

Physical evidence of rape against children and adolescents in Brazil: Analysis of 13,870 reports of sexual assault in 2017

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Ivan Dieb Miziara¹, Carmen Silvia Molleis Galego Miziara²,
Luan Salguero Aguiar² and Beatriz Alvez²

Abstract

Introduction: The medical literature reports child and adolescent maltreatment since the 8th century. Unfortunately, even today, the incomplete knowledge of this event persists. Several forms of violence are applied to children and adolescents, mainly sexual violence including rape and sexual assault. Forensic medical examinations routinely include the genital area, anus, and the body of the victims for signs of a recent or old injury. The main goal of this study is to show the results of physical and sexual examinations regarding confirmation of rape in children and adolescents, based on the medicolegal reports.

Methods: We made a descriptive cross-sectional study conducted by collecting data from Medicolegal Institute (IML-São Paulo, Brazil) in 2017. We examined 13,870 reports of sexological examinations of victims of the alleged rape. The variables analyzed were age; sex; physical examination; sexological examination; and direct search for sperm in the vaginal, anal, or oral cavity. We selected 11,725 reports from victims under 18 years.

Results: As for the medical-legal findings, only 1735 reports (14.8%) confirmed sexual abuse. The most affected ages were between 3 and 5 years in the male group and 11 to 14 years in the female group. The most frequent injuries were bruises and abrasions, fissures in the anal region. In 96.2% of the examined males and 85.8% of the females under 14 years old, the examination was inconclusive, and somebody cannot prove the alleged rape. Only 1735 reports (113 from men and 1622 from women) concluded beyond any doubt the alleged rape (14.8%). The search for sperm was positive in only 1582 cases (13.5%).

Conclusion: This study shows that the results of the medicolegal examinations were quite limited in recording evidence. Sexual violence against children and adolescents reaches mostly females under 13 years of age. Besides, it is a complicated crime to prove, as 85.8% of female examinations and 96.2% of male exams revealed: “no supporting elements” or “undetermined” to characterize the felony. Therefore, to prevent it, the communication of the alleged rape must be made as quickly as possible.

Keywords

Legal medicine, pathology, violence, children, adolescent, rape

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Introduction

Child and adolescent maltreatment have been reported in the medical literature since the 8th century. Ambroise Tardieu, in 1860, was the first author who described child maltreatment syndrome.¹ Unfortunately, even today, the incomplete knowledge of this event persists, making it impossible for many diagnoses to be reached. As Robinson stated, “many sexually abused children show no physical signs, and even when signs believed to be indicative of sexual abuse are present the diagnosis should very rarely be made on investigation.”² The most important single feature is a statement by the child. As the author pointed out, “this may be supported

by medical and forensic evidence, an admission by the abuser,” and so on. All are fallible guides to diagnosis, which should be approached with caution and humility, “knowing

¹Department of Legal Medicine, Ethics and Occupational Health, São Paulo University School of Medicine, São Paulo, Brazil

²Discipline of Legal Medicine and Bioethics, ABC School of Medicine, Santo André, Brazil

Corresponding author:

Ivan Dieb Miziara, Department of Legal Medicine, Ethics and Occupational Health, São Paulo University School of Medicine, Rua Capote Valente, 127-111, Pinheiros, São Paulo, SP 05409-000, Brazil.
Email: ivan.miziara@usp.br



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the serious consequences of diagnostic error in either direction.”²

Several forms of violence are applied to children and adolescents; however, sexual violence, including rape and other forms of sexual abuse (obscenity, sodomy, etc.), undoubtedly entails serious immediate and late consequences, being itself considered a public health problem.^{3,4}

Walker stated that

the word rape is originally derived from the Latin verb *rapere*: to seize or take by force, and until relatively recent history, most definitions of rape have referred to an act of forced vaginal intercourse perpetrated through actual—or threat of—physical violence, associated with a presumption of resistance on the part of the victim. Gladly, many modern legal definitions have now replaced the “use of force” with a “lack of consent” as rape’s defining feature.⁵

Although many forms of sexual violence (such as rape and sexual assault) affects individuals of all ages, most victims are children or adolescents. It is estimated that annually across the planet, 1 in 5 girls and 1 in 13 boys are sexually abused.³

For the World Health Organization (WHO), sexual violence is the realization or attempt to maintain sexual activity without the victim’s consent, regardless of the affective relationship between the parties.⁶ Although rape is a sub-set of sexual violence, in Brazil since 2009, all forms of sexual violence are considered rape. In other words, rape (in Brazil) is “to constrain someone, through violence or serious threat, to have a carnal connection or to practice or allow another libidinous act to be performed with him or her” considering the age over 14 years of age. But when it comes to a person under 14 years of age, it is defined as “vulnerable rape,”⁷ and “the eventual consent of the victim to the practice of the act, previous sexual experience or the existence of a romantic relationship with the agent being irrelevant.”

Carnal conjunction means carnal copulation, the introduction of the penis into the vagina, with or without ejaculation. Otherwise, libidinous act means any practice in which the aggressor satisfies a “sexual appetite”^{8,9} by touching, licking, or sucking.

Worldwide, in 2002, 150 million girls and 73 million boys under the age of 18 were forced to maintain a carnal connection or suffered other forms of sexual abuse involving physical contact.¹⁰ The analysis of these occurrences in 21 countries, mostly with high economic status, showed that between 3% and 29% of boys reported having been victims of sexual violence.¹¹

It is estimated that more than one billion children suffer some type of violence each year around the world. However, the prevalence of sexual abuse notification to the authorities by children is 30 times lower than what is officially reported.¹² Probably it occurs because there is in Brazil a subnotification of the alleged rape.¹³ The victim does not notify the authorities because of fear of reprisals since the

perpetrator is usually someone close, such as parents or step-fathers or uncles.

In the United States, only about 15% of total rapes are reported to the police.¹³ Data from the WHO showed that in 2011, 18% of girls and 8% of boys were subjected to sexual violence worldwide.¹⁴

In African countries, there are the highest prevalence rates of sexual abuse against children and adolescents (34% of boys and 21.1%–50.7% of girls); in Europe and the United States, the rate is lower (9.2% of boys and 6.8% to 12.3% of girls).¹⁵

Proof of violence, as well as the irrefutable identification of the aggressor, is no easy task.¹⁶ “The purpose of the forensic medical examination is to provide justice with material elements of the tort that require medical procedures.”⁹ Shreds of evidence that there were sexual conjunction (vaginal penetration) or another libidinous act (oral or anal penetration) are crucial for the correct materialization of the crime of rape. The evidence is given in the first case (e.g. sensual meeting) by finding “hymenal rupture, presence of sperm in the vagina or pregnancy.” Evidence for other libidinous acts is more complicated, as these may not leave traces as often. “The expertise here aims to demonstrate the presence of sensual acts other than carnal conjunction. Among these, it is essential to find sperm, whether in other parts of the body (skin, anus) than the vagina or the victim’s clothes.”

On the contrary, findings of physical violence such as bodily injuries may corroborate the history provided by the victim, strengthening the expert findings. It is important to note that

some children have evidence of both sexual and other physical abuse; violent sexual abuse may be associated with bruising around the knees, thighs, and genitalia. The report concentrates, however, on signs present the genital area in girls and the anal region in both sexes.²

In a forensic examination, all of these signs require the attention of the expert. Also, knowledge of normal and abnormal sexual behaviors, clinical signs of sexual violence, diagnostic tests for detecting sexually transmitted infections (STIs), and differential diagnoses of lesions in genital regions can be helpful in the assessment of children and adolescents with suspected abuse.¹⁷

We emphasize the importance of the physical signs as they play a subsidiary role in this forensic diagnosis, even when they are not present because they may disappear with the passage of time—claiming the importance of an immediate report of the event.

Thus, the main goal of this study is to show the results of physical and sexual examinations regarding confirmation of sexual violence in children and adolescents, based on the medicolegal reports carried out at the Legal Medical Institutes of the State of São Paulo in 2017. More specifically, our objective is to show the physical findings (not only

in other parts of the body and the genital region) in children and adolescents who are victims of rape, showing how difficult it is to obtain irrefutable evidence in this type of violence. Furthermore, we hypothesize that a good part of the cases of alleged rape may not be confirmed by the medical-legal examination, causing the aggressor to go unpunished.

Methods

We made a descriptive cross-sectional study conducted by collecting data contained in the report management system (GDL) of the Superintendence of the Technical-Scientific Police (Legal Medical Institute) of the State of São Paulo in 2017.

Brazilian legislation

It is important to note that a rape victim must go to a police station to report the crime under Brazilian criminal law. The police chief opens an investigation and requests an expert examination of the victim. An official forensic expert carries out this examination at the Legal Medical Institute. In addition to the physical exam, the forensic expert can collect and request other exams such as sperm research in the vaginal or anal cavity, in addition to radiological exams and eventual consultation with a psychologist. After the examinations, a forensic expert prepares a report within a digital system called GDL. This report is forwarded back to the chief of police, who requested the analysis of the victim. If the examination brings evidence that proves the rape, the investigation proceeds to punish the aggressor. On the contrary, the process is closed if the report does not show elements that establish the alleged rape, interrupting the investigation.

Sample size and power analysis

We examined 13,870 reports of sexological examinations. For this study, all reports of rape against children and adolescents in the state of São Paulo, Brazil, that occurred in 2017 were used, without determining the sample size. Only the inclusion and exclusion criteria were applied.

The total number of cases of rape against children and adolescents throughout Brazil in 2017 was 45,000 cases. When calculating the sample size, considering a confidence level of 99% of certainty of rape and a margin of error of 1%, we have that the necessary sample size would be 12,115 cases, which is lower than the number of reports collected in this study. This calculation reveals the strength of our sample.

Variables

The variables analyzed were age; sex; physical examination (presence and type of bodily injuries); results of sexological examination; and direct search for sperm in the vaginal, anal,

oral, or hair cavity. In addition, we extracted from the analyzed report's data that may evidence the expert confirmation of rape, such as hymenal rupture; the presence of sperm in the vagina, anus, or oral cavity. Besides, we search for signs of violence such as bruises, abrasions, and other injuries that demonstrate the use of violence by the aggressor to subdue the victim.

In light of our hypothesis, we paid particular attention to the search for cases in which the examinations were inconclusive, making it impossible to convict the accused.

Inclusion criteria:

- (a) Reports of medical-legal examinations for verification of sexual violence that contained the studied variables;
- (b) Reports of victims of both sexes under 18 years of age.

Exclusion criteria:

- (a) Only reports of victims under 18 years of age were included in the study, as 18 years of age is the maximum age for characterized adolescents;
- (b) The search period is limited to 2017, as the rules of Brazilian Penal Law do not allow the use of data for research before 3 years of the event happened.

Ethical approval

The study was approved by the Ethics and Research Committee of the University of São Paulo which waived the requirement of written consent. According to the Instituto Médico Legal de São Paulo norms, the data contained in medicolegal reports can only be released for research 3 years after its completion. Furthermore, all ethical standards were adopted as determined by the Resolution of the National Health Council.

Statistical analysis. Distributions were defined as non-parametric by the Kolmogorov–Smirnov test, in which the chi-square test or Mann–Whitman's *U* Test were used for comparisons, the most suitable for each analysis, using the SPSS® statistical program version 17.0 (SPSS® Inc; Illinois, USA). Therefore, we assume a significance level if $p < 0.005$.

Results

The research in the GDL (database of the Superintendence of the Technical-Scientific Police of the State of São Paulo), using the year 2017 as a reference, resulted in 13,870 reports of sexual examinations for suspected sexual violence. The age of the victims ranged from 1 to 92 years, with 10,480 females (average age of 13 years) and 3390 males (average age of 8 years).

Table 1. Age distribution according to the sex of victims.

Age (years)	Sex		Total n (%)
	Male n (%)	Female n (%)	
1	63 (1.9)	156 (1.8)	219 (1.9)
2	179 (5.5)	323 (3.8)	502 (4.3)
3	299 (9.1)	510 (6)	809 (6.9)
4	332 (10.1)	479 (5.7)	811 (6.9)
5	321 (9.8)	455 (5.4)	776 (6.6)
6	315 (9.6)	380 (4.5)	695 (5.9)
7	290 (8.8)	397 (4.7)	687 (5.9)
8	268 (8.2)	391 (4.6)	659 (5.6)
9	226 (6.9)	469 (5.6)	695 (6.9)
10	210 (6.4)	457 (5.4)	667 (5.7)
11	183 (5.6)	555 (6.6)	738 (6.3)
12	142 (4.3)	844 (10)	986 (8.4)
13	178 (5.4)	1,053 (12.5)	1,231 (10.5)
14	129 (3.9)	689 (8.2)	818 (7)
15	47 (1.4)	563 (6.7)	610 (5.2)
16	56 (1.7)	410 (4.9)	466 (4)
17	44 (1.3)	312 (3.7)	356 (3)
Total	3,282 (100)	8,443 (100)	11,725 (100)

Of this total, 11,725 (84.53%) reports from victims under 18 years of age were selected (mean=9.2 years; SD=4.44), with 8443 (72%) reports from female victims (peak aged between 12 and 13 years) and 3282 male victims (peak age between 3 and 6 years). The age difference between the sexes was statistically significant ($p < 0.001$ —chi-square test), as shown in Table 1.

As for the medical-legal findings on clinical examination, of the total of 11,725 reports, 1735 (14.8%) confirmed sexual abuse by the physician, 113 reports from men, and 1622 from women. The most affected ages were between 3 and 5 years in the male group and from 11 to 14 years in the female group ($p < 0.001$ chi-square test). In each group, ages were compared individually. So, in the male group, the ages more affected were 3, 4, and 5 years. In the female group, 11, 12, 13, 14 years old.

In 321 (2.7%) reports, the presence of bodily injuries was described, of which 248 (7.6%) were male victims, and 73 (0.9%) were female, with a difference between the two groups ($p < 0.001$ —chi-square test). The most frequent injuries were bruises and abrasions on the upper (203) and lower (118) limbs, followed by bruises and fissures in the anal region (119), penile bruises (61), and scarring in the penile area (30). In 210 reports, there was a description of more than one type of bodily injury (Table 2).

Confirmations of the sensual act other than carnal conjunction were measured in 153 (1.3%) reports, of which 113 were boys and 40 were girls, and the sexual meeting was measured in 1582 reports (13.5%). The age at which there was a higher rate of confirmation of the libidinous act was

Table 2. Incidence of bodily injuries concerning the sex of victims.

Type of bodily injury	Male	Female	Total
Bruises and abrasions—upper limbs	166	37	203
Bruises and abrasions—lower limbs	82	36	118
Bruises and fissures—anal region	98	21	119
Bruises—penile region	61	0	61
Linear scar—penile region	30	0	30

around 14 years of age, and that of carnal conjunction was between 12 and 13 years old ($p < 0.001$ —Kolmogorov—Smirnov test).

In 64.3% of the cases, the experts did not find objective medical elements that corroborated the alleged sexual violence. In 19.8%, the medical data found were undetermined; therefore, although there were abnormalities in the forensic examination, they were not enough to ensure the occurrence of sexual violence (Table 3).

Under 14 years of age

When we analyzed only the reports of children under 14 years of age (Table 4), 9475 were selected from a total of 13,870, representing 68.31% of all the reports. Of these, 6469 (68.27%) were girls. The mean age of the victims was 7.79 years (SD=3.68), but when we analyze the sexes separately, the mean age shows a difference between the groups ($p < 0.001$ —chi-square test). The average age of boys was 3 to 7 years and girls 12 years. Likewise, there was a difference between the sexes regarding the presence of bodily injury ($p < 0.001$ —binomial test), with a predominance in the male group.

In 275 (2.9%) of the reports, bodily injuries were described, with a difference between the sexes; as in the male group, these findings were more frequent ($p < 0.001$). The distribution of injuries was similar to those described for the victims under 18 years of age.

Of the 6469 sexological reports of children under 14 years old, in 23.8% (1537), the presence of abnormalities was described on the examination. Of these, in 801 reports, the sexual conjunction was proven by hymenal rupture, and in two cases, the proof was due to pregnancy. The sperm test was positive in 614 subjects with carnal conjunction and 102 cases of the libidinous act other than the carnal conjunction. The anal injury was described in 34 reports.

The results show that medicolegal confirmation of the alleged rape was more prevalent in girls aged between 11 and 13 years ($p < 0.001$ —chi-square test).

Discussion

Any violence applied to children or adolescents is a crime against the human dignity of enormous proportions and must

Table 3. Distribution of conclusive results described in the reports of victims under 18.

Completion of reports	Sex		Total
	Male n (%)	Female n (%)	
No supporting elements ^a	1.365 (41.6)	6.176 (73)	7.541 (64.3)
Proven libidinous act	113 (3.4)	40 (0.5)	153 (1.3)
Proven carnal conjunction	0 (0)	1.582 (19)	1.582 (13.5)
Undetermined ^a	1.776 (54.1)	541 (6.4)	2.317 (19.8)
No medical-legal examination performed	28 (0.9)	104 (1.2)	132 (1.1)
Total	3.282 (100)	8.443 (100)	11.725 (100)

^a“No supporting elements” and “undetermined” means that the examination was inconclusive or negative.

Table 4. Distribution of medicolegal findings of children under 14 years of age.

Completion of reports	Sex		Total n (%)
	Male n (%)	Female n (%)	
No supporting elements ^a	1.265 (42.1)	5.170 (79.9)	6.435 (67.9)
Proven libidinous act	87 (2.9)	31 (0.5)	118 (1.3)
Proven carnal conjunction	0 (0.0)	814 (12.6)	814 (8.6)
Undetermined ^a	1.627 (54.1)	383 (5.9)	2010 (21.2)
No medical-legal examination performed	27 (0.9)	71 (1.1)	98 (1.0)
Total	3.006 (100)	6.469 (100)	9.475 (100)

^a“No supporting elements” and “undetermined” means that the examination was inconclusive or negative.

be reported compulsorily, even if suspected, throughout the national territory, following the Child and Adolescent Statute.¹⁸ Therefore, our study contains convenience sampling, limited to the State of São Paulo, in 2017.

Age and sex of victims

Thus, in our series, female victims of rape (n=8443) were apparently most affected than male victims (n=3282), although we cannot determine if girls were more affected than boys. In addition, the age range most affected for female victims was between 12 and 13 years, and for male victims was between 3 and 6 years. These results showed that the primary victims of sexual violence were female and under 13 years of age, and our findings are consistent with the medical literature.^{4,17} Official data from 2018 showed that 68% of rapes registered in the health system were underage victims in Brazil. The victims were under 13 years old.¹⁹

Regarding the male group, the most affected ages were between 3 and 6 years old in our series. On the contrary, we found the female group's mean age between 12 and 13 years old. This result is compatible with another study by Platt et al.²⁰ The authors raised the notifications of suspected and confirmed cases of sexual abuse in the Notifiable Diseases Information System (SINAN), from January 2008 to December 2014, and concluded that the age groups between

10 and 15 for women and from 2 to 6 years old for men were the most affected.²⁰

Difficulties proving the crime

Our series brings some spooky results: in 96.2% of the examined males under 14 years and 85.8% of the females under 14 years, the conclusion was that the examiner has “no supporting elements,” or the result was “undetermined.” In other words: the examination was inconclusive, had no objective evidence, and the alleged rape cannot be proved. Hagemann et al., in 2011, in Norway, found a similar number. In their series (222 cases), they had 56% (104) of issues where “evidence was considered insufficient.”²¹ Furthermore, only 18.75% of spermatozoa were detected (3 cases in 16). The same occurred in another study made in Israel, where only 12% of the cases examined by the authors “showed clear evidence of the sexual assault.” In their cases, “80% of the recent injuries in the anogenital area were identified in patients within the first 24 hours after the assault.”²⁴ Furthermore, the authors pointed that the difficulty to prove the rape is the rule in many countries, as “the prevalence of clear evidence of sexual assault in the U.S ranges from 3–23%, in Italy 9.5%, in Thailand 32% and in Denmark 40%.”²⁴

It is important to note that the use of some technical devices could prevent this kind of failure. In the setting of a

forensic examination following rape, “colposcopy allows practitioners to identify and photograph genital injury not readily visible to the unaided eye, thereby clarifying the location and extent of the injury as well as providing evidence for court proceedings.”²² Besides, it has been shown to be a sensitive and acceptable tool for detection of anogenital abnormalities in children, although the significance of some genital findings remains controversial, especially when images are interpreted by inexperienced clinicians.²³

Despite the growing development of diagnostic techniques, obtaining unequivocal medical evidence of rape is still very difficult. Numerous external factors can influence it, given the peculiarities of this crime. The ability to identify physical signs and symptoms of sexual violence or rape is based on the premise that a victim will be assessed soon after the event. Thus, it is expected that many medicolegal examinations fail to prove the fact. Nevertheless, only the victim’s report ends up being the unique element of crime evidence.²⁰ So it is essential to note that the absence of medical evidence does not imply technical failure of medical investigation²¹ since the main predictor of medically identifying rape is the interval between the aggression and the forensic medical examination.²⁴

On the contrary, many children and adolescents subjected to sexual violence do not disclose it. Instead, they keep the violence they suffered secret indefinitely or delay in revealing the abuse sustained.²⁵ Besides, it is estimated that half of the sexually assaulted women take an average of 5 years to report the violation²⁶ and children between 6 and 17 years old, with an average of 17 months.²⁷ The main reasons for the delay were shame, threats from the perpetrator, and fear of reprisal. In a study comparing the sexes, girls (81%) tend to reveal the crime more often than boys (69%), and, in general, they do it to their peers or family members with whom they are close.²⁸

Interpreting medicolegal findings

In our study, the bodily lesions observed in the reports, such as abrasions, bruises, fissures, and scars, did not allow confirmation of sexual abuse. However, it is essential to note that, in the same way, the presence of hymenal rupture, pregnancy, or the presence of sperm in some part of the victim’s body does not necessarily imply the occurrence of violence, if the victim is older than 14 years. In fact, according to Brazilian Law, victims more senior than 14 years can have consensual intercourse, and those findings do not imply automatically the use of violence. However, the exams were always carried out at the request of a police or judicial authority when there was a victim complaint that the sexual intercourse was not consensual and there was a possibility of violence.

Many injuries observed in sex examinations do not reflect the fact of sexual abuse. For example, in investigations of alleged sexual abuse of women, analysis of the hymen is

usually highly valued. However, the results found are not totally “accurate or reliable,” except when other clinical findings may reinforce the possibility that violence occurred.²⁹

In their series, Hagemann et al. described that

the number of extragenital injuries varied between none and 20 (median three). Most injuries were minor to moderate, but five women had sustained more serious injuries; four had signs of attempted strangulation, and one had been slashed by a knife.²¹

In our series, most of the bodily injuries were minor, like bruises and abrasions. We did not detect any anogenital damages as Hagemann et al. did (e.g. five cases of lesions located in the vestibulum, three in the posterior fourchette, three in the perianal area, two in the perineum, and one in each of the following locations: vagina, labia minora, and labia majora). It is important to note that in their series, the interval between assault and a medical examination was less than 24 h in 69% of their cases. Adams et al. in 2006 published an article in which they addressed the main clinical and laboratory findings that aid in the diagnosis of suspected child sexual abuse.³⁰ According to the authors, the results can range from normal conditions (variants of normality) to trauma and sexual contact signs. In addition, the authors describe the primary lesions present in the genital regions that are considered suspicious by the medical examiner and that trigger the entire investigation process.

Among them, we have erythemas; dilation of blood vessels; lip adhesion; vaginal discharge; excoriations and bleeding from eczema or seborrhea, for example; urethral prolapse, hemangiomas; anal fissures; anal folds flattened by external sphincter relaxation or local edema; and partial or complete anal dilatation of fewer than 2 centimeters (which can occur in encopresis, sedation/anesthesia, or neuromuscular condition).

The search for evidence of biological material becomes a good ally in obtaining proof of sexual contact and identification of the possible aggressor, mainly when the medical-legal examination is carried out within the first 72 h after the event.³¹ However, obtaining the material must follow strict standards (guidelines or protocols), especially when researching DNA.

The primary biological materials to be analyzed are the semen present up to 72 h after vaginal sexual contact, 24 h anorectal, and 6 h after oral contact. We must remember that the semen half-life is shorter in prepubertal girls due to the scarcity of cervical mucus. The search for sperm is done under optical microscopy on slides stained with methylene blue, hematoxylin-eosin, Christmas Tree, and so on.

Sperm may not be identified if the aggressor uses a condom, has azoospermia, or is vasectomized. However, it is possible to minimize this situation using the following techniques: apply Florence Iodine Test (if the material is obtained in a dry spot), or search for the seminal acid phosphatase (SAP), and search for the prostate-specific antigen (PSA).³⁰

In many cases of sexual abuse, there are no physical injuries or the presence of traces left by the aggressor. When it comes to children, penetration usually does not occur. When it does, ejaculation can happen outside the cavity,³⁰ justifying the data we found on the age group of up to 10 years to represent more incredible difficulty in proving in females. Our findings show a low sperm positivity and search rate, which is a worrying fact. The presence of sperm in the victim's body is critical evidence to characterize the rape and identify the aggressor.

Although the peculiarity of some results in our series, our findings are not unexpected at all. Offenders are likely to do all they can to cover their tracks, including (as we mentioned) using a condom or another type of protection. Victims are generally reluctant to come forward for fear that they will not be believed or because the offender could be someone close to them (father or other relatives). As we said, the lack of bruises or other physical signs does not preclude an act of violence. For example, suppose the event had been a series of repeated actions. In that case, the victim may know what is coming and resort to avoiding the fight to ensure the experience passes as quickly as possible to prevent additional physical suffering.

Doctrinal and legal aspects in Brazil

The Brazilian medicolegal doctrine establishes that we can prove the sexual conjunction (vaginal penetration) only when signs of hymenal rupture, sperm in the vagina, or pregnancy are present.³² Furthermore, concerning the rape of the vulnerable, the Brazilian Penal Law determines that maintaining sexual conjunction or another libidinous act with a child under 14 years of age is a rape of a vulnerable person. There are no reservations regarding the age or sex of the partner or the consent of the child/adolescent.⁷ In this case, the violence is presumed because our Penal Law "believes" that a person under 14 years cannot consent to a sexual act. Thus, both sexes can be victims of rape, and the presence of hymenal rupture and pregnancy in children under 14 years of age is undoubtedly rape, and the Guardianship Council must be notified.

Strength of the study

Literature on physical signs of child sexual abuse is scarce, mainly in boys of this age. The major strength of our study is the huge number of reports we achieved, a unique data from a sample of 3282 boys and 8443 girls, and the power of our analysis. Thus, our study presents the most extensive case series in sexual abuse in children and adolescents, collected in a single year, in the available medical literature. Also, our data show that children under 12 years of age are the most vulnerable victims of sexual violence, especially females. Unfortunately, obtaining factual medical evidence of the alleged violent act is not always possible. We also show that

despite the high incidence of alleged sexual abuse, the results of the medicolegal examinations were quite limited in recording evidence. Therefore, to prevent it, the communication of the alleged rape to the police authority must be made as quickly as possible.

Limitations of the study

Our study has some obvious limitations. One of them is that we use a convenience sample. Even though the power analysis for sample size calculation was done, it brings some limitations to the conclusions. Another is the lack of information about the time interval between the alleged violence and the medical examination. This fact can be hampered by type 2 statistical error, that is, the inability to demonstrate significant associations where fundamental differences exist. Another one is the absence of responses to the biological analyses performed. Finally, it is also a retrospective descriptive study, which may not show the absolute truth of the facts. Also noteworthy is that the reports were carried out by different examiners, leading to interpretation biases of the findings encountered in the examinations. It is important to note that a lack of physical evidence does not rule out the alleged rape; therefore, finding physical evidence during an examination is the exception rather than the rule.⁴ Questioning the victim and investigating the circumstances of the case "are crucial elements in all instances of presumed sexual assault on children."⁴

In any case, our findings are highly relevant and deserve consideration when creating public policies for the education and prevention of sexual abuse committed against children and adolescents.

Specific implications of the study findings

Our findings reveal some essential aspects of rape victim care. The first one concerns the high number of negative sperm research exams in female victims ($n=6861$). In other words, we have only 18.73% of the sperm research positive in female victims. Thus, we can infer that the time elapsed between the event and the victim's arrival for the forensic examination is critical (under 72h) for searching evidence like that. It is important to note that although we do not have concrete data in this regard, we could extract it from our sample (due to the absence of such data in the examined reports).

In the case of lewd acts (sucking, licking, oral sex), these are even more difficult to prove. In our series, in only 153 cases (1.3%), these acts could be confirmed. The reason is simple: lewd acts like these rarely leave a trace.

This absence of an evidentiary element of certainty of rape should draw the attention of the forensic expert in the search for other signs present in the examination. The main one is the presence of a recent hymenal rupture. But it is necessary to look for other signs of violence used by the

aggressor, such as bruises and abrasions on the body and the genital region.

In the case of male victims, it is interesting to note the bruises and excoriations on the upper and lower limbs (n=248) and in the anal region (n=98). These lesion locations indicate both an attempt at anal intercourse and an intention to contain any reaction on the victim's part.

Otherwise, our findings suggest that it is necessary to improve the quality of the forensic examinations (beyond the experience of the examiner). The routine and appropriate use of some devices in victims' examination, such as colposcopy,^{22,23,33} alternate light sources,^{34,35} which with some adjuncts like the use of toluidine blue may allow for accurate dating of bruising. In this scenario, it becomes mandatory for forensic purposes.

However, although our Penal Law is a good one to prevent the sexual crimes, it is evident that it fails in the majority of the cases, as shown by our results. When the most important way to prove rape is the physical findings in the victim's body (in our legislation), and the testimony of this victim does not have the same importance, it is a serious problem that needs an urgent solution.^{35–37}

Conclusion

Although the limitations of the study, we can conclude that sexual violence against children and adolescents in Brazil reaches mostly females under 13 years of age. Besides, it is a complicated crime to prove, as 85.8% of female examinations and 96.2% of male exams revealed: "no supporting elements" or "undetermined" to characterize the felony, causing the alleged perpetrator could not be punished if he is guilty of the crime. Thus, the inability for medical examination to provide conclusive evidence of sexual violence in the majority of penetrative and non-penetrative rape cases in children and adolescents is clear.

Therefore, to prevent it, the communication of the alleged rape must be made as quickly as possible, and it is necessary to improve the methods used in the forensic investigation, such as a correct use of some devices like colposcopy, alternate light sources, toluidine blue, and so on.

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Ethical approval

Ethical approval for this study was obtained from the Ethics Committee of Instituto Medico Legal Do Estado De São Paulo (Approval Number/USP-IML 00248).

Informed consent

Informed consent was not sought for the present study because it was a cross-sectional study and it was impossible to contact the victims or their legal representants.

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