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ORIGINAL ARTICLE

Neonaticide: A Comprehensive Review of Investigative and Pathologic Aspects of 55 Cases

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Abstract Analysis of neonaticide cases from a law enforcement perspective is virtually non-existent in the research literature. Nonetheless, law enforcement and prosecutors face unique challenges when investigating and prosecuting neonaticide; and a specialized, informed approach is necessary. By highlighting the crime scene characteristics and autopsy findings of 55 neonaticide victims, the authors hope to assist the law enforcement and legal communities in their neonaticide investigations. Specifically, this article clarifies how neonaticide occurs by chronologically examining the pregnancy, the birth and death of the infant, the subsequent crime scene (or scenes) and the pathological findings. The article also highlights the potential challenges that may arise during investigation and prosecution of these cases in addition to providing the forensic community with recommended investigative techniques.

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Neonaticide[1] has occurred in every country and by every culture. Historically, the killing of newborns was most often the result of illegitimacy, gender selection, economic hardship, or physical deformity (Resnick 1969). Yet, even with modern civilization's contributions and social acceptance of contraception, illegitimacy, and single-mothers, this complex and poorly understood crime continues to occur (Overpeck et al. 1998). Past research has reflected that neonaticide offenders are typically women who are young and unmarried (Resnick 1970). However, more recent literature reveals that neonaticide offenders are of every race, age, educational level, marital and socioeconomic status (Oberman 1996; Riley 2005). Women in their thirties and forties also commit neonaticide as well as women who are married (Beyer et al. 2008). It appears women from a variety of ages and life circumstances are capable of committing neonaticide in response to a conflicted pregnancy (Riley 2005).

Women who kill their newborns are something of a mystery to present-day culture even with the advances in the medical, psychological, and behavioral fields. In response to what many find inexplicable, society tends to think of mothers who kill their newborns as irrational and pathological, labels that encompass a variety of explanations including mental illness, menstruation, poor socialization, domestic pressures, or a broken home (Coughlin 1994; Wilczynski 1991). In reality, neonaticide offenders are rarely psychotic, but often are perceived as less culpable

[1] Neonaticide is commonly defined as the killing of a newborn within 24 h of birth most commonly by the biological mother (Resnick 1970).

by the criminal justice system (Alder and Baker 1997; Craig 2004; Dobson and Sale 2000; Resnick 1970; Shelton et al. 2010). Common factors mitigating culpability include the emotional and physical turmoil over an unwanted and/or illegitimate pregnancy, most often present in youthful offenders (Haapasalo and Petaja 1999; Resnick 1970; Shelton et al. 2010).

Not surprisingly, then, law enforcement and the criminal justice system face unique challenges when investigating and prosecuting neonaticide cases. These types of cases can be resource-intensive, emotionally charged, and difficult to resolve (Beyer et al. 2008). Since investigators are often unfamiliar with this exceptional crime, they may be perplexed when faced with certain case dynamics: variation in offender characteristics, intermittent denial of pregnancy, the physical and emotional resiliency of the offender, and the lack of documented mental illness and criminal history (Beyer et al. 2008). In summary, neonaticide investigations require a unique, informed approach. The objective of this article is to assist the forensic, law enforcement, and legal communities in their neonaticide investigations and prosecutions. By highlighting research into the crime scene characteristics and autopsy findings of 55 neonaticide victims, our goal is threefold: to clarify how neonaticide occurs by chronologically examining the pregnancy, the birth and death of the infant, and the subsequent crime scene (or scenes) and pathological findings; to highlight the potential challenges that may arise during investigation/prosecution of these cases; and to provide the criminal justice system with recommended investigative techniques.

Prevalence

The United States has the fourth highest of rate of infant homicide relative to population size, trailing Japan, Austria, and Finland, respectively (Briggs and Cutright 1994). The National Center for Health Statistics Report for the year 2000 reflected that homicide was the 15th leading cause of death (COD) during the first year of life in the United States (Murphy 2000). In addition, the risk for homicide is greater in infancy than in any other year of childhood, especially during the first 4 months of life (Overpeck et al. 1998). More specifically, the first day of life reflects the greatest risk for homicide with rates at least 10 times greater than any other time of life (Overpeck et al. 1998).

Although various studies have attempted to estimate the rate of occurrence of neonaticide, these are no doubt underestimates (Herman-Giddens et al. 2003; Meyer et al. 2001). The covert nature of neonaticide makes estimations problematic for a variety of reasons. Upon delivery, the disposal of a newborn is relatively easy and, as a result, difficult to attribute to any one person. Pathological examinations of a newborn may result in non-specific pathological findings, and the incidents may be classified under different charges (Herman-Giddens et al. 2003). Typically only those cases that involve medical complications, unsophisticated crime scenes, or obvious body disposal efforts come to the attention of law enforcement and/or medical professionals (Beyer et al. 2008).

The Path to Neonaticide

A perpetrator's pre-offense environment and stressors are often manifested at the crime scene. If the context is understood, investigators and medical examiners can observe and document important, but often overlooked, evidence. But what factors commonly precede a mother killing her newborn? Various studies have consistently reported recurring demographic findings of neonaticide offenders, to include typically young, unmarried offenders who concealed and/or denied the pregnancy and who received no prenatal care (McKee 2006; Oberman 1996; Pitt and Bale 1995; Resnick 1969; Riley 2005; Spinelli 2001). The relationship with the father of the newborn has typically ended or is dissolving, and the majority of the women live at home with parents or other relatives at the time of the birth (Riley 2005).

Nonetheless, there have been very few studies that systematically examine the pathway that women take to neonaticide. However, one recent study by Riley (2005) paints a more detailed picture of the steps these women take during the homicide and the previous gestational period. By conducting interviews with nine neonaticide offenders, Riley highlights the behavioral and psychological responses integral to the act of neonaticide: 1) fear, 2) concealment, 3) emotional isolation, 4) denial, 5) dissociation, 6) panic, and 7) homicide.

The pathway to neonaticide often begins with the discovery of an unplanned pregnancy. In response to this discovery, women describe a sense of disabling fear. Fear seems to be a pronounced factor in the motivation of neonaticide and is associated with the shame and guilt of having a child out of wedlock (Pitt and Bale 1995). In particular, neonaticide offenders often express concern regarding their parents discovering the pregnancy (Beyer et al. 2008; Marcikie et al. 2006; Sadoff 1995). As a result, they take action to conceal their body's physical changes to include wearing baggy clothing, decreasing visits with family and/or friends or hiding out in their bedrooms. Their deliberate physical isolation may lead to emotional isolation where the lack of meaningful and supportive relationships prevents the offender from confiding in another. Denial of pregnancy is a woman's recurring

response during this time (Oberman 1996; Spinelli 2001). This denial is often described as an ebb and flow of awareness and compartmentalization (Oberman 1996; Spinelli 2001). For example, one offender is quoted as saying, "My stomach was pretty out there. I don't know why it was that I felt like nobody else could see my stomach" (Riley 2005, p. 16).

At the onset of labor, the neonaticide offender rarely seeks medical care, but instead retreats to a private location, often the residential bathroom or her bedroom, and delivers the child. Various researchers have reported that a mother's delivery in a nonmedical setting is a significant risk factor for neonaticide. Meyer et al. (2001) found that almost all of the women in the neonaticide category killed their newborns in bathrooms, bedrooms, or other nonmedical settings. Emerick (1986) reported that 95% of those victims killed on the first day of life were born in a nonhospital/medical setting, a finding also endorsed by Overpeck et al. (1998) and Cummings et al. (1994).

During the labor and delivery, women often describe dissociative-like experiences, characterized by the inability to remember details, limited amnesia (e.g., flashes of memory), blacking out, and/or viewing themselves outside of their bodies (Atkins et al. 1999; Briere 1992; Putnam 1989; Riley 2005; Shelton et al. 2010). Once the newborn is delivered, the offenders experience intense panic, having made no plans for the birth or care of the child. With the arrival of the baby the mother now becomes focused on silencing the infant and finding a way to "get it away" from her (Riley 2005, p. 22).

Pitt and Bale (1995) suggested that the actual act of neonaticide is not premeditated, but rather the offender reacts based on fear, shock, and guilt. This lack of premeditation can be reflected in the fact that many offenders equate labor pains with defecation, constipation, or menstrual cramps (Schwartz and Isser 2000). The offenders typically report being totally shocked when a baby appears. Many offenders give birth silently, often reporting a lower level of pain that is usually associated with childbirth (Mendlowicz et al. 1999). In other cases, the offenders admit to experiencing intense pain, but exert enough self-control not to make a sound (Schwartz and Isser 2000). A silent delivery is often necessary given that, in a majority of cases, neonaticide offenders give birth while others are nearby. Putkonen et al.'s (2007) study of 32 neonaticide offenders found that 59% of the mothers gave birth while someone else was in close proximity. While some theorize that the offender's rationalization and denial allow this atypical response to childbirth (Finnegan et al. 1982), others suggest this behavior further supports intentional concealment, as one would expect a woman to call for help if she was truly unaware of her pregnancy, but instead found herself giving birth (Porter and Gavin 2010). When the baby is delivered (often directly into the toilet) the mother typically attends to herself and does not assess the condition of the baby for some time. The mother may cut the umbilical cord with a makeshift tool (e.g., scissors, razor blade, nail file) and the baby is typically placed in some type of container (e.g., plastic bag or towel). The blood is cleaned up and the young woman often resumes her normal, daily activities (Schwartz and Isser 2000). Attempts to conceal the birth range from immediate disposal of the infant's body to long term storage of the body in the mother's personal surroundings. Once the infant is discovered, offenders often attempt to obscure their culpability by attributing the death to a heavy menstruation, miscarriage, an accident, or natural causes (Stanton and Simpson 2001).

Pathological Findings

Newborns are killed in a variety of ways; however, it is more likely for the deaths to be a result of inaction by the mother, as opposed to a violent action that is more often seen in the killing of older infants (Marks 2008). A look at past neonaticide studies reveal an emerging trend among cause of death determination. Although some newborns are simply abandoned, or die from blunt or sharp force injury, asphyxiation appears to be the most commonly reported COD (Corey and Collins 2001; Crittendon and Craig 1990; DiMaio and DiMaio 2001; Meyer et al. 2001; Pitt and Bale 1995; Resnick 1969). Asphyxiation is most often accomplished through suffocation, smothering, or drowning (Feldman 2007). Common instruments include the mother's hands, containers, bags or towels, or toilet water (Arboleda-Florez 1976; Bloch 1988; Bourget and Labelle 1992; Mayhew 2007; Resnick 1970). Often the child is born directly into the toilet which poses unique challenges for pathologists (Mitchell and Davis 1984). The brief time interval between delivery and immersion into the toilet water may not allow for expansion of the lungs with air, and other associated "air-dependent" signs such as air in the gastrointestinal tract (Mitchell and Davis 1984). Furthermore, decomposed or skeletonized remains make the determination of independent life very difficult (Kahana et al. 2005; Spitz 1993).

In many cases, the filing of criminal charges depends upon the findings and conclusions of experienced investigators and pathologists. Often, the case hinges on a determination of live birth, viability (when the newborn is able to exist separately from the mother), and COD determination by the pathologist. Viability varies from state to state, but most jurisdictions define it as greater than 24 weeks gestation (Collins 2010). Although state statutes vary, generally speaking, the pathologist must determine the

following with reasonable medical certainty: 1) the child lived outside of the mother and achieved a separate existence, and 2) COD was a deliberate act of commission or omission by the mother (Kellet 1992).

Medical examiners utilize various tests to determine live birth. The most useful tests include analysis of gastric contents and aeration of the respiratory and gastrointestinal tracts (Mitchell and Davis 1984). Other related tests include middle ear aeration and evaluation of the umbilical stump for signs of postnatal vital reaction. Less reliable at autopsy is the evaluation of intestinal gas patterns and lung to body weight ratios (Mitchell and Davis 1984). Even if live birth status and/or COD cannot be determined, concealment of the birth and the improper disposal of a body are considered criminal acts and may be punishable depending upon the laws in a given state.

Method

For the purpose of this research, neonaticide is operationally defined as the killing of one's biological newborn infant less than 24 h after birth. Fifty-four female offenders with 55 related infant deaths were examined in this study. (One offender killed two infants in separate incidents.) The cases included in this study occurred from 1992 to 2009. Given that there is no national repository for these offenses, offenders were identified through various sources, such as the FBI's internal Automated Case Support (ACS) database, Violent Criminal Apprehension Program (ViCAP), FBI National Academy graduates, LexisNexis, and other public-source databases. Cases were obtained from 20 states: Alabama, Arizona, California, Delaware, Florida, Georgia, Kansas, Kentucky, Louisiana, Nevada, New Jersey, New York, North Carolina, North Dakota, Oregon, Pennsylvania, Texas, Virginia, Washington, and Wisconsin. The District of Columbia is also represented.

Neonaticide inclusion criteria entailed the following: 1) female offenders who killed their biological children within the first 24 h of birth, 2) medical determination of live birth and subsequent death of the baby, and 3) a criminal charge against the biological mother for the death of infant.

Materials and Procedure

Upon identifying offenders who met inclusion criteria, trained researchers assigned to the FBI's National Center for the Analysis of Violent Crime (NCAVC) requested available detailed case records from prosecutors' and medical examiners' offices and local, state, and federal law enforcement agencies. Requested documents included police investigative, psychological, and autopsy reports, as well as medical and offense records. Police interviews with the offender and family members, court transcripts, and sentencing information were also collected. Requests for case materials were made through telephone calls, letters, and/or travel to the law enforcement agencies. Thereafter, follow-up calls were made to law enforcement agencies requesting additional information.

Data collected from case records were extracted from the files and recorded onto a 232-question protocol that was developed by the NCAVC and peer reviewed by the NCAVC's external Research Advisory Board (RAB). The RAB, comprised of 15 nationally and internationally recognized researchers, scholars, and practitioners, assists the NCAVC in producing high-quality, academically-sound research. Autopsy reports and related documents were reviewed by a forensic pathologist, who serves as a consultant to NCAVC and is a member of the RAB.

Based upon previous NCAVC research protocols, the neonaticide protocol focused on areas considered to be useful for investigations. The protocol is divided into three areas: offender background, offense information, and victimology. Offenders background information includes demographics, as well as educational, marital, employment, medical, mental health (prior to, during, and after the offense), and criminal history. The offense section includes information such as the date, time and location of the offense, precipitating factors, weapon used, COD, body disposal and recovery, immediate post offense behavior, arrest, case disposition, and sentencing information. The victimology section is a summary of demographics, family structure, and environment. A victim addendum of 114 questions, which replicates the victimology and offense section, is completed in cases involving multiple victims. Therefore, multiple victims are captured, but offenders are not counted more than once in the data.

Interrater reliability was established and conflicting questions were reviewed by the primary coder. The completed protocols were then entered into IBM SPSS Version 17.0 (SPSS Inc., Chicago, IL) for analysis. Descriptive and frequency statistics were generated for various offender, victim, and offense characteristics.

The autopsy reports were all reviewed and a database was prepared documenting COD, level of decomposition, and gestational age based on information provided in the original reports. A forensic pathologist reviewed the stated COD opinions of the examining pathologist to determine a succinct COD for coding purposes.

Various parameters were used to determine gestational age including recorded weight, fetal length, foot length (see Wigglesworth 1996), and opinions of the original pathologist. The level of decomposition was recorded based on the observation and opinion of the original examining pathology. For coding purposes decomposition was divided into the four main categories: none, mild, moderate and severe.

Results

Offender Demographics

The mean age of the 54 female offenders was 21.7 years. The mode was 18 years, with a range 13–42 years. Twenty-eight (52%) offenders were Caucasian, followed by 11 (20%) Hispanic, eight (15%) African-American, two (4%) Asian and five (9%) Native-American.

Obstetric History

Eighteen (33%) of offenders had other living biological children at the time of the offense. Twenty-three (43%) of offenders had previously been pregnant although not all had resulted in live births (abortion, miscarriage or stillbirth).

Pregnant Appearance

Forty-three (80%) of the 54 offenders displayed physical changes consistent with pregnancy. Witnesses most often reported enlarged abdomen and breasts, changes in the offender's walk, and swollen ankles.

Others' Awareness of Pregnancy

Fifty-two (96%) of the 54 offenders were hiding the pregnancy from family members, typically the offender's parents. Only one offender informed her biological mother of the pregnancy prior to delivery. Another offender confirmed the pregnancy to her biological father. However, the offender did not live with him as he was incarcerated at the time of the offense.

In 24 of the 55 cases (44%), the offender had confirmed the pregnancy to someone. In 21 of these 24 cases (88%) at least one age-related peer (e.g., biological father of the infant, friend, sibling, roommate, or cousin) knew of the pregnancy. In 11 (46%) of the 24 cases, only the biological father of the infant was aware of the pregnancy. In five (21%) cases, a medical doctor was aware of the pregnancy because the offender had contacted or been seen by a doctor. In an additional 23 (42%) cases someone strongly suspected the offender was pregnant. Those who suspected the pregnancy often included the offender's parents, teachers and co-workers.

Household Dynamics

Fifty-two (96%) of offenders lived with someone else at the time of the offense. Twenty-six (50%) of offenders were living with their parents when they committed the neonaticide. Of those offenders living with their parents, 20 (77%) also lived with other people in their parent's home. They included siblings (n=17), other relatives (n=2), biological children (n=2) and a friend (n=1). Twenty-six (50%) of offenders were not living with their parents at the time of the neonaticide. In those cases, they lived with a variety of other people, to include biological children (n=11), husband (n=7), other relatives (n=7), friends (n=8), siblings (n=2), boyfriend (n=2), and guardian (n=1).

Victim Demographics

Because neonaticides comprise the entire sample, the age of all 55 victims was less than 1 day. Males accounted for 30 (55%) of the victims; females, 25 (45%). Twenty-seven (49%) victims were Caucasian; ten (18%) were Hispanic; eight (15%) were bi-racial; five (9%) were African-American; three (6%) were Native American and two (4%) were Asian.

Crime Characteristics

Birth Location

Bathrooms were the most common delivery location, occurring in 36 (65%) of the 55 cases, with birth directly into the toilet in 22 (61%) cases. In six (17%) cases, the birth occurred in a shower/tub. In eight (22%) cases, the exact location in the bathroom was unknown. The bathrooms were located in the offender's residence (n=29, 81%), motel/hotel (n=3, 8%), public building (n=3, 8%), or dorm room (n=1, 3%).

For those in which the delivery did not occur in a bathroom, the birth location was the offender's residence (n=14, 25%), a motel/hotel room (n=2, 4%), and an outhouse (n=1, 2%). In two cases (4%) the birth location was unknown.

Others Within Close Proximity

In 41 (75%) of the 55 cases, adults(s) and/or child(ren) were in the same living space as the offender during the birth and murder. However, in 36 cases (88%) the adults(s) and/or child(ren) were unaware.

Nurturing/Life-sustaining Behaviors

Of the 55 cases, ten offenders (18%) engaged in behavior after the birth of the infant that could be considered nurturing or life sustaining (i.e., breast feeding, dressing the infant, purchasing a pacifier or baby bottles).

Weapons/Implements

A weapon/implement was used in 43 of the 55 cases (78%). The most common type of weapon/implement used was an

asphyxiant in 37 cases (86%). A sharp cutting instrument was used in four (9%) cases. In 5 (11%) of the cases, a blunt force instrument was used.

A variety of mechanisms were used in the 37 asphyxial related deaths. The mechanisms used were plastic bag (n=14, 38%), water (n=11, 31%), cloth (n=3, 8%), foreign body (n=3, 8%), ligature strangulation (n=2, 5%), manual strangulation (n=1, 3%), and duct tape (n=1, 3%). In two cases (5%) the asphyxial mechanism was not specified. In two (6%) cases, multiple asphyxial mechanisms were used: foreign body with a plastic bag; and plastic bag with a cloth.

Container Disposal

In 43 of the 55 cases (78%), the offender placed the victim in some type of container either prior to, during or after death. For 30 of these 43 cases (70%), a plastic/paper bag was used. Other types of containers included linens/clothing (n=9, 21%), travel gear (n=4, 9%) (e.g., suitcase, backpack), food containers (n=3, 7%) (e.g., popcorn tin, coffee can, cooler), laundry basket (n=2, 5%), and storage containers (n=2, 5%).

Body Recovery

In 32 of the 55 cases (58%), the victim's body was recovered in an indoor location. In 18 cases (33%), the body was recovered in an outdoor location. In one (2%) case the body was recovered in water. In four cases (7%), a vehicle was the location of the body recovery, to include both functional and abandoned vehicles.

The offender's residence was the location of the body recovery in 29 (53%) of the 55 cases. Of those 29 cases, 23 (79%) were recovered in the interior of the offender's residence. Bathroom and bedroom closets and cabinets were the typical locations of recovery. In six of the 29 (21%) cases, the body recovery location was the exterior of the offender's residence. Trashcans, the backyard and the roof were the specific exterior locations.

Body recovery was in a non-residence outdoor location (e.g. a field, port-o-potty, side of the road) in six (11%) cases, followed by a dumpster/dump/landfill (n=5, 9%), vehicle (n=4, 7%), other residence (n=3, 6%) other structure or dwelling (n=3, 6%), business (n=2, 4%), motel/hotel room in (n=2, 4%) and lake (n=1, 2%).

Pathology Determinations

Cause of Death (COD)

The examining pathologist identified a cause of death in 46 (84%) of the 55 cases. In nine (16%) of the cases the cause of death was undetermined. Of the 46 cases where a COD was determined, 37 (80%) were asphyxial related deaths. Of these, 23 (62%) were due to suffocation; 11 (30%) were due to drowning; and three (8%) were due to strangulation.

The examining pathologist identified a single COD in 31 (56%) of the cases. In 15 (27%) of the cases the pathologist identified the COD as being multi-factorial. For the 31 cases in which a single COD was found, 11 (35%) were due to drowning; 9 (29%) were due to suffocation; four (13%) were due to sharp force injury; three (10%) were caused by strangulation; two (7%) were due to blunt force injury; and two (7%) were due to exposure. In 15 cases the death was due to a combination of causes. Of the multi-factorial causes of death, the following causes were reported: suffocation (n=14), exposure (n=12), blunt force injury (n=3), and cocaine intoxication (n=1). The most common combination was suffocation and exposure occurring in 11 of the 15 cases (73%).

Degree of Decomposition

For 41 of the 55 cases (75%), there was no decomposition of the infant's body. Three (5%) infants were described as having mild decomposition, while an additional three (5%) were described as having moderate decomposition. For eight (15%) infants, the pathologist opined that the degree of decomposition was severe.

Autopsy Weight

The autopsy weight was recorded by the medical examiner in 51 (93%) of the 55 victims. The average autopsy weight was 2,781 g (6.13 lb) with 41 (75%) victims weighing more than 5.5 lb (SD 1.37 lb; range 1–9 lb). In the 41 cases with discovery in the early postmortem period (those cases without physical evidence of decomposition or mummification), the weight range was 2.7–8 lb (1240–3629 g).

Estimation of Gestational Age

The authors estimated the gestational age in 49 (89%) cases to be full-term (37 weeks or greater). This estimation was based on review of multiple growth parameters, including fetal length, foot length, and weight. In six (11%) cases, the infant was considered preterm (less than 37 weeks). Of those six cases, the earliest gestational age recorded was 28 weeks.

Foot Length

In 29 (53%) cases, medical examiners documented the victim's foot length. The range was 6.0 cm to 8.9 cm. The average foot length was 7.7 cm (SD 0.65 cm). Based on the authors' review of records of those cases

with recorded foot lengths, 24 of 29 (83%) fall into the parameters of "full term." Full-term was considered 7.35 cm or greater.

Physical Deformities/Congenital Anomalies

Three (5%) infants were born with easily observable malformations. One infant had a deformity of the foot, including the absence of two toes. Two infants had supernumerary toes or fingers. None of the victims manifested significant or life-threatening congenital anomalies.

Live Birth Recorded

In 48 (87%) of cases, the examining forensic pathologist specifically listed "live birth" on the autopsy report. For the remaining seven (13%) cases, "live birth" was not specifically noted although it is assumed since all deaths were determined to be homicide.

Toxicology

In 37 (67%) of cases, a toxicology screen was conducted on blood from either the infant and/or placenta (afterbirth). In four (7%) cases, the autopsy report indicated no toxicology tests were performed. In 14 (25%) cases, the researchers were unable to determine whether toxicology was performed because the report did not indicate either way. The most common toxicology sample submitted was infant heart blood. In three cases the toxicology sample submitted was placental blood.

In 22 (59%) cases, the results were negative for screens of major therapeutic and abused drugs. In six cases, toxicology results were positive for various drugs. These cases included two offenders who tested positive for cocaine or cocaine metabolites, one offender who used multiple substances including methamphetamines and morphine, one offender who used salicylates (aspirin), one offender who used diphehydramine (i.e. Benadryl) and one offender who tested positive for cocaine or cocaine metabolites, methamphetamine, and diphenhydramine In six cases small levels of ethanol were detected which were thought (by the authors) to be due to post-mortem production.

Condition of Umbilical Cord

In 23 (42%) of cases the umbilical cord edge was described in the autopsy report. Of these cases, the examining pathologist described the cord as "torn" in 11 (48%) cases, cleanly cut in ten (43%) cases and that the cord appeared cut with an irregular edge in two (9%) cases.

Placental Recovery

In 36 (65%) of cases, the placenta was recovered and analyzed. For the remaining cases, the placenta was either not recovered (n=12, 22%) or not reported in the autopsy (n=7, 13%).

Discussion

Law enforcement and the criminal justice system face unique challenges when investigating and prosecuting neonaticide cases. Investigators are often unfamiliar with neonaticide, and when it occurs, it is frequently the agency's first death investigation of this type. A specialized and informed investigative approach is necessary.

Typically, law enforcement is notified about this potential crime in one of two ways: 1) the body of a newborn is discovered, or 2) the offender presents for medical care due to such problems as heavy vaginal bleeding. Investigators should be prepared to investigate these calls as homicides, especially when it has been reported that a woman has given birth unattended in a non-medical setting and has presented without an infant.

The authors aim to assist law enforcement and legal communities by highlighting the potential challenges that may arise during the investigation and prosecution of these cases, and by recommending investigative techniques. Challenges and suggestions are highlighted among four categories: 1) Crime scene investigation, 2) General investigation, 3) Offender interview/interrogation, and 4) Autopsy and pathology.

Crime Scene(s) Investigation

Neonaticide victims are recovered in a variety of locations to include sewers, trash dumps and public bathrooms. For the majority of cases within the current study the body recovery location was within the offender's residence and was within close proximity to the delivery location, the bedroom or bathroom. Neonaticide offenders often ignore the signs of labor and attribute their physical symptoms with the flu or heavy menstruation and retreat to their bathrooms and bedrooms.

Given the small size of an infant's body and the frequent occurrence of bathroom and/or toilet deliveries, many newborns are disposed like refuse, often placed in a bag(s) and put in a trash container (Shelton et al. 2010).

Regardless of the body placement or recovery location, a thorough crime scene investigation is very important in cases of neonaticide because the usual causes of death, asphyxia and exposure leave little to no evidence of trauma (Collins 2010). Law enforcement consultation with a

pathologist while still on scene is helpful, in that determination of some causes of death, particularly drowning and certain forms of asphyxia, are dependent on scene findings.

A compromised or altered crime scene may also prove challenging for investigators. Investigators should also be aware that labor, delivery, homicide, body disposal, and placental disposal may all be separate evidence recovery areas. Disposal may be in a variety of locations, including a garage, backyard, outdoor trash can, or vehicle. Because of this, a thorough scene investigation with photographic documentation must be conducted at all potential sites of infant delivery and/or disposal. Attempts may have been made to clean up scenes; therefore, forensic resources, such as alternative light sources and Luminal, should be considered. Since toilet births are very common, it is recommended that documentation of the toilet be made including make, model, measurements, water level, and water flow. If feasible, it is recommended that the toilet be removed and taken into evidence. Artifacts discovered with the body and placenta, such as bags, blankets, and other containers should also be collected (Saukko and Knight 2004).

Diligent efforts should be made to recover the placenta and severed umbilical cord and provide those to the pathologist for examination. In cases wherein the placenta is not recovered with the infant, the offender should be questioned about its disposal location. Important clues as to COD and overall health of the baby while in the womb may be found not through examination of the actual body, but instead through examination of the placenta.

General Investigation Recommendations

The offender's medical records from the year preceding the birth should be subpoenaed. Law enforcement should obtain records, not only from personal physicians, but also from any health centers, clinics, and/or hospitals in and around where the offender lived and worked. It is important to review prenatal and obstetric records for all prior pregnancies, including live births, miscarriages, and/or abortions. Several offenders within this study received medical care during the pregnancy and the pregnancy was confirmed to her by a doctor. It should be noted, however, that many of the offenders who sought medical care during the pregnancy did so for some other health issue or ailment (e.g., back pain, yearly physical, urinary tract infection) and did not reveal the pregnancy to the doctor. Obstetric and gynecological records can help refute a history of high-risk pregnancy which may become a mitigating factor during the prosecutive phase. In addition, this information may be helpful during the interview of the offender when discussing the similarities and differences among her prior pregnancies and the pregnancy resulting in neonaticide.

It is also suggested that investigators obtain all psychiatric and mental health records for the offender, including those from school psychologists, social workers, psychologists, psychiatrists, and/or psychiatric nurses. Relevant records include, but are not limited, to psychological evaluations, psychological tests, individual, group, and/or family counseling notes, as well as inpatient and outpatient treatment notes. A previously diagnosed psychiatric disorder as well as a lack of prior mental health problems are important to document and may better assist prosecutors in disputing a mental illness defense.

Additionally, a search warrant should be served for the offender's wireless devices, including mobile phones and computers, as well as the recovery of emails and text messages, and information from social networking sites which may have direct or indirect references to an offender's physical status and symptoms. Forensic computer examinations and mobile phone activity should not be limited to days or weeks before the homicide, but be expanded to cover the entire pregnancy period. A number of offenders within this sample conducted searches on their computer related to pregnancy, self-abortion, and how to kill a fetus throughout their pregnancy. In addition, notes, writings, diaries and/or letters written by the offender should be recovered. For several cases within the current study, investigators searching the offender's home discovered letters and diary entries revealing her anxiety and conflict over the pregnancy and her concern about the future. When presented during the prosecutive phase, evidence such as this can be instrumental in establishing an offender's awareness of and desire to conceal her pregnancy.

Another consideration for investigators is to determine the whereabouts of the offender shortly before the delivery to ascertain if any surveillance cameras captured her image. In one case within the current sample, cameras in a convenience store depicted the offender minutes before delivery. These images not only provided the investigators with a clear visual display of her obvious pregnant state, but were also helpful when presented to the offender and other supporting witnesses.

As with any investigation, interviews of the offender's family members and close friends are important. These individuals can often provide important information and details. However, these interviews are not without challenges. Denial of pregnancy often extends beyond the offender to family members and close friends who may also engage in a sort of community denial (Pitt and Bale 1995; Vallone and Hoffman 2003). Even if some question the offender about pregnancy, she will deny allowing others to continue to ignore the signs that are often easily visible to others. Furthermore, family members may also provide very little information regarding the primary crime scene.

Those who are in the same living space as the offender almost never report hearing screams or cries from the offender. Instead, family members often state that around the time of delivery the offender only reported menstrual/stomach problems, spent an unusual amount of time in her room or bathroom, and resumed her normal activities soon after delivery and disposal. Thus, investigators should expand their interviews to include classmates, co-workers, teachers, etc. In many cases, these witnesses provide more useful information related to the offender's physical appearance, demeanor, and activities. Unlike the offender's family members, these witnesses are more objective since they are not directly affected by the offender's pregnancy, birth and subsequent responsibility/parenting of the child.

Offender Interview and Interrogation

Although investigators may feel pressure to conduct an interview soon after the offense, he/she should be familiar with certain aspects of the investigation before conducting an in-depth interview of the offender. Specifically the interviewer should review crime scene videos and photos, past and recent medical records, and statements of family members, friends, co-workers, emergency medical technicians, nurses, and doctors. If the offender has been interviewed by law enforcement multiple times or has given another account of the event, the interviewer should attempt to become familiar with every version of the story. This may include her initial statements to medical personnel, which could be the first time she discloses her knowledge of the pregnancy.

Before conducting the interview, law enforcement should be aware of the unique and counter-intuitive offense characteristics of neonaticide. An investigator's own personal experience and perception about pregnancy and childbirth may be quite different from the situation he/she will encounter during a neonaticide investigation. The offender's continual denial of pregnancy and her physical and emotional resiliency are often difficult to understand and hard to believe. Complicating the offender interview is the shame, fear, and guilt of her unwanted pregnancy. Additionally, confessions can be more challenging due to the offender's altered-perception[2] during delivery and the description she gives of the newborn upon birth. An understanding of these characteristics will better prepare an investigator for a successful interview/confession.

The discussion of sexual history, pregnancy, and vaginal delivery are often uncomfortable for neonaticide offenders. Fear seems to be a prominent factor in a neonaticide offender's motivation, specifically the fear of stigma and guilt associated with illegitimacy. Fear of rejection by their parents, specifically the offender's mother has also caused great anxiety for these women (Beyer et al. 2008; Marcikie et al. 2006). However, this anxiety is not exclusive to young, unmarried offenders. Older, married offenders have also expressed concern over the discovery of the pregnancy by others. This concern is less related to illegitimacy and premarital sex, but more often due to the "irresponsibility" the pregnancy represents. For example, in cases wherein the offender was older and married at the time of the neonaticide, the authors often observed that a generalized comment by family members and friends was that the offender already had several children for whom she could not provide proper care.

Because of the sensitivity of such topics as the female anatomy, sex, pregnancy, and the birthing process, the authors recommend that agencies consider assigning a sex crimes investigator (SCI) to conduct the interview. A SCI's experience in interviewing both offenders and victims in sex crimes investigations may be beneficial due to the training and comfort level in discussing very personal topics in specific detail without influencing the interviewee's responses. One such topic that is quite personal but consistently reported by neonaticide offenders is bowel movements during delivery. Neonaticide offenders often attribute the signs of labor with bowel movements, and it is frequently discussed during initial phases of the interview.

Since neonaticide offenders are typically interviewed shortly after the homicide, they are often still physically recovering as well as coping with the emotional impact from the birth. As a result, an offender's presentation during an interview can appear more like a victim than an offender. She might be unresponsive, unemotional, or overly emotional which may impact the pace of the interview. In addition, the offender's slow, disjointed, or incomplete answers to the investigator's questions may result in long periods of silence. SCIs or other experienced investigators may be more comfortable with this slower pace. This kind of interview typically requires investigators to be comfortable with awkward silences and be able to wait patiently for the offender's answers. Allowing the offender to process or discuss her feelings, concerns, and fears during the pregnancy and birth will help investigators obtain the content and/or details they need. This will help to paint a more complete picture of the offender's motivation as well as help identify themes which the investigator can use to elicit a confession.

The offender's concealment and denial of pregnancy and live birth may be the most difficult challenge for an interviewer to overcome. Neonaticide offenders often display an ebb and flow of denial and awareness throughout

[2] Characteristics of altered perception included lapses in memory, missing pieces of time, blacking-out, anxiety, panic, fear, pain, feelings of being out of control, numbing, detachment, and depersonalization.

their pregnancy. Their denial throughout the pregnancy is long-standing and allowed them to avoid thinking of the pending birth or what might happen afterward (Oberman 1996). One woman described her state of denial as being, "as if I was just going to stay pregnant forever" (Auer and Vogel 2003, p. 1A).

Past research has purported that a neonaticide offender's level of denial is so strong that she is not aware that she is pregnant (Meyer et al. 2001). However, investigators should keep in mind that it was determined that all of the offenders within this study were aware of their pregnancies in spite of their propensity to deny it. Evidence of awareness was observed in a variety of ways, including confirming the pregnancy to another, and/or documentation such as emails, diary entries, letters and past medical records. Furthermore, nearly half (43%) of the offenders had previously been pregnant, which suggests familiarity with the signs and symptoms of pregnancy. At first glance, an investigator may assume that those who deny pregnancy are unintelligent, naïve, sexually inexperienced, and/or young. However, women with a variety of characteristics and backgrounds deny pregnancy, and not all commit neonaticide (Friedman et al. 2007; Wessel et al. 2002). It appears that what separates women who deny pregnancy and commit neonaticide from women who deny pregnancy and do not commit neonaticide is the concealment and denial of live birth (Collins 2010).

The overwhelming majority of neonaticide offenders exhibit physical and emotional resiliency prior to, during and after delivery. Offenders within this study participated in physical and athletic events during labor (e.g., playing basketball, volleyball, dancing). During delivery, this resiliency is exhibited as they frequently gave birth silently and without assistance (Finnegan et al. 1982; Mendlowicz et al. 1999; Schwartz and Isser 2000). Post-offense, offenders often return immediately to their routine activities including attending school, shopping, dancing, or returning to work. A period of recovery is typically not displayed by these offenders, and absences from work or school shortly before and after the birth are rarely seen. The physical and emotional resiliency of neonaticide offenders may be a manifestation of the enormous relief they feel after the birth and their desire to live in an unburdened and uninterrupted manner (Beyer et al. 2008). Additionally, they likely are concerned that unexplained absences will be viewed suspiciously and increase the possibility that their secret will be revealed.

Further complicating these cases is an offender's altered perception of the birth and homicide. Neonaticide offenders typically have difficulty remembering details and have lapses in their memory due to fear, anxiety, pain, and loss of control (Atkins et al. 1999; Shelton et al. 2010;). A variety of terms have been used when describing this response to childbirth, including mental disconnect, depersonalization, detachment, cognitive separation, limited amnesia, and dissociation. Dissociation is a widely used term that is both formal and informal in context. Although a specific diagnosis in the Diagnostic and Statistics Manual of Mental Disorders IV, dissociation has also been used to describe everything from forgetfulness to daydreaming (American Psychiatric Association 2000). However, in some neonaticide cases, evidence of dissociation is offered to reduce culpability or support a mental illness defense (Atkins et al. 1999). Still, a formal diagnosis of dissociation among neonaticide offenders in this sample was rare, occurring in only 9% of the cases.

Nevertheless, an altered perception and reduced awareness is not limited to neonaticide offenders. Women in the general population report very similar experiences during the birthing process. Many perceive childbirth to be traumatic and describe missing pieces in their memory as well as being overcome with panic and helplessness. (Alcorn et al. 2010; Ayers 2007; Reynolds 1997; Waldenstrom et al. 1996). If these experiences occur under normal circumstances, one should not be surprised that the same would or might occur when a woman is giving birth with no assistance and in secret. Law enforcement should not be concerned if an offender endorses symptoms of dissociation, but should ask questions that establish that the offender was aware of her actions during and after delivery of the infant. Questions should focus on the offender's concern about potential discovery during delivery, the steps she took to avoid detection, and the procedure and method of body disposal. Within this sample, offenders described the placement of tampons and sanitary napkins to stage menstrual bleeding, biting down on something, and/or covering the infant's mouth to facilitate a silent birth and sending others within close proximity out on an "errand." These actions indicate a desire to conceal the birth of the child and to avoid detection hours or even days after delivery. Such evidence, when presented at the prosecutive phase, can diminish the effectiveness of a dissociative and/or mental illness defense.

When discussing the details of the birth and homicide, it is common for offenders to describe something other than the delivery of a full-term/near-term infant. Explanations of miscarriage and preterm fetus were often provided initially by offenders within this sample. Once her descriptions of miscarriage and preterm fetus are refuted, (often through the presentation of autopsy results) many neonaticide offenders describe the infant as appearing stillborn. They often state the baby was blue or gray in color and not breathing, crying or moving. In some instances, the offender may claim to have poked at the baby or rubbed the baby's arms or legs in an attempt to see if the baby was alive. In other cases, the mothers state they did nothing to assess the baby's condition. Keeping in mind that a

newborn's transition from an intra-uterine to extra uterine environment requires remarkable physiological adjustments, newborns can appear blue, make grunting or coughing sounds or even stop breathing for short of periods of time (up to 20 s) right after birth (Boston Children's Hospital 1987). However, signs of life questions should not be limited to breathing or moving. Although neonaticide offenders may be very reluctant to admit to awareness of signs of life, they may be more willing to give information regarding whether the infant urinated/defecated, open or closed his/her eyes, shivered, shook, or flinched.

The following paragraphs provide additional suggestions and considerations for interviewing neonaticide offenders and other supporting witnesses. Specific recommendations are provided for interviewer demeanor and rapport building, obtaining general background information, and interrogation techniques/parameters.

The interviewer's demeanor throughout the interview(s) is an important consideration. A calm and non-judgmental interviewer will build rapport and reduce an offender's anxiety. The authors have found that an initial non-accusatory posture prolongs the interview and allows for the possibility of a transition to an interrogation, which may become confrontational. Be careful of tone of voice, especially since many of these offenders believe they are victims and often present as such. Avoid name calling and/or questions that begin with "How could you…, "You had to know that if....." and "What kind of person are you...." These concepts can come into play during the interrogation but are detrimental when used too early.

The objective of rapport building is not to become the "best friend" of the offender such as pretending to share common interests or views. Rather rapport should be a roadway establishing a common ground whereby attempts to elicit information are more successful. Consideration for successful rapport building with neonaticide offenders include demonstrating a genuine interest in the offender's entire story, avoiding a parental tone while still maintaining control of the interview, and not displaying shock, disgust or disbelief when she reveals details of the birth, homicide and body disposal. When they see you are interested in knowing what their life was like the past 9 months, they are more inclined to share their feelings and emotions, as well as details of the offense. This part of the interview should not be limited to just fact finding, since information learned in this stage will be beneficial in later phases of the interview. Prepare for retractions and variation in details during the course of the interview and understand that disclosures may come gradually and sporadically.

There are a few techniques which may be beneficial in facilitating rapport. One techniques is to verbally label any emotions exhibited by the offender. For example, if the offender describes being fearful when she discovered her pregnancy, the interviewer should state, "I understand that you were scared." In the current study, there was a case in which law enforcement did not take full advantage of this technique during the interview. When investigators asked the offender about why she did not scream out for help during delivery, she replied, "I was scared" and began to sob. Instead of exploring her feelings, investigators ignored this opportunity and proceeded to question the offender about details of the offense. Obviously, learning the details is critical in any investigative interview; however, greater insight might have been obtained if the investigators allowed her to be more specific about her fears.

Another good technique when establishing rapport is for the interviewer to paraphrase and summarize what the offender has been saying. This technique demonstrates the interviewer's willingness to understand what the offender was going through during the entire pregnancy, delivery, homicide, and body disposal. For some investigators, this may be difficult because it can appear the interviewer is more concerned about the offender rather than the victim. Remember that obtaining as much information as possible is the goal, since the offender's motivation and knowledge comes into play during the prosecutive and sentencing phases. For example, the interviewer in his own words tries to retell what the offender has been saying, "So what I understand is that you were having trouble with your parents and were scared to tell them you had sex and became pregnant. Tell me more about your relationship with your parents." This initially may only be background information and general conversation, since these offenders are often initially reticent in their exchanges. However, this technique is helpful in expanding the dialogue between interviewer and offender.

During the interview the investigator should spend time obtaining background information on the offender and what was going on in her life nine months ago or just prior to/at the onset of pregnancy. This information may prove to be crucial in the investigation. The information obtained should include but not be limited to: social, school and work activities, family and friends, living arrangements, daily routines, sexual history, and any and all medical visits prior, during and after delivery. These medical visits can include physicals, hospital/emergency room visits, and other non-gynecological complaints. Within this sample, various offenders were told during these medical exams that they were pregnant. If investigators have such records, the information may be useful in refuting subsequent denials of her awareness of pregnancy.

Within this sample, obtaining details about an offender's sexual history, such as partner's identities and the number of sexual encounters, was very difficult. In fact, many offenders were more willing to discuss the details of the

homicide and body disposal than their sexual history. It appears the shame of pre-marital sex, and/or multiple partners is still prevalent in the offender's mind. This may be counter-intuitive since disclosures of premarital sex would seem to be much less serious than allegations of homicide. Nonetheless, investigators should remain flexible in attempts to gain information about sexual history and other background information, though it should not become the investigator's sole focus.

At some point, the interview will transfer from general information gathering to specific details regarding the crime. Slowly begin to ask offense-related questions in a non-accusatory and sympathetic tone. Open-ended questioning often elicits more information. The benefit of this technique is that it typically forces the offender to expand beyond a simple, yes–no answer. For example, instead of asking, "Did you know you were pregnant?" ask "When did you first think you might be pregnant?;" instead of "Did you do anything once the baby was born?," ask "What did you do once the baby was born?"

In addition to using open-ended questions, interviewers should concentrate on asking non-leading questions. For example, do not ask, "Was the cord wrapped around the neck?" but instead ask, "How was the baby connected to you after the birth?" Interviewers should be aware that their questions may give the offender information that will help her to develop potential defenses, such as the umbilical cord being wrapped around the neck. Other suggested questions are: How and when did you discover you were pregnant? Why did you hide the pregnancy? How did your pregnancy remain undetected? Who did you tell about the pregnancy? Why did you tell them? How did you remain quiet and undetected during delivery? What did you do at each phase—labor, delivery, homicide, body disposal? What didn't you do at each phase? Sometimes the inaction of the offender can be more important and telling than what she did do.

An important part of the investigation and subsequent offender interview is the information gathering of people around the offender such as family members, friends, classmates, co-workers, employers, and teachers/coaches. Suggested questions include: Did you notice physical changes of the offender? If so, when? Did you see changes in her attire? What did she say about these changes? Did you ask the offender? If so, what did you say or ask? What was her response? Did you confront the offender? Did the offender's responses change over time? What is the relationship between the offender and her family—specifically her mother? What concerned or scared the offender (shame, embarrassment, people finding out)? What other stressors were going on in the offender's life during the pregnancy (financial, marital/significant other, school-related). An interviewer should be prepared for and understand the potential for denial among the offender's close associates, particularly those closest to her.

These highlighted suggestions are meant to increase the flexibility of the interviewer and are not intended to be considered a rigid checklist. The interview process will require the interviewer to be comfortable alternating among multiple techniques and themes, without losing rapport with the offender. Within this sample, 30% of the cases went to trial. Therefore, the interviewer should keep in mind that the information gathered in the interview will be an exhibit for a jury or judge. Issues such as motivation, disposal details, life circumstances and stressors are all important factors that a court must see in order to determine a legal outcome. Neonaticide investigations present unique challenges to law enforcement. Conducting interviews requires a specialized approach, since the interviews, like the pathology findings, are linchpins in these cases.

Autopsy and Pathology

One of the most important questions asked when the body of a newborn is found is whether the infant was born alive or was stillborn. If the infant was stillborn, the only crime that was committed may be improper disposal of the dead body. If the infant was born alive, then someone (usually the mother) is typically charged with some degree of murder.

Ideally, the autopsy examination should be conducted by a board-certified forensic pathologist with experience in pediatric pathology and the investigation of newborn deaths. This examination will routinely include pre-autopsy radiographic examination to document presence or absence of aeration of the lung field and gastrointestinal tract. Furthermore, the pathologist may perform what is known as the "flotation test" to document aeration of the lung tissue, which uses the liver as a control for decompositional gases and the lungs are placed in water to determine whether they float or not.

The most common causes of death in neonaticide victims are asphyxia, exposure, and drowning. Unfortunately, all three of these causes may leave little or no physical signs on the infant's body. COD determination may be further complicated in some instances by varying degrees of decomposition, which may obliterate salient findings. Such changes may hamper the pathologist's ability to interpret findings from procedures such as the "flotation test" which has been deemed somewhat controversial by some authors (Spitz 1993). In addition, the usual criterion indicating live birth—aerated lungs—may be complicated by gas-forming bacteria in the lungs and the body. Inquiries should be made regarding resuscitation efforts by either the offender or responding emergency personnel as mouth-to-mouth resuscitation, chest compres-

sion or administration of oxygen will actively inflate the lungs, dead or alive (Saukko and Knight 2004).

Hemorrhages associated with broken bones or from head or visceral injuries can provide proof of active circulation after birth, indicating live births. Unfortunately, these types of injuries are rare in neonaticide cases. If a child was immersed in water after the onset of respirations, contents of that water may be found in the lungs or circulation (Feldman 2007). The presence of milk or other food in the gastro-intestinal tract would indicate that the child was alive (Kahana et al. 2005). However, this occurs with little frequency as very few women within this sample attempted to feed their infant before the homicide. Many of the victims in this sample were likely deceased within minutes of delivery, as most of the offenders did not care for their newborn in any way that would prolong life.

The placenta represents a specialized and unique organ, not usually encountered in routine forensic pathology practice. Therefore, the forensic pathologist should consider consultation with a perinatal pathologist if the placenta is available for examination. Evidence of underlying placental diseases or infections may suggest stillbirth or natural causes of death, and evidence of cord injuries or tears will suggest live birth or traumatic death (Shiono et al. 1986). The placenta may be a crucial piece of evidence in certain cases, and documentation, including written reports and photography, should occur as with any other important piece of evidence. Finally, information from the scene must be integrated with the autopsy and placental examination findings in order for the pathologist to be able to properly interpret these anatomic findings.

Conclusion

Despite its occurrence throughout history, neonaticide continues to be viewed as remarkable and unusual, yet society is often ambivalent about mothers who kill. We are outraged and perplexed, and the crime often demands a special explanation. As a result, offenders are often labeled 'crazy' or 'mad', evil,' or 'bad' (Coughlin 1994). However, such labels limit investigative perspectives.

While society may respond with confusion and simplification when a neonaticide occurs, the forensic community is required to investigate, understand, and explain its occurrence in a court of law. This can be a difficult task because of the unfamiliar case dynamics and unusual circumstances which are often associated with neonaticide. Furthermore, neonaticide has received only limited attention in research literature, and virtually none exists with a law enforcement perspective. The guiding purpose of this study is to provide law enforcement with empirically-based investigative strategies and pathologic considerations, and ultimately promote a comprehensive and successful approach to neonaticide investigations.

Limitations

There are several limitations to consider when discussing this research given the low prevalence rate of this type of homicide. Although the sample size is consistent with or exceeds sample sizes of other previous studies, the relatively small sample size of the current study limits generalizability. The method of case collection was representative of operational cases but was not random. The majority of the cases selected were identified through law enforcement or open media sources. Additionally, the researchers were limited to the information obtained within the investigative case materials which provided scarce medical and psychological information.

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