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Patient Agitation and Violence in Medical-Surgical Units at a Large Inner-City Community Health Center in New York, One Year Before and During the COVID-19 Pandemic

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ABSTRACT

Importance: Institutional violence has a grave burden on the healthcare system and has a major impact on staff's physical and mental wellbeing. The COVID-19 pandemic has brought to bear the complexity of circumstances, which may have increased its incidence.

Objective: To determine whether the prevalence of agitation and violence in medical-surgical settings increased in BronxCare Hospital (BCH) during the COVID-19 Pandemic.

Design: This is a retrospective study to identify the effects of the COVID-19 pandemic in increasing patient agitation and violence in medical-surgical settings in BCH. Data collection occurred between June 2021 and August 2021, while the sampling time was from 2019 to 2021. The data were separated into two-time frames: Pre-COVID-19 (03/2019-03/2020) and COVID-19 (03/2020-03/2021).

Participants: Four exclusion criteria were determined:

- Subjects under 18 years old
- Agitation or violence related to substance use or withdrawal from substances or certain medications such as benzodiazepines;
- Agitation due to delirium and dementia
- Verbal agitation and threats that were redirected and managed without the use of restraints or medications.

Results: The sample size for the pre-COVID-19 population was n=115, while the sample size for the COVID-19 timeframe was n=194. The ratio between age groups remained the same for both timeframes. During COVID-19, there was an increase in female patients (n=65, 33.5%) and a decrease in male patients (n=129, 66.5%). Our final analysis, completed using a chi-square test, determined the difference in violence in patients between pre-COVID-19 and COVID-19 periods. Our data shows that there was an increase of almost 70% in incidents of violence during COVID-19 (03/2020-03/2021) with 194 (62.8%) reported events, compared to pre COVID-19 (03/2019-03/2020) with 115 (37.2%) events (p=0.01).

Conclusions and relevance: Agitation and violence increased in medical-surgical settings at BCH during the COVID-19 pandemic.

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Our data can potentially improve the quality of care and safety for healthcare workers and patients by using preventative approaches and the least restrictive measures when dealing with agitated patients. Updating policies and reviewing the protocols for safety in the healthcare system need to be considered during future large-scale events such as the Pandemic.

Keywords: Violence; COVID-19; Substance use; Benzodiazepines; BronxCare hospital; Healthcare workers

INTRODUCTION

Violence is an act of physical force intended to cause harm and may lead to physical and/or psychological damage. Violence toward healthcare workers (HCWs) is more common in psychiatric settings, emergency departments and nursing homes [1]; however, HCWs in a medical setting are not spared from such events. Workplace violence has a grave burden on the healthcare industry and has a major impact on staff's physical and mental well-being.

The World Medical Association has most recently defined violence against health personnel as "an international emergency that undermines the very foundations of health systems and impacts critically on patient's health" [2]. Globally there has been a reported increase in violence against HCWs, which had been noted even prior to the Pandemic [3]. A 2019 systematic review found that 61.9% of HCWs experienced a form of violence in the past year, verbal abuse being the most common, and 24.4% of HCWs experienced physical violence [4]. Since COVID-19, it has continued to worsen, with over 611 incidents reported to the International Committee of the Red Cross (ICRC) within the first 6 months of the Pandemic [5].

The purpose of this study is to compare the prevalence of patient agitation and violence in medical-surgical settings of a community hospital within a major urban area-BronxCare Hospital (BCH), Bronx, New York-one year before and during the COVID-19 Pandemic (03/2019-03/2020 and 03/2020-03/2021).

METHODS

Prior to the initiation of the study procedures, it was approved by the Institutional Review Board (IRB # 06 10 21 01). Data collection occurred between June 2021 and August 2021, while the sampling time was from 2019 to 2021. The data were separated into two-time categories: Pre-COVID-19 (03/2019-03/2020) and COVID-19 (03/2020-03/2021). The data required to be cleaned after collection, ensuring all patients were viable for the study. Patients that were not viable were excluded from the study. Four exclusion criteria were determined:

- Subjects under 18 years old;
- Agitation or violence related to substance use or withdrawal from substances or certain medications such as benzodiazepines;
- Agitation due to delirium and dementia;
- Verbal agitation and threats that were redirected and managed without the use of restraints or medications.

Due to the broad nature of different admission diagnoses, similar diagnoses were grouped by body systems. For example, seizure disorder was grouped into the Central Nervous System (CNS) disorders. Psychiatric diagnoses were grouped based on the underlying nature of the diagnosis.

We created frequency tables for 19 variables. Categorical variables were summed into frequency and percentages, but numerical variables, such as length of stay, were used to calculate mean, median, standard deviation, minimum, and maximum. We used a chi-square test to determine a variable's statistical significance. We tested all variables against 'Restraint Type', determining if a patient was violent or became violent enough to restrain. The 'Restraint types' were Chemical, Physical, or Both. This analysis was also used to determine if there was a statistical difference between the pre-COVID-19 and during COVID-19 timeframe.

RESULTS

The sample size for the pre-COVID-19 population was n=115, while the sample size for the COVID-19 timeframe was n=194. The ratio between age groups remained the same for both timeframes. During COVID-19, there was an increase in female patients (n=65, 33.5%) and a decrease in male patients (n=129, 66.5%). There was an increase in Asian (n=27, 13.9%) and Latino/Hispanic (n=63, 32.5%) patients between the two timeframes. **Table 1** illustrates a detailed demographic data comparison between pre-COVID-19 and COVID-19 eras.

Table 1: Descriptive statistics on sample population demographics

Variable (name and descriptors), n (%)	Pre-Covid (n=115)	During-Covid (n=194)
Age		
0-18	1 (0.9)	0 (0)
19-35	43 (37.4)	74 (38.1)
36-45	22 (19.1)	38 (19.6)
46-64	35 (30.4)	65 (33.5)
65+	14 (12.2)	17 (8.8)
Gender		
Female	32 (27.8)	65 (33.5)
Male	83 (72.2)	129 (66.5)
Ethnicity		
Asian	2 (1.7)	27 (13.9)
Black/African American	50 (43.5)	70 (36.1)
Latino/Hispanic	32 (27.8)	63 (32.5)
Other	3 (2.6)	7 (3.6)
Unknown	18 (15.7)	17 (8.8)
White/Caucasian	10 (8.7)	10 (5.2)
Admission diagnosis		
Abscess	0 (0)	2 (1)
Agitation	8 (7)	20 (10.3)
Cardiovascular disease	8 (7)	16 (8.2)

CNS disease	32 (27.8)	40 (20.6)
Dermatologic disease	3 (2.6)	5 (2.6)
DVT	0 (0)	2 (1)
Electrolyte imbalance	1 (0.9)	3 (1.5)
Endocrinologic disease	7 (6.1)	6 (3.1)
Fall	2 (1.7)	2 (1)
Foreign body	1 (0.9)	0 (0)
FTT	0 (0)	1 (0.5)
GI disease	4 (3.5)	11 (5.7)
Hematologic disease	0 (0)	3 (1.5)
Hyperammonaemia	0 (0)	2 (1)
Infectious disease	4 (3.5)	16 (8.2)
Lactic acidosis	0 (0)	3 (1.5)
Musculoskeletal disease	22 (19.1)	25 (12.9)
Neglect	0 (0)	1 (0.5)
Obstruction	1 (0.9)	0 (0)
Ophthalmic disease	1 (0.9)	1 (0.5)
Pain	0 (0)	1 (0.5)
PEG tube dislodgement	1 (0.9)	0 (0)
Renal disease	6 (5.2)	1 (0.5)
Respiratory disease	5 (4.3)	20 (10.3)
Suicidality	3 (2.6)	4 (2.1)
Swallowed a foreign body	0 (0)	1 (0.5)
Swollen leg	0 (0)	1 (0.5)
Traumatic injury	5 (4.3)	3 (1.5)
Tylenol intoxication	0 (0)	1 (0.5)
Ulcer of lower extremity	0 (0)	1 (0.5)
Under arrest medical clearance d/t psych history	1 (0.9)	0 (0)
Urologic disease	0 (0)	1 (0.5)
Weakness	0 (0)	1 (0.5)
Psychiatric diagnosis		
ADHD	1 (0.9)	1 (0.5)
Adjustment disorder	0 (0)	1 (0.5)
Anxiety disorder	2 (1.7)	3 (1.5)
Autism spectrum disorder	5 (4.3)	2 (1)
Bipolar disorder	20 (17.4)	28 (14.4)
Intellectual disability	2 (1.7)	2 (1)
Intermittent explosive disorder	1 (0.9)	1 (0.5)
Major depressive disorder	10 (8.7)	12 (6.2)
Neurocognitive disorder	1 (0.9)	1 (0.5)
None	19 (16.5)	56 (28.9)
Personality disorder	1 (0.9)	0 (0)
Psychotic disorder	41 (35.7)	65 (33.5)
PTSD	0 (0)	2 (1)
Substance use disorder	12 (10.4)	20 (10.3)
Substance use history		
N/A	2 (1.7)	5 (2.6)
No	42 (36.5)	63 (32.5)
Yes	71 (61.7)	126 (64.9)
Urinary toxicology completed?		
N/A	3 (2.6)	0 (0)
No	34 (29.6)	52 (26.8)
Yes	78 (67.8)	142 (73.2)
Header for violence		
N/A	1 (0.9)	1 (0.5)
No	89 (77.4)	143 (73.7)
Yes	25 (21.7)	50 (25.8)
CL consulted		
N/A	2 (1.7)	0 (0)
No	28 (24.3)	42 (21.6)
Yes	85 (73.9)	152 (78.4)
Length of stay		
N/A	5 (4.3)	0 (0)
0-3	41 (35.7)	90 (46.4)
4-7'	51 (44.3)	66 (34)
08-Nov	8 (7)	17 (8.8)
Dec-15	3 (2.6)	10 (5.2)
16+	7 (6.1)	11 (5.7)
30-day readmission		
N/A	1 (0.9)	0 (0)
No	102 (88.7)	161 (83)
Yes	12 (10.4)	33 (17)
90-day readmission		
N/A	1 (0.9)	0 (0)
No	104 (90.4)	175 (90.2)
Yes	10 (8.7)	19 (9.8)
Restraint type		
Both (Physical and Chemical)	27 (23.5)	67 (34.5)
Chemical	72 (62.6)	87 (44.8)
Physical	16 (13.9)	40 (20.6)
Insurance status		
Medicaid	90 (78.3)	158 (81.4)
Medicare	8 (7)	9 (4.6)
Medicare. Medicaid	5 (4.3)	11 (5.7)
Private insurance	1 (0.9)	5 (2.6)
Self pay	11 (9.6)	11 (5.7)

The top admission diagnosis for pre-COVID-19 and COVID-19 timeframes was CNS disease. **Table 1** shows the main admission diagnoses in both timeframes. Psychotic disorders were the top psychiatric background in both pre and during-COVID-19 timeframes. There was no significant change in substance use history during both timeframes (**Table 2**). There was a slight increase in 30-day and 90-day readmission rates during COVID-19 (n=33, 17%), (n=19, 9.8%). Medicaid remained the most common health insurance type pre-and during COVID-19. Haldol was the most frequently used medication for agitation management pre-and during COVID-19.

Table 2: Drug information pre and during Covid

Pre-Covid drug combination frequency, n (%)	
Haldol, Ativan, Benadryl	49 (42.6)
Haldol, Ativan	9 (7.8)
Haldol	6 (5.2)
Pre-covid individual drugs used, n (%)	

Haldol	89 (29.5)
Ativan	86 (28.5)
Benadryl	75 (24.8)
Midazolam	18 (6)
Olanzapine	16 (5.3)
Thorazine	14 (4.6)
During-covid drug combination frequency, n (%)	
Haldol, Ativan, Benadryl	77 (39.7)
Haldol, Ativan, Benadryl, Midazolam	19 (9.8)
Haldol, Ativan	12 (6.2)
During-covid individual drugs used, n (%)	
Haldol	158 (29.3)
Ativan	143 (26.5)
Benadryl	134 (24.9)
Midazolam	46 (8.5)
Olanzapine	31 (5.8)
Thorazine	25 (4.6)
Fluphenazine	2 (0.4)

We used a 95% significance threshold, p=0.05. Several variables were statistically significant pre-COVID-19: Age (p=0.02), race/ethnicity (p=0.01), header for violence (p=0.002), number of chemical restraints throughout admission (p=0.001), insurance status/type (p=0.02), and intra-muscular (IM) medications (p=0.05) (Table 3a).

Table 3a: Pre-covid variables those are statistically significant as predictors of violence

Category	Both (Physical and Chemical)	Chemical	Physical	Total (n=115), n (%)	p-value
Age group					
0-18	1	0	0	1 (0.9)	
19-35	15	18	10	43 (37.4)	
36-45	4	16	2	22 (19.1)	p=0.02
46-64	6	25	4	35 (30.4)	
65+	1	13	0	14 (12.2)	
Race/Ethnicity					
African American	14	29	7	50 (43.5)	
Asian	2	0	0	2 (1.7)	
Hispanic	7	17	8	32 (27.8)	p=0.01
Other	0	3	0	3 (2.6)	
Unknown	0	17	1	18 (15.7)	
Header for violence					
No	16	64	9	89 (77.4)	
N/A	0	1	0	1 (0.9)	p=0.002
Yes	11	7	7	25 (21.7)	
# of chemical restraints throughout the admission					
1	5	31	6	42 (36.8)	
2	3	22	4	29 (25.4)	
3	2	7	0	9 (7.9)	
4	6	6	2	14 (12.3)	
5	3	1	0	4 (3.5)	
6	2	0	0	2 (1.8)	
7	4	0	2	6 (5.3)	p=0.001
8	0	1	0	1 (0.9)	
9	0	0	1	1 (0.9)	
10	1	2	0	3 (2.6)	
11	0	0	1	1 (0.9)	
12	1	0	0	1 (0.9)	
13	0	1	0	1 (0.9)	
Insurance status					
Medicaid	21	59	10	90 (78.3)	
Medicare	2	4	2	8 (7.0)	
Medicare, Medicaid	4	1	0	5 (4.3)	p=0.02
Private insurance	0	1	0	1 (0.9)	
Self-pay	0	7	4	11 (9.6)	
Ativan	0	5	0	5 (4.3)	
Ativan, Benadryl	0	1	0	1 (0.9)	
Ativan, Benadryl, Midazolam	0	1	0	1 (0.9)	
Ativan, Benadryl, Olanzapine	0	1	0	1 (0.9)	p=0.05
Ativan, Benadryl, Olanzapine, Thorazine	0	1	0	1 (0.9)	
Ativan, Benadryl, Thorazine	0	1	0	1 (0.9)	
Haldol	0	5	1	6 (5.2)	

Haldol, Ativan	0	8	1	9 (7.8)	
Haldol, Ativan, Benadryl	16	28	5	49 (42.6)	
Haldol, Ativan, Benadryl, Midazolam	1	3	0	4 (3.5)	
Haldol, Ativan, Benadryl, Midazolam, Thorazine	0	3	0	3 (2.6)	
Haldol, Ativan, Benadryl, Olanzapine	3	1	1	5 (4.3)	
Haldol, Ativan, Benadryl, Olanzapine, Thorazine	0	0	1	1 (0.9)	
Haldol, Ativan, Benadryl, Thorazine	2	0	1	3 (2.6)	
Haldol, Ativan, Midazolam	0	1	0	1 (0.9)	
Haldol, Ativan, Olanzapine	0	1	0	1 (0.9)	
Haldol, Benadryl	0	2	0	2 (1.7)	
Haldol, Benadryl, Midazolam	0	1	0	1 (0.9)	
Haldol, Midazolam	0	3	0	3 (2.6)	
Haldol, Thorazine	1	0	0	1 (0.9)	p=0.05
Midazolam	2	1	0	3 (2.6)	
Midazolam, Olanzapine, Benadryl	0	2	0	2 (1.7)	
N/A	0	1	0	1 (0.9)	
Olanzapine	1	0	1	2 (1.7)	
Olanzapine, Thorazine	0	0	3	3 (2.6)	
Thorazine	1	2	2	5 (4.3)	
Ativan	0	5	0	5 (4.3)	

Variables that were statistically significant during-COVID-19: Race/ethnicity (p<0.001), substance use history (p<0.001), urine toxicology completion (p=0.04), header for violence (p=0.007), length of stay (p=0.05), number of chemical restraints throughout admission (p<0.001), insurance status/type (p=0.002), and Intra-Muscular (IM) medications used (p=0.002) (Table 3b).

Table 3b: During Covid variables that are statistically significant as predictors of violence

Category	Both (Physical and Chemical)	Chemical	Physical	Total (n=194), n (%)	p-value
Race					
African American/Black	0	51	19	70 (36.1)	
Asian	27	0	0	27 (13.9)	
Hispanic/Latino	25	24	14	63 (32.5)	p<0.001
Other	12	5	0	17 (8.8)	
Unknown	0	3	4	7 (3.6)	
White/Caucasian	3	4	3	10 (5.2)	
Substance use history					
N/A	1	4	0	5 (2.6)	
No	9	45	9	63 (32.5)	p<0.001
Yes	57	38	31	126 (64.9)	
Urinary toxicology completed?					
No	14	31	7	52 (26.8)	p=0.04
Yes	53	56	33	142 (73.2)	
Header for violence					
N/A	1	0	0	1 (0.5)	
No	42	75	26	143 (73.7)	p=0.007
Yes	24	12	14	50 (25.8)	
Length of stay					
1	16	4	1	21 (10.8)	
2	9	12	5	26 (13.4)	
3	11	24	8	43 (22.2)	
4	9	11	4	24 (12.4)	
5	6	9	6	21 (10.8)	
6	4	6	3	13 (6.7)	
7	4	4	0	8 (4.1)	
8	2	0	1	3 (1.5)	
9	1	5	1	7 (3.6)	
10	0	3	3	6 (3.1)	
11	0	0	1	1 (0.5)	
12	0	1	1	2 (1.0)	
13	1	1	0	2 (1.0)	

14	0	1	1	2 (1.0)	
15	0	2	2	4 (2.1)	
18	1	1	0	2 (1.0)	
20	1	1	0	2 (1.0)	
21	0	0	2	2 (1.0)	p=0.05
26	1	0	0	1 (0.5)	
29	1	0	0	1 (0.5)	
37	0	1	0	1 (0.5)	
40	0	0	1	1 (0.5)	
50	0	1	0	1 (0.5)	
Number of chemical restraints throughout the admission					
0	0	0	5	5 (2.6)	
1	17	32	10	59 (30.6)	
2	16	19	11	46 (23.8)	
3	11	13	4	28 (14.5)	
4	5	15	2	22 (11.4)	
5	7	3	2	12 (6.2)	p<0.001
6	4	4	2	10 (5.2)	
7	4	1	0	5 (2.6)	
8	2	0	1	3 (1.6)	
12	0	0	2	2 (1.0)	
14	1	0	0	1 (0.5)	
Insurance status and type					
Medicaid	63	63	32	158 (81.4)	
Medicare	0	5	4	9 (4.6)	
Medicare, Medicaid	0	11	0	11 (5.7)	p=0.002
Private insurance	0	3	2	5 (2.6)	
Self-pay	4	5	2	11 (5.7)	
Medication administered					
Ativan	0	1	1	2 (1.0)	
Ativan, Benadryl	0	1	1	2 (1.0)	
Ativan, Benadryl, Midazolam	1	0	0	1 (0.5)	
Ativan, Benadryl, Olanzapine	1	1	0	2 (1.0)	
Ativan, Fluphenazine	0	0	1	1 (0.5)	
Ativan, Fluphenazine, Olanzapine, Thorazine	0	0	1	1 (0.5)	
Ativan, Midazolam	0	1	1	2 (1.0)	
Ativan, Midazolam, Olanzapine	0	0	1	1 (0.5)	
Ativan, Olanzapine	0	1	0	1 (0.5)	
Benadryl	0	1	0	1 (0.5)	
Haldol	2	1	3	6 (3.1)	
Haldol, Ativan	2	7	3	12 (6.2)	
Haldol, Ativan, Benadryl	27	38	12	77 (39.7)	
Haldol, Ativan, Benadryl, Midazolam	11	8	0	19 (9.8)	
Haldol, Ativan, Benadryl, Midazolam, Olanzapine	0	0	1	1 (0.5)	
Haldol, Ativan, Benadryl, Midazolam, Thorazine	2	2	0	4 (2.1)	p=0.004
Haldol, Ativan, Benadryl, Olanzapine	2	5	1	8 (4.1)	
Haldol, Ativan, Benadryl, Olanzapine, Thorazine	2	1	0	3 (1.5)	
Haldol, Ativan, Benadryl, Thorazine	1	2	2	5 (2.6)	
Haldol, Ativan, Midazolam	1	0	0	1 (0.5)	
Haldol, Benadryl	2	5	0	7 (3.6)	
Haldol, Benadryl, Midazolam	1	2	0	3 (1.5)	
Haldol, Midazolam	3	1	0	4 (2.1)	
Haldol, Midazolam, Olanzapine, Thorazine	1	0	0	1 (0.5)	
Haldol, Midazolam, Thorazine	0	1	0	1 (0.5)	
Haldol, Olanzapine	0	1	1	2 (1.0)	
Haldol, Olanzapine, Midazolam	1	0	0	1 (0.5)	
Haldol, Olanzapine, Thorazine	1	0	0	1 (0.5)	
Haldol, Thorazine	1	0	1	2 (1.0)	
Midazolam	0	4	0	4 (2.1)	

Midazolam, Olanzapine, Thorazine	3	0	0	3 (1.5)
N/A	0	1	0	1 (0.5)
None	0	0	6	6 (3.1)
Olanzapine	1	1	2	4 (2.1)
Olanzapine, Thorazine	0	0	1	1 (0.5)
Olanzapine, Thorazine, Benadryl	0	0	1	1 (0.5)
Thorazine	1	1	0	2 (1.0)

There was overlap between some of the statistically significant variables, such as race, insurance status, and header for violence between the two study periods. Despite this overlap, variables such as race/ethnicity, number of chemical restraints throughout admission, insurance status/type, and intramuscular (IM) medications became more statistically significant from the pre-COVID-19 to during the COVID-19 era. However, the header for violence decreased in statistical significance from pre-COVID-19 to COVID-19 era. This could indicate that these patients did not have the header placed at the beginning of the admission because they were new violent patients, or that less attention was placed on the entry of the header in the electronic health record during COVID-19, despite the increased number of positive BVC results.

Our final analysis, completed using a chi-square test, determined the difference in violence in patients between pre-COVID-19 and COVID-19 era. We then tested the violence marker against restraint type. The result was statistically significant, p=0.01.

DISCUSSION

This is the first paper to systematically review the prevalence of viole ce in medical-surgical units in a hospital, pre COVID-19 and during the COVID-19 era.

Our data shows that there was an increase of almost 70% in incidents of violence during COVID-19 (03/2020-03/2021) with total of 194 (62.8%) reported events, compared to pre COVID-19 (03/2019-03/2020) with 115 (37.2%) events (p=0.01).

Violence and its management in healthcare settings have traditionally been a challenge [6-10], and the COVID-19 pandemic has brought to bear the complexity of circumstances, which may have increased its incidence.

Our data aligns with the global trend of increased violence toward healthcare workers during the COVID-19 pandemic [11-13].

While it remains unclear what effect the COVID-19 pandemic had on violence in healthcare settings, potential risk factors for violence could be categorized into three groups:

- Patient-related factors
- Healthcare worker-related factors
- Institutional-related factors

Below we will describe each group:

1. Patient-related factors:

- Financial stressors (e.g., unemployment, homelessness and food insecurity)
- Worsening substance use and mental health prior to admission
- Fear of becoming infected by COVID-19 during a hospital stay
- Visitor restrictions during the peaks of the pandemic

2. Healthcare workers-related factors

- Staff burnout affecting the quality of care
- Inadequate training on violence risk assessment, de-escalation techniques and other preventative measures
- Poor documentation of violent incidents
- Poor communication among healthcare workers regarding violent incidents

3. Hospital-related factors

- Limited preventative measures and focused policies that were misaligned with the early COVID-19 era
- Initial insufficient personal protective equipment leading to limited assessments
- Challenges in staffing (fewer nurses and nurse assistants)
- Inadequate video surveillance in common areas of the hospital

The Broset Violence Checklist (BVC) is a tool to assess for confusion, irritability, verbal and physical threats, and attacks on objects as either present or absent [14]. It is hypothesized that any patient presenting with two or more of these behaviors is more likely to be violent in the next 24 hours [14]. At BronxCare, BVC is used in the med-surg units for violence risk assessment. Data reported by the nursing department shows that about 1800 cases had positive BVC in 2019 while this number increased dramatically to about 4100 in 2020. Unfortunately, our data cannot clarify what percentages of the patients with positive BVC were restrained either physically or chemically during their admission into med-surg units at BronxCare. We could however conclude that the COVID-19 pandemic has had a significant role in the BVC results.

Table 1 describes the demographic information of patients including age, gender and ethnicity. As shown, Black/African Americans suffered more incidents of violence followed by Latino/Hispanics; however, it is worth mentioning that the two ethnicities make up the main patient population at BronxCare; hence it cannot be concluded in our study that ethnicity is a risk factor for violence.

While it may be assumed that having a psychiatric comorbidity may increase the incidence of violence, in a study by Della et al., the diagnosis of a mental health condition was associated with a decrease in physical aggression and assault [9]. Our study also did not show any positive correlation between past

psychiatric history and increase in the incidence of violence. In our study during the pre-COVID-19 era 83.5% of cases of violence had a psychiatric diagnosis while in the COVID-19 era 71.1% of cases had psychiatric illness (**Tables 3a and 3b**).

The admission diagnosis for individuals with violence is reported in **Table 1**. The main admission diagnosis was seizure disorder, which was categorized under CNS diseases. Musculoskeletal diseases ranked second with Rhabdomyolysis being the main diagnosis. Chart review revealed that the Rhabdomyolysis cases were the result of multiple chemical restraints precipitated by violent behavior while admitted in the Psychiatric inpatient units at BronxCare hospital, who were in turn transferred to the medical units for treatment.

There was no significant difference in the median age for violence in pre-COVID versus the COVID era (S1) The median length of stay was also identical (4 days) in both periods, and the average length of stay in the hospital was less in the COVID-19 era (5.84 days) versus pre COVID-19 era (7.15 days).

Table 1 report that substance use history was a major risk factor for violence in med-surge units, and almost two-thirds of violence pre and during COVID had a history of substance use. Urine toxicology on arrival was done for most (almost 70%) but not all cases (**Table 1**), which is an area of improvement for the future (**Figure 1**).

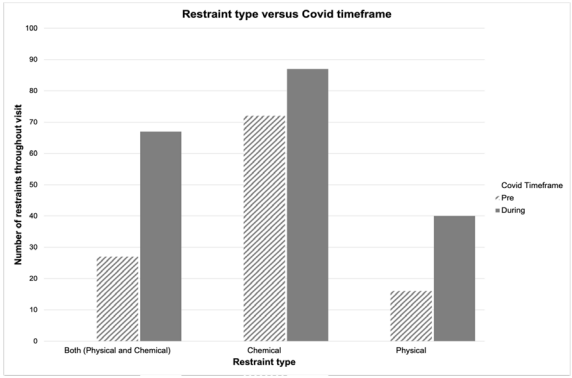

Figure 1: Restraint type (chemical, physical, or both) versus pre and during Covid time frame

Communication among healthcare workers is key when dealing with hospital violence. A simple tool used on the EMR at BronxCare is to place a header for "violence" in the patient's chart following a violence risk assessment or any violent events, which already happened. This serves as an alert to warn staff about the potential risk for violence and the appropriate precautions required while caring for these patients. Only a few cases, both pre and during the COVID-19 pandemic, had the header for violence (**Table 4**), which indicates that better communication needs to occur amongst healthcare workers of different disciplines.

Table 4: Pre-covid versus during covid versus restraint type as a predictor of violence

	Both (Physical and Chemical)	Chemical	Physical	Total (n=309), n (%)	p-value
During	67	87	40	194 (62.8)	p=0.01
Pre	27	72	16	115 (37.2)	

Violence risk assessment should be improved, and all healthcare workers especially nursing staff, need to be fully trained not only for violence risk assessment but also for de-escalation and preventative techniques and improving interdisciplinary communication as well as adequate documentation.

Global changes in nursing practices and improvements in emergency management strategies have resulted in lower incidences of restraint use in the past decade [15]. In an Australian study, it was reported that there has been a recent focus on preventative measures such as de-escalation techniques as first-line management in dealing with violent patients to minimize the use of restraints and utilize them as a last resort [16]. Despite these efforts, there have been many reports of a rise in the prevalence of agitation, violence, and abuse in the healthcare sector, which threatens healthcare workers' rights to a safe and harassment-free working environment and may indicate the need for improved strategies in dealing with violent patients [17-20]. Healthcare workers and stakeholders must review their strategies, policies and practice guidelines in order to make appropriate adjustments when significant events such as pandemics occur (**Table S1**).

CONCLUSION

Educating staff about de-escalation techniques has shown to be very effective, and more focus should be paid to prevention strategies to create a less restrictive environment to the delivery of care.

Updating policies and reviewing the protocols for safety in the healthcare system should be considered during future large-scale events such as the Pandemic.

Our data can potentially improve the quality of care and safety for healthcare workers and patients by using preventative approaches and the least restrictive measures when dealing with agitated patients.

LIMITATIONS

Our inclusion criteria for violence in the study only captured cases that led to physical restraints or required IM medications. The staff's experience in dealing with violent patients is not uniform, which may result in bias in the data.

Our data collection was from 03/2019 to 03/2020 for the pre-COVID-19 and from 03/2020 to 03/2021 for the COVID-19 era. This is while COVID cases were reported a few months earlier, in January 2020. We targeted the World Health Organization (WHO) date of 03/2020 as the start of the pandemic for our data collection to better capture the psychosocial aspects of COVID-19 leading to violent events in med-surg units, however, this time discrepancy may have resulted in bias in the data collected.

DECLARATIONS

Findings

This is the first paper to systematically, and retrospectively review the prevalence of violence in medical-surgical units in a community hospital pre COVID-19 and during the COVID-19 era. Our data shows that there was an increase of almost 70%

in incidents of violence during COVID-19 (03/2020-03/2021) with 194 (62.8%) reported events, compared to pre COVID-19 (03/2019-03/2020) with 115 (37.2%) events (p=0.01).

Meaning

Our data can potentially improve the quality of care and safety for healthcare workers and patients by using preventative approaches and the least restrictive measures when dealing with agitated patients.

Statement

All authors have contributed sufficiently to the manuscript and all authors have approved the final manuscript.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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