

ORIGINAL ARTICLE

Open Access



# Medicolegal assessment of reported female sexual assaults in the Kingdom of Bahrain: record-based descriptive study

Fatema Abdul-Rahman Alfadhel<sup>1</sup>, Mohammed Nour El-Din Fouda<sup>1</sup> and Mona Mohamed Awny<sup>2\*</sup>

## Abstract

**Background** Sexual assault is an important social issue that influences women's lives. Despite a significant increase in 2018, there is no reliable information available in the Kingdom of Bahrain about female sexual assaults. The aim of this study is to investigate the pattern of reported sexual assaults among living female victims in the Kingdom of Bahrain. All medicolegal reports of sexual assaults in living female victims from 2016 to 2020 were included. Reported cases were studied for sociodemographic data of victims, assailant data, assault circumstances, and medicolegal findings and procedures.

**Results** The prevalence of female sexual assault allegations was 7%. During the studied period, there were 272 cases of sexual assault overall. Most cases were in the age group 18–30 years (41.2%). In 58.1% of assaults, the assailant was the boyfriend or partner of the victim. The medicolegal examination took place within 2 days after assault in only 32%. Forensic examination of sexual assault victims revealed extragenital injuries in only 30.9% of cases. Sexual assaults involving mixed penetration occurred in 66.9% of victims, followed by vaginal penetration (30.1%), then anal penetration (2.9%). The final medicolegal opinion confirmed positive assault in 38.6% of allegations and negative assault in 32.4% of allegations, while allegations that have no firm medicolegal conclusion were 29%.

**Conclusions** Despite the efforts made in Bahrain, there is an underestimated problem of sexual violence against females which needs a robust multilevel strategy including the roles of education, law, and non-governmental institutions.

**Keywords** Rape, Sodomy, Forensic examination, Injury, Assailant, Female victim

## Background

Sexual violence is a serious public health issue that has a range of legal, medical, physical, psychological, and social implications. For millions of victims worldwide, mostly women, it is a painful and terrible reality (Brahim et al. 2022). Any physical act of sexual conduct that is carried

out without the victim's consent is referred to as sexual assault. Rape, attempted rape, oral and anal penetration, unwanted touching, and child molestation fall under this category. It also includes other forms of torture against the victim (Wishart 2003). It comprises a significant breach of human rights with serious repercussions for the victim's physical and mental health (Zerbo et al. 2018).

Regional differences exist in the prevalence of sexual violence against women. Data accuracy is influenced by non-reporting, and available statistics are derived from various populations using various indicators of sexual violence. Depending on several factors, demographic characteristics may change throughout cultures and

\*Correspondence:

Mona Mohamed Awny  
mona\_awnym@med.suez.edu.eg

<sup>1</sup> Directorate of Forensic Science Evidence, Public Prosecution, Manama, Kingdom of Bahrain

<sup>2</sup> Department of Forensic Medicine and Clinical Toxicology, Faculty of Medicine, Suez Canal University, Ismailia, Egypt



© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

between distinct areas of the same nation (El-Elemi et al. 2011).

The World Health Organization (WHO) reports that 6% of women worldwide claim to have experienced sexual violence from a person other than their husband or partner. However, with the stigma associated with this specific kind of violence, the actual rate of non-partner sexual assault is probably far greater. Additionally, 15 million adolescent females, between the ages of 15 and 19, globally have engaged in forced sex (WHO 2021; UN Women 2022). Even though there are several studies documenting the frequency of sexual violence against women around the world, Arab-Muslim countries in particular and developing nations as a whole notably lack such reports (Haj-Yahia 2000; Ben Khelil et al. 2019).

Considering its terrible implications, violence against women in Arab nations has received little attention recently (Ben Khelil et al. 2019). For example, Morocco performed a nationwide study on the problem of violence against women in 2019 and revealed that, of the 13.4 million women surveyed (aged between 15 and 74), 57% had experienced at least a single incident of violence. According to the same survey, sexual assault increased from 9 to 14% between 2009 and 2019, respectively (Gauthier 2019). In Algeria, 6985 incidences of violence against women were reported during the first nine months of 2018, per information published by the security services (Hamitouche 2020). In Saudi Arabia, where the designated authorities were operating independently, there were no detailed and accurate statistics available on the prevalence of domestic violence against women, although the Ministry of Social Development claims that it is about 50% (Kazzaz et al. 2019).

According to a study on the reality of domestic violence against women in the Kingdom of Bahrain, the results of the assaulted women's questionnaire revealed that 19% of the respondents had experienced sexual violence, which is typically committed through sexual coercion with a rate of 72%, followed by harassment by 35%, physical abuse during sexual relations by 33%, then rape by 19%, and finally desertion and failing to grant sexual rights by 9% (Tafawuq 2020).

Sexual assaults are frequently underreported, particularly in Arab nations, which can be explained by a variety of sociocultural variables, including disgrace, thoughts of male dominance established in traditional society, and the incorrect application of religious regulations (Nossier 2015; Elghossain et al. 2019). This underreporting makes determining the real incidence complex and challenging work, especially with late consultations and medical assessments, disappearing evidence of sexual assault, and a low conviction rate (Arif et al. 2016).

The forensic examiner has an essential function in evaluating women who have made allegations of sexual assault (Sobh et al. 2020). Examining suspected sexual assault cases, however, is one of the most difficult jobs in forensic medicine. The medical examiner's duties are very difficult due to the severe punishments imposed for these crimes, the ensuing psychological, societal, and familial repercussions, the risk of allowing true crimes to go unpunished, as well as the unfairness of incorrect conviction (El-Elemi et al. 2011). Due to the lack of published studies and national statistics, the problem of female sexual assault in the Kingdom of Bahrain is still underestimated, which motivated us to concentrate on evaluating the cases that were referred to the legal authorities and identifying the prevalence, pattern, and outcome related to this assault.

## Methods

The current study included an analysis of all the allegations of sexual assault from the living female cases that were referred to the Directorate of Forensic Science Evidence of the Public Prosecution in the Kingdom of Bahrain for medicolegal examination from January 2016 to December 2020.

The protocol of medicolegal examination of victims followed the recommended guidelines for medicolegal care for victims of sexual violence reported by the World Health Organization (Organization 2003). The medicolegal examination starts after the referral of the victims from public prosecution with a prosecution memorandum. Informed consent was obtained from the adult victims or the guardians in the case of minor victims for examination and injury documentation by photographs, then the victims were interviewed and examined by the forensic doctor with total privacy in the presence of a trained female nurse, and for a minor victim, attendance of the mother was allowed. A general top-to-toe inspection of the victim's body for injuries was done to reveal any use of violence against her. The vaginal examination was performed in the lithotomy position with inspection of the labia major, labia minor, hymen, and wall of the vaginal canal for any injuries or signs of hymen defloration. The anus was examined with the victim in the knee-chest position for external injuries, anal sphincter tone, reflexes, anal dilatation, and mucosal corrugations. Swabs for the detection of semen are taken according to Faculty of Forensic and Legal Medicine guidelines (Stark 2023). Victims who were suspected of being pregnant were referred to the obstetrics and gynecology department in Salmaniya Medical Complex for further investigations (pregnancy test and ultrasound). Finally, after examination, retrieval of forensic laboratory results, and pregnancy investigation findings, the forensic examiner

finalizes the report with his/her final medicolegal opinion of allegation and diagnosis of the case and send his/her report to the prosecution for a legal decision.

For this study, the information was collected from the archived medicolegal files in a pre-organized data sheet including sociodemographic characteristics of victims (age, marital status, residence, disability, nationality), assailant data and circumstances of assault (number and gender of assailants, relationship with victim, place of assault), medicolegal procedures, and evidence (timing of medicolegal assessment following the assault, extragenital injuries: type and anatomical location, type of sexual assault, genital injuries, forensic evidence collection and results, and final medicolegal opinion).

### Statistical analysis

Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 26 of IBM Corporation, Chicago, USA. Descriptive statistics were used for summarizing

data. Qualitative data were represented as frequencies ( $n$ ) and percentages (%). The significant association between two qualitative variables was calculated using a chi-squared test. For statistical significance, a  $p$ -value of less than 0.05 was considered.

### Results

After the exclusion of four victims who refused the medicolegal examination, the total number of sexual assault cases was 272 representing 7% of all living instances reported over the 5 years by the Directorate of Forensic Science Evidence of the Public Prosecution in the Kingdom of Bahrain. The year 2018 recorded the highest number of cases (65 cases), while the lowest number of cases (43 cases) occurred in 2020 (Table 1).

Table 2 shows the sociodemographic characteristics of sexually assaulted females. More than half of the victims were adults (53.3%), mostly in the age group 18–30 years (41.2%). Minor victims represented 46.7%, mostly in the age group 12 years to less than 18 years (36%). Most examined females (81.25%) were unmarried, and only 0.7% of victims had a mental disability.

Regarding the assailant, most victims (94.5%) were sexually assaulted by one assailant. In more than half of the assaults (58.1%), the assailant was the boyfriend or partner of the victim, while the assaults that occurred within a family relationship represented 9.6% of cases (Table 3).

Medicolegal examination in about one-third of cases (32%) took place within 2 days after the assault (Fig. 1). Forensic examination of sexual assault victims revealed that nearly one-third of them (30.9%) have extragenital injuries (Fig. 2a). Bruises and abrasions were the two most frequent types of injuries, accounting for 24.6% and

**Table 1LE: Please check if the tables are presented**

**correctly.** Prevalence of female sexual assault in the Kingdom of Bahrain from 2016 to 2020

Year	Total number of living examined cases	Female sexual assault cases $n$ (%)
2016	763	64 (8.4%)
2017	1195	50 (4.2%)
2018	904	65 (7.2%)
2019	660	50 (7.6%)
2020	359	43 (11.9%)
Total	3881	272 (7%)

**Table 2** Sociodemographic characteristics of sexually assaulted victims ( $n=272$ )

Variable		Frequency	Percent (%)	
Age category	Minor	< 12 years	29	10.7
		12–< 18 years	98	36.0
	Adult	18–30 years	112	41.2
		> 30 years	33	12.1
Marital status	Unmarried	221	81.25	
	Married	51	18.75	
Residence	Capital	93	34.2	
	Northern governorate	72	26.5	
	Southern governorate	77	28.3	
	Muharraq	30	11.0	
Victim disability	No disability	270	99.3	
	Mental disability	2	0.7	
Nationality	Bahraini	178	65.4	
	Arab	15	5.5	
	Non-Arab	79	29.0	

**Table 3** Characteristics of assailants and circumstances of alleged sexual assault (n = 272)

Variable		Frequency	Percent (%)
<b>Number of assailants</b>	One	257	94.5
	Two	10	3.7
	More than two	5	1.8
<b>Gender of assailant</b>	Masculine	265	97.4
	Feminine	7	2.6
<b>Place of alleged assault</b>	Victim's house	42	15.4
	Assailant's house	37	13.6
	Others	193	71.0
<b>Relationship between victim and assailant</b>	Family	26	9.6
	Boyfriend/partner	158	58.1
	Acquaintance	48	17.6
	Stranger	40	14.7

11.4% of all injuries, respectively, mainly located in both the upper limb (15.8%) and the lower limb (14%) (Fig. 2b).

Sexual assaults involving mixed penetration occurred in 66.9% of the victims, followed by vaginal penetration in 30.1% of the victims, then anal penetration in 2.9% of victims (Fig. 3). Old and recent hymen tears were found in 45.6% and 6.6% of females, respectively. Old and recent anal injuries were found in 12.1% and 5.9% of females, respectively. Positive vaginal and anal swab results for semen detection were related to 26.8% of cases. Victims who became pregnant after the assault were 17 representing 6.3% and 2 of them had abortions before the medicolegal examination (Table 4).

The final medicolegal opinion confirmed positive assault in 38.6% of allegations and negative assault in 32.4% of allegations, while allegations that have no firm

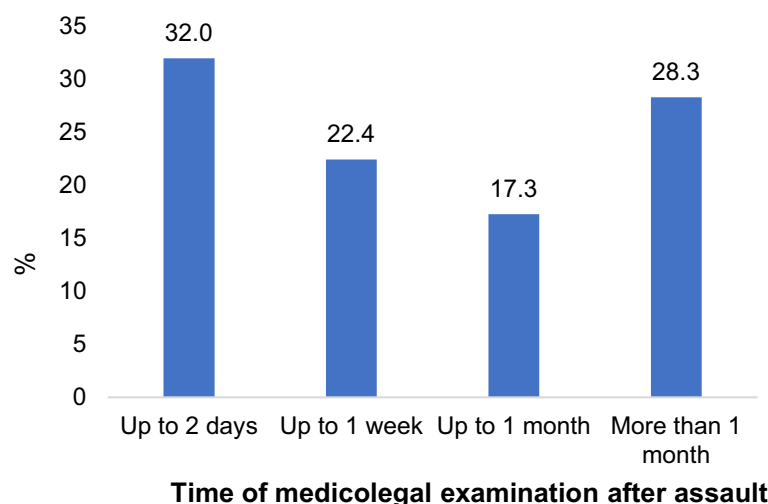
medicolegal conclusion to confirm the allegation represented 29% (Fig. 4).

Table 5 illustrates the association of the age category of female victims with other medicolegal variables. There was a significant association between the age of the victim and the relation between victim and assailant, time of medicolegal examination, presence of extragenital injuries, hymen condition, and swab results. Most of the victims who had a family relationship with their assailants were minors (84.6%). More than half of the victims to whom the assailant was a boyfriend/partner were adults (52.5%). Most cases who reported the assault early and had a medicolegal examination within the first 48 h were adult females (64.4%). Most victims presented with extragenital injuries were adults as well (63.1%). More than half of the females who had recent hymen tears were minors (55.6%). Most of the victims who had positive swab results for semen detection were adult females (67.1%).

Table 6 shows the significant association of the time of the medicolegal examination with both the pregnancy test results and the final medicolegal opinion regarding the assault. Most positive pregnancy tests (94.1%) belonged to victims who were medicolegally examined after more than 1 month of the assault. Most confirmed positive assaults (62.9%) were related to cases examined during the first 48 h after the assault, while the highest rate of negative assaults (40.9%) was related to cases examined after 1 month of the assault.

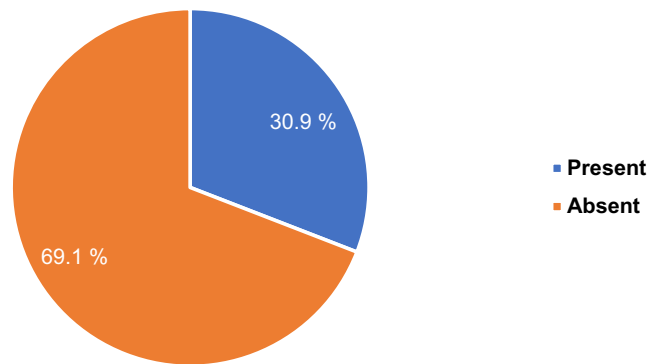
### Discussion

Sexual assault is the most underreported crime, affecting one in three women worldwide. Women and children are the two most at-risk demographics in this crime (Sharaf

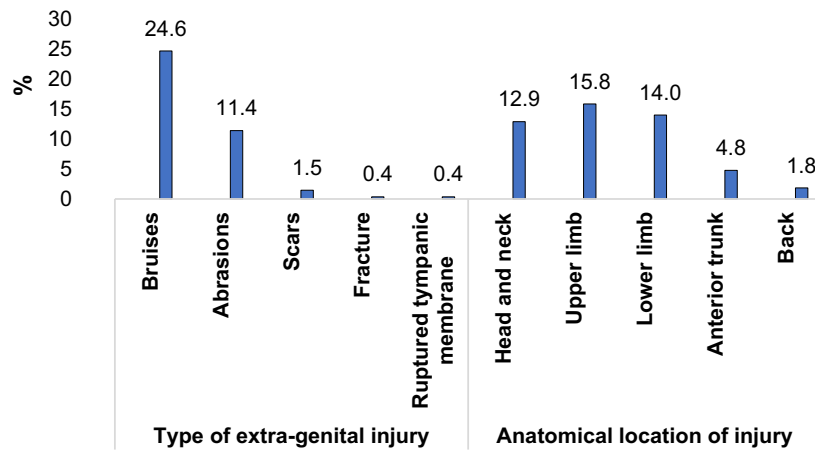


**Fig. 1** Bar chart showing the time of the medicolegal examination of the victims after the assault (n = 272)

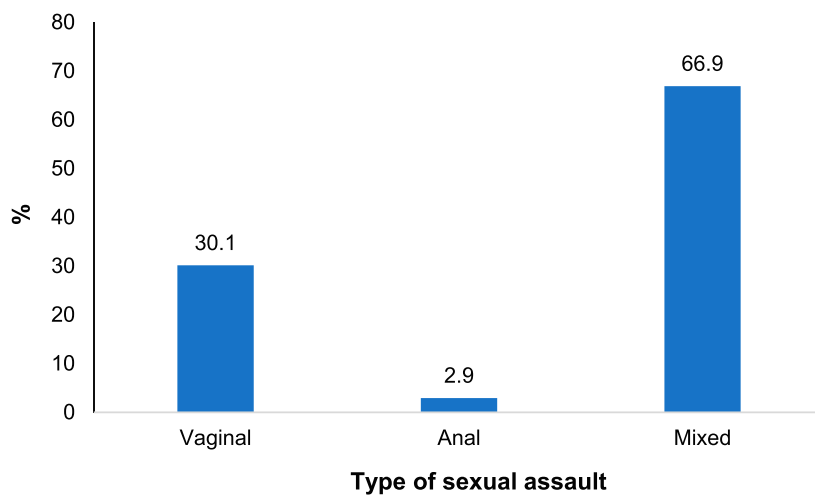
a) Presence or absence of extra-genital injuries



b) Types and anatomical locations of extra-genital injuries



**Fig. 2** a Pie chart of the presence or the absence of extragenital injuries. b Bar chart showing types and anatomical locations of extragenital injuries in sexual assault victims (n = 272)



**Fig. 3** Bar chart showing the type of sexual assault allegation (n = 272)

**Table 4** Forensic local examination and evidence findings ( $n = 272$ )

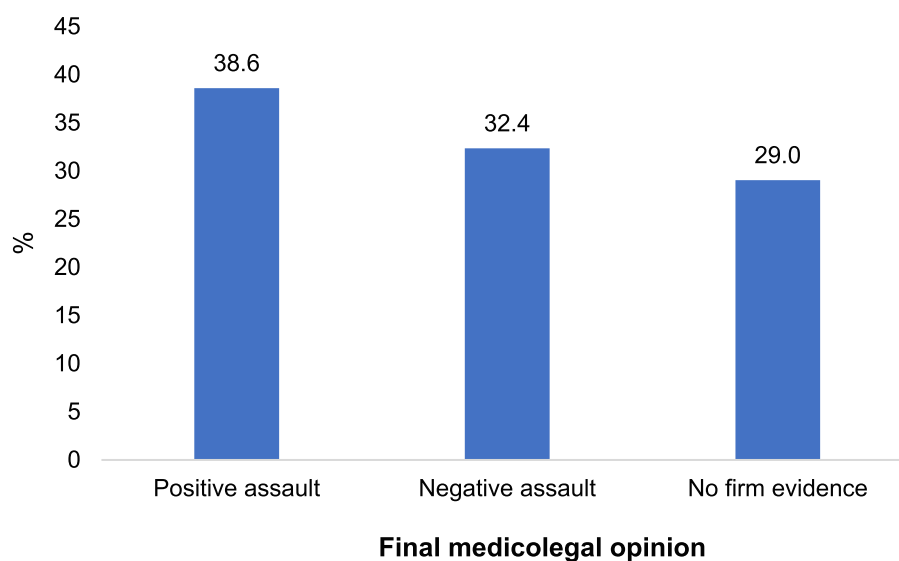
Variable		Frequency	Percent (%)
<b>Hymen condition</b>	Intact hymen	130	47.8
	Old hymen tear	124	45.6
	Recent hymen tear	18	6.6
<b>Anal injury</b>	No injury	223	82.0
	Old injury	33	12.1
	Recent injury	16	5.9
<b>Swab results</b>	Positive	73	26.8
	Negative	58	21.3
	Not collected	141	51.8
<b>Pregnancy test results</b>	Negative	255	93.8
	Positive	17	6.3

El-Din et al. 2015). The dramatic increase in sexual assault rates around the world is a serious health issue (Walch and Broadhead 1992). Violence against women violates Bahrainis' cultural and religious norms. Any sexual relations outside of marriage are prohibited by law and religion in Bahrain (Tafawuq 2020).

Many studies worldwide investigated sexual violence from different prospects. This study is the first one conducted in Bahrain focusing on the medicolegal profile of female sexual assault. The prevalence, the pattern, and the outcome of sexual assault against females were the focus of the current study. The objective of this study was to describe the pattern of all allegations of female sexual assault that were reported to the Directorate of Forensic Science Evidence of the Public Prosecution in the

Kingdom of Bahrain over 5 years, from January 2016 to December 2020.

This study revealed that the prevalence of female sexual assault allegations was 7% (272 cases) of the total medicolegally examined living cases during the 5-year duration. Considering previous published studies, a survey of 150 abuse victims in Bahrain revealed that 87 of them had been sexually abused (Al-Mahroos et al. 2005). A survey of 188 cases, however, revealed 28 instances of sexual abuse in Riyadh Medical City (Al Eissa and Almuneef 2010). Several studies in Egypt showed variable rates of female sexual assault. Five-year duration studies conducted in Dakahlia governorate, Qaluybia governorate, and Suez Canal area reported 650 cases, 145 cases, and 40 cases, respectively (Maklad et al. 2006; Abo El Wafa and Mohammed Ali 2020; El-Ellemi et al. 2011). Another 4-year duration study conducted in Gharbia governorate reported 174 cases of female sexual assault (Sherif et al. 2018). In Tunisia, 216 cases over 8-year duration study were reported (Brahim et al. 2022). Sexual assault is observed at a comparatively high prevalence, according to data from high-income countries (Dartnall and Jewkes 2013). In comparison to one in 71 males, one in five women (18.3%) reported experiencing sexual assault in their lifetimes, according to the National Intimate Partner and Sexual Violence Survey (NISVS) conducted in the USA (Black et al. 2011). According to research conducted in South Africa, higher rates were reported, as the prevalence of sexual assault among women ranged from 12 to 28%. Researchers examined the factors that may contribute to variations in annual incidences and variations in the characteristics of victims and assaults, and

**Fig. 4** Bar chart showing the final medicolegal opinion of sexual assault allegations ( $n = 272$ )

**Table 5** Association of the age category of female victims with other medicolegal variables ( $n=272$ )

Variable	Age category			<sup>#</sup> P-value	
	Minor	Adult	Total		
<b>Relationship between victim and assailant</b>	Family	22 (84.6%)	4 (15.4%)	26 (100%)	0.000*
	Boyfriend/partner	75 (47.5%)	83 (52.5%)	158 (100%)	
	Acquaintance	21 (43.8%)	27 (56.3%)	48 (100%)	
	Stranger	9 (22.5%)	31 (77.5%)	40 (100%)	
<b>Time of medicolegal examination</b>	Up to 2 days	31 (35.6%)	56 (64.4%)	87 (100%)	0.036*
	Up to 1 week	29 (47.5%)	32 (52.5%)	61 (100%)	
	Up to 1 month	22 (46.8%)	25 (53.2%)	47 (100%)	
	More than 1 month	45 (58.4%)	32 (41.6%)	77 (100%)	
<b>Extragenital injuries</b>	Present	31 (36.9%)	53 (63.1%)	84 (100%)	0.031*
	Absent	96 (51.1%)	92 (48.9%)	188 (100%)	
<b>Type of sexual assault</b>	Vaginal	32 (39%)	50 (61%)	82 (100%)	0.192
	Anal	3 (37.5%)	5 (62.5%)	8 (100%)	
	Mixed	92 (50.5%)	90 (49.5%)	182 (100%)	
<b>Hymen condition</b>	Intact hymen	94 (72.3%)	36 (27.7%)	130 (100%)	0.000*
	Old hymen tear	23 (18.5%)	101 (81.5%)	124 (100%)	
	Recent hymen tear	10 (55.6%)	8 (44.4%)	18 (100%)	
<b>Anal injury</b>	No injury	103 (46.2%)	120 (53.8%)	223 (100%)	0.060
	Old injury	20 (60.6%)	13 (39.4%)	33 (100%)	
	Recent injury	4 (25%)	12 (75%)	16 (100%)	
<b>Swab results</b>	Positive	24 (32.9%)	49 (67.1%)	73 (100%)	0.004*
	Negative	24 (41.4%)	34 (58.6%)	58 (100%)	
	Not collected	79 (56%)	62 (44%)	141 (100%)	

\* Significance at  $p < 0.05$ <sup>#</sup> Chi-square test**Table 6** Association of the time of medicolegal examination with pregnancy test results and final medicolegal opinion ( $n=272$ )

Variable	Time of medicolegal examination					<sup>#</sup> P-value	
	Up to 2 days	Up to 1 week	Up to 1 month	More than 1 month	Total		
<b>Pregnancy test results</b>	<b>Negative</b>	87 (34.1%)	60 (23.5%)	47 (18.4%)	61 (23.9%)	255 (100%)	0.000*
	<b>Positive</b>	0 (0.0%)	1 (5.9%)	0 (0.0%)	16 (94.1%)	17 (100%)	
<b>Final medicolegal opinion</b>	<b>Positive assault</b>	66 (62.9%)	15 (14.3%)	4 (3.8%)	20 (19%)	105 (100%)	0.000*
	<b>Negative assault</b>	11 (12.5%)	22 (25%)	19 (21.6%)	36 (40.9%)	88 (100%)	
	<b>No firm evidence</b>	10 (12.7%)	24 (30.4%)	24 (30.4%)	21 (26.6%)	79 (100%)	

\* Significance at  $p < 0.05$ <sup>#</sup> Chi-square analysis

they discovered that these factors may include how sexual violence is assessed, the definitions used, the stigma attached to the act, and the degree to which disclosure of abuse (Dartnall and Jewkes 2013).

In this study, adults made up the highest percentage of victims (53.3%), mostly between the ages of 18 and 30 (41.2%). These findings were in line with those of El-Emeli et al. (2011), who discovered that 65% of female victims were in the 18–28 age category. Additionally,

Sudupe Moreno (2013) reported that most victims were 18 or older representing 53.6%. It was reported that the age group of 18–30 years is the main target group of victims of natural sexual offenses (Sukul et al. 2009). On the other hand, minor females showed generally a lower percentage (46.7%) mainly those younger than 12 years representing only 10.7% of sexual assault victims. This finding reflects that young children being under the attention and protection of their parents could decrease

the chances of being vulnerable to sexual assault. However, adolescents aged 12 to 18 years presented the second highest age group exposed to sexual assault; this finding may be due to teenagers' physical attraction to perpetrators, their lack of experience, and immaturity, as well as their guardians' lack of concern for them during these teen years, which encourages them to engage in boyfriend relationships (Sobh et al. 2020). In contrast, previous studies conducted in Indonesia and Taipei showed much higher female minor victims at 82% and 64%, respectively (Hwa et al. 2010; Afandi 2018), and others showed higher adolescent victims specifically (Sharaf El-Din et al. 2015; Arif et al. 2016; Sobh et al. 2020). Taking into consideration the different numbers and composition of samples used in these studies could justify why our results are not entirely comparable with them.

In the current study, single, unmarried women reported sexual assaults at higher rates (81.25%). Similar findings were reported by other studies (Sobh et al. 2020; Abo El Wafa and Mohammed Ali 2020; Al-Galad et al. 2022). This outcome might be attributed to married women's awareness and understanding of any sexual conduct, which caused them to be cautious (Sherif et al. 2018). Moreover, several factors relevant to the victims' beliefs and culture will result in disturbing societal stigma, which will have an impact on their psycho-social status (El-Elemi et al. 2011).

In this study, however, two victims reported sexual assault by the husband; this brings up a significant issue about sexual violence, namely sexual violence in marriage (marital rape). Marital rape is a criminal offense in many countries and a crime under international law; however, 127 countries fail to criminalize marital rape (Truman 2011). Marriage in Islam is based on kindness and equity, compassion and love, sympathy and consideration, patience, and goodwill, and in most Islamic countries, it is impossible to define rape in the context of marriage even if it occurs since there is a religious and cultural presumption that marriages are peaceful because husbands and wives always agree. Accordingly, marital rape is not defined in Bahrain's penal law (Bahrain Women Union 2017; Ahmad 2018; Afandi 2018). In light of international changes and the effects of globalization, Bahrain has taken serious steps in drafting laws for women's protection in all fields, especially domestic violence. Officially, the efforts of the Supreme Council for Women to set a national strategy to protect women from domestic violence bore fruit with the issuance of Law No. 17 for the year 2015 regarding the protection of women from domestic violence but it included some shortcomings, such as not including the criminalization of marital rape, which the Council seeks to change (Bahrain Women Union 2017). Furthermore, regarding

the Kingdom of Bahrain's efforts to support women victims of domestic violence, it provides protection, care, and shelter to these women and their companions for a duration of 1 week to 3 months. Based on the specifics of each case, the authorities are consulted regarding medical, social, psychological, and legal services, both during and after the shelter period (Information & eGovernment Authority 2023a). From another perspective, and in one of the most important steps to support rape victims, the Kingdom of Bahrain had approved Law No. 7 of 2023, which repeals Article 353 of Decree-Law No. 15 of 1967 on the Penal Code. The repealed article 353 exempted the perpetrator of rape or sexual assault (including one who used his authority to commit the crime) from penalty if he marries the victim (Sadek 2023).

In this study, only two victims (0.7%) had a mental disability. These findings were in line with two studies from Egypt that reported mental illnesses in a small number of victims (Sharaf El-Din et al. 2015; Abo El Wafa and Mohammed Ali 2020). However, other studies report that the mental disability of victims increases the risk for sexual abuse (Martin et al. 2006; Brownlie et al. 2007).

Consistent with the literature (Sudupe Moreno 2013; Sobh et al. 2020; Brahim et al. 2022), the present study showed that only one assailant assaulted the victim in most cases (94.5%), adding that, in most instances, the assailant was someone the victim knew (85.3%). This high rate of known offenders can be explained by the fact that the assailant is frequently a close acquaintance who resides in the same residence or surroundings and who sometimes exerts legal authority. According to this research, in more than half of the allegations (58.1%), the assailant was a boyfriend or a partner. According to estimates of intimate partner violence (IPV) data collected from 81 countries, the lifetime prevalence of physical and/or sexual IPV for women of reproductive age (15–49 years) who have never been married or in a committed relationship is 27% (WHO 2021). Partner sexual violence figures could be higher than 50% in some populations (Barker et al. 2019). This was confirmed in a survey study conducted among 810 Bahraini women above 18 years visiting 27 primary health care centers in the Kingdom of Bahrain who were either married, widowed, or divorced, and revealed that the prevalence of intimate partner violence (IPV) was 71.11% among them (Al Ubaidi et al. 2021). Another survey in Kuwait on intimate partner violence among 1122 Kuwaiti married women and 213 divorced women showed a higher rate (81%) of sexually abused women (Alsaleh 2022).

In the current study, 9.6% of the incidents had a family member as the assailant. In research conducted in Tunisia, the incidental rate of a family member being the assailant was comparable to ours (8.8%). Moreover, this



research uncovered a significant correlation between the relation between victim and assailant and the age of the victim. It was noticed that most of the victims with a family relationship with their assailants were minors. Cases considered as incest were 5.9% of total victims where the most frequently reported offender in incest is the father followed by the uncle and then the brother; similar rates were reported in Egypt (El-Elemi et al. 2011). According to Islamic Sharia Law, incest is regarded as any sexual acts between intimate family members who are not allowed to marry, regardless of the individuals' ages or consent. Most incest instances are reported to involve fathers and daughters. Additionally, brother-sister relationships are common but rarely reported since the victims are afraid of their families' reactions and views and assume that no one will believe them (Nita A. 2009). Further research in that area is necessary because the current results do not accurately reflect the actual situation. It is questionable who should file a complaint when a family member sexually assaults a minor female, especially if the parent or guardian is the assailant. As per Bahraini law, a court charge concerning offenses must be dropped after 10 years (International Humanitarian Law Databases 2013), which gives a reasonable window generally for raising claims after assaults, but for the crime of incest, this window is still not enough especially when the victim is young and cannot claim her offender meaning that some instances are never submitted to the court when disclosed more than 10 years after the offense has been committed. Furthermore, it might be challenging to establish incest in court after time has elapsed, particularly in the absence of forensic evidence (El-Elemi et al. 2011). Nevertheless, one of the Kingdom of Bahrain's initiatives for protecting children is "The Child Protection Center." This social care facility protects against all types of abuse and neglect for children up to the age of 18. In addition to offering counseling, active listening, and referral services, child support helpline service is available for reporting incidents of violence, abuse, or danger against children (Information & eGovernment Authority 2023b).

When establishing the case of sexual assault, the interval between the sexual act and medicolegal examination is crucial. Medicolegal examination in about one-third of cases of the current study (32%) was performed within 2 days following the assault; this is in line with Kaushik et al. (2016) who indicated that about 34% of the cases were examined early within the first 2 days of the incidence. Also, Arif et al. (2016) reported that about 47% of victims presented to the medicolegal department for examination within 72 h. After a month of the sexual assault incident, over a quarter of victims (28.3%) underwent examinations. Similar to this, Brahim et al. (2022)

noted that 24% of victims were examined after a month had passed since the sexual assault occurrence. Many factors, particularly in Arab societies, have been linked to delays in seeking medical care, including the victim's knowledge of the perpetrator, the victim's fear of being held responsible for the assault, the victim's experience of embarrassment and humiliation, the victim's fear of the aggressor's reprisal, and the absence of family support in the context of the traditional male-dominated model prevalent in the Arab world (Alempijevic et al. 2007; El-Elemi et al. 2011; Adama-Hondégla et al. 2013). Sexual assaults that go unreported may have detrimental effects, such as preventing victims from accessing legal and social services that are provided by both public and private resources (Fisher et al. 2003; Du Mont et al. 2003). Restricting the possibility that sexual assailants may be prosecuted by the law is another detrimental result of unreported sexual assault (Allen 2007). Regarding the age of victims, it was found that most of the victims (64.4%) who reported at the earliest 2 days were adults, while most of those who reported and were examined after 1 month were minors (58.4%). As in earlier studies, cases involving younger victims who are easily threatened or pacified to keep quiet report late as compared to older victims (Riggs et al. 2000; Brown et al. 2001; Chen and Ullman 2010).

Forensic examination of sexually assaulted victims revealed that nearly one-third of them only (30.9%) have extragenital injuries; similar rates were reported in studies conducted in Egypt (30%) (El-Elemi et al. 2011) and Spain (30.6%) (Sudupe Moreno 2013). This rate of physical injuries is considered low within this assault, but this could be attributed to delayed examination after the assault, false allegations, also the victim being overpowered or under threat or effect of drugs (El-Elemi et al. 2011b; Sherif et al. 2018; Karki et al. 2020). The current study also displayed substantial differences between adult and minor victims in terms of extragenital injuries, indicating a correlation between age category and extragenital injuries. Furthermore, similar trends to those in our study were seen in some other investigations, with older victims sustaining an increased frequency of physical injuries (Hwa et al. 2010; Sudupe Moreno 2013; Afandi 2018). The higher rate of physical injuries in adults could be explained by the fact that the use of physical force is usually needed when the victim resists the assault, and naturally, adult victims often resist more vigorously than minors who are usually afraid and unaware of details of this act especially if they were under the authority of the assailant. The two most frequent injury types identified in this study were bruises and abrasions, which were also identified in earlier studies. The extremities were the most frequent site of injury reflecting self-defense and

resistance of the victim (Sudupe Moreno 2013; Zerbo et al. 2018; Afandi 2018).

In the current study, 66.9% of the victims had mixed penetration during sexual assaults, followed by vaginal penetration in 30.1% of the victims, then anal penetration in 2.9% of victims. These results agree with research in Brazil over 8 years where vaginal coitus was reported in 43.9% of cases, whereas anal penetration occurred in 3.6% of cases (Vertamatti et al. 2013). On the contrary, several publications reported vaginal penetration as the commonest type of assault followed by anal, and finally mixed assaults (Sharaf El-Din et al. 2015; Sherif et al. 2018; Abo El Wafa and Mohammed Ali 2020; Saleh 2022). Moreover, it was found in the current work that most vaginal (61%) and anal (62.5%) assaults were reported in adult female victims, while mixed assaults were nearly equal in minors and adults.

Regarding forensic local examination of the anogenital area, only 6.6% of victims had recent hymen tears, and 45.6% of victims had old hymen tears. Similar findings were reported by Sobh et al. (2020). Moreover, there was a significant correlation between the age of the victim and the condition of the hymen as more than half of the victims with recent hymen tears were minor females, while most of the victims with old hymen tears were adults. However, the lack of a recent hymen tear does not necessarily eliminate the possibility of sexual assault because there are a variety of factors to consider, including a delayed medicolegal examination and vaginal intercourse following a previously damaged hymen, minimal non-specific findings like erythema that could be misdiagnosed as local infection (Sherif et al. 2018; Brahim et al. 2022). Current work showed recent anal injury in 5.9% of victims, and old anal injury in 12.1% of victims as reported by Brahim et al. (2022). Recent anal injuries were mainly tears in anal mucosa, bruises, or abrasions. It was found that anal injuries are almost equally divided between minor and adult females where most old injuries were found in minor females and most recent injuries were found in adults. Sharaf El-Din et al. (2015) revealed that the largest percentage of anal penetration was seen in children under the age of 12.

Semen detection positive swabs were found in 26.8% of victims and negative results came from 21.3% of victims, while in 51.8% of cases, swabs were not collected. These findings are consistent with the literature (Arif et al. 2016; Brahim et al. 2022; Al-Galad et al. 2022), which revealed a 22 to 28% success rate for sperm detection. Our results indicated that most positive swabs were detected within the first 48 h after assault with a dramatic decrease after that. Several circumstances, including those mentioned below, may explain negative samples from sexual assault victims: a delayed collection of specimens, penetration

without ejaculation, drainage of seminal fluid or its dilution by vaginal fluid, bathing or showering, use of condoms, azoospermia or oligospermia, vaginal inflammation, and digital penetration (Santhy 2003; Grossin et al. 2003). In this work, most positive swabs were detected in adult victims (67.1%), and this may be attributed to the higher rate of penetration involving adult victims than minors. This finding is in line with the results of previous research (Grossin et al. 2003; Sudupe Moreno 2013).

The consequences of sexual assault can occur immediately or after long-term such as pregnancy, sexually transmitted diseases (STD), mental health problems including post-traumatic stress disorder, depression, suicidal ideation, and sometimes death of the victim (Afandi 2018; Tullio et al. 2021). The present study showed that 17 victims representing 6.3% became pregnant following the assault and two of them had abortions before the medicolegal examination. Other researchers also reported similar findings (Tamuli 2013; Kaushik et al. 2016; Karki et al. 2020; Brahim et al. 2022). Interestingly, 16 of those victims representing 94.1% were found to be related to delayed reporting and medicolegal examination after more than 1 month. Unfortunately, neither emergency contraceptive methods and STD prophylaxis nor the post-trauma psychological assessment are routinely introduced to the victims of sexual assaults within the medicolegal protocol in the Kingdom of Bahrain. This shortage should be considered to improve the outcome of medicolegal procedures for those victims.

Medicolegal conclusions regarding hymenal integrity are important and complex, and they frequently lead to considerable levels of uncertainties. For instance, the existence of an intact hymen seemed insufficient to rule out vaginal penetration because the probability of a hymenal rupture depends mostly on the extent of its flexibility and dilatation, the ratio of the male penis to the vagina, and the amount of force applied. In addition, young females' hymenal lesions may heal entirely, leaving no signs of prior penetration (Stark 2011; Walker 2015). The cornerstone in establishing that there was vaginal intercourse is the presence of recent genital injuries and/or the presence of spermatozoa in the vagina since the rape is recognized as penovaginal penetration (Rege et al. 2018). In the same vein, the diagnosis of anal penetration depends on the presence of anal injuries, a decreased anal reflex, and anal sphincter tone in addition to the detection of spermatozoa in anal swabs. However, the disproportion between the penis and the anal orifice, as well as the amount of force applied, have a significant impact on these findings, hence why lubricant-facilitated penetration may not have notable consequences (Du Mont et al. 2003; Stark 2011).

Accordingly, the medicolegal opinion in the present study confirmed positive assault in 38.6% of allegations and negative assault in 32.4% of allegations. This high rate of negative assaults reported in this study may come from true negative cases due to false allegations or from false negative cases caused by loss of evidence due to several factors mentioned before, but the most important one is the delay in reporting the assault and the ensuing delay in the medicolegal assessment (Rege et al. 2018; Pal et al. 2018). This research revealed a significant correlation between the final medicolegal opinion regarding the assault and the time of medicolegal examination. It was noticed that most confirmed positive assaults (62.9%) were related to cases examined during the first 48 h post-assault, while the highest rate of negative assaults (40.9%) were reported in cases examined after 1 month of the assault. Additionally, allegations that have no firm medicolegal conclusion to confirm the allegation represented 29%. This uncertainty is frequently addressed during the assessment of sexual violence when it is too late for the examination, allowing injuries to heal and evidence to be lost. Furthermore, total penile penetration without obvious recent injuries could be possible when there are old anogenital injuries combined with wide orifices (Sobh et al. 2020).

### Conclusions

Sexual assault against females is a very sensitive issue, so there is usually delay or even un-reporting of this crime, especially in Arab societies. This study concluded that unmarried females in early adulthood and adolescence were the most targeted victims of sexual assault. The victim's acquaintance was most frequently the perpetrator of sexual crimes. Due to the prolonged post-coital delay, there was no evidence of coercive sexual activity when the patient underwent a medicolegal examination in most cases, even though some cases ended with being pregnant as an outcome of the sexual assault. Delay in medicolegal examination resulted in healing of injuries and loss of vital trace evidence which eventually led to increased negativity or un-confirmation of most claims. However, the absence of injuries and trace evidence may not indicate the absence of sexual assault, but usually, the documentation of evidence is the only way to prove this crime. The responsibility of proving this crime lies on the forensic examiners. The frequent difficulties in the interpretation of existing evidence or even the absence of evidence in many cases make their role challenging but crucial for the documentation and assistance of sexual assault victims.

### Recommendations

The Kingdom of Bahrain is taking serious steps to stand against all types of violence and discrimination against women. However, it should be thought about a multi-disciplinary approach involving different governmental and non-governmental institutions to provide medical education to youngsters and their families on alarm signals, prevention techniques, and immediate response and reporting of sexual assault incidents. In the same vein, forensic examiners, in particular, must participate in increasing community awareness of this issue based on their experience and coordinate continuously with representatives of the law to present the victims to them as soon as they report the incident to ensure early medicolegal examination of victims with proper documentation and collection of evidence. Moreover, the medicolegal strategy should extend beyond the assessment of the victims to include providing emergency medical services in the form of contraceptive methods and STD prophylaxis in addition to the medical follow-up and psychiatric management of them; this would prevent further traumatization of the victims and their families.

### Limitations of the study

The present study has some limitations. It is a record-based study, and the available data records were about the assault and the victim with a lack of information about the assailant. Furthermore, there was no reported psychological evaluation of female victims after the assault.

### Abbreviations

REC	Research Ethics Committee
WHO	The World Health Organization
NISVS	The National Intimate Partner and Sexual Violence Survey
IPV	Intimate partner violence
STD	Sexually transmitted disease

### Acknowledgements

The authors would like to express their gratitude and appreciation to consultant Mr. Qutami Al-Qutami for his continuous support, encouragement, and guidance. Many thanks would also extend to Dr. Ali Bin Fadol Albuainain, the General Attorney in the Kingdom of Bahrain, for his support and encouragement.

### Authors' contributions

The research idea was by FA and MF. FA contributed to the study design and writing of the manuscript and performed the collection of victims' data. MF contributed to the study design and writing of the manuscript. MA contributed to the study design, interpretation, and presentation of the results, writing, and final editing of the manuscript. All the authors read and approved the final manuscript.

### Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

### Availability of data and material

The datasets analyzed during the current study are available from the corresponding author upon reasonable request.

## Declarations

### Ethics approval and consent to participate

This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for human studies. The Public Prosecution of the Kingdom of Bahrain provided official authorization for the review of files and the proper data collection. The Research Ethics Committee (REC) at the Faculty of Medicine, Suez Canal University, Egypt, granted ethical permission (Reference number 5429#). The confidentiality of the victims' data was kept throughout the study. The need for informed consent from the victims was waived as there was no identifiable information included in the study.

### Consent for publication

Not applicable.

### Competing interests

The authors declare that they have no competing interests.

Received: 6 March 2024 Accepted: 30 June 2024

Published online: 09 July 2024

## References

- Abo El Wafa SM, Mohammed Ali NE (2020) A five year retrospective study of female sexual assault in Qaluybia Governorate, Egypt. *Zagazig Journal of Forensic Medicine* 18(2):75–92. <https://doi.org/10.21608/zjfm.2020.23083.1047>
- Adama-Hondégla AB, Aboubakari A-S, Fiagnon K, N'kamga-Tchocote AR, Akpadza K, (2013) Aspects épidémiologiques et prise en charge des agressions sexuelles chez les sujets de sexe féminin à Lomé. *Afr J Repro Health* 17(1):67–72. <https://doi.org/10.4314/ajrh.v17i1>
- Afandi D (2018) Medicolegal study of sexual violence cases in Pekanbaru, Indonesia: prevalence, pattern, and Indonesian legal framework. *Egypt J Forensic Sci* 8(1):1–10. <https://doi.org/10.1186/s41935-018-0067-5>
- Ahmad MA (2018) The importance of marriage in Islam. *Int J Res Granthaalayah* 6(11):1–6. <https://doi.org/10.29121/granthaalayah.v6i11.2018.1082>
- Al Eissa M, Almuneef M (2010) Child abuse and neglect in Saudi Arabia: journey of recognition to implementation of national prevention strategies. *Child Abuse Negl* 34(1):28–33. <https://doi.org/10.1016/j.chiabu.2009.08.011>
- Al Ubaidi B, Tawfeeq F, Ayed H, Hasan S, Alahmed F (2021) Intimate partner violence in the Kingdom of Bahrain: prevalence, associated factors and WAST screening in primary health centres. *J Family Med Prim Care* 10(8):2893–2899. [https://doi.org/10.4103/jfmpc.jfmpc\\_2401\\_20](https://doi.org/10.4103/jfmpc.jfmpc_2401_20)
- Alempijevic D, Savic S, Pavlekcic S, Jecmenica D (2007) Severity of injuries among sexual assault victims. *J Forensic Leg Med* 14(5):266–269. <https://doi.org/10.1016/j.jfml.2006.08.008>
- Al-Galad G, Ghaleb S, Mohamed O, Saleh A (2022) Medico-legal study of alleged sexual assault cases in Fayoum and Aswan governorates from 2010–2016: comparative study. *Fayoum University Medical Journal* 10(2):24–33. <https://doi.org/10.21608/fumj.2022.252719>
- Allen WD (2007) The reporting and underreporting of rape. *South Econ J* 73(3):623–641
- Al-Mahroos F, Abdulla F, Kamal S, Al-Ansari A (2005) Child abuse: Bahrain's experience. *Child Abuse Negl* 29(2):187–193. <https://doi.org/10.1016/j.chiabu.2004.07.008>
- Alsaleh A (2022) Violence against Kuwaiti women. *J Interpers Violence* 37(5–6):NP3628–NP3649. <https://doi.org/10.1177/0886260520916280>
- Arif M, Ahmed M, Chaudhary MK (2016) Medicolegal analysis of child and adolescent victims of sexual assault in Lahore—a retrospective study
- Barker LC, Stewart DE, Vigod SN (2019) Intimate partner sexual violence: an often overlooked problem. *J Womens Health (larchmt)* 28(3):363–374. <https://doi.org/10.1089/jwh.2017.6811>
- Ben Khelil M, Zgarni A, Belghith M, Allouche M, Banasr A, Bellali M, Bekir O, Benzarti A, Hamdoun M (2019) Managing cases of gender based sexual assault in the metropole of Tunis, a public health based approach. *Aggress Violent Beh* 47:257–261. <https://doi.org/10.1016/j.avb.2018.10.005>
- Black M, Basile K, Breidling M, Smith S, Walters M, Merrick M, Chen J, Stevens M (2011) National Intimate Partner and Sexual Violence Survey: 2010 summary report. National Center for Injury Prevention and Control, Centers for Disease Control and Prevention, Atlanta, GA.
- Brahim O, Turki E, Chebbi E, Fersi O, Fatnassi R (2022) Sexual assault of women in the region of Kairouan, Tunisia: an 8-year retrospective study on epidemiological and medicolegal characteristics. *BMC Women's Health* 22(1):64. <https://doi.org/10.1186/s12905-022-01647-8>
- Brown A, Jejeebhoy S, Shah I, Yount K (2001) Sexual relations among young people in developing countries: evidence from WHO case studies
- Brownlie EB, Jabbar A, Beitchman J, Vida R, Atkinson L (2007) Language impairment and sexual assault of girls and women: findings from a community sample. *J Abnorm Child Psychol* 35(4):618–626. <https://doi.org/10.1007/s10802-007-9117-4>
- Bahrain Women Union (2017) CAWTAR center of arab women for training and research. In: CAWTAR Clearing house. <https://www.cawtarclearinghouse.org/ar>. Accessed 31 Aug 2023
- Chen Y, Ullman SE (2010) Women's reporting of sexual and physical assaults to police in the National Violence Against Women Survey. *Violence against Women* 16(3):262–279. <https://doi.org/10.1177/1077801209360861>
- Dartnall E, Jewkes R (2013) Sexual violence against women: the scope of the problem. *Best Pract Res Clin Obstet Gynaecol* 27(1):3–13. <https://doi.org/10.1016/j.bpobgyn.2012.08.002>
- Du Mont J, Miller K-L, Myhr TL (2003) The role of "real rape" and "real victim" stereotypes in the police reporting practices of sexually assaulted women. *Violence against Women* 9(4):466–486. <https://doi.org/10.1177/1077801202250960>
- El-Elemi AH, Moustafa SM, Hagraas AM (2011) Reported cases of female sexual assault over 5 years period in Suez Canal area, Egypt: demographic study. *Egypt J Forensic Sci* 1(3):118–123. <https://doi.org/10.1016/j.ejfs.2011.08.002>
- Elghossain T, Bott S, Akik C, Obermeyer CM (2019) Prevalence of intimate partner violence against women in the Arab world: a systematic review. *BMC Int Health Hum Rights* 19(1):29. <https://doi.org/10.1186/s12914-019-0215-5>
- Fisher BS, Daigle LE, Cullen FT, Turner MG (2003) Reporting sexual victimization to the police and others: results from a national-level study of college women. *Crim Justice Behav* 30(1):6–38. <https://doi.org/10.1177/0093854802239161>
- Gauthier C (2019) Communiqué du Haut-Commissariat au Plan à l'occasion de la campagne nationale et internationale de mobilisation pour l'élimination de la violence à l'encontre des femmes. In: Site institutionnel du Haut-Commissariat au Plan du Royaume du Maroc. <https://www.hcp.ma/Communique-du-Haut-Commissariat-au-Plan-a-l-occasion-de-la-campagne-nationale-et-internationale-de-mobilisation-pour-l-a2411.html>. Accessed 24 May 2023
- Grossin C, Sibille I, Lorin de la Grandmaison G, Banasr A, Brion F, Durigon M (2003) Analysis of 418 cases of sexual assault. *Forensic Sci Int* 131(2):125–130. [https://doi.org/10.1016/S0379-0738\(02\)00427-9](https://doi.org/10.1016/S0379-0738(02)00427-9)
- Haj-Yahia MM (2000) The incidence of wife abuse and battering and some sociodemographic correlates as revealed by two national surveys in Palestinian society. *Journal of Family Violence* 15(4):347–374. <https://doi.org/10.1023/A:1007554229592>
- Hamitouche Y (2020) The issue of violence against women in Algeria: causes and public policies. *Journal of Mediterranean Knowledge (ISSN 2499-930X)* 5(1):151–161
- Hwa H-L, Chen S-C, Wu M-Z, Shun C-T, Liu S-K, Lee J-C, Chen Y-C (2010) Analysis of cases of sexual assault presenting at a medical center in Taipei. *Taiwan J Obstet Gynecol* 49(2):165–169. [https://doi.org/10.1016/S1028-4559\(10\)60035-6](https://doi.org/10.1016/S1028-4559(10)60035-6)
- Information & eGovernment Authority (2023a) Government Services Information. <https://www.bahrain.bh/wps/portal/en/BNP/ServicesCatalogue/GSX-UI-PServiceDetails?psID=1222>. Accessed 30 Apr 2024
- Information & eGovernment Authority (2023b) Child Protection Centre & Child Helpline 998 Service. [https://www.social.gov.bh/website/home/subservices\\_sections/18?lang=en](https://www.social.gov.bh/website/home/subservices_sections/18?lang=en). Accessed 30 Apr 2024
- International Humanitarian Law Databases (2013) Code of Criminal Procedure, 2002. <https://ihl-databases.icrc.org/en/national-practice/code-criminal-procedure-2002>. Accessed 2 Mar 2024

- Karki RK, Singh PK, Khan AS (2020) Medico-legal findings in victims and accused of sexual assault. *J Nobel Med Coll* 9(2):12–17. <https://doi.org/10.3126/jonmc.v9i2.33349>
- Kaushik N, Pal SK, Sharma A, Thakur GC (2016) A retrospective study of sexual assaults in southern range of Himachal Pradesh. *International Journal of Health Sciences*
- Kazzaz YM, AlAmeer KM, AlAhmari RA, Househ M, El-Metwally A (2019) The epidemiology of domestic violence in Saudi Arabia: a systematic review. *Int J Public Health* 64(8):1223–1232. <https://doi.org/10.1007/s00038-019-01303-3>
- Maklad A, El-Mehy I, El-Shazly M (2006) Maklad: a medicolegal study of sexual offences in Dakahlia Governorate. *Zagazig Journal of Forensic Medicine and Toxicology* 4(1):75–94
- Martin SL, Ray N, Sotres-Alvarez D, Kupper LL, Moracco KE, Dickens PA, Scandlin D, Gizlice Z (2006) Physical and sexual assault of women with disabilities. *Violence against Women* 12(9):823–837. <https://doi.org/10.1177/1077801206292672>
- Nita A. (2009) Incest needs public debate and a stringent law to combat it. In: A wide angle view of India. <https://nitawriter.wordpress.com/2009/03/23/incest-needs-public-debate-and-a-stringent-law-to-combat-it/>. Accessed 5 Sep 2023
- Nossier SA (2015) Violence against women in the Arab world. *J Egypt Public Health Assoc* 90(3):85. <https://doi.org/10.1097/01.EPX.0000471671.51800.34>
- Organization WH (2003) Guidelines for medico-legal care of victims of sexual violence. World Health Organization
- Pal S, Rana A, Sharma A, Sehgal A (2018) Forensic study of child sexual abuse in northern range of Himachal Pradesh. *PRJFGS* 1(3). <https://doi.org/10.32474/PRJFGS.2018.01.000112>
- Rege S, Deosthali P, Reddy N (2018) Medico legal aspects of sexual violence: impact on court judgments. *J Forensic Res Anal* 1(1). <https://doi.org/10.16966/2577-7262.103>
- Riggs N, Houry D, Long G, Markovchick V, Feldhaus KM (2000) Analysis of 1,076 cases of sexual assault. *Ann Emerg Med* 35(4):358–362. [https://doi.org/10.1016/s0196-0644\(00\)70054-0](https://doi.org/10.1016/s0196-0644(00)70054-0)
- Sadek G (2023) Bahrain: new law repeals penal code provision exempting rapists from punishment. In: Library of Congress, Washington, D.C. 20540 USA. <https://www.loc.gov/item/global-legal-monitor/2023-08-13/bahrain-in-new-law-repeals-penal-code-provision-exempting-rapists-from-punishment/>. Accessed 16 Oct 2023
- Saleh A (2022) Medicolegal examination of sexual assault cases. A retrospective study. *Zagazig Journal of Forensic Medicine* 20(2):205–221. <https://doi.org/10.21608/zjfm.2022.138712.1116>
- Santhy KG (2003) Non-consensual sexual experiences of young people: a review of the evidence from developing countries. Population Council
- Sharaf El-Din AAI, Elkholy SMS, Metwally ES, Farag HA (2015) Pattern of female sexual assault in Qalyubia Governorate, Egypt, during the period from 2009 to 2013: a retrospective study. *Am J Forensic Med Pathol* 36(4):276. <https://doi.org/10.1097/PAF.0000000000000182>
- Sherif M, El-Gohary M, El-Kelany R, Abo El-Noor M (2018) Pattern of sexual assault in Gharbia Governorate during the period between 2011–2014: retrospective and cross section study. *Ain Shams Journal of Forensic Medicine and Clinical Toxicology* 30(1):128–138. <https://doi.org/10.21608/ajfm.2018.18203>
- Sobh Z, El-Banna A, Menessi HM (2020) Medico-legal assessment of physical and sexual assaults' allegations among adolescent and adult females referred to Medicolegal Department of Ministry of Justice at Alexandria: a prospective study. *The Egyptian Journal of Forensic Sciences and Applied Toxicology* 20(2):95–116. <https://doi.org/10.21608/ejfsat.2019.14868.1086>
- Stark MM (ed) (2011) *Clinical forensic medicine: a physician's guide*. Humana Press, Totowa, NJ
- Stark M (2023) Recommendations for the collection of forensic specimens from complainants and suspects – the evidence
- Sudupe Moreno A (2013) Age differences among victims of sexual assault: a comparison between children, adolescents and adults. *J Forensic Leg Med* 20(5):465–470. <https://doi.org/10.1016/j.jflm.2013.02.008>
- Sukul B, Chattopadhyay S, Bose T (2009) A study of victims of natural sexual offence in the Bankura district of West Bengal. *Journal of Indian Academy of Forensic Medicine*
- Tafawuq (2020) Study of the reality of domestic violence against women in the Kingdom of Bahrain - 2016 edition. In: Excellence Consulting Center for Development. <https://www.tafawuqbh.com/wp-content/uploads/2016/11/tafawuq.pdf>. Accessed 2 Mar 2024
- Tamuli R (2013) A statistical analysis of alleged victims of sexual assault - a retrospective study. *Journal of Punjab Academy of Forensic Medicine and Toxicology* 13
- Truman J (2011) *Criminal victimization, 2010*. US Department of Justice, Washington DC
- Tullio V, Lanzarone A, Scalici E, Vella M, Argo A, Zerbo S (2021) Violence against women in heterosexual couples: a review of psychological and medico-legal considerations. *Med Sci Law* 61(1\_suppl):113–124. <https://doi.org/10.1177/0025802420936081>
- Vertamatti MAF, de Abreu LC, Drezett J, Valenti VE, Barbosa CP (2013) Time lapsed between sexual aggression and arrival at the Brazilian health service. *J Hum Growth Dev* 23(1):46–51. <https://doi.org/10.7322/jhgd.50390>
- Walch AG, Broadhead WE (1992) Prevalence of lifetime sexual victimization among female patients. *J Fam Pract* 35(5):511–516
- Walker G (2015) The (in)significance of genital injury in rape and sexual assault. *J Forensic Leg Med* 34:173–178. <https://doi.org/10.1016/j.jflm.2015.06.007>
- WHO (2021) Violence against women prevalence estimates, 2018 – executive summary. <https://www.who.int/publications-detail-redirect/9789240026681>. Accessed 23 May 2023
- Wishart G (2003) The sexual abuse of people with learning difficulties: do we need a social model approach to vulnerability? *The Journal of Adult Protection* 5(3):14–27. <https://doi.org/10.1108/14668203200300021>
- UN Women H (2022) Facts and figures: ending violence against women. <https://www.unwomen.org/en/what-we-do/ending-violence-against-women/facts-and-figures>. Accessed 23 May 2023
- Zerbo S, Milone L, Scalici E, Procaccianti S, Nardello R, Ventura Spagnolo E, Piscionieri D, Argo A (2018) Medico legal procedures related to sexual assault: a 10-year retrospective experience of a Daphne protocol application. *Egypt J Forensic Sci* 8(1):4. <https://doi.org/10.1186/s41935-018-0039-9>

## Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.