Implementation of a Novel Home Visiting Nurse Pilot Program for Victims of Violent Penetrating Injury

NCPD 2.5 ANCC Contact Hours

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BACKGROUND: Survivors of violent injuries are at risk for readmission, rehospitalization, and reinjury. In 2017, a novel home visiting nurse pilot program was implemented within a hospital-based violence intervention program (HVIP) to address disparities in care and combat the limited health care literacy and access, and the general mistrust of health care institutions among much of this population.

OBJECTIVE: The purpose of this study was to review the design and implementation of the home visiting nurse component of the HVIP and to report the demographics, clinical characteristics, home care needs, and short-term health outcomes of the pilot sample.

METHODS: This retrospective study was performed using a cohort of patients presenting to the emergency department at an urban, Level I trauma center for a violent penetrating injury between 2017 and 2018. The χ^2 and Wilcoxon rank sum tests were used to compare patient demographics and injury characteristics. Cox proportional hazards regression models were used to estimate health outcomes.

RESULTS: Of the 742 victims of violence included in this analysis, the 57 patients enrolled in the home visiting nurse pilot program were more likely to have severe gunshot wounds (68.4% vs. 40.3%, $p < .001$) requiring hospitalization (80.7% vs. 53.3%, $p < .001$), with 3.5% requiring rehospitalization within 90 days. The primary interventions provided by the home visiting nurse involved medical navigation and education, wound care, and consultation, underscoring the critical importance of health literacy and outreach for this vulnerable population.

CONCLUSION: The nurse–advocate partnership provides the foundation for this novel program to aid a marginalized population in overcoming health inequities.

KEY WORDS: Firearm injury, Gun violence, Health literacy, Home nurse, Home visiting nurse, Hospital-based violence intervention, Violence intervention, Violent injury

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BACKGROUND

Homicide is the third leading cause of death for victims aged 15–34 years in the United States (Centers for Disease Control and Prevention [CDC], 2019), with firearm and stabbing injuries accounting for 85.9% and 7.2%, respectively, of all homicides (CDC, 2019). In 2017, over 9,000 people in the United States died from firearm- and stabbing-related intentional homicides (CDC, 2019). For every gunshot or stabbing homicide, there are approximately four nonfatal penetrating injuries, totaling over $4.6 billion in combined medical costs and work productivity lost (CDC, 2019). In 2010, the average medical cost for each nonfatal penetrating injury hospitalization was $18,339 (CDC, 2019).

Survivors of violent injuries may face additional challenges after hospital discharge. Patients suffering

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The Boston University/Boston Medical Center Institutional Review Board approved the creation of the VIAP data repository (Study H-38631) with a waiver of the requirement of informed consent. The Institutional Review Board deemed this study (H-39962) exempt from federal regulations for the protection of human research participants.

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KEY POINTS

- Survivors of violent trauma are at high risk for readmission, rehospitalization, and injury recidivism.
- This study presents the practical details, feasibility, reproducibility, and outcomes of a novel home visiting nurse pilot program for victims of violent penetrating injury.
- A key implication for trauma practice from this study is the opportunity for partnerships between nurses and hospital-based violence intervention programs to better serve vulnerable patients.

from gunshot wounds have been found to be at the greatest risk for readmission (West et al., 2018). According to the 2013–2014 Nationwide Readmissions Database of 22 states, 7.6% of patients who were hospitalized for firearm injuries were readmitted within 30 days for the same wounds, leading to medical costs of over $54 million and totaling $131 million for readmissions within 1 year. The majority of these medical costs were for patients with either public insurance or no health insurance coverage (Rattan et al., 2018). The primary reasons for firearm injury readmission were surgical complications, intestinal disorders, and open wounds, issues that are more cost-effective to find and treat early before conditions worsen (Kalesan et al., 2019; Petrey et al., 2015).

Boston Medical Center, the region's largest safety-net hospital and a Level I trauma center, treats approximately 70% of the gunshot and stab wound victims in the city (Boston Medical Center, 2016). Established in 2006, the Violence Intervention Advocacy Program (VIAP) at Boston Medical Center is a hospital-based violence intervention program (HVIP) that provides services to all victims of penetrating injuries due to community or interpersonal violence (James et al., 2014; Karraker et al., 2011). Like other HVIPs, the VIAP utilizes a trauma-informed model of care to provide case management and services to any victim of a violent penetrating injury treated in the emergency department (these patients henceforth referred to as clients) and assists clients for an indefinite amount of time or until their goals are met (Pino et al., 2021a, 2021b). After hospital discharge, victims of violent injuries are often unable to attend follow-up appointments, hindering injury recovery and potentially leading to hospital readmission. Clients may have difficulty leaving their homes due to disability or physical challenges resulting from their injury. They may also be concerned about missing work to attend medical appointments or fear leaving their homes due to safety concerns regarding retaliation and reinjury (Rich & Grey, 2005). Further, low health literacy surrounding discharge instructions can lead to improper administration of medications or worsening or infected wounds (Boston CHNA-CHIP Collaborative, 2019; Wallace et al., 2016). This pilot program sought to address these gaps in care to reduce trauma recidivism and hospital readmissions.

Visiting home nurse programs have previously been implemented to address disparities in care for homebound elderly populations and babies born to mothers living in poverty. A nationwide intensive, evidence-based nurse home visitation program for low-income, first-time mothers has been shown, through randomized controlled trials, to improve maternal and child health, including reductions in injuries and child maltreatment (Dawley et al., 2007; Olds et al., 1997). This program has also been found to reduce public benefit costs for participants, mediated by subsequent pregnancy planning (Olds et al., 2019). For medically complex, homebound elderly patients, home nursing visits led to reduced annual hospitalization rates and 30-day readmissions (Jones et al., 2017). Among a hospitalized homebound population, transitional home nursing visitation improved coordination among providers and allowed for continuity of care for patients after hospital discharge (Ornstein et al., 2011).

OBJECTIVE

The purpose of this study was to review the design and implementation of the home visiting nurse component of a hospital-based HVIP and to report the demographics, clinical characteristics, home care needs, and short-term health outcomes of the pilot sample.

METHODS

Program Development

In 2017, a home visiting nurse pilot program for victims of violent injuries was implemented to decrease the barriers to clients following recommended best practices for wound care and injury recovery. We intended to test the feasibility of the home care model that has demonstrated efficacy in high-risk populations. Several factors indicated the need to pilot this approach, including the occupational risks for home care nurses when traveling to neighborhoods with high levels of violence as well as the potential for threats of violence within the home (Hittle et al., 2016); incorporating a warm hand-off approach between the client advocate, the home nurse, and the continuing clinical care providers among a patient population that lacks trust in the medical community; and navigating the complicating factor of delivering care to patients with unstable housing or those living in shelters. This program was funded by the Boston Medical Center Philanthropic Board, which assists in advancing the mission of Boston Medical Center to provide accessible health services to

all, regardless of health status and financial ability. In the program, a registered nurse travels once per week to the homes of victims of violent injury who have been discharged from hospital. The home nurse cleans and redresses their wounds, offers medical evaluation and education on wound care, and supports clients in navigating follow-up appointments.

Procedure

Following a violent penetrating injury and triage in the emergency department, a client is immediately enrolled into the VIAP and assigned a violence intervention advocate and a family support advocate. The advocates make first contact with the client and their family either while the client is still admitted to the hospital or immediately after discharge or release from the emergency department. Advocates collaborate with inpatient staff and the hospital care team of the client while they are admitted. Collaboration efforts include plan of care and medication concerns. Advocates and social workers contribute to plans for safety concerns and housing stability upon discharge. The program may also contact the hospital pharmacy to coordinate medication pickup if the client has transportation concerns.

From this initial contact, staff assess whether the client will be enrolled into the home visiting nurse program. Several factors are considered when making this decision: the severity of the penetrating trauma, the client's physical and mental health needs upon discharge, safety and travel concerns for follow-up appointments, housing status, and additional input from the client, family members, and VIAP advocates. Clients with severe or life-threatening penetrating injuries and those who are gang involved, fear retaliation, or experienced physical disabilities from their injuries are typically enrolled in the home visiting nurse program.

A decision tree of enrollment in the home visiting nurse program is shown in Figure 1. Upon enrollment into the home nursing program, the visiting nurse, an intensive care registered nurse, will meet with the client before discharge for introductions, exchanging contact information, and arranging plans to schedule a home visit. If the client has been discharged before this introduction, the visiting nurse reaches out in partnership with violence intervention advocates. One day per week, the nurse, along with a client advocate and a family support advocate, makes scheduled visits to clients. The nurse–advocate partnership is a critical component of this home visiting nurse program, as much of this patient population harbors a mistrust of medical systems and staff and may have previously had only limited access to health care. These visits generally happen within 1–2 weeks of client discharge to ensure continuity of care. During these visits, the nurse will provide an assessment and care of the penetrating wounds. Client needs vary considerably by safety concerns, health literacy, insurance issues, injury severity, and housing status. Because of this, the visiting nurse may help with medical navigation concerning follow-up appointments and insurance, as well as thoroughly reviewing hospital discharge instructions and medication instructions. Depending on the severity of any medical issues that may be identified, the visiting nurse may help the client to schedule a follow-up appointment for an earlier time or suggest an immediate emergency department visit if the situation is urgent. The nurse may also link the client to their primary care provider or aid them in obtaining their prescription medications.

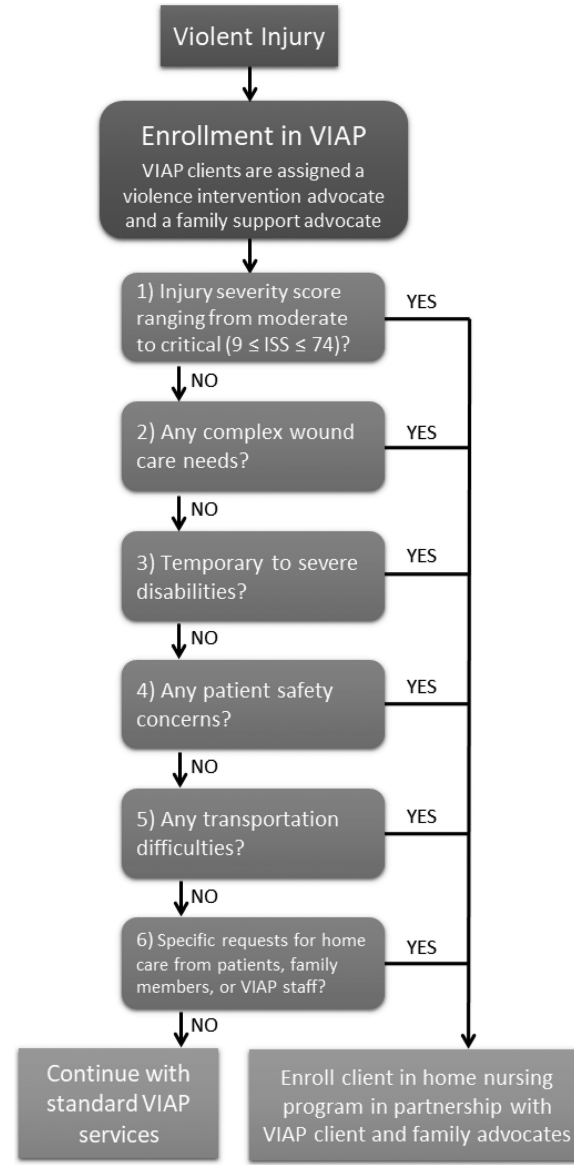

Figure 1. Boston Violence Intervention Advocacy Program (VIAP) home visiting nurse program enrollment decision tree.

Following the diagnoses and advice of the home nurse, violence intervention advocates aid clients in reaching follow-up appointments with medical providers and may provide additional medical services, including providing substance use resources, applying for social security benefits, and linking to mental health providers. Advocates also help clients in navigating the legal system with assistance in applying for the victim's compensation or contacting the local authorities about legal issues related to the client's injury.

Sample

Criteria for inclusion in this analysis required victims of violent penetrating injury treated at the Boston Medical Center emergency department from the calendar years 2017 and 2018. Information was gathered from the VIAP data repository, which includes client demographic and injury data. The VIAP data repository uses information from electronic medical records for injury-related details and client self-reported data for insurance payer, employment, and housing status. The nurse also completed a form for each visit detailing the immediate concerns of the client during the visit, interventions provided, and subsequent patient outcomes following the visit.

The Boston University and Boston Medical Center Institutional Review Board approved the creation of the VIAP data repository (Study H-38631) with a waiver of the requirement of informed consent. The Institutional Review Board deemed this study (H-39962) exempt from federal regulations for the protection of human research participants.

Measures

Age was analyzed as both a continuous variable and dichotomized by the median gunshot wound patient age of 30 years. Race and ethnicity were classified into five categories: White, Black, Hispanic, other (Asian and all other races), and those missing race and ethnicity information (as a separate category). Health insurance payer was classified into four categories: Medicaid and Medicare, private, no health insurance, and unknown insurance status. Homeless housing status includes clients living on the street, at a shelter, at a friend's house, or unknown homeless location. Employment status was classified by self-report as either employed (including both reported and unreported employment) or unemployed (including those seeking or not seeking work, students, retirees, and those unable to work due to disability or immigration status). Variables with missing information (unknown) were included in the analysis. Injuries were categorized by injury type (gunshot wound, stab wound) and hospital disposition. Of those patients admitted to the hospital, we assessed the length of stay and discharge placement.

Data Analysis

The statistical software Stata 16 (College Station, TX) was utilized for analysis. Categorical variables were compared using χ^2 tests, or Fisher's exact test for variables with fewer than five expected observations in individual cells. Continuous variables were compared using the nonparametric Wilcoxon rank sum test after rejection of the assumption of normality using the Shapiro–Wilk test. Cox proportional hazards regression models were used to estimate hazard ratios and 95% confidence intervals. Crude univariate and age-adjusted bivariate estimates were derived for each outcome measure. Health outcomes for participants of the home visiting nurse pilot program were compared to outcomes for clients with injuries severe enough to require hospital admission but did not receive home nurse services.

RESULTS

There were 742 victims of violent penetrating injury treated in the emergency department from 2017 to 2018. Of those, 57 patients (7.7%) were enrolled into the home visiting nurse pilot program.

Patient demographics and injury characteristics by enrollment in the home visiting nurse pilot program are presented in Table 1. Clients receiving home nurse services were significantly younger (27.5 years vs. 30.4 years, $p = .04$) than clients not visited by the home nurse and were more likely to live in a permanent home (89.5%) than in a group home or homeless (5.3%, $p = .001$). Patients enrolled in the home visiting nurse program were also more likely to be victims of gunshot wounds compared with unenrolled patients (68.4% vs. 40.3%, $p < .001$) and to have sustained injuries severe enough to require hospital admission (80.7% vs. 53.3%, $p < .001$). Of the patients admitted to hospital, clients receiving home nurse services had more severe injuries as evidenced by longer lengths of stay in hospital (*Mdn* 3.9 days [interquartile range, IQR 8] vs. 2 days [4], $p = .017$), higher injury severity scores (*Mdn* 9 [IQR 14] vs. 5 [9], $p = .005$), and increased discharge to rehabilitation or long-term care facilities (18.2% vs. 5.4%, $p = .018$). There were no statistical differences by gender, race, insurance payer, employment status, injury year, or disability level.

The main reasons for contact with the home nurse are presented in Figure 2A. Over half (55.6%) of home nurse visits were for the purpose of supporting clients with medical navigation, followed by assistance with wound care (46.0%) and issues with medication (17.5%). Other common reasons for contact included pain management (15.9%), behavioral health (9.5%), and swelling (7.9%). Figure 2B details the main interventions provided by the home visiting nurse. The

Table 1. Patient and Injury Characteristics by Use of Home Visiting Nurse Services Boston Medical Center, 2017–2018 ($n = 742$)

	All Clients	Clients Receiving Home Nurse Services	Clients Not Receiving Home Nurse Services	*p*
Clients, *n* (% row)	742	57 (7.7)	685 (92.3)	
Injury year				.145
2017	400 (53.9)	36 (63.2)	364 (53.1)	
2018	342 (46.1)	21 (36.8)	321 (46.9)	
Demographics				
Age, *Mdn* (IQR)	30.3 (15.6)	27.5 (12.4)	30.4 (15.9)	.04
Age group				.41
≤30	365 (49.2)	31 (54.4)	334 (48.8)	
≥31	377 (50.8)	26 (45.6)	351 (51.2)	
Gender				.64
Male	628 (84.6)	47 (82.5)	581 (84.8)	
Female	114 (15.4)	10 (17.5)	104 (15.2)	
Race/ethnicity				.18
				.15*
Black	520 (70.1)	47 (82.5)	473 (69.1)	
Hispanic	95 (12.8)	4 (7.0)	91 (13.3)	
White	87 (11.7)	3 (5.3)	84 (12.3)	
Other	30 (4.0)	3 (5.3)	27 (3.9)	
Unknown	10 (1.4)	0 (0)	10 (1.5)	
Insurance payer				.001
				.26*
Medicaid/Medicare	378 (50.1)	35 (61.4)	343 (50.1)	
Private	63 (8.5)	10 (17.5)	53 (7.7)	
No health insurance	77 (10.4)	7 (12.3)	70 (10.2)	
Unknown	224 (30.2)	5 (8.8)	219 (31.2)	
Employment status				<.001
				.13*
Employed/student/retired	272 (36.7)	33 (57.9)	239 (34.9)	
Unemployed	269 (36.3)	22 (38.6)	247 (36.1)	
Unknown	201 (27.1)	2 (3.5)	199 (29.1)	
Housing status				<.001
				.001*
Permanent home	451 (60.8)	51 (89.5)	400 (58.4)	
Homeless/group home	148 (20.0)	3 (5.3)	145 (21.2)	
Unknown	143 (19.3)	3 (5.3)	140 (20.4)	
Injury specifics				
Injury type				<.001
Gunshot wound	315 (42.5)	39 (68.4)	276 (40.3)	
Stab wound	427 (57.6)	18 (31.6)	409 (59.7)	

(*continues*)

Table 1. Patient and Injury Characteristics by Use of Home Visiting Nurse Services Boston Medical Center, 2017–2018 ($n = 742$) (*Continued*)

	All Clients	Clients Receiving Home Nurse Services	Clients Not Receiving Home Nurse Services	*p*
Bodily location				
Head/neck/face	168 (23.6)	11 (19.6)	157 (24.0)	.46
Torso	342 (47.1)	29 (51.8)	313 (46.7)	.465
Extremities	449 (62.2)	38 (66.7)	411 (61.8)	.468
Buttocks/genitals	32 (4.6)	5 (8.9)	27 (4.3)	.111
Missing	7 (0.9)			
Hospital disposition				.001
				<.001**
Admitted	407 (55.5)	46 (80.7)	361 (53.3)	
Discharged	280 (38.2)	11 (19.3)	269 (39.7)	
Eloped	33 (4.5)	0 (0.0)	33 (4.9)	
Deceased	14 (1.9)	0 (0.0)	14 (2.1)	
Missing	*8 (1.8)**			
Of those admitted:				
Length of stay, *Mdn* (IQR)	2 (4.1)	3.9 (8)	2 (4)	.017
ISS, *Mdn* (IQR)	5 (9)	9 (14)	5 (9)	.005
AIS score, ≥2, %				
Head/neck/face	41 (10.1)	6 (13.0)	35 (9.7)	.48
Chest/abdomen	125 (30.7)	21 (45.7)	104 (28.8)	.020
Extremities	11 (2.7)	1 (2.2)	10 (2.8)	1.00
Discharge placement				.032
				.018*
Home	340 (85.2)	34 (77.3)	306 (86.2)	
Rehab/long-term care/ further hospitalization	27 (6.8)	8 (18.2)	19 (5.4)	
Left against medical advice	21 (5.3)	1 (2.3)	20 (5.6)	
Police custody	5 (1.3)	1 (2.3)	4 (1.1)	
Deceased	6 (1.5)	0 (0.0)	6 (1.7)	
Missing	*8 (0.0)*			
Disability				.11
				.063*,**
None	1 (0.3)	0 (0.0)	1 (0.3)	
Temporary	327 (80.3)	38 (82.6)	289 (80.1)	
Moderate	11 (2.7)	1 (2.2)	10 (2.8)	
Severe	6 (1.5)	3 (6.5)	3 (0.8)	
Deceased	4 (1.0)	0 (0.0)	4 (1.1)	
Unknown	58 (14.3)	4 (8.7)	54 (15.0)	

Note. All values are frequencies and column percentages except age, ISS, and length of stay, which are means and standard errors. Categorical variables were compared using χ^2 tests except for discharge placement, disability, and AIS extremities score, which were compared using Fisher's exact test. Continuous variables were compared using the Wilcoxon rank sum test for skewed data, after rejection of the assumption of normality using the Shapiro–Wilk test. Homeless housing status includes clients living on the street, in a shelter, at friends' houses, or unknown homeless location. AIS = Abbreviated Injury Scale; IQR = interquartile range; ISS = Injury Severity Score.

**p* value excluding unknown category.

***p* value excludes patients who died before hospital admission or discharge.

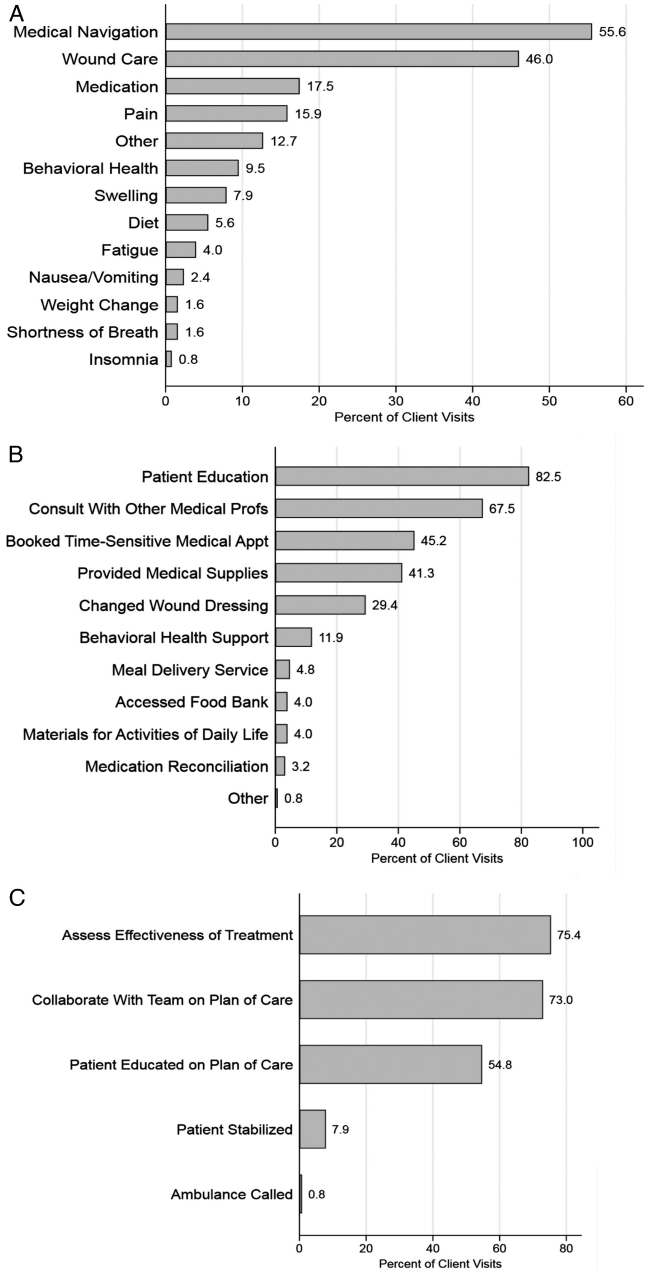

Figure 2. (A) Reasons for contact with Violence Intervention Advocacy Program (VIAP) home visiting nurse, 2017–2018. (B) Interventions provided by VIAP home visiting nurse, 2017–2018. (C) Patient outcomes from contact with VIAP home nurse, 2017–2018. Appt = Appointment; Profs = Professionals.

majority of visits provided patient education (82.5%), consultation with other medical professionals (67.5%), and booking of time-sensitive follow-up appointments (45.2%) for clients. Other common interventions related to wound care included providing medical supplies (41.3%) and changing the wound dressings (29.4%). Patient outcomes noted by the VIAP home nurse (Figure 2C) included assessment of the treatment effectiveness (75.4%), collaboration with the medical team on plan of care (73.0%), and patient education (54.8%).

Health outcomes for participants of the home visiting nurse pilot program at 30 and 90 days following discharge for their injuries are presented in Table 2 and Supplemental Digital Content Table 1 (available at: http://links.lww.com/JTN/A50). Urgent care visits, emergency department visits, and hospitalizations related to the violent penetrating injury are stratified by mechanism of injury (Table 2). The most common causes of urgent care and emergency department visits were pain and wound checks, with some more severe cases of infection and surgical complications. The two gunshot wound clients requiring rehospitalization suffered from deep vein thrombosis and sepsis. In several of these cases, the VIAP home visiting nurse was the one to identify and expedite treatment for complications and infections and called an ambulance for the life-threatening case of deep vein thrombosis. Compared with the population of patients who were admitted to the hospital but did not receive home nurse services, participants of the home nurse pilot program trended toward having fewer emergency department visits and hospitalizations within 30 and 90 days following their injury (see Supplemental Digital Content Table 1, available at http://links.lww.com/JTN/A50). However, due to the limited numbers of participants in the program, differences did not reach the levels for significance.

DISCUSSION

In this descriptive study of a novel home visiting nurse pilot program for victims of violent penetrating injury, we detail the 57 clients who benefited from these services in the first 2 years of the program. Further, we present key findings from observations on client home care needs and a template for other HVIPs and emergency departments wishing to address gaps in care for victims of violence. To our knowledge, this is the first documented home nursing service specifically targeted toward victims of violence and the unique challenges and needs of this vulnerable population. Compared with a nationwide sample of firearm injury hospitalizations, participants of the VIAP home visiting nurse pilot program had a fraction of the rehospitalizations at 30 (6.1% vs. 2.6%) and 90 days (10.5% vs. 5.1%) following discharge (Kalesan et al., 2019).

Although victims of violence who are recovering from their injuries are not typically thought of as a vulnerable group in need of home medical care, we believe this high-risk population can particularly benefit from home nurse services to reduce hospital readmissions and emergency department visits and decrease future reinjuries as part of the VIAP's mission to empower clients, families, and communities. Community violence is

Table 2. Health Outcomes for Participants of the Violence Intervention Advocacy Program Home Visiting Nurse Program, 2017–2018

n	All Home Nurse Patients, *n* (%) 57	Stab Wounds, *n* (%) 18	Gunshot Wounds, *n* (%) 39	Reasons for Visit	Length of Stay, *Mdn* (IQR)
Urgent care visit				Pain, wound check	
At 30 days	4 (7.0)	1 (5.6)	3 (7.7)		
At 90 days	5 (8.8)	1 (5.6)	4 (10.3)		
Emergency room visit				Pain, wound check, swelling, bleeding, infection, surgical complication, tracheostomy complication	
At 30 days	9 (15.8)	4 (22.2)	4 (10.3)		
At 90 days	10 (17.5)	4 (22.2)	6 (15.4)		
Hospitalization					
At 30 days	1 (1.8)	–	1 (2.6)	Deep vein thrombosis, sepsis	2.2 (–)
At 90 days	2 (3.5)	–	2 (5.1)		8.7 (13.0)

Note. All values are frequencies and column percentages except length of stay, which are medians and interquartile ranges (IQR).

a downstream consequence of institutional and social determinants of health, and HVIPs, with their utilization of wraparound services, are uniquely positioned to help victims of violence overcome social and structural barriers to health (James, 2019). As is the case in other urban centers, in the city of Boston, community violence is disproportionately localized in neighborhoods with larger minority populations, higher levels of poverty and unemployment, and lower levels of educational achievement. Further, violent injury is known to be chronic and recurring, with injury recidivism rates in the 5 years following initial injury between 5% and 45% (Goins et al., 1992; Gomez et al., 2012; Nygaard et al., 2018; Sims et al., 1989). Clients recovering from violent injury often do not have the health knowledge, access to care, food security, or time away from work to prioritize their health and recovery from their wounds (James, 2019). Fear of revictimization and reinjury can also cause clients to avoid leaving their homes to attend medical follow-up appointments, or worse, to arm themselves for protection, potentially leading to retaliation or escalation of violence (Corbin et al., 2011; Liebschutz et al., 2010). The home visiting nurse meets clients in the convenience of their own homes, assessing plans for care, educating and advising clients on their injuries, and connecting with family and caregivers. In conjunction with the services of the violence intervention advocate, the home visiting nurse program serves as another tool to overcome barriers that create and perpetuate health disparities.

The unique opportunity of HVIPs to alter the life course for victims of violence centers on a trusting and compassionate relationship between the client and the violence intervention advocate (Corbin et al., 2011; James et al., 2014; Liebschutz et al., 2010; Purtle et al., 2015). For this reason, the nurse–advocate partnership is critical to a successful home visiting nurse program directed toward victims of violent injury. Patients of color, who represent over 80% of VIAP clients, often harbor a mistrust of the medical system, which is backed by a long history of discrimination and unethical medical practices committed by health care institutions (Brandon et al., 2005; Kennedy et al., 2007). Medical mistrust has been associated with lower levels of patient satisfaction, lower rates of utilization of health care, and skepticism of individual medical providers (Brandon et al., 2005). Given this history, patients of color who are treated in the emergency department after a traumatic experience may feel reluctant to cooperate with medical personnel and their affiliates. The VIAP and other HVIPs, in acknowledgment of this barrier to care, hire advocates who have been raised or live in the same or similar communities with the highest rates of violence. This allows advocates to quickly build rapport with their clients and better understand the challenges clients may face upon discharge (Decker et al., 2008; James et al., 2014; Pino et al., 2021b). Through this trusting relationship with their advocates, clients may feel more trusting of medical personnel introduced by and in affiliation with VIAP advocates, leading to a positive therapeutic relationship between the home visiting nurse and the client that could have otherwise been superficial.

The typical VIAP home visiting nurse program client is the victim of a serious gunshot wound living in a permanent home. These clients are also more likely to have a longer length of stay, followed by a stay in a rehabilitation facility, before finally transitioning home. This transition back to their homes can lead to difficulties adjusting to the activities of daily living, with serious penetrating injuries to care for and often temporary

or permanent disabilities. The home visiting nurse serves as a valuable intermediary between inpatient hospital care and life post-discharge. Previous reports on transitional home care programs for homebound older adults have shown that they lead to fewer unplanned rehospitalizations and emergency department visits after discharge; higher patient satisfaction, quality of life, and self-rated health at 4–6 weeks after discharge; and improved communication between inpatient providers and primary care providers (Allen et al., 2014; Ornstein et al., 2011; Wee et al., 2014). Importantly, in our data, we observe that the main interventions provided by the home visiting nurse are centered on patient education, medical navigation, and wound care. These interventions suggest that the majority of our clients have limited health literacy to be able to competently process and understand health information to make informed decisions on their plan of care following discharge (Wright et al., 2018). Although only roughly 12% of U.S. adults have proficient health literacy, low or limited health literacy disproportionally affects racial and ethnic minorities, people living in poverty, and people with less than a high school education and can contribute to poor health outcomes, increased health costs, and higher mortality rates (Hersh et al., 2015; Ylitalo et al., 2018). Increased health literacy has the potential to lower the number of future preventable emergency department visits from improper wound care or medication management (Balakrishnan et al., 2017). The VIAP home visiting nurse program provides medical navigation and education to ease the transition home for both clients and their families.

This home visiting nurse pilot program is a unique hospital-based service targeting victims of violence recovering from their injuries, and, to our knowledge, this is the first program of its kind. This program aims to serve as a model for other HVIPs who wish to expand their victim services to include transitional home nursing. Just as previous studies have found efficacy in home visiting nursing programs for vulnerable groups such as the homebound elderly and pregnant women living in poverty, future studies must quantitatively evaluate the effectiveness of a home visiting nurse program for victims of violent injury through randomized controlled trials or case–control studies. Currently, the home visiting nurse program is funded for 6 nurse hours per week for home visits, follow-up contact, note documentation, and transportation. We aim to expand the program to serve more clients who may benefit from home nurse services and, in doing so, widen the program's impact. Additional sources of funding are needed to subsidize a full-time nurse for the program and to cover transportation costs and medical supplies, as well as to fund an evaluation of the financial, clinical, and social benefits. We further plan to partner with local nursing schools as possible internship opportunities in which student nurses can shadow the visiting nurse to learn valuable lessons in providing trauma-informed care.

LIMITATIONS

Our cohort consisted of patients from only one medical center, which may limit the generalization of our pilot program to other patient populations. Next, clients who were eligible and accepted admittance into the pilot program differ from clients who did not meet eligibility requirements or did not choose to receive home nurse services in terms of demographics and injury characteristics and, likely, in health-seeking behaviors and risks for adverse short-term health outcomes, limiting the conclusions we may make from our comparison group. The needs assessment for the home nurse program relies on information gathering from client advocates, whose methods may differ individually based on recording style, rapport building with clients, contact information, and style of recording.

As a pilot program, the home visiting nurse program is limited by the number of clients that can be visited per week and the number of home nursing services provided by our sole part-time visiting nurse. Information regarding patient demographics, injury characteristics, and patient mortality was restricted to data from medical records and the VIAP data repository, which rely critically on patient self-report data and may include medical errors. Clients who refused to provide information upon admission and those who left against medical advice or were incapacitated upon admission may explain the unknowns in the data. If clients are not willing to share personal details, they may not be willing to receive general VIAP client services or be interested in a home visiting nurse pilot program. In addition, clients who have disconnected phone lines or do not have a permanent address may be harder to contact both for collecting vital information and for assessing their eligibility for the home visiting nurse program.

CONCLUSIONS

Survivors of gunshot and stabbing injuries are a vulnerable group that may be susceptible to intervention following a traumatic injury. However, victims of violent injury face challenges upon discharge, putting them at greater risk of readmission, rehospitalization, and reinjury. In 2017, this home visiting nurse pilot program was created to address disparities in care and combat structural and social barriers to health. During the first 2 years of the pilot program, the 57 clients who were enrolled into the home visiting nurse program were more likely to have severe gunshot wounds

requiring hospitalization, often followed by long-term rehabilitation and temporary or permanent disabilities. The primary interventions provided by the home visiting nurse involved medical navigation and education, wound care, and consultation on plan of care, underscoring the critical importance of health literacy and outreach for this vulnerable population. We believe the trusting and compassionate relationship between the client and their advocate serves as the foundation for a successful home visiting nurse program through the nurse–advocate partnership. This partnership allows the home nurse to connect and build trust with patients who may have previously had limited health literacy or access to health care and lacked trust in medical institutions. This home visiting nurse program is the first of its kind, specifically targeting survivors of community violence, and will require additional funding to expand the program beyond the pilot stage, and further research is required to evaluate its clinical success and cost-effectiveness.

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REFERENCES

Allen, J., Hutchinson, A. M., Brown, R., & Livingston, P. M. (2014). Quality care outcomes following transitional care interventions for older people from hospital to home: A systematic review. *BMC Health Services Research*, *14*, 346. https://doi.org/10.1186/1472-6963-14-346

Balakrishnan, M. P., Herndon, J. B., Zhang, J., Payton, T., Shuster, J., & Carden, D. L. (2017). The association of health literacy with preventable emergency department visits: A cross-sectional study. *Academic Emergency Medicine*, *24*(9), 1042–1050. https://doi.org/10.1111/acem.13244

Boston CHNA-CHIP Collaborative. (2019). *2019 community health needs assessment: Boston CHNA-CHIP collaborative*. Boston Medical Center. https://www.bmc.org/sites/default/files/CHNA-less-Graphics-2.pdf

Boston Medical Center. (2016). *Injury prevention center annual report 2014-2015*. Retrieved November 13, 2020, from https://www.bumc.bu.edu/emergencymedicine/files/2016/06/16114_IPC_AR_2016_web-FINAL.pdf

Brandon, D. T., Isaac, L. A., & LaVeist, T. A. (2005). The legacy of Tuskegee and trust in medical care: Is Tuskegee responsible for race differences in mistrust of medical care? *Journal of the National Medical Association*, *97*(7), 951–956. https://www.ncbi.nlm.nih.gov/pubmed/16080664

Centers for Disease Control and Prevention. (2019). Web-based injury statistics query and reporting system (*WISQARS*). www.cdc.gov/injury/wisqars

Corbin, T. J., Rich, J. A., Bloom, S. L., Delgado, D., Rich, L. J., & Wilson, A. S. (2011). Developing a trauma-informed, emergency department-based intervention for victims of urban violence. *Journal of Trauma & Dissociation*, *12*(5), 510–525. https://doi.org/10.1080/15299732.2011.593260

Dawley, K., Loch, J., & Bindrich, I. (2007). The nurse-family partnership. *American Journal of Nursing*, *107*(11), 60–67; quiz 67–68. https://doi.org/10.1097/01.NAJ.0000298065.12102.41

Decker, S., Bynum, T. S., McDevitt, J., Farrell, A. S., & Varano, S. P. (2008). *Street outreach workers: Best practices and lessons learned: Innovative practices from the Charles E. Shannon Jr. Community safety initiative series*. Northeastern University.

Goins, W. A., Thompson, J., & Simpkins, C. (1992). Recurrent intentional injury. *Journal of the National Medical Association*, *84*(5), 431–435. https://www.ncbi.nlm.nih.gov/pubmed/1495116

Gomez, G., Simons, C., St John, W., Creasser, D., Hackworth, J., Gupta, P., Joy, T., & Kemp, H. (2012). Project prescription for hope (RXH): Trauma surgeons and community aligned to reduce injury recidivism caused by violence. *The American Surgeon*, *78*(9), 1000–1004.

Hersh, L., Salzman, B., & Snyderman, D. (2015). Health literacy in primary care practice. *American Family Physician*, *92*(2), 118–124. https://www.ncbi.nlm.nih.gov/pubmed/26176370

Hittle, B., Agbonifo, N., Suarez, R., Davis, K. G., & Ballard, T. (2016). Complexity of occupational exposures for home health-care workers: Nurses vs. home health aides. *Journal of Nursing Management*, *24*(8), 1071–1079. https://doi.org/10.1111/jonm.12408

James, T. (2019). A paradigm shift to interrupt the bidirectional flow driving community violence. *Annals of Emergency Medicine*, *74*(5S), S47–S51. https://doi.org/10.1016/j.annemergmed.2019.08.444

James, T. L., Bibi, S., Langlois, B. K., Dugan, E., & Mitchell, P. M. (2014). Boston Violence Intervention Advocacy Program: A qualitative study of client experiences and perceived effect. *Academic Emergency Medicine*, *21*(7), 742–751. https://doi.org/10.1111/acem.12409

Jones, M. G., DeCherrie, L. V., Meah, Y. S., Hernandez, C. R., Lee, E. J., Skovran, D. M., Soriano, T. A., & Ornstein, K. A. (2017). Using nurse practitioner co-management to reduce hospitalizations and readmissions within a home-based primary care program. *Journal for Healthcare Quality*, *39*(5), 249–258. https://doi.org/10.1097/JHQ.0000000000000059

Kalesan, B., Zuo, Y., Vasan, R. S., & Galea, S. (2019). Risk of 90-day readmission in patients after firearm injury hospitalization: A nationally representative retrospective cohort study. *Journal of Injury and Violence Research*, *11*(1), 65–80. https://doi.org/10.5249/jivr.v11i1.979

Karraker, N., Cunningham, R. M., Becker, M. G., Fein, J. A., & Knox, L. M. (2011). *Violence is preventable: A best practices guide for launching and sustaining a hospital-based program to break the cycle of violence*. http://www.ncdsv.org/images/NNHVIP-YouthAlive_ViolenceIsPreventable_2011.pdf

Kennedy, B. R., Mathis, C. C., & Woods, A. K. (2007). African Americans and their distrust of the health care system: Healthcare for diverse populations. *Journal of Cultural Diversity*, *14*(2), 56–60. https://www.ncbi.nlm.nih.gov/pubmed/19175244

Liebschutz, J., Schwartz, S., Hoyte, J., Conoscenti, L., Christian, A. B., Sr. Muhammad, L., Harper, D., & James, T. (2010). A chasm between injury and care: Experiences of black male victims of violence. *Journal of Trauma*, *69*(6), 1372–1378. https://doi.org/10.1097/TA.0b013e3181e74fcf

Nygaard, R. M., Marek, A. P., Daly, S. R., & Van Camp, J. M. (2018). Violent trauma recidivism: Does all violence escalate? *European Journal of Trauma and Emergency Surgery*, *44*(6), 851–858. https://doi.org/10.1007/s00068-017-0787-5

Olds, D. L., Eckenrode, J., Henderson, C. R., Jr. Kitzman, H., Powers, J., Cole, R., Sidora, K., Morris, P., Pettitt, L. M., & Luckey, D. (1997). Long-term effects of home visitation on maternal life course and child abuse and neglect. Fifteen-year follow-up of

a randomized trial. *The Journal of the American Medical Association*, *278*(8), 637–643. https://www.ncbi.nlm.nih.gov/pubmed/9272895

Olds, D. L., Kitzman, H., Anson, E., Smith, J. A., Knudtson, M. D., Miller, T., Cole, R., Hopfer, C., & Conti, G. (2019). Prenatal and infancy nurse home visiting effects on mothers: 18-year follow-up of a randomized trial. *Pediatrics*, *144*(6), e20183889. https://doi.org/10.1542/peds.2018-3889

Ornstein, K., Smith, K. L., Foer, D. H., Lopez-Cantor, M. T., & Soriano, T. (2011). To the hospital and back home again: A nurse practitioner-based transitional care program for hospitalized homebound people. *Journal of the American Geriatrics Society*, *59*(3), 544–551. https://doi.org/10.1111/j.1532-5415.2010.03308.x

Petrey, L. B., Weddle, R. J., Richardson, B., Gilder, R., Reynolds, M., Bennett, M., Cook, A., Foreman, M., & Warren, A. M. (2015). Trauma patient readmissions: Why do they come back for more? *The Journal of Trauma and Acute Care Surgery*, *79*(5), 717–724; discussion 724–745. https://doi.org/10.1097/TA.0000000000000844

Pino, E. C., Fontin, F., & Dugan, E. (2021a). Violence intervention advocacy program and community interventions. In Pediatric firearm injuries and fatalities (pp. 157–177). Springer.

Pino, E. C., Fontin, F., James, T. L., & Dugan, E. (2021b). Boston Violence Intervention Advocacy Program: Challenges and opportunities for client engagement and goal achievement. *Academic Emergency Medicine*, *28*(3), 277–382. https://doi.org/10.1111/acem.14162

Purtle, J., Rich, J. A., Fein, J. A., James, T., & Corbin, T. J. (2015). Hospital-based violence prevention: Progress and opportunities. *Annals of Internal Medicine*, *163*(9), 715–717. https://doi.org/10.7326/M15-0586

Rattan, R., Parreco, J., Namias, N., Pust, G. D., Yeh, D. D., & Zakrison, T. L. (2018). Hidden costs of hospitalization after firearm injury: National analysis of different hospital readmission. *Annals of Surgery*, *267*(5), 810–815. https://doi.org/10.1097/SLA.0000000000002529

Rich, J. A., & Grey, C. M. (2005). Pathways to recurrent trauma among young black men: Traumatic stress, substance use, and the "code of the street." *American Journal of Public Health*, *95*(5), 816–824. https://doi.org/10.2105/AJPH.2004.044560

Sims, D. W., Bivins, B. A., Obeid, F. N., Horst, H. M., Sorensen, V. J., & Fath, J. J. (1989). Urban trauma: A chronic recurrent disease. *Journal of Trauma*, *29*(7), 940–946; discussion 946–947. https://www.ncbi.nlm.nih.gov/pubmed/2746704

Wallace, A. S., Perkhounkova, Y., Bohr, N. L., & Chung, S. J. (2016). Readiness for hospital discharge, health literacy, and social living status. *Clinical Nursing Research*, *25*(5), 494–511. https://doi.org/10.1177/1054773815624380

Wee, S. L., Loke, C. K., Liang, C., Ganesan, G., Wong, L. M., & Cheah, J. (2014). Effectiveness of a national transitional care program in reducing acute care use. *Journal of the American Geriatrics Society*, *62*(4), 747–753. https://doi.org/10.1111/jgs.12750

West, S. K., O'Mara, M. S., & Spalding, M. C. (2018). Using clinical analysis to classify 30-day trauma readmissions. *The Journal of Trauma and Acute Care Surgery*, *85*(3), 613–619. https://doi.org/10.1097/TA.0000000000001968

Wright, J. P., Edwards, G. C., Goggins, K., Tiwari, V., Maiga, A., Moses, K., Kripalani, S., & Idrees, K. (2018). Association of health literacy with postoperative outcomes in patients undergoing major abdominal surgery. *JAMA Surgery*, *153*(2), 137–142. https://doi.org/10.1001/jamasurg.2017.3832

Ylitalo, K. R., Meyer, M. R. U., Lanning, B. A., During, C., Laschober, R., & Griggs, J. O. (2018). Simple screening tools to identify limited health literacy in a low-income patient population. *Medicine (Baltimore)*, *97*(10), e0110. https://doi.org/10.1097/MD.0000000000010110

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