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The impact of domestic violence: a prospective forensic study in the northeastern region of Algeria (Annaba)

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Abstract

Background: Violence against women is a global problem affecting different social and economic classes. The present study aimed to identify the impact of domestic violence on the health status of women abused by their intimate partner.

Methods: This is a cross-sectional descriptive study of a sample of women who were examined at the forensic exploration unit of Annaba Hospital over a period of 3 months (first quarter of 2018). In all, 200 women were recruited among those who had been abused by the intimate partner.

Results: One in ten women who consulted was a victim of domestic violence (9.36%). The average age was 33.91+/−9.02 years, with extremes from 19 to 65 years. There were multiple consequences, including physical injuries (bruises, fractures), many sequelae (neurosensory and functional deficits), and acute stress and anxiety disorders requiring appropriate care and social consequences (lack of resources, divorce). Forty percent of the interviewed victims had a general comorbidity, three quarters of whom had a worsening of their previous pathology. All forms of violence were present with varying frequencies, especially psychological violence with an extremely high frequency and sexual violence of remarkable severity. Many negative effects were identified; an association of suicide attempts and sexual violence ($P = 0.0020$) was rated.

Conclusions: The impact of this form of abuse is considerable and concerns mental, physical, and social health. We have to anticipate and raise the awareness of care providers of its consequences.

Keywords: Violence, Women, Intimate partner, Impact, Anxiety, injuries, screening

Background

Violence against women is widely recognized as a serious human rights violation and a critical public health issue with significant impacts on physical, mental, sexual, and reproductive health. According to the World Report on Violence and Health, domestic violence is a process in which a person uses force or coercion to promote and/or maintain hierarchical relationships and dominance over the partner (Krug et al. 2002).

According to the same report, the World Health Organization (WHO) estimates that women victims of domestic violence lose between 1 and 4 years of their healthy lives, and that it costs two and a half more time to care for a woman who is a victim of domestic violence than for taking care of a purely pathological case (Krug et al. 2002).

The same global body sponsored a survey of over 24,000 women in 10 countries to investigate spousal

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physical and sexual violence, with a prevalence of 15% (Garcia-Moreno et al. n.d.).

The aim of our work is to identify and assess the impact of domestic violence on the health status of a population of women who have experienced violence from their intimate partner and to raise the awareness of health professionals on the extent of this form of domestic abuse.

Methods

Study design and population

This is a cross-sectional descriptive study of a sample of women who were examined at the forensic exploration unit of Annaba Hospital. Participants were recruited among adult women with a lower age limit of 18 years (age of majority in Algeria) and without an upper age limit. They consulted to obtain the assault and battery certificate without distinction of socioeconomic condition, level of education, number of dependent children, etc. We did not make a distinction on the basis of medical or surgical history. These were all women with or without a systemic or general pathology (diabetes, hypertension, osteoarthritis, asthma, etc.) and gynecological or obstetrical and who could be impacted by the violence suffered.

The victims were received at our medical-judicial exploration unit at the Forensic Medicine Department of Annaba University Hospital Center, as part of a specialized forensic medicine consultation in order to get a medicolegal certificate and initiate legal proceedings following physical, psychological, and sexual violence, and whose aggressor was often the intimate partner, whether or not the marital bond was broken.

This study focused on the impact of this form of maltreatment on physical health. The World Health Organization's definition of the health status[1] of victims is based on both mental and social aspects of it. The study period is one quarter, the first of 2018; it ran from 20 January to 20 April 2018. Our sample consisted of women who were abused by the intimate partner and underwent a forensic examination.

Data collection

Our data were collected with a questionnaire that was administered at the time of consultation (the questionnaire is available). All the elements of identification, the circumstances of violence, and the medicolegal aspects were collected from the assault and battery medical certificate issued to the victims.

We designed a valid and reliable questionnaire from which we assembled the sociodemographic characteristics of participants, data on the location of violence, duration of cohabitation, type of violence, type of somatic comorbidity, regularly followed or not, type of gynecological or obstetric comorbidity, and attitude and behavior of the specialists after the violence suffered.

Victims who consented for an interview were referred to a doctor's office for a 10-min semi-directional individual interview. A total of 200 women were identified.

Statistical analysis

Data analysis was performed using Statistical Package for Social Science software (SPSS) version 23.0, MedCalc version 18.11, and EpiData Analysis v2.2.0.164. Qualitative variables were expressed as frequencies and percentages; mean and standard deviation were used for quantitative values. Comparisons between groups were performed using the chi-square test for qualitative variables and the Mann–Whitney *t*-test for quantitative variables. A *P*-value of less than 0.05 was considered statistically significant.

Multiple logistic regression was performed to assess independent factors that affect domestic violence exposure; covariates entered into the model and were all significant variables in bivariate analysis.

Ethical consideration

All data collection procedures were kept confidential in accordance with the Helsinki Biomedical Ethics Guidelines. An explanatory letter was prepared and presented to the consultants, including the objective and framework of the study, with the sole purpose of research. Informed consent was obtained.

Results

The study revealed that 9.35% of the participants were exposed to domestic violence.

A total of two-thousand one-hundred and thirty-eight victims (2138) were examined. During the reporting period, 16.5% of victims filed a judicial complaint and received a judicial review.

Table 1 illustrates the socio-professional characteristics of the victims of domestic violence.

Our study included 200 victims of domestic violence who had undergone medical-legal examination, received their certificate, and responded to our questionnaire. The majority of them were under the age of 40 (76.40%). We noted that the average age was 33.91 ± 9.02 years, with extremes from 19 to 65 years (Table 1).

Almost two-thirds of the women were unemployed at the time of the survey (64.5%). The majority of victims had a formal marital status (legal marriage) at the time of aggression (93.5%); few victims were recently divorced (4%), married, and separated. During the

[1] Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.

Table 1 Socio-professional and demographic characteristics of the study population ($n = 200$)

	Frequency	Pourcentage
Type of forensic consultation		
On demand	167	83.5
Requisition	33	16.5
Age (years)		
18–24 ans	31	15.5
25–34 ans	96	48.0
35–44 ans	44	22.0
45–54 ans	23	11.5
55–65 ans	6	3.0
• Unemployment	129	64.50
• Employee, laborer	49	24.00
• Upper frame	10	5.00
• Student	5	2.50
• Liberal profession	5	2.50
• Others	2	1.00
Study level		
• Second area	52	26.00
• Medium	54	27.00
• Superior	45	22.50
• Primary	35	17.50
• Illiterate	14	7.00
Current marital status		
• Bride	188	94.50
• Divorce	8	4.00
• Fiancee	2	1.00
• Separated/couple	2	1.00
Type of habitat		
• Apartment	94	47.00
• Precarious housing	55	27.50
• Individual house	34	17.00
• Villa	17	8.50

Mean ± (SD), 33.91 ± 9.02. Confidence index 95%, 32.65 to 35.16. Extremes, 19–65

consultation, a total of 49.5% of the victims had one or two dependent children, while almost a quarter had between three and four children. An average of two children was observed.

Regarding the educational background of the interviewed victims, different levels of education were noted with different frequencies: 25% of victims had an average level of education, 26% had a secondary education level, and 22.5% had a higher level of education. The remaining frequencies were represented by women with primary school education (17.5%), vocational training (2%), and illiterate women (7%) (Table 1).

Ten percentage of victims in our sample had an ongoing pregnancy at the time of aggression; its duration was as follows: 65% in the first trimester, 30% in the second trimester, and 5% in the third trimester.

Different categories of marital life with the perpetrator of violence were represented by number of years; however, those whose marital life ranged from 4 to 6 years and from 11 to 20 years had a relatively higher frequency, 25.5% for each. The average length of conjugal life with the perpetrator of violence was 9.02 ± 9.10, and extremes ranged from zero to 62 years.

Almost half of the victims we surveyed (47%) lived in apartments, while more than a quarter (27%) lived in slums (precarious housing), and a quarter (25.5%) lived in individual houses.

In more than 90% of cases, the perpetrator was the legal husband (93.40%). The other aggressors were in decreasing order of frequency: the former husband (5.10%), or the husband who did not register the religious marriage in the civil status in, and finally the fiancé.

The examined and interviewed victims mentioned multiple places where aggressive acts occurred; the major one was the marital home (87.5%), and to a lesser degree, a public place (5.5%) or the workplace (2.5%).

Regarding the periodicity of physical violence, in the majority of cases, these are frequent acts, occurring more or less regularly. More than one in three women (40%) estimated that at least one episode of physical violence occurs monthly, and that in a quarter of cases (25.5%), an episode of violence occurs weekly.

Table 2 shows that all forms of violence were present but at different levels. More than nine out of ten (93%) of the interviewed victims reported experiencing emotional abuse (insults, threats and humiliations, etc.), 46.5% declared having suffered from economic violence, and 27.5% declared having suffered marital sexual violence. The carried out statistical test objectified a significant link between the recurrent and repeated character of violence and family psychological violence ($P = 0.0001$).

The medicolegal examination objectified multiple and varied violent injuries in the study participants, in the form of superficial integumentary involvement: abrasions and/or scratches (31%), first-degree (66%) and second-degree contusions (17.5%), fractures (5%), and simple wounds (Fig. 1).

For first-degree bruising, the forensic examination revealed (87.72%) multiple bruises on the head, upper limbs, lower limbs, and back.

All parts of the body were affected by this kind of injury, but we found that some parts were particularly affected. As an indication, a frequency of 47.5% was observed on the head, cervical region, and upper limbs. To a lesser extent, the maxillofacial area was impacted in 38.5% (Fig. 2).

Table 2 Distribution of victims of domestic violence[a] studied according to the categories of violence suffered and their form

Sexuel violence (yes)	**Frequency *N* (55)**	**Pourcentage 27.5**
Form		
• Pud uer attack	33	60
• Sadomasochistic sexual practices	08	14.5
• Forced sex	28	50.9
Psychological abuse (yes)	***N* (186)**	**93**
Form		
• Insult	159	85.48
• Threat	69	37.10
• Harassment	33	17.74
• Blackmail	12	6.45
• Humiliation	60	32.26
Economic violence (yes)	***N* (93)**	**46.5**
Form		
• Impediment to looking for work	26	27.9
• Impediment to work	23	24.7
• Money grabbing	34	36.5
• Others	08	8.6

The three commonly known forms of interpersonal violence were present in our population, in order of frequency, respectively: psychological violence, economic violence, and sexual violence

[a] A single victim can be subjected to several forms of violence.

the suffered violence, it is often a question of recurring episodes and rarely of an isolated one.

At the end of the psychological support period, one in four women (26%) who were mistreated showed signs of clear psychological impact, and they benefited from long-term programmed support.

At the end of this period, four victims were entrusted to fellow psychiatrists after the absence of improvement and the persistence of disabling disorders, represented mainly by anxiety-depressive disorders.

More than one in three abused women (40%) had chronic problems; the majority of them (86.50%) had a regular follow-up of their illness. The victims' identified pathologies are detailed with their respective frequencies in Fig. 3.

Table 3 illustrates the impact of domestic violence in terms of physical, mental, gynecological, and obstetrical health. More than three quarters of the victims (78.50%) presented an aggravation or an imbalance of their preexisting disease after multiple episodes of violence. A total of 14.5% of victims of family violence were hospitalized at least once, either because of violence or because of the aggravation of a previously balanced chronic illness.

In terms of comorbidity, one woman in four (24%) had a sexually transmitted disease at least once in her life as a couple, and one woman in ten (10.5%) had an early abor-

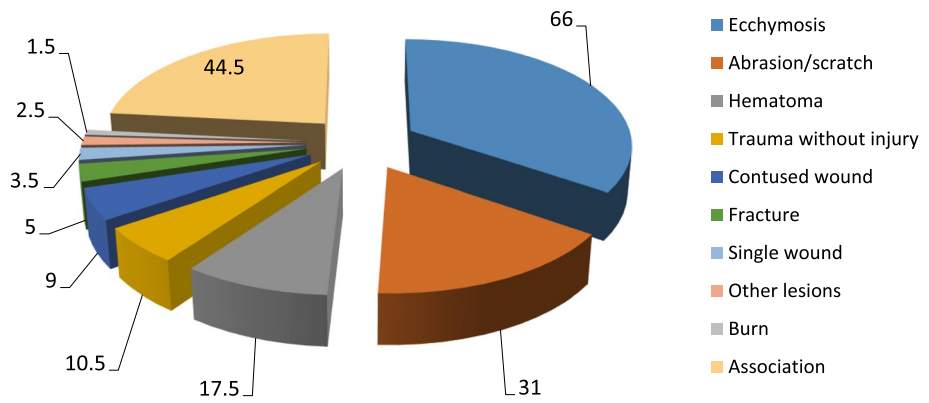

Fig. 1 The nature of the violent injuries found by the women examined. The physical consequences of the injuries sustained are mainly represented by first degree bruises (bruises) and the category of victims with multiple injuries (two or three post-traumatic injuries). Two injuries = 82 victims. Three injuries = 7 victims. (A single victim may have several types of trauma)

Regarding the repetition of acts of violence by the same perpetrator, the interviewed victims confirmed that in the overwhelming majority of cases (90%), it was repeated physical, verbal, psychological, and sexual acts, and that in only ten percent (10%) of cases, they were isolated episodes.

The average duration of conjugal life was 5.11 ± 4.8 years. In terms of frequency, periodicity, and rhythm of

tion. Overall, more than 50% of victims (106) had at least one gynecological and obstetrical condition, and one woman in ten (18 women) had at least two concomitant conditions.

Somatic complaints experienced by the examined victims were by order of decreasing frequency: sleep disorders (55%), headaches and migraines (53.5%), abdominal and pelvic pain (22.5%), and appetite disorders (21.5%).

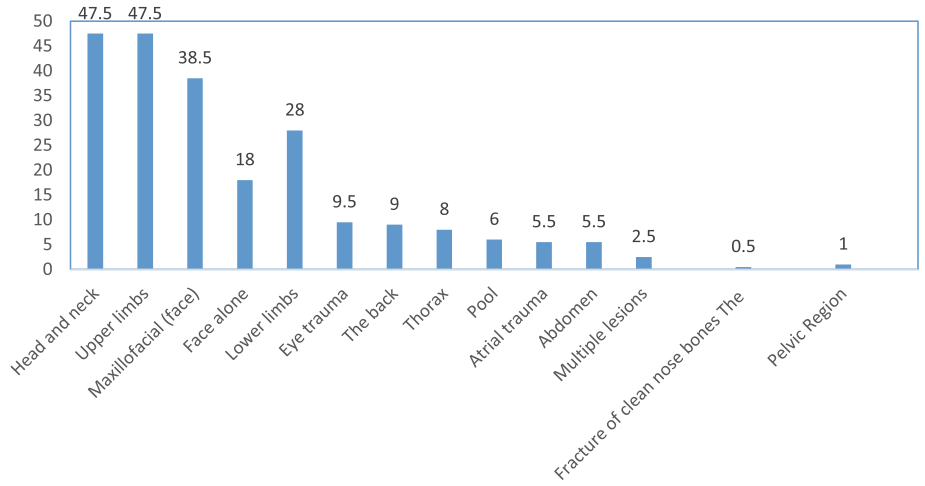

Fig. 2 The site of injuries among the women examined. (Several anatomical regions can be affected in the same trauma victim)

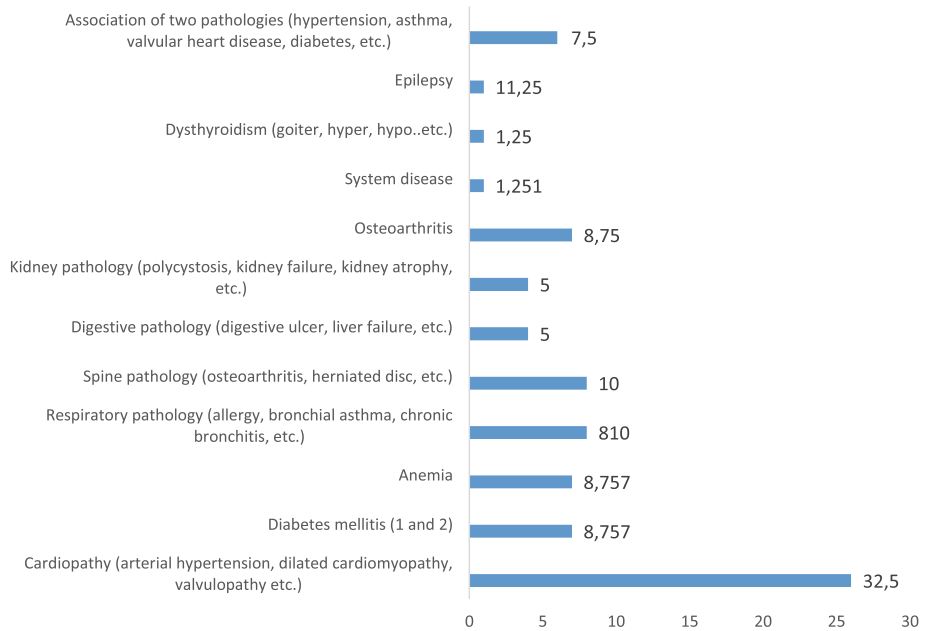

Fig. 3 The type of general pathology reported by the women examined and their respective frequencies in our study population ($N = 80$)

Domestic sexual violence is still underestimated and unknown to the public. To assess its extent and its consequences, statistical tests were carried out.

A statistically significant result was found between psychological and economic violence (P-value = 0.002).

It was found that sexual violence committed against young women was more frequent, with a significant difference (P-value= 0.076) in the age group below 35 years.

It was found that sexual violence committed in the family circle was statistically significant with suicide attempts (P-value= 0.002) and psychotropic drugs consumption (P value = 0.029).

Statistically significant results were also found among victims of sexual violence who suffered from general comorbidities (P-value = 0.023), gynecological comorbidities (P-value = 0.030), and those undergoing economic violence (P-value = 0.007).

For economic violence, a statistically significant association with a low level of education was found (P-value = 0.007), including sexual violence (P-value = 0.007),

Table 3 Impact of domestic violence on the general and mental health of victims

Morbidity	Frequency	Percentage (%)
1. Chronic disease	*N* (80)	40
Regularly monitored (yes)	69	86.3
Disease aggravated by the violence	63	78.7
2. Gyneco-obstetric pathology	*N* (81)	40.5
Sexually transmitted disease	48	59.26
Repeated early abortion	21	25.93
Late abortion	14	17.28
Uterine fibroids	11	13.58
Threat of premature birth	6	7.41
Cancer	4	4.94
Ectopic pregnancy	2	2.47
3. Mental impact		
Comorbidity	2	1
Suicide attempt (ST)	59	29.5
Psychiatric follow-up or psychology	14	7
Psychiatric hospitalization	1	0.5
Regular taking of psychotropic	6	3
Regular antidepressant intake	7	3.5

This summary table summarizes the consequences, in terms of physical and mental health. Remarkably formidable and serious results: suicide attempt, increased somatic complaints, and use of care

these symptoms. Almost 29.5% have been victims of a suicide attempt.

Nearly 18% have used anxiolytics, while a small proportion of women (3.5%) regularly took antidepressants and psychotropic drugs (3%), and a frequency of 0.5% previously stayed in a psychiatric setting.

There is a significant frequency of victims likely to develop pathologic sequelae. Indeed, more than one woman in ten (13.5%) presented serious injuries from the outset and would be detrimental to multiple and varied sequelae. The sequelae y were divided into psychiatric (33, 33%), musculoskeletal (22, 22%), and, to a lesser degree, neurosensory ones (18, 52%), mainly auditory problems (Fig. 4).

Forty percent (40%) of the victims confirmed that they were going to take legal action, and 27.5% had not yet decided on their fate, preferring to take the certificate and see later, while 7.5% had already consulted a lawyer.

In terms of the intention expressed on the day of consultation concerning family life, a frequency of 39% of the victims expressed their wish to put an end to the relationship, whereas for 23%, no decision was foreseen, unlike 20% of victims who had no intention to break the conjugal bond.

Half of the victims (48.5%) were housed by their families; 44% did not leave the conjugal home, and, finally,

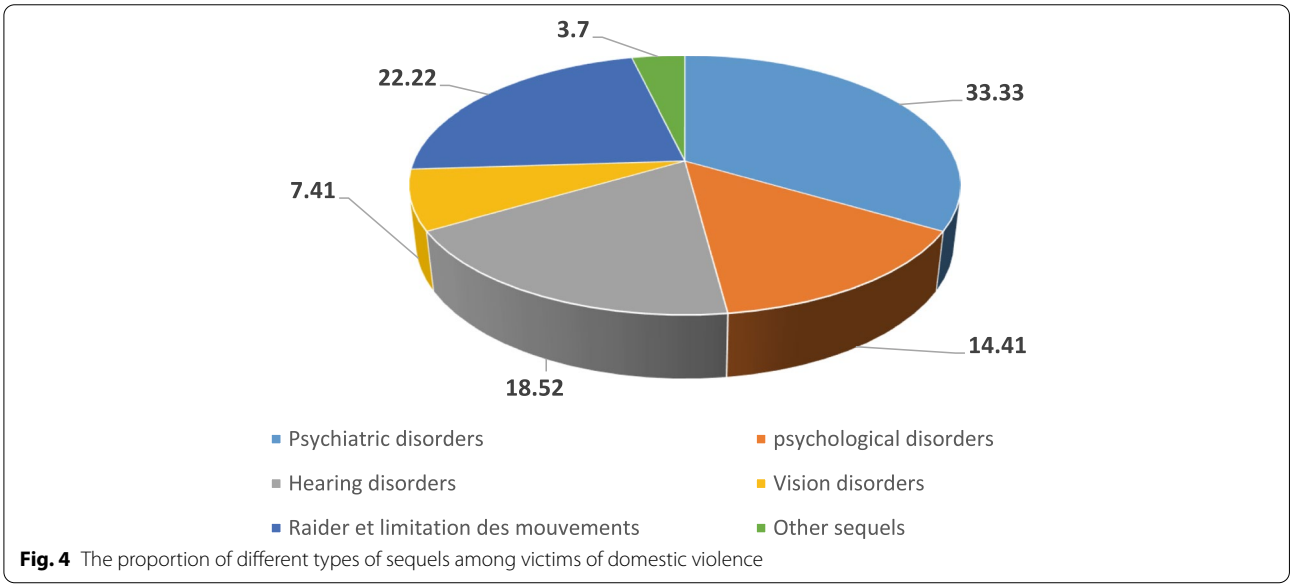

Fig. 4 The proportion of different types of sequels among victims of domestic violence

psychological violence (P-value = 0.002), and suicide attempts (P-value = 0.020) (Table 3).

In terms of healthcare received by the participants in the study, seven out of ten women (70.5%) who reported symptoms of somatization saw these symptoms worsen following domestic violence. Twenty-five percent of these victims consulted a doctor following 6.5% found refuge with their loved ones.

In terms of the impact of violence on the victims' social health, we found an increased frequency among young victims, with a statistically significant result in the age group below 35 years (P-value = 0.0001).

Regarding the victims' needs and expectations, a frequency of 47% indicated an imminent need for

Table 4 Multivariate analysis for sexual violence risk factors

Variables	*B*	SE	*p*-value	OR	95% *CI*	
Pathology obstetrics and gynecology	**0.517**	**0.141**	**0.130**	**1.678**	**0.857**	**3.285**
Chronic pathology	0.624	0.070	0.067	1.867	0.957	3.643
Psychotropic treatment	1.729	0.106	0.062	5.636	0.912	34.812
Attempted suicide	0.753	*0.063*	***0.033****	*2.125*	*1.060*	*4.261*
Economic violence	0.612	0.113	0.082	1.845	0.924	3.684
Emotional abuse	1.247	0.353	0.250	3.483	0.415	29.238
Constant	-	-	0.002	-	-	-

B regression coefficients, *SE* standard error of the coefficient, *OR* odds ratio, *95% CI for OR*, 95% confidence interval for the odds ratio. **P*-value was considered significant if ≤ 0.05

comprehensive information and referrals to judicial services. On the other hand, other victims expressed the need related to multidisciplinary care (medical care, assault certificates, psychological care, and legal assistance).

Multiple logistic regression analysis was fitted to identify independent predictors of sexual violence (Table 4). The analysis showed that women who reported having had previous suicide attempts were 2.12 times more likely to experience sexual violence ($P = 0.033$).

Discussion

All available studies agree on the extremely high frequency of intrafamily violence, particularly domestic violence, but few studies have focused on the consequences of this violence on general and mental health. This study aims to assess the impact of this form of abuse on women's mental health.

Domestic violence has a considerable place in the activity of the forensic exploration unit; out of 2138, one in ten patients is a woman victim of domestic violence. In the United States of America (USA), according to population-based surveys, between 22 and 39% of women reported being abused by an intimate partner at some point in their lives (Centers for Disease Control and Prevention (CDC) 2008; Nelson et al. 2012). For another study conducted in the sub-Saharan region, the prevalence of physical, emotional, and sexual violence in the 25 studied countries was 29.3%, 28%, and 11.5%, respectively (Seidu et al. 2021). Based on the results of an 8-year systematic review of Saudi cases using the PRISMA guide, the prevalence of domestic violence was between 39.3 and 44.5% (Kazzaz et al. 2019).

A frequency of 16.5% was reviewed after filing a complaint; the victims came forward meticulously with a judicial requisition, and the low rate already indicates the low incidence of victims going before the courts. This proportion is comparable to most published series using data from forensic units (Cantin et al. 2008; Irgui and Ait 2019). In our sociocultural context, taking legal action against the spouse is a taboo, which is why this frequency is low compared to that recorded in the majority of forensic units in France. On the other hand, the majority of forensic acts are carried out on requisition. For example, in an assault unit in Bordeaux (Raux et al. 2013), 70% of victims are reviewed by court order, and only 6% are reviewed at the request of victims. The vast majority of them (76.40%) were under 40, with an average age of 33.91 ± 9.02 and with extremes ranging from 19 to 65 years (Table 1).

Domestic violence was significantly linked to young age (under 40) with a frequency of 76.40%; this is in agreement with another study. For example, this result is slightly lower than that reported in a Toulouse study (Raux et al. 2013), where an average age of 36.6 +/−11 years was determined.

Marital status is a determining factor for many authors. A total of 93.5% of married women were noted; divorced women were less represented (4%). This result is in perfect agreement with the Parisian series (Vasseur 2004), where 84% of women are married or in cohabitation. These rates confirm the high incidence of domestic violence and call into question the idea that women are safe in their own homes.

Over six out of every 10 women, victims of violence, are not employed. This indicates that being an unemployed housewife is a major vulnerability for victims.

More than three-quarters of the victims have children, half of them (49.5%) have one or two children, and nearly a quarter of them (23%) have three or four children. It can be assumed that the presence of children at the time of the violent act could have long-term effects.

Children living in such homes are involved in violence in a variety of ways; for example, they may be injured intentionally, unintentionally, or when attempting to stop the violence (Christian et al. 1997).

A meta-analysis found that children's simple exposure to spousal violence is strongly linked to poor emotional and behavioral outcomes in children (Hughes 1988). According to results from an African study, physical violence was the most common (78.6%), followed by psychological (67.8%) and sexual (34.8%) violence (Stiller et al. 2022).

Many authors agree that the state of pregnancy constitutes a moment of onset or aggravation of violence; the prevalence varies between 10 and 30%. According to the results of an American study carried out on a sample of 2310 cases, there was a frequency of 9.6% of physical violence and 13.1% during pregnancy (Charles and Perreira 2007).

Physical abuse varies in frequency and severity, ranging from a single blow to severe chronic beatings. The functional consequences of injuries are as much a function of their nature as of their location and extent. The lesions are usually multiple and superficial. All habitual lesions of voluntary violence can be encountered and highlighted by forensic examination. They are mainly represented by bruises of the first degree; these are usually multiple and can have different dimensions and locations (Fig. 1).

They are followed by other superficial integumentary lesions (abrasions and hematomas). Based on the results of a Taiwanese study, there was an average of 2.86 injuries per victim of abuse; intracranial injuries were the most common injuries (28.83%), and the average length of hospitalization was 9.37 days (Chien et al. 2013).

The association of several types of lesions is common; nearly one woman in two has multiple lesions likely to evoke various vulnerabilities. According to a Brazilian study on a sample of 1000 women, injuries sustained by women were classified as minor in 971 cases of injuries considered minor, 23 serious injuries, and 6 very serious ones (Falcão de Oliveira et al. 2014).

In another investigation, injuries most often occurred in the hands, fingers, and repeated injuries involving the anatomy with a combination of multiple medial injuries to the hand, head, or face (Thomas et al. 2021).

The face was the most affected location (67.7%), and the fractures were on the clean bones of the nose (29.6%), followed by those of the mandible (11.1%), and the orbits (10.5%); the left side was the most targeted (59.2%) according to a recent study (Gujrathi et al. 2022) (Fig. 2).

A remarkable finding of our study is that nine out of ten women reported recurring acts of violence. This observation seems identical to that of a French study conducted by Philippe Vasseur (Vasseur 2004), in which78% of the victims said that it was repeated violence.

At the same time, 62% of victims who experienced multiple episodes of violence did not file previous complaints. This same observation was made possible by a previous study by Thomas Agnes (Stiller et al. 2022), where the anteriority of violent acts was noted in three-quarters of the victims (75%). It would be very interesting to develop primary prevention by introducing multiple screening actions at the level of basic care centers.

In terms of recurrence of this form of violence, one in two women attended forensics for the first time, one-quarter visited once, and one in ten visited twice or more times (11.5%). This confirms the repeated and insidious nature of this form of violence. Therefore, screening actions at the level of care structures are essential.

In terms of seniority and frequency of domestic violence, there was an average duration of conjugal life of 5.11 ± 4.8 (mean $\pm$ SD years). In our context, the duration of conjugal life with the perpetrator of domestic violence has no effect, contrary to the existing idea; the older spouses get, the better protected they become.

This study is one of the first studies in Algeria to examine the impact of family abuse on the mental health of female victims.

Previous research overemphasized physical violence and underestimated the magnitude of other forms, namely, physical, psychological, and economic ones.

This study showed the high frequency of psychological violence (93%) and its seriousness in terms of consequences on the victims' health, followed by economic violence (46%), which is poorly known and underestimated by the general public, and, finally, sexual violence, which, in the eyes of society, is considered taboo. No information was available on this form of abuse before this study.

Figure 3 details the frequency of general chronic diseases (diabetes mellitus, hypertension, osteoarthritis, etc.). The majority of these identified pathologies (86.50%) were regularly monitored. It should be added that more than three-quarters (78.50%) of victims who reported having a general chronic pathology estimated that they experienced a worsening of their pathology as a result of episodes of physical aggression. According to a family clinic survey, women experiencing violence were more than twice as likely to report a disability. The most frequently reported were those associated with heart or circulatory disease (4.9%), followed by back problems (3.5%), chronic pain (3.4%), arthritis (3.0%), damage to the nervous system (2.4%), and asthma or other respiratory diseases (Ruiz-Perez et al. 2007).

This study made it possible to note that domestic violence represents a determining factor of serious risk, particularly in the case of general comorbidity; it contributes to the imbalance of pathology previously in remission and to the use of care consumption.

Moreover, a large cross-sectional public health survey was conducted in the USA on a sample of 70,000

Table 5 Risk factors for psychological abuse, sexual violence, and economic violence according to sociodemographic characteristics, somatic, gynecological, and mental morbidity of victims

	Psychological abuse			Sexuel violence			Economic violence		
	Yes $n = 186$ *n* (%)	No $n = 14$ *n* (%)	*p*-value	Yes $n = 55$ *n* (%)	No = 145 *n* (%)	*p*-value	Yes $n = 93$ *n* (%)	No $n = 107$ *n* (%)	*p*-value
Age (years)									
Mean	33.85	34.64	0.861*	33.98	33.88	0.820*	32.90	34.78	0.318*
SD	8.93	10.55		9.18	9.00		8.18	9.65	
Médiane	33.00	33.50		33.00	33.00		33.00	33.00	
Educational level									
Illiterate	12 (6.5)	2 (14.3)	0.6525	2 (3.6)	12 (8.3)		2 (2.2)	12 (11.2)	**0.007****
Primary	33 (17.7)	2 (14.3)		13 (23.6)	22 (15.2)		24 (25.8)	11 (10.3)	
Medium	49 (26.3)	5 (35.7)		12 (21.8)	42 (29)		29 (31.2)	25 (23.4)	
Secondary	50 (26.9)	2 (14.3)		18 (32.7)	34 (23.4)		19 (20.4)	33 (30.8)	
Superior	42 (22.6)	3 (21.4)		10 (18.2)	35 (24.1)		19 (20.4)	26 (24.3)	
Professional status									
Free profession	5 (2.7)	0 (0.0)	0.5221	2 (3.6)	3 (2.1)	0.2343	2 (2.2)	3 (2.1)	0.880
Factory girl	11 (5.9)	0 (0.0)		4 (7.3)	7 (4.8)		6 (6.5)	7 (4.8)	
Student	5 (2.7)	0 (0.0)		2 (3.6)	3 (2.1)		3 (3.2)	3 (2.1)	
Employee	35 (18.8)	5 (35.7)		13 (23.6)	27 (18.6)		19 (20.4)	27 (18.6)	
Unemployment	120 (64.5)	9 (64.3)		30 (54.5)	99 (68.3)		57 (61.3)	99 (68.3)	
Upper frame	10 (5.4)	0 (0.0)		4 (7.3)	6 (4.1)		6 (6.5)	6 (4.1)	
Somatic morbidity	74 (39.8)	6 (42.9)	0.821	29 (52.7)	51 (35.2)	**0.023****	41 (44.1)	39 (36.4)	0.271
Gynecological morbidity	78 (41.9)	3 (21.4)	0.131	29 (52.7	52 (35.9)	**0.030****	44 (47.3)	37 (34.6)	0.067
Economic violence	92 (49.5)	1 (7.1)	**0.002****	34 (31.8)	59 (40.7)	**0.007****	/	/	/
Psychological abuse	/	/	**/**	54 (98.2)	132 (91)	0.076	92 (98.9)	94 (87.9)	**0.002****
Sexuel violence	1(7.1)	54 (29.0)	0.077	/	/	**/**	34 (36.6)	21 (19.6)	**0.007****
Attempted suicide(AS)	3(21.4)	56 (30.3)	0.486	25 (45.5)	34 (23.6)	**0.002****	35 (37.6	24 (22.6)	**0.020****
Taking psychotropic	0(0.0)	6 (3.2)	0.496	4 (7.3)	2 (1.4)	**0.029****	2 (2.2)	4 (3.8)	0.504

*Mann–Whitney test. ***P*-value was considered significant if ≤ 0.05

women in 2005. Those who reported having been victims of domestic violence in their lifetime would be more likely to report joint disease, current asthma, activity limitations, and HIV risk factors; they also reported not having had an examination with a doctor in the past (Breiding et al. 2008).

Regarding care received by victims of domestic violence, more than one in ten women (14.5%) had a previous hospitalization at least once, either because of direct consequences of suffering violence or because of a worsening of a previously balanced general pathology. This inevitably raises the role of domestic violence as a determining factor in morbidity and drug treatment use.

The examined women had various obstetric gynecological pathologies; one in four women (24%) was affected by sexually transmitted diseases, one in ten women had an early abortion (10.5%), and 7% had a late abortion. Overall, more than half of the examined women (54%) suffered at least one obstetric gynecological pathology during their lifetime as a couple, and 18 victims had at least two concomitant pathologies.

A significant gynecological and obstetrical comorbidity with domestic violence has been demonstrated, with an increased risk of disease, risky sexual behavior, premature delivery, and abortion (Table 5).

According to a Bolivian study, the prevalence of positive syphilis tests was twice as high among women who reported spousal violence (8%) as among women who did not report it (Díaz-Olavarrieta et al. 2009).

According to a Maghreb study (Boufettal et al. 2012), a frequency with a high risk of early abortion and threats of premature delivery, fetal hypotrophy, and neonatal death are linked to physical abuse undergone by pregnant women. It appears that violence is a serious factor of morbidity and chronic pathology imbalance, and it may contribute to increasing the frequency of gynecological and obstetrical conditions. Another Portuguese study supports this and confirms that violence is associated with diseases during pregnancy (Defilipo et al. 2020).

More than half of the sample reported somatization-related disorders: sleep (55%), headaches and migraines (53.5%), chronic pelvic pain and appetite disorders (22.5%), and 21.5% for some authors. These symptoms are mainly related to the direct consequences of acute stress frequently found in this type of repeated violence and chronic form. Hence, multiple disorders were reported by a study conducted in the care setting, with a negative impact of psychological violence; the overwhelming majority of women (70–93%) had headaches, stomach problems, chronic pain, and/or vaginal bleeding (Kramer et al. 2004).

Comorbidities between domestic violence and mental pathology are frequent. Indeed, nearly one in three (29.5%) women had at least one suicide attempt, one in four (25%) women had recourse to a physician following somatization symptoms, and nearly one in ten women had recourse to a physician more rarely (13% and 5.5%). They regularly used antidepressants and psychotropic medications on prescription. This frequency (29.5%) is comparable to most published series, with a frequency ranging from 21 to 30% (Hughes 1988; Defilipo et al. 2020).

The impact of domestic violence on mental health is increasingly identified and individualized. According to our study, the impact is real and affects young women; it is expressed by suicide attempts, symptoms of somatization and/or states of acute stress, and recourse to antidepressants and psychotropic drugs.

According to a Swedish study, exposure to domestic violence increased the risk of depressive symptoms by two and a half times, and a statistically significant association between exposure to domestic violence and depressive symptoms was noted (Lövestad et al. 2017). In addition, a USA cohort study concluded that exposure to domestic violence is associated with a higher risk of developing psychiatric illnesses, including major depressive disorder (Bonomi et al. 2009), but it also exposed victims to an increased risk of developing serious mental illness (anxiety, depression) (Chandan et al. 2020; Zacarias et al. 2012).

Regarding health risk behaviors, more than one in three women (38.5%) confirmed increased self-consumption of pain medication. However, nearly one in five women (18%) used anxiolytics and, to a lesser extent, neuroleptics (5.5%). For example, women who experience violence use psychotropic medications three times as much as other women (Raux et al. 2013; Field et al. 2004).

Such conduct could have a negative effect on the victims' health, with a particular possibility of physical and psychic dependence, which is superimposed and can be the cause of new suffering. In the USA, a study showed that alcohol is the primary predictor of intimate partner violence (Field et al. 2004).

Our study highlighted a significant proportion of pathological sequelae likely to affect women who are victims of domestic violence. There is a significant frequency of victims likely to develop diverse pathologic sequelae due to the location and severity of the initial injury balance. In fact, more than one in ten women of the studied sample showed serious lesions at the outset that would be detrimental to multiple and varied sequelae.

In terms of risk and protective factors, although no individual has absolute immunity for involvement in domestic violence, our study made it possible to confirm certain individual risk factors already known, such as the young age of victims, the low level of education, unemployment, or poverty.

Other community and societal factors have also been identified, such as the lack of institutions that shape social interactions as well as the weakness and disproportionality of the mechanism for repressing domestic violence within our community, the low participation of women in the working life, victims' social isolation, and deprivation from care and support structures.

In terms of conjugal life, almost one in five women wants to end her marriage relationship because she feels there is no other solution and no way out.

Nevertheless, regarding family life, we were able to show through this study that more than a third of the victims (39%) expressed a firm will for the dissolution of the marriage bond, and one woman in five confirmed that she wished to remain married. This confirms that these victims have no hope of improving their situation.

This result appears to be different from that of the Toulouse study (Raux et al. 2013), in which separation is considered with a relatively high frequency (71.2%).

These discrepancies are essentially the result of sociocultural differences and require an opportunity to accompany the female victims of domestic violence.

In terms of the impact on the health of victims, it is clear that many physical, psychological, or mental health problems and risky health behaviors are intimately associated with domestic violence.

The severity of this abuse correlates with the impact on physical and mental health; moreover, exposure to domestic violence is associated with an increased risk of developing mental disorders, including major anxiety-depressive disorders, disabling sequelae, and health-risk behaviors.

Conclusions

The results of our study clearly indicate that the situation is worrisome, and that it is impossible to neglect the importance and impact of domestic violence in our regions. This is a major public health issue.

Our study highlighted the extremely high frequency of psychological violence, as well as the reality and seriousness of sexual and economic violence, involving their interdependence. The traumatic consequences are many and can take multiple forms; they are often recurrent.

This study showed the health consequences of domestic violence. Although they are sometimes difficult to individualize, they are multiple and detrimental to women's health; therefore, none of their consequences on both physical and mental health should be underestimated. Victims are more likely to present multiple somatic and psychic disorders: aggravation and imbalance of previous pathologies, acute posttraumatic stress disorder, and suicide attempt; moreover, this mistreatment increases the risk of abortion, threats of premature delivery, and sexually transmitted infections.

It is clear that intimate partner violence goes hand in hand with negative and dangerous health behaviors and with alcohol and toxic substance consumption. The mission of the medical examiner is complex and delicate; it must inevitably respond to legal and health imperatives.

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Authors' contributions
All authors contributed to this study as follows: forensic examination of victims, interviews with victims, interrogations of victims, data retrieval, data capture, statistical analysis of data, and writing sections of the article. The authors read and approved the final manuscript.

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Availability of data and materials
All data from both prospective surveys are available on an Excel file and in paper format.

Declarations

Ethics approval and consent to participate
All measures and provisions relating to the principles applied to the ethics of human research (the Helsinki Biomedical Ethics Guidelines) have been respected and observed throughout this research work. The confidentiality of the information collected and the informed consent of the victims examined were respected. All the participants in this survey gave a favorable opinion after having explained to them the purpose and the framework of the investigation. Sheets explaining the objectives and the framework of the study were prepared beforehand and presented in two languages (Arabic and French) to the victims of domestic violence during the medicolegal examination and before each collection of information. The Ethics and Health Sciences Research Committee of the IBN ROCHD University Hospital in Annaba give a favorable opinion for this investigation. The ethics board approved the research protocol with an emphasis on confidentiality.

Consent for publication
All authors gave a favorable opinion for the publication of the results of our study.

Competing interests
The authors declare that they have no competing interests.

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