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Sexual violence in adult women and adolescents: a narrative review

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Abstract:

Sexual violence is a widespread phenomenon, as it has been estimated that about 35.6% of women have experienced some forms of sexual abuse, with variable prevalence estimates worldwide. Sexual violence has remarkable negative consequences on women's health and quality of life, with a specific harmful impact on women's psychological well-being and sexuality.

In this narrative review, we provide an overview on the phenomenon of sexual violence against adult women and adolescents, discussing its associated multiple negative consequences with a specific focus on clinical and sexological aspects. ''Women centered care'' and a multidisciplinary approach appear of pivotal importance when working with sexual violence survivors. Woman should be engaged in all the clinical activities as equal partners in the decision-making process, and should be supported by multiple and different professional figures (i.e. gynecologists, psychologists, sexologists, forensic medical doctors, lawyers) working within the framework of a cooperative integrated model.

Key words: sexual violence, sexual abuse, rape, adolescents, adult women

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Sexual violence: the extent of the problem

Sexual violence, defined by the World Health Organization (WHO) as "any sexual act, attempt to obtain a sexual act, or other act directed against a person's sexuality using coercion, by any person regardless of their relationship to the victim, in any setting", is a crucial issue worldwide, with serious physical, mental, ethical, and social consequences.[1]

According to the above-mentioned definition, sexual violence may include a wide range of sexually violent acts, such as completed rape or attempted rape, sexual coercion, sexual contact with force or threat of force, unwanted sexual advances or sexual harassment, systematic rape during wars, sexual abuse of children, rape within marriage or dating relationship.[1]

The Council of Europe "Convention on preventing and combating violence against women and domestic violence" (better known as the Istanbul Convention),[2] which is aimed at preventing any form of gender violence, defines sexual violence as "any non-consensual vaginal, anal or oral penetration of a sexual nature of the body of another person with any bodily part or object, any other non-consensual acts of a sexual nature with a person, or any attempt to force another person to engage in non-consensual acts of a sexual nature with a third person". The Istanbul Convention highlights the need for any sexual relationship to be carried out with consent, rather than pointing out the presence of situations that involve coercion, induction, violence, threat or abuse to define the occurrence of sexual violence.

Taking this into account, the lack of consent appears to be the constitutive element of the crime of sexual violence. The consent must be given voluntarily, as a free manifestation of the person's will, and must be evaluated considering the situation and context. It should be explicit (i.e. "yes means yes"), expressed in a quiet context and in the absence of conditions that may alter the woman's will (drugs, alcohol), not constrained by conditioning situations and/or environmental pressures (abuse of authority). Moreover, it should be preliminary to the sexual intercourse and it should remain valid throughout the period of time in which sexual acts are performed, concerning

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all the ways in which sexual intercourse is consumed (for example regarding the use of prophylactic or sex toys).

Data from the WHO underline that about 35.6% of women have experienced some forms of sexual violence, with variable prevalence estimates worldwide.[3] Results from an Italian national survey conducted by the National Institute of Statistics[4] revealed that, on a sample of 24.000 women aged 16-70, 6.788.000 women have been victims of either physical or sexual violence during their life (that is 31.5% of the sample). More specifically, 21% of women has been victim of sexual violence and 5.4% of the most serious forms of sexual violence such as rape and attempted rape.[4]

Data on sexual violence usually come from non-governmental organizations, governmental survey research, police reports, or from clinical settings. However, the available data are often insufficient and limited as many women do not report sexual violence to police because they feel ashamed or fear not to be believed. Moreover, data from clinical settings may be biased by the fact that only women who have suffered from the most severe forms of sexual violence (such as rape) ask for help to dedicated health services.

Several vulnerability factors, which put a woman at greater risk of sexual violence, have been described in the literature.[5] As the perpetrator of violence in most cases is represented by the partner or the ex-partner, being or having been in an intimate relationship represents a first and important factor of vulnerability. Other factors that influence the risk of sexual violence are young age, abuse of alcohol or other substances, having many sexual partners, prostitution/trafficking, and poverty.

Consequences of sexual violence

Psychological consequences of sexual violence

Research suggests that women victims of sexual violence are more likely to suffer from a broad range of psychological consequences, both in the immediate period following the violence

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and over the longer term.[6-10] Some authors reported a prevalence of symptoms indicative of a mental disorder in 33% of adult women who experienced sexual violence, in 15% of women who suffered from physical violence in an intimate relationship and in 6% of non-abused women.[8]

Specifically, studies reported higher risks of depression, anxiety,[7,9,10] higher levels of stress[7] suicidality attempts, post-traumatic stress disorders (PTSD), dissociative disorders,[11,12] eating disorders,[13] and sleep disturbances.[14] PTSD symptoms are more frequently associated to forms of sexual violence perpetrated with the use of a weapon and/or extreme physical force, or in cases where women were raped by strangers.[15] Moreover, women with a history of sexual trauma often report poor self-esteem and a lower ability to participate in social life, to the point that they are unable to adequately take care of their children or even to work.[15]

The first description of a specific psychological symptomatology caused by sexual violence - namely “Rape Trauma Syndrome”- was provided by Burgess and Holmstrom in 1974.[16] The authors interviewed and followed 146 women admitted to the emergency department of a city hospital because victims of a rape. Based upon an analysis of the 92 adult women of the sample, the authors described the existence of a rape trauma syndrome and delineated its characteristics. Specifically, the authors described an initial acute phase which can last from days to 3 weeks and is characterized by a mental disorganization where fear is the prevalent symptom, and a second phase of mental reorganization (that can last from months to years) in which the woman tries to restore order in her life and to retrieve a sense of control on the external world. In the acute phase women experiment feelings of shock and disbelief regarding what has happened, confusion, mood swings, disgust, humiliation, shame, self-blame, helplessness, anger, revenge, desire to forget, and inability to speak and describe the violence. In the reorganization phase (which may be either adaptive or maladaptive) women experiment feelings of loss of security, independence or autonomy, self-confidence and self-esteem. Reactions during this second phase may significantly differ from woman to woman, according to the age of the victim, her life situation, the type of rape, specific personality traits and the presence of a supportive environment.[16]

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Moreover, women may present mental disorders such as depression, anxiety, decreased self-esteem, phobias, self-harm attempts, suicidal ideation, drug use, eating disorders, sleep disorders, and psychosomatic disorders such as chronic pelvic pain, chronic migraine and gastro-intestinal disorders. In addition, very frequently women who survive sexual violence may suffer from nightmares, recurring thoughts, flashbacks, reduced attention and concentration or hypervigilance. Also, they may present difficulties in sexual or emotional relationships or a reduction in social interactions.

Physical consequences of sexual violence

Sexual violence does not necessarily involve a considerable deal of physical force or the use of a weapon. Women very often report that they felt immobilized by the fear of lethal consequences and so offered minimal active resistance to the sexual assault.[15] Some authors suggest that, similar to animals, humans who experienced extreme threat with fear of severe injuries or even death may react with a state of involuntary, temporary motor inhibition, known as tonic immobility.[17-19]
A study of 298 women who asked for help in an emergency clinical service for raped women within 1 month after the assault revealed that 70% of women reported significant tonic immobility, and 48% reported extreme tonic immobility during the sexual assault.[18] The development of post-traumatic stress disorder was more frequent in women with tonic immobility (OR 2.75; 95% CI 1.50-5.03, $p = 0.001$) and severe depression (OR 3.42; 95% CI 1.51-7.72, $p = 0.003$) at 6 months.[18]
From a physical rather than a psychological perspective, this means that very often sexual violence and rape are not associated with the presence of genital or extragenital lesions. It has been estimated that about one-third of rape survivors present visible physical lesions.[15] A recent study aimed at exploring differences in characteristics and clinical findings in cases of sexual violence in adolescents and in adult women reported that genital injuries were observed in 37% of adolescents and in 35% of adults, with no statistical differences between the two groups.[20] Genital lesions were associated with time of evaluation in the antiviolence-center in both groups (p=0.0456) and were

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more frequent in sexual violence survivors who requested help within the first 12 hours following the assault. Extragenital lesions were identified in 45% of adolescent girls and in 52% of adult women, with no statistically significant differences between the two groups.[20]

A study on 358 survivors of sexual violence with an average age of 18 years – who requested a gynecological evaluation within 72 hours from the sexual assault in 61% of cases – found that extra-genital lesions were identified in only 28% of cases, while genital/anal lesions were present in only 31% of cases.[21]

Genital lesions due to sexual violence are most likely found in the posterior fourchette, the labia minora, the hymen and/or the fossa navicularis. Injuries typically include tears, ecchymosis, abrasions, redness and swelling. Extra-genital physical lesions usually involve the presence of bruises and contusions, lacerations, and ligature marks typically localized to ankles, wrists and neck.[15]

Evaluating the prevalence of physical injuries after a sexual violence is essential, especially if one considers that clinicians have to adequately explain to the court the findings of their clinical examination. A meta-analysis on injury data following sexual assault – which included 26 studies published between 1972 and 2011 – reported a very wide range in the prevalence of genital lesions after sexual violence, from 5% to 87% of cases, with a mean of 34%. Authors were unable to draw definite conclusions about the prevalence of genital lesions after sexual violence, primarily because of the heterogeneity of the research methodology of the included studies.[22] This means that it could be dangerous to place too much emphasis on the forensic significance of genital lesions in adult women survivors of sexual violence, and that the only deduction that can be made with a certain confidence is that both consenting and non-consenting sexual intercourse may or may not been associated with genital lesions.[23] Consent –which represents the connotative element of the crime of sexual violence – cannot simply be deduced from an evaluation of genital or extra-genital injuries.

In addition, women who have experienced sexual violence may be at increased risk of unwanted pregnancy, unsafe abortion, sexually transmitted infections (STIs) including HIV, urinary

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tract infections, sexual dysfunctions, infertility, pelvic inflammatory disease, and chronic pelvic pain.[15]

Sexual violence in adolescence: a particularly critical situation

The estimated proportion of adolescent girls who have experienced sexual violence is not negligible. It is generally estimated that worldwide from 12% to 25% of girls younger than 18 years of age are victims of some type of sexual violence,[24] and that up to one-third of adolescents report their first sexual experience as being forced.[5] In a survey conducted in the Baltic countries, about 42%–56% of young girls described having been touched in a sexual offensive way, and about 10% reported non-consensual sexual intercourse.[25] A recent Italian national survey confirmed these alarming numbers,[4] and revealed that about 10% of the women interviewed reported to have been victims of sexual violence before the age of 16.

This data must be of concern for several reasons, as sexual violence in adolescence may be associated with devastating consequences on multiple levels.[26,27] Firstly, exposure to a severe trauma such as sexual violence in adolescence may have long-lasting destructive consequences on psychological wellbeing and mental health, and even be associated with the development of borderline or schizoid personality disorders.[28] Moreover, the consequences of a repetitive trauma (such as a sexual abuse at a young age perpetrated by a relative, a friend, or someone well known to the victim) may be particularly dangerous for the adolescent's psychological development. Secondly, adolescent girls exposed to sexual violence are more likely to re-experience sexual abuse in their adulthood (58.5% vs. 31.5% of the total examined female population).[4]

Moreover, teen dating violence (including cyber dating abuse) is increasingly frequent among adolescents and appears to be a critical issue, as it is associated with negative physical and mental health consequences.[29] Specifically, it was reported that more than half of experiences of sexual violence among young girls occurs in the context of dating or of an intimate relationship.[30-31] 'Sextortion' is a specific new form of cyber violence, which employs psychological forms of

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coercion (for example threats to expose girl's sexual images on the web) to force the victim to offer sexual favors or provide additional sexual pictures. Young girls are more likely to be exposed to 'sextortion', to be threatened for a longer time, or to be psychologically forced to harm themselves by their dating partner.[32,33]

Adolescents who have experienced sexual violence request help at a later stage compared to adult female victims of sexual abuse.[20] A delayed disclosure has several negative repercussions. Firstly, it could have a significant impact on the risk of severe mental consequences. Secondly, it could limit the capability to diagnose genital and extra-genital injuries and to collect biological materials (such as for example spermatozoa) which are useful for forensic/legal purpose. Thirdly, it could reduce the efficacy of prophylaxis for sexually transmitted diseases or unwanted pregnancies. For all these reasons, prevention programs should be focused on the importance of a prompt disclosure after a sexual violence, and gynecologists should be made aware of this delicate issue, to better assist adolescent victims.

Clinical issues related to the assistance of women survivors of sexual violence

When offering clinical care for women survivors of sexual violence, the prevailing priority must always be the health and the mental wellbeing of the woman. The access to clinical services can represent a first reparative experience with respect to the predatory and oppressive relationship the woman experienced at the time of the sexual violence. The woman must feel that she has found the right place to tell her experience and that she can trust the health-care worker. At the same time, health professionals working with victims of sexual violence should be free of prejudices and guarantee high ethical standards and confidentiality in the provision of such a sensitive service.

As regards this specific issue, the World Health Organization[34] recommends professional figures to be non-judgmental and supportive with respect to the woman's history of violence; to provide practical assistance and support addressing all the woman's concerns, without however engaging in intrusive behavior; to ask the woman to tell her story of violence, listening carefully,

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without pressuring her to speak; to facilitate access to important information on available resources, including legal/social services; to ensure confidentiality, although informing the woman of the duty of a mandatory report to the judicial system in the cases specified by the law.

The main clinical purposes of the first assessment of women victims of the sexual violence are to evaluate psychological needs and offer immediate support, to identify and eventually treat all acute physical lesions, to evaluate the risk of adverse consequences, such as sexually transmitted infections and pregnancy, to guide specimen collection for forensic purposes, to provide a valid documentation (such as for example pictures, description of injuries) to be used in the legal context.

Ideally, the provision of clinical assistance to survivors of sexual violence (i.e. physical and gynecological inspection, detection and treatment of physical lesions, prevention of sexually transmitted infections and unwanted pregnancies) should be conducted in conjunction with forensic activities, such as injury description with regards to size, type, shape, depth, color, borders and/or specimens' collection. Moreover, proposing medical and forensic assistance at the same time should be an advantageous approach to limit the number of invasive physical and gynecological evaluations, as well as the number of interviews to women about the abuse they experienced.[15]

Offering immediate psychological support for post-traumatic symptoms is also of pivotal importance. The cornerstone of the first psychological counseling to victims of sexual violence is to empathically listen the woman's history of violence and her experiences, starting a therapeutic alliance to contain woman's emotions and feeling of fear, shame, guilt, self-blame, and humiliation. There are several evidence-based approaches suggested for post-traumatic stress disorder (PTSD) or other psychological difficulties resulting from sexual violence, such as psychodynamic psychotherapy, trauma-focused cognitive behavioral therapy (TF-CBT), and eye movement desensitization and reprocessing therapy (EMDR).[35] Being unhurried, giving time, using a calm tone of voice, being non-judgmental, and using sensitive language may contribute to avoid woman's revictimization. In addition, it is important to inform the woman about her judicial rights

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and about the modality to make a voluntary complain, as well as about the existence of dedicated local services.

During the initial assessment, health care workers should also obtain an informed consent to all the clinical evaluations proposed, clearly explaining all aspects of the consultation, including information on the meaning of the gynecological examination, the need for toxicological exams, the collection of biological samples for the detection of infectious diseases or for forensic purposes.

Specific details about the sexual assault must be documented including date and location of the sexual violence, characteristics of the perpetrators (such as the name, number of assailants, relationship with the victims), modality of violence (type of sexual contact, vaginal/anal/oral penetration, penetration with penis, fingers or objects, ejaculation, use of condom), use of weapons, use of alcohol or other drugs. The physical examination should be conducted from head-to-toe, concluding with the genito-anal area.[36] All injuries should be accurately described and, if possible, documented with pictures, ensuring privacy and confidentiality.

According to the modality of the sexual assault, most women are concerned about the possibility of an unwanted pregnancy. In these cases, emergency contraception (i.e levonorgestrel single administration or a single dose of 30 mg ulipristal acetate) should always be offered if the clinical evaluation is conducted within 5 days from the sexual violence, the woman has a negative pregnancy test or is sure she is not currently pregnant. However, women should be advised that emergency contraception is not 100% effective. If a woman undergoes clinical examination more than 5 days after the sexual violence, she should be advised to perform a pregnancy test if she misses her next menstrual period. In the event of a confirmed pregnancy patients should be fully informed of their legal rights, according to the national laws.

As a consequence of sexual violence, women may be exposed to the risk of contracting a sexually transmitted infection (STI), such as chlamydia, gonorrhea, syphilis, trichomoniasis, human papilloma virus (HPV), HIV and the hepatitis B and C virus. Vaginal and cervical cultures and blood samples should be obtained to assess STI status. The decision to provide prophylactic

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treatment for STI (including post-exposure prophylaxis for HIV) should be made on a case-by-case analysis, according to the history and modality of violence, woman's preference, and time elapsing between the violence and the physical examination. Individualized follow-up evaluation for infectious diseases should be always proposed. The collection of biological samples, in particular swabs for spermatozoa search, should be conducted according to the history of violence (considering for example the site of penile penetration and ejaculation) and time elapsed between the sexual violence and the clinical evaluation.

Sexual dysfunctions after sexual violence specifically experienced in adulthood

The association between child sexual abuse and sexual disfunctions is well known and widely described in the literature.[37-44] Although limited, some evidences suggest an association between sexual trauma experienced in adulthood and the development of sexual dysfunctions.[45-47] A retrospective study evaluating the characteristics of women suffering from sexual dysfunctions who attended a tertiary hospital found that, among the 610 women eligible for the study, 134 (21.97%) reported they had been victims of sexual violence. Moreover, 74.0% of women survivors of sexual violence vs. 59.8% of controls had a hypoactive sexual desire disorder ($p<0.05$), 20.3% of survivors vs. 7.19% of controls ($p<0.05$) had primary anorgasmia, 52.3% of survivors vs. 39.6% ($p<0.05$) of controls reported a lower sexual interest and reduced arousal (61.3% vs 48.8%, $p<0.05$). Moreover, authors found that depression was significantly more prevalent in women who had suffered from sexual violence (32.1% vs. 18.3%; $p<0.05$).[47] Similarly, a significant association between the traumatic experience of being exposed to sexual violence and lower sexual satisfaction, greater PTSD, depressive symptoms, and higher suicidal ideation was also described by Di Mauro *et al*., in a study on 255 female veterans in monogamous relationships who reported a previous history of sexual violence (n = 153) or nonsexual violence (n = 102).[48]

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In a cross-sectional analysis on a cohort of 2016 women aged 40 to 80, Gibson *et al*. examined the association between intimate partner violence (IPV), sexual violence, and posttraumatic stress disorder and menopause symptoms. Sexual violence was reported by 382 women (18.9%) and was associated with vaginal dryness (OR, 1.41; 95% CI, 1.10-1.82), vaginal irritation (OR, 1.42; 95% CI, 1.04-1.95), and pain with intercourse (OR, 1.44; 95% CI, 1.00-2.06), highlighting the need for better recognition of exposure to sexual assault by health professionals also when taking care for midlife and older women.[49]

Being victimized at a young age by a known perpetrator and experiencing penetration during sexual violence were related to the development of severe sexual problems during and immediately after the assault.[46] It has been reported that women who experienced a sexual assault with penetration had many more adverse consequences in several sexual domains compared to women who experienced a sexual violence without penetration, including decreases in sex frequency and sexual interest.[50] A qualitative study on survivors of sexual violence suggested main themes describing how sexuality changed after a sexual assault, such as losing sexual desire, increased sexual behavior, and increasing sexual partners,[51] with clear clinical implications for prevention and treatment.

Some authors pointed out that, although sexual dysfunctions often occur after a sexual assault, they are infrequently targeted within psychological treatments. A meta-analytic review aimed at assessing whether psychological treatment for PTSD (as a consequences of sexual violence) has an effect on female sexuality found that psychological treatment for PTSD has no effect on sexual disfunctions.[52] Future psychological interventions for sexual violence survivors should specifically target also sexual dysfunctions, to help women engage in positive consensual sexual activities, as well as to provide elements to facilitate the communication of their needs to their sexual partners.

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Conclusion

The team involved in the care of women survivors of sexual violence should be composed of different professional figures, such as gynecologists, forensic medical doctors, psychologists/psychotherapists, social workers, sexologists, and lawyers, with a continuous constructive dialogue with the judicial authorities. All professional figures should be trained in gender violence (and particularly in sexual violence) as well as in trauma-informed care, as it has been demonstrated that a sexual assault is a threatening event in the woman's life with multiple negative psychological consequences.

''Women centered care'' is of pivotal importance when working with sexual violence survivors. This means that woman should be engaged in all the clinical and psychological activities as equal partners in the decision-making process, considering individual preferences and needs, avoiding re-victimization due to inappropriate practices that put women in a powerless situation.

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References

1.World Health Organization (2002). World report on violence and health. Edited by Krug EG, Dahlberg L, Mercy JA, Zwi AB and Lozano R. Available at: hiips://apps.who.int/iris/bitstream/handle/10665/42495/9241545615_eng.pdf. Accessed January 2022.

2. Council of Europe Convention on preventing and combating violence against women and domestic violence (CETS No. 210) (2021). Available at: hiips://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treatynum=210. Accessed on January 2022

3. Garcia-Moreno C, Palitto C, Devries K. Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence. Geneva: World Health Organization; 2013.

4. Italian National Institute of Statistics ISTAT (2015). Violence Against Women -year 2014. Available at: hiip://www.istat.it/en/archive/169135. Accessed on January 2022.

5. Centers for Disease Control and Prevention (CDC) (2021). Violence prevention. Available at: hiips://www.cdc.gov/violenceprevention/sexualviolence/riskprotectivefactors.html. Accessed on January 2022.

6. Darves-Bornoz JM. Rape-related psychotraumatic syndromes. European Journal of Obstetrics, Gynecology and Reproductive Biology 1997;71:59–65.

7. Brunton R, Dryer R. Sexual violence and Australian women: A longitudinal analysis of psychosocial and behavioral outcomes. Soc Sci Med 2021; 20:114334.

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8. Mullen PE, Romans-Clarkson SE, Walton VA, Herbison GP. Impact of sexual and physical abuse on women's mental health. Lancet 1988;i:841–845.

9. Tarzia L, Maxwell S, Valpied J, Novy K, Quake R, Hegarty K. Sexual violence associated with poor mental health in women attending Australian general practices. Aust N Z J Public Health 2017 41:518-523.

10. Satyanarayana VA, Chandra PS, Vaddiparti K. Mental health consequences of violence against women and girls. Curr Opin Psychiatry 2015;28:350-6.

11. Chivers-Wilson KA. Sexual assault and posttraumatic stress disorder: a review of the biological, psychological and sociological factors and treatments. Mcgill J Med 2006;9:111-8

12. Honda T, Wynter K, Yokota J, Tran T, Ujiie Y, Niwa M, *et al*. Sexual Violence as a Key Contributor to Poor Mental Health Among Japanese Women Subjected to Intimate Partner Violence. J Womens Health (Larchmt) 2018;27:716-723.

13. Lie SØ, Bulik CM, Andreassen OA, Rø Ø, Bang L. Stressful life events among individuals with a history of eating disorders: a case-control comparison. BMC Psychiatry 2021;21:501.

14. Steine IM, Skogen JC, Hysing M, Puigvert L, Schønning V, Sivertsen B. Sexual harassment and assault predict sleep disturbances and is partly mediated by nightmares: Findings from a national survey of all university students in Norway. J Sleep Res 2021;30:e13338.

15. WHO 2003: Guidelines for medico-legal care of victims of sexual violence. Available at: hiips://apps.who.int/iris/bitstream/handle/10665/42788/?sequence=1, Accessed January 2022

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16. Burgess AW & Holmstrom LL. Rape Trauma Syndrome, Am J Psychiatry 1974; 981-986

17. Bovin MJ, Jager-Hyman S, Gold SD, Marx BP, Sloan DM. Tonic immobility mediates the influence of peritraumatic fear and perceived inescapability on posttraumatic stress symptom severity among sexual assault survivors. J Trauma Stress 2008;21:402-9.

18. Möller A, Söndergaard HP, Helström L. Tonic immobility during sexual assault - a common reaction predicting post-traumatic stress disorder and severe depression. Acta Obstet Gynecol Scand 2017;96:932-938.

19. Van Buren BR, Weierich MR. Peritraumatic Tonic Immobility and Trauma-Related Symptoms in Adult Survivors of Childhood Sexual Abuse: The Role of Posttrauma Cognitions. J Child Sex Abus 2015;24:959-74.

20. Torazzi E, Merelli V, Barbara G, Kustermann A, Marasciuolo L, Collini F, *et al*. Similarity and Differences in Sexual Violence Against Adolescents and Adult Women: The Need to Focus on Adolescent Victims. J Pediatr Adolesc Gynecol 2021;34:302-310.

21. Santos JC, Neves A, Rodrigues M, Ferrão P. Victims of sexual offences: medicolegal examinations in emergency settings. J Clin Forensic Med 2006;13:300-3.

22. Kennedy KM. Heterogeneity of existing research relating to sexual violence, sexual assault and rape precludes meta-analysis of injury data. J Forensic Leg Med 2013;20:447-59.

23. Walker G. The (in)significance of genital injury in rape and sexual assault. J Forensic Leg Med 2015;34:173-8.

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24. Sapp MV, Vandeven AM. Update on childhood sexual abuse. Curr Opin Pediat 2005;17:258–264.

25. European institute for gender equality's studies on gender biased violence. Available at: hiip://eige.europa.eu/gender-based-violence/eiges-studies-gender-based-violence study-identify-and-map-existing-data-and-resources-sexualviolence- against-women-eu Accessed January 2022.

26. Barbara G, Collini F, Cattaneo C, et al: Sexual violence against adolescent girls: labeling it to avoid normalization. J Womens Health 2017; 26:1146

27. Barbara G, Collini F, Cattaneo C, Facchin F, Vercellini P , Chiappa L *et al.* Sexual violence against adolescent girls: the need for shared multidisciplinary prevention strategies. BJOG 2017; 124:434

28. Krupnick JL, Green BL, Stockton P, Goodman L, Corcoran C, Petty R. Mental health effects of adolescent trauma exposure in a female college sample: exploring differential outcomes based on experiences of unique trauma types and dimensions. Psychiatry 2004;67:264-79.

29. Johnson SE, Hoffman JA, Kruger LJ, Rizzo CJ. Teaching school psychology students about dating violence: A snapshot of training practices across the USA. School Ment Health 2015;7:249–270.

30. Black MC, Breiding MJ. Adverse health conditions and health risk behaviors associated with intimate partner violence – United States, 2005. Morbidity and Mortality Weekly Report 2008, 57:113–117

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31. Black MC, Basile K, Breiding M, Smith S, Walters M, Merrick M, et al. *The National Intimate Partner and Sexual Violence Survey (NISVS)*: 2010 Summary Report. Atlanta, GA: National Center for Injury Prevention and Control Centers for Disease Control and Prevention, 2011

31. Wolak J, Finkelhor D, Walsh W, Treitman L. Sextortion of Minors: Characteristics and Dynamics. J Adolesc Health 2017;62:72.

32. Miller E, Jones KA, McCauley HL. Updates on adolescent dating and sexual violence prevention and intervention. Curr Opin Pediatr 2018;30:466-471.

33. World Health Organization (WHO) 2003. Responding to intimate partner violence and sexual violence against women. Available at: hiips://www.who.int/reproductivehealth/publications/violence/9789241548595/en/ . Accessed on January 2022

34. Cowan A, Ashai A, Gentile JP. Psychotherapy with Survivors of Sexual Abuse and Assault. Innov Clin Neurosci 2020;17:22-26.

35. Società Italiana di Ginecologia e Ostetricia (SIGO) 2020. Raccomandazioni per l'assistenza alla donna vittima di violenza sessuale Available at.hiips://www.sigo.it/wpcontent/uploads/2019/10/Raccomandazioni_AssistenzaViolenzaSessuale.pdf. Accessed January 2022.

36. Staples J, Rellini AH, Roberts SP. Avoiding experiences: sexual dysfunction in women with a history of sexual abuse in childhood and adolescence. Arch Sex Behav 2012;41:341-50.

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37. Rellini AH, Elinson S, Janssen E, Meston CM. The effect of pre-existing affect on the sexual responses of women with and without a history of childhood sexual abuse. Arch Sex Behav 2012;41:329-39.

38. Zollman G, Rellini A, Desrocher D. The mediating effect of daily stress on the sexual arousal function of women with a history of childhood sexual abuse. J Sex Marital Ther 2013;39:176-92.

39. Stephenson KR, Pulverman CS, Meston CM. Assessing the association between childhood sexual abuse and adult sexual experiences in women with sexual difficulties. J Trauma Stress. 2014;27:274-82.

40. Gewirtz-Meydan A, Ofir-Lavee S. Addressing Sexual Dysfunction After Childhood Sexual Abuse: A Clinical Approach from an Attachment Perspective. J Sex Marital Ther 2021;47:43-59.

41. Bigras N, Vaillancourt-Morel MP, Nolin MC, Bergeron S. Associations between Childhood Sexual Abuse and Sexual Well-being in Adulthood: A Systematic Literature Review. J Child Sex Abus 2021;30:332-352.

42. Najman JM, Dunne MP, Purdie DM, Boyle FM, Coxeter PD. Sexual abuse in childhood and sexual dysfunction in adulthood: an Australian population-based study. Arch Sex Behav 2005 ;34:517-26.

43. Pulverman CS, Kilimnik CD, Meston CM. The Impact of Childhood Sexual Abuse on Women's Sexual Health: A Comprehensive Review. Sex Med Rev 2018;6:188-200.

44. Weaver TL. Impact of rape on female sexuality: review of selected literature. Clin Obstet Gynecol 2009;52:702-11.

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45. Van Berlo W, & Ensink B. Problems with sexuality after sexual assault. Annual Review of Sex Research 2000;11, 235–57

46. Figueira JR, Lara LAS, Andrade MC, Rosa-E-Silva ACJS. Comparison of Sexual Dysfunction in Women Who Were or Were Not Victims of Sexual Violence. J Sex Marital Ther 2021;47:621-630.

47. DiMauro J, Renshaw KD, Blais RK. Sexual vs. Non-sexual trauma, sexual satisfaction and function, and mental health in female veterans. J Trauma Dissociation 2018;19:403-416.

48. Gibson CJ, Huang AJ, McCaw B, Subak LL, Thom DH, Van Den Eeden SK. Associations of Intimate Partner Violence, Sexual Assault, and Posttraumatic Stress Disorder With Menopause Symptoms Among Midlife and Older Women. JAMA Intern Med 2019;179:80-87.

49. Perilloux C, Duntley JD, & Buss DM. The costs of rape. Archives of Sexual Behavior 2012;41, 1099–1106.

50. O'Callaghan E, Shepp V, Ullman SE, Kirkner A. Navigating Sex and Sexuality After Sexual Assault: A Qualitative Study of Survivors and Informal Support Providers. J Sex Res 2019;56:1045-1057.

51. O'Driscoll C, Flanagan E. Sexual problems and post-traumatic stress disorder following sexual trauma: A meta-analytic review. Psychol Psychother 2016;89:351-67.

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