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Lockdowns Causing Lock-Ins: Impact of the COVID Pandemic on Trends Observed by Forensic Nurse Examiners

S. Rachel Kennedy, PhD, MSN/MPH, RN[1]
Christine Foote-Lucero, MSN, RN, CEN, SANE-A, SANE-P, AFN-C, IVSE-C, DF-AFN[2]
Erin Aschman, BSN, RN, SANE-A, GFN-C[3]
Kerry Peterson, PhD, DNP, PMHCNS-BC, PMHNP-BC, FAANP[4]
Christina Yannetsos, MD[1,3]

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Corresponding author: Rachel Kennedy
University of Colorado School of Medicine, Department of Emergency Medicine
Aurora, CO 80045
Phone: (770) 861-9548
Email: rachel.kennedy@cuanschutz.edu

Affiliations: 1 - University of Colorado School of Medicine, Department of Emergency Medicine; 2 - SDFI-Telemedicine; 3 - University of Colorado Hospital, Anschutz Medical Campus; 4 - University of Colorado College of Nursing

Abstract

This study consists of a secondary, longitudinal analysis of chart data pulled from a forensic nursing program at a large Level I Hospital in Colorado between 2018–2023 to explore trends in forensic assessments conducted during pandemic lockdown periods. Descriptive analyses and logistic regression were used to examine the number and severity of consultations performed by the forensic nursing team across COVID-19 pandemic timepoints. A total of 9,944 patients received a consult from the forensic nursing program between 2018–2023, with 2,144 seen during a COVID-19 lockdown period. The odds of forensic nurses conducting exams for traumatic brain injury, sexual assault, and intimate partner violence were significantly higher during various COVID lockdowns or timepoints. No changes in the odds of patients reporting strangulation were observed during COVID-19 lockdowns. While the odds of patients being examined for risk of intimate partner violence (IPV) increased during the second lockdown and reopening periods, the severity of reported IPV did not vary compared to other timepoints. Older adult patients were less likely to be seen during COVID-19, with significant declines in patients screened for elder abuse. This analysis provides valuable insight into the changes in patient volumes, types of assault, and severity of these patient experiences before and after the pandemic and over time. Observed

trends emphasize the importance of coordinated responses and screenings in the emergency department setting as well as the value of the in-depth care that forensic nurses provide before, during, and after a time of global crisis.

Keywords: forensic nursing, COVID-19, intimate partner violence, sexual assault, strangulation, head trauma

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The COVID-19 pandemic triggered unprecedented disruptions to daily life, healthcare delivery, and public safety systems, significantly affecting population health and behavior. Public health restrictions and prolonged lockdowns created wide-ranging challenges and resource gaps that complicated efforts to monitor and respond to violence and trauma (Benis et al., 2021; Betron et al., 2020). The subsequent and significant shifts in the nature and context of social interactions during the pandemic had notable, and often adverse, impacts on health, behavior, and well-being (Bonsaksen et al., 2021; Godara et al., 2023; Lettiere-Viana et al., 2021).

Within this context, trends in interpersonal violence—including intimate partner violence (IPV), sexual assault (SA), and other forms of abuse—have been difficult to assess. A meta-analysis of U.S.-based studies found an 8.1% overall increase in domestic violence after the onset of the pandemic (Kourti et al., 2023). This is further supported by the National Domestic Violence Hotline (2019), which reported a 9% increase in contacts in 2020 compared to 2019. Yet our understanding of the nuances of these calls or reports remain varied widely by setting, time period, and methodology (Abdo et al., 2020; Kourti et al., 2023; Piquero et al., 2021). Similarly, structural barriers—such as social distancing requirements or fear of exposure—may have hindered access to in-person healthcare for things such as forensic nurse consultations and exams, particularly for vulnerable groups (Decker et al., 2022; Wood et al., 2022).

This study leverages a large, multi-year dataset of forensic nursing encounters from a program in Colorado to assess changes in patient characteristics, types of forensic assessments completed, and reporting outcomes across distinct COVID-19 timepoints. We specifically sought to answer the question of whether lockdown periods showed unique trends in patient characteristics (age, sex, race, and ethnicity) and experiences of IPV or other forms of violence. By examining both frequency and severity of violence-related presentations, we aimed to clarify how the pandemic shaped forensic nursing care and inform future responses during times of global crisis.

Methods

Ethical approval

The study was determined exempt by the Colorado Multiple Institutional Review Board (COMIRB #24-2259).

Setting and Population

This was a retrospective study consisting of electronic medical record (EPIC) data of patients seen by a local forensic nurse examiner (FNE) program in either the emergency

department or an inpatient unit between 2018 and 2023. The FNE program primarily serves patients at a large academic urban hospital with 130,000 ED annual visits that serves as a Level I Trauma Center in Aurora, Colorado. It also provides on-call consults for a smaller, Level III facility located south of Denver with approximately 20-40,000 annual ED visits in Highlands Ranch, Colorado. The program sees all patients affected by violence, which can include SA, physical assault, domestic/interpersonal violence, human trafficking, elder abuse, adolescent abuse, strangulation, assault by weapon (e.g. firearm injury), and vehicular assaults.

There were n = 9,975 total forensic nurse consultations with patients affected by violence between January 1, 2018 and December 31, 2023, with n = 5,733 who consented to at least part of a medical forensic exam (Table 1). The number of patients consulted by the forensic nursing program increased by an average of approximately 446 patients per year (SD = 209), reflecting a 60.8% average annual increase in patient volume over time. The largest year-to-year growth occurred between 2018 and 2019 (184.9%, from 336 to 960 patients), followed by increases of 66.9% in 2020, 31.9% in 2021, 13.3% in 2022, and 7.2% in 2023. Notably, there were two contextually relevant events that took place between 2019 and 2020 unrelated to the COVID-19 pandemic. First, in 2019, the FNE program went from an on-call consult service to a 24/7 in-house consult service. Second, between 2018 and 2019, closure of several sexual assault nurse examiner and forensic nursing programs throughout the state of Colorado may have led to increases in patient volumes. Although difficult to measure the degree of impact these events had, out of abundance of caution for potential confounding, our primary focus was therefore on trends during and after COVID pandemic lockdowns, rather than pre-post comparisons.

Data Extraction

The health system in which this forensic nursing program operates has its own Health Information Management department, independent of the study team, with specialists who receive ongoing training and auditing to extract all medical record data. Data extraction included patient demographics, diagnoses, and forensic nursing chart assessment data. Patient records were selected based on whether they received a forensic nurse consultation (most often by physician referral) and received a medical forensic exam completed at either hospital location between 2018 and 2023. Data included that which was documented at hospital intake and registration (e.g., patient demographic characteristics) as well as the information collected specifically by the forensic nursing team (e.g., abuse- or injury-specific assessments).

Measures

The predictor of this analysis was the COVID timepoint in which the patient received a medical forensic exam. Dependent outcomes included patient demographic variables (age, legal sex, race, ethnicity, primary language, and county of residence), the type of abuse/assault assessment performed by the forensic nurse (sexual assault, drug-facilitated sexual assault, intimate partner violence, elder abuse, human trafficking, and traumatic brain injury or strangulation), reporting outcomes (legal, medical, anonymous, non-reporting), and the patient's self-reported (to the forensic nurse) relationship to their assailant that harmed them.

COVID lockdowns and timepoints. The overall timeline of the COVID pandemic was divided into seven distinct timepoints based on the Executive Orders placed and enforced in Colorado during the pandemic (Exec. Order NO. D 2020 017, 2020; Exec. Order NO. D 2020 044, 2020; Exec. Order NO. D 2021 122, 2020). These include: 1) pre-pandemic: 2018–March 6, 2020; 2) first COVID lockdown in Colorado: March 7, 2020–April 26, 2020; 3) first reopening:

April 27, 2020–June 30, 2020; 4) second COVID lockdown: July 1, 2020–July 8, 2021; 5) restrictions lifted: July 9, 2021–December 31, 2021; 6) the calendar year of 2022: January 1, 2022–December 31, 2022; and 7) the calendar year of 2023: January 1, 2023–December 31, 2023. Breaking down the time points in this way allowed for comparison of trends during lockdown periods (either the initial or second lockdown period; 424 days total) vs. non-lockdown periods (i.e., before, between, or after lockdown periods; 1,767 days total). Whether patients were categorized as being seen during a COVID-specific timepoint was based on the date of their arrival to the hospital.

Demographics. Demographic variables, including sex, age, race, and ethnicity, were obtained through patient self-report or documentation and recorded at hospital intake or by their primary care team, not the forensic nurse. Age was treated as a continuous variable but also categorized into age groups to facilitate interpretation, explore group-level differences, and support the application of findings. Age categories included 17 and under, 18–29, 30–49, 50–69, and 70+ years old. Race and ethnicity were recorded as two separate variables, with race response options including White or Caucasian, Black or African American, Asian or Asian American, Native American or Alaskan Native, Native Hawaiian or other Pacific Islander, multiracial, other, or unknown (e.g., unable to assess or patient declines). Ethnicity was recorded as Hispanic/Latino/Latina or non-Hispanic/Latino/Latina, with an additional category for unable to assess/unknown. Legal sex was recorded in response to the question, "What is your legal sex?" with documentation options of male, female, or unknown/patient declined.

Relationship to assailant. Easily the most complex aspect of data cleaning was categorizing how patients responded to one of the routine forensic exam questions, "What is your relationship to the person who did this to you?" Responses are written verbatim in an open-ended text field in real time by the forensic nurse. Following Grodal, Anteby, and Holm's (2021) recommendations for categorizing qualitative data, we grouped patients' relationships to their assailants into the following 10 categories: 1) intimate partner – including current partner, ex, or child's parent; 2) relationship to partner – including current partner/ex's family member, friend, or ex/current partner; 3) family – including any blood relative, caregiver, or relative/partner of family member such as stepchild; 4) friend – including family friend; 5) roommate or cohabitating – including housemate or cellmate; 6) acquaintance or contextual relationship – including classmate, friend of friend, neighbor, tenant/landlord, healthcare worker/patient, professional colleague, employer, or client; 7) stranger; 8) multiple people; 9) other (e.g., drug dealer); or 10) unknown – including declined, patient did not see assailant, or unable to assess.

Strangulation. While all physical assaults are seen and assessed by the forensic nursing program, strangulation and are the forms of physical assault that include in-depth, tailored assessments by the forensic nursing team. When a patient reports strangulation, the forensic nurse asks a series of questions about the number of times strangled, the methods and estimated amount of pressure applied (0-10, 10 = most imaginable), the duration of each strangulation, and signs and symptoms during and after the assault. Patients were marked as having received a strangulation exam if any of these observations were in their medical record.

Traumatic brain injury. First implemented in this forensic nursing program in 2020, thus limiting observations to post-COVID only, a modified Acute Concussion Evaluation (ACE) concussion screener from the Centers for Disease Control and Prevention (CDC) is used to assess the severity of head trauma and a patient's subsequent risk for concussion (Gioia & Collins, 2006). This validated questionnaire includes 22 yes/no items about signs/symptoms the patient

may have experienced since experiencing head trauma (Gioia & Collins, 2006). The ACE total score is the sum of post-head trauma symptoms, which fall into the following sub-categories: sleep (four items), cognitive (four items), emotional (four items), and physical (eight items) symptoms.

Sexual assault (SA). Many of the patients who come to the forensic nursing program are being seen for recent experiences of SA. These patients are then asked 11 questions about the type of penetration or touching experienced, as well as 17 questions assessing their risk for drug-facilitated sexual assault (DFSA). Patients were categorized as having received an SA exam if any observations from either assessment were completed in their medical record.

Intimate partner violence. The Danger Assessment (DA) is used routinely for any patient with suspected or reported IPV to assess the presence and lethality risk of IPV-related experiences the patient reports over the past 12 months (Graham et al., 2022). The DA uses a weighted algorithm to assess general lethality of indicators such as death threats, partner access to or threats with weapons, substance abuse issues, controlling behaviors or stalking, escalation of violence over time, prior strangulation, threats to loved ones, and suicidality (Graham et al., 2022). There are two validated versions of the DA currently in use in this setting (same-sex and opposite-sex/heterosexual), both of which have been validated only among adult female samples (Campbell et al., 2009; Glass & Campbell, 2007; Graham et al., 2022; Messing et al., 2020). Due to the lack of validated instruments for assessing lethal IPV risk among males, the FNE program uses the DA with male patients while acknowledging its limitations of this approach. In the absence of validation studies specific to male populations, for this study male patients were excluded from the linear regression analyses to minimize potential bias. Total scores of the 20-items in the opposite-sex DA can range from 0–39, and total scores for the 18 items of the same-sex DA ranging from 0–25.

Elder abuse. Forensic nursing consults for elder abuse at this health system began in 2020, and subsequently the Elder Abuse Suspicion Index (EASI) was incorporated into the forensic charting system and completed whenever these consults took place (Yaffe et al., 2008). The EASI was developed in 2002 to identify patient risk factors for elder abuse or neglect using a five-item yes/no screener (Yaffe et al., 2008). Given the timing of its implementation to the forensic nursing program, only post-COVID trends were observed for this patient population.

Human trafficking. For patients suspected of being trafficked or who self-report human trafficking of any kind, forensic nurses complete a six-item critical assessment of human trafficking red flags with the patient, as recommended by the Laboratory to Combat Human Trafficking (2019).

Reporting. All patients who received consultation from the forensic nursing program are asked and informed about their reporting options. Patient choices are then recorded in the patient chart and include law reporting, medical reporting, anonymous reporting, and non-reporting.

Analysis

Stata 17 was used to perform all statistical analyses. Descriptive statistics were used to summarize patient demographics, types of forensic assessments conducted, assailant relationship, and reporting outcomes, stratified by whether the patient was seen during a COVID-19 lockdown period (Table 1). Frequencies and proportions were reported for categorical variables; means and standard deviations were reported for continuous variables.

To examine associations between lockdown status and each categorical outcome, binary logistic regression models were estimated. Next, multinomial logistic regression models were used to assess the association between COVID timepoint (seven-category variable) and the same categorical outcomes (Table 2), with 2023 used as the reference group to examine longitudinal trends following the pandemic onset. Assessments for TBI and elder abuse were limited due to the ACE assessment not being introduced until the first reopening (04/47/20–06/30/20) and the EASI first introduced during the second lockdown (07/01/20–07/08/21), thus restricting points of comparison.

To examine change over time in continuous variables, linear regression models were used to evaluate differences in patient age, DA scores, and TBI (ACE) symptom scores across COVID timepoints (Table 3). All models used robust standard errors, and significance was evaluated at the $p < .05$ level.

Missingness

There were no notable patterns in missingness in terms of the race, ethnicity, age group, or assault type that patients reported upon hospital admission. Missingness in gender identity and sex assigned at birth variables led to their exclusion and reliance on legal sex for this given 94% had legal sex charted whereas only 40–50% had gender or sex at birth documented. Temporal trends for when the TBI and elder abuse assessments were introduced in this setting limited their inclusion in the multinomial and linear regressions.

Results

Table 1

Patient Demographics

Patient Demographics, Abuse/Assault Assessment, Relationship to Assailant, and Reporting Outcome Frequencies and Regression by Whether Arrived During Lockdown Period

	Total	Non-Lockdown Period[1]	Lockdown Period[2]	Logistic Regressions
	n (%)	n (%)	n (%)	OR (SE)
Number of FNE consultations	9,944	7,800	2,144	*(ref: no exam)*
Number of FNE exams	5,733 (57.7%)	**4,420 (56.7%)**	**1,313 (61.2%)**	**1.21 (0.06)*** **
Type of FNE assessment				*(binomial)*
Traumatic brain injury	2,526 (25.4%)	**1,817 (23.3%)**	**709 (33.1%)**	**1.63 (0.09)*** **
Strangulation	2,083 (21.0%)	1,607 (20.6%)	476 (22.2%)	1.10 (0.06)
Sexual assault, including drug-facilitated	2,109 (21.2%)	**1,593 (20.4%)**	**516 (24.1%)**	**1.23 (0.07)*** **
Intimate partner violence	1,784 (17.9%)	**1,360 (17.4%)**	**424 (19.8%)**	**1.17 (0.07)***
Elder abuse	165 (1.7%)	**148 (1.9%)**	**17 (0.8%)**	**0.41 (0.11)*** **
Human trafficking	176 (1.8%)	133 (1.7%)	43 (2.0%)	1.18 (0.21)
Department				
UCH Emergency	7,891 (79.4%)	6,184 (79.3%)	1,707 (79.6%)	*(ref: UCH ED)*
HRH Emergency	394 (4.0%)	307 (3.9%)	87 (4.1%)	1.03 (0.13)
Inpatient	1,659 (16.7%)	1,309 (16.8%)	350 (16.3%)	0.97 (0.06)
Legal Sex				
Male	3,292 (33.1%)	2,559 (32.8%)	733 (34.2%)	*(ref: males)*
Female	6,652 (66.9%)	5,241 (67.2%)	1,411 (65.8%)	0.94 (0.05)
Race				
White/Caucasian	4,054 (40.8%)	3,206 (41.2%)	848 (39.6%)	*(ref: White)*
Black or African American	2,768 (27.9%)	**2,100 (27.0%)**	**668 (31.2%)**	**1.20 (0.07)***
Asian/Asian American	214 (2.2%)	167 (2.1%)	47 (2.2%)	1.06 (0.18)
American Indian/Alaskan Native	199 (2.0%)	148 (1.9%)	51 (2.4%)	1.30 (0.22)
Native Hawaiian/Other Pacific Islander	45 (0.5%)	39 (0.5%)	6 (0.3%)	0.58 (0.26)
More Than One Race	135 (1.4%)	112 (1.4%)	23 (1.1%)	0.78 (0.18)

Patient Demographics, Abuse/Assault Assessment, Relationship to Assailant, and Reporting Outcome Frequencies and Regression by Whether Arrived During Lockdown Period

	Total	Non-Lockdown Period[1]	Lockdown Period[2]	Logistic Regressions
	n (%)	n (%)	n (%)	OR (SE)
Other	2,356 (23.7%)	1,881 (24.2%)	475 (22.2%)	0.95 (0.06)
Patient Declined	22 (0.2%)	20 (0.3%)	2 (0.1%)	0.38 (0.28)
Unknown	134 (1.4%)	110 (1.4%)	24 (1.1%)	0.82 (0.19)
Ethnicity				
Non-Hispanic/Latino	6,719 (67.7%)	5,225 (67.1%)	1,494 (69.7%)	*(ref: Non-Hisp.)*
Hispanic/Latino	3,061 (30.8%)	2,430 (31.2%)	631 (29.4%)	0.91 (0.05)
Unknown	147 (1.5%)	**128 (1.6%)**	**19 (0.9%)**	**0.52 (0.13)****
Average Age - M (SD)†	36.69 (15.71)	36.83 (15.90)	36.09 (14.89)	-0.00 (0.00)
Age Group				
≤17	321 (3.2%)	261 (3.3%)	60 (2.8%)	0.84 (0.12)
18–29	3,501 (35.2%)	2,714 (34.8%)	787 (36.7%)	1.06 (0.06)
30–49	4,334 (43.6%)	3,406 (43.7%)	928 (43.3%)	*(ref: 30-49 years)*
50–69	1,368 (13.8%)	1,056 (13.5%)	312 (14.6%)	1.08 (0.08)
70+	420 (4.2%)	**363 (4.7%)**	**57 (2.7%)**	**0.58 (0.08)*****
Relationship to Assailant[3]				
Intimate partner	1,919 (35.8%)	1,475 (35.7%)	444 (35.9%)	*(ref: partner)*
Relationship to partner	111 (2.1%)	**71 (1.7%)**	**40 (3.2%)**	**1.87 (0.38)****
Family	385 (7.2%)	296 (7.2%)	89 (7.2%)	1.00 (0.13)
Friend	331 (6.2%)	258 (6.2%)	73 (5.9%)	0.94 (0.13)
Roommate or Cohabitating	129 (2.4%)	100 (2.4%)	29 (2.3%)	0.96 (0.21)
Acquaintance or contextual relationship	611 (11.4%)	468 (11.3%)	143 (11.6%)	1.02 (0.11)
Stranger	868 (16.2%)	661 (16.0%)	207 (16.7%)	1.04 (0.10)
Multiple People	343 (6.4%)	269 (6.5%)	74 (6.0%)	0.91 (0.13)
Other (e.g., drug dealer)	111 (2.1%)	88 (2.1%)	23 (1.9%)	0.87 (0.21)
Unknown	560 (10.4%)	444 (10.8%)	116 (9.4%)	0.87 (0.10)
Report Type				
None / Unknown	4,537 (45.6%)	3,496 (44.8%)	1,041 (48.6%)	*(ref: unknown/none)*
Law	4,840 (48.7%)	3,809 (48.8%)	1,031 (48.1%)	0.91 (0.05)
Medical	201 (2.0%)	160 (2.1%)	41 (1.9%)	0.86 (0.15)
Anonymous	166 (1.7%)	135 (1.7%)	31 (1.4%)	0.77 (0.16)
Nonreporting	200 (2.0%)	200 (2.6%)	0 (0.0%)	-

1. Non-Lockdown Periods: Before 3/6/20, Between 4/27/20–6/30/20, or After 7/8/21

2. Lockdown Periods: Between 3/6/20–4/26/20 or 7/1/20–7/8/21

3. How patients described their relationship to their assailant was grouped into the following 10 categories: 1) intimate partner – including current partner, ex, or child's parent; 2) relationship to partner – including current a partner/ex's family member, friend, or ex/current partner; 3) family – including any blood relative, caregiver, or relative/partner of family member such as stepchild; 4) friend – including family friend; 5) roommate – including housemate or cellmate; 6) acquaintance or contextual relationship – including classmate, friend of friend, neighbor, tenant/landlord, healthcare worker/patient, professional colleague, employer, or client; 7) stranger; 8) multiple people; 9) other (e.g., drug dealer); or 10) unknown – including declined, patient did not see assailant, or unable to assess.

**p < .05, **p < .01, ***p < .001*

† *Linear regression - reported values are the coefficient and standard error*

Patient Demographics, Assault Characteristics, and Reporting by Lockdown Period

Between January 1, 2018, and December 31, 2023, there were 9,944 forensic nurse patient consultations, with 2,144 (21.6%) occurring during COVID-19 lockdown periods and 7,800 (78.4%) during non-lockdown periods. Overall, 5,733 exams were completed (57.7%), with higher completion during lockdowns (61.2%) compared to non-lockdowns (56.7%) which was significant ($OR = 1.21$, $SE = 0.06$, $p < 0.001$). The most common assessments were for TBI (25.4%), SA (21.2%), and strangulation (21.0%). TBI was more frequently assessed during

lockdown periods (33.1%) compared to non-lockdowns (23.3%; *OR* = 1.63, *SE* = 0.09, $p < 0.001$). There was a 1.23 higher odds of a SA exam among those seen during a lockdown period (*SE* = 0.07, $p < 0.001$) and 1.17 higher odds of DAs completed to screen for lethal IPV (*SE* = 0.07, $p = 0.012$). Assessments for elder abuse (1.6%) and human trafficking (1.8%) were rare. Elder abuse had significantly lower odds of be reported and assessed during lockdown periods (*OR* = 0.41, *SE* = 0.11, $p = 0.001$).

Although most forensic nursing patients were female (66.9%), females were less represented during lockdown periods, but this was not significant (*OR* = 0.94, *SE* = 0.05, $p = 0.229$). Racial composition included White/Caucasian (40.8%), Black/African American (27.9%), and Other (23.7%), with Black/African American patients more represented during lockdown periods (31.2% vs. 27.0%; *OR* = 1.20, *SE* = 0.07, $p = 0.002$). The majority identified as non-Hispanic (67.7%), and 30.8% identified as Hispanic/Latino/Latina. Those with an unknown ethnicity had lower odds of being seen during lockdown periods (*OR* = 0.52, *SE* = 0.13, $p = 0.008$). Patients were on average 36.69 years old (*SD* = 15.71), with most between ages 18–49. No significant shifts in age group distributions were observed, apart from older patients 70 or over showing lower representation during lockdown periods (2.7% vs. 4.7%; *OR* = 0.58, *SE* = 0.08, $p < 0.001$).

In terms of the patient's relationship to their assailant, the majority (35.8%) reported a current or former partner; 16.2% reported a stranger; 6.4% reported multiple people; 7.2% reported family, 6.2% reported a friend or family friend, 11.4% reported an acquaintance or contextual relationship (such as a work colleague, neighbor, or friend of a friend) was the one who harmed them. Only 2.4% reported a roommate and 2.1% some other type of person (such as a drug dealer) was the assailant, and for 10.4% the assailant was unknown (meaning the patient either didn't see assailant or was unable/unwilling to respond to the question). During lockdown periods, the only people with higher odds of being the assailant than intimate partners/exes were the friends, other partners, and/or family of patient's partners/exes (*OR* = 1.87, *SE* = 0.38, $p = .002$). Regarding reporting outcomes, 48.7% of cases were reported to law enforcement, 2% did a medical report, 1.7% an anonymous report, 2% were explicitly nonreporting, and 45.6% had no, unknown, or undocumented reporting. No significant changes in frequency of reporting or type of report made were observed between lockdown and non-lockdown periods.

Multinomial Regression of Outcomes by COVID Timepoint

As shown in Table 2, the odds of a forensic consultation leading to a medical forensic exam were significant across nearly all time points, with exception of the initial lockdown and 2022. TBI was assessed using the ACE starting in the reopening period, with predictably lower odds of being conducted during this timepoint compared to 2023 (*OR* = 0.34, *SE* = 0.06, $p < .001$). ACE then had significantly higher odds of being conducted during the second lockdown compared to 2023 (*OR* = 1.28, *SE* = 0.08, $p < .001$). Strangulation exams had significantly higher odds of being conducted pre-COVID than in 2023 (*OR* = 1.27, *SE* = 0.10, $p = .002$). Conversely, fewer strangulation exams were conducted in 2022 as compared to 2023 (*OR* = 0.85, *SE* = 0.06, $p = .21$). There were no significant changes in the number of strangulation exams during COVID lockdowns or reopening periods. Sexual assault assessments had significantly higher odds of being conducted than in 2023, with exception of 2022. For example, pre-COVID patients had 3.58 higher odds of receiving a SA exam from this forensic program compared to 2023 (*SE* = 0.28, $p < .001$). The DA had higher odds of being conducted pre-COVID (*OR* = 2.27, *SE* = 0.18, $p < .001$), the 2020 reopening period (*OR* = 1.67, *SE* = 0.25, $p = .001$), and the second lockdown

(*OR* = 1.46, *SE* = 0.11, $p < .001$). Elder abuse screenings had significantly lower odds of being conducted during the second lockdown (*OR* = 0.32, *SE* = 0.09, $p < .001$) and the 2021 restrictions lifted period (*OR* = 0.49, *SE* = 0.15, $p = .017$) after their integration into practice in 2020.

Table 2

Outcomes by COVID Timepoint

Multinomial Regression of Patient Demographics, Types of Forensic Assessments Conducted, Relationship to Assailant, and Reporting Outcomes by COVID Timepoint

	Pre-COVID	**Initial Lockdown[1]**	**Reopening**	**Second Lockdown**	**Restrictions Lifted**	**2022**
	(1/1/2018 – 3/5/20) **n=1,486**	(3/6/20 – 4/26/20) **n=125**	(4/27/20 – 6/30/20) **n=296**	(7/1/20 – 7/8/21) **n=2019**	(7/9/21 – 12/31/21) **n=1071**	(1/1/22 – 12/31/22) **n=2390**
	OR (SE)	**OR (SE)**	**OR (SE)**	**OR (SE)**	**OR (SE)**	**OR (SE)**
Number of FNE consultations						
FNE exam (vs. no exam)	**1.46 (0.10)*** **	1.44 (0.27)	**1.95 (0.26)*** **	**1.36 (0.08)*** **	**1.27 (0.09)** **	0.99 (0.06)
Type of FNE assessment						
Traumatic Brain Injury	-	-	**0.34 (0.06)*** **	**1.28 (0.08)*** **	1.12 (0.09)	0.93 (0.06)-
Strangulation	**1.27 (0.10)** **	1.28 (0.27)	1.32 (0.19)	1.10 (0.08)	0.96 (0.09)	**0.85 (0.06)***
Sexual assault, including drug-facilitated	**3.58 (0.28)*** **	**2.37 (0.49)*** **	**1.88 (0.28)*** **	**1.83 (0.14)*** **	**1.37 (0.13)** **	1.11 (0.09)
Intimate partner violence	**2.27 (0.18)*** **	1.18 (0.29)	**1.67 (0.25)** **	**1.46 (0.11)*** **	0.97 (0.10)	1.00 (0.08)
Elder abuse	-	-	-	**0.32 (0.09)*** **	**0.49 (0.15)***	1.07 (0.19)
Human trafficking	1.59 (0.39)	1.72 (1.05)	1.20 (0.58)	1.42 (0.33)	1.40 (0.39)	1.13 (0.27)
Department						
AMC Emergency	**2.06 (0.19)*** **	1.38 (0.33)	**1.60 (0.27)** **	1.14 (0.08)	**1.20 (0.11)***	0.89 (0.06)
HRH Emergency	**0.65 (0.12)***	1.83 (0.66)	0.74 (0.26)	0.95 (0.14)	0.73 (0.15)	1.27 (0.17)
Inpatient	**0.48 (0.05)*** **	**0.51 (0.15)***	**0.62 (0.11)** **	0.87 (0.07)	0.88 (0.08)	1.07 (0.08)
Legal Sex						
Male	**0.40 (0.03)*** **	**0.62 (0.13)***	0.90 (0.12)	0.95 (0.06)	1.02 (0.08)	1.04 (0.06)
Female	**2.48 (0.20)*** **	**1.63 (0.34)***	1.11 (0.14)	1.05 (0.07)	0.98 (0.07)	0.96 (0.06)
Race						
White/Caucasian	0.95 (0.06)	1.28 (0.24)	0.87 (0.11)	0.89 (0.05)	0.88 (0.07)	1.01 (0.06)
Black or African American	**1.31 (0.10)*** **	0.96 (0.21)	**1.46 (0.19)** **	**1.47 (0.10)*** **	**1.30 (0.11)** **	**1.19 (0.08)** **
Asian/Asian American	1.33 (0.28)	1.59 (0.84)	0.66 (0.34)	1.05 (0.22)	1.20 (0.29)	0.92 (0.19)
American Indian/Alaskan Native	0.60 (0.16)	0.75 (0.55)	0.47 (0.28)	1.15 (0.23)	0.75 (0.21)	1.09 (0.21)
Native Hawaiian/ Pacific Islander	0.29 (0.22)	-	2.17 (1.41)	0.63 (0.32)	1.80 (0.80)	1.16 (0.47)
More Than One Race	1.17 (0.30)	1.11 (0.81)	0.46 (0.34)	0.72 (0.20)	1.03 (0.31)	0.92 (0.22)
Other	0.89 (0.07)	0.75 (0.17)	0.92 (0.13)	**0.82 (0.06)** **	0.91 (0.08)	**0.83 (0.06)** **
Patient Declined	-	-	0.78 (0.82)	0.23 (0.18)	0.22 (0.23)	0.68 (0.33)
Unknown	**0.41 (0.14)***	0.97 (0.71)	0.82 (0.43)	0.66 (0.17)	0.85 (0.26)	0.99 (0.22)
Ethnicity						
Non-Hispanic	**1.36 (0.10)*** **	**1.72 (0.36)***	1.30 (0.17)	**1.28 (0.08)*** **	**1.19 (0.09)***	**1.17 (0.07)** **
Hispanic/Latino/a/x	**0.78 (0.06)*** **	**0.62 (0.13)***	0.80 (0.11)	**0.83 (0.05)** **	0.86 (0.07)	**0.85 (0.05)** **
Unknown	**0.40 (0.13)** **	0.40 (0.40)	0.67 (0.35)	**0.44 (0.12)** **	0.60 (0.19)	1.01 (0.20)
Age Group						
≤17	0.70 (0.13)	0.40 (0.29)	0.51 (0.22)	0.73 (0.12)	0.76 (0.16)	0.89 (0.14)
18–29	**1.28 (0.09)*** **	0.86 (0.17)	1.03 (0.13)	**1.21 (0.08)** **	**1.24 (0.09)** **	1.04 (0.06)
25–49	1.13 (0.07)	**1.46 (0.27)***	**1.33 (0.16)***	1.01 (0.06)	1.05 (0.08)	1.01 (0.06)
51–69	**0.80 (0.08)***	1.01 (0.26)	0.88 (0.16)	1.02 (0.09)	0.90 (0.10)	0.98 (0.08)
70+	**0.21 (0.05)*** **	0.36 (0.21)	**0.30 (0.13)** **	**0.40 (0.06)*** **	**0.36 (0.08)*** **	0.94 (0.11)
Relationship to Assailant[2]						
Intimate partner	**2.13 (0.17)*** **	1.24 (0.29)	**1.71 (0.25)*** **	**1.38 (0.11)*** **	1.01 (0.10)	1.02 (0.08)
Relationship to partner	1.18 (0.43)	1.08 (1.11)	0.91 (0.68)	**2.63 (0.74)*** **	1.51 (0.56)	1.41 (0.43)
Family	0.90 (0.15)	0.77 (0.40)	1.16 (0.34)	1.03 (0.15)	0.79 (0.16)	0.88 (0.13)
Friend	1.37 (0.24)	1.29 (0.61)	1.65 (0.48)	1.08 (0.18)	1.17 (0.23)	0.81 (0.14)
Roommate or Cohabitating	1.28 (0.36)	2.00 (1.23)	1.69 (0.76)	1.06 (0.26)	1.00 (0.33)	0.93 (0.25)
Acquaintance/contextual relationship	0.95 (0.13)	1.37 (0.46)	1.26 (0.30)	1.11 (0.14)	0.97 (0.15)	1.02 (0.12)
Stranger	**0.64 (0.08)*** **	1.12 (0.34)	1.08 (0.22)	1.02 (0.10)	1.07 (0.13)	0.83 (0.08)
	Pre-Covid	Initial	Re-opening	Second	Restrictions	2022

		Lockdown		Lockdown	Lifted	
Multiple People	**0.63 (0.14)***	1.32 (0.62)	1.46 (0.45)	1.12 (0.19)	**1.65 (0.30)*****	1.33 (0.21)
Other (e.g., drug dealer)	0.57 (0.21)	0.68 (0.69)	0.57 (0.42)	0.93 (0.26)	1.60 (0.47)	0.93 (0.25)
Unknown	**1.44 (0.20)****	1.38 (0.52)	1.23 (0.33)	1.14 (0.15)	**1.63 (0.24)****	1.13 (0.15)
Report Type						
None/Unknown	**0.86 (0.06)***	1.03 (0.19)	0.81 (0.10)	**1.13 (0.07)***	1.09 (0.08)	0.97 (0.06)
Law	**0.64 (0.08)*****	0.61 (0.20)	0.70 (0.15)	**0.66 (0.08)*****	**0.71 (0.10)***	**0.74 (0.09)*****
Medical	1.38 (0.29)	1.94 (0.94)	0.81 (0.35)	0.82 (0.18)	0.79 (0.22)	0.83 (0.18)
Anonymous	**3.60 (0.86)*****	**3.01 (1.66)***	1.88 (0.82)	1.23 (0.34)	1.49 (0.47)	1.10 (0.31)
Nonreporting	-	-	-	-	-	**1.66 (0.25)*****

1. Reference timepoint was the 2023 calendar year (1/1/23–12/31/23)
2. How patients described their relationship to their assailant was grouped into the following 10 categories: 1) intimate partner – including current partner, ex, or child's parent; 2) relationship to partner – including current a partner/ex's family member, friend, or ex/current partner; 3) family – including any blood relative, caregiver, or relative/partner of family member such as stepchild; 4) friend – including family friend; 5) roommate – including housemate or cellmate; 6) acquaintance or contextual relationship – including classmate, friend of friend, neighbor, tenant/landlord, healthcare worker/patient, professional colleague, employer, or client; 7) stranger; 8) multiple people; 9) other (e.g., drug dealer); or 10) unknown – including declined, patient did not see assailant, or unable to assess.
**p < .05, **p < .01, ***p < .001*

Compared to 2023 patients, patients seen pre-COVID (*OR* = 2.06, *SE* = 0.19, $p < .001$), during the reopening (*OR* = 1.60, *SE* = 0.27, $p = .005$), and restrictions lifted (*OR* = 1.20, *SE* = 0.11, $p = .005$) periods had significantly higher odds of being seen at the large Level I trauma center in Aurora. Conversely, those seen at the Highlands Ranch facility were less frequent pre-COVID compared to 2023 (*OR* = 0.65, *SE* = 0.12, $p = .024$). Inpatient encounters had lower odds of occurring compared to 2023 during pre-COVID (*OR* = 0.48, *SE* = 0.05, $p < .001$), the initial lockdown (*OR* = 0.51, *SE* = 0.15, $p = .022$), and the reopening (*OR* = 0.62, *SE* = 0.11, $p = .010$).

Male patients had lower odds of being seen pre-COVID (*OR* = 0.40, *SE* = 0.02, $p < .001$) and during the initial lockdown (*OR* = 0.62, *SE* = 0.13, $p = .020$) compared to patients seen in 2023. By contrast, females had higher odds of being seen during pre-COVID (*OR* = 2.48, *SE* = 0.20, $p < .001$) and the initial lockdown (*OR* = 1.63, *SE* = 0.34, $p = .020$) compared to 2023 patients.

Black/African American patients had higher odds of being seen compared to 2023 patients across almost all timepoints except the initial lockdown (*OR* = 1.30–1.47, *SE* = 0.08–0.19, $p < .05$). The initial lockdown period showed no significant difference in the odds of Black/African American patients being seen compared to 2023. Those whose race was identified as "other" showed lower odds of presenting during the second lockdown (*OR* = 0.82, *SE* = 0.06, $p = .005$) and in 2022 (*OR* = 0.83, *SE* = 0.06, $p = .006$) compared to 2023.

Non-Hispanic identifying patients had higher odds of being seen across all time points with exception of the reopening period. By contrast, Hispanic/Latino/Latina patients had lower odds of being seen during pre-COVID (*OR* = 0.78, *SE* = 0.06, $p < .001$), the initial lockdown (*OR* = 0.62, *SE* = 0.13, $p = .023$), the second lockdown (*OR* = 0.83, *SE* = 0.05, $p = .003$), and in 2022 (*OR* = 0.85, *SE* = 0.05, $p = .007$) compared to 2023. Patients with an unknown ethnicity had lower odds of being seen pre-COVID (*OR* = 0.40, *SE* = 0.12, $p = .005$) and during the second lockdown (*OR* = 0.44, *SE* = 0.12, $p = .003$) than in 2023.

In terms of age group, patients between 18–29 years old were more likely to be seen during pre-COVID (*OR* = 1.25, *SE* = 0.09, $p < .001$), the second lockdown (*OR* = 1.21, *SE* = 0.08, $p = .002$), and the restrictions lifted period (*OR* = 1.24, *SE* = 0.09, $p = .005$). Those ages 30–49 years old had higher odds of a forensic consult in the initial lockdown (*OR* = 1.46, *SE* = 0.27, $p =$

.039) and the reopening period (*OR* = 1.33, *SE* = 0.16, *p* = .20) compared to 2023. Patients between 50–69 years old had lower odds of being seen pre-COVID (*OR* = 0.80, *SE* = 0.08, *p* = .026). Elderly patients 70 years of age or older were least likely to be consulted across almost all timepoints, except for the initial lockdown and 2022, compared to 2023 (*OR* = 0.21–0.94, *SE* = 0.05–0.21, *p* < .05).

More patients reported their partner/ex as the assailant during pre-COVID (*OR* = 2.13, *SE* = 0.17, *p* < .001), the reopening (*OR* = 1.71, *SE* = 0.25, *p* < .001), and the second lockdown (*OR* = 1.38, *SE* = 0.11, *p* < .001) compared to 2023. During the second lockdown, the friends, partners, or family of the patient's partner/ex had 2.63 higher odds of being the assailant compared to 2023 (*SE* = 0.71, *p* < .001). Strangers had lower odds of being the assailant pre-COVID compared to 2023 (*OR* = 0.64, *SE* = 0.08, *p* < .001) as well as healthcare workers or patients (*OR* = 0.21, *SE* = 0.16, *p* = .40). Fewer patients reported having multiple assailants pre-COVID (*OR* = 0.63, *SE* = 0.14, *p* = .037) than in 2023. Conversely, patients with multiple assailants had higher odds of a forensic consult during the restrictions lifted period (*OR* = 1.65, *SE* = 0.30, *p* = .006). Patients with an unknown assailant had higher odds of a forensic consult during pre-COVID (*OR* = 1.44, *SE* = 0.20, *p* < .01) and the restrictions lifted period (*OR* = 1.63, *SE* = 0.24, *p* < .01) than in 2023.

Patients who didn't report or with unknown reporting status at time of their forensic nurse consult had lower odds of presenting pre-COVID (*OR* = 0.86, *SE* = 0.06, *p* = .021) yet higher odds in the second lockdown (*OR* = 1.13, *SE* = 0.07, *p* = .043). Patients had lower odds of reporting to law enforcement during pre-COVID, the second lockdown, the restrictions lifted period, and in 2022 compared to 2023 (*OR* = 0.64–0.74, *SE* = 0.08–0.10, *p* < .05). There were no changes in medical reporting by COVID time point. Patients who chose to anonymously report had 3.6 higher odds of a forensic consult pre-COVID (*SE* = 0.86, *p* < .001) and 3.01 higher odds in the initial lockdown (*SE* = 1.66, *p* = .046) compared to those in 2023. Non-reporting as an explicit option in the medical record became an option in 2022, showing higher odds of occurring than in 2023 (*OR* = 1.66, *SE* = 0.25, *p* < .001) but limited in comparison otherwise.

Table 3

Linear Regression of Outcomes by COVID Treatment

Linear Regression of Patient Age, IPV Danger Assessment Scores, and Traumatic Brain Injury (ACE) Scores by COVID Timepoint

	Pre-COVID[1]	**Initial Lockdown**	**Reopening**	**Second Lockdown**	**Restrictions Lifted**	**2022**
	(1/1/2018 – 3/5/20)	(3/6/20 – 4/26/20)	(4/27/20 – 6/30/20)	(7/1/20 –7/8/21)	(7/9/21 – 12/31/21)	(1/1/22 – 12/31/22)
	n=1,486	**n=125**	**n=296**	**n=2020**	**n=1071**	**n=2390**
	Coef. (SE)	**Coef. (SE)**	**Coef. (SE)**	**Coef. (SE)**	**Coef. (SE)**	**Coef. (SE)**
Age	**-3.53 (0.51)*****	-1.33 (1.43)	**-2.19 (0.96)***	**-1.96 (0.47)*****	**-2.34 (0.57)*****	-0.39 (0.45)
Danger Assessment Scores[2]						
Opposite Sex	**-1.68 (0.60)****	-0.66 (1.83)	-0.55 (1.13)	-014 (0.61)	0.20 (0.82)	0.11 (0.63)
Same-Sex	1.00 (2.39)	-	-0.75 (3.09)	3.75 (2.65)	2.25 (4.15)	2.07 (2.17)

ACE Scores	Pre-COVID[1]	Initial Lockdown	Reopening	Second Lockdown	Restrictions Lifted	2022
All Symptoms (Total Score)	-	-	-1.13 (0.87)	**-0.71 (0.27)****	0.00 (0.33)	-0.10 (0.27)
Sleep Symptoms	-	-	**-.038 (0.17)***	**-0.19 (0.05)*****	-0.10 (0.07)	**-0.12 (0.05)***
Cognitive Symptoms	-	-	-0.29 (0.26)	**-0.20 (0.08)***	0.05 (0.10)	-0.05 (0.08)
Emotional Symptoms	-	-	-0.37 (0.24)	-0.10 (0.07)	-0.10 (0.09)	0.04 (0.08)
Physical Symptoms	-	-	-0.10 (0.44)	-0.23 (0.14)	0.14 (0.17)	0.01 (0.14)

1. Reference timepoint was the 2023 calendar year (1/1/23 – 12/31/23)

2. The Danger Assessment (DA) is a validated instrument for assessing intimate partner homicide risk among females [Campbell, 1986; Messing et al., 2020]. Due to a lack of validation evidence for male populations, only female participants' scores are included in this table.

*p<.05, **p<.01, ***p<.001

Compared to patients in 2023, patient age was significantly lower during pre-COVID ($B = -3.53$, $SE = 0.51$, $p < .001$), the reopening ($B = -2.19$, $SE = 0.96$, $p = .022$), the second lockdown ($B = -1.96$, $SE = 0.47$, $p < .001$), and Restrictions Lifted ($B = -2.34$, $SE = 0.57$, $p < .001$). For patients with opposite-sex partners, DA scores were significantly lower pre-COVID ($B = -1.68$, $SE = 0.60$, $p = .010$) but otherwise showed no significant variations compared to those seen in 2023. No significant differences were observed for same-sex DA scores. ACE symptom scores were significantly lower during the second lockdown compared to in 2023 ($B = -0.71$, $SE = 0.27$, $p = .009$). Sleep symptom scores were lower during the reopening ($B = -0.38$, $SE = 0.17$, $p = .027$), the second lockdown ($B = -0.19$, $SE = 0.05$, $p = .001$), and in 2022 ($B = -0.12$, $SE = 0.05$, $p = .034$) than in 2023. Cognitive symptom scores were also significantly lower during the second lockdown ($B = -0.20$, $SE = 0.08$, $p = .014$). No significant variations in emotional or physical symptom scores were observed over time compared to patients seen in 2023.

Discussion

In this retrospective study of an urban FNE program at a large Level I Trauma Center, patients experiencing IPV, TBI, and SA exams had higher odds of being examined during COVID-19 lockdowns. Conversely, fewer older adult patients and those experiencing elder abuse were seen during this time. These shifts may reflect changes in cycles of abuse or experiences of violence, changes in personal health or help-seeking behavior, community- or system-level changes in site utilization or availability (e.g., closures of other programs), changes in economic or housing stability, or the more likely scenario where it was a combination of more than one of these factors (Moreira & Da Costa, 2020).

Previous COVID-19 studies among U.S. regional healthcare facilities that have explored trends in patients who report trauma, violence, or abuse have found similar fluctuations in patient volume and severity after the onset of the global pandemic, with a wide range of preparedness and responses (Hartnett et al., 2020; Holland et al., 2021; Muldoon et al., 2021; Staunton et al., 2021; Rhodes et al., 2020; Kourti et al., 2023; Piquero et al., 2021; Pallansch et al., 2022). For example, Muldoon et al. (2021) compared 2018 to 2020 patient volumes at the Ottawa Hospital, observing drops in all-cause ED admissions and significant reductions in the number of patients who presented for domestic violence, SA, and physical assault. Looking at the first few weeks of the pandemic, Holland et al. (2021) examined trends from the Centers for Disease Control and Prevention (CDC) National Syndromic Surveillance Program and similarly found a 34% decrease in IPV-related ED visits within the first 14 weeks of COVID-19. However, others examining

trends in domestic violence crisis hotline calls, calls to law enforcement, and crime reporting observed the opposite—with significant increases across states and jurisdictions (CoSAOoE, 2020; Money, 2020; New York Police Department, 2020; National Commission on COVID-19 and Criminal Justice, 2021; National Domestic Violence Hotline, 2020). This FNE program, given its robust resources and reputation among community partners as a safe, trauma-informed place for seeking care for violence or abuse, perhaps captures the intersection of these diverging trends and the benefit of having a highly trained, specialized team of forensic nurses to support screening and care for these patient populations during times of global crisis.

For patients experiencing IPV, while there was a higher odds of the DA being completed during the reopening phase and the second lockdown, average DA scores did not change. In other words, more women expressed concern for their safety in relationships during periods of potential isolation, yet their risk for lethal danger was comparable to women seen at other time points. The lack of variation in the danger score is reflective of others' findings such as that by Ashwell et al. (2022), who found no changes in IPV severity in their online general-population survey among Michigan residents. The heightened odds of patients experiencing IPV presenting during lockdowns in this study aligns with substantial evidence that found an increase in IPV during the pandemic (e.g., Agüero, 2021; Bracewell et al., 2020; Hamadani et al., 2020; Hassan et al., 2020; Leslie & Wilson, 2020; Mohler et al., 2020; Payne et al., 2020; Rhodes et al., 2020; Sabri et al., 2020; Sediri, et al., 2020; Weller et al., 2021). Placing IPV findings into context both during and since the pandemic, however, has become increasingly difficult without a reliable and valid means of understanding trends in remote/rural areas or at the national level. Well-supported, robust national studies staffed by trauma-informed, highly trained researchers, such as the CDC's National Intimate Partner and Sexual Violence Surveys (NISVS; 2010 and 2017 versions) to examine national epidemiological trends in IPV-related health outcomes and injuries have previously been instrumental to making informed interpretations, responses, and plans for future directions for the field. Building on and ensuring the continuation of these efforts would be a meaningful strategy to place findings into context and inform future scientific inquiry and clinical practice.

While ACE assessments for TBIs were more common during the second lockdown, there were significantly lower overall, sleep, and cognitive symptom scores compared to 2023 trends. Further, strangulation assessments showed no significant changes by lockdown period, being more common pre-COVID and less likely to be conducted in 2022 than they were in 2023. A robust comparison to other studies is limited by the lack of published literature on the use of the ACE and strangulation assessments to examine the patient-reported symptoms associated with these blunt injuries. However, our findings are similar to a cross-sectional thesis study conducted at a concussion clinic by McIndoe (2023), which used a validated tool comparable to the ACE (the Post-Concussion Symptom Scale) in terms of its robust measurement of TBI-related symptoms and found no significant between-group differences for affective, cognitive, somatic, or sleep symptoms among its patient population. Given patients in the current study at this FNE program reported fewer sleep, concentration, or memory symptoms, this could be due to the widely documented pandemic-related declines in overall sleep and cognitive health which may have made it harder for patients to self-compare symptoms to their baseline (e.g., Alimoradi et al., 2021; Jahrami et al., 2021; Papagiovanni et al., 2022). And yet our findings are contrary to a systematic review of literature on clinical forensic medicine and psychiatry, which found how lockdown restrictions limited access to resources and care which may have led to delays in care and thus likely to present with worsened signs or symptoms (Xu, Parkin, & Cunningham, 2024).

More research specifically allowing comparison of self-reported TBI or strangulation symptoms from interpersonal or IPV-related assault is needed to better understand the generalizability of our findings during the pandemic.

There were more patients who presented for SA exams at all timepoints compared to 2023, potentially demonstrating that these assaults were happening more frequently among this patient population, changes occurred in help seeking behavior, and/or perhaps the more likely possibility that the closures of other sexual assault nursing programs locally may have limited available options for residents in the area to seek care for these assaults. The literature is mixed on pandemic trends in SA, and several studies found decreases in patients treated for SA during and following COVID-19 (e.g., Chiaramonte et al., 2022; Muldoon et al., 2021). However, many of these, much like this study, were restricted to singular healthcare systems that limited generalizability to the greater population. Findings from others aligned with ours and found increases in sexual violence prevalence or severity since the onset of COVID-19, yet often in the context of domestic violence (e.g., Kourti et al., 2023). This context matters, as in this study where assailants were predominantly a patient's intimate partner or ex, with only individuals who had a direct relationship with the patient's partner/ex (e.g., their partner's family member, ex partner, or friend) being more likely to be the assailant during the second lockdown. The nuance of these relationships and impact of the pandemic on their dynamics demonstrates the importance of healthcare professionals not only assessing patients for their injuries or experiences of assault, but the critical need for them to carefully screen for the relationship of patients to those who harmed them. It is equally essential these questions are asked in the context of evidence-based models for trauma-informed practice and survivor-centered care to prevent patient re-traumatization, such as those used to guide practice at this FNE program (Ashworth et al., 2023; Grossman et al., 2021; Navarroli, 2023; Valentine, Sekula, & Lynch, 2020).

There were significantly fewer examinations for elder abuse and older adult patients seen by this FNE program from 2020–2022 compared to 2023. While not surprising given the higher vulnerability of older adults to COVID-19 and the active discouragement of the public to seek care unless critical, this potentially had an adverse impact on those able to receive support for their experiences of abuse (Farina & Ailshire, 2022; Makaroun et al., 2021). More specifically, it may potentially reflect changes in access (such as older adult patients being unable or unwilling to seek care for abuse), changes in the types of abuse experienced (e.g., emotional or financial compared to physical), and/or changes in ability of caregivers to identify signs of abuse (e.g., being separated, restricted from, or otherwise having limited ability to visit nursing homes and facilities) (Farina & Ailshire, 2022; Makaroun et al., 2021). Evidence on elder abuse trends during the pandemic is mixed. For instance, an online survey conducted during the initial lockdown found that 21.3% of their 191 participants reported elder abuse, an 83.6% increase from their pre-COVID estimates (Chang & Levy, 2021)—whereas an analysis of the calls made to the National Center on Elder Abuse did not observe any changes in the number of calls made during COVID-19 (Weissberger et al., 2022). More coordinated, trauma-informed, and in-depth screening practices, age-appropriate educational techniques and tools, and active advocacy and support for older adult patients, particularly during times of global crisis, are needed to ensure these patients receive the care and support they deserve (Chang & Levy, 2021; Makaroun et al., 2021; Weissberger et al., 2022; Wei, 2021).

Limitations. Threats to external validity included the fact that we only analyzed data from one forensic nursing program in the Denver metro area, one that is well-resourced and supported

by the robust facility. This is not common, as a search for programs registered under the International Association of Forensic Nurses yields only 28 such programs in Colorado, and 1,051 programs overall, which is only a fraction of the 6,120 hospitals in the United States (; American Hospital Association, 2024; International Association of Forensic Nurses, 2023). In addition, generalizability is further limited by the location of this forensic nursing program at one of the largest medical facilities and emergency departments in the state, with over 100,000 ED visits annually. Smaller or more rural healthcare facilities may therefore have had very different experiences in terms of patient volume and the type or severity of violence observed. Changes to the FNE program's service hours and delivery (on-call to 24/7 in-hospital) and closures of local sexual assault nurse examiner programs further limited examination of not only pre-COVID trends, but potentially those observed after the lockdowns as well. While mentioned previously, it's worth reiterating that these closures may have confounded our findings particularly related to SA examinations.

Our ability to make robust comparisons with existing evidence was limited by inconsistencies and limitations of available literature, particularly in how time points were defined and framed across studies, as well as by when studies were published since the start of the pandemic. By including 2022–2023 data, we aimed to provide a more comprehensive retrospective view of how trends have evolved not only pre-pandemic to "post-pandemic," which could technically be defined up until present day, but across the many complex phases of change that continued to affect communities during and long after the initial lockdown. And while extensive research has examined domestic violence and IPV before and after the onset of COVID-19, future studies that take a more longitudinal approach comparing multiple timepoints and that focus on cases seen by similar FNE programs or health systems would allow for more rigorous comparisons. This would be particularly valuable for understanding trends in elder abuse, SA, strangulation, and TBI that were observed in this analysis.

Conclusion

In summary, this study found notable shifts not only in the patient volumes and demographics seen by forensic nurses, but also in the types of violence patients reported experiencing. These trends emphasize the importance of the in-depth care that forensic nurses provide during a time of global crisis and the nuanced impact of the pandemic on forensic healthcare encounters and documentation practices. The patients seen by this one FNE program were not alone in their experiences, with other facilities and studies finding similarly concerning trends. For healthcare facilities that do not have forensic nursing programs, findings demonstrate the importance of screening for not only the presence of violence or abuse, as with IPV, but also its severity and implications for patient health and safety. Strategically addressing access barriers to trauma-informed care, building multisectoral partnerships, educating all disciplines in recognizing signs of abuse, and implementing protocols to safely coordinate care for patients would provide transformative steps forward for healthcare systems to be better prepared to meaningfully support survivors of violence during times of global crisis.

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