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Staying Connected: A Feasibility Study Linking American Indian and Alaska Native Trauma Survivors to their Tribal Communities

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Abstract

The objective of this investigation was to assess the feasibility of a culturally tailored care management intervention for physically injured American Indian/Alaska Native (AI/AN) patients. The intervention was initiated at a Level I trauma center and aimed to link AI/AN patients to their distant tribal communities. Thirty AI/AN patients were randomized to the intervention or to usual care. Assessments at baseline, 3 months, and 6 months included self-reported lifetime cumulative trauma burden, Native healing requests, and symptoms of posttraumatic stress, depression, and alcohol use. Generalized estimating equations ascertained differences between groups over time. Ninety-four percent of eligible patients participated; follow-up at 3 and 6 months was 83%. Participants had high numbers of lifetime traumas (mean = 5.1, standard deviation = 2.6). No differences between the intervention and control groups were observed in posttraumatic stress symptoms, depression symptoms, or alcohol use at baseline or follow-up time points. Among intervention patients, 60% either requested or participated in traditional Native healing practices and 75% reported that the intervention was helpful. This effectiveness trial demonstrated the

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feasibility of recruiting and randomizing injured AI/AN patients. Future efforts could integrate evidence-based interventions and traditional Native healing into stepped collaborative care treatment programs.

Injuries are the third leading cause of death for American Indians (AIs) (Centers for Disease Control and Prevention, 2010). AIs suffer unintentional injuries, including motor vehicle and pedestrian fatalities, at rates 2 to 3 times those of Whites (Manson, Beals, Klein, Croy, & AI-SUPERPFP Team, 2005). The rates of intentional trauma, such as violent victimization, are twice as high among AIs as the national average (Office of Justice Programs, 2010). For example, in one Southwestern AI community, exposure to a traumatic event (81%) was higher than in the general U.S. population (Robin, Chester, Rasmussen, Jaranson, & Goldman, 1997). Another study of two reservation-based populations observed that lifetime rates of exposure to at least one traumatic event ranged from 62% to 70% (Manson et al., 2005).

One sequela of both intentional and unintentional physical trauma is posttraumatic stress disorder (PTSD). As with trauma, AIs appear to be at high risk for PTSD. In a study of approximately 3,000 trauma survivors treated at 69 hospitals nationwide, AIs and Alaska Natives (ANs) had the highest risk of all racial and ethnic groups for experiencing symptoms consistent with PTSD 12 months after their injury (Zatzick et al., 2007). Similarly, among 269 traumatically injured patients hospitalized at two trauma centers in the Western United States PTSD and peritraumatic dissociative symptoms were more common among AI/ANS than White patients (Santos et al., 2008). Other studies have documented a 21% lifetime prevalence of PTSD in Native communities (Robin et al., 1997)

Although racially and ethnically diverse trauma survivors with PTSD and depression experience enduring functional impairment and diminished quality of life (Holbrook, Anderson, Sieber, Browner, & Hoyt, 1999; Michaels et al., 1999; Ramchand, Marshall, Schell, & Jaycox, 2008; Zatzick et al., 2008), mental health care is often fragmented and unavailable at crucial post-injury points (Zatzick et al., 2010). AI/AN patients encounter numerous obstacles to receipt of mental health and substance abuse services, such as privacy issues in small tribal communities, poor quality of care, and lack of communication and trust with providers (Duran et al., 2005). An additional consideration for AI/AN patients treated within trauma care systems is the distance between acute care trauma centers, specialty care centers, and rural tribal communities.

Collaborative care management interventions involve front-line trauma center providers and social work and nursing care managers. The care managers provide early trauma-focused mental health services and link trauma center care to outpatient and community settings (Zatzick et al., 2004; Zatzick, Roy-Byrne et al., 2001). Notably, randomized effectiveness trials that compare usual care to a combination of care management, evidence-based PTSD medication, and psychotherapy treatments have improved symptoms among intervention patients (Zatzick et al., 2004). Although minority groups with a high cumulative trauma burden, such as African Americans and Latinos, have been included in such collaborative care intervention trials (Miranda, Schoenbaum, Sherbourne, Duan, & Wells, 2004), no randomized trial has targeted PTSD and related comorbidities among AI/AN trauma survivors.

Several studies, however, have described psychological interventions tailored for AI/AN patients with substantial trauma histories (Gone, 2007, 2009; Gray & Nye, 2001; Manson, 1996; Stone, Whitbeck, Chen, Johnson, & Olson, 2006). These studies acknowledge that an important part of the healing and recovery process entails reconnecting to Native heritage, spirituality, family, and community support, in addition to introspection and group or

community therapy (Gone, 2009; Venner, Feldstein, & Tafoya, 2008). Traditional Native activities, strong links to indigenous culture, and spirituality have also been associated with alcohol cessation (Stone et al., 2006).

We therefore developed an intervention that linked trauma center services with primary care and mental health specialty services in distant tribal communities, and we provided compassionate, culturally sensitive care management for physically injured AI/AN trauma survivors. We conducted a pilot randomized controlled trial to assess the feasibility and acceptability of this culturally tailored care management intervention. Published literature suggests that small pilot investigations can serve a number of purposes in the development and implementation of early, trauma-focused interventions (Kraemer, Mintz, Noda, Tinklenberg, & Yesavage, 2006; Zatzick, Roy-Byrne et al., 2001). First and foremost, demonstration projects such as ours can establish the feasibility and acceptability of recruitment, intervention, and retention procedures. Second, outcome data from small pilot investigations can be used in larger-scale meta-analyses that aggregate results from multiple investigations (Kraemer et al., 2006). Third, given earlier reports that debriefing interventions may have a potentially harmful effect on trauma survivors (Bisson, Jenkins, Alexander, & Bannister, 1997; Mayou, Ehlers, & Hobbs, 2000), it is important to disseminate small pilot investigations if they find that early interventions have a neutral effect on injured participants.

The primary aim of this trial was to assess whether physically injured AI/AN trauma survivors could be recruited, randomized, and followed up in their distant tribal communities during the first weeks and months after injury. Our secondary aim was to compare intervention and control group participants with regard to symptomatic outcomes.

METHOD

Participants and Procedures

Harborview Medical Center in Seattle is the only Level I trauma center serving injured patients from Washington, Wyoming, Alaska, Montana, and Idaho. From June to December 2009, trained AI/AN recruiters at the trauma center downloaded a list of all patients admitted to the trauma surgery service from the automated admissions data system. The recruiters screened patients' charts for the following exclusionary criteria: non-English speaking; age less than 18 years; severe head, spinal cord, or other injuries that prevented participation in interviews; self-inflicted injury; active psychosis or mania; or recent history of severe violence that required immediate intervention.

Since this was a feasibility trial, all physically injured AI/AN patients were eligible for participation, regardless of the presence or absence of PTSD symptoms, depression symptoms, or alcohol use. After reviewing medical charts, the recruiters approached patients on the hospital ward to ascertain their self-reported racial, ethnic, and cultural identity, using protocols described in previous investigations that underwent minor modifications for the present study (Buchwald, Beals, & Manson, 2000; Rhoades, Manson, Noonan, & Buchwald, 2005). Patients could select one or more of the following options: White, Black, Asian, Pacific Islander, American Indian/Alaska Native, or another race. All patients who reported AI/AN ethnicity, either alone or in combination with another category were invited to enroll in the study. During the baseline assessment we gathered information on tribal affiliation, tribal enrollment status, and reservation versus urban residence. We asked patients this open-ended question: "How would you describe your tribal or cultural heritage?" We used the patients' self-reported tribal or cultural heritage to determine their tribal affiliation and used enrollment status and residential situation to determine their eligibility for Indian Health Service programs in their communities.

After completing the baseline interview, patients were randomized to the intervention ($n = 15$) or control ($n = 15$) conditions by an automated computer program. The intervention began on the surgical ward or intensive care unit and extended through outpatient care for 6 months after the initial injury admission date. All study participants, regardless of group assignment, completed a 3- and 6-month follow-up assessment after the initial injury. Participants were reimbursed for completing the baseline interview and each of the 2 follow-up interviews. All study procedures were approved by the appropriate institutional review board and all participants provided written, informed consent.

Intervention Condition

The care management intervention was based on a stepped collaborative care model developed by Zatzick and colleagues (Zatzick et al., 2004; Zatzick, Roy-Byrne et al., 2001). To meet the aim of providing culturally appropriate care coordination, we conducted 6 key informant interviews with Native healers to gather their perspectives on trauma and post-injury care. The Native healers offered an array of acute care strategies that were culturally suitable, such as listening to patients, allowing them time to voice their concerns, repeatedly asking them about their concerns, and addressing their spiritual needs (Bassett, Tsosie, & Nannauck, 2011; Zatzick, Kang et al., 2001). We also applied a racial match construct (Meyer, Zane, & Cho, 2011) and hired an AI/AN care manager to coordinate care for intervention group participants. She established a relationship with each patient and elicited physical, mental, emotional, and spiritual needs and concerns. The care manager was familiar with a diverse range of tribal groups and had experience working with numerous tribes. We implemented these strategies both during the recruitment stage of the study and afterward, as we coordinated the patients' post-injury care and linked them to services in their remote communities.

This individually tailored care management intervention aimed to address patient concerns and coordinate care across surgical, primary care, mental health specialty, and tribal community delivery sectors. The care manager was supervised by a senior investigator (DZ) who is experienced in acute and collaborative care intervention protocols (Zatzick et al., 2004; Zatzick, Roy-Byrne et al., 2001). The care manager and other study team members customized the intervention to fit each patient's constellation of posttraumatic concerns.

Together, the care manager and patient worked on a plan to readjust and reengage in daily activities. This work involved discussing emotional reactions to the injury; PTSD or depression symptoms; alcohol or drug use; and problem solving (e.g., financial difficulties). The care manager also provided culturally appropriate support by listening to and ameliorating patient concerns, facilitating family and community connections, and addressing spiritual needs. As appropriate, she engaged in storytelling; recommended traditional Native activities such as weaving, drumming, or crafting; and reengaged patients with their tribal communities. The care manager also remained in close contact with the patient's family, often met the patient and family members at outpatient appointments and in the community, and was available by telephone as needed. The study did not directly provide patients with medications or psychotherapy. Instead, they were linked to primary care or mental health specialty services that could prescribe medication or treatment.

Control Condition

Participants in the control group received usual posttraumatic care, which has been described in previous publications (Zatzick et al., 2004; Zatzick, Roy-Byrne et al., 2001). Such care includes outpatient surgical, primary care, and emergency department visits, as well as the occasional use of specialty mental health services. Patients assigned to the control group were encouraged to use all resources available to them. They also received a

resource list that included telephone numbers of local mental health, case management, and crisis care agencies.

Measures and Outcome Assessment

All participants were interviewed at baseline in the surgical ward after their initial injury and again over the telephone or in person at 3 and 6 months after study enrollment. A trained staff member blinded to treatment condition conducted follow-up interviews lasting 45 to 60 minutes each.

Sociodemographic and Clinical Characteristics

During the baseline interview, information on age, sex, education, marital status, number of children, living situation, income, employment status, and tribal demographics was collected. Clinical characteristics such as injury type and Injury Severity Score (ISS), length of inpatient stay, and days on the ward prior to study enrollment were obtained from medical records. The ISS is an anatomical scoring system that provides an overall score for patients with multiple injuries. It is obtained from surgical records by a conversion software program (Johns Hopkins Health Services Research and Development Center, 1989) that transforms recognized International Classification of Disease Ninth Version Clinical Modification (ICD-9CM) codes into an Abbreviated Injury Scale (Civil & Schwab, 1985). The Abbreviated Injury Scale is a numerical scale ranging from 0 (no injury) to 6 (severe injury with likelihood of fatality). The ISS is the sum of squares of the highest Abbreviated Injury Scale score in each of the 3 most severely injured body regions (Johns Hopkins Health Services Research and Development Center, 1989).

Cumulative Lifetime Trauma, PTSD, and Depression Symptoms

To assess prior traumatic life events, we used a modified version of the National Comorbidity Survey Revised Traumatic Event Inventory (Kessler et al., 2004; Kessler et al., 2005; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Participants were asked if they had ever experienced specific traumatic events (e.g., combat, assault, life-threatening accident). The stem queries were modified to reference the post-injury timeline (e.g., “Has this happened to you before the event in which you were injured?”). The responses were summed and a mean was calculated.

PTSD symptoms were assessed with the civilian version of the Post-Traumatic Stress Disorder Checklist-Civilian Version (PCL-C) (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Weathers, Huska, & Keane, 1991), which is a reliable and valid instrument to assess trauma-exposed populations (Asmundson et al., 2000; Blanchard et al., 1996; Walker, Newman, Dobie, Ciechanowski, & Katon, 2002; Weathers & Ford, 1996). The PCL-C is a 17-item self-report questionnaire that elicits graded responses for the intrusive, avoidant, and arousal symptom clusters. Responses ranged from “not at all” (1) to “extremely” (5). The baseline measure was modified to read: “How bothered have you been by these experiences since the event that brought you to the hospital?” The instrument yields both a continuous symptom score and a dichotomized cut point indicative of symptoms consistent with a DSM-IV diagnosis of PTSD (American Psychiatric Association, 2000).

We used the Patient Health Questionnaire-9 (PHQ-9), a 9-item self-report measure, to assess depression symptoms. This instrument has been shown to be a reliable and valid measure of depression severity in the general population (Kroenke, Spitzer, & Williams, 2001). Patients were asked to report the frequency with which they experienced depression symptoms since their index injury, using a 4-point scale of “not at all” (0) to “nearly every day” (3). The continuous PHQ-9 score was used as our depression outcome measure.

Alcohol Use

Baseline blood alcohol level was assessed by blood alcohol toxicology screens in the emergency department. Problematic alcohol use before the injury and during the follow-up interviews was assessed with the AUDIT-C, which includes 3 questions that elicit quantity and frequency of alcohol consumption (Bradley et al., 2007). The AUDITC is scored on a scale of 0–12 points, with a score of 0 reflecting no alcohol use in the past year. Problematic alcohol use was indicated by a score greater than 4 for men and 3 for women (Bradley et al., 2007).

Statistical Analysis

To assess protocol feasibility and acceptability, we meticulously tracked the patients flow through the study protocol to ascertain the percentage of those who declined to participate in the study and did not complete follow-up assessments. The 25 patients who completed baseline, 3-month, and 6-month assessments were compared with the 5 patients who did not complete all 3 assessments. To examine the success of the randomization, intervention and control groups were compared on all study variables at baseline using Fisher's exact probability tests for the categorical data and *t*-tests for the continuous variables.

We examined descriptive statistics and described characteristics of the care management intervention, including the frequency with which patients engaged in traditional Native healing practices as part of their post-injury care. We also assessed longitudinal changes in PTSD, depression, and alcohol use outcomes for the intervention and control groups using generalized estimating equations. These analyses allow the inclusion of all cases regardless of missing outcome assessments, and are considered an intent-to-treat analysis. For each outcome, we first fit a model that tested for an interaction of group (intervention and control) by time (3- and 6-month follow-up assessments), using gender, age, ISS, number of prior traumatic events, and baseline outcome as covariates.

RESULTS

Participants

A total of 338 patients were screened for eligibility and self-reported their racial and ethnic identity. Thirty-six AI/AN patients were eligible to participate; 2 declined, reporting that they had very little Native ancestry or were not raised in a Native culture. Four additional patients were excluded during in-person screening, leaving 30 patients who enrolled in the study. The investigation achieved an 83% response rate for both the 3- and 6-month follow-up assessments (Figure 1).

The 5 patients who did not complete either the 3- or 6-month assessments did not differ on any study variable from the 25 patients who completed both of these assessments. As expected from randomization, no significant differences were noted in demographic or clinical characteristics between the 2 groups at baseline (Table 1). Overall, the sample had a mean age of 42 years; 73% ($n = 22$) were men; 47% (14) were married, 53% (16) were employed, 57% (17) had less than a high school education, and 50% (15) were enrolled tribal members. Sixteen tribal affiliations were reported, most commonly Blackfeet 13% (4), Cherokee 13% (4), and Yakama 6% (2). Seventy percent (21) of patients lived in predominately rural areas at least 50 miles away from the trauma center and 30% (9) lived outside the state where the trauma center is located.

Care Management Activities

As shown in Table 2, the care manager averaged 15 (range, 8–44) contacts per patient and spent an average of 476.3 minutes or 7.9 hours (standard deviation (SD) = 422.5 minutes)

with each patient over the course of the 6-month study. The care manager's field logs and notes revealed that 86% of patients were either connected to available resources at their tribe, such as counseling and physical therapy services, or community rehabilitation programs. In addition, the field logs also revealed that 33% of patients used or requested a Native healer or spiritual advisor and 60% chose to participate in traditional Native practices, such as living a subsistence lifestyle (e.g., fishing and hunting), beading, crafting, or traditional dancing, as a means to facilitate the healing process.

Outcomes

Table 3 presents the means for the PTSD (PCL-C), depression (PHQ-9), and alcohol (AUDIT-C) symptom outcomes for the intervention and control groups at baseline, 3 months, and 6 months. The generalized estimating equation models revealed no significant interactions of treatment group by time. For PTSD, no group effect was observed, but a significant time effect was detected (Wald's chi square (1) = 4.25; $p = 0.04$). Collapsing over groups, PCL-C scores averaged 38.0 (95% Confidence interval (CI) = 33.1–42.9) at 3 months and significantly decreased to 33.0 (95% CI = 28.5–37.4) at 6 months. The other significant effects in the model were baseline PCL-C ($p = 0.001$), age ($p = 0.001$), and number of traumas ($p = 0.01$). Higher baseline PCL-C scores, more traumas, and younger age were associated with more PTSD over time. The pattern was similar for depression, with a non-significant group effect and a significant time effect. The PHQ-9 scores declined significantly over time. Collapsed over groups (Wald's chi square (1) = 6.33; $p = 0.01$), the mean PHQ-9 score was 10.8 (95% CI = 8.9–12.7) at 3 months, and 8.3 (95% CI = 6.2–10.4) at 6 months. Higher baseline PHQ-9 scores ($p = 0.001$) and more traumatic events were associated with more depression over time. The generalized estimating equation analysis of the AUDIT-C did not reveal time or group effects. Higher baseline AUDIT-C scores ($p < 0.001$), younger age ($p = 0.04$), and male gender ($p = 0.008$) were all significantly related to AUDIT-C scores over time.

DISCUSSION

Our primary aim was to assess whether physically injured AI/AN trauma survivors would accept randomization and whether they could be followed up in their distant tribal communities during the first weeks and months after injury. Our secondary aim was to compare the intervention and control groups with regard to symptomatic outcomes. In terms of feasibility, 94% of eligible patients agreed to enroll in the study, and 83% completed the 3- and 6-month follow-up assessments. At the time of admission, patients had high levels of cumulative lifetime trauma and moderate levels of PTSD symptoms, depressive symptoms, and alcohol use. Even so, participants were successfully engaged, followed up, and linked with local trauma care services and traditional Native approaches to healing during the ensuing 6 months of the study. Seventy-five percent of intervention patients reported that the intervention was helpful, and 92% of all study participants, from both the intervention and the control group, reported that they gained something positive from the trial.

Our results suggest that AI/AN patients are receptive to, and easily engaged in, trauma-focused interventions in a hospital setting. However, we did not observe reductions in self-reported PTSD and depressive symptoms or in alcohol use in the intervention group compared to the control group. Since the primary aim of the study was to assess feasibility and acceptability, we did not exclusively recruit participants who were symptomatic with PTSD and depression or alcohol use problems, thus decreasing the likelihood of detecting a treatment effect. These findings are congruent with other trials of care management that lacked evidence-based components to address specific mental health disorders (Zatzick, Roy-Byrne et al., 2001). One interpretation of such findings is that care management interventions alone are unlikely to be beneficial if they do not incorporate evidence-based

interventions that target PTSD, depression, and alcohol use in order to diminish the considerable psychiatric comorbidity of physical trauma.

Nonetheless, this study contributes to the small but growing body of literature on culturally tailored, trauma-focused interventions for AI/AN people. Although we employed an AI/AN care manager and used a culturally appropriate approach, our impression is that, for a substantial proportion of AI/AN hospitalized trauma patients, an even more culturally enhanced intervention, with traditional prayers and healing ceremonies, would be desirable. In this regard, 33% of intervention patients reported that they used or requested a Native healer or spiritual advisor, and 60% participated in traditional Native healing practices during the 6-month follow-up period.

Pertinent investigations have also revealed that AI/AN trauma survivors have culture-specific idioms for PTSD (e.g., “wounded spirit”) and may prefer traditional approaches to healing trauma (Gone, 2007; Manson, 1996). More generally, use of traditional practices is common among AI/AN patients. In one study, 38% of urban AI/AN primary care patients reported seeing a Native healer, and 86% of those who did not would consider seeing a healer in the future (Marbella, Harris, Diehr, Ignace, & Ignace, 1998). In another study of urban AI/AN primary care patients, 70% used traditional healing practices, 52% reported significant improvements in their health, and 96% believed traditional Native healing activities should be more available (Buchwald et al., 2000). These observations highlight the need for traditional Native interventions (Gone, 2007, 2009; Gray & Nye, 2001; Manson, 1996; Stone et al., 2006), while our own findings stress the relevance of traditional modalities that target AI/AN trauma patients.

We believe that evidence-based practices aimed at specific psychiatric and substance abuse conditions should be integrated with traditional, holistic, Native healing practices that connect the spiritual, mental, emotional, and physical realms of health and wellness. As noted by other researchers (Gone, 2009), cultural adaptations of existing interventions resonate with AI/AN patients. This observation suggests that more systematic and rigorous efforts to mobilize family and community support, reconnect patients to Native culture, and encourage participation in traditional activities may enhance the benefit of conventional approaches to the care of trauma patients. Notably, other studies have demonstrated that interventions including participation in traditional activities and spirituality significantly and positively influenced alcohol cessation (Stone et al., 2006).

This study has several limitations that should be considered in interpreting our results. First, our small sample size, which is typical of feasibility studies, lacked sufficient power to demonstrate significant effects between groups. Second, our outcomes were self-reported, and we did not use clinical diagnoses for psychiatric and substance abuse disorders. Third, although the measures used to assess our outcomes have been validated in the general population, few investigations have validated their use in AI/AN patients (Dillard & Christopher, 2007; Leonardson et al., 2005; Sahota, Knowler, & Looker, 2008). Fourth, we were unable to disaggregate information on requesting versus using a Native healer or spiritual advisor. Future studies could provide much greater detail on Native healing as part of outcomes assessments. Fifth, given our design as a feasibility study, we could not determine which aspects of the care management intervention were most influential in improving service coordination or other key outcomes.

In summary, no randomized controlled trials, and few clinical studies, have focused on traumatic injury survival and psychiatric comorbidity among AI/ANs. Our results demonstrate the feasibility and acceptability of a care management-based intervention for AI/AN patients. Future investigations should consider combining care management services;

evidence-based interventions targeting PTSD, depression, and alcohol; and traditional Native healing approaches that address the spiritual and cultural needs of this vulnerable minority.

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FIGURE 1.
Trial CONSORT Diagram

TABLE 1

Baseline Demographic, Injury, and Clinical Characteristics of Patients Randomized to Intervention Group vs. Usual Care Control Group

	Total Sample <i>n</i> = 30	Intervention <i>n</i> = 15	Control <i>n</i> = 15	<i>p</i> ^c
Demographic				
Age, mean (SD)	42.4 (14.8)	45.4 (17.0)	39.3 (12.0)	0.27
Male, <i>n</i> (%)	22 (73.3)	13 (86.7)	9 (60.0)	0.22
Education high school, <i>n</i> (%)	17 (56.7)	11 (73.3)	6 (40.0)	0.14
Married or living as married, <i>n</i> (%)	14 (46.7)	6 (40.0)	8 (53.3)	0.72
Has children, <i>n</i> (%)	21 (70.0)	11 (73.3)	10 (66.7)	1.00
Lives with others, <i>n</i> (%)	24 (80.0)	12 (80.0)	12 (80.0)	1.00
Lives > 50 miles from medical center, <i>n</i> (%)	21 (70.0)	10 (66.7)	11 (73.3)	1.00
Income < \$30,000, <i>n</i> (%)	14 (46.7)	14 (46.7)	14 (46.7)	1.00
Employed, <i>n</i> (%)	16 (53.3)	8 (53.3)	8 (53.3)	1.00
Tribal				
Enrolled member, <i>n</i> (%)	15 (50.0)	8 (53.3)	7 (46.7)	1.00
Lives on reservation, <i>n</i> (%)	5 (18.5)	2 (16.7)	3 (20.0)	1.00
Injury				
Unintentional, <i>n</i> (%)	26 (89.7)	14 (93.3)	13 (86.7)	1.00
Motor vehicle crash, <i>n</i> (%)	9 (30.0)	6 (40.0)	3 (20.0)	0.64
Injury Severity Score, mean (SD)	14.9 (11.5)	15.5 (10.6)	14.4 (12.4)	0.80
Clinical				
# traumas prior to baseline (mean, SD)	5.1 (2.6)	5.3 (2.2)	4.9 (3.0)	0.68
4 prior traumas, <i>n</i> (%)	22 (73.3)	12 (80.0)	10 (66.7)	0.17
PTSD by PCL-C algorithm, <i>n</i> (%)	6 (20.0)	5 (33.3)	1 (6.7)	0.17
Major depression by PHQ-9 algorithm, <i>n</i> (%)	7 (23.3)	3 (20.0)	4 (26.7)	1.00
AUDITC>3, <i>n</i> (%)	18 (60.0)	9 (60.0)	9 (60.0)	1.00
Blood alcohol level performed, <i>n</i> (%) ^a	22 (75.9)	11 (78.6)	11 (73.3)	1.00
Positive blood alcohol level, <i>n</i> (%) ^b	2 (10.0)	1 (9.1)	1 (9.1)	1.00
Inpatient length of stay, mean (SD)	8.3 (8.2)	8.9 (7.7)	7.7 (8.9)	0.70
# hospital days before enrollment (mean, SD)	6.1 (7.6)	7.8 (8.4)	4.3 (6.5)	0.22

Note.

^aMissing 1 patient.

^bPerformed on 22 patients.

^c*p* < .05 for test statistic *t*(28) or Fisher's Exact (2-tailed).

TABLE 2

Care Management Activities for Intervention Group Participants

Care Management Activities	Total	Ward Discharge Through 3-Month Follow-Up	3-Month Follow-Up Through 6-Month Follow-Up
Total minutes spent per patient, mean (<i>SD</i>)	476.3 (422.5)	262.6 (309.7)	137.4 (125.7)
# contacts per intervention patient, median (range)	15 (8–44)	10 (4–22)	4 (1–19)
Total In-person contacts, <i>n</i> (%)	35 (12.7)	25 (15.2)	10 (8.9)
Total Telephone contacts, <i>n</i> (%)	157 (56.9)	86 (52.4)	71 (63.4)
Total Third-party contacts ^a <i>n</i> (%)	67 (24.3)	52 (31.7)	17 (15.2)
Total Correspondence <i>n</i> (%)	15 (5.4)	1 (0.6)	14 (12.5)

Note.

^aFor example, family member or service provider.

Longitudinal PTSD, Depression, and Alcohol Use Outcomes for Intervention Group vs. Control Group Participants

TABLE 3

	Baseline		3-Month Follow-Up		6-Month Follow-Up	
	Intervention n = 15	Control n = 15	Intervention n = 14	Control n = 11	Intervention n = 13	Control n = 12
Clinical characteristics						
PCL-C, mean (SD)	32.9 (15.4)	28.9 (8.1)	39.8 (16.6)	35.2 (12.2)	35.5 (15.7)	32.5 (12.2)
PHQ-9, mean (SD)	6.9 (6.8)	8.9 (5.6)	12.2 (7.4)	11.3 (6.2)	8.4 (7.2)	9.0 (6.6)
AUDIT-C, mean (SD)	3.7 (3.4)	3.1 (2.6)	2.4 (3.0)	0.4 (0.8)	2.7 (2.6)	1.5 (1.4)