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BRIEF NOTE

Precision prevention network: new pathway for supporting women victims of violence

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Abstract

Introduction. Violence against women (VAW) is a persistent global public health problem that runs across all social classes and ethnicities with a considerable negative influence on women's health and behaviour. Early detection, appropriate interventions and multidisciplinary cooperation are crucial factors in tackling gender violence.

Objectives. This note describes "The Violence against women: long-term health effects for precision prevention" transdisciplinary and multicenter project that aims to implement the National Guidelines with two sets of questions: the European Injury Database (EU-IDB) violence module and the Post-Traumatic Stress Disorder (PTSD) questionnaire for improving innovative approaches to limit the long-term health effect of VAW. Furthermore, the analysis of epigenetic profile in women's DNA may contribute to the knowledge of molecular mechanisms underlying PTSD and other non-communicable diseases. Epigenomic research in parallel with rigourous guidelines and social, educational, clinical and community interventions could accomplish innovative precision prevention protocols.

Conclusions. Public health plays essential role in identifying risk factors and strengthening the support for women victims of violence.

Key words

- violence against women (VAW)
- intimate partner violence (IPV)
- post traumatic stress disorder (PTSD)
- long-term effect
- precision prevention

INTRODUCTION

Violence against women (VAW) may determine higher physical health morbidity and mortality [1]. It is one of the most devastating plagues worldwide with a considerable negative influence on women's health and behaviour [2].

The United Nations defines VAW as "any act of gender-based violence that results in, or is likely to result in, physical, sexual, or mental harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life" [3].

Furthermore, the Council of Europe Convention on preventing and combating VAW and domestic violence, the so-called Istanbul Convention (2011), defines gender-based violence as any violence directed against a woman as such, or that affects women disproportionately (art. 3) [4].

A data analysis conducted from 2000 to 2018, across 161 countries, by WHO and UN Interagency Working Group on Violence against Women, found the prevalence of nearly 30% of women subjected to physical and/or sexual violence by an intimate partner or non-partner sexual violence or both [1].

In addition, the Italian National Institute of Statistics reported that about 31.5% of women have experienced some form of violence at least once in their life [5].

Current data confirm the very high prevalence of all types throughout the world [6, 7]: 35% of women worldwide have experienced either physical and/or sexual violence, 7% have been sexually assaulted by someone other than a partner, and 200 million have experienced female genital mutilation/cutting [8].

Worldwide, almost one-third (27%) of women aged 15-49 years, who have been in a relationship, reported that they have been subjected to some form of physical and/or sexual violence by their intimate partner [1]. An increasing research demonstrates the associations between intimate partner violence (IPV) and women's mental health problems, in particular, depression and stress related disorders [9] affecting woman's physical and mental health, reducing sexual autonomy, and in-

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creasing the risk for unintended pregnancy and multiple abortions [10].

According to the European Injury DataBase (EU-IDB) [11], the two most common forms of VAW are IPV and violence by acquaintances or friends (39% and 17% respectively).

Thus, violence has long-term consequences even if the violence has stopped or has been limited to a single abuse episode making the victims vulnerable to many diseases and conditions [10] (*Figure 1*). Among the mental health and behavioural disorders, the most prevalent is the Post Traumatic Stress Disorder (PTSD), a stress-related disorder triggered by sudden traumatic events and multiple genomic factors [1, 12].

In analogy to the Istanbul Convention, the current Italian National Strategic Plan on male violence against women [13] includes 4 pillars: *i)* prevention, *ii)* protection and support, *iii*) prosecution and punishment, *iv)* assistance and promotion.

The Decree of the President of the Council of Ministers (November 24, 2017) introduced the National Guidelines for Health Authorities and Hospitals concerning rescue and socio-medical assistance to women victims of violence, adopted in accordance with the objectives of the Italian National Strategic Plan [14]. The aim of the National Guidelines is to provide an adequate and integrated intervention in the treatment of the physical and psychological consequences of violence starting from timely care of women victims of violence up to accompaniment to local services. This pathway encompasses both the Emergency Department (ED) and the dedicated medical services in the territory (*Figure 2*).

MEASURES TO IMPROVE THE PATHWAY FOR SUPPORTING WOMEN VICTIMS OF VIOLENCE

National Guidelines path provides a triage code (for confirmed or suspected violence) and, according to the severity of the trauma, an *ad hoc* protocol, as the result of the activation of fast track to psychological assessment in case of less serious health conditions; otherwise, in the case of hospitalization, the psychological assessment will be performed when the health conditions improve. In order to better understand the context of violence, our project proposes to collect information concerning: *i)* sex of the perpetrator, *ii)* age of the perpetrator, *iii)* setting of the assault *iv)* relationship victim/perpetrator *(see Supplementary Material available online in italian version, in order to meet the objectives of the project; Figure 2)* through the EU-IDB violence module [11].

In addition to the physical and medical examination, a psychological interview is submitted for assessing re-victimization risk. If, following the psychological assessment, as already suggested by National Guidelines (*e.g.* with the Brief Risk Assessment for ED-DA-5; see *Supplementary Material available online*) [15], a medium/high risk of relapse emerges, the woman is entrusted to an emergency shelter or similar facilities, otherwise she is discharged. In both cases, the objective is the activation of her entry into the territorial anti-violence network.

Finally, the PTSD assessment is carried out when patient has established a relationship with the psychologist. After the discharge from hospital to her place to an emergency shelter, the PTSD assessment can be performed using the International Trauma Questionnaire-ITQ (*see Supplementary Material available online; Figure 2*) [16].

One of the new tasks of the Central Actions Area (*Centro Nazionale per la Prevenzione e il Controllo delle Malattie, CCM*) "Violence against women: long-term health effects for precision prevention" requires the integration of EU-IDB violence module and ITQ in the National Guidelines [14].

This integration is part of a multicentric and transdisciplinary project, "The Violence against women: long-term health effects for precision prevention", aiming at defining new strategies and models for supporting wom-

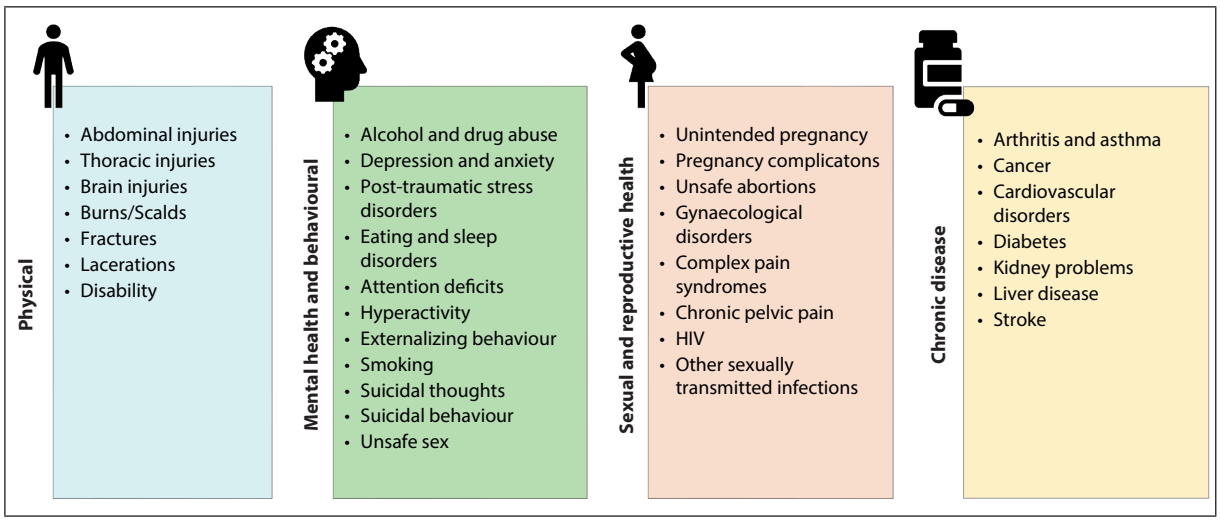

Figure 1
Behavioural and health consequences of violence (adapted from WHO. Global status report on violence prevention 2014. Available from: https://www.who.int/publications/i/item/9789241564793, last access August 2024. WHO is not responsible for the content or accuracy of this adaptation).

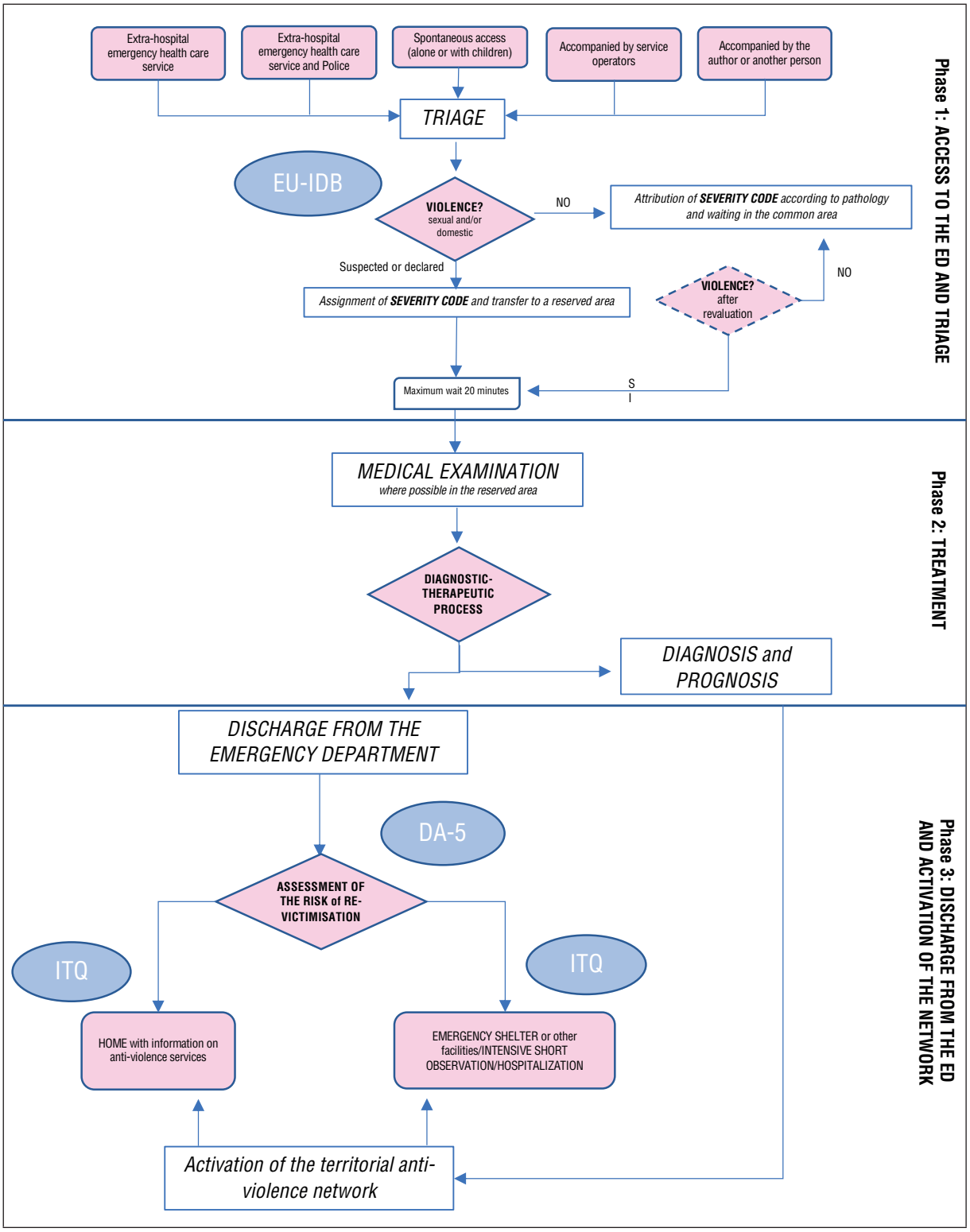

Figure 2
The pathway for supporting women victims of violence. In the circle the assessment tools are shown: EU-IDB violence module revised; Brief Risk Assessment (DA-5) and PTSD questionnaire (International Trauma Questionnaire-ITQ). (Modified from "Linee guida nazionali per le Aziende sanitarie e le Aziende ospedaliere in tema di soccorso e assistenza socio-sanitaria alle donne vittime di violenza. Gazzetta Ufficiale della Repubblica Italiana, Serie generale - n. 24 del 30.01.2018).

en and at creating new territorial models to counteract long-term health effects. In fact, most epidemiological studies on VAW focus on short-term effects, while long-term ones are neglected or marginally included even if they involve serious and complex consequences.

Early detection of chronic and non-communicable diseases that originate from the trauma is crucial to face their onset.

EPIGENETICS OF VIOLENCE AGAINST WOMEN

Violence, as a negative "socio-environmental" factor, is able to influence and modify the functionality of our genome through epigenetic modifications. Studying the genome and identifying epigenetic markers is an innovative approach to understanding the effects of violence on women's psychophysical health. In fact, the consequences of violence remain in the psyche and can also affect the structure and functionality of the DNA (deoxyribonucleic acid) compromising women's health.

It has already been demonstrated that violence interferes with genome plasticity and gene expression through epigenetic mechanisms [17]. Differentially regulated methylation levels of genes associated with Hypothalamic-Pituitary-Adrenal (HPA) axis, neurotransmission and inflammation genes were found to be linked to PTSD [18, 19]. Among long-term psychiatric disorders, PTSD is the most prevalent and is triggered by sudden traumatic events and multiple genomic factors and influenced by duration and severity of violence [1, 12].

In 2016, the Italian National Institute of Health (Istituto Superiore di Sanità, ISS) in collaboration with the University of Milan and the Cà Granda Foundation of the Ospedale Maggiore Policlinico di Milano, conducted the pilot study "Epigenetics for women" (EpiWE) that highlighted the presence of epigenetic markers associated with PTSD arising from violence in the relational and/or sexual environment compared to the control population.

The EpiWe study represented a preliminary attempt to link PTSD and stress relatated disorders in women who have been exposed to IPV or sexual violence to epigenetic changes detected in their DNA samples [20]. In particular, three genes brain-derived neurotrophic factor (BDNF), dopamine receptor D2 (DRD2), and insulin-like growth factor 2 (IGF2) have been found to be differentially expressed (hypermethylated) indicating that violence can interfere with genome plasticity and gene expression regulation. This finding, although preliminary, is promising in revealing epigenetic markers in genes mediators of brain plasticity, which can modulate learning and memory in response to stress associated with IPV and violence-induced PTSD. By contributing to the knowledge of epigenetic signature underlying PTSD and stress-related disorders in the context of VAW, we could derive clues about better treatments and innovative protocols of precision medicine for limiting the long-term effects [20].

The EpiWe pilot project developed into a multicentric project, "Violence against women: long-term health effects for precision prevention", that intends to collect biological samples for a follow-up study to detect the epigenetic signature of the entire genome.

DISCUSSION AND CONCLUSIONS

VAW has different dimensions in different cultures and, clearly, encompasses very different levels of traumatic injuries. This leads to the need of a unescapable systematic multidisciplinary approach.

The "Violence against women: long-term health effects for precision prevention", a transdisciplinary and multicenter project, aims to implement the National and Territorial Health Services for tackling the long-term health consequences by means of dedicated health and social services. It is necessary to build up the entire health history of women to correlate violence and the early onset of some non-communicable diseases.

In our project, a substantial premise is represented by the creation of a unique individual personal code that will enable to set up the personal clinical history of the patient (DMdS 262 of 7 December 2016).

Moreover, during our pilot study we faced various problems in particular, the patient dropout, which means the abandon of the care pathway. This results in the lack of DNA samples acquisition, necessary to the follow-up study (2 years, at least). The epigenomic analysis of the samples could be of use as a biomarker of the consequences of the violence that sometimes could emerge even many years after the event.

The implementation of the ViVa biobank within the ISS, ensures the first collection of biological samples of women who have survived violence, and violence for the first time is considered as a social health determinant that causes diseases.

The earlier is the detection of PTSD in association with the epigenetic markers, the faster will be the development of resilience.

Our objective consists in improving Public Health research by creating and interconnecting innovative strategies to ensure long-term care and limit the costs of violence weighing heavily both on women for women who have suffered violence and on the National Health Service (NHS).

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Authors' contributions

AC, MG and SG conceived and designed the study and wrote the manuscript. EC revised and edited the manuscript. All Authors revised the manuscript for important intellectual content, and agreed with this article's contents.

Conflict of interest statement

The Authors declare no competing interests.

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REFERENCES

1. Violence against women prevalence estimates, 2018. Global, regional and national prevalence estimates for intimate partner violence against women and global and regional prevalence estimates for non-partner sexual violence against women. WHO: Geneva, 2021. Available from https://www.who.int/publications/i/item/9789240022256.
2. European Institute for Gender Equality. Forms of violence. 2019. Available from: https://eige. europa.eu/gender-based-violence/forms-of-violence.
3. United Nations. Declaration on the elimination of violence against women. New York: UN; 1993. Available from: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.un.org/en/genocideprevention/documents/atrocity-crimes/Doc.21_declaration%20elimination%20vaw.pdf.
4. Council of Europe. Council of Europe Convention on preventing and combating violence against women and domestic violence. Istanbul; 2011. Available from: https://rm.coe.int/168008482e.
5. Istituto Nazionale di Statistica. Indagine sulla sicurezza delle donne. Anno 2014. ISTAT; 2015. Available from: https://www.istat.it/it/files//2015/06/Violenze_contro_le_donne.pdf.
6. United Nations. Department of Economic and Social Affairs, Statistics Division. World population prospects: The 2019 revision. Available from: https://esa.un.org/unpd/wpp/Download/Standard/Population/2019.
7. World Bank. World development indicators. Available from: http://data.worldbank.org/data-catalog/world-development-indicators.
8. World Bank. Gender-based violence (Violence against women and girls). 2019. Available from: www.worldbank.org/en/topic/socialdevelopment/brief/violence-against-women-and-girls.
9. Stewart DE, Vigod SN. Update on mental health aspects of intimate partner violence. Med Clin North Am. 2019;103(4):735-49.
10. Sarkar NN. The impact of intimate partner violence on women's reproductive health and pregnancy outcome. J Obstet Gynaecol. 2008;28(3):266-71.
11. Giustini M, Fondi G, Bejko D, Bauer R, Valkenberg H, Pitidis A for the EU-IDB Working Group. European Injury Data Base (EU-IDB): data analysis 2020. Roma: Istituto Superiore di Sanità; 2023. (Rapporti ISTISAN, 23/12).
12. Castro-Vale I, Carvalho D. The pathways between cortisol-related regulation genes and PTSD psychotherapy. Healthcare (Basel). 2020;8(4):376.
13. Presidenza del Consiglio dei Ministri. Piano strategico nazionale sulla violenza maschile contro le donne 2021-2023. Available from: https://www.pariopportunita.gov.it/it/politiche-e-attivita/violenza-di-genere/piano-strategico-nazionale-sulla-violenza-maschile-contro-le-donne-2021-2023/.
14. Italia. Decreto del presidente del consiglio dei ministri 24 novembre 2017. Linee guida nazionali per le Aziende sanitarie e le Aziende ospedaliere in tema di soccorso e assistenza socio-sanitaria alle donne vittime di violenza. Gazzetta Ufficiale, Serie Generale - n. 24, 30 ottobre 2018. Available from: https://www.gazzettaufficiale.it/eli/id/2018/01/30/18A00520/SG.
15. Snider C, Webster D, O'Sullivan CS, Campbell J. Intimate partner violence: development of a brief risk assessment for the emergency department. Acad Emerg Med. 2009;16(11):1208-16. doi: 10.1111/j.1553-2712.2009.00457.x
16. Cloitre M, Shevlin M, Brewin CR, Bisson JI, Roberts NP, Maercker A, Karatzias T, Hyland P. The International Trauma Questionnaire: development of a self-report measure of ICD-11 PTSD and complex PTSD. Acta Psychiatr Scand. 2018;138(6):536-46. doi: 10.1111/acps.12956
17. Daskalakis NP, Rijal CM, King C, Huckins LM, Ressler KJ. Recent genetics and epigenetics approaches to PTSD. Curr Psychiatry Rep. 2018;20(5):30.
18. Rusiecki JA, Chen L, Srikantan V, Zhang L, Yan L, Polin ML, Baccarelli A. DNA methylation in repetitive elements and post-traumatic stress disorder: a case-control study of US military service members. Epigenomics. 2012;4(1):29-40.
19. Smith AK, Ratanatharathorn A, Maihofer AX, Naviaux RK, Aiello AE, Amstadter AB, Ashley-Koch AE, Baker DG, Beckham JC, Boks MP, Bromet E, Dennis M, Galea S, Garrett ME, Geuze E, Guffanti G, Hauser MA, Katrinli S, Kilaru V, Kessler RC, Kimbrel NA, Koenen KC, Kuan PF, Li K, Logue MW, Lori A, Luft BJ, Miller MW, Naviaux JC, Nugent NR, Qin X, Ressler KJ, Risbrough VB, Rutten BPF, Stein MB, Ursano RJ, Vermetten E, Vinkers CH, Wang L, Youssef NA, INTRuST Clinical Consortium, VA Mid-Atlantic MIRECC Workgroup, PGC PTSD Epigenetics Workgroup, Uddin M, Nievergelt CM. Epigenome-wide meta-analysis of PTSD across 10 military and civilian cohorts identifies novel methylation loci. BioRxiv. 2019. doi: 10.1101/585109
20. Piccinini A, Bailo P, Barbara G, Miozzo M, Tabano S, Colapietro P, Farè C, Sirchia SM, Battaglioli E, Bertuccio P, Manenti G, Micci L, La Vecchia C, Kustermann A, Gaudi S. Violence against Women and Stress-Related Disorders: Seeking for Associated Epigenetic Signatures, a Pilot Study. Healthcare (Basel). 2023;11(2):173. doi: 10.3390/healthcare11020173