A Latent Class Analysis of Child Sexual Abuse Victim Typologies Through a Developmental-Situational Victimology Approach

Tipologías de víctimas de abuso sexual infantil: un análisis de clases latentes desde una victimología situacional y del desarrollo

Tipologias de vítimas de abuso sexual infantil: uma análise de classes latentes a partir da vitimologia situacional e do desenvolvimento

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Abstract This study examines patterns of child sexual abuse (CSA) victimization in Colombia through a developmental victimology framework. The primary objectives were to identify distinct victim typologies, determine which factors most strongly differentiate these typologies, and assess their temporal and geographic stability. Using latent class analysis, 27 405 forensic medical examination cases from Colombia's National Institute of Legal Medicine (2015-2023) were analyzed in Bogotá. Five distinct classes emerged: Public Space Stranger Abuse (4.1%), Residential Family Abuse-Adolescent Pattern (46.8%), Institutional Acquaintance Abuse (4.2%), Residential Acquaintance Abuse-Adolescent Pattern (21.9%), and Residential Family Abuse-Young Child Pattern (23.1%).

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Offender-victim relationship emerged as the primary differentiating factor (Cramér's V = 0.94), followed by victim age (V = 0.59), location (V = 0.45), and gender (V = 0.41). External validation demonstrated strong temporal (V = 0.067) and geographic (V = 0.024) stability, indicating these patterns persist across time and contexts. The findings challenge Colombia's current umbrella approach treating all victims under 18 uniformly, demonstrating that victimization patterns vary substantially by developmental stage, perpetrator relationship, and environmental context. These distinct typologies suggest the need for differentiated prevention strategies, investigation protocols, and treatment approaches tailored to each class's specific characteristics, with resource allocation proportionate to class prevalence.

Keywords
Child sexual abuse; victimology; situational theory; statistical methods; Colombia.

Resumen

Este estudio examina los patrones de victimización de abuso sexual infantil (ASI) en Colombia a través de un marco de victimología del desarrollo. Los objetivos principales son identificar tipologías distintivas de víctimas, determinar qué factores diferencian más marcadamente estas tipologías y evaluar su estabilidad temporal y geográfica. Mediante análisis de clases latentes, se analizaron 27 405 casos de exámenes médico-legales del Instituto Nacional de Medicina Legal de Colombia (2015-2023) en Bogotá. Cinco clases distintas emergieron: abuso por extraños en espacios públicos (4.1%), abuso de adolescente por pariente que comparte residencia (46.8%), abuso por conocidos en instituciones (4.2%), abuso de adolescente por conocido que comparte residencia (21.9%) y abuso familiar residencial hacia niños y niñas (23.1%). La relación víctima-victimario resultó ser el factor diferenciador principal (V de Cramér = 0.94), seguido por la edad de la víctima (V = 0.59), la ubicación (V = 0.45) y el género (V = 0.41). La validación externa demostró una fuerte estabilidad temporal (V = 0.067) y geográfica (V = 0.024), que indica que estos patrones persisten a través del tiempo y de contextos urbanos. Los hallazgos problematizan el enfoque actual de Colombia (que trata uniformemente a todas las víctimas menores de 18 años con el término "niñas, niños y adolescentes"), debido a que los patrones de victimización varían sustancialmente según la etapa de desarrollo, la relación con el abusador y el entorno. Estas tipologías distintivas sugieren la necesidad de estrategias de prevención diferenciadas, protocolos de investigación y enfoques de atención adaptados a las características específicas de cada clase, con asignación de recursos proporcional a la prevalencia de cada grupo.

Palabras clave
Abuso sexual infantil; victimología; teoría situacional; métodos estadísticos; Colombia.

Resumo

Este estudo examina os padrões de vitimização por abuso sexual infantil (ASI) na Colômbia por meio de uma abordagem da vitimologia do desenvolvimento. Os objetivos principais foram identificar tipologias distintas de vítimas, determinar quais fatores diferenciam mais fortemente essas tipologias e avaliar sua estabilidade temporal e geográfica. Utilizando a análise de classes latentes, foram analisados em Bogotá 27 405 casos de exames médico-legais do Instituto Nacional de Medicina Legal da Colômbia (2015-2023). Cinco classes distintas emergiram: abuso por estranho em espaço público (4,1%), abuso de adolescente por familiar no ambiente residencial (46,8%), abuso por conhecido em instituição (4,2%), abuso de adolescente por conhecido no

ambiente residencial (21,9%) e abuso de criança pequena por familiar no ambiente residencial (23,1%). A relação agressor-vítima surgiu como o principal fator diferenciador (V de Cramér = 0,94), seguida pela idade da vítima (V = 0,59), localização (V = 0,45) e gênero (V = 0,41). A validação externa demonstrou forte estabilidade temporal (V = 0,067) e geográfica (V = 0,024), indicando que esses padrões persistem ao longo do tempo e em diferentes contextos. Os resultados desafiam a atual abordagem generalizada da Colômbia, que trata todas as vítimas menores de 18 anos de maneira uniforme, demonstrando que os padrões de vitimização variam substancialmente de acordo com o estágio de desenvolvimento, a relação com o agressor e o contexto ambiental. Essas tipologias distintas sugerem a necessidade de estratégias de prevenção diferenciadas, protocolos de investigação e abordagens de tratamento adaptadas às características específicas de cada categoria, com alocação de recursos proporcional à prevalência de cada uma delas.

Palavras-Chave

Abuso sexual infantil; vitimologia; teoria situacional; métodos estatísticos; Colômbia.

Introduction

The United Nations has placed eradicating all forms of violence against children as a priority target (SDG 16.2) in the 2030 Agenda for Sustainable Development (United Nations, 2024). Approximately one billion children globally experience some form of emotional, physical or sexual violence annually, with one child dying from violence every five minutes (United Nations, 2024). Child sexual abuse (CSA) represents a significant subset of this violence. Meta-analyses estimate that 8-31 % of girls and 3-17 % of boys experience CSA, with more recent estimates suggesting about 24 % of girls experience sexual violence (Barth et al., 2013; Qu et al., 2022). Beyond its high prevalence, CSA has severe short- and long-lasting effects on victims, negatively impacting quality of life (Browne & Finkelhor, 1986; Downing et al., 2021; Maniglio, 2009; Noll, 2021).

CSA is used as an umbrella term for sexual offences against persons below eighteen years old (United Nations, 1989). However, this population exhibits stark differences due to varying developmental stages, behaviors and activities. Research indicates many sex offenders select targets based on environmental cues and victims' lifestyles (Hindelang, 1978; Kaufman et al., 2006; Beauregard et al., 2010). Lifestyle differences between children and adolescents impact opportunity structures by altering guardianship dynamics and accessible locations. Younger children typically remain at home or school under supervision, while older children increasingly occupy unsupervised spaces. "Thus, it is as likely that where, when, and by whom children are sexually abused will be shaped (or even dictated) by their age-related routines and lifestyles" (McKillop et al., 2015, p. 2).

Lifestyle theory (Hindelang, 1978) emphasizes how behavioral patterns and lifestyle choices influence victimization risk exposure. Certain lifestyle characteristics increase vulnerability by placing individuals in situations where they more likely encounter potential offenders. In CSA contexts, lifestyle theory helps explain how developmental stages create varying risk patterns through associated behavioral and social patterns. Routine activities theory (Cohen & Felson, 1979) complements this by focusing on the relationship of motivated offenders, suitable targets, and absence of capable guardians. This framework suggests victimization occurs when these elements converge in time and space, making everyday activity patterns relevant for understanding developmental victimization risks.

However, these theories may not fully explain youth victimization patterns. Finkelhor and Asdigian (1996) posit that "much of youth victimization, especially of younger children, occurs at the hands of acquaintances and family members (…). These acquaintances and intrafamily victimizations are not well suited to the lifestyle or routine activities concepts" (p. 4). They propose target congruence, which modifies traditional frameworks for youth victimization. This theory proposes that guardianship, exposure, and proximity should be viewed as environmental conditions that protect or expose victims rather than mere aspects of routines. When children face abuse risk from inattentive parents, this represents an environmental condition conducive to victimization rather than a child's lifestyle choice.

Target congruence explains how victim characteristics increase vulnerability independent of routine activities through congruence between victim characteristics and offenders' needs or motivations (Finkelhor & Asdigian, 1996). Target vulnerability refers to characteristics compromising

resistance capacity (e.g., small physical size, emotional deprivation). Target gratifiability encompasses characteristics offenders seek (e.g., female gender, prepubescent children). Target antagonism describes characteristics provoking offender anger or destructive impulses (e.g., perceived disobedience, disability).

Despite heterogeneity, this population is largely treated homogeneously for theorizing, legislative and prevention purposes. Finkelhor (2007) suggests "developmental victimology" considering: "the nature, quantity, and impact of victimization to vary across childhood with the different capabilities, activities, and environments that are characteristic of different stages of development" (p. 21). Integrating developmental victimology and target congruence with lifestyle and routine activities approaches provides comprehensive understanding of CSA patterns, suggesting effective prevention must address both environmental opportunity structures and victim-specific vulnerabilities across developmental stages.

This study employs a typological approach grounded in empirical pattern identification rather than administrative classification. This paper defines victim typologies as empirically-derived subgroups exhibiting distinct constellations of victimization characteristics, representing qualitatively different victimization experiences rather than arbitrary categorical divisions. Unlike descriptive classifications grouping victims by single attributes (e.g., age, gender), this typological approach identifies latent patterns where multiple characteristics co-occur systematically, revealing underlying structural features of victimization contexts. This person-centered analytical strategy moves beyond variable-centered approaches that assume population homogeneity, instead recognizing that developmental stage, relationship context, and environmental setting may configure into distinct victimization profiles requiring differentiated theoretical explanations and intervention approaches.

Existing research demonstrates age-related patterns in CSA. Adolescents (13-17) show higher victimization rates than younger children across studies (Finkelhor et al., 2009). Gender patterns also vary by age, with male victims more prevalent among younger children than adolescents (Barth et al., 2013; Fischer & McDonald, 1998). Location research consistently identifies residential settings as primary CSA sites (Wortley & Smallbone, 2006; Leclerc et al., 2010), though institutional and public space abuse also occur. Most offenders are known to victims, predominantly family members or acquaintances (Barth et al., 2013).

Colombian Context of CSA

In Colombia from 2010 to 2018, 52 % of all rape test kits were administered to victims from 10 to 17 years old (Arrieta-Burgos et al., 2020). However, it is estimated that in this country, only 50 % of victims of CSA reveal that they have been abused, and 15 % report it to authorities (Echeburúa & Corral, 2006). Of these, only 5 % result in convictions (Ibid). According to the National Institute of Legal Medicine, CSA in Colombia is a growing problem since the rate of examinations for suspected sexual assault increased from 31.9 per 100 000 inhabitants in 2000 to 49.08 in 2011 (Instituto Nacional de Medicina Legal, 2010; Vergel, 2012). In 2024, the National Forensic Institute performed 22 597 medical-legal assessments, of which 87 % of the victims were under 18 years of age (Instituto

Colombiano de Medicina Legal y Ciencias Forenses, 2025). The highest number of sexual assault forensic examinations was performed on girls between 10 and 14 years old, with a rate of 339.57 per 100 000 inhabitants, followed by girls between 5 and 9 years old with a rate of 209.24; while in boys, the highest peak occurs between 5 and 9 years old with a rate of 67.40.

Law 1146 of 2007 regulates the institutional measures to prevent sexual violence against children as well as how to assist victims of CSA. The law utilizes the umbrella term "*niños, niñas y adolescents*" (boys, girls and adolescents) to refer to any person under the age of eighteen years old. The legislation does not present a differential approach toward preventive measures against CSA. In their systematic review of prevention interventions in developing countries, Russel et al. (2020) found that "most prevention work is targeted at the local level, typically in education settings for children at pre-school and primary school" (p. 9). This may seem to indicate there is a distinction among groups for prevention purposes. Yet, it also shows that no programs were found that target older children or adolescents. However, this study did not discuss specific interventions in Colombia.

In Colombia, where most CSA prevention projects do not discriminate between children and teenagers, the evaluation of Gómez Peña et al. (2023) of CSA prevention strategies in this country identified only one program, "*Abre tus Ojos*" ("Open your eyes"), which has one separate module targeted to children and to adolescents.

The Colombian Penal Code (Código Penal, 2000) distinguishes children younger than 14 in Article 208 and categorizes CSA cases with this age group as aggravated. Furthermore, Article 211 (§ 4) specifies that any sexual act against a child younger than 12 should be considered a worst-case. In this sense, while child development is taken into account in the severity of sentencing of CSA offenders, this distinction is not clear when addressing the issue from prevention and protection perspectives.

Methods

This study uses Latent Class Analysis (LCA) to investigate victimization patterns among children (N = 27 405) across different facility types. LCA is a statistical approach that identifies mutually exclusive and distinct typologies based on dichotomous indicator variables (Collins & Lanza, 2009; Sinha et al., 2021). Previous research has successfully applied LCA to develop typologies in sexual violence research, including crime scene behaviors (Chopin & Beauregard, 2021), offending patterns (Paquette et al., 2023), and offense motivations (Chopin & Beauregard, 2019), as well as child sexual abuse typologies related to post-traumatic stress and treatment outcomes (Hébert & Amédée, 2020).

Data

The dataset comprises forensic medical examinations for alleged sexual offenses conducted by the National Institute of Legal Medicine and Forensic Sciences in Colombia. Data were obtained from Colombia's Open Data Portal (https://www.datos.gov.co/d/hyqu-diue) and include all examinations performed for incidents occurring between 2015 and 2023.

The National Institute of Legal Medicine and Forensic Sciences is the primary forensic authority in Colombia, conducting medical-legal examinations as mandated by Law 938 of 2004, Article 35. These examinations constitute a critical component of the response chain for sexual violence cases. These data represent cases known to the medical-legal system through requests by competent authorities and do not capture all sexual violence incidents, as not all cases investigated by judicial authorities are referred for forensic examination. The forensic classifications do not constitute legal determinations of guilt but represent medical-legal assessments based on information provided by authorities, forensic examination findings, and victim testimony.

Sample selection and data preparation

The initial dataset for Bogotá contained 32 255 forensic medical examinations from 2015-2023. Cases were included if they met the following criteria: (a) the victim was under 18 years of age at the time of the incident, (b) complete information was available for core analysis variables (age, gender, location, day of week, and offender relationship), and (c) the incident occurred within the study period (2015-2023).

Cases were excluded if they contained missing or incomplete data on core variables. 4 001 of these cases were excluded because the relationship to the victim was unknown and 849 because the location where the offense took place was unknown.

Following these exclusions, the final Bogotá sample comprised 27 405 cases (84.9 % of the original dataset). Research on sample size requirements for LCA indicates that “with sample sizes greater than 500, models and fit statistics consistently perform with high accuracy” (Sinha et al., 2021, p. e69), confirming the adequacy of the sample for this analytical approach. The stability of this derived model was then tested via external validation on independent samples from four additional cities (Medellín, Cali, Bucaramanga, Barranquilla) which combined added 18 716 cases.

Variable selection and operationalization

The analysis utilized five key indicators to identify latent classes of CSA victimization: victim age, victim gender, location of abuse, day type, and offender relationship.

1. Age: Victims were classified into three developmental stages following Finkelhor’s (2007) developmental victimology framework: early childhood (0-5 years), middle childhood (6-11 years), and adolescence (12-17 years). This classification aligns with the Colombian Forensic Institute’s developmental stage categorizations, and corresponds to distinct phases of cognitive, physical, and social development relevant to victimization risk.
2. Gender: Victim gender was recorded as male or female based on forensic examination records.
3. Location: Incident locations were categorized into four types: (a) residential settings, (b) institutional settings (schools, childcare facilities, religious institutions), (c) commercial

settings (businesses, shops, entertainment venues), and (d) public spaces (parks, streets, public transportation).

4. Day type: Cases were classified as occurring on weekends (Saturday or Sunday) or weekdays (Monday through Friday) to examine temporal patterns potentially related to supervision, routine activities, and opportunity structures.
5. Offender relationship: The relationship between victim and alleged offender was categorized as: (a) family member (including parents, siblings, extended family), (b) friend or acquaintance (known non-family members such as neighbors, family friends, or authority figures), or (c) unknown/stranger (offenders not known to the victim prior to the incident).

Statistical Analysis

LCA was conducted using the poLCA package (Linzer & Lewis, 2011) in R version 4.40 (R Core Team, 2024). Models with one to six latent classes were tested. Each model was estimated using 500 random starts (nrep = 500) and a maximum of 10 000 iterations (maxiter = 10000) to ensure convergence. Model fit was evaluated using Bayesian Information Criterion (BIC), Akaike Information Criterion (AIC), entropy, and classification accuracy. Lower BIC and AIC values indicate better model fit, with BIC preferred for large samples (Nylund et al., 2007). Entropy values above 0.70 indicate acceptable classification quality and above 0.80 indicate excellent separation (Collins & Lanza, 2010). Beyond statistical criteria, practical interpretability and theoretical coherence informed final model selection (Nylund et al., 2007).

Data wrangling and analyses used tidyverse (Wickham et al., 2019), flextable (Gohel & Skintzos, 2021), and effectsize (Ben-Shachar et al., 2020). The dataset and R code are available at https://osf.io/5cjp3

Class characterization

Following model selection, chi-square tests assessed class differences in age distribution, location patterns, gender composition, day type, and offender relationship. Effect sizes were calculated using Cramér's V with 95 % confidence intervals computed using the non-central chi-square distribution method (Smithson, 2003). For binary variables (gender, day type), Yates' continuity correction was applied. Effect sizes were interpreted using standard benchmarks: 0.06 (small), 0.17 (medium), and 0.29 (large) for variables with three degrees of freedom (Cohen , 1988).

External validation

The primary analysis focuses on cases from Bogotá. External validation employed two approaches:

1. Temporal validation: Latent class structure stability was examined across years (2015-2023) to determine whether identified typologies remained consistent over time.

2. Geographic validation: The Bogotá-derived model was validated using independent samples from four additional major Colombian cities: Medellín, Cali, Bucaramanga, and Barranquilla. These cities represent diverse geographic regions, socioeconomic contexts, and cultural backgrounds within Colombia.

Results

Descriptive Statistics

Table 1 presents descriptive statistics of the variables used in the analysis. The sample comprised 27 405 cases from Bogotá (2015-2023), with 85 % female and 15 % male victims. Adolescents (12-17 years) represented the largest age group (51 %), followed by middle childhood (33 %) and early childhood (15 %). Residential settings were the most common abuse location (79 %), with family members representing the majority of perpetrators (66 %). Most incidents occurred on weekdays (85 %).

Table 1. Descriptive Statistics for Bogotá

Sample	
Characteristic	**N = 27 405 (%)**
Victim Gender	
Male	4029 (15 %)
Female	23 376 (85 %)
Age Category	
Early Childhood	4235 (15 %)
Childhood	9113 (33 %)
Adolescence	14 057 (51 %)
Location	
Residential	21 690 (79 %)
Institutional	1263 (4.6 %)
Commercial	675 (2.5 %)
Public	3777 (14 %)
Day Type	
Weekend	4102 (15 %)
Weekday	23 303 (85 %)

Sample	
Characteristic	**N = 27 405 (%)**
Offender Relationship	
Family	18 147 (66 %)
Friend/Acquaintance	7943 (29 %)
Unknown	1315 (4.8 %)

Model Selection

Latent class models were estimated for one through six classes. Table 2 presents fit statistics for each solution.

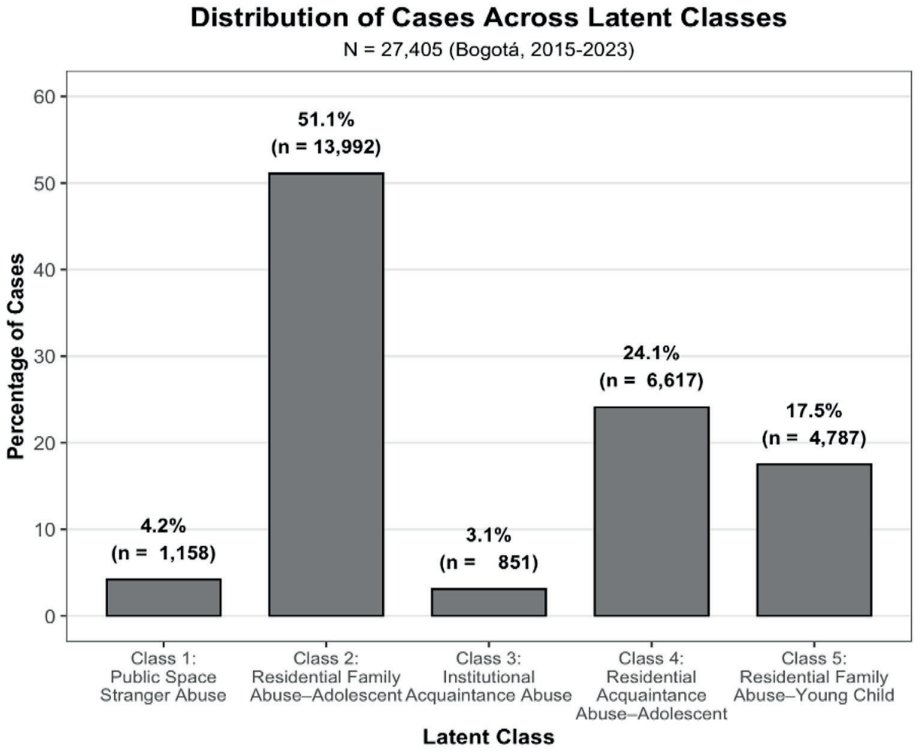
Table 2. Model Fit Statistics for Latent Class Analysis Solutions

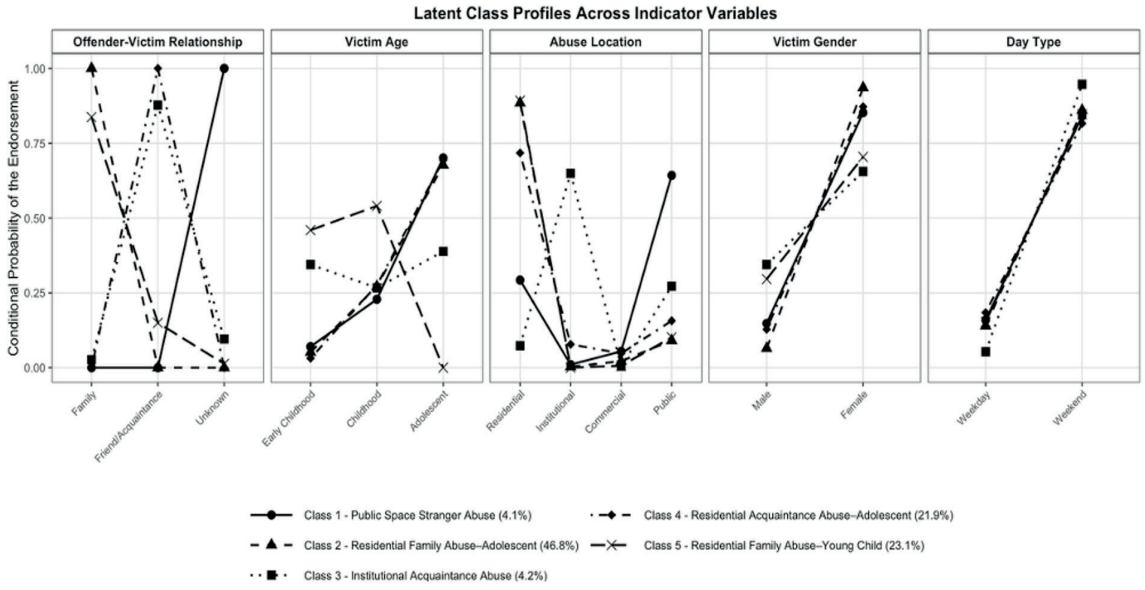
Classes	Log-likelihood	BIC	AIC	G^2	Entropy
1	-90592.59	181277.2	181203.2	6467.1767	NA
2	-88430.05	177054.2	176898.1	2142.0874	0.7749553
3	-87917.80	176131.9	175893.6	1117.5887	0.6926588
4	-87568.62	175535.8	175215.2	419.2215	0.7096399
5	**-87476.06**	**175452.8**	**175050.1**	**234.1158**	**0.7957281**
6	-87438.76	175480.4	174995.5	159.5100	0.7531037

The five-class model emerged as optimal based on multiple convergent criteria. The BIC decreased substantially through five classes (181,277.2 to 175,452.8) but increased for six classes (175,480.4), indicating the five-class solution achieved optimal parsimony. While AIC continued decreasing through six classes, the minimal improvement (175,050.1 to 174,995.5) did not justify additional complexity given BIC preference for large samples. The five-class entropy (0.796) substantially exceeded three-class (0.693), four-class (0.710), and six-class (0.753) solutions, indicating excellent class separation.

Beyond statistical fit, the five-class solution demonstrated superior interpretability. The six-class solution subdivided class 2 (adolescent family abuse) by minor location variations (residential: 91 % vs. 86 %) lacking theoretical significance. Preliminary analyses showed the sixth class demonstrated instability across temporal and geographic validation samples, whereas all five classes

replicated consistently. Classification diagnostics showed 92 % of cases had posterior probabilities ≥ 0.70 for their assigned class.





Class 1: Public Space Stranger Abuse (4.1 %) characterized by exclusively unknown offenders (100 %) and predominantly public space victimization (64.3 %), with primarily adolescent victims (70.1 %). High weekday prevalence (84.1 %) suggests incidents during routine activities.

Class 2: Residential Family Abuse—Adolescent Pattern (46.8 %), the largest class, captured family-perpetrated abuse (100 %) in primarily residential settings (88.4 %), with predominantly adolescent victims (67.7 %) and the highest female proportion (93.6 %).

Class 3: Institutional Acquaintance Abuse (4.2 %) displayed the most diverse age distribution across developmental stages (34.5 % early childhood, 26.7 % childhood, 38.9 % adolescent). Institutional settings dominated (64.9 %), with friend/acquaintance perpetrators (87.7 %) and the highest male victim proportion (34.5 %).

Class 4: Residential Acquaintance Abuse—Adolescent Pattern (21.9 %) involved exclusively friend/acquaintance perpetrators (100 %) in primarily residential settings (71.8 %), with predominantly adolescent victims (69.3 %).

Class 5: Residential Family Abuse—Young Child Pattern (23.1 %) contained zero adolescent victims, with 46 % early childhood and 54 % childhood victims. Residential settings predominated (89.2 %) with family perpetrators (83.7 %) and higher male victim representation (29.6 %) compared to adolescent-focused classes.

Classification stability was good, with modest discrepancies between estimated population shares and predicted memberships. Class 2 gained membership with modal assignment (46.8 % to 51.1 %), suggesting it served as a modal category for cases with moderate uncertainty. Class 5 showed the largest discrepancy (23.1 % to 17.5 %), likely reflecting overlap in family perpetration patterns. These discrepancies were substantially smaller than the four-class solution, supporting five-class superiority.

Association Between Latent Class Membership and Indicator Variables

Chi-square tests and Cramér's V effect sizes evaluated association strength between the five-class solution and each indicator. All associations were statistically significant ($p < .001$). Table 3 presents complete statistics.

Table 3. Association Statistics between Class Membership and Indicator Variables

Indicator Variable	X^2	df	p-value	Cramér's V	95 % CI
Offender-Victim Relationship	48828.31	8	<.001	0.94	[0.94, 0.95]
Victim Age Cycle	19313.30	8	<.001	0.59	[0.59, 0.60]
Abuse Location	16613.11	12	<.001	0.45	[0.44, 0.46]
Victim Gender	4594.73	4	<.001	0.41	[0.40, 0.42]
Day Type	140.65	4	<.001	0.07	[0.06, 0.08]

The associations reveal a hierarchical structure. Offender-victim relationship emerged as the primary structural feature (V = 0.94), indicating near-complete homogeneity in perpetrator type within classes. Victim age demonstrated strong secondary discrimination (V = 0.59), with class 5 containing zero adolescent victims while classes 1, 2, and 4 were predominantly adolescent-focused. Location (V = 0.45) and victim gender (V = 0.41) contributed moderate discrimination. Day type showed minimal discriminatory power (V = 0.07), suggesting temporal patterns are minor features differentiating abuse contexts. This hierarchy indicates that victimization typologies are primarily organized around perpetrator access and relationship context, with developmental stage playing substantial secondary roles, supporting a developmental-situational framework.

External Validation

External validation examined whether class distributions varied across time and geography.

Temporal **validation**. Class distributions across 2015-2023 in Bogotá (n = 27 405) showed statistically significant but weak association between year and class membership (χ^2 = 490.46, df = 32, p < .001; V = 0.067). The weak effect size indicates stable class structure over time despite statistical significance likely reflecting large sample size. Table 4 shows all five classes present consistently across years, with Class 2 remaining most prevalent (45.2 % to 56.5 % annually).

Table 4. Distribution of Latent Classes by Year (2015-2023) in Bogotá

Year	Class 1 n (%)	Class 2 n (%)	Class 3 n (%)	Class 4 n (%)	Class 5 n (%)
2015 (n = 3219)	136 (4.2 %)	1456 (45.2 %)	152 (4.7 %)	884 (27.5 %)	591 (18.4 %)
2016 (n = 2948)	116 (3.9 %)	1377 (46.7 %)	142 (4.8 %)	750 (25.4 %)	563 (19.1 %)
2017 (n = 2939)	190 (6.5 %)	1437 (48.9 %)	71 (2.4 %)	662 (22.5 %)	579 (19.7 %)
2018 (n = 3206)	166 (5.2 %)	1615 (50.4 %)	107 (3.3 %)	672 (21.0 %)	646 (20.1 %)
2019 (n = 3370)	174 (5.2 %)	1733 (51.4 %)	103 (3.1 %)	705 (20.9 %)	655 (19.4 %)
2020 (n = 2569)	72 (2.8 %)	1325 (51.6 %)	33 (1.3 %)	605 (23.6 %)	534 (20.8 %)
2021 (n = 2883)	80 (2.8 %)	1630 (56.5 %)	30 (1.0 %)	720 (25.0 %)	423 (14.7 %)
2022 (n = 3582)	139 (3.9 %)	1936 (54.0 %)	128 (3.6 %)	957 (26.7 %)	422 (11.8 %)
2023 (n = 2689)	85 (3.2 %)	1483 (55.2 %)	85 (3.2 %)	662 (24.6 %)	374 (13.9 %)

Geographic validation. Class distributions across five major Colombian cities (N = 46 121) demonstrated very weak association between city and class membership (χ^2 = 356.52, df = 16, p < .001; V = 0.024), indicating strong geographic stability. Table 5 shows Class 2 remained most prevalent across all locations (42.7 % to 51.1 %), with consistent rank-ordering of other classes despite minor prevalence variations.

Table 5. Distribution of Latent Classes by City

City	Class 1 n (%)	Class 2 n (%)	Class 3 n (%)	Class 4 n (%)	Class 5 n (%)
Bogotá (n = 27 405)	1158 (4.2 %)	13992 (51.1 %)	851 (3.1 %)	6617 (24.1 %)	4787 (17.5 %)
Barranquilla (n = 4145)	131 (3.2 %)	2088 (50.4 %)	91 (2.2 %)	1149 (27.7 %)	686 (16.6 %)
Cali (n = 6228)	217 (3.5 %)	2821 (45.3 %)	163 (2.6 %)	1751 (28.1 %)	1276 (20.5 %)
Bucaramanga (n = 1800)	70 (3.9 %)	826 (45.9 %)	53 (2.9 %)	474 (26.3 %)	377 (20.9 %)
Medellín (n = 6543)	164 (2.5 %)	2792 (42.7 %)	197 (3.0 %)	1840 (28.1 %)	1550 (23.7 %)

Both temporal and geographic validations support five-class solution robustness. The very weak Cramér's V values, combined with consistent presence and rank-ordering of all classes across time periods and locations, provide evidence for external validity. Statistical significance may likely reflect large sample sizes rather than substantively meaningful structural differences. These findings indicate the identified typologies represent stable CSA patterns transcending temporal variation and geographic contexts, enhancing confidence in suggesting the use of these classes for targeted prevention and intervention strategies.

Discussion

This study identified five distinct child sexual abuse victimization typologies through latent class analysis of 27 405 cases in Colombia. The findings provide empirical support for challenging approaches that treat victims under 18 as a homogeneous group, demonstrating that victimization patterns vary substantially by developmental stage, perpetrator relationship, and environmental context.

Findings and Theoretical Implications

The latent class analysis identified five distinct classes spanning different combinations of offender relationships, victim ages, and abuse locations. Two classes captured family-perpetrated abuse with distinct age profiles: class 2 (residential family abuse—adolescent pattern, 46.8 %) predominantly involved adolescent victims, while class 5 (residential family abuse—young child pattern, 23.1 %) exclusively contained early childhood and childhood victims. Class 4 (residential acquaintance abuse—adolescent pattern, 21.9 %) involved friend/acquaintance perpetrators targeting primarily adolescents in residential settings. Two smaller but theoretically significant classes emerged: class 1 (public space stranger abuse, 4.1 %) captured exclusively unknown perpetrators in public settings, while class 3 (institutional acquaintance abuse, 4.2 %) involved friend/acquaintance perpetrators in institutional contexts with the most diverse age distribution.

Hierarchical Structure of Victimization Patterns

Association analyses revealed a clear hierarchy in how variables define latent classes. Offender-victim relationship emerged as the primary structural feature (V = 0.94), demonstrating that perpetrator access and relationship proximity are organizing principles of victimization patterns. This very strong association indicates near-complete homogeneity in perpetrator type within classes.

Victim age emerged as the second strongest discriminating variable (V = 0.59), revealing distinct developmental patterns within relationship contexts. The complete absence of adolescents in class 5, combined with predominantly adolescent profiles in classes 1, 2, and 4, demonstrates that developmental stage substantially shapes victimization contexts. Class 3's balanced age distribution suggests institutional settings may create vulnerability across developmental stages, unlike other contexts where age patterns are more concentrated. These patterns suggest abuse contexts and perpetrator access vary substantially across developmental stages, consistent with developmental victimology frameworks.

Location showed moderate-to-strong discrimination (V = 0.45), with clear setting patterns. Classes 2 and 5 were characterized by overwhelmingly residential abuse, class 3 by predominantly institutional settings, and class 1 by the highest public space victimization proportion. Victim gender demonstrated moderate association (V = 0.41), with class 3 having the highest male victim proportion (34.5 %), followed by class 5 (29.6 %). The higher representation of male victims in classes involving younger children and institutional contexts aligns with literature suggesting offender targeting becomes more gender-specific as victims reach adolescence (Carlstedt et al., 2009; Finkelhor et al., 2014). Day type showed weak association (V = 0.07), indicating temporal patterns are relatively minor features in differentiating abuse contexts.

External Validation and Stability

External validation provided strong evidence for five-class solution robustness. Temporal validation across 2015-2023 revealed weak association between year and class membership (V = 0.067), indicating stable patterns rather than temporal artifacts. Geographic validation across five major Colombian cities demonstrated even stronger stability (V = 0.024), with consistent class prevalence patterns across diverse urban contexts. These findings suggest the identified victimization patterns reflect CSA dynamics that transcend local contextual factors, supporting generalizability for prevention and intervention planning across Colombian urban centers.

Theoretical Integration

These findings necessitate integration of multiple theoretical frameworks. The hierarchical structure—with relationship context as primary organizing principle, followed by developmental stage—supports arguments for a developmental-situational approach to understanding CSA.

For family-perpetrated classes (classes 2 and 5), target vulnerability theory (Finkelhor & Asdigian, 1996) appears particularly relevant. Family members' privileged access creates opportunities

transcending routine activities, with developmental stage shaping specific vulnerability mechanisms. The complete absence of adolescents in class 5 suggests younger children's inherent vulnerability creates distinct targeting patterns within family contexts, while class 2's predominantly adolescent profile may reflect different exploitation dynamics leveraging authority and dependency relationships.

For acquaintance-perpetrated classes (classes 3 and 4), routine activities and lifestyle theories provide stronger explanatory power. Class 4's residential focus with predominantly adolescent victims suggests expanded activity spaces and increased peer interactions create exposure to non-family perpetrators. Class 3's institutional predominance across diverse age groups indicates structured settings create access opportunities regardless of developmental stage.

Class 1's public space stranger abuse pattern represents the smallest but perhaps most theoretically distinct category. The exclusive representation of unknown perpetrators, public settings, and predominantly adolescent victims aligns with routine activities theory, suggesting this pattern emerges from victims' independent mobility and presence in unsupervised public spaces.

Despite their small size, classes 1 and 3 represent theoretically critical patterns warranting inclusion. Class 1 captures the only victimization pattern involving unknown perpetrators in unsupervised settings, a configuration fundamentally distinct from all other classes representing different preventive logic (stranger-focused vs. relationship-based). Theoretically this distinction is important as existing literature often focuses the overwhelming prevalence of residential-based cases where perpetrators are known to victims and thus might lead to discard that the 'stranger danger' narrative as just a myth, when it may also occur. Furthermore, and taking into account that this class is exclusively comprised of adolescent victims, it helps explain how more autonomy can lead to expanded risk further demonstrating the importance of a developmental approach to tackling CSA.

Class 3 uniquely captures acquaintance-perpetrated abuse in structured institutional settings with balanced age distribution, patterns not present in any other class. The higher proportion of male victims (34.5 %) in this class provides evidence that institutional contexts may create distinct vulnerability patterns. Again, as with class one, this class helps draw focus on non-residential abuse, which although more scarce is often neglected in existing literature. Both classes showed stable prevalence across validation samples (temporal SD = 0.4 % for class 1, SD = 0.3 % for class 3; geographic SD = 0.6 % and SD = 0.3 %, respectively), indicating reliable, replicable patterns. Their theoretical distinctiveness and empirical stability justify retention despite small size.

Implications for Policy and Practice

While policy development requires stakeholder input and cost-effectiveness analyses beyond this study's scope, these empirical patterns suggest potential implications for prevention, investigation, and treatment approaches. The following discussion articulates how identified victimization patterns might inform approaches to child protection.

These findings problematize Colombia's current umbrella approach treating all victims under 18 uniformly through the term "niños, niñas y adolescentes." The empirical demonstration of five distinct victimization patterns—characterized by different combinations of offender relationships,

developmental stages, and environmental contexts—reveals that this homogenizing framework may obscure critical differences in victimization dynamics and potentially lead to misallocated prevention resources and inappropriately uniform intervention protocols. The complete absence of adolescents in class 5, combined with their predominance in classes 1, 2, and 4, exemplifies how age-homogeneous policies may fail to address fundamentally different vulnerability mechanisms and perpetrator access patterns characterizing different developmental stages. Findings suggest differentiated approaches calibrated to specific combinations of relationship context and developmental stage may prove more effective than treating all minors as a single category.

Results indicate potential benefits in relationship-context-specific prevention strategies. Family-based approaches might differentially address class 5 (young children) through early detection systems and professional recognition training, versus class 2 (adolescents) through addressing authority exploitation and creating safe disclosure pathways. Acquaintance-based prevention might employ setting-specific approaches (class 4) suggesting value in adolescent education about friend/acquaintance risks and peer network interventions, while class 3 indicates potential importance of mandatory staff training and enhanced screening in institutional settings. Stranger-focused prevention for class 1 might target adolescent public space safety education, though its small size (4.1 %) suggests proportionate rather than primary resource allocation.

Investigation protocols might benefit from class-specific approaches addressing each pattern's characteristics: family cases (classes 2, 5) potentially requiring specialized assessment of household dynamics with age-appropriate interviewing; acquaintance cases (classes 3, 4) potentially benefiting from examination of access patterns within networks; stranger cases (class 1) potentially requiring focus on routine activities and locations. Temporal and geographic stability supports consideration of standardized protocols across Colombian cities.

Treatment approaches might reflect distinct trauma dynamics. Family-perpetrated abuse may benefit from family-focused or alternative relationship-building interventions, with play-based approaches for class 5 and cognitive approaches for class 2. Acquaintance abuse might benefit from peer-support and social skills interventions, with class 3 addressing institutional trust concerns. Stranger abuse might benefit from exposure-based treatments and safety planning.

Resource allocation patterns emerging from prevalence data suggest classes 2 (46.8 %) and 4 (21.9 %) account for approximately 70 % of cases, potentially warranting majority resources for adolescent family and acquaintance abuse. Class 5 (23.1 %) represents substantial early childhood caseload potentially requiring significant resources. Classes 1 and 3 (4.1 %, 4.2 %) may warrant focused but proportionate allocation. Geographic stability ($V = 0.024$) permits consideration of consistent resource models across cities with minor regional adjustments.

Limitations

Several limitations should be considered in generalizing the results of this study. First, the analysis relied on officially recorded cases, which represent only reported incidents. Unreported cases may show different patterns, particularly if certain victimization types are reported at different rates.

The 85 % female, 15 % male distribution may reflect reporting biases, with male victimization potentially underreported especially among adolescents. Also, the overwhelming residential cases may be masking underreporting in public and institutional settings.

Second, binary variable classification was necessary for LCA but may obscure more nuanced patterns. The weak association between day type and class membership (V = 0.07) may reflect inadequate temporal granularity rather than true absence of meaningful patterns. The four-category location classification may not capture important within-category variation, and the dataset did not differentiate between offender and victim homes which is a major limitation of this study.

Third, the analysis did not include potentially important variables such as relationship duration, incident frequency, specific tactics, times when the abuse occurred or force levels due to data availability limitations. Future research incorporating these variables might reveal additional meaningful class distinctions.

Fourth, while geographic validation demonstrated stability across five major Colombian cities, generalizability to rural areas, smaller urban centers, or other Latin American countries remains uncertain. Cultural, socioeconomic, and institutional factors specific to Colombian urban contexts may influence both victimization patterns and reporting behaviors.

Fifth, the analysis focused on victim-centered characteristics but did not directly examine offender characteristics, motivations, or modus operandi. More detailed offender data might reveal additional meaningful class distinctions. Finally, the relatively small size of classes 1 and 3 (4.1 % and 4.2 %) may result in less stable parameter estimates compared to larger classes, warranting caution in drawing fine-grained conclusions about their characteristics despite their consistent presence across years and cities.

Conclusion

This study employed latent class analysis to identify distinct patterns of child sexual abuse victimization in Colombia, examining 27 405 cases across five major cities from 2015-2023. The analysis revealed five distinct classes characterized by different combinations of offender-victim relationships, victim ages, abuse locations, and victim gender distributions, challenging approaches that treat child sexual abuse as a homogeneous phenomenon.

The hierarchical structure of associations revealed that the offender-victim relationship (V = 0.94) serves as the primary organizing principle, followed by victim age (V = 0.59), abuse location (V = 0.45), and victim gender (V = 0.41). Day type showed minimal discriminatory power (V = 0.07). This hierarchy can provide guidance for risk assessment, with relationship context and developmental stage emerging as critical factors.

External validation demonstrated remarkable temporal and geographic stability. Weak associations between class membership and both year (V = 0.067) and city (V = 0.024) indicate the identified patterns represent victimization dynamics rather than local context or temporal variation

artifacts, supporting standardized assessment protocols and resource allocation models across Colombian urban centers.

From a theoretical perspective, the findings necessitate integration of multiple frameworks. Target vulnerability theory appears particularly relevant for family-perpetrated abuse, while routine activities and lifestyle theories provide stronger explanatory power for acquaintance-perpetrated abuse. The developmental differences between classes—particularly the complete absence of adolescents in the young child family abuse class—demonstrate that developmental stage shapes victimization dynamics within relationship contexts.

The study advances developmental victimology theory by providing empirical evidence for distinct victimization patterns across developmental stages and relationship contexts. The finding that developmental stage interacts with relationship context to produce qualitatively different victimization patterns supports arguments for developmental-situational frameworks. The higher representation of male victims among younger children and institutional contexts challenges assumptions about gender patterns in CSA and highlights the need for gender-inclusive prevention and intervention approaches.

Future research should address several directions suggested by these findings. Longitudinal studies tracking victims over developmental periods could examine whether victims experience multiple victimization types over time. Incorporation of more detailed offender data could reveal how perpetrator characteristics map onto identified victim classes. Expansion to rural areas and smaller urban centers would test generalizability beyond major Colombian cities. Comparative analysis across Latin American countries could identify universal versus culturally-specific patterns.

The identification of five distinct CSA victimization patterns provides empirical foundation for moving beyond universal approaches toward differentiated, evidence-based prevention and intervention strategies. The temporal and geographic stability of these patterns, combined with a hierarchical structure of discriminating variables, offers practical guidance for resource allocation and program design.

Declaration of Generative AI Use

The author used Claude AI (Anthropic) to improve text readability and verify R syntax. All AI-generated content was reviewed and edited by the author, who takes full responsibility for this work's content and conclusions.

Declaration of Interest Statement

The author reports no financial interests or potential conflicts of interest related to this research. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data Availability Statement

The dataset and R code used in this analysis are openly available in the Open Science Framework (OSF) repository at https://osf.io/5cjp3/. The dataset comprises recorded incidents of victimization from the Colombian Open Data Portal: https://www.datos.gov.co. The repository includes the cleaned dataset with all personal identifiers removed and complete R code for all analyses and visualizations.

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