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Pattern of Injuries in Sexual Assault Cases

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ABSTRACT

Background

Sexual assault is a significant public health and legal concern with profound physical and psychological consequences for survivors. Understanding injury patterns in such cases is crucial for improving forensic assessments, medical care, and legal proceedings. This study analyzes the demographic characteristics of victims, the nature of injuries sustained, and the forensic evidence collected in reported sexual assault cases.

Methods

A descriptive observational study was conducted at Pak International Medical College from January 2023 to January 2024. A total of 75 cases were reviewed based on medical and forensic records. Data on demographic details, assault characteristics, injury patterns, and forensic findings were collected and analyzed using statistical methods, including chi-square tests for significance.

Results

The majority of victims were women aged 18–30 years. Most assaults were penetrative, with a significant proportion involving physical force. Injuries were present in 80% of cases, with bruises, abrasions, and lacerations being the most common. Genital trauma was noted in more than half of the cases. In 70% of cases, forensic evidence was successfully collected, while psychological distress, including PTSD, anxiety, and depression, was observed in many victims. The findings highlight the complexity of sexual assault cases and the need for comprehensive forensic and psychological support.

Conclusion

This study emphasizes the critical role of forensic examinations in sexual assault investigations. While physical injuries are common, their absence does not rule out sexual violence. Psychological evaluations and forensic evidence remain essential in proving cases and supporting victims. Strengthening forensic protocols, timely medical interventions, and enhanced legal frameworks are necessary to improve justice outcomes and survivor care.

Keywords

Sexual assault, injury patterns, forensic evidence, psychological impact, medico-legal examination, victim support.

INTRODUCTION

Sexual assault is a serious public health and legal issue that affects individuals across all age groups and backgrounds(1). It is a form of violence that not only causes physical harm but also has long-lasting psychological and emotional consequences for survivors. Understanding the patterns of injuries in sexual assault cases is essential for improving forensic investigations, medical care, and legal outcomes(2).

The nature and extent of injuries sustained by victims can vary widely, depending on factors such as the type of assault, the level of force used, and whether the victim attempted to resist(3). While some victims exhibit visible physical trauma, others may have no apparent injuries, making forensic evidence and psychological evaluations critical in such cases.(4) The presence of injuries, particularly genital and non-genital trauma, can provide valuable medical and legal insights, supporting both the survivor's recovery and the pursuit of justice.

Several studies have examined injury patterns in sexual assault cases, highlighting that younger women are often the most vulnerable group(5). The involvement of acquaintances or intimate partners as perpetrators further complicates the reporting and legal process, as many survivors face social, emotional, and legal barriers when seeking justice. Additionally, forensic evidence plays a crucial role in legal proceedings, but its availability can be limited by factors such as delayed reporting or lack of visible injuries.

Given these complexities, a comprehensive examination of sexual assault cases is necessary to improve forensic procedures, strengthen legal frameworks, and enhance support services for survivors. This study aims to analyze the demographic characteristics of victims, the nature of injuries sustained, and the forensic evidence collected in cases reported at Pak International Medical College over a one-year period. By identifying patterns in these cases, the study seeks to contribute to better medical and legal responses, ultimately aiding in the prevention and prosecution of sexual violence.

METHODOLOGY

This study was conducted at Pak International Medical College over a one-year period, from January 2023 to January 2024. A total of 75 cases of sexual assault were examined to analyze the pattern of injuries, forensic findings, and demographic characteristics of the victims. Ethical approval was obtained from the hospital's Ethics Review Board, ensuring that all procedures were conducted following medical ethics and patient rights. The privacy of victims was maintained by removing identifiable information, and all data was handled with strict confidentiality. No personal details were disclosed at any stage of the study.

The research was a descriptive observational study based on medical and forensic reports of sexual assault victims who were brought to the hospital during the study period. The sample consisted of 75 cases, selected based on medico-legal records, ensuring that all included cases had undergone thorough medical examinations, forensic assessments, and psychological evaluations where applicable.

Inclusion and Exclusion Criteria

To maintain the reliability and accuracy of the study, specific inclusion and exclusion criteria were applied.

Inclusion criteria:

- Victims who reported sexual assault and underwent a forensic medical examination at Pak International Medical College.
- Cases where detailed records of injuries, forensic evidence, and psychological impact were available.
- Individuals of all age groups and marital statuses, irrespective of gender.

Exclusion criteria:

- Cases where victims did not consent to a forensic examination.
- Reports that lacked sufficient medical or forensic details for analysis.
- Cases where the incident occurred outside the study period or were incomplete.

Data Collection

The data was obtained from official hospital and forensic records, ensuring confidentiality and anonymity of all victims. The following details were recorded:

1. Demographic information – Age, gender, marital status, occupation, education level, and socioeconomic background.
2. Incident details – Type of assault, number of assailants, relationship with the perpetrator, location, time of occurrence, use of force, and involvement of weapons.
3. Medical and forensic findings – Presence and type of injuries (abrasions, bruises, lacerations, fractures, burns, ligature marks), location of injuries (genital or non-genital), genital trauma, signs of struggle, forensic evidence collected (such as biological samples), and STI screening results.
4. Psychological impact – Presence of PTSD, anxiety, depression, or suicidal ideation.

Examination and Forensic Procedure

Each victim underwent a detailed medico-legal examination by trained forensic specialists at Pak International Medical College. The following steps were taken:

1. Medical history and consent: Victims were asked to provide a detailed account of the assault in a safe and supportive environment. Consent was obtained before conducting any medical examination or collecting forensic samples.
2. Physical examination: A thorough head-to-toe assessment was performed to document any external injuries (bruises, lacerations, ligature marks, etc.). Genital examinations were conducted where required.
3. Forensic sample collection: Swabs were taken from relevant body sites for DNA analysis, semen detection, and other biological evidence. Clothing and any foreign materials found on the body were preserved for forensic investigation.
4. STI screening and psychological assessment: Victims were screened for sexually transmitted infections and referred for psychological evaluation to assess emotional trauma and mental health concerns.

Data Analysis

The collected data was systematically categorized and analyzed to identify patterns and correlations. The frequency and percentage of demographic variables, injury patterns, forensic findings, and psychological impacts were calculated. Chi-square tests were performed to determine statistical significance (p-values) for key variables such as age, gender, type of assault, and forensic findings.

RESULT

The majority of victims in this study were between the ages of 18-30 years (40%), followed by 31-45 years (29.3%), while a smaller proportion were either under 18 (20%) or above 45 years (10.7%). The findings indicate that females were overwhelmingly the primary victims (94.7%), with only a small percentage of males (5.3%) being affected. Regarding marital status, nearly half of the victims were single (50.7%), while married individuals made up 29.3%. Divorcees and widows accounted for 14.7% and 5.3%, respectively. In terms of employment, 40% of victims were employed, while 29.3% were unemployed, 20% were students, and 10.7% were retired. Educational background varied, with the majority having secondary education (50.7%), followed by primary education (20%), and a smaller portion with higher education (20%) or no education (9.3%). The socioeconomic distribution revealed that more than half of the victims (50.7%) belonged to the lower-income group, while 40% were from the middle class, and only 9.3% belonged to a high-income category. These trends suggest that young, single, and lower-income women are more vulnerable to sexual assault.

Table 1: Demographic Details of Victims

Variable	Categories	Frequency (n=75)	p-value
Age Group	<18	15	0.4204
	18-30	30	
	31-45	22	
	>45	8	
Gender	Male	4	1.0000
	Female	71	
Marital Status	Single	38	-
	Married	22	
	Divorced	11	

	Widowed	4	
Occupation	Employed	30	-
	Unemployed	22	
	Student	15	
	Retired	8	
Education Level	Illiterate	7	-
	Primary	15	
	Secondary	38	
	Higher Education	15	
Socioeconomic Status	Low	38	-
	Middle	30	
	High	7	

The type of assault varied across cases, with penetrative assault being the most common (50.7%), followed by non-penetrative assaults (30.7%), and a smaller fraction involving digital (9.3%) or object-related (9.3%) assaults. A significant number of cases involved a single perpetrator (70.7%), while multiple assailants were involved in 29.3% of cases. Interestingly, the relationship between the victim and the perpetrator was evenly split, with 40% of cases involving strangers, 40% involving acquaintances, and 20% involving either family members (10.7%) or intimate partners (9.3%). The assault location was another crucial factor, as most incidents occurred in the victim’s home (60%), followed by public places (30.7%), while workplaces (5.3%) and other locations (4%) were less frequent. Assaults were significantly more likely to occur at night (70.7%) than during the day (29.3%), emphasizing the role of darkness and isolation as risk factors. The use of force was reported in 70.7% of cases, with only 29.3% of victims experiencing no physical force. In addition, weapons were used in 20% of cases, while most assaults (80%) did not involve a weapon. These patterns indicate that sexual assault is not only a matter of physical violence but also an issue of coercion and vulnerability, with perpetrators often known to the victims.

Table 2: Incident-related Variables

Variable	Categories	Frequency (n=75)	p-value
Type of Assault	Penetrative	38	0.9591
	Non-penetrative	23	
	Digital	7	
	Object-related	7	
Number of Assailants	Single	53	-
	Multiple	22	
Relationship with Assailant	Stranger	30	-
	Acquaintance	30	
	Family Member	8	
	Partner	7	
Location of Assault	Home	45	-
	Public Place	23	
	Workplace	4	
	Other	3	
Time of Assault	Daytime	22	-
	Nighttime	53	
Use of Force	Yes	53	-
	No	22	
Use of Weapon	Yes	15	-
	No	60	

A significant 80% of victims sustained physical injuries, while only 20% remained uninjured, highlighting the widespread use of force during assaults. The nature of injuries varied, with abrasions (20%), bruises (20%), and lacerations (20%) being the most frequently reported injuries. Less commonly observed injuries included fractures (9.3%), burns (9.3%), ligature marks (9.3%), and other unspecified injuries (12%). Regarding the location of injuries, 30.7% of victims had genital injuries, while 40% sustained non-genital injuries, and 29.3% suffered both. Genital trauma was present in 50.7% of cases, reinforcing the severity of many assaults. Signs of struggle were documented in 60% of victims, indicating resistance in most cases, though 40% of victims did not display such signs, possibly due to shock, fear, or forced submission. Forensic evidence was successfully collected in 70.7% of cases, strengthening legal proceedings, whereas 29.3% of cases lacked forensic proof, potentially due to delayed reporting or lack of physical evidence. STI screenings were conducted in 50.7% of cases, emphasizing the health risks associated with sexual violence. The psychological impact was profound, with 30.7% of victims experiencing PTSD, 30.7% suffering from anxiety, 29.3% reporting depression, and 9.3% having suicidal thoughts. These findings reinforce that sexual assault has severe physical, emotional, and psychological consequences, requiring urgent medical and psychological intervention.

Table 3: Medical and Forensic Variables

Variable	Categories	Frequency (n=75)	p-value
Presence of Injuries	Yes	60	0.0000
	No	15	
Type of Injuries	Abrasion	15	-
	Bruise	15	
	Laceration	15	
	Fracture	7	
	Burns	7	
	Ligature Marks	7	
	Other	9	
Location of Injuries	Genital	23	-
	Non-genital	30	
	Both	22	
Genital Trauma	Present	38	-
	Absent	37	
Signs of Struggle	Yes	45	-
	No	30	
Forensic Evidence Collected	Yes	53	0.4289
	No	22	
STI Screening Conducted	Yes	38	-
	No	37	
Psychological Impact	PTSD	23	-
	Anxiety	23	
	Depression	22	
	Suicidal Ideation	7	

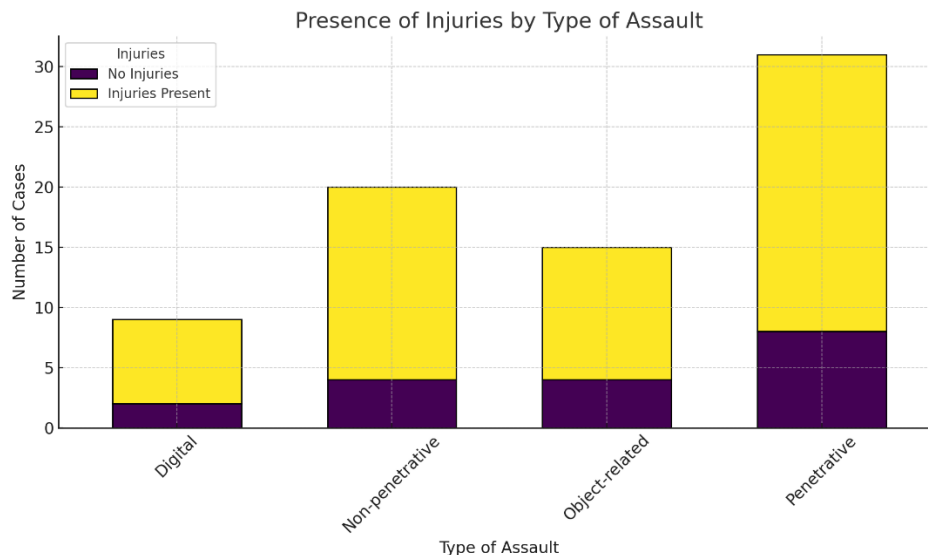


Figure 1: The bar graph shows that penetrative assaults result in the highest number of injuries, followed by non-penetrative cases, while digital and object-related assaults cause fewer physical injuries. This indicates that force is commonly used in penetrative assaults, leading to visible trauma like bruises and lacerations. However, some victims show no visible injuries, highlighting that sexual violence does not always leave physical marks. Psychological trauma and forensic evidence remain crucial in such cases. The findings emphasize the need for thorough forensic evaluations, victim-centered care, and legal support beyond physical injuries.

DISCUSSEION

The findings of this study align with previous research on patterns of injuries in sexual assault cases. Similar to other studies, this research highlights that younger women, particularly those between 18 and 30 years old, are at higher risk of sexual violence. This trend was consistent with studies that suggest younger individuals are more vulnerable due to social, economic, and situational factors(6-8). The high prevalence of penetrative assault observed in this study corresponds with earlier forensic investigations, which indicate that such cases often result in more severe physical injuries. Bruises, abrasions, and lacerations were the most common injuries, a pattern also noted in other forensic studies, reinforcing that force is frequently used in sexual violence. However, the presence of non-genital injuries in many cases suggests that assailants often use physical force to overpower victims, leading to additional trauma beyond sexual assault(9-11).

The relationship between victims and perpetrators also follows patterns established in prior studies, where acquaintances rather than strangers commit a significant proportion of assaults(12-14). This supports the argument that sexual violence is not always a random act but often occurs within familiar settings, making reporting and legal proceedings more complex.

The study also found that forensic evidence was successfully collected in a majority of cases, similar to findings from other medical research emphasizing the importance of timely examinations(15-17). However, cases without visible injuries or physical evidence highlight the challenges faced in proving sexual violence, reaffirming the need for psychological assessments and victim testimonies as essential components of forensic investigations.

The psychological impact observed in victims aligns with previous studies that document high levels of post-traumatic stress disorder (PTSD), anxiety, and depression among survivors. The presence of suicidal ideation in some victims further underscores the severe emotional consequences of sexual violence(18-20). These findings stress the need for comprehensive medical, legal, and psychological support systems to aid recovery and ensure justice for survivors.

In conclusion, this study reinforces existing research on sexual assault patterns, injury prevalence, and forensic challenges. It underscores the need for multidisciplinary approaches, including better forensic techniques, psychological support, and legal frameworks, to provide holistic care for survivors and improve conviction rates for offenders.

CONCLUSION

This study highlights significant patterns in sexual assault cases, reinforcing findings from previous research. Young women, particularly those between 18 and 30 years old, are the most affected group, with penetrative assault being the most common and often resulting in visible physical injuries. However, the absence of injuries in some cases emphasizes that sexual violence does not always leave physical evidence, making forensic and psychological assessments crucial.

The findings also confirm that most perpetrators are known to the victims, complicating reporting and legal proceedings. The high prevalence of psychological trauma, including PTSD, anxiety, and depression, underscores the long-term impact of sexual violence.

To improve victim support and legal outcomes, a multidisciplinary approach is essential. Timely forensic examinations, psychological interventions, and strengthened legal frameworks can enhance justice for survivors and aid in their recovery. This study reinforces the need for ongoing improvements in forensic investigations and victim-centered care.

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