

## **The medico-legal investigation of abandoned fetuses and newborns – A review of cases admitted to the Pretoria Medico-Legal Laboratory, South Africa**

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### **Abstract:**

There is a dearth of literature on the extent of fetal or newborn abandonment or “dumping” and the medico-legal investigation procedures these cases require. This is despite the fact that these occurrences are a world-wide phenomenon and by definition involve criminal law concerns such as illegal abortion, concealment of birth, murder, or neonaticide, depending on the country concerned. This article contributes to current literature in both respects and provides a retrospective case audit for the period 2004-2008 pertaining to all abandoned newborns and fetuses admitted to the Pretoria Medico-Legal Laboratory (PMLL) in South Africa. Demographic details, scope and nature of the medico-legal investigation as well as formulation of cause of death, were recorded. A total of 289 cases were identified for inclusion in this study, 57% of which were considered to have been non-viable fetuses, whilst 45 of the viable fetuses were deemed to have been stillborn. These instances involve the crimes of concealment of birth and at times illegal abortion, yet prosecution of these cases are relatively unheard of. Signs of live birth were identified in 38 of the cases in the study. Of these infants, 9 were deemed to have died from injuries they have sustained and in a further 9 cases no anatomical cause of death could be identified. Homicidal cases should be brought in cases where death ensued as a result of abandonment however it is not known how many cases were prosecuted. A comparatively large number of cases were found to have been admitted to the Pretoria Medico-Legal Laboratory. This is alarming because South African abortion laws are liberal and services are free at point of access in the public health care sector. A substantial percentage of cases of abandoned infants were found to have shown signs of life after birth implying a homicidal manner of death or death by abandonment but it seems these cases are merely shelved.

### **Keywords:**

Fetus, newborn, neonaticide, live birth, stillbirth, viability, concealment of birth

### **Introduction**

Bodies of newborns or fetuses are sometimes found abandoned in places such as rubbish dumps and washrooms.[1] The term abandonment in this regard refers to babies or fetuses found abandoned in places such as rubbish dumps and does not refer to live born babies left in places, such as hospitals, to be cared for by someone other than the mother. This phenomenon is a worldwide concern.[2, 3] In South Africa there is a constant stream of reports indicating an alarming and possible growing trend in abandoning fetuses and newborns in places where survival is not expected. Unfortunately, these reports are not found in scientific literature, but usually in social media. These social media reports emphasize that the exact extent of the problem concerning babies abandoned and found dead is not

known in South Africa and this is in all likelihood a problem not unique to South Africa. Furthermore, there is also a dearth of information concerning the medico-legal investigation procedures required when these cases do reach medico-legal laboratories for post mortem examination. For instance this study was able to source only a handful of available studies pertaining to the medico-legal investigation of abandonment cases, none of which originate from an African country let alone an African metropolitan city. Furthermore none of the studies indicate of how these issues are approached in an African country or city.

Having identified that there is no scientific literature emanating from Africa, this study is the first of its kind and it focuses on the South African position. The aim of the study is to attempt to determine the scope and nature of the problem alluded to above and demonstrate the number of these cases and management thereof by the attending forensic medical practitioner. In this respect a review was done on all fetuses and abandoned babies admitted to the Pretoria Medico-Legal Laboratory (PMLL) over a 5 year period (2004-2008). This study only reviewed the cases admitted, and it is highly likely that there were numerous other cases which were not even admitted to the mortuary. Pretoria is the capital city of South Africa with an estimated population of 1.6mil in 2012.[4] Two medico-legal mortuaries serve the greater Pretoria region and investigate a combined total of approximately 3 500 cases each year. Review of the subsequent legal proceedings, if any, was beyond the scope of this study. The results of the study indicate an alarmingly high rate of abandonment of fetuses and newborns, especially given that the study was limited to one city in South Africa.

### **The general legal and medico-legal milieu of investigating abandoned fetuses and newborns**

There seems to be a paucity of scientific literature reviewing the medico-legal investigation of these abandoned babies and fetuses. Numerous international articles address specific issues such as concealment of birth or infanticide. The inclusion criteria of these articles make comparison of articles difficult. A recent study by Gheorghie et al. in Denmark discussed 11 cases of abandonment of babies from 1997 – 2008, indicated concealment of birth, abandonment of babies and neonaticide are rare but the authors emphasized that the investigation of these cases needs to be done by skilled forensic pathologists.[5] Herman-Giddens et al. in North Carolina reviewed all known live birth infants who died before the 4th day of life: 34 newborns were identified in a 16 year period and the rate of neonatal death in this setting was determined to be 2.1 per 100 000 newborns (the newborns were either killed by the mother or left to die).[6] In France, Tursz and Cook reviewed the judicial data on neonaticide and identified 27 cases from 1996 – 2007 where infants died within the first 24 hours of life.[7] In Germany, Schulte et al. identified 150 cases (1997-2007) in 27 institutes of legal medicine.[8] The latter authors did not indicate an incidence of these cases but only reported on the findings at the mentioned medico-legal laboratories. [8]

The nature and scope of the medico-legal investigation of fetal and baby abandonment cases will depend on relevant regional laws. In South Africa there are numerous laws applicable the medico-legal investigations. The Births and Deaths Registration Act (Act 51 of 1992) prescribes that all babies born alive and all stillborn babies (a baby born after 26 weeks of gestational age who shows no signs of life) must be registered at the Department of Home Affairs. Failure to do so will constitute the crime of concealment of birth in terms of section 113 of the General Law Amendment Act (Act 46 of 1935). However, the crime of concealment of birth is only applicable to fetuses which have reached at least 28 weeks gestation.[9] The crime of murder is a common law crime which is defined as unlawfully and intentionally causing the death of another person.[10] 'Person' in this instance refers to someone who was born alive. Proof of live birth is regulated by section 239(1) of the Criminal Procedure Act (Act 51 of 1977) which prescribes that breathing is sufficient evidence of live birth for purposes of criminal prosecution.

In South Africa, if the body of a fetus or newborn is found abandoned, the police open a docket to investigate the case [in terms of the Inquests Act (Act 58 of 1959)] and the body will be admitted to the medico-legal mortuary for a forensic post mortem examination. Several issues are pertinent with regards to the management of products of conception (fetuses, embryos and newborns) in the scope of forensic medical practice. The forensic pathologist conducting the medico-legal investigation should attempt to address the following in each case: It is imperative to determine whether or not the infant had lived substantially after birth/separation from the woman concerned.[11] Infants who have lived after birth are legal subjects in South Africa and as such they are afforded legal rights and the law's full protection.[12] Consequently their death should be managed under the umbrella of the common law

crime of murder. If, however, it transpires that the pathologist diagnoses stillbirth, the determination of an accurate gestational age is important from a legal perspective due to registration of stillbirth statutory requirements.[11,13] In all viable babies, an attempt should be made to accurately diagnose the cause of death or intra-uterine death.[11,13-15]

The investigation of these cases should include full assessment of anthropological parameters. The gestational age may be determined with the use of anthropometric parameters, published percentile charts, ossification centres as well as histological examination.[11,13,14,16] As a crude method in the forensic setting in Pretoria, South Africa, the so-called Haase's rule of thumb is commonly used to assist in establishing the gestational age.[13]

The determination of live vs. stillbirth can prove extremely difficult, especially in decomposed cases. The "hydrostatic test" as described by Schleyer in 1681 can be difficult to interpret especially in decomposed remains. However, in a fresh body a positive test can lead to the conclusion that live birth had taken place.[11,13] Abandoned bodies are often found in varying stages of decomposition having been subjected to post mortem trauma or predation making reliable interpretation of trauma difficult.[11,13] The validity of and benefit obtained from ancillary investigations (radiology, histology, etc.) to more accurately determine the gestational age and/or the exact anatomical cause for the early pregnancy loss or intra-uterine death is debatable and accordingly are seldom performed in South Africa.

## **Methods**

A retrospective descriptive case audit was conducted at the PMLL on case files of abandoned fetuses and newborns admitted to the PMLL from January 2004 through December 2008. The total number of cases admitted to the institution (case load) was also recorded. More than 90% of the cases admitted to the PMLL undergo full autopsy.

The data that were recorded included demographic details, gestational age, medico-legal post mortem findings (including features of decomposition, live or stillbirth and specimens retained) and the cause of death.

All newborns who were born alive and survived for more than 24 hours, where placental tissue was the only specimen received or where an attending medical practitioner was not in a position to ascertain live or stillbirth which were referred for medico-legal investigation and where the family members ultimately claimed the remains, were excluded from the study.

The statistical evaluation of the data was done in conjunction with the Department of Statistics at the University of Pretoria and the program used was SPSS version 21.00.

Approval to conduct this study was obtained in advance from the Research Ethics Committee from the Faculty of Health Science at the University of Pretoria.

## **Results**

A total of 289 cases were identified for inclusion in this study. The number of cases per year ranged from 28 to 99. The total case load at the mortuary was between 2253 and 2461 with a total case load of 11 768 over the 5 year period. The study cases comprized 2.5% of the total case load.

### *Demographic details*

Early gestational age influences the accurate determination of gender. There were 141 (49%) males and 92 (32%) females. In 56 (19%) of the cases gender was unascertained. The pathologist indicated ambiguous genitalia in 8 of the cases. The majority of these cases were fetuses of very early gestational age and no invasive autopsy was conducted in an attempt to identify the internal genitalia, thus the gender remained unascertained.

### *Decomposition*

Decomposition was present in a third of the cases [101 (35%)]. Nearly 50% of these cases (45 cases) were deemed viable (gestational age of more than 26 weeks).

#### *Anthropometric parameters measured:*

The mass [284 cases (98%)] and the crown-heel-length [275 cases (95%)] were recorded in the majority of cases. The mass ranged from 10g to 4900g with a mean of 1288g. The crown-heel length was between 5 and 60cm with a mean of 34cm. Other measurements included crown-rump-length [93 cases (32%)], foot-length [140 cases (48%)], head circumference [134 cases (46%)], rump-heel-length [43 cases (15%)] and measurement of the length of the femur [12 cases (4%)] and tibia [13 cases (5%)]. The length of the humerus and the abdominal circumference was recorded in only 1 case.

#### *Gestational age (GA)*

The gestational age estimations based on the autopsy findings varied from 9 weeks to term gestational age. The gestational ages of 22 babies were not recorded. The average gestational age was 26 weeks with standard deviation of 7 weeks. For 11 babies gestational ages of more than 42 weeks were recorded. These cases were treated as full term pregnancies and were not included when the mean and standard deviation were computed. The majority of the 256 babies (57%) was less than 26 weeks of gestational age. The pathologists noted the gestational age in 174 (60%) of the cases as part of their findings on the post mortem report. In the 115 cases (40%) where the pathologist did not indicate the gestational age in the report, 43 fetuses were more than 26 weeks gestational age (and thus deemed viable).

#### *Live birth vs. stillbirth*

In 57% of the cases the fetus was considered to be non-viable (less than 26 weeks of gestational age). The pathologist differentiated between live birth [38 (13%)] and still birth [82 (28%)] in 120 of the total case load. In the 110 fetuses deemed viable, live birth was indicated in 31 and stillbirth in 45. The mean mass of the live born babies was 2529g and 1618g for the stillborn babies. In the remaining 169 cases (59%) no differentiation was made. The majority of these were non-viable fetuses and in the other infants, decomposition and other complicating factors, prohibited the determination of live birth or stillbirth. The mean mass in the latter group was 843g (see table I).

**Table I:** Live and stillbirth in relation to viability of the fetuses

		Live birth	Stillbirth	Undetermined
Non-viable	179	7	37	135
Viable	110	31	45	34

#### *Extent of post mortem examination of cases*

Full post mortem examinations were conducted on 145(50%) of the cases and viewings (external examinations only) on 144 (50%) cases. Full post mortem examinations were done on the majority of fetuses with a mass of more than 1000g (with a mean mass of 1987g); however, in 10 of these no dissection was conducted – some of these bodies were decomposed. Viewings were conducted on smaller products of conception (mean mass 560g).

#### *Specimens retained*

Histological examination of tissue slides were conducted on 31 (11%) of the cases. Specimens for DNA analysis and typing [these included blood or bone (especially rib tissue)] were conducted on 79 of the total cases (27%), but only 110 cases were more than 26 weeks gestational age which indicates that DNA analysis were done in 72 % of the cases (excluding the 11 term cases and 22 cases where no GA was recorded.)

#### *Cause of death*

Upon completion of the post mortem examination, the pathologist recorded the cause of death to be “non-viable product of conception/abortus” in 156 cases (54%), but no specific medical condition or anatomical cause of death was identified in these cases. The cause of death was recorded as “stillbirth” in 53 cases (18%), with no underlying reason for the stillbirth (such as genetic conditions or congenital infections) having been ascertained at autopsy. In 9 cases (7%) the cause of death was due to trauma (including sharp force injury and birth related head trauma). In 62 cases (22%) no specific anatomical cause of death was established but it should be borne in mind that a number of these comprised decomposed or mutilated remains. In the remaining 9 cases (3%), no macroscopic cause of death could be ascertained (and all these babies showed signs of live birth) and the term “abandoned baby” was used to describe the cause of death indicating a live born baby who was abandoned and most probably

succumbed to lack of heat/nutrition/exposure (all very difficult diagnosis to be made at post mortem). (Refer to table II)

**Table II:** Cause of death

Abortus/non-viable product of conception	156
Stillbirth	53
Trauma	9
No specific anatomical cause of death – unascertained	62
Live birth with no anatomical cause of death – “abandoned baby”	9
Total	289

#### *Completion of death notification form*

The death notification form (DNF) was completed in 147 (51%) of the cases. These included all the infants born alive, 59 of the stillborn infants and 50 of the unascertained cases. There were cases where the death notification form was completed for very small products of conception and the cause of death was stated as abortion (22 cases). In 22 cases where the fetus was deemed to have been viable, no DNF form was completed despite statutory prescription that these deaths should be registered.

#### **Discussion**

The current study identified a total of 289 abandoned fetuses and newborns admitted to the PMLL from January 2004-December 2008. The majority of these were found on the rubbish dumps. This appears to be a very high figure in comparison to the other studies although the inclusion criterion may have been different. The study conducted in Denmark by Gheorghie et al. identified 11 cases of fatal newborn abandonment over an 11 year period.[5] Herman-Giddens et al (North-Carolina) identified 35 newborn fatalities over a 16 year period.[6]

Statistics South Africa (the official agency responsible for the release of such data) reported 601 133 deaths in South Africa in 2007.[17] The majority of these (546 917) were due to natural causes while 54 216 were due to non-natural causes. This also indicates the relatively high number of non-natural deaths in South Africa annually. The publication by Statistics South Africa further indicated that 46 546 infants died in 2007; the majority (45 315) died from natural causes and the remaining 1 231 died from non-natural causes.[17] The number of stillborn babies registered at the Department of Home Affairs was not indicated. A report released by the South African Medical Research Council on 15 April 2011 summarized the findings of the Stillbirth Series from the Lancet and indicated that South Africa had a stillbirth rate of 148 making South Africa the country with the 17<sup>th</sup> highest stillbirth rate.[18,19] In 2009, a total of 23 000 babies were stillborn in South Africa (approximately 63 per day).[18,19] Jacobs et al. reported the rate of abortions (admitted to the medico-legal laboratories – with exclusion of Pretoria) as 2.9/100 000 and the rate of abandoned babies as 0.2/100 000 for 2009.[20] The methodology of the latter study only included review of completion of statistical forms and not review of the post mortem reports, which impairs on the quality of the data.

The findings of this study showed no marked difference in the gender of the abandoned babies, in contrast, press reports and lay publications indicate female infants are more often killed in countries such as China, Taiwan, South Korea and Pakistan.

The extent and nature of the post mortem examination of these cases are often dependent on or dictated by extraneous factors such as the degree of decomposition and skeletalization.[1,11] In our study, decomposition was present in 35% of the cases. This correlates with the study by Schulte et al. in Germany where marked and severe putrefaction was present in 32% of cases.[8] Tissue for DNA analysis for identification purposes was retained in 79 of the 110 fetuses who were more than 26 weeks of gestational age (72%). Review of the final outcome of these DNA investigations was beyond the ambit of this study, and it is unknown whether any prosecutions were implemented based on the findings of these investigations.

In 38 of the cases in our study, signs of live birth were identified by the attending forensic medical practitioner. In such cases homicidal charges should be brought, however; it is not known in how many cases prosecutions were implemented. Nine of these infants were deemed to have died from injuries they sustained and in 9 cases (where live birth was determined by the pathologist) no anatomical cause of death could be identified. The probability is that exposure to the elements and the lack of

warmth and food was most probably the cause of death, but it is clear that such diagnoses are not easily made. Suffocation was not established as a cause of death in any of the cases in our study in contrast to the study by Schulte et al. where 41 of the 76 cases where a cause of death was ascertained, death was due to suffocation. [8]

In view of the liberal termination of pregnancy legislation it is difficult to understand why so many of these babies and fetuses are still found. According to the Choice on Termination of Pregnancy Act (Act 92 of 1996), a pregnancy termination can be performed up to 12 weeks of gestation if requested by the female. Requirements for termination in the second and third trimester of pregnancy are also prescribed and include congenital abnormalities of the fetus and socio-economic considerations. The places where termination of pregnancy procedures may be performed are also specified. Despite this liberal legislation numerous illegal terminations of pregnancy still occur. Research into how the Choice on Termination of Pregnancy Act is experienced by women and girls found numerous reports that people opt for illegal pregnancy terminations for a number of reasons including lack of knowledge of the provisions of the Choice on Termination of Pregnancy Act, inadequate public provision of termination of pregnancy services, fear of abusive and disrespectful treatment at public facilities, and fear of stigma associated to termination of pregnancy generally. [21]

In conclusion, our study shows relatively large numbers of abortuses, fetuses and newborns are admitted to the PMLL. In many cases autopsies indicated that the babies had been born alive thereby implying homicidal death or death by abandonment. Post mortem injuries and predation or decomposition complicate the medico-legal investigation of these cases and therefore it is important that experienced forensic pathologists conduct these cases and that due protocol is followed. Schulte et al. also indicated that additional investigations in such cases should be mandatory and if the attending forensic medical practitioner does not perform such investigations “his/her expertise would be incomplete without the implementation of additional examinations and that court proceedings without the results – from a medical point of view – not acceptable”. [8] Shortcomings in such an investigative protocol may jeopardize the judicial process in cases where criminal prosecution may be possible. The ethical dilemma is that if life can so easily be “disposed” of and disregarded, what message will this convey about society?

## Conclusions

These case load admitted to the PMLL appears to be exceptionally high, although minimal comparative published articles were found. There should be a clear legislative framework pertaining to the medico-legal investigation and management of these cases. Each case should be subjected to a thorough investigation in order to determine gestational age, live or stillbirth and the cause of death as subsequent legal proceedings can include the investigation of homicide or concealment of birth. It is also submitted that all cases of abandonment be properly recorded regardless of the remains' evidentiary weight. Such records should be open to scientific and social attention and analysis aimed at addressing broader issues associated to abandoning fetuses and newborns.

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