. The use of the bedside flow sheet (Appendix C) was also discussed and instructions for using the flow sheet as well as an example of a filled out flow sheet were

presented. Copies of the sample flow sheet were also on the unit for the staff to refer to. The inservice also addressed the responsibilities of the admissions nurse to inform the researcher of possible candidates for the study.

#### Bedside Record

A record of other nursing measures, such as swaddling, rocking, placing in swing or the control infants being placed in a darkened room, was kept on a flow sheet at the bedside (Appendix C.) This data was collected because the researcher felt that there might be other variables, such as parental visits or placing the infants in a swing, which could affect the abstinence score, and this needed to be documented.

#### Demographic Data

Maternal demographic data which included the maternal methadone dosage prior to giving birth and any significant prenatal maternal history, such as infections, illnesses, or injuries (Appendix B.) was collected on a standard tool, developed by the researcher for this study. Demographic data regarding the infant such as the baby's gestational age, birth weight, length and head circumference was noted. Any medications that the infant received, such as paregoric or phenobarbital was recorded. Length of stay on the Mother Baby unit was also noted, to determine if this

was significant.

#### Protection of Human Subjects

This study was noninvasive and did not involve any experimental medications. The drug withdrawal infants received all ordered medical interventions. Current practice in the INCU does involve various measures to decrease light and noise, so this study did not introduce any new interventions. This study attempted to measure the effectiveness of the intervention. Patient confidentiality was maintained and a consent form was signed by the infant's mother to participate in the study (Appendix D.)

#### Analysis

Due to the small sample size, this study must be considered a descriptive case study. The information gathered with the use of the Neonatal Abstinence Score sheet and the bedside flow sheet, as well as maternal methadone dosage and infant demographic data will be described in the Results section. There will be no attempt to determine statistical significance of the data collected.

## CHAPTER III

## RESULTS AND DISCUSSION

The following chapter will discuss the results of this study regarding the effects of environmental manipulation on methadone withdrawal infants. This discussion will first individually describe the three subjects who participated in this study. The infants' abstinence scores, demographic data and maternal methadone dosage will be described. Originally this study proposed to be an experimental study with a sample size of ten subjects. The fact that the sample size was only three and the possible reasons for the lack of subjects who qualified for the study will be explored.

## Description of the Subjects

Collection of data took place from September 1, 1988 to February 28, 1989. During that time approximately 90 infants were admitted to the Intermediate Neonatal Care Unit with the primary diagnosis of passive drug withdrawal. Of those, 4 were identified via urine drug screen and maternal history, as withdrawing from methadone only. Only three of the above met the criteria for the study, and as mentioned before, all of the qualifying infants were enrolled in the study. These infants will be given the names of Baby A, Baby B, and Baby C to protect confidentiality.

Baby A

Baby A was a 37 week gestation caucasian male infant, born to a 30 year old woman with a history of intravenous drug abuse and currently on a methadone maintenance program. The infant's mother received 42mg of methadone daily, which was the highest of any of the study babies. Maternal history was significant for late prenatal care (first visit at 30 weeks gestation). During labor the baby was noted to have decelerations in his heartrate, indicative of some sort of stress. Apgars were 7 and 9, birth weight 2.91 kilograms (kg), length 48 centimeters (cm), head circumference 31.5 centimeters (cm). The infant's urine drug screen was positive for opiates. The infant went to Mother Baby Unit (MBU) for 18 hours after birth, then was transferred to INCU. Random assignment placed this infant in the control group, in an open crib. The infant's mean daily abstinence scores ranged from 13.8 to 2.0 (see Figure 5.) The infant was started on Phenobarbital 6.8 mg every 12 hours (4.6 mg/kg/day) on Day 3 of life. The infant began exhibiting water loss stools so he was started on Paregoric 0.1cc every 4 hours on Day 7 of life. The length of the infant's hospital stay was 27 days and the infant was discharged to home with his mother. This baby's long length of stay can partially be attributed to his need to be

Baby A

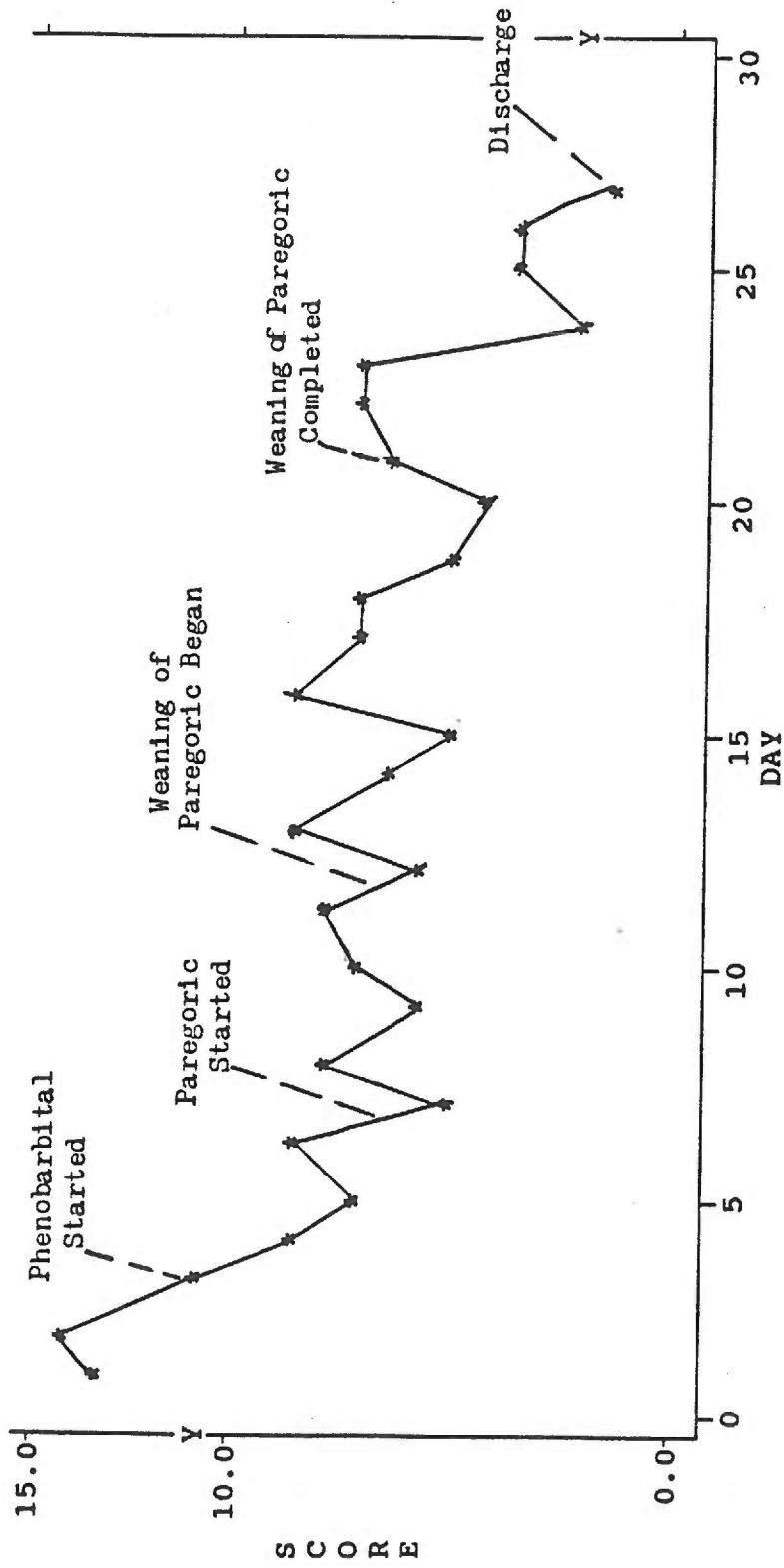


Figure 5. Mean abstinence scores on each day of life until discharge

slowly weaned from the paregoric prior to discharge. This is evident in the infant's mean daily abstinence scores, in that every time the scores began to drop, the paregoric dose was decreased, so the abstinence scores then increased accordingly. See Figure 5.

The other factors that may have an affect on the infant's withdrawal score were recorded on the bedside flow sheet (Appendix C.) The infant was swaddled throughout most of the study, with only short periods (<2 hours per day) of being unwrapped. The infant was moved to the darkened room approximately 2 to 4 hours per day. The parents visited on an average of every other day, with each visit lasting 45 to 90 minutes. During the parents visits, they held and fed the baby. During the last 15 days of the infant's hospital stay the infant was in the swing daily, for varied amounts of time, ranging from one hour to more than six hours in a 24 hour period. On the day of discharge the infant's mean abstinence score was 2.0.

#### Baby B

Baby B was a 38 week gestation male infant. This infant was born to a 27 year old woman on a methadone maintenance program of 30 mg per day, weaned down from 60 mg per day. There is no documentation in the mother's prenatal records as to how long the weanin process from 60 mg to 30 mg of methadone took.



Prenatal history was significant for smoking 1/4 packs of cigarettes per day. The baby was delivered via c-section which was done due to fetal distress. There was also thick meconium in the amniotic fluid. Apgars were 7 and 9 , birthweight 2.57 kg. The baby's urine drug screen was positive for methadone metabolites. The infant went to MBU for 22 hours. Upon transfer to INCU the infant was randomly assigned to the experimental group and placed in a covered isolette. The infant was removed from the isolette only for feeding, bathing, exams and visits from the family. The infant was started on Phenobarbital 10 mg every 24 hours (3.9 mg/kg/day) on Day 3 of life for severe withdrawal symptoms. The infant's mean daily abstinence scores ranged from 12.6 to 6.3 (Figure 6.) The infant was hospitalized for nine days and was discharged home to his mother.

The other factors which may have affected the infant's withdrawal score were recorded on the bedside flow sheet (Appendix C.) The infant was swaddled for 21 to 23.5 hours per day. The parents visited for an average of 3.9 hours per day. During the visits, the family held the infant for periods of one to two hours, which included feeding time. The visits often took place in the darkened room (see Figures 3 and 4 for light and noise measurements in this room.) The infant

Baby B

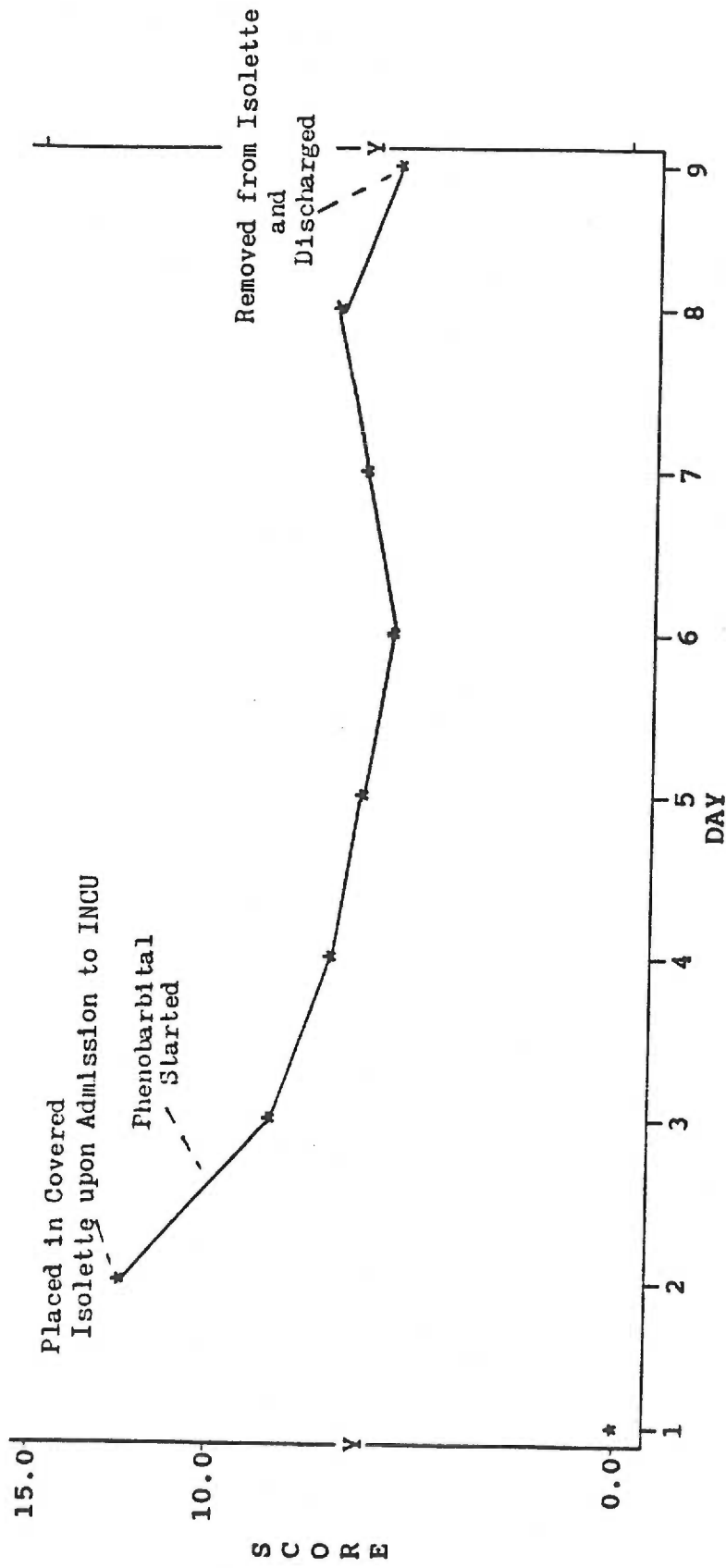


Figure 6. Mean abstinence scores on each day of life until discharge

was placed in the swing only once, for 2 1/2 hours, according to the bedside flow sheet. On day of discharge the infant's mean abstinence score was 6.3 on the Finnegan neonatal abstinence score.

#### Baby C

Baby C is a 37 week gestation male infant born to a 28 year old woman with a history of intravenous drug use, currently being maintained on 20 mg of methadone daily. This is this mother's second infant to be admitted to INCU for passive methadone withdrawal. Prenatal history was significant for cocaine and heroin use in first and second trimesters. Labor and delivery was uncomplicated. Apgars were 9 and 9, birthweight 2.79kg, length 47.5cm, head circumference 33.5cm. The infant's urine was positive for opiates. The infant went to MBU for 34 hours. Upon admission to INCU the infant was placed by random assignment in an open crib. The infant's mean daily abstinence scores ranged from 10.2 to 1.0 (see Figure 7.) On Day 6 of life, the infant was placed on Phenobarbital 12 mg per 24 hours (4.3 mg/kg/day) The infant was hospitalized for 11 days and then discharged home with his mother.

Other factors which affected the infant's withdrawal score were recorded (Appendix C.) The infant was swaddled an average of 21 hours per day. The infant was moved to a darkened room for at least 5

Baby C

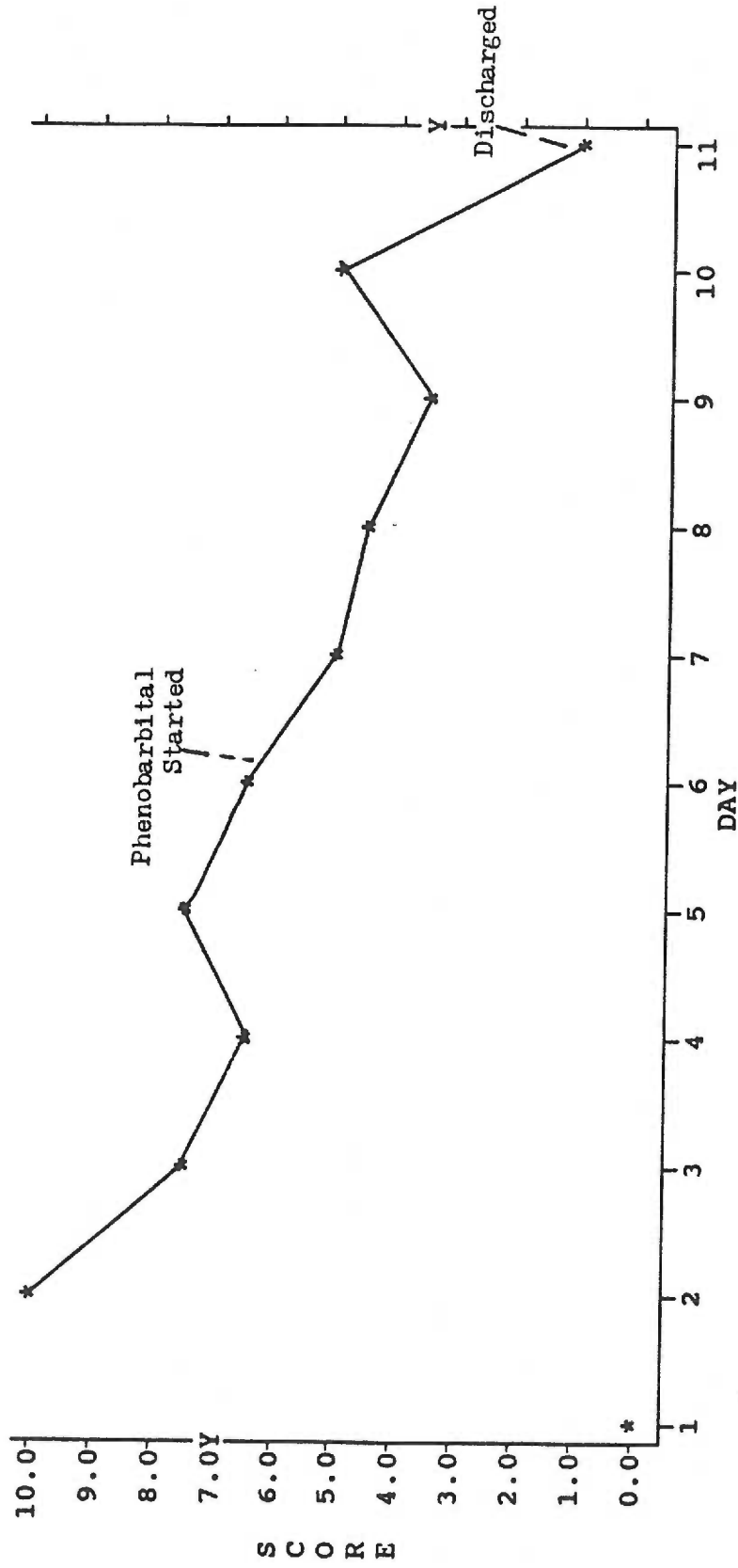


Figure 7. Mean abstinence scores on each day of life until discharge

or 6 hours per day. The parents visited minimal amounts of time ranging from five minutes to one hour. The staff (which included a volunteer) held the baby four to five hours per day. The infant was placed in the swing on only two days for periods of one to two hours. The infant had a mean abstinence score of 1.0 on day of discharge.

#### Discussion

This section will discuss the three infants and the similarities and differences between them. The three infants were all either 37 or 38 weeks gestation (Table 1.) Their birth weights ranged from 2.56 kg to 2.91 kg. These birth weights are similar to the mean of 2.815 kg Chasnoff et al (1982) found among the methadone infant subgroup (N = 39) in a study comparing methadone addicted infants with polydrug addicted infants. Kaltenbach and Finnegan (1987) had a slightly higher mean birth weight of 2.953 in their study of 141 methadone exposed infants. Their Apgar scores (Table 1) indicate that there was no fetal distress at birth, and compare with a study of 15 addicted babies White conducted in 1987, in which 7 of the 15 had one minute Apgar scores of 7 to 9 and 7 of the 15 had Apgar score of 9 or 10 at five minutes. These studies indicate that the birthweight and Apgar scores of the three infants in this study compare favorably with other

Table 1  
Relationships Between the Three Study Infants in  
Regards to Birth Statistics and Hospital Course

	Baby A	Baby B	Baby C
Group	Control (open crib)	Experimental (covered isolette)	Control (open crib)
Maternal Methadone Dose (mg/day)	42	30	20
Infant's Gestational Age (weeks)	37	38	37
Birthweight (kg)	2.91	2.57	2.79
Apgars (1 minute & 5 minute)	7 & 9	7 & 9	9 & 9
Length of Hospital Stay (days)	27	9	11
Phenobarbital Dose (mg/kg/day)	4.6	3.9	4.3
Needed Paregoric	Yes	No	No

methadone exposed infants who were studied.

The maternal methadone dosage ranged from 20 mg per day to 42 mg per day. As indicated before, one mother was weaned from 60 mg per day to 30 mg per day, this may have had some effect on the infant's withdrawal pattern. Note that the infant (A) whose mother was on the highest dose of methadone, also had the longest hospital stay and required paregoric to alleviate the gastrointestinal symptoms of withdrawal. This is consistent with the findings of Ostrea et al (1976) who found a significant correlation between the severity of withdrawal in the infant and the maternal methadone dosage ( $p < 0.025$ .)

All of the study infants were started on Phenobarbital for withdrawal symptoms. The dosage for the infants ranged from 3.9 mg/kg/day to 4.3 mg/kg/day. This was a medical decision and beyond the control of the researcher. As stated in the review of literature, phenobarbital in large doses, may significantly suppress the CNS of the infant, may impair the suck reflex and may delay bonding between mother in infant (American Academy of Pediatrics, 1983.) If Phenobarbital is prescribed to modify the "hyperactive" behavior in the infant, the Academy recommends a maintenance dose of 2 to 8 mg/kg/day. The Phenobarbital dose of the infants in this study did

fall within this recommended range. Inconsistencies in the prescribing of Phenobarbital for the study babies is noted. Baby A and Baby B were started on day 3 and day 2 of life respectively, when their mean abstinence score were 13 or above. Baby C was started on day 6 after his mean abstinence score had fallen to 6.3 from a high of 10.2. This does not follow the prescribing recommendations of Finnegan, who recommends that Phenobarbital be started when the abstinence scores are 8 or above or if the infant has seizures (1986.) This inconsistency the medical management among the infants, may be in part due to the fact that the medical staff rotates, and that different physicians cared for the study infants.

Only Baby A needed to be started on Paregoric. This infant had severe water-loss stools and the paregoric was prescribed to alleviate the gastrointestinal symptoms associated with withdrawal. This is consistent with the prescribing recommendations of the American Academy of Pediatrics (1983.) The infant was weaned from the Paregoric in the recommended manner, in that the dosage was decreased every time the mean abstinence score fell to below 8.

There was a notable difference in the length of stay for the three infants in the study (Table 1.) This did not appear to correlate directly with maternal



methadone dosage. Baby C, whose mother was on the lowest dose of methadone, was hospitalized longer than Baby B. This is another inconsistency between the medical management of the study infants. Baby B was discharged when his mean daily abstinence scores were 6.3, while Baby C was not discharged until his abstinence scores were 1.0. Baby A was discharged when his mean abstinence score was 2.0, after weaning from the Paregoric. All of the infants were discharged on maintenance Phenobarbital, to be weaned at a later date as an outpatient.

Another major difference between the study infants, is the amount of time the family spent visiting and caring for the infant during it's hospitalization. This may have impacted on the infants' abstinence scores, as well as its' length of hospital stay. As mentioned before, Baby B had regular, lengthy visits from his mother and her support person. Whereas Baby A and Baby C had less contact with their mother and family members, as mentioned previously. It is difficult to measure the impact of this on the abstinence scores, so this is just noted, and may be an area for further study.

As for the effectiveness of the intervention, decreased environmental stimuli, it is not possible to draw any conclusions between the experimental and

control babies, with this small of a sample. It should be noted that the baby in the isolette did have a shorter length of hospital stay, but this may be due to the inconsistencies mentioned above. As for abstinence scores, Baby C whose mother had the lowest maternal methadone dose, had the lowest overall mean daily abstinence scores, which is consistent with other studies of methadone withdrawal infants (Ostrea et al, 1976.)

#### Original Proposal for Study

Originally this study was proposed as an experimental study with a sample size of ten infants, with five infants in the experimental group and five in the control group. The experimental group would be placed in a covered isolette which would decrease the light and noise stimuli to the infant. The control group would be placed in an open crib, as is the current nursing practice at OHSU. The infant's mean daily abstinence scores using the Finnegan scale (Appendix A) were to be compared using a T-test. An analysis of covariance would be used to statistically remove the effect of maternal methadone dosage on the infant's abstinence scores. This original design was not carried out due to the lack of infants whose mothers used only methadone during the data collection period.

Previous to initiation of the study an average of 2 to 3 infants per month were admitted to the Intermediate Neonatal Intensive Care Unit. The drastic decrease in admissions during the study period required explanation. To investigate this decrease in admissions the researcher conducted a chart audit of the eight months preceding the data collection period and the data collection period itself. All patients identified in the INCU log book with the primary diagnosis of drug withdrawal or rule out withdrawal were audited to determine what the population of infants whose mothers were only on methadone and if there were infants who escaped this researcher during the data collection period.

In the eight months prior to the data collection period, there were nine infants admitted to the INCU with a primary diagnosis of passive methadone withdrawal. Eight of these infants would have qualified for the study, according to their urine drug screens. During the data collection period of six months, there were five infants admitted for methadone withdrawal, and three qualified for the study. One of the two infants who did not qualify had a urine drug screen positive for cocaine and marijuana as well as methadone. The other infant was premature (34 weeks gestation.) Thus it does appear that there was a

drastic decrease in the number of admissions for methadone withdrawal during the study period.

Obtaining a sample of women and infants who use only one drug or who are compliant with their methadone maintenance program appears to be a major stumbling block to research using this population. In a review of the literature Silverman (1989) also found that polydrug abuse is common in pregnancy and that it created difficulty in determining the effect of each individual drug on the fetus and infant.

## CHAPTER IV

## SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter includes the summary of the study; its pertinent conclusions and implications for nursing practice. It concludes with recommendations for further nursing research in the area of drug withdrawal infants.

Summary

The question this study addressed is as follows: What is the experience of methadone withdrawal infants who are placed in an environment of decreased light and noise stimuli as compared to those who are not.

The review of the literature shows that there is a void in the area of nursing research concerning the care of drug withdrawal infants. Although there are many suggestions for making the infant more comfortable, which might decrease the infants' abstinence score, there is no research to measure the effectiveness of the interventions.

This study consisted of a descriptive case study of three infants admitted to the Intermediate Neonatal Care Unit (INCU) during the data collection period from September 1, 1988 to February 28, 1989. The infants were randomly assigned to either an open crib or a covered isolette upon admission to the INCU. Throughout the infants' hospital stay the infants'

neonatal abstinence score was recorded every four hours and a bedside record was kept of other factors that could affect the infants abstinence score. Demographic data concerning the mother and the infant was obtained.

#### Conclusions and Implications for Nursing Practice

After reviewing the literature and based on the researcher's clinical experience with drug withdrawal infants, the investigator felt that decreasing the light and noise stimuli would help the withdrawing infant be more comfortable. This increased comfort would be evidenced by the infant having decreased overall mean daily abstinence scores. There is not enough supporting data from this clinical investigation to support this conclusion. One problem is the small sample size. It is impossible to make any conclusions based on a sample size of three infants. The other point to be made is that the infant in the isolette or the experimental group did not have the lowest abstinence scores. This may be due to the higher maternal methadone dosage, but this is inconclusive.

Upon examination of the data, it is noted that Baby B did have the shortest length of hospital stay. This could be due to many factors, among them the fact that the infant was in the covered isolette. Another major factor and probably the most significant factor is that the family visited for extended time periods

daily. This researcher feels that this has as great an impact as the intervention, if not greater. Another thought is that the staff had more interaction with this family and their consistency in visiting the infant and caring for him may have influenced the medical and nursing staff in their decision as to when to discharge the infant.

The implications of this study for nursing practice are limited. It is clear that the incidence of drug use during pregnancy is on the rise. Neonatal nurses are faced with the drug affected infant daily and there needs to be additional information regarding the affect of nursing interventions on the withdrawing infant. This study suggests that decreasing the environmental stimuli may decrease the length of hospital stay, but there are many other factors that need to be explored. Such as the impact of the family and if long daily visits to the unit to provide care for the infant affect the infant's withdrawal pattern.

This study needs to be expanded with a larger sample size and with polydrug affected babies. The impact of multiple drugs surely affects the infants' abstinence scores and length of hospital stay, and the impact of this needs to be studied. Obtaining a sample of polydrug affected babies should be relatively easy, given the current number of infants being admitted for

withdrawal.

### Limitations

This investigator acknowledges the limitations of this study. Unfortunately during the data collection period, only a few methadone withdrawal infants were admitted to the Intermediate Neonatal Care Unit and of these only three met the criteria for inclusion on the study. This limits the study in that statistically significant conclusions cannot be made regarding the effectiveness of the intervention. This may have been evident with a larger sample size.

Another limitation of the study may be the fact that it only included methadone exposed infants. This study and others have shown that the current trend is for women to use many different drugs during their pregnancy. Methadone maintenance programs are expensive and to get into one is difficult. It is cheaper and easier for women to use illicit street drugs, than it is to conform to a methadone maintenance program.

### Recommendations for Further Nursing Research

The investigator recommends that future research be done on the effectiveness of nursing interventions with drug withdrawal infants. The use of a larger sample size will make the results more conclusive and generalizable to other methadone withdrawal infants. A



comparison sample of cocaine-only or poly-drug exposed infants would widen the scope of the investigation and provide additional insight into the nursing care of these infants.

This study has generated many other questions regarding the nursing care of drug exposed infants. The following list presents five possible suggestions for further nursing research in this area.

1) An expansion of this study with methadone withdrawal infants, with a longer data collection period, to be able to obtain a larger sample size.

2) A comparative study with cocaine or polydrug exposed infants and methadone infants to compare the effectiveness of nursing measures between infants exposed to a variety of drugs during pregnancy.

3) A descriptive study of cocaine and polydrug effected infants, to develop a tool for use in measuring the infants withdrawal, since the withdrawal from cocaine and other stimulants is noted to be different from narcotics.

4) A descriptive study of the visiting and interaction patterns of the parents of the drug exposed infant.

5) A study that investigates the impact of the addicted mother's social support system (father of baby, significant other, or any other supportive people

she may identify) upon her ability to effectively parent her child.

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**APPENDIX A**  
**NEONATAL ABSTINENCE SCORE SHEET**



APPENDIX B  
DEMOGRAPHIC DATA COLLECTION TOOL



Maternal Information

Age \_\_\_\_\_ Para \_\_\_\_\_

Methadone Dosage \_\_\_\_\_

Significant History \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Neonatal Information

Birth Date \_\_\_\_\_ Gestation \_\_\_\_\_

Weight \_\_\_\_\_ Length \_\_\_\_\_ Apgars \_\_\_\_\_

Urine Screen \_\_\_\_\_

Significant Neonatal History \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

To MEU for \_\_\_\_\_ hours

APPENDIX C  
BEDSIDE FLOW SHEET



APPENDIX D  
CONSENT FORM

Oregon Health Sciences University  
CONSENT FORM

I, \_\_\_\_\_, understand that I am being asked to give consent for my infant, \_\_\_\_\_, to participate in a clinical investigation titled "The Effect of Environmental Manipulation on Narcotic Withdrawal Infants." I understand that the principal investigator is Teri Moser Woo, RN, BSN and that the information gathered will be used for a Masters Research Project at Oregon Health Sciences University School of Nursing. The faculty persons who are overseeing the project are Pam Hellings, RN, PhD and Dr. J. Reynolds.

I understand that the purpose of the study is to increase nursing knowledge regarding the care of infants withdrawing from maternal methadone maintenance. I also understand that my infant will be assigned by chance (flip of a coin) to the usual nursery care provided for all infants who show withdrawal signs or to a modified nursery care which has decreased light and noise stimuli. If my infant is assigned to the experimental group he/she will be placed in a covered isolette for a period of seven days after admission to the Intermediate Neonatal Care Unit. My infant will receive routine nursery care and feedings. I may remove my infant from the isolette for parental visitation and for feeding. Information on the infant's withdrawal signs will be collected on all infants for the duration of their stay in the hospital, as is routine for all of these infants admitted to the unit.

I understand that participation in this investigation is voluntary. I also understand that the medical and nursing management of my infant will not be affected by participation or nonparticipation in this study. I may withdraw my infant from the study at any time without jeopardizing our care at the hospital. I understand that neither my name or the name of my infant will be used in any publication of the data obtained or for publicity purposes.

I understand that decreasing light and noise stimuli is currently being used for methadone withdrawal infants and that there will be no risks or complications because of participation in this study.

The benefits to my infant include the potential of decreasing the infant's withdrawal symptoms. The benefits to nursing may be a better understanding of the effects of light and noise stimuli on infants withdrawing from maternal methadone maintenance.

I understand that I will receive a copy of this form.

I understand that there will be no additional costs incurred

by participating in this study.

The Oregon Health Sciences University, as an agency of the State, is covered by the State Liability Fund. If your child would suffer any injury from the research project, compensation would be available to you only if you establish that the injury occurred through the fault of the University, its officers or employees. If you have further questions, please call Dr. Michael Baird at (503) 279-8014.

Teri Moser Woo, RN, BSN has offered to answer any questions I may have. If I have further questions, I may contact Mrs. Woo or Dr. Pam Hellings at 279-8382.

I have read the forgoing and agree for my child to to participate in this study.

\_\_\_\_\_  
Parent's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Date

APPENDIX E  
STAFF INSERVICE

The Effect of Environmental Manipulation on  
Narcotic Withdrawal Infants

STAFF INSERVICE

Subjects: 10 infants withdrawing from passive addiction to methadone. This study will include infants of mothers who only use methadone during their pregnancy. Urine drug screens should have been done on all of the infants. Five of the infants will be in the control group (no intervention) and five will be in the experimental group. The experimental group infants will be placed in an isolette which will be covered with a special cover. They will be in isolette for 7 days.

Data Collection: The Neonatal Abstinence Score will be the primary data collection tool. The abstinence score should be done every four hours. There should be no 0 or sleeping scores. If the infant is sleeping during the scoring time change the time on the tool (example-if sleeping at 0800 but awake at 0700, change the time on the sheet to 0700). Because a mean daily abstinence score will be used, there must be six scores for each 24 hour period.

There will also be a three day flow sheet that will be on the patients clip board. This will be blue paper and is to be used for anything that you feel affects the abstinence score. I have attached a sample to give an idea of how it should be used. It is important that this is filled out since the abstinence score is used for data analysis.

Significant infant and maternal information will be collected by myself (such as L & D info. and septic w/u, etc.) so if you have any info. you feel is necessary on mom or babe please let me know.

There will be folders located in the patient education file that will have the extra three day flow sheet (blue pages) and the photo of the isolette set up. There will also be a folder for the filled in blue sheets.

Admission nurse: Please notify me of any women in labor who are on methadone. Call me any time, we have an answering machine to leave a message.



