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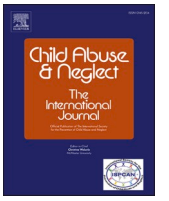

Beyond neonaticide: A forensic typology of suspicious perinatal deaths in South Korea (2015–2021)

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ABSTRACT

Background and objective: Crisis pregnancies can lead to a spectrum of fatal outcomes, yet traditional research, focused narrowly on neonaticide and constrained by the "born-alive principle," often overlooks concealed stillbirths and forensically ambiguous cases. This study applies the broader framework of Suspicious Perinatal Death (SPD) to a national South Korean forensic dataset (2015–2021) to identify epidemiological patterns and empirical typologies during a period of significant sociopolitical change.

Participants and setting: From all perinatal autopsies (N = 230) at South Korea's National Forensic Service, 138 cases met criteria for SPD (fetal death ≥24 gestation or neonatal death within ≤24 h under suspicious circumstances).

Methods: In this retrospective study, 64 variables were coded from forensic and investigative records. After feature selection (Boruta algorithm) and outlier removal, Partitioning Around Medods (PAM) cluster analysis on 132 cases was used to derive typologies.

Results: Three distinct typologies emerged: 'Adolescent-Dependent' (n = 42, 31.8 %), 'Isolated Single-Mother' (n = 36, 27.3 %), and 'Socially Vulnerable-External Discovery' (n = 54, 40.9 %). A critical temporal trend was identified: confirmed neonaticide cases declined by 91.7 %, while non-neonaticide SPD cases (e.g., induced stillbirths) increased by 150 %. Live birth status remained forensically indeterminate in 29.0 % of cases.

Conclusions: The SPD framework reveals that perinatal deaths in South Korea are not simply decreasing but are transforming in method, influenced by shifting legal and medical landscapes. The identification of distinct, evidence-based typologies underscores the need for a paradigm shift from punitive responses toward tailored, preventive public health interventions.

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1. Introduction

> "I turned to sport, hoping that my effort or a fall might dislodge" that thing "(the fetus) inside me. In borrowed ski gear, I fell with abandon, imagining the shock would save me. Convinced I had to reach the summit to rid myself of it, I wore myself out to kill it (the embryo) under me."
> "In my student bathroom, I had given birth to both life and death. For the first time, I felt caught up in a line of women, future generations would pass through us."
>
> — Annie Ernaux, Happening (L'événement)

The excerpts above from French author Annie Ernaux's autobiographical essay *Happening (L'Événement)* poignantly illustrate the intense psychological pressures and desperate choices women face during crisis pregnancies. Although Ernaux's experiences occurred in 1963 France, the issues she highlights transcend specific temporal or geographic contexts and remain highly relevant today.

In June 2023, a government audit in South Korea revealed that among 2123 infants born in medical facilities between 2015 and 2022 who were never officially registered, 249 had died (Cho et al., 2024). This figure nearly equaled the official average of all reported infanticide and abandonment cases during the same period, implying that the known scale of fatal events had been underestimated by almost half. Yet even these numbers reflect only deaths following births in medical facilities. Prior research consistently shows that the vast majority of neonaticides—infant killings within 24 h of birth—occur in private, non-medical settings, typically at home (Overpeck, 2003; Overpeck et al., 1998; Putkonen et al., 2007). Given their high concealability and low detection rates, such deaths belong to what criminologists term the "dark figure of crime" (Krüger, 2015; Porter & Gavin, 2010; Radojevic et al., 2021; Tanaka et al., 2017; Wessel et al., 2003). The actual magnitude of perinatal deaths linked to crisis pregnancies is therefore likely far greater than current statistics suggest (Beyer et al., 2008; Schofield et al., 2013).

Despite the gravity of this issue, systematic empirical research in South Korea remains scarce (Kim et al., 2021). Existing studies are largely limited to isolated case reports, with little comprehensive analysis. This study addresses this gap by analyzing forensic autopsy data to identify the specific characteristics and typologies of crisis-pregnancy–related deaths.

1.1. From neonaticide to a broader framework: suspicious perinatal death (SPD)

Academic inquiry into fatal outcomes of crisis pregnancies has historically centered on neonaticide, defined as the killing of an infant within the first 24 h of life (Resnick, 1970). Prior research consistently characterized this act as a distinct subtype of filicide, typically committed by young, unmarried, socially isolated women concealing an unwanted pregnancy (Putkonen et al., 2007; Spinelli, 2001). Such studies generated a "classic profile" of perpetrators, emphasizing demographic vulnerability and social marginalization. Importantly, however, both legal and scholarly definitions of neonaticide restrict the term exclusively to infants who were demonstrably born alive.

This reliance on the "born-alive principle" creates critical blind spots. Women experiencing crisis pregnancies do not only kill infants after birth; in many cases, their efforts to end the pregnancy begin well before delivery. Such attempts often include self-induced miscarriages through abdominal trauma, ingestion of toxic substances, or unsupervised use of abortifacient drugs (Grossman et al., 2010; Ralph et al., 2020). Furthermore, even when delivery occurs, forensic determination of live birth is frequently impossible, particularly when remains are discovered in an advanced state of decomposition or when births take place in concealed, unattended settings (Brennan & Milne, 2018; du Toit-Prinsloo et al., 2016; Li et al., 2017; Stenton & Cohen, 2020). These limitations underscore that a substantial proportion of crisis pregnancy-related deaths remain conceptually invisible and empirically underexamined, a problem consistently noted across different jurisdictions (Wilson et al., 2022).

To address these limitations, Milne (2017) proposed the broader concept of Suspicious Perinatal Death (SPD). SPD encompasses all abnormal and potentially intentional deaths occurring from approximately the 24th week of gestation through the first 24 h postpartum. This includes neonaticide, but also induced stillbirth, concealed or unattended deliveries, corpse abandonment, and non-medical self-induced abortion attempts. By situating these outcomes along a continuum of maternal acts and omissions—from pregnancy recognition through the immediate postpartum period—SPD provides a comprehensive analytic lens for understanding the multifaceted and concealed realities of crisis pregnancy termination.

1.2. The South Korean context: a sociopolitical paradox and an urgent research need

The SPD framework holds particular significance in South Korea, where recent legal and sociopolitical changes have created a paradoxical environment. In 2019, the Constitutional Court ruled the criminalization of abortion unconstitutional, yet no replacement legislation has been enacted as of 2025 (Constitutional Court of Korea, 2019; Heo, 2025; Yang, 2020). While public attitudes toward abortion have become more liberal, access to safe and legal termination remains severely constrained. Physicians, uncertain about potential liability, frequently refrain from providing abortion services, thereby pushing women toward unsafe alternatives outside formal healthcare systems (Kim, 2022; Lee & Lee, 2024).

This systemic vacuum is reflected in the dramatic surge of illegally imported abortifacient drugs: seizures of mifepristone and misoprostol increased from only 12 cases in 2015 to 2365 in 2019 (Yang, 2020). At the same time, reactive measures such as the introduction of the Anonymous Birth Policy in July 2024 and the imposition of harsher penalties for infanticide have focused on post-birth outcomes, leaving the root causes of crisis pregnancies unresolved (Lee & Lee, 2024).

Taken together, these dynamics suggest that non-medical pregnancy terminations—including self-induced miscarriages and

abandonment of stillborn infants—may be becoming increasingly prevalent under current conditions. In this context, reliance on a neonaticide-only framework is analytically inadequate. The broader SPD framework is essential to empirically capture concealed and fatal outcomes of crisis pregnancies in South Korea and to inform the development of effective, evidence-based prevention and intervention strategies.

1.3. The multifaceted nature of SPD and a typological research approach

To build the conceptual foundation for this study, we conducted a comprehensive scoping review of the international literature on SPD (2023–May 2025). This review, spanning major academic databases (e.g., PubMed, Google Scholar) and regional repositories for South Korea (e.g., RISS) and Japan (e.g., CiNii), revealed a clear evolution in the understanding of these deaths.

Early research on neonaticide established a seemingly uniform "classic profile". This profile typically involved a young, unmarried, primiparous woman from a socioeconomically disadvantaged background who, fearing social stigma, conceals her unwanted pregnancy and gives birth in a hazardous, non-medical setting (Amon et al., 2012; Beyer et al., 2008; Craig, 2004; d'Orban, 1979; Friedman & Resnick, 2009; Li et al., 2017; Porter & Gavin, 2010; Resnick, 1970; Spinelli, 2001).

However, as research accumulated, this monolithic view proved inadequate. Subsequent studies documented a wide spectrum of perpetrators who defied the classic profile—including married, middle-aged, and middle-class women—and revealed a range of lethal behaviors from passive neglect to active violence, sometimes involving familial complicity (Beyer et al., 2008; Bonnet, 1993; Putkonen et al., 2007; Tursz & Cook, 2011). This growing recognition of heterogeneity underscored that neonaticide is not a singular phenomenon but a multifaceted one, irreducible to a single profile.

This understanding spurred the development of more refined typological frameworks. Researchers began classifying cases based on motivation, such as Sakuta and Saito's (1981) distinction in Japan between the 'anomie type' (young women avoiding social shame) and the 'mabiki type' (literally "thinning out," involving older parents facing economic burdens). Others focused on method, like Bonnet's (1993) differentiation between 'active' (direct violence) and 'passive' (neglect) neonaticide.

In recent years, the methodologies for deriving such typologies have become more analytically sophisticated. For instance, Greenwood et al. (2023) employed Smallest Space Analysis (SSA) to identify "desperation," "disturbance," and "rejection" subtypes, while Negishi (2022) applied multi-value Qualitative Comparative Analysis (mvQCA) to identify two primary pathways: (1) unmarried, economically stable women lacking family support, and (2) impoverished married women with insufficient spousal support.

While these typological studies confirm that neonaticide is a complex and layered phenomenon, they are often characterized by certain methodological boundaries: reliance on small samples, dependence on secondary sources, and, most importantly, an exclusive focus on neonaticide rather than the broader SPD framework.

This study addresses these gaps. Using all neonatal autopsy data from South Korea's National Forensic Service (NFS, 2015–2021), our objectives are to:

1) Map the epidemiology of SPD in South Korea by identifying trends and key characteristics.
2) Analyze multidimensional risk factors by integrating forensic, situational, and sociodemographic variables.
3) Develop a data-driven typology of SPD by applying rigorous cluster analysis to a comprehensive forensic dataset, extending such frameworks beyond traditional neonaticide to inform tailored prevention and intervention strategies.

2. Methods

2.1. Research design and data collection

This retrospective study analyzed forensic autopsy cases conducted by the NFS of South Korea from January 2015 to December 2021. Primary data sources included forensic autopsy reports from the NFS, police and prosecutorial investigative records, and interviews with suspects and witnesses. Where available, secondary sources such as media reports were also reviewed to provide additional contextual information. Approval for conducting this research was obtained from the NFS (approval number: 906-240228-BR-005-01), and the study was carried out in accordance with established procedures and ethical guidelines.

2.2. Inclusion and exclusion criteria

Among forensic autopsy cases conducted by the NFS between 2015 and 2021, we initially screened 230 deaths involving fetuses at or beyond 24 weeks' gestation or neonates within 24 h after birth. Cases were classified as SPD (Milne, 2017) when they met both of the following:

- Death occurred between 24 weeks' gestation and 24 h postpartum; and
- Circumstances raised forensic concern consistent with crisis-pregnancy–related acts or omissions, including suspected assault, neglect or abandonment, refusal or delay of medical care, concealed or unattended delivery, neonaticide, fetal injury, or non-medical abortion attempts (e.g., self-administration of medications or folk remedies outside healthcare settings).

Conversely, cases were excluded if any of the following applied:

- Fetal death at <24 weeks' gestation without evidence of violence or trauma;
- Death occurring >24 h postpartum with no suspicion of harmful acts within the first 24 h of life;
- Death fully explained by accidental or natural causes, with no necessary or substantial contribution from maternal crisis-pregnancy–related acts or omissions (e.g., concealment, unattended delivery, delayed/refused care);
- Domestic-violence events in which only the mother was victimized (no fetal/neonatal victimization);
- Third-party perpetration (e.g., partner-inflicted injuries), as the analytic focus was outcomes arising from maternal acts or omissions.

For clarity, in this study the term disease denotes the proximate pathophysiological mechanism (e.g., neonatal sepsis, hypothermia, hypoxic-ischemic encephalopathy) and does not by itself indicate a natural manner of death. Cases were classified as SPD even when the proximate mechanism was coded as disease if that process was a foreseeable consequence of, or was materially exacerbated by, suspicious circumstances such as unattended delivery, abandonment, concealment, or delayed/refused care.

2.3. Data coding and analysis

Two researchers holding doctoral degrees in social psychology and clinical psychology, with 8 and 20 years of relevant experience respectively, independently coded each case. Subsequently, two forensic pathologists reviewed their coding results. 64 variables were categorized into four domains: (1) Maternal and Family Characteristics, (2) Pregnancy and Birth-Related Risk Factors, (3) Birth and Death Circumstances, and (4) Lethal Perinatal Behavior and Post-Death Behavior (for detailed variables, see Appendix). Out of the total 230 cases reviewed, 138 cases (60.0 %) were classified as SPD. Inter-coder reliability was found to be high (Intraclass Correlation Coefficient = 0.97).

2.4. Cluster analysis

To identify typologies among SPD cases, a Partitioning Around Medoids (PAM) cluster analysis based on Gower distance (Gower, 1971) was conducted (Jung et al., 2020). Prior to clustering, data refinement was performed in two steps to enhance variable relevance and clustering accuracy.

First, key variables for inclusion in the cluster analysis were selected using the Boruta algorithm. The Boruta algorithm is a variable selection method based on an extension of the random forest framework, systematically assessing the relative importance of variables and eliminating statistically insignificant ones (Kursa & Rudnicki, 2010). Through this method, only 26 core variables out of an initial 64 were retained, significantly reducing dimensionality, computational complexity, and improving the efficiency of the clustering process.

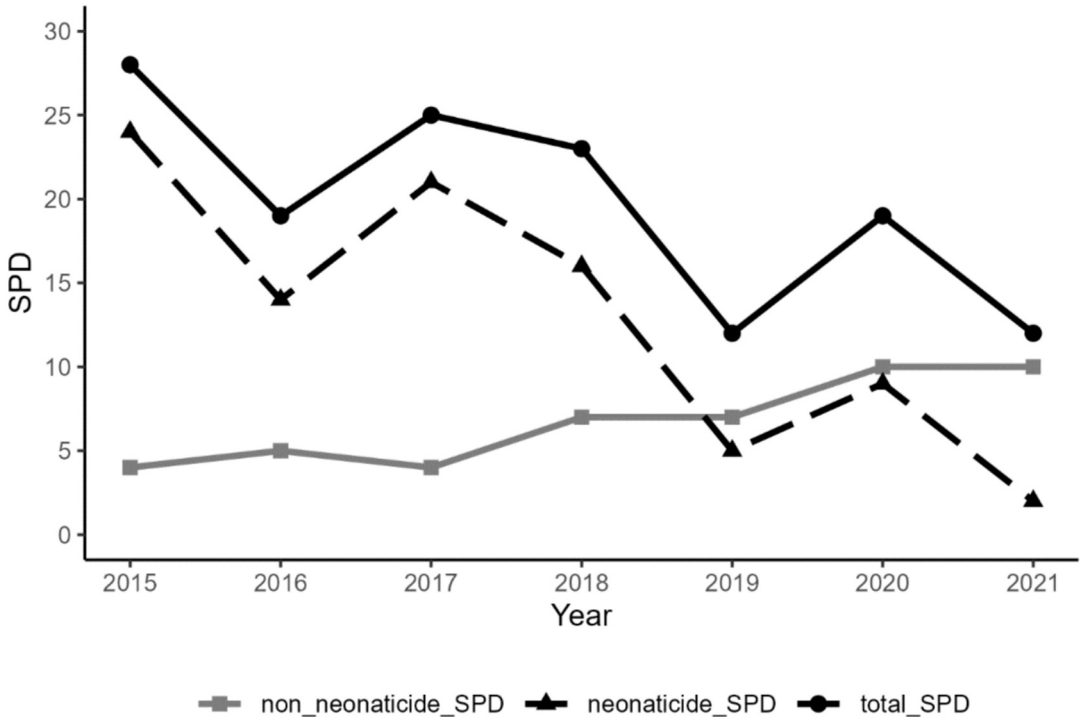

Fig. 1. Annual trends in suspicious prenatal death: comparison of neonaticide SPD (≤24 h) and non-neonaticide SPD cases (2015–2021).

Second, data quality was enhanced through outlier detection using the K-means algorithm. In this step, data points exceeding a predefined Mahalanobis distance threshold from their cluster centroids were identified and removed as outliers. Consequently, the dataset was reduced from the original 138 cases to a final set of 132 cases. Re-applying PAM clustering to this refined dataset yielded an improved silhouette coefficient of 0.2 for an optimal number of three clusters. Although this silhouette coefficient is somewhat low, it is within an acceptable range (Kaufman & Rousseeuw, 2009). Given the inherent complexity of SPD and the multidimensional, heterogeneous characteristics of these data, this result was deemed reasonable.

To closely examine the characteristics of the resulting three-cluster solution, cluster frequencies by year were compared. Furthermore, statistical differences across clusters in key categorical variables were assessed using Fisher's Exact Test and Chi-square tests, with the magnitude of inter-cluster differences evaluated using Cramér's V coefficient.

3. Results

3.1. Overview and trends of SPD cases

Of the 230 forensic autopsy cases reviewed, 138 cases (60.0 %) were classified as SPD. Among these, 66 % (n = 91) were neonaticide-related SPD cases associated with deaths following live births, while the remaining 34 % (n = 47) involved non-neonaticide SPD cases, including suspicious fetal deaths, premature births induced by maternal violence, and concealment or abandonment of stillbirths.

Time series analysis of neonaticide SPD and non-neonaticide SPD revealed notably contrasting trends. Neonaticide cases decreased dramatically from 24 cases in 2015 to only 2 cases in 2021, whereas non-neonaticide SPD cases increased by approximately 150 % during the same period, from 4 cases to 10 cases (Fig. 1). Although the NFS autopsy data is limited to cases referred during criminal investigations, these findings suggest a qualitative shift in SPD patterns, with traditional neonaticide forms significantly declining while other forms of suspicious perinatal death are increasing.

3.2. Key characteristics of SPD cases

While the preceding analysis highlights the divergent temporal trends of SPD subtypes, both ultimately represent manifestations of the broader phenomenon of crisis pregnancy termination. To elucidate the underlying vulnerabilities and behavioral patterns common to this population, we systematically examined all 138 SPD cases using a four-domain analytic framework that proceeds chronologically: (1) maternal sociodemographic and familial characteristics (who they are), (2) pregnancy-related risk behaviors (what they did), (3) the birth and death circumstances (what happened), and (4) post-mortem management of the remains (how they responded afterward).

(1) Maternal and Family Characteristics: Socioeconomic Instability and Isolation

The mean maternal age in SPD cases was 26.06 years (SD = 7.85), significantly lower than the average childbearing age (approximately 32 years, Statistics Korea, 2023) among Korean women during the same period. Notably, their mean age at first childbirth was 21.29 years (SD = 4.57), indicating considerably earlier first childbirth experiences compared to the general Korean female population (see Appendix 1).

Occupationally, there was a high prevalence of unemployment (23.9 %, n = 33) or engagement in unstable, unskilled labor (23.9 %, n = 33). Regarding relational aspects, distinct patterns of isolation were observed: in the vast majority of cases (Partner Relationship Type: 86.2 %, n = 119), the biological father was not the mother's current partner; legally married mothers constituted only a small minority (Marital Status: 5.8 %, n = 8); and cohabitation with the biological father was exceptional (Household Composition: 6.5 %, n = 9).

Regarding the mothers' parity, 16 women (11.6 %) had other children. However, this prior maternal experience did not appear to be a protective factor, as their family structures were often fragmented. A more detailed review of case files revealed that only six of these mothers were cohabiting with their other children, and in only two instances was another child confirmed to be present in the home during the unattended delivery.

These findings demonstrate that mothers in SPD cases exhibit a pervasive pattern of socioeconomic instability and relational vulnerability, a profile consistent with established findings from prior neonaticide research.

(2) Pregnancy and Birth-Related Risk Factors: Concealment, Harm, and Contradictions

Only 15.2 % (n = 21) of mothers disclosed their pregnancy to the biological father (Maternal Disclosure), while for the remaining cases, either they did not disclose or this information was unknown. Their pregnancies were intertwined with complex psychosocial vulnerabilities, with economic difficulties (26.8 %, n = 37), unstable living situations (18.1 %, n = 25), absence of social support systems (13.8 %, n = 19), and fear of parental reaction to pregnancy (15.9 %, n = 22) identified as significant risk factors (see Appendix 2).

Particularly noteworthy was the pronounced inconsistency between mothers' statements and their actual behaviors. A substantial proportion of mothers who claimed to have been unaware of their pregnancy (Concealment due to Pregnancy Unawareness: 58.7 %, n = 81) deliberately avoided prenatal care (42.0 %, n = 58) and engaged in behaviors clearly detrimental to fetal health (Any Prenatal

Risk Behavior: 32.6 %, n = 45). Specifically, these included alcohol consumption (9.4 %, n = 13), smoking (8.7 %, n = 12), excessive use of over-the-counter medications (7.2 %, n = 10), intentional physical risk behaviors (3.6 %, n = 5), and use of abortifacient drugs (4.3 %, n = 6).

This contradictory behavioral pattern strongly suggests that many mothers, contrary to their claims of "not knowing" about their pregnancy, actively attempted to terminate unwanted pregnancies. Ultimately, these behaviors reveal a vulnerable reality: mothers, isolated from the biological father and family, confronting the crisis alone through maladaptive coping.

(3) Birth and Death Circumstances: Non-Medical Deliveries and Forensic Ambiguities

The vast majority of SPD cases involved deliveries outside of medical institutions, typically in non-medical and hazardous environments such as the mother's residence (57.2 %, n = 83). This context created a significant discrepancy between maternal statements and objective forensic evidence, frequently making a definitive determination of live birth exceedingly difficult (see Appendix 3).

A comprehensive forensic analysis of all 138 SPD cases revealed the complexity of this issue. A definitive ruling of live birth was made in 50.0 % (n = 69) of cases, and a clear stillbirth was determined in 21.0 % (n = 29). Most notably, nearly a third of all cases, 29.0 % (n = 40), were classified as 'ambiguous/uncertain,' where the distinction between live birth and stillbirth could not be conclusively made. This high degree of forensic ambiguity is a key finding that suggests the circumstances surrounding these births were often chaotic and precarious.

This objective forensic reality becomes even more complex when contrasted with maternal statements. In a focused sub-analysis of the 40 cases where mothers claimed stillbirth or where the birth status was uncertain, only 42.5 % (n = 17) of these claims were supported by a definitive forensic ruling of stillbirth. Conversely, 12.5 % (n = 5) were found to be clear live births, directly contradicting the maternal narrative, while the largest portion, 45.0 % (n = 18), remained forensically 'ambiguous/uncertain.'

The implications of this distribution are not straightforward. The high number of 'ambiguous/uncertain' cases was typically characterized by a combination of factors that confounded forensic analysis, such as unattended delivery, advanced decomposition of the remains, or extreme prematurity. Taken together, this evidence suggests that a substantial number of SPD cases are not simple matters of natural stillbirth or passive concealment, but are deeply intertwined with active harmful acts and severe neglect surrounding the perinatal period. This further suggests the limitations of a traditional neonaticide framework focused solely on live birth, and highlights the value of adopting an expanded SPD approach that encompasses the full spectrum of maternal acts and omissions.

(4) Lethal Perinatal and Post-Death Behavior: Strategies of Concealment and Neglect

Among lethal perinatal behaviors, passive neglect (47.1 %, n = 65) was most frequently observed, followed by active violence (15.9 %, n = 22). Notably, in 34.8 % (n = 48) of cases, specific lethal behaviors could not be clearly identified, reflecting insufficient evidence, evidence degradation due to decomposition, or the use of passive neglect strategies that are difficult to detect (see Appendix 4).

In terms of post-mortem management, clear concealment intentions were evident. Public disclosure of neonatal death was rare (Patterns of Death Disclosure: 4.3 %, n = 6), with the majority of mothers either completely concealing the death (19.6 %, n = 27) or disclosing to only a limited circle - such as the biological father (10.1 %, n = 14) or select members of their social network (28.3 %, n = 39).

The post-mortem management of the remains reveals a pattern of profound concealment and isolation. Public disclosure of the death was rare (4.3 %), with the majority of mothers either completely concealing the event (19.6 %) or disclosing it only to a limited circle.

To analyze this concealment process, our study distinguished between two distinct stages: an interim 'temporary storage' phase, where the remains are hidden for a period before final disposal, and the 'final abandonment' phase. A crucial finding emerged from this distinction: the maternal residence was the most frequent location for both the initial temporary storage (43.5 %) and the ultimate abandonment site (44.2 %). This pattern—in which the private home serves as the site for both the interim hiding and the final disposal—powerfully suggests these acts were committed by mothers in extreme social isolation, lacking any external support or alternatives.

Forensic autopsy results revealed that the cause of death remained undetermined in more than half of the cases (52.2 %, n = 72). Among cases where determination was possible, external or violent causes (20.3 %, n = 28)—including asphyxiation (10.1 %, n = 14) and physical trauma (4.3 %, n = 6)—were identified at a higher frequency than natural or stillbirth-related causes (17.4 %, n = 24).

Collectively, these findings indicate that SPD is not simply a pregnancy or birth complication but a phenomenon stemming from complex psychosocial factors, characterized by systematic pregnancy concealment, behaviors threatening fetal health, non-medical birth environments, and subsequent concealment of death.

3.3. Cluster analysis

The cluster analysis statistically identified three distinct SPD clusters (Table 1):

(1) Cluster 1: Adolescent-Dependent (n = 42)

Cluster 1 represented the youngest subgroup of mothers (M = 22.52, SD = 6.42, p = .002) and predominantly comprised

Table 1
Frequency distribution and statistical comparison of variables across the three typologies of suspicious prenatal death.

Characteristic (% (N))	Total (N = 132)	Cluster 1 (42)	Cluster 2 (36)	Cluster 3 (54)	Statistic	*p*
(1) Maternal and familial characteristics						
Maternal age (mean, (SD, N))	25.52 (7.31)	22.52 (6.42, 42)	26.51 (7.50, 35)	28.27 (7.0, 33)	F (2,107) = 6.85	0.002
Maternal age at first childbirth (mean, (SD, N))	21.45 (4.46, 39)	21.00 (4.46, 39)	21.73 (4.17, 11)	22.90 (6.03, 10)	F (2, 57) = 0.675	0.513
Maternal occupational status						
None	24.24 (32)	57.1 (24)	2.8 % (1)	13.0 (7)	V = 0.41 (0.25-∞)	<0.001
Unskilled	22.73 (30)	21.4 (9)	33.3 (12)	16.7 (9)		
Semi-skilled	7.58 (10)	9.5 (4)	8.3 (3)	5.6 (3)		
Skilled	6.06 (8)	7.1 (3)	2.8 (1)	7.4 (4)		
UNK/NA	39.39 (52)	4.8 (2)	52.8 (19)	57.4 (31)		
Victim sex						
Female	48.85 (64)	47.6 (20)	45.7 (16)	51.9 (28)	V = 0.00 (0.00-∞)	0.838
Male	51.15 (67)	52.4 (22)	54.3 (19)	48.1 (26)		
Maternal cohabitation status (whether the mother was cohabiting with someone at the time of childbirth)						
Yes	9.09 (12)	2.4 (1)	5.6 (2)	16.7 (9)	V = 0.45 (0.33-∞)	<0.001
No	31.06 (41)	9.5 (4)	77.8 (28)	16.7 (9)		
UNK/NA	59.85 (79)	88.1 (37)	16.7 (6)	66.7 (36)		
Marital status (mother's legal marital and cohabitation status)						
Single	30.30 (40)	9.5 (4)	75.0 (27)	16.7 (9)	V = 0.42 (0.28-∞)	<0.001
Unregistered cohabitation	4.55 (6)	4.8 (2)	5.6 (2)	3.7 (2)		
Registered marriage	5.30 (7)	2.4 (1)	2.8 (1)	9.3 (5)		
UNK/NA	59.85 (79)	83.3 (35)	16.7 (6)	70.4 (38)		
Household composition (mother living with)						
Biological father	6.06 (8)	2.4 (1)	0 (0)	13.0 (7)	V = 0.19 (0.00-∞)	0.024
Non-biological partner	10.61 (14)	9.5 (4)	19.4 (7)	5.6 (3)		
Single maternal grandparent	11.36 (15)	16.7 (7)	11.1 (4)	7.4 (4)		
Both maternal grandparents	28.79 (38)	45.2 (19)	30.6 (11)	14.8 (8)		
UNK/NA	43.18 (57)	26.2 (11)	38.9 (14)	59.3 (32)		
(2) Pregnancy and birth-related risk factors						
Paternal separation (separation with the biological father during pregnancy)	34.09 (45)	50.0 (21)	58.3 (21)	5.6 (3)	V = 0.49 (0.33-∞)	<0.001
Fear of parents (fear of parents discovering the pregnancy)	15.91 (21)	31.0 (13)	16.7 (6)	3.7 (2)	V = 0.29 (0.09-∞)	<0.001
Unknown paternity (uncertainty regarding the identity of the child's father)	12.88 (17)	14.3 (6)	25.0 (9)	3.7 (2)	V = 0.23 (0.00-∞)	0.011
Economic difficulties (experienced economic difficulties)	24.24 (32)	16.7 (7)	50.0 (18)	13.0 (7)	V = 0.35 (0.17-∞)	<0.001
Concealment due to pregnancy unawareness						
Yes	57.58 (76)	85.7 (36)	72.2 (26)	25.9 (14)	V = 0.37 (0.24-∞)	<0.001
No	3.03 (4)	0 (0)	2.8 (1)	5.6 (3)		
UNK/NA	39.39 (52)	14.3 (6)	25.0 (9)	68.5 (37)		
Maladaptive coping mechanism						
Lack of support/socioeconomic	21.97 (29)	52.4 (22)	5.6 (2)	9.3 (5)	V = 0.53 (0.40-∞)	<0.001
Psychological/cognitive	36.36 (48)	23.8 (10)	63.9 (23)	27.8 (15)		
Relationship/sexual issues	16.67 (22)	16.7 (7)	30.6 (11)	7.4 (4)		
UNK/NA	25.00 (33)	7.1 (3)	0 (0)	55.6 (30)		
Partner unreliability factors						
Partner identity issues (unknown paternity)	21.97 (29)	19.0 (8)	41.7 (15)	11.1 (6)	V = 0.53 (0.41-∞)	<0.001
Separation/ignored (father ignored the pregnancy, separated)	31.06 (41)	42.9 (18)	52.8 (19)	7.4 (4)		
Unsuitable/abusive (father incompetence, sexual assault)	8.33 (11)	21.4 (9)	2.8 (1)	1.9 (1)		
UNK/NA	38.64 (51)	16.7 (7)	2.8 (1)	79.6 (43)		
Family support deficiency factors						
Conflict/fear (parental expectations, neglect and fear)	15.15 (20)	19.0 (8)	25.0 (9)	5.6 (3)	V = 0.32 (0.15-∞)	<0.001
Multiple issues/grandparental upbringing (family unreliability, raised by grandparents)	4.55 (6)	4.8 (2)	8.3 (3)	1.9 (1)		

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Table 1 (*continued*)

Characteristic (% (N))	Total (N = 132)	Cluster 1 (42)	Cluster 2 (36)	Cluster 3 (54)	Statistic	*p*
No support/contact (no contact with family members, lack of support)	24.24 (32)	16.7 (7)	47.2 (17)	14.8 (8)		
UNK/NA	56.06 (74)	59.5 (25)	19.4 (7)	77.8 (42)		
Exposure-related concealment (concealment of pregnancy due to fear of discovery by others)	31.82 (42)	59.5 (25)	27.8 (10)	13.0 (7)	$V = 0.41$ (0.24-∞)	<0.001
Separation-induced concealment (concealment of pregnancy due to partner separation)	36.36 (48)	38.1 (16)	80.6 (29)	5.6 (3)	$V = 0.62$ (0.47-∞)	<0.001
Prenatal care (receipt of medical care during pregnancy)						
No	42.42 (56)	90.5 (38)	11.1 (4)	25.9 (14)	$V = 0.45$ (0.33-∞)	<0.001
Yes	0.76 (1)	0 (0)	0 (0)	1.9 (1)		
UNK/NA	56.82 (75)	9.5 (4)	88.9 (32)	72.2 (39)		
Prenatal alcohol consumption	9.09 (12)	2.4 (1)	25.0 (9)	3.7 (2)	$V = 0.27$ (0.08-∞)	<0.001
Prenatal over-the-counter medication	8.33 (11)	0 (0)	25.0 (9)	3.7 (2)	$V = 0.31$ (0.13-∞)	<0.001
(3) Birth and death circumstances						
Delivery location						
Accommodation facility	15.91 (21)	23.8 (10)	11.1 (4)	13.0 (7)	$V = 0.32$ (0.00-∞)	<0.001
Non-residential building	6.06 (8)	2.4 (1)	5.6 (2)	9.3 (5)		
Maternal residence	56.82 (75)	64.3 (27)	77.8 (28)	37.0 (20)		
Healthcare facility	2.27 (3)	0 (0)	2.8 (1)	3.7 (2)		
Other residence	3.03 (4)	0 (0)	0 (0)	7.4 (4)		
Educational institution	3.79 (5)	7.1 (3)	2.8 (1)	1.9 (1)		
UNK/NA	12.12 (16)	2.4 (1)	0 (0)	27.8 (15)		
Maternal death narrative (mother's account of child's condition at time of death)						
Maternal post-delivery unconsciousness	4.55 (6)	4.8 (2)	5.6 (2)	3.7 (2)	$V = 0.37$ (0.18-∞)	<0.001
Reported stillborn	18.18 (24)	14.3 (6)	33.3 (12)	11.1 (6)		
Born without vital signs	4.55 (6)	11.9 (5)	0 (0)	1.9 (1)		
Observed alive	25.00 (33)	35.7 (15)	33.3 (12)	11.1 (6)		
Toilet-birth/neglect	12.12 (16)	21.4 (9)	5.6 (2)	9.3 (5)		
UNK/NA	35.61 (47)	11.9 (5)	22.2 (8)	63.0 (34)		
Premature birth	28.87 (41)	27.5 (11)	20.3 (12)	41.9 (18)	$V = 0.16$ (0.00-∞)	0.059
(4) Lethal perinatal and post-death behavior						
Lethal perinatal behavior						
Active violence (suffocation, strangulation, physical trauma)	15.15 (20)	21.4 (9)	11.1 (4)	13.0 (7)	$V = 0.27$ (0.06-∞)	<0.001
Abortifacient drug use (administering misoprostol to cause death)	1.52 (2)	0 (0)	2.8 (1)	1.9 (1)		
Passive neglect (leaving the child unattended until death)	47.73 (63)	69.0 (29)	50.0 (18)	29.6 (16)		
UNK/NA	35.61 (47)	9.5 (4)	36.1 (13)	55.6 (30)		
Final abandonment site						
Non-residential building	3.79 (5)	0 (0)	2.8 (1)	7.4 (4)	$V = 0.33$ (0.06-∞)	<0.001
Maternal residence	43.18 (57)	54.8 (23)	72.2 (26)	14.8 (8)		
Indoor structure	3.03 (4)	4.8 (2)	2.8 (1)	1.9 (1)		
Open outdoor are	1.52 (2)	0 (0)	2.8 (1)	1.9 (1)		
Waterway (in or near river)	1.52 (2)	2.4 (1)	0 (0)	1.9 (1)		
Temporary lodging (a short term stay location)	3.79 (5)	2.4 (1)	5.6 (2)	3.7 (2)		
UNK/NA	43.18 (57)	35.7 (15)	13.9 (5)	68.5 (37)		
Patterns of death disclosure						
Paternal figure (biological father, non-bio partner)	9.85 (13)	11.9 (5)	0 (0)	14.8 (8)	$V = 0.27$ (0.07-∞)	<0.001
No disclosure (did not inform anyone)	19.70 (26)	19.0 (8)	36.1 (13)	9.3 (5)		
Social network (public disclosure, family member)	31.82 (42)	35.7 (15)	44.4 (16)	20.4 (11)		
UNK/NA	38.64 (51)	33.3 (14)	19.4 (7)	55.6 (30)		
Temporary storage location						
Maternal residence	42.42 (56)	52.4 (22)	66.7 (24)	18.5 (10)	$V = 0.30$ (0.12-∞)	<0.001
Indoor location (lodging establishment)	17.42 (23)	21.4 (9)	11.1 (4)	18.5 (10)		

(*continued on next page*)

Table 1 (*continued*)

Characteristic (% (N))	Total (N = 132)	Cluster 1 (42)	Cluster 2 (36)	Cluster 3 (54)	Statistic	*p*
Outdoor location (an area near the mother's home, general outdoor location)	6.82 (9)	4.8 (2)	8.3 (3)	7.4 (4)		
UNK/NA	33.33 (44)	21.4 (9)	13.9 (5)	55.6 (30)		
Cause of death						
Asphyxiation	10.61 (14)	9.5 (4)	8.3 (3)	13.0 (7)	$V = 0.32$ (0.00-∞)	0.152
Advanced decomposition	9.85 (13)	7.1 (3)	13.9 (5)	9.3 (5)		
Disease	0.76 (1)	0 (0)	0 (0)	1.9 (1)		
Drowning	3.03 (4)	0 (0)	0 (0)	7.4 (4)		
Fetal distress	3.79 (5)	2.4 (1)	2.8 (1)	5.6 (3)		
Infection	2.27 (3)	0 (0)	5.6 (2)	1.9 (1)		
Neglect	3.03 (4)	2.4 (1)	5.6 (2)	1.9 (1)		
Prematurity	1.52 (2)	0 (0)	0 (0)	3.7 (2)		
Stillbirth	8.33 (11)	7.1 (3)	2.8 (1)	13.0 (7)		
Physical trauma	4.55 (6)	4.8 (2)	0 (0)	7.4 (4)		
Undetermined	52.27 (69)	66.7 (28)	61.1 (22)	35.2 (19)		

Note. "Cause of Death" denotes the proximate pathological mechanism and does not itself indicate the medicolegal manner of death; all cases met the SPD inclusion criteria (Section 1.2).
UNK/NA = unknown/not available; V = Cramér's V; F = one-way ANOVA; p values compare distributions across clusters.
Cluster labels: Cluster 1 = Adolescent–Dependent; Cluster 2 = Isolated Single Mother; Cluster 3 = Socially Vulnerable–External Discovery.
This table presents only those variables that showed statistically significant differences across the three clusters. Full definitions and descriptive statistics of all variables are provided in the Appendix. Variables are organized according to the four analytic domains outlined in Section 3.2: (1) Maternal and Family Characteristics, (2) Pregnancy and Birth-Related Risk Factors, (3) Birth and Death Circumstances, and (4) Lethal Perinatal and Post-Death Behaviors.

adolescents or young adults who lived with their family of origin, mainly both maternal grandparents (45.2 %, n = 19) or a single maternal grandparent (16.7 %, n = 7; $p = .024$; Table 1). Key risk factors included separation from the biological father during pregnancy (Paternal Separation: 50.0 %, n = 21) and a pronounced fear of parental discovery (Fear of Parents: 31.0 %, n = 13, $p < .001$) which largely motivated the frequent concealment of pregnancy (59.5 %) as a strategy to avoid social exposure and reputational damage.

Deliveries most often occurred unattended within the maternal residence (64.3 %, n = 27), frequently in bathrooms or similarly hazardous settings. Although 35.7 % of mothers reported observing signs of life in the newborn, immediate intervention was typically absent. Lethal outcomes were primarily the result of passive neglect in states of confusion (69.0 %, n = 29), while overt acts of active violence were less common (21.4 %). Reflecting the precarious circumstances of these cases, the cause of death remained undetermined in a majority (66.7 %, n = 28). In over one-third of cases (35.7 %, n = 15) disclosure of the infant's death occurred belatedly and was limited to members of the mother's social network rather than formal authorities.

Importantly, the frequency of this cluster declined markedly after 2018 (Fig. 2), indicating a temporal shift in the demographic and behavioral patterns of crisis pregnancies within this subgroup.

(2) Cluster 2: Isolated Single-Mother (n = 36)

Mothers in this cluster were older than those in Cluster 1 (M = 26.51, SD = 7.50, $p = .002$) and predominantly single (75.0 %, n = 27, $p < .001$). Their pregnancies were marked by profound relational instability, with a majority separated from the biological father (Paternal Separation: 58.3 %, n = 21, $p < .001$) and a significant portion experiencing uncertain paternity (Unknown Paternity: 25.0 %, n = 9, $p = .011$) or severe partner conflicts (Partner Unreliability Factors: Separation/Ignored, 52.8 %, n = 19; unsuitable/abusive partners, 2.8 %, n = 1; total partner issues, 55.6 %, $p < .001$). This instability was compounded by severe economic hardship (50.0 %) and a lack of social or familial support (No Support/Contact: 47.2 %, n = 17, $p < .001$). Unsurprisingly, these combined vulnerabilities motivated a high rate of pregnancy concealment (80.6 %).

High-risk prenatal behaviors were prevalent in this group, including alcohol consumption (Prenatal Alcohol Consumption: 25.0 %, n = 9, $p < .001$) and misuse of over-the-counter medications (25.0 %, n = 9, $p < .001$), reflecting patterns of maladaptive coping (63.9 %). Deliveries typically occurred unattended at the maternal residence (77.8 %, n = 28) and the remains were frequently stored or abandoned within the home (Final Abandonment Site, 72.2 %, n = 26, $p < .001$). Prolonged concealment often led to forensically challenging outcomes, such as undetermined causes of death (61.1 %, n = 22) or advanced decomposition (13.9 %, n = 5). Significantly, and in contrast to Cluster 1, the frequency of this cluster increased sharply after 2018 (Fig. 2).

(3) Cluster 3: Socially vulnerable–External Discovery (n = 54)

A defining feature of this cluster was its external discovery by third parties, which often resulted in substantial informational uncertainty due to unidentified perpetrators. Among cases with identified mothers, this group had the oldest maternal age (M = 28.27, SD = 7.0, $p = .002$). A key paradox emerged: while cohabitation with the biological father was more frequent than in other clusters

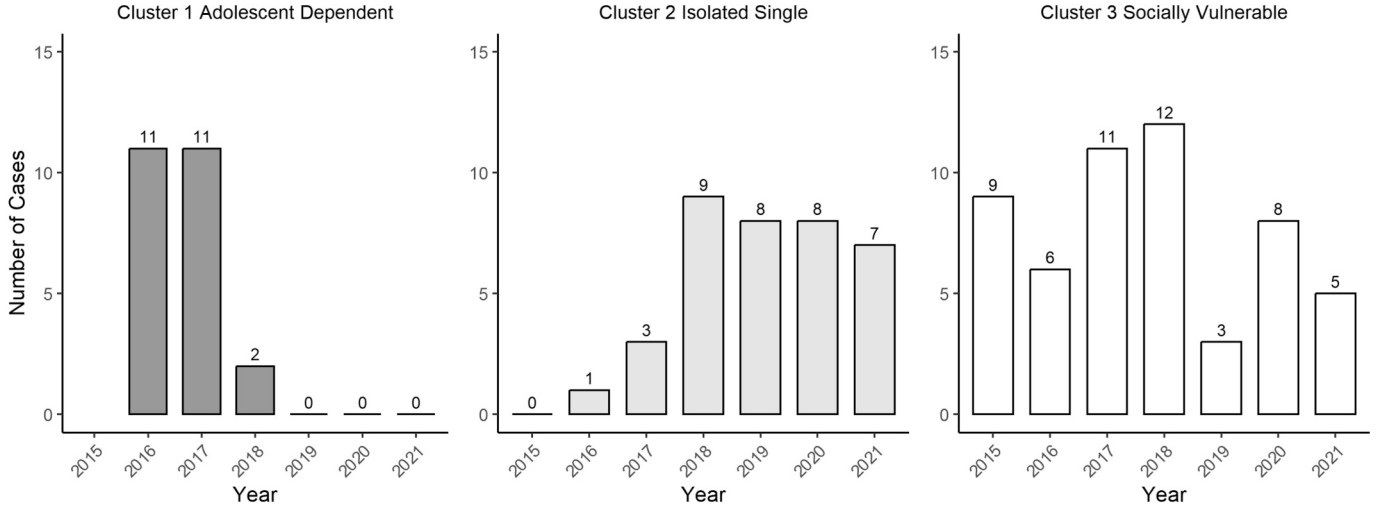

Fig. 2. Annual distribution of SPD cases by typology (2015–2021). Cluster 1 = Adolescent–Dependent, Cluster 2 = Isolated Single-Mother, and Cluster 3 = Socially Vulnerable-External Discovery.

(Maternal Cohabitation Status, 16.7 %, n = 9, $p < .001$; complete household with biological father, 13.0 %, n = 7, $p = .024$), this paternal presence did not confer stability. These families were predominantly socially vulnerable, often comprising married or immigrant couples facing poverty, unstable housing, and exclusion from institutional welfare. Consequently, prenatal care was limited, and deliveries frequently occurred in precarious, non-medical locations such as temporary accommodations (13.0 %, n = 7) or workplaces (9.3 %, n = 5).

Concealment in this cluster was particularly thorough, with the initial abandonment site unknown in the majority of cases (68.5 %, n = 37, $p < .001$), complicating perpetrator identification. The varied causes of death—including asphyxiation (Asphyxiation: 13.0 %, n = 7), drowning (Drowning: 7.4 %, n = 4), and physical trauma (Physical trauma: 7.4 %, n = 4) —point to a higher incidence of active violence compared to other clusters. Organized concealment methods, such as burial, often suggested the involvement of third parties. Unlike the other two clusters, the frequency of this typology remained stable throughout the study period (Fig. 2).

4. Discussion

This study comprehensively analyzed 230 perinatal death cases autopsied at the NFS of South Korea between 2015 and 2021. Among these, 138 cases (60.0 %) met criteria for SPD, encompassing both neonaticide (65.9 %) and non-neonaticide cases (34.1 %). By applying the broader SPD framework, our analysis moved beyond the narrow confines of traditional neonaticide research to capture a wider range of crisis pregnancy outcomes.

The results revealed two critical patterns. First, there was a marked inverse temporal trend: while confirmed neonaticide cases following live births declined sharply, non-neonaticide cases—including induced stillbirths and ambiguous outcomes—rose substantially over the study period (Fig. 1). This indicates not a simple reduction in perinatal deaths, but a transformation in the methods of crisis pregnancy termination. Second, cluster analysis identified three distinct typologies—'Adolescent–Dependent,' 'Isolated Single-Mother,' and 'Socially vulnerable –External Discovery'—each reflecting unique constellations of demographic vulnerabilities, social contexts, and behavioral patterns.

4.1. Shifting patterns: the decline of neonaticide and rise of non-neonaticide SPD

The conventional concept of neonaticide, which focuses exclusively on live-born infants, is insufficient to capture the diverse methods of terminating a crisis pregnancy. By applying the broader SPD framework, this study identified a striking inverse temporal trend: while neonaticide cases declined, non-neonaticide cases, such as induced stillbirths and ambiguous outcomes, increased.

The significance of this finding is primarily methodological. Analyses confined to neonaticide would risk misinterpreting the decline in live-birth cases as evidence of effective prevention, overlooking the simultaneous—and troubling—rise in other concealed forms of perinatal death. The SPD framework instead reveals a more complex reality: not a straightforward reduction in fatal outcomes, but an evolution in the methods by which crisis pregnancies are terminated.

This shift appears plausibly linked to the growing availability of illicit abortifacient drugs, facilitated by online distribution networks (e.g., Telegram, or local digital platforms like KakaoTalk). Broader sociopolitical dynamics likely accelerated this trend, including the 2019 Constitutional Court ruling that decriminalized abortion and the COVID-19 pandemic, which curtailed in-person medical access and may have driven reliance on discreet, technology-mediated alternatives (Kim et al., 2019). Although further empirical research is needed, these contextual factors offer a compelling explanation for the transformation from overt neonaticide to less visible forms of non-neonaticide SPD (Ha et al., 2024; Yang, 2020).

Finally, the overall demographic profile of SPD cases—predominantly young, unmarried women lacking paternal support and facing economic hardship—remains consistent with international research on neonaticide. This cross-cultural convergence suggests that crisis pregnancy represents a common root condition, with different lethal outcomes best understood as varied manifestations of the same underlying phenomenon. Such consistency underscores the analytical value of adopting a comprehensive SPD framework.

4.2. Interpreting the three SPD typologies

Our analysis identified three distinct typologies. The 'Adolescent-Dependent' type (n = 42) featured the youngest mothers (mean age = 22.5) who, fearing damage to their own reputation, concealed their pregnancy while living with family, often resulting in unattended births and passive neglect. The 'Isolated Single-Mother' type (n = 36) comprised older, socially severed women (mean age = 26.5) facing economic hardship, who showed a stronger tendency toward active termination attempts, including the use of illicit abortifacient drugs. The 'Socially Vulnerable' type (n = 54) was the oldest group (mean age = 28.3), primarily consisting of married or immigrant women facing structural vulnerabilities, whose cases were often discovered externally and involved third-party complicity in concealment.

Notably, these empirically derived typologies show striking parallels with prior research across diverse cultural contexts. Our shame-driven 'Adolescent-Dependent' and 'Isolated Single-Mother' types resonate with the 'anomie type'—young, unmarried women motivated by avoiding social shame—identified in Japanese research (Sakuta & Saito, 1981), while our economically-driven 'Socially vulnerable –External Discovery' type aligns with their 'mabiki type'—older, often married parents facing severe economic burdens.

This cross-cultural resonance extends to Western research. The motivational categories identified in a UK study by Greenwood et al. (2023) align conceptually with our findings. The 'desperation' motive, stemming from an inability to cope with overwhelming circumstances, mirrors the acute crisis central to our 'Isolated Single-Mother' type. The 'disturbance' motive, characterized by panic and confusion in young perpetrators, reflects the psychological state described in our 'Adolescent–Dependent' type. Finally, the 'rejection'

motive, often involving third-party complicity, parallels the dynamics of our 'Socially vulnerable' type, where partners were frequently involved in concealment.

The significance of these parallels is twofold. First, it suggests that the fundamental sociopsychological mechanisms and structural factors underlying SPD are not culture-specific but may be universal, not culture-specific. Second, our study—which integrated non-neonaticide cases into the broader SPD framework—yielded typologies consistent with prior *neonaticide-only* research. This empirically demonstrates that the core patterns of perinatal death in crisis situations are driven by common mechanisms, regardless of whether a live birth was proven.

4.3. Interpreting the temporal shifts and social implications

A central finding of this study is the diverging temporal trajectories of SPD typologies. The 'Adolescent-Dependent' type showed a pronounced decline after 2018, while the 'Isolated Single Mother' type increased markedly during the same period. By contrast, the 'Socially vulnerable' type remained relatively stable (Fig. 2).

The decline of the Adolescent-Dependent type is plausibly attributable to improvements in preventive behaviors within an increasingly supportive social climate. For example, rates of consistent contraceptive use among sexually active female adolescents in South Korea recorded their largest annual increase between 2017 and 2018 (Ha et al., 2024), while the induced abortion rate in this group nearly tripled between 2018 and 2021 (Byun et al., 2022). These behavioral shifts unfolded within a broader socio-political context shaped by global reproductive rights movements, notably Poland's "Black Protest," which galvanized international solidarity and inspired parallel activism in South Korea, thereby fostering a more permissive and open public discourse (Banaś, 2023; Kim et al., 2019).

Yet these positive developments were tempered by persistent structural barriers in reproductive healthcare. Access to contraception remains uneven, school-based sex education is frequently inadequate, and emergency contraception ("Plan B") still requires a physician's prescription (Yang, 2020). In practice, this fragmented system forces individuals to depend heavily on informal networks—primarily family—to navigate reproductive crises.

This reliance on familial support helps to explain the concurrent rise of the Isolated Single Mother type. Defined by their exclusion from such support systems, these women are exposed most acutely to the shortcomings of the formal healthcare and welfare system. Moreover, the very socio-legal changes that empowered adolescents appear to have exerted an unintended effect on this group. The 2019 Constitutional Court ruling fostered the perception that termination constituted a legitimate option, while the expanding availability of illicit abortifacient drugs further facilitated access to covert methods of pregnancy termination. For socially isolated women, this combination may have driven a methodological shift—from overt neonaticide toward concealed forms such as drug-induced stillbirths. Counterintuitively, the same evolution that contributed to the reduction of adolescent-perpetrated neonaticide may have simultaneously fueled the rise of non-neonaticide SPD within the isolated single-mother subgroup, a trend likely intensified by the disruptions of the COVID-19 pandemic.

Finally, the persistence of the Socially vulnerable type underscores the enduring influence of deep-rooted structural inequalities. The high proportion of foreign nationals within this group is particularly noteworthy, highlighting unskilled immigrants as a potential high-risk population for SPD. This finding signals the urgent need for tailored prevention strategies and inclusive policies that guarantee universal and effective access to healthcare, irrespective of legal or immigration status.

4.4. Research implications and limitations

This study holds several key implications. Methodologically, the application of the SPD framework was essential for revealing a critical transformation in crisis pregnancy termination: a shift from overt neonaticide toward more concealed forms like induced stillbirths. This evolution appears linked to the proliferation of online-sourced abortifacient drugs. Evidence from this study, including discussions on how to dispose of fetal remains after drug-induced termination, suggests this trend may be generating a substantial "dark figure" of undetected SPD cases.

However, the study has notable limitations. Its reliance on official autopsy data likely underestimates the true prevalence of SPD, and its use of secondary records constrains deep psychosocial insight. To overcome these limitations, future research should integrate qualitative methods, such as interviews with women who have experienced crisis pregnancies. Specifically, dedicated empirical investigation is needed to clarify the link between online abortifacient access and SPD incidence, and to further elucidate the mechanisms driving the observed shift from adolescent to adult-perpetrated cases.

5. Conclusion

This study demonstrates that SPD is a complex, persistent, and evolving social-health phenomenon that demands a paradigm shift in response strategies. Rather than punitive measures, priority should be given to preventive public health approaches—most notably, the early identification of high-risk groups and the development of tailored support interventions. As reflected in Annie Ernaux's words cited in the introduction, the "chain that women have passed through over generations" persists in contemporary Korean society, reshaped by digital environments and the accessibility of abortion medications. Across all typologies, the universal imperative remains clear: the timely recognition of crisis situations and the provision of accessible, nonjudgmental support. Achieving this goal requires sustained empirical investigation and systematic understanding, as this study has sought to advance.

Ethical approval and informed consent statements

Ethical approval for this retrospective study was obtained from the National Forensic Service (NFS) of South Korea (Approval Number: 906-240228-BR-005-01). Given the nature of the study, which involved the analysis of existing anonymized autopsy and investigative records, the requirement for individual informed consent for participation was waived by the NFS ethics review board. Consent for publication of anonymized aggregate data is not applicable.

CRediT authorship contribution statement

KyuHee Jung: Writing – original draft, Visualization, Methodology, Investigation. **Heesong Kim:** Writing – review & editing, Project administration, Methodology, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Kyung-moo Yang:** Writing – review & editing, Supervision, Project administration, Funding acquisition, Conceptualization. **Inseok Choi:** Writing – review & editing, Resources, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Jae-hong Park:** Writing – review & editing, Supervision, Methodology, Funding acquisition, Data curation. **Sohyung Park:** Writing – review & editing, Supervision. **Sookyoung Lee:** Writing – review & editing, Supervision, Funding acquisition.

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Declaration of competing interest

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.chiabu.2025.107654.

Data availability

The data that support the findings of this study are available from the National Forensic Service (NFS) of South Korea, but restrictions apply to the availability of these data, which were used under approval for the current study and are therefore not publicly available due to their sensitive and confidential nature. Data may be available from the authors upon reasonable request and with permission from the NFS.

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