

A current absence of neonaticide in Norway

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ABSTRACT

The present study is the first attempt to explore the rate, characteristics and legal reactions to neonaticide in Norway during the years 1990 – 2009. Potential incidents of neonaticide were identified through the national homicide index held by the National Criminal Investigation Service and the national police registers for all recorded crime in Norway held by the National Police Computing and Material Services. The study uncovers that no clear incident of neonaticide has been recorded in the respective registers during the study's time period. There was however recorded one case of a discarded stillborn and one case of an abandoned neonate that died through exposure. The paper discusses whether the study's findings are congruent with an evolutionary psychological understanding of filicide and current knowledge of risk factors and rates for neonaticide.

Keywords:

Evolutionary psychology, Filicide, Neonaticide

INTRODUCTION

Neonaticide, defined as the killing of a newborn within the first 24 hours after its birth, was first recognised as a distinct type of caretaker perpetrated child homicide (filicide) in a seminal paper by the psychiatrist Phillip J. Resnick published in 1970 [1]. Having reviewed the world literature on filicide from 1751 – 1968, Resnick combined the cases he found in his review with cases from his own practice as a psychiatrist to explore causes and characteristics of filicide. His study revealed how neonaticides systematically differ from other filicides with regards to the characteristic traits of the perpetrators, such as the perpetrator's sex, age, social circumstances, mental health and motive. Not all later studies of filicide adhere to Resnick's notion of neonaticide as a distinct category [2-4]. However, as will be reviewed in the present article, studies from a variety of cultures that do make a distinction between neonaticide and other filicides find the same distinct pattern of risk factors and characteristics for neonaticide that were revealed in Resnick's study.

Since the 1980s, Evolutionary Psychology (EP) has emerged within the behavioural sciences as a comprehensive approach to studying cross-cultural tendencies in human psychology and behaviour [5,6]. EP has proven itself to be of great interest to forensic psychology as its theoretical approach offers a predictive as well as an interpretive framework for studying cross-cultural tendencies in crime and antisocial behaviour, and is applied in the study of a range of topics such as violence, theft, sex differences and age patterns, personality disorders and victimology [7-14].

Going beyond the descriptive ability of more mainstream theories, such as social learning theory or psychodynamic theory, which explain the existence and characteristics of a given phenomenon retrospectively, EP takes advantage of modern evolutionary theory as a meta-theory from which to derive *a priori*, predictive hypotheses concerning the existence and characteristics of a vast range of phenomena which can be tested empirically [5,6]. For instance, EP perspectives have been utilized in deriving predictive

hypothesis concerning alternative probabilities for risk factors for every recognised category of homicide, including filicide, successfully identifying significant risk factors [15-27].

The present study is the first attempt to explore the rate and characteristics of neonaticide and the legal outcomes of this type of filicide in Norway during the time period 1990 – 2009. The purpose of this article is to understand the study's findings in context of EP perspectives on filicide and the current state of knowledge of neonaticide.

Before presenting the present study's methods and results, the article will give a short introduction to EP perspectives on filicide, listing predictions deduced within this theoretical framework concerning risk factors for filicide that are relevant to neonaticide. The article will then summarize current knowledge of the epidemiology and characteristics of neonaticide. The abandonment of neonates, legal reactions and international rates of neonaticide will also be briefly touched upon as these aspects are also relevant to the study's findings.

EVOLUTIONARY PSYCHOLOGICAL PERSPECTIVES ON FILICIDE

Informed by modern evolutionary theory and biology, EP pays explicit attention to the fact that evolutionary selection pressures will inevitably have shaped psychological processes in our species that generate and regulate behaviours that would have been crucial to overcoming recurrent challenges to survival and reproductive success in our species history [5,6]. With reproduction being the *sin qua non* of evolution, parental psychology and behaviour are particularly vulnerable to evolutionary selection pressures [28-34]. It is an understanding of parental psychology congruent with modern evolutionary theory and biology that has informed evolutionary psychologists in their approach to understanding and identifying risk factors for filicide [16-20, 23-27].

At first it might seem improbable that filicide could be understood in evolutionary terms. With reproduction being so central to evolution, how could evolution reward a parent who does anything but protect and nurture his or her child? As a species, humans are singular with regards to the amount of resources parents need to invest in their children in order to succeed in raising them to reproductive maturity, and "[i]ronically, it is precisely because our investment in children is so great that we must be extraordinarily choosy about the very few on whom we lavish our finite resources" (Buss, 2005: 165) [16]. In an ancestral past, with few resources available to the individual parent, evolution would inevitably favour parents who were discriminant in their parental investment in that investment was conditional on the prospect of the child reaching maturity, or if the child was ones own genetic offspring [28-34]. Following principles of modern evolutionary theory and knowledge of challenges to reproduction in our species ancestral past, EP perspectives enables the deduction of hypotheses concerning which environmental cues could trigger an increase or decrease in parental investment in a child respectively. The death of a child at the hands of its caretaker(s) is at times the extreme consequence of a decrease in parental investment. Predictions concerning a decrease in parental investment may therefore be transferable to filicide [18,19].

In every species, including humans, the individual has to make an appraisal of the amount of resources it should invest in present versus future reproduction, in order to secure ultimate reproductive success throughout his or her lifetime [28,30,33]. For instance, if the present circumstances are not favourable towards the success of raising a given offspring to maturity, it might benefit the individual, in evolutionary terms, to withhold parental investment. The individual's parental resources may then be preserved for the future when circumstances may be more favourable, and parental investment thus more likely to lead to the offspring reaching maturity. As presented below, the appraisal of whether or not to invest in a given child is affected by the parent's age, sex, the age of the child, and the parent's social circumstances. It is important to note that EP perspectives on filicide do not imply that filicide is inevitable under the listed circumstances. Rather, these circumstances are expected to increase the potential risk for filicide.

The sex and age of the parent

As women age, their residual reproductive potential is lowered due to the loss of fertility associated with the onset of menopause. As younger women have a greater residual reproductive potential than older women, young women may afford to take the chance on withholding investment in present offspring at the prospect of having more offspring in the future. It is therefore predicted from EP reasoning that there will be a negative association between women's age and their risk for committing filicide, in that the older a woman is, the less likely she is to commit filicide, and this prediction is supported empirically [18,27].

The sex of the parent and the age of child

Due to the physiologically different roles in reproduction of the two sexes in our species, they will have undergone significantly different selection processes with regards to what parental psychology and behaviour would benefit their reproductive success respectively [28,30-32]. For instance, as women are the only sex that is able to breastfeed, ancestral mothers were physiologically obliged to invest more heavily and directly in the youngest children, in order to secure their reproductive success. If circumstances

were not favourable towards succeeding in rearing a child to maturity, then although a mother had already invested heavily in her child through nine months of gestation, the earlier she curtailed her postnatal investment, the smaller her potential loss of parental resources would be overall. Further, the older a child is, the greater its reproductive value is to its parents with regard to its potential to reach maturity [32]. It is therefore predicted from EP reasoning that there will be an increased risk for the youngest children to be victimised in filicide in general, with the youngest infants, such as neonates, being at a particularly high risk of being victimised by their mothers, and this prediction is confirmed empirically [18,27].

The social circumstances of the parent

The needs of an infant would have exceeded the capacity of a single mother in our ancestral past. The importance of secondary caretakers is apparent in the greatly lowered survival rate of the youngest children in the absence of fathers and alloparents, such as kinswomen, as help in childcare in traditional societies [30,31,33,34]. It is therefore predicted from EP reasoning that there will be an increased risk of filicide when the mother is a single parent and does not have a supporting social network, and this prediction is supported empirically [18,27].

Considering the cost an infant would have been on its mother's resources in our ancestral past, investing in a neonate would greatly reduce an ancestral mother's possible investment in any other dependent child she might already have, and who had proven themselves fit enough to survive the critical years of early infancy. It is therefore predicted from EP reasoning that there will be an increased risk for filicide for the youngest children when the mother already has children of a dependent age, and this prediction is supported empirically [18,27].

Psychopathology

Following the suggestion that it would, evolutionary speaking, be more advantageous for a parent to decrease or even curtail investing in a child under the above listed circumstances in our species' evolutionary past, is the prediction that there will be a low probability of mental illness among parents who perpetrate filicide under these circumstances. A further prediction following this reasoning, is that when the circumstances of filicide deviates significantly from conditions were it would, evolutionary speaking, be advantageous to decrease or even curtail parental investment, there will be a high probability of mental illness among the perpetrating parents. This final prediction is also supported empirically [18,23,24,27].

EP perspectives have not derived predictions concerning risk factors for filicide specifically within the first 24 hours of the victim's life. However, as will be presented the following review, the predictions deduced from EP perspectives concerning the risk factors for filicide in general are highly applicable to neonaticide.

THE CHARACTERISTICS AND EPIDEMIOLOGY OF NEONATICIDE

The following section reviews the current state of knowledge of the characteristics and epidemiology of neonaticide in the U.S. England & Wales, Scotland, France, Finland, Denmark, Italy, Japan, Fiji and Brazil. There is a dearth of epidemiological studies from more developing countries

on homicide in general and on filicide and neonaticide specifically in the scholarly literature [36,37], and most studies referred to in the present review are thus from developed countries.

The sex of the perpetrator

Perhaps the most striking characteristic of neonaticide is the overwhelming majority of female perpetrators who, without any known exception, are the victims' mothers [1,15,22,27,36,38-53]. In all but two of the 37 cases of neonaticide in Resnick's study, the mother was the sole perpetrator. In a third case, the mother and father committed the filicide together. In contrast, the father was either the sole perpetrator or accomplice in 89 of the 131 other filicides in the study [1]. In a population study on neonaticide in North Carolina covering the years 1985 – 2000, there were 34 cases of neonaticide of which 29 perpetrators were identified. All the identified perpetrators were the mothers of the victim, and they were all the sole perpetrator of the neonaticide [50].

The age of the perpetrator

A further striking characteristic of neonaticide is the young age of the female perpetrators, who most often are in their teens or early twenties [1,15,22,36,38-46,48-51]. In Resnick's study, 89% of the female perpetrators were under 25 years old, ranging from 16 to 38 years old. In contrast, 77% of the perpetrators who committed filicide were over 25 years old, ranging from 20 to 50 years old [1]. A French population study by Anne Tursz and Jon Cook covering the years 1996 – 2000 reports the highest median age for the female perpetrators of neonaticide included in this review. The median age for the 17 identified perpetrators in the study was 26 years, and only two perpetrators were under 20 years old. There were however 10 cases in the study where the perpetrators were unidentified and their age is thus unknown [47].

The social circumstances of the perpetrator

The social circumstances of perpetrators of neonaticide and other filicides also differ. Whereas only 19% of the female perpetrators of neonaticide were married in Resnick's study, 88% of the female perpetrators of filicide were married. A high rate of unmarried status among the female perpetrators of neonaticide is repeatedly reported in later studies where such information has been made available [15,22,27,36,38,45,46,48-51]. Tursz and Cook's French population study is an exception, reporting that more than half of the identified perpetrators lived with the victim's father. The female perpetrators of neonaticide are most often nulliparous, but it is not uncommon to find that they may have children of a dependent age [1,35,42,47]. For example, Tursz & Cook report that a third of the perpetrators identified in their study already had three or more children [44], and the aforementioned study from North Carolina found that 35% of the neonaticide victims were the all-female perpetrators' second or third child [50].

In spite of living with either their family or a partner, the female perpetrators of neonaticide report feeling isolated and alone. Further, they fear being rejected by their significant others if these were to learn of the pregnancy to such an extent that they deliberately conceal their pregnancy from all others, including health personnel [1,15,27,36,38,40,43-51]. The population study in North Carolina deviates notably from this pattern in that eight of the 17 cases where such information was available, the perpetrators reportedly had solicited prenatal care from health personnel [50].

Denial and psychopathology among the perpetrators

Several studies report that some perpetrators of neonaticide may not have been conscious of their pregnancy, and the perpetrators are then described as having been in denial of their pregnancy [1,15,45,47,49,52,53]. Such alleged denial occurred in 19 of 47 cases in a population study in the US [43], and eight of 34 cases in the population study from North Carolina [50].

"Denial" is a psychodynamic concept used by authors who interpret the female perpetrators' lack of awareness of her pregnancy as a defence mechanism, and as such a pathological manifestation of unconscious conflict [1,52,53]. This alleged denial is understood as being elicited because the to-be perpetrator perceives her pregnancy, and the sexual relations that would have caused the pregnancy, as a threat to her relationship with her family or partner.

Denial of pregnancy is not uncommon among women with a history of psychotic illness [54,55]. However, perpetrators of neonaticide reportedly do not have such a history, and there are no psychiatric correlates to alleged denial among perpetrators of neonaticide [14,44,45]. In fact, the psychiatric diagnosis of perpetrators of neonaticide and other filicides differ significantly, with psychosis and depression being extremely rare among female perpetrators of neonaticide and common among perpetrators of filicide [14,35]. For instance, whereas a mere 17% of the female perpetrators of neonaticide were reportedly psychotic at the time of their offence in Resnick's study, two-thirds of the female perpetrators of other filicides were reportedly psychotic at the time of their offence. And whereas a serious element of depression was found among three of the 37 female perpetrators of neonaticide, it was found among 71% of the female filicide perpetrators. Further, no study so far has uncovered any perpetrators of neonaticide attempting or committing suicide, which is in stark contrast to the one-third of the female perpetrators of filicide in Resnick's study who either attempted or committed suicide [1].

The alleged denial of pregnancy is reportedly so strong in some neonaticide cases, that the perpetrator may deny or report having no recollection of having been pregnant, giving birth or committing the neonaticide – even when confronted with the evidence [14,45]. However, until Margaret Spinelli published a study in 2001, there were no scientific reports of a systematic investigation of denial, dissociative symptoms or psychosis associated with neonaticide [52]. In Spinelli's study, 16 female defendants who had undergone a psychiatric evaluation in association with being charged with neonaticide responded to the Dissociative Experience Scale. All of the defendants reported that they had "watched themselves" give birth, and their scores suggest high levels of dissociative pathology.

There has been some controversy surrounding the findings reported by Spinelli, because such a high prevalence of disassociation uncovered in her study has not been found in previous studies. It has been suggested that the study may suffer from a selection bias of the sample, and further that the Dissociative Experience Scale opens for possible malingering by the respondent which would invalidate the study's results [52,56-58].

The psychodynamic notion of denied pregnancy in association with neonaticide suggests that the mother has at some point been aware of her pregnancy. But pregnancies that are followed by neonaticide are often characterised by an absence, reduction or delay of the physical symptoms that usually let women know they are pregnant, such as nausea and abdominal swelling [14,47]. Perhaps not surprisingly then, Tursz & Cook found no true case of denied pregnancy in their recent population study;

the four possible cases of such pregnancies were realised by the perpetrator around the 20th week of gestation [47]. Allegedly denied pregnancies in the general population that are not followed by neonaticide are also realised after this point, but before going into labour [59,60].

Modern evolutionary biology offers an alternative understanding of the female perpetrators lack of awareness of their pregnancy to the psychodynamic postulation of denial [61]. Mother-offspring conflicts over the mother's physiological resources occur in varying degrees in all pregnancies, because the foetus only shares half of its genes with its mother. The absence or delay of physiological symptoms seen in some pregnancies is simply a resolution to the biological conflict where the physiological cost of pregnancy is reduced for the mother at the expense of the foetus. And as predicted from an evolutionary informed perspective, such pregnancies - whether they end with neonaticide or not - are associated with circumstances that would have been adverse towards a mother's ability to raise a child to maturity in our ancestral past, such as the mother's young age, separation from the child's father, family conflict, feelings of isolation and children of a dependent age [59-62].

Motive

In the majority of neonaticide incidents, the motive is that perpetrator does not want the child [1,14,38,47]. In Resnick's study, this was reportedly the motive in 83% of the neonaticide cases, whereas it was the motive in only 11% of the other filicides. The most common reason for why the neonates are not wanted by their own mother has traditionally been that the pregnancy occurs out of wedlock and the fear of the stigma attached to such so-called illegitimacy [1,35,36,45]. In more current societies, where there is no longer the same stigma attached to having children out of wedlock, the neonaticide of an unwanted child appears to be an extreme means for family planning by certain women who already have dependent children and for various reasons do not use contraception [47,63]. In contrast, Resnick reports that the motive for filicide was altruistic in 56% of the cases, in that the perpetrator believed that killing the victim would relieve it from suffering, whether this suffering is real or imagined by the perpetrator (e.g. as part of an extended suicide) [1].

Location

Female perpetrators of neonaticide typically give birth alone and in secret, often in the perpetrator's place of residence, but also in public, such as restrooms [14,36,39,40,43-48]. A population study from the US reports that 95% of neonaticide victims were not born in a hospital, and further that 71% were born in the mother's place of residence. In contrast, 92% of the infanticide victims (filicide with the first 12 months of life) were born in hospital [44].

The neonaticide victim is often poorly hidden by the perpetrator, such as in wardrobes, cupboards, and garbage bins, and are often found by the perpetrator's family members or members of the public [14,35,36,43,47,49,50].

Methods

There are often difficulties in diagnosing how the infant died through autopsy alone, especially due to decomposition when the perpetrator has been successful in hiding the victim for some time [14,47,48]. First of all, is the question of whether the infant was stillborn or not. Secondly, if the infant was not stillborn, is the question of whether it was killed or died of natural

causes. Further, if the infant died due to neglect, there is the question of whether this neglect was due to the mother's mental and physical state after giving birth without (medical) assistance, or because she purposely chose not to take care of her infant with the intent that the infant should die.

In Resnick's study, there were six different methods by which the 37 neonaticides were performed with greatest frequency. In rank order, these were suffocation; strangulation; head trauma; drowning (e.g. in the toilet in which the infant often is given birth into); exposure; and stabbing [1]. Tursz & Cook report from their more recent population study in France that the most frequent methods in the 27 neonaticides were in rank order asphyxia; drowning; abandonment; skull fractures; stabbing; and unknown in four cases [47].

It has been suggested that neonaticides are often performed in an aggressive manner rather than by passively letting the infant die through exposure [35]. Resnick even claims to find bitterness towards the infant in the more aggressive methods of killing, such as in the cases where excess violence has been performed by the perpetrator. He exemplifies this excess violence by referring to a case where the victim suffered 48 stab wounds at the hands of its mother [1]. Other authors point to that suffocation is the most common method of neonaticide across studies, and interpret the suffocation as a result of the perpetrator's attempt to stifle the neonate's cries or the neonate being discarded in a plastic bag, rather than as the result of the perpetrator in some way punishing the neonate [2]. How aggressive the method of killing is, and what motive can be read from the method of killing the infant, is however a matter of subjective interpretation (see Lewis & Bunce (2003) for a critique of subjectivity in research on filicide [3]).

Male perpetrators

Research has uncovered few cases of men committing neonaticide, and so not much is known about what characterises male perpetrators and their circumstances. It has been suggested that the lack of male perpetrators of neonaticide is due to men not having the motive nor the opportunity that women have [1], a reasoning that is congruent with an EP approach to understanding filicide.

There were only three cases in Resnick's study where the putative father of the child was either an accomplice or sole perpetrator of the neonaticide. Although few in number, they give some insight into motives men might possibly have for committing neonaticide. In the one case, the father committed the neonaticide together with the victim's mother. They were married and 28 and 17 years old, respectively. They both reported that "they were deeply in love and could not bear the thought of a third party [their infant] interfering in their relationship" (Resnick, 1970: 60) [1]. Together they planned on killing their infant upon delivery, and in preparation dug a grave in their cellar to bury it.

One of the two fathers who was a sole perpetrator of neonaticide was 32 years old and in poor health. He reportedly feared that his own death would render the child and its mother without a provider, and thus saw his filicide as altruistic. The second father included in Resnick's review who committed the neonaticide on his own, was 26 years old. He felt forced into marriage due to the pregnancy and perceived the coming child as an obstacle to his ambitions in life. He first poisoned his wife, in an attempt to kill the unborn child, but was unsuccessful. He then strangled the child as he delivered it. He was reported to have been free of overt psychosis when he committed the neonaticide, but was diagnosed with schizophrenia three years later [1].

Abandonment of neonates

Although an abandoned neonate may die through exposure, dehydration, suffocation or by some other means, the perpetrator of the abandonment may often have intended on the neonate being found and rescued by members of the public. Because of the difference in intent in neonaticide and abandonment respectively, the two offences may morally and legally be perceived as distinctly different actions. From an evolutionary informed perspective, however, the two phenomena are less distinct, as they are both a result of a parent curtailing his or her parental investment in the given child. "Abandonment is, you might say, the default mode for a mother terminating investment. Infanticide occurs when circumstances (including fear of discovery) prevent a mother from abandoning it" (Hrdy, 1999: 297) [31]. It is therefore predicted from EP reasoning that abandonment of neonates will have similarities with neonaticides in the demographic characteristics, circumstances and motivation of the perpetrator. The scholarly literature does suggest that this may be the case, but research does not always draw a distinction between the two offences in their analyses, and the prediction has thus not been tested rigorously enough to draw a firm conclusion [48,64].

LEGAL REACTIONS TO NEONATICIDE

Aside from the US, most western countries have a more merciful prosecution and sanctioning of female perpetrators of neonaticide than perpetrators of either sex in other homicides, including filicide [1,14,21,36,38,40]. Several countries, such as England and Wales, Canada, Austria, Finland and Norway have laws that deal specifically with neonates killed by their mothers, separating such homicides from all others.

The Infanticide Act in England and Wales was one of the first of such laws to be developed. This act makes an explicit reference to the mother's allegedly "disturbed balance of mind" after giving birth as an intermittent for killing her neonate, commanding leniency in the punishment of the mother. Evidence of a "disturbed balance of mind" in association with perpetrating neonaticide is however not a criterion for being charged under the Infanticide Act in England & Wales [35], and, as reviewed above, is not a criterion female perpetrators of neonaticide would often fulfil. In contrast, the Norwegian neonaticide law makes no explicit reference to an alleged state of mind by the mother, yet commands a lesser punishment for neonaticide nevertheless.

In spite of laws dealing specifically with neonaticide and infanticide, or with murder and manslaughter in general that could be applied to female neonaticide perpetrators, there are reports in the scholarly literature that they frequently do not get charged or prosecuted with their offence [1,14,21]. One study reports that through prosecutory discretion, the director of public prosecution in England & Wales chose not to charge female perpetrators of neonaticide because he saw the women as not being legally responsible for their offence, and further believed that trying the cases would not serve public interest [65].

The special treatment of female perpetrators of neonaticide compared to other homicide offenders is by some authors argued to be chivalrous, as the prosecution is seen as protecting women against punishment by dropping charges or giving them lighter sentences such as probation or minimal prison sentence. Other authors argue that female perpetrators of neonaticide are punished more severely than other homicide offenders when they are denied the opportunity to take responsibility for their actions.

Instead they are interpreted as being pathological and helpless – even in the absence of a diagnosis of a "disturbed balance of mind" – merely because they defer from our cultural expectation of mothers as naturally benign and loving caretakers [49,66].

INTERNATIONAL RATES OF NEONATICIDE

Because the female perpetrators of neonaticide conceal their pregnancies, there is no social knowledge of their victims' existence. There is therefore no one who can report them as missing after their birth. Also, although the victims often are poorly hidden, there is an accidental nature to their discovery. It is therefore argued that neonaticide potentially has a higher rate of undiscovered incidents than other homicide categories [1,36,47]. Further, because of the difficulties in identifying the mother in cases where the victim has been found in public, and in diagnosing the cause of death and proving intent in alleged neonaticides, there is a lack of convictions against those women who are trialled for a possible neonaticide [1,14,47]. Official numbers of known neonaticide cases are therefore expected to be conservative compared to the actual number of cases in a given society.

It is important to note that the source used to identify homicide cases can greatly affect the estimated rate of neonaticide in a population. For instance, the official rate of neonaticide in France is 0.39 per 100 000 live births according to the mortality statistics which assigns cause of death codes in accordance with the WHO-International Classification of Diseases. In great contrast, Tursz & Cook estimate the rate to be 2.1 known neonaticide cases per 100 000 live births a year in France, based on their population study that identified neonaticide cases through submissions by the state prosecutor to the courts in three regions of France [47].

Making estimates for the rate of neonaticide for a whole country based on rates in certain regions may however be faulty. A population study in North Carolina covering the years 1985 – 2000 identified 34 neonaticide cases through reviewing the case records of all deaths of live births in the North Carolina Medical Examiner (ME) database. Based on their results, the authors estimate a rate of 2.1 neonaticides for every 100 000 live births in North Carolina. If the finding in that study is representative of the rest of the US, there would be about 85 neonaticides a year in the US [50]. However, a population study on infanticide for the whole of the US covering the years 1983 – 1991 that identified neonaticide cases through comparing birth and death certificates for all known live births, reports 139 neonaticide cases in the whole of the study's time period [44]. There is some evidence that neonaticide might occur at a higher rate in rural areas than in urban areas [39,40,48]. A population study on filicide in the US covering the years 1976 – 1979 using data from the Federal Bureau of investigations – Uniform Crime Reporting Systems (FBI-UCR) found that whereas the rate of neonaticide was 0.7 per 100 000 live births in the West and North Central regions it was 2.1 in the North East region, averaging a rate of 1.3 neonaticides per 100 000 live births for the whole of the United States [44].

Children have historically been at an increased risk of dying at the hands of their caretakers during their first year of life, with the risk being at the highest during the first 24 hours after the birth of the child [1,2,14,18,35-44,49,64]. However, as the 20th century saw a decline in homicides in general, several countries including the EU, Australia and Japan, have seen the greatest drop in the rate of victims aged 0 - 4 [67]. This trend is also apparent in Scandinavia. A population study in Finland covering the years 1970 – 1994 identified 56 neonaticides. About 60% of the neonaticide

cases occurred in the years 1970 – 1979 [40]. Similarly, a population study of filicide in Norway covering the years 1950 – 1979 also reports that the number of neonaticides dropped dramatically over the study's time period. Whereas there were 21 cases of neonaticide in the years 1950 – 1959 in Norway, there were 13 cases in the years 1960 – 1969, and only two cases in the years 1970 – 1979. Both cases happened before 1975 [68]. A Swedish population study covering the years 1971 – 1980 identified only one case of neonaticide [69]. More recently, a Finnish population study identified four neonaticides in the years 2003 – 2009 [4]. A recent Danish population study identified 11 cases of fatal abandonment of neonates in the years 1997 – 2008 [48]. Although it was not always possible to discern whether a case was one of fatal abandonment or neonaticide in the study, the frequency of possible neonaticides in Denmark identified in the study's time period was less than one a year.

The international decline in the official number of neonaticide in westernised countries during the last century has been argued to result from sex education, effective birth control and safe abortions that enable the prevention of unwanted pregnancies. Additionally, it is argued, with the financial status of women improving over the past century, the increased welfare payments to mothers and the stigma of having children out of wedlock no longer prevailing, the major motivations mothers have had for concealing their pregnancy and killing their neonates are steadily being eliminated [1,14,18,44,67].

METHODS AND MATERIAL

Norway does not have a national homicide index that is intended for and directly accessible to research. The National Criminal Investigation Service (Kripos) are however in charge of keeping a register of all homicides in Norway, and researchers may ask Kripos to provide lists of homicide cases and certain information on individual cases for the purpose of research. Neonaticide, defined as the killing of a neonate by its own mother within 24 hours of birth, is explicitly dealt with in a separate law from homicide in the Norwegian penal code, which is not included in Kripos' homicide register. However, due to the occasional flaws in recording in this type of register [70], Kripos were asked to search their homicide register for incidents where the victim was killed <24 hours after birth.

The National Police Computing and Material Services (PDMT) keep a more extensive register of all crimes recorded by the police in Norway within the past five years (Strasak), and an archival register for crimes registered more than five years ago (Sansak). PDMT were therefore asked to search their registers to identify cases of neonaticide. The law concerning neonaticide in Norway is sex specific, referring only to maternal perpetrators. PDMT were therefore asked to search their registers for both neonaticides and for any type of crime where the victim was 24 hours old or younger to identify any possible cases with a male perpetrator.

RESULTS

There were no listings of neonaticide in Kripos' homicide register. PDMT uncovered two recorded cases in their registers where a dead neonate had been found outdoors by members of the public. In the one case, however, the autopsy uncovered that the neonate had been stillborn, and this case is then understood as a discarded stillborn and not a neonaticide. In the

second case, the autopsy could not determine whether or not the neonate had been stillborn or not. There were no clear signs of the child having been actively killed. In this second case, the police investigation never led to identifying the neonate's mother, nor any eyewitnesses who could inform on what had happened to either the neonate or its mother. Through massive coverage in the Norwegian media, it is officially confirmed knowledge that the neonate was wrapped in a blanket and placed in a shopping bag just a couple of metres from a private home [71]. This suggests that this case was one of abandonment rather than a clear case of neonaticide. A third case was incorrectly coded in PDMT's register as a neonaticide. Contact with the police district that recorded the incident revealed that the incident involve neither a homicide nor a neonate.

DISCUSSION

The present study is the first attempt to uncover the rate, characteristics and legal reactions to neonaticide in Norway. The study uncovered one case of a discarded stillborn and one case of an abandoned neonate recorded in the Norwegian police register for crime for the years 1990 - 2009, but did not uncover any clear incidents of neonaticide.

These findings could be considered curious, as it is a cross-cultural finding that children are at an increased risk of filicide victimisation during their first year of life, and in particular during the first 24 hours after birth. The study's findings are however not so curious in light of the decrease in neonaticides internationally over the past century, and the dramatic drop in Norway and neighbouring countries such as Sweden and Finland over the previous decades.

Recent population studies in Finland [4] and Denmark [48] have uncovered a frequency of less than one neonaticide a year in the years 2003 – 2009 and 1998 – 2008, respectively. Both countries have a population of about 5, 5 million. As Norway's population has been below 5 million until just recently, it is not curious to find that Norway may have an even lower frequency than Finland and Denmark. This study, however, did not find any neonaticides over two whole decades, which is curious in light of the phenomena's clear existence in two neighbouring countries.

The study's findings are not curious from an EP perspective, as withholding parental investment from a neonate, by for instance abandonment or even ending its life, is by EP perspectives expected to be a conditional response to an environment that would have been hostile towards successfully raising a child to maturity in our species' past. Currently, the circumstances of women in Norway hardly resemble those hostile environments that would elicit neonaticide in our past. Welfare payments to mothers, government run childcare services and the social acceptance for children born out of wedlock buffer mothers from the desperate social situations that make them feel that their neonate is such a burden that they kill it. Further, sex education and birth control has become increasingly accessible in Norway over the past few decades. A web panel survey in 2005 on the use of birth control among sexually active women aged 20 – 44 who were not planning on becoming pregnant showed that 90% of the women had used at least one form of birth control in the past three months, suggesting the use of birth control is high among sexually active women in Norway [72]. Further, abortion became a legal right for all women in the late 1970's (Loven om svangerskapsbrudd), enabling women in Norway to prevent those pregnancies that may lead to neonaticide. A recent population study in Oslo, Norway, for the years 2000

– 2002 showed that the women' age, ethnic background and education was linked to their decision of whether or not to have an abortion [73]. Comparing women of Pakistani and Norwegian ethnic backgrounds, the study found that a relative high parity and advanced age increased the likelihood of abortion among Pakistani women, while young age and lack of education increased the likelihood of abortion among Norwegian women. The study's authors interpret their findings to suggest that both groups of women are using abortion as a form of family planning, making the timing and number of children they bear suit their current and future social circumstances. Although it is mere speculation, it could be that without the legal access to abortion in Norway, some of these women might have felt forced to commit neonaticide.

In spite of all of the listed social and political circumstances in Norway that go a long way in preventing the ancient female predicament of being pregnant with a child one cannot take care of, the Norwegian society is not necessarily immune to neonaticide. The cases of the discarded stillborn and the abandoned neonate testify to this. At least two women in Norway during the time period covered in the present study did not seek professional help for their neonates upon delivery, but left their neonates discarded and abandoned. There could certainly have been more women making similar decisions that have gone undetected.

A clear limitation in utilising Kripos' homicide register and the PDMT registers Strask and Sansak as sources to identify potential cases of neonaticide, is that this will only uncover cases that have been reported to the police. As reviewed, though, neonaticide appears to lend itself to going undiscovered as most often only the mother knows of the victims' existence. There might therefore have been an unknown number of neonaticides occurring in Norway during the two decades covered in the study's time period that never came to the police's attention. It is however characteristic of neonaticide that the victims are not always hidden or disposed of in a manner that would ensure that they never are found. They are therefore found by family members or members of the public, and are reported to the appropriate authorities, such as the police. The present study uncovered two incidents where members of the public found an infant's corpse and notified the police. Perhaps, what is missing in Norway is family members reporting incidents to the authorities.

Neonaticides rarely occur in hospitals, as the perpetrators do not present themselves for medical assistance once they go into labour. However, if a neonaticide were to occur in a Norwegian hospital, the medical staff would be under obligation by law to report the incident to the police (Helsepersonelloven § 36).

The registers utilized in the present study for identifying cases of neonaticide only include incidents where the police have made an official investigation into a possible criminal action. A perhaps controversial suggestion for the limitation of using these registers for identifying neonaticide cases is that the police through the use of discretion may have chosen not to initiate official investigations in possible neonaticide cases during the past two decades.

As reviewed earlier, the prosecution in other countries are known to use their discretion and not charge female perpetrators of neonaticide. It

is beyond the scope of the present study to investigate whether the lack of registered neonaticides in the register is due to the police in Norway choosing not to initiate official investigations of possible neonaticides. In the absence of evidence of such a possible use of discretion, however, it is a reasonable presumption that the police registers for crime are a valid and reliable source for identifying potential cases of neonaticide in Norway. Also, it is a reasonable assumption that the complete lack of registered cases may suggest that the potential number of unknown cases, or known but not registered cases, is small.

As presented in this paper, EP predictions concerning what may increase the risk for filicide have been supported cross-culturally through research on filicide in general and on neonaticide specifically. This suggests a universally shared maternal psychology underpinning such homicides. Any potential neonaticides in Norway could then be expected to share this cross-culturally confirmed pattern of risk factors. It is nevertheless crucial that each individual society investigates the specific epidemiological reality of this phenomenon in their society. Whereas the risk factors associated with neonaticide are stable, the prevalence of these risk factors is not necessarily stable between societies or even within a society over time. Also, like any other social problem, prevention of homicide should be based on factual knowledge of the epidemiology of risk factors in the society in question, and not assumptions about what they might be.

CONCLUSION

The present study did not uncover any clear cases of neonaticide in Norway during the past two decades. We should however not be satisfied with the results of the present study as a conclusive end point to the study of neonaticide in Norway, but follow any potential developments with regards to the discovery of neonaticides, abandonment and discarded neonates and the circumstances in which they occur. The present study did uncover two incidents where mothers did not seek professional help upon delivering their infants. A mother's choice to not seek help for herself and her neonate upon delivery may have serious consequences, including both accidental and intentional death. To prevent such incidents from occurring in the future, we need to explore why mothers do not present themselves or their neonates to medical or other appropriate assistance. Without any empirical evidence showing which groups of mothers are at an increased risk for perpetrating neonaticide in Norway, the present study forms an uncertain basis for recommending preventive measures in Norway.

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