



Research paper

Non-fatal strangulation in sexual assault: A study of clinical and assault characteristics highlighting the role of intimate partner violence



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ABSTRACT

Objective: To describe the prevalence, risk factors, signs and symptoms of non-fatal strangulation (NFS) in women referred to a Sexual Assault Resource Centre (SARC) following recent sexual assault.

Methods: A cross-sectional study using data routinely collected at time of forensic examination of women (age ≥ 13 years) referred to the Western Australian SARC between Jan-2009 and Mar-2015 alleging a recent sexual assault. Data on demographics, assault characteristics and forensic findings were available.

Results: A total of 1064 women were included in the study; 79 (7.4%) alleged NFS during the sexual assault. The prevalence of NFS varied significantly by age-group and assailant type. Of women aged 30–39 years 15.1% gave a history of NFS compared to less than 8.2% in all other age groups. Of women assaulted by an intimate partner, 22.5% gave a history of NFS compared to less than 6% of women assaulted by other assailant types. Of all sexual assaults with NFS, intimate partners were the assailant in 58.2% of cases, whereas in sexual assault cases without NFS, intimate partners were the assailant in 15.9% of cases. Odds of NFS were 8.4 times higher in women sexually assaulted by an intimate partner compared to women assaulted by an acquaintance/friend and 4.9 times higher compared to women assaulted by a stranger. When considering both age and assailant type the highest proportion of NFS (33.9%) was in women aged 30–39 years sexually assaulted by an intimate partner. Other factors associated with NFS during sexual assault included deprivation of liberty, verbal threats, being assaulted in the woman's home and use of additional blunt force. External physical signs of NFS were absent in 49.4% of all NFS sexual assault cases.

Conclusions: This study identifies and quantifies NFS risk factors in female sexual assault and highlights the strong association with intimate partner sexual assault. Greater awareness of NFS in sexual assault should lead to improvement in medical screening, forensic management and safety risk assessment by sexual assault and domestic violence services, emergency departments and police.

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1. Introduction

Strangulation is a form of mechanical asphyxia caused by direct

pressure on the neck by one or two hands (manual strangulation), a constricting band (ligature strangulation) or arm (sleeperhold or chokehold).^{1,2} It may result in obstruction of the great veins and carotid arteries, stimulation of carotid sinus baroreceptors and airway obstruction.^{1,2} Injuries sustained depend on force, duration and method and death may result.^{3,4} Non-fatal strangulation (NFS) refers to those surviving an episode of strangulation.

The clinical and forensic importance of NFS has been under-recognised.^{5,6} European and North American lifetime prevalence for NFS by an intimate partner is estimated to range from 3.0% to

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9.7%⁷ with estimates reported as high as 27%⁸ and 68%⁹ in women with a history of intimate partner violence. No published Australian data exists on the prevalence of NFS. The prevalence of NFS in the context of sexual assault is not well established in any population.

Health sequelae of NFS range from mild and transient to severe and life-threatening. NFS may result in injury to any neck structures including dissection, thrombosis and embolism of carotid arteries and contusion or fracture of the larynx, hyoid bone,⁴ tracheal rings and thyroid cartilage.^{5,6,10} Published studies report differing frequencies of symptoms following NFS. Symptoms include neck pain, sore throat, dyspnoea, vocal changes, pain or difficulty swallowing or speaking, loss of consciousness, incontinence, memory loss, visual changes and tinnitus.^{3,5,9–13} Clinical signs include neck and chin bruises and abrasions; neck swelling; petechial bruising of the face, eyelids, conjunctivae, scalp and neck; subconjunctival haemorrhages; and signs of cerebral anoxia such as agitation and memory loss.^{3,5,9,11–14} Signs may not appear for 24–36 h and laryngeal oedema may develop up to 36 h later resulting in delayed airway obstruction and compromise.^{3,10,15} Both fatal and non-fatal strangulation can occur without any signs of visible external injury.^{3,16–21} Absence of external neck injuries does not exclude strangulation.²²

Identification of NFS is important medicolegally. Documentation of signs and symptoms and photography of injuries may corroborate the history and collection of forensic samples such as skin and fingernail swabs for DNA analysis, may lead to identification of an alleged offender. NFS is now a discrete offence within the criminal code (some specific to the domestic violence context) in 43 USA states,²³ with similar legislative responses likely in New Zealand and Queensland, Australia in the near future.²⁴ These legal reforms highlight the importance of identification, and clinical forensic and risk factor assessment of NFS in sexual assault.²⁵

NFS by an intimate partner is a recognised predictive risk factor for subsequent severe violence and is associated with a 7.5-fold increased risk of homicide.⁸ Other predictive risk factors for future violence or homicide by intimate partner include sexual assault,²⁶ abuse during pregnancy and threats to kill.^{27,28} When NFS occurs during sexual assault by an intimate partner multiple risk factors may co-exist making risk assessment and safety planning essential.

This study aimed to describe the prevalence, demographics, clinical and assault characteristics and risk factors for NFS in female sexual assault presentations.

2. Methods

2.1. Selection of study participants

Study participants included females aged 13 years and older referred to the Sexual Assault Resource Centre (SARC) in Perth, Western Australia between 1 January 2009 and 31 March 2015 following alleged recent sexual assault. Excluded from the study were patients who (i) declined consent for research, (ii) were indecently assaulted, (iii) did not know the date of sexual assault or could not estimate time since assault, (iv) presented to SARC >10 days after sexual assault, (v) did not know assailant type (no memory), (vi) declined consent for general physical examination, (vii) admitted that report was fallacious and/or determined to be false by police.

2.2. Physical examination of patients and data collection

Forensically trained doctors from SARC conducted physical examinations according to a standard sexual assault examination protocol, as outlined in the SARC Medical and Forensic Manual,

Western Australia. This includes physical examination of the entire body (head to toe, front and back), with measurement and documentation of any injuries and findings on standardized body diagrams in the SARC Forensic Record. Photographs of any injuries may also be taken by the SARC doctor. Patient and/or guardian informed consent was obtained for use of de-identified data for research. The attending clinician entered history and examination data into the SARC Medical Forensic Services Clinical Information System. Additional specific symptoms and signs related to NFS were extracted by clinician chart review.

2.3. Study definitions

NFS included manual, ligature and chokehold methods of neck pressure.

Sexual assault was completed or attempted penetration without consent, of the vagina or anus (with penis, finger, tongue or object) or of the mouth with penis.

Indecent assault was a sexual act or contact without consent but with no completed or attempted penetration.

Assailants were categorised as stranger, intimate partner, acquaintance/friend and “other”. Intimate partner included current and ex-partners (including husbands, de facto and boyfriends).

Acquaintance/friend included short-term, long-term and accidental acquaintances (known <24 h), internet acquaintances and work colleagues.

“Other” assailants included relatives, carers or other relationships.

Blunt force assault was the history of being punched, kicked, slapped, dragged, stomped, hit, pushed, knocked, beaten and/or pulled hair.

Deprivation of liberty was any action unlawfully depriving a person of their freedom for a period of time.

Verbal threat was threat to kill or harm the woman, her family, friends or pets.

2.4. Statistics

Descriptive statistics were used to describe characteristics of women with and without an allegation of NFS during the sexual assault and summarized as means \pm standard deviations for continuous data and as percentages for categorical data. The chi-square test or the Fisher exact test was performed to compare categorical variables between groups. Logistic regression was used to identify characteristics associated with the odds of NFS in univariate analyses. All statistical analyses were performed using Stata version 13.1 (College Station, TX, USA).

3. Results

A total of 1755 women alleging sexual assault were seen during the 75 month study period, of whom 1064 were included in the study. The exclusion rate was 39.4% (n = 691), 5.4% (n = 95) not consenting to research, 2.0% (n = 35) solely indecent assault, 0.0% (n = 0) could not estimate time since assault, 4.0% (n = 70) presenting >10 days after assault, 5.8% (n = 101) unknown assailant type, 21.3% (n = 373) not consenting to a general body physical examination and 1.0% (n = 17) report deemed fallacious (Fig. 1). Almost half of the women excluded because they did not consent for general body physical examination (49.9%, 186/373) gave consent to a genital examination. The remaining 187 women declined both general body and genital examinations. There was no significant difference in mean age between participants (26.5 \pm 11.0 years) and non-participants (26.0 \pm 11.3 years) (p-value = 0.37).

Seventy-nine (7.4%) of the participants reported NFS (75 manual

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