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Article

Baseline Needs Assessment for a Hospital-Based Violence Intervention Program 1-Year Pilot

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Abstract: The objectives of the present study were to measure and describe the baseline participant needs of a hospital-based violence intervention 1-year pilot program, assess differences in expected hospital revenue based on changes in health insurance coverage resulting from program implementation and discuss the program's limitations. **Methods:** Between September 2020 and September 2021 Encompass Omaha enrolled 36 participants. A content analysis of 1199 progress notes detailing points of contact with participants was performed to determine goal status. Goals were categorized and goal status was defined as met, in process, dropped, or participant refusal. **Results:** The most frequently identified needs were help obtaining short-term disability assistance or completing FMLA paperwork (86.11%), immediate financial aid (86.11%), legal aid (83.33%), access to food (83.3%), and navigating medical issues other than the primary reason for hospitalization (83.33%). **Conclusions:** Meeting the participants' short-term needs is critical for maintaining their engagement in the long-term. Further, differences in expected hospital revenue for pilot participants compared with a control group were examined, and this analysis found a reduction in medical and facility costs for program participants. The pilot stage highlighted how complex the needs and treatment of victims of violence are. As the program grows and its staff become more knowledgeable about social work, treatment, and resource access processes, the program will continue to improve.

Keywords: HVIP; violence intervention; interpersonal violence; cost savings; pilot; evaluation



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1. Introduction

Violent victimization is a serious public health problem in the United States. Over 2 million injuries stemming from violence require medical attention each year. Of these, firearm injuries claimed the lives of 45,222 individuals [1]. The National Violent Reporting System data demonstrates that every hour seven people die a violent death. Most often, these victims have previously experienced a violent injury [2]. In 2020, homicide was the second leading cause of death for young men between the ages of 15 and 24, and the third leading cause of death for those aged 25–34. Homicide remains the leading cause of death for African American youth [3]. Mortality rates and injury severity from violent crime have risen since the early 2000s [4]. African American adolescents are fourteen times more likely to be killed by firearm violence than their White peers [1].

The devastation of violence is not limited to homicide, but also includes survivors of non-fatal injuries. Approximately 71,000 Americans are treated annually for non-fatal firearm related injuries [5]. In parallel to fatal firearm injuries, non-fatal firearm related injuries also disproportionately affect young, male, racial and ethnic minority Americans [6]. The non-fatal effects of injury include psychological distress, physical disability, decreased

quality of life, and economic consequences for the individual, society, and the surrounding community [7,8]. Moreover, 40% of those patients who were injured from violent encounters later returned to emergency departments with additional injuries, and 20% were murdered within five years of their initial emergency department visits [9,10]. Hospitalization for violent injury comes at an enormous financial cost to the U.S. healthcare system with U.S. hospitals and health systems spending USD 852 million dollars annually in unreimbursed medical care treating victims of violence [11].

In Nebraska, violence is geographically concentrated in the eastern part of the state, specifically in the Omaha metropolitan area. Although there has been a slight downward trend in Omaha's homicide rate over the past two years, Omaha is not resistant to the burden of violence, as evidenced by an increase in non-fatal shooting incidents. Gun violence in this metropolitan area primarily occurs in two police precincts that have the most homicides (64% and 69% in 2018 and 2019, respectively) and non-fatal shootings (83% and 74% in 2018 and 2019, respectively). Violence disproportionately occurs among young, disadvantaged African American males from families that experience intergenerational violence [12]. Research demonstrates re-injury rates are highest among populations with these demographic characteristics [9,10].

Trauma centers are important community and regional resources. In addition to patient care, these centers are sources of information, expertise, and public safety leadership in the treatment of major injury. Trauma centers also serve as unique platforms for violence intervention since they have access to the victim immediately following their injury when they are most open to behavioral change [13,14]. Hospital-Based Violence Intervention Programs (HBVIP) are a public health approach to violence prevention. HBVIPs acknowledge that there are modifiable risk factors associated with violent injury and reinjury such as poor education, lack of employment opportunities, injury and criminal recidivism, poverty, and substance use [15]. HBVIPs then address these risk factors through intensive case management and utilization of hospital and community-based resources. By targeting the highest-risk individuals (i.e., those who have sustained at least one violence related injury) and providing risk reduction resources, HBVIPs have led to a considerable reduction in reinjury and reduction in associated medical care costs [16,17].

Encompass Omaha (Engaging Networks within the Community of Omaha to Maintain and Promote a Safe Society) is the only HBVIP in Nebraska and is also located in the only comprehensive adult and pediatric level 1 trauma center. Like other HBVIPs, the goals of Encompass Omaha are to decrease violent revictimization through intensive case management by addressing participants' social determinants of health (e.g., financial assistance, food assistance, legal aid, advocacy, medical issues), and to address rising hospital costs associated with violent injury by connecting participants with resources to meet individual needs (e.g., insurance, Medicaid). The purpose of this project is to examine process measures of Encompass Omaha during the program pilot phase, specifically the participant needs assessment derived from case planning notes and hospital costs, to identify and discuss major program limitations to inform hospital-based violence intervention strategies.

2. Materials and Methods

Encompass Omaha offers enrolment to hospitalized victims of interpersonal violence (most often victims of intentional gunshot related injuries). After medical stabilization, the victim is introduced to a culturally competent Violence Intervention Specialist (VIS) and voluntarily consents into the program. The VIS is a community member who serves in the role of a "credible messenger" with relevant life experience and social capital that gives them the authority to challenge and transform the thoughts, attitudes, and behaviors of others and allows them to build an authentic trusted relationship with the victim [18,19]. The VIS meets the victim of violence at the "teachable moment;" the period immediately following a violent injury when the victim is susceptible to intervention [20–22]. After program enrolment, the VIS immediately works to build trust with the victim and their

family and maintains effective communication with them after discharge. A structured individualized case plan is created with the victim based on the unique systems surrounding the victim, including family, community, risk and protective factors, and obstacles to achieving a healthier life. The case plan outlines social, economic, and behavioral goals and progress throughout the participants' enrolment including the date the goal was identified, where the referral was made, and the outcome.

The present data was collected during the 1-year Encompass Omaha pilot between September 2020 and September 2021. During this period, 36 victims of violence enrolled, 34 (94.44%) of participants were admitted due to gunshot injuries and two (5.56%) for stabbings. Victims of child abuse, domestic violence, self-harm, and sexual assault are not eligible to receive Encompass Omaha services as there is existing programming specific to these forms of victimization and associated risk factors available in the community. The research inclusion criteria are victims of violence (gunshots and stabbings). Exclusion criteria are victims of child abuse, domestic violence, self-harm, and sexual assault. Although Encompass Omaha had access to a single part-time volunteer VIS through a partnership with the local police department, the pilot phase was unfunded and had no full-time staff dedicated to the program.

ENCOMPASS participants complete a program authorization form at enrolment. The present study was completed under the Institutional Review Board (IRB) exemption for quality improvement.

2.1. Data Collection

The VIS entered detailed case progress notes organized by both participant ID and date of entry into an Excel spreadsheet. For the 36 Encompass Omaha pilot program participants, the VIS entered a total of 1199 case progress notes, or approximately 33 case progress notes per participant. Case progress notes discuss any communication between the VIS and participant and any case management progress, including submitting documents on the participants behalf, reaching out to referral sources, identifying housing options, communication with property owners, employers, or other individuals in the participants' network for example.

The present study was determined to meet the criteria for quality improvement exemption by the Institutional Review Board. The qualitative analysis dataset was kept in an encrypted Excel spreadsheet and imported into Dedoose version 9.0.17 (SocioCultural Research Consultants, LLC, Los Angeles, CA, USA) [23] for analysis. The dataset was not anonymized as identification of the participants was necessary to clarify case notes with the VIS.

In addition to data collected from case progress notes, data on hospital costs were also gathered from Strata, the hospital's financial system, to examine if the Encompass Omaha program influenced expected hospital revenue. Data on expected hospital revenue for each pilot program participant and on individuals in a control group ($n = 53$; those admitted to the same trauma center for a firearm related injury but not enrolled in the Encompass Omaha pilot program) were collected from the date of admission and for three months following. The inclusion of cost data beyond the initial treatment date is useful for examining the financial burden this type of victimization places on the victim and their family, as well as giving a clearer picture of the facility-associated costs and expected revenue.

2.2. Data Analysis

To assess these outcomes, a qualitative review in the form of a content analysis of 1199 case progress notes from 36 victims of gun violence was performed to identify participant needs and to identify any major program limitations. Case progress notes entered into Excel were coded and accessed thematically using the Dedoose version 9.0.17 web application [23]. Notes were matched to the pilot program participants so that demographic information, and outcome measures could be collected, aggregated, and analyzed.

The first outcome of interest for Encompass Omaha pilot program participants is if the program is meeting participant needs. There were five categories of participant need status coded for: (1) identified (i.e., the progress note indicates that both the participant and VIS have identified the need), (2) in process (i.e., the need has been identified and the participant and VIS are taking active steps towards meeting the need), (3) met (i.e., the need has been filled), (4) dropped (i.e., the need is no longer part of the individualized case plan), (5) and participant refusal (i.e., the participant refused to engage in activities necessary to meet the need, such as completing necessary paperwork or providing supporting documents). Successful completion of program requirements indicates that the participant graduated from the Encompass Omaha program after completing their individualized case plans. Participants who disengaged with the program prior to completion of case plans were considered unsuccessful. In addition, some participants may still be enrolled in the program as they are working toward completion of their case plans. Student's T-test was performed to analyze significant differences in length of enrolment time for the different engagement groups. The second outcome of interest for this study is the effect of the Encompass Omaha program on hospital costs. As this program is an HBVIP, the goal of the programming is to reduce future victimization of participants which results in increased costs to local hospitals. The VIS and program staff work with Encompass Omaha participants that do not have health insurance to enroll them in Nebraska Medicaid through program participation. As costs associated with gunshot injuries can be substantial, this program component seeks to minimize the financial strain of treatment for both the victim and the hospital. To examine this outcome, costs associated with hospital expected revenue were examined for differences between a control group of firearm injury victims in 2018 ($n = 53$) and the Encompass Omaha pilot participants ($n = 36$). These data were exported from Strata, Nebraska Medicines financial system.

3. Results

3.1. Demographics

The Encompass Omaha pilot participants ($n = 36$) were largely male ($n = 28, 77.78\%$). The largest proportion of victims were Black or African American ($n = 27, 75\%$), Latinx ($n = 3, 8.33\%$) and White ($n = 3, 8.33\%$). A total of 34 (94.44%) were admitted for gunshot injuries, and the remaining two (5.56%) were admitted for stabbing injuries. The median age was 24 years old, with ages ranging from 7 to 36 years old. Of those in the pilot program, 14 (38.89%) of the participants who enrolled in the program became inactive after several failed attempts at communication, including phone, text, in-person, and next of kin were exhausted. Further, 20 participants (55.56%) remained active after the pilot stage and two participants (5.56%) graduated from the program after completing their individualized case plans.

The 20 active participants had the highest mean number of progress notes, averaging 41.20 (SD 30.117) per participant. The 14 inactive participants had the fewest average case notes with an average of 22.00 (SD 12.588) per inactive participant. The inactive participants were also enrolled in the program for a significantly shorter amount of time, 55.36 (SD 52.599) mean days of enrolment compared with 289.00 (SD 106.066) mean days of enrolment in the program graduates, $p < 0.001$, and 166.45 (SD 11.661) mean days of enrolment in the active participant group, $p < 0.01$.

3.2. Participant Goals

Considering the outcome of meeting participant goals, analysis of the case planning data suggests that all the Encompass Omaha participants that graduated remained active, whereas the inactive participants made minor improvements in meeting their goals. Completing applications for short-term disability assistance or job protected family and medical leave (FMLA) directly for participants or indirectly for spouses or family members who would act as care givers throughout the participants medical recovery was noted in 86.11% of all case progress notes and had a 9.68% achievement rate. Immediate financial assistance

was also a goal of 86.11% of participants, with a 16.13% achievement rate. Immediate food assistance, legal aid or advocacy, and navigating medical issues other than the primary reason for hospitalization were goals identified in 83.33% of cases, with 20%, 10%, and 10% achievement rates, respectively. Half of all individuals who identified receiving mental healthcare as one of their goals dropped it from their case plans due to barriers such as hesitation and not being able to find a good provider match (Table 1).

Table 1. Encompass Omaha Participant Goals and Status, n (%).

Goal Type	Identified	Met	In-Process	Dropped	Participant Refusal
Disability or FMLA ¹	31 (86.11)	3 (9.68)	26 (83.87)	1 (3.23)	1 (3.23)
Immediate financial aid	31 (86.11)	5 (16.13)	26 (83.87)	0	0
Food	30 (83.33)	6 (20.00)	24 (80.00)	0	0
Legal	30 (83.33)	3 (10.00)	24 (80.00)	0	0
Other medical ²	30 (83.33)	3 (10.00)	26 (86.67)	0	0
Establish PCP ³	29 (80.56)	5 (17.24)	22 (75.86)	2 (6.90)	0
Employment	28 (77.78)	2 (7.14)	24 (85.71)	2 (7.14)	0
Education	27 (75.00)	2 (7.41)	22 (81.48)	3 (11.11)	0
VOCA application ⁴	27 (75.00)	2 (7.41)	18 (66.67)	1 (3.70)	1 (3.70)
Housing	20 (55.56)	8 (40.00)	7 (35.00)	4 (20.00)	1 (5.00)
Mental health	18 (50.00)	3 (16.67)	5 (27.78)	9 (50.00)	1 (5.55)
Health insurance	11 (30.60)	11 (100.00)	0	0	0

¹ Family and Medical Leave Act (FMLA): Job protected unpaid leave for medical and family reasons. ² Medical issues other than the reason for admission. ³ Primary Care Provider (PCP). ⁴ Victims of Crime Act (VOCA) Application: Financial Compensation for Victims of Crime.

3.3. Hospital Costs

One of the primary goals of Encompass Omaha is for uninsured participants to become insured. This is often achieved through obtaining Medicaid for qualified participants. In 2018, gross charges to Medicaid-insured gunshot victims amounted to \$753,275, of which the hospital expected revenue was \$47,332. Although the pilot sample was nearly half the size of the control group ($n = 36$ compared with $n = 53$), due to program efforts, the gross charges to Medicaid-insured victims increased \$265,010 to \$1,018,285, of which \$227,034 was hospital expected revenue, a 4.79-fold increase in expected revenue compared with the control group.

4. Discussion

Violent victimization is a social and public health crisis in the U.S., which disproportionately affects young African American males. To address this ongoing issue, Encompass Omaha, a HBVIP, ran a pilot program from October 2020 until September 2021 to begin assessing and addressing the needs of those exposed to violent victimization (i.e., gunshots and stabbings) that were patients in a level 1 trauma center in Nebraska. As the costs associated with violent victimization extend beyond the physical and emotional costs to victims and their families and social costs to the community, another goal of the pilot program was to assess the effect of the program on the financial costs of violent revictimization for the hospital.

The purpose of this project was to examine process measures of Encompass Omaha during the program pilot phase, specifically the participant needs assessment and expected hospital revenue, and to identify and discuss major program limitations to inform hospital-based violence intervention strategies. A content analysis of 1199 case progress notes from 36 pilot program participants was conducted to assess the program's impact on meeting the participants identified needs and goals. Further, an analysis of associated costs and hospital expected revenue was performed by using a control group of firearm injury victims in 2018 compared with the hospital expected revenue for the Encompass Omaha pilot participants. Over half, 20 participants, remained active in the program after the pilot stage and two graduated during the program, and 14 became inactive during the pilot program.

All the Encompass pilot program participants made at least minor progress toward their goals during their time in the Encompass program. Many of these goals, such as enrolling in college courses, legal aid, or navigating complex medical issues, are long-term in nature and take significant time to achieve. Further, some goals rely on the completion of another goal before their own process can begin; for example, insurance needs to be obtained before the participant can establish a primary care physician or advocacy is necessary for the return from the police department of personal possessions such as a wallet, phone, or car necessary for a return to work. Content analysis of the case planning notes indicated that mental health treatment was one of the most challenging needs to meet. Once the participant leaves the hospital there are major challenges in re-engaging them in mental health care, including a lack of community resources, a lack of health insurance coverage, and cultural hesitation. Beginning mental health treatment assessment and goals at the bedside allows for a treatment plan to begin prior to returning to the stressors and barriers at home. Going forward, the Encompass Omaha program intends to hire a full-time mental health provider dedicated to victims of violence to begin mental health care immediately following the violent injury.

Analysis of the expected hospital revenue comparing a control group with that of the pilot program participants suggests that the pilot was effective at increasing insurance coverage and thus expected hospital revenue from Medicaid qualified patients. Obtaining insurance for victims of violence is critical to decreasing lost hospital revenue on uninsured patients given the complicated and lengthy recovery of gunshot injuries [24,25]. It is estimated that healthcare related costs increase 3 to 20 times in the 6-months following a gunshot injury compared with the 6 months before [26]. Evidence of increases in expected hospital revenue and patient insurance coverage could encourage hospitals to implement HBVIPs, or partner with existing community-based violence intervention and interruption programs, such as the Cure Violence model [27].

In addition to examining the program's effect on meeting participant needs and goals and on expected hospital revenue, another goal of this study was to examine limitations with the current program design that impeded successful program completion. One program limitation is that inactive participants ceased communication before their needs were met. The average number of days enrolled for participants that were inactive was 55.35 days (about 2 months) compared with 166.45 days (about 5 and a half months) for participants who did not disengage. Participants that disengage tend to do so before they have been enrolled in the program long enough to realistically achieve any of their goals. It is critical to meet participants' short-term needs, such as obtaining insurance or getting emergency financial assistance, to keep them engaged long enough to reach the long-term needs, such as relocating to permanent housing or obtaining GED. The lack of a social worker role during the pilot phase inhibited the program's ability to bridge the transition from inpatient clinical engagements to outpatient community-based case management. The inclusion of a social worker to the HBVIP program moving forward will address this limitation and improve participant engagement.

Another program limitation was the inclusion of only one VIS working with the program during the pilot stage. Due to financial constraints at the time of the pilot, only one VIS was responsible for case planning and reporting all the case progress notes for all pilot program participants. Adding more VIS to the program will help to reduce the case load and should result in more thorough case planning notes in the future. In addition to improving case progress notes by including more VIS in the program, the inclusion of validated assessment tools to measure program effectiveness at intake and discharge will be fundamental to further examining the effectiveness of the program in the future. Validated tools need to be systematically administered to measure changes in quality of life, depression, and other metrics. Practical implications include the need for training and time to accurately and systematically collect data. Further, the present study utilized data already collected for case management purposes. To collect data from research victims

could jeopardize the relationship between the VIS and the victim, which the program fundamentally depends on.

Violent trauma (i.e., gunshots and stabbings) and revictimization continue to pose challenges to victims and their families and are concerns for communities and health care organizations. The Encompass Omaha HBVIP pilot program seeks to improve upon participant outcomes and prevent revictimization by identifying participant needs and setting individualized goals and care plans. The pilot program participants showed improvement in process measures related to meeting personal goals during their time in the HBVIP. Further, the inclusion of data on expected hospital revenue also supports the utility of the HBVIP for addressing and mitigating the costs associated with gunshot trauma and revictimization. Limitations to program delivery have been identified and can be addressed to improve the ability of Encompass Omaha to meet participant and program goals.

The primary limitations to this study include the use of case planning notes and expected hospital revenue from one HBVIP program in Nebraska collected during the pilot phase of the program. As such, the results may not be generalizable to other HBVIPs in other locations. Future research on this and other HBVIPs should further examine the role of the VIS in program effectiveness. Moreover, the ability to examine expected hospital revenue provides additional insights into the broader implications and reach of programming such as this HBVIP and should be further examined using a larger sample of individuals with violence-related injuries over a longer follow-up period. Finally, the present data were collected at a single institution. Further multi-site data is needed from other HBVIPs as well as control (non-HBVIP) sites to ensure sufficient data and comparison groups.

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