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Health Disparities in Orthopedic Trauma: A Qualitative Study Examining Providers' Perspectives on Barriers to Care and Recovery Outcomes

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Abstract

Social workers involved in interdisciplinary orthopedic trauma care can benefit from the knowledge of providers' perspectives on healthcare disparities in this field. Using qualitative data from focus groups conducted on 79 orthopedic care providers at three Level 1 trauma centers, we assessed their perspectives on orthopedic trauma healthcare disparities and discussed potential solutions. Focus groups originally aimed to detect barriers and facilitators of the implementation of a trial of a live video mind-body intervention to aid in recovery in orthopedic trauma care settings (Toolkit for Optimal Recovery-TOR). We used the Socio-Ecological Model to analyze an emerging code of "health disparities" during data analysis to determine at which levels of care these disparities occurred. We identified factors related to health disparities in orthopedic trauma care and outcomes at the Individual (Education- comprehension, health-literacy; Language Barriers; Psychological Health- emotional distress, alcohol/drug use, learned helplessness; Physical Health- obesity, smoking; and Access to Technology), Relationship (Social Support Network), Community (Transportation and Employment Security), and Societal level (Access-safe/clean housing, insurance, mental health resources; Culture). We discuss the implications of the findings and provide recommendations to address these issues, with a specific focus on their relevance to the field of social work in health care.

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Declaration of Interest Statement:

Each author certifies that he or she has no commercial associations (e.g., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted article.

Ethics Statement:

Ethical approval for this study was obtained from Mass General Brigham Institutional Review Board which approved all study procedures

Keywords

Orthopedic trauma; Social work; Health disparities; Trauma Care; Trauma recovery; Qualitative research

Introduction

Orthopedic trauma is a leading cause of disability in the United States (U.S.) (Lyons et al., 2011). The estimated lifetime cost of orthopedic trauma in the U.S. is \$406 billion (\$326 billion in productivity loss and \$80 billion in healthcare costs) (Finkelstein, Corso, & Miller, 2006; Elliott & Rodriguez, 1996). Given this substantial impact, clinicians and scientists are urgently working to improve care and recovery following orthopedic trauma. Such efforts have resulted in pivotal advances that include reductions in inpatient hospital stays and improved recovery and cosmetic results for orthopedic patients. Several technological advances have accelerated the recovery process for traumatic orthopedic injuries (Kuroda et al., 2020). These include minimally invasive surgical techniques (e.g., computer-assisted implants), high sensitivity/specificity assessments directed at achieving optimal functional recovery (e.g., three-dimensional CT), and advances in interventional orthobiologics (Centeno & Pastoriza, 2020; Genova et al., 2017; Thaeter et al., 2016).

However, not all patients benefit equally from the advances in orthopedic trauma care (Pandya et al., 2018). There are important patient factors – population characteristics, environment, community resources – that strongly impact quality of care and recovery outcomes (Healthy People 2030, U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, 2021). For example, patients with transportation difficulties may be unable to access clinical services or patients' financial difficulties may contribute to increased morbidity and mortality. It is clear that there is a need for clinical innovations to address disparities in orthopedic trauma healthcare. An important first step is to understand which patient factors impact orthopedic trauma care and optimal recovery.

Level 1 trauma centers, which offer comprehensive, multidisciplinary assessment and treatment for orthopedic trauma cases, are ideal settings to examine healthcare disparities (Chun et al., 2021). Disparities may be more likely to occur in these settings for three main reasons. First, instances of disparities may be more likely given the range of therapeutic services available and number of providers interacting with them. Second, these units are not accessible to all patients (e.g., those in rural areas). Finally, these units include a variety of patients which provide rich opportunities to examine patient vulnerability factors related to disparities. There is growing quantitative evidence that healthcare disparity factors within level 1 trauma centers (e.g., lack of access, transportation issues, insurance status) impact quality of care and patient outcomes (Benavent et al., 2021; Braswell et al., 2021; Johnson et al., 2019; Salim et al., 2010). However, to our knowledge, no qualitative work has examined these disparities from the perspective of the orthopedic care providers. Such qualitative data can provide an in-depth insight into the nuanced nature of these disparities, as well as providers' awareness of healthcare disparities and their openness to addressing them

in practice. Understanding providers' perceptions is critical for informing educational and clinical initiatives to address these disparities.

We have previously conducted a qualitative focus group study among orthopedic care providers from different disciplines to inform implementation of a live video, mind-body program (Toolkit for Optimal Recovery-TOR) aimed at preventing chronic pain among orthopedic trauma patients in 3 level 1 trauma centers (see cited paper for detailed report on the methodology and findings) (Vranceanu et al., 2021). TOR offers evidence-based mind-body strategies in four sessions (45 min each) to aid in recovery, pain management, and disability (e.g., mindfulness meditation, debunking myths about pain, pain acceptance, and values-based living and activity). From this group, a theme of healthcare disparity factors emerged as important for the recovery trajectory of orthopedic trauma patients. The purpose of this study is to further explore how orthopedic care providers describe healthcare disparity factors in their patient population (Rosenbloom et al., 2019). We used the Socio-Ecological Model as an organizing construct for these findings, as an established framework for examining health disparities (Stokols et al., 1996). Social workers play a critical role in addressing healthcare disparities at different levels of the socio-ecological model and are particularly well-suited to engage in and lead integrated trauma care efforts aimed at reducing these disparities (Donaldson & Daughtery, 2011; Held et al., 2017). However, the existing disciplinary silos represent a significant barrier preventing collaboration among orthopedic care providers, including social workers (Ernstzen et al., 2016). By fostering a cross-disciplinary exchange of ideas and perspectives, we can begin to break down these barriers and develop integrated care plans that effectively address healthcare disparities in orthopedic trauma care (Vranceanu et al., 2022). We expect the insight into the perspectives of orthopedic providers from various disciplines regarding healthcare disparities in trauma settings and relevant practical recommendations, provided by this study, can serve as a valuable resource for social workers seeking to promote equitable access to care.

Materials and Methods

Study Design and Setting

We recruited participants from three Level 1 trauma centers to participate in virtual focus groups and individual exit interviews via Zoom. Our aim was to investigate orthopedic trauma providers' views on implementing a remote mind-body psychological intervention designed to decrease chronic pain after acute orthopedic trauma in patients with high levels of pain anxiety and pain catastrophizing (i.e., a tendency for anxious pain preoccupation and exaggeration of threat value or amplification of the seriousness of experienced pain) (Quartana, Campbell, & Edwards, 2009). We have anonymized our recruitment sites and refer to them as Sites 1, 2, and 3. Sites 1, 2, and 3 (anonymized) are level I trauma centers in Austin, Texas; Lexington, Kentucky; and Boston, Massachusetts. The Institutional Review Board of Site 3 provided human subjects' oversight.

In support of recruitment, we partnered with surgeon champions at each site and presented our study and the format and function of focus groups to orthopedic trauma providers. These presentations served to make all orthopedic care providers aware of the study. After each presentation, attending staff were given the opportunity to express their willingness to

participate in a one-session focus group and exit interview. We then emailed a screening survey to those participants who had expressed their willingness to participate. The survey included an IRB-approved fact sheet that further described the format and content of the focus groups, as well as tentative dates for the sessions. We administered our screening survey to 94 providers across Sites 1, 2, and 3. The only inclusion criteria for our study was direct involvement with outpatient acute musculoskeletal trauma care. Given our limited recruitment sources, we utilized purposive sampling to ensure a high information yield. This is a common approach for qualitative research in settings of limited data availability (Creswell & Clark, 2011; Patton, 2002).

Participants gave implied consent for study participation by completing the study survey that was emailed to them following the presentation (Vranceanu et al., 2021). During the presentation phase and through the fact sheet, participants were informed that participation in the study is completely voluntary and that they could drop from the study at any phase they would like. It was clarified that non-participation by no means would affect staff appraisals in the workplace.

Amongst the 94 care providers contacted, 88 (94%) completed the survey and consented to participate. Out of the 88 who consented, 9 (10%) had scheduling conflicts that prevented them from participating. Ultimately, our group of participants was composed of 79 individuals: 28 residents, 20 attending surgeons, 13 medical assistants, 10 nurse practitioners/registered nurses/physician assistants, 2 physical therapists, 3 social workers, and 3 clinical research fellows.

Data Collection

The research team conducted a total of 18 focus groups amongst our 76 participants. All focus groups were 60-minutes long. At Site 1, we conducted 7 focus groups amongst 42 participants; at Site 2, we conducted 8 focus groups amongst 21 participants; and at Site 3, we conducted 3 focus groups amongst 13 participants. Department chiefs at each site (n=3) participated in 30-minute individual interviews. We conducted these interviews separately to mitigate potential bias due to workplace-related hierarchy.

We segregated focus groups by provider type within each site (e.g., nurse practitioners at Site 1 would have their own focus group, physical therapists at Site 2 would have their own focus group). These groupings were intended to facilitate active participation and diversity of opinions by ensuring participant familiarity and inter-participant equality in the workplace. At times when this segregation was impossible, such as when we did not have enough participants of a certain provider type to fill a focus group, we combined provider types to reach acceptable focus group size. In all focus groups, participants were given the option to participate in 10-minute individual exit interviews. Exit interviews were designed to provide participants the opportunity to discuss opinions and ideas they did not want to share with the group and to offer thoughts about the focus group process.

A multidisciplinary team composed of psychologists, orthopedic surgeons, and an implementation scientist wrote the semi-structured focus group script and the individual exit interview script. The focus group script was shaped to elicit providers' thoughts on both the

integration of psychosocial care in their care settings generally and the implementation of a specific remote mind-body program designed to decrease chronic pain after acute orthopedic trauma in patients with high levels of pain anxiety and pain catastrophizing. In this paper, we focus on providers' discussion of health disparities related to care and outcome of patients.

The authors, along with other members of the research team, administered focus groups and exit interviews. Each focus group was conducted securely via Zoom and there were no external observers. Participants consented to focus group and exit interview audio being recorded. We completed field notes after each focus group using a pre-structured template (Phillippi & Lauderdale, 2017). In field notes we aimed to quickly capture highlights from each discussion and share them with the larger team. We used this method to determine when data saturation was achieved for each topic within our script.

Data Analysis

We adhered to established guidelines for qualitative research in our data analysis approach (O'Brien et al., 2014). Members of the research team transcribed each interview verbatim. We performed directed content analysis to analyze our data (Hsieh & Shannon, 2005). Directed content analysis is a technique for analyzing textual data where initial coding categories are derived from existing theories (i.e., using a set of predefined categories). It allows researchers to systematically apply a theoretical lens to new data (Hsieh & Shannon, 2005). We utilized an *a priori* framework to code the transcripts in Nvivo, and as is appropriate with directed content analysis, we permitted for unexpected codes to emerge during the coding process (QSR International Pty Ltd, 2020).

In the first phase of our coding process, we used our *a priori* coding framework to delineate perceptions of intervention implementation in healthcare settings (Vranceanu et al., 2021). Simultaneously, as unexpected codes emerged in our data, we recoded our data with the new emergent codes. "Health disparities" was one of our emergent codes that required recoding. In the second phase of our coding process, after recoding, we aimed to thoroughly evaluate the emergent code of "health disparities." We extracted all text previously coded for "health disparities," and we then analyzed each quotation using the predefined categories of Socio-Ecological Model (Stokols et al., 1996). We selected this model as it conceptualizes health broadly and focuses on multiple factors that might affect health and envisions four social-ecological levels in which disparities resulting from social determinants of health may exist: individual, relationship, community and society. Three team members coded transcripts using this framework, through directed content analysis. The team met weekly to discuss and reach a consensus about the reliability and validity of the coding framework, and to overcome any coding inconsistencies through a discussion and consensus process.

Results

Using the Socio-Ecological Model, we identified specific factors and sub-factors related to *Individual*, *Relationship*, *Community*, and *Societal* levels perceived by our participants to be contributing to the occurrence of patients' health disparities when seeking or receiving orthopedic trauma care. We report on each of these factors and sub-factors below. Exemplar quotes by each factor and sub-factor are presented in table 1, which provides

a rich description of the types of health disparities and social determinants of health that participants' felt were present among their patients.

Individual Level

We identified five *Individual* level factors: Education, Language Barriers (i.e., the extent to which patient and provider language differences inhibit communication), Psychological Health, Physical Health, and Access to Technology (i.e., a patient's ability to access phones and computers to facilitate healthcare utilization). Education included two sub-factors: Comprehension (i.e., a patient's ability to understand new information offered by providers) and Health Literacy (i.e., a patient's baseline knowledge of medical information). Psychological Health included three sub-factors: Emotional Distress (i.e., a patient's baseline mental wellness), Alcohol and Drug Use (i.e., the extent to which a patient uses drugs and alcohol to cope with stress), and Learned Helplessness (i.e., a patient's belief there's nothing they can do to control their environment after repeated failures to address it). Physical Health included two sub-factors: Obesity (i.e., the extent to which obesity impedes recovery) and Smoking (i.e., the extent to which smoking behavior impedes recovery).

Relationship Level

The main factor represented in the Relationship level was that of a patient's Social Support Network (i.e., the extent to which a patient has family and friends available to support the patient in recovery).

Community Level

Two factors were identified that corresponded to the Community level: Transportation (i.e., the extent to which transit to and from healthcare settings is accessible to a patient) and Employment Security (i.e., the extent to which a patient's job is secure despite needed time off for recovery and changes in ability post-injury).

Societal Level

We identified two *Societal* level factors which represented providers' perceptions of why patients experienced disparities in care: Access and Culture (i.e., the extent to which one's cultural norms legitimize recovery-related needs). Access included three sub-factors: Safe and Clean housing (i.e., the extent a patient is ensured housing adequate to facilitate recovery), Insurance (i.e., the extent to which a patient's insurance covers the patient's healthcare needs), and Mental Health Resources (i.e., the extent to the healthcare system meets a patient's mental health needs).

Discussion

Our focus group design allowed us to examine the perspective of medical providers on factors determining health disparities related to social determinants of health within the context of a Level 1 trauma center. Providers identified a set of factors related to disparities in care (e.g., delays in diagnosis, poorer access to quality care, and increased time to surgery) and outcome (e.g., lengthy hospital stays, readmissions). The identified factors were related to either socioeconomic status, or environment, reflecting an acknowledgment

of systemic socioeconomic disparities by medical providers (Arceo et al., 2018; Driesman et al., 2017; Hsia & Shen, 2011; Khetpal et al., 2021; Sheridan et al., 2019). We categorized these factors according to the different levels of the Socio-Ecological Model (i.e., individual, interactions, community, and societal). Below we present clinical implications as well as suggested strategies for addressing each health disparity factor based on previous literature.

Individual level

At the individual level, orthopedic providers discussed comprehension difficulties and health literacy as determinants of poor outcome (Moore et al., 2017; Swartz et al., 2018). Providers discussed patients' difficulty understanding words at or above a high school reading level, which can impact patient-provider communication. Providers also identified low health literacy as a factor impacting the patient's care and outcome trajectory. Health literacy, defined as the ability to uptake, process, and understand medical information, has been demonstrated to have a direct relationship with patient's healthcare decisions, adherence to treatment protocols, and recovery outcomes. Methods to address comprehension and health literacy barriers include providing health communication training to medical providers with the aim of tailoring communication to fit each patient's learning needs, as well as providing brief health literacy training to the patients (Jablow, 2016).

Similarly, providers reported lack of English proficiency as an important barrier to patient-provider communication and recovery among a subgroup of patients. This observation was more prominent in one of the sites with higher rates of minority ESL (English as a Second Language) patients and is consistent with prior research emphasizing poorer outcomes for orthopedic patients who are not fluent in English (Moore et al., 2017). To address such language barriers, Level 1 trauma centers may adopt initiatives that emphasize employment of multilingual providers. Additionally, Level 1 trauma centers may hire trained live interpreters to work closely with the medical team as an additional means of addressing language barriers. This goal can be better achieved through the coordination of team members and integration of all members as equals.

From the standpoint of social work, coping with the intricacies associated with extensive medical procedures necessitates the presence of a person who can offer ongoing assistance to patients and families with health literacy/language related barriers (Wilson et al., 2014). In addition to advocating on their behalf, social workers may help patients and families by simplifying burdensome paperwork, helping to resolve literacy and language problems, and assisting families in gathering and organizing relevant documents.

Providers identified psychological health as another factor impacting orthopedic trauma outcomes. They discussed the role of comorbid mental illness (e.g., depression and anxiety), substance abuse (e.g., alcohol and drugs), and learned helplessness in poor outcome trajectories (Castillo et al., 2019). Previous research has highlighted the impact of comorbid mental illness and substance abuse on treatment adherence and treatment response of patients with orthopedic conditions for both short- and long-term outcomes. Learned helplessness, defined as a behavioral tendency to avoid situations due to repeated failures and perception of lack of control over the environment, is known to be a strong predictor of poor outcomes across many conditions including orthopedic injury (Matkin & Ring,

2019). To address these issues, Level 1 trauma centers may consider organizing services as an “integrated care model” by having mental health professionals available to consult for patients’ mental health needs (Burgess, Hoyt-Hudson, & Smith-Osborne, 2021). Other options include training medical providers on effective methods of communicating about mental health issues and referring patient for appropriate mental health care.

Social workers are among the healthcare providers that can deliver effective mental health interventions in trauma centers. (Murray et al., 2010). Further, social workers can work with patients to co-develop comprehensive discharge plans to overcome recovery challenges (Girona et al., 2006). This approach enables the patients to participate in post-operative recovery, boosting their sense of control and agency. Further, outpatient follow-ups allow social workers to find and encourage the use of internal and external resources for recovery and help build resilience among underprivileged minority patients (Andrade et al., 2022).

Providers also reported physical health problems as a factor influencing the outcome of orthopedic trauma. They identified obesity and smoking as predictors of worse outcomes. Modifiable and non-modifiable health issues (i.e., hypertension, diabetes, obesity, and asthma) are associated with higher likelihood of complications following orthopedic trauma/surgery (Aneja et al., 2014). Smoking is also a unique predictor of poor pain control and tissue healing following orthopedic trauma (Matuszewski et al., 2021; Radi et al., 2019; Sprague et al., 2021). Psychoeducation and interventions aimed at lifestyle change could help modify these physical health predictors of poor outcomes after injury. Notably, social workers are well equipped to coordinate an interdisciplinary team in planning, implementing, and evaluating obesity reduction and other related programs (Auslander et al., 2000; Pappas et al., 2015).

Finally, providers reported lack of access to technology as a factor impacting care and orthopedic trauma outcomes (Chun et al., 2021; Free et al., 2013). This observation was more prominent at one of our sites that served higher rates of rural populations, where some patients reportedly lacked access to phones or computers at home. Access to technology is vital to patients maintaining care and follow up particularly when patients have transportation difficulties (e.g., living in rural areas). Increased support of government and non-profit efforts to improve access to technology could help address this barrier (Chun et al., 2021). Social workers may serve as impartial advocates, working with surgeons to represent patients in policy discussions aimed at increasing access to technology (Cochran, Montgomery, & Bell, 2012). Moreover, social workers may provide brief in-person interventions to many patients who do not have access to technology-based mental health services (Cochran & Field, 2013).

Relationship level

At the relationship level, providers identified lack of social support as a major factor affecting outcomes (Haider et al., 2020). Social support is directly and indirectly related to the outcome of orthopedic trauma across several studies (Orlas et al., 2021). Support from close family and friends is instrumental at the earlier stages of recovery when functional limitations are at their peak. Social support also plays an important role in facilitating emotional wellbeing, which is vital throughout the recovery process. Similar to previous

research, our study delineates a relationship between lack of social support and poor recovery after orthopedic trauma. To reduce this barrier to recovery, care centers may offer in-person or virtual patient support groups, or other forms of peer advocacy programs that connect patients with similar injury related issues (Truong et al., 2020).

Social workers may play an essential role in boosting personal and societal structures that develop a sense of control, commitment, and resilience throughout recovery from a traumatic injury by collaborating with patients and their families (Gironde et al., 2006). Social workers may assist people in reaching their full potential despite personal and environmental challenges by investigating the elements that contribute to resilience and social support.

Community level

Providers repeatedly identified lack of transportation as a predictor of poor care and outcomes. Issues associated with lack of reliable transportation range from difficulty accessing comprehensive initial care at a Level I trauma centers to difficulties attending in-person follow-up visits which are vital for optimal recovery (Archer et al., 2010; Guan, 2017). A vast literature is focused on the impact of transportation difficulties on orthopedic trauma outcome. Our providers' repeated mention of this impact further highlights the importance of addressing transportation-related barriers among orthopedic trauma patients. Strategies to address transportation barriers include increasing resources at Level 2 trauma by hiring orthopedic traumatologists, building more regional Level 1 trauma centers, placing medical helicopters in more strategic locations, and using remote treatment delivery strategies (e.g., live-video, web-based) (Dave et al., 2020). Aside from advocating for patients, social workers should assist and be prepared for virtual platforms and remote interventions that minimize transportation needs (Weng, 2022).

Providers also reported early return to work due to employment insecurity as another factor that can adversely affect recovery trajectory (Zhou, Olivier, & McDaniel, 2009). This factor is more impactful for those with lower socioeconomic status, particularly when the patient is the primary breadwinner (Savitsky et al., 2020). Workplace policies that do not accommodate the functional limitations involved in the transitional recovery period may exacerbate this issue. Provision of vocational rehabilitation services throughout the recovery period may reduce the negative impact of early return to work (Centers for Disease Control and Prevention, 2018). Social workers' awareness of vocational rehabilitation resources can help connect patients to needed support (Vaingankar et al., 2021).

Societal level

As expected, the most reported factor impeding recovery was lack of access to resources (safe/clean housing, insurance, and mental health resources) (Orlas et al., 2021). Lack of access to resources is a major cause of poor outcomes across medical conditions including orthopedic trauma. For example, homelessness is associated with higher length of hospital stays and complications after orthopedic trauma (Schaffer et al., 2020). Insurance status is also a strong predictor of one's ability to access timely and high-quality care, as well as the recovery outcome of orthopedic trauma patients (Chaudhary et al., 2018; Nahm et al., 2012;

Salazar et al., 2017; Zhang et al., 2021). At times, uninsured patients end up not receiving care and are transferred to less equipped centers. Even patients with public insurance (Medicaid) could suffer low reimbursement rates and administrative burdens. Strategies to address homelessness include investing in programs that assist with access to safe housing following hospital discharge (Sabesan, et al., 2017). Strategies to address lack of access to proper insurance include increasing reimbursement rates for public insurance, involving primary care providers and physician assistants to deliver orthopedic care, conducting group appointment visits, and encouraging medical providers to familiarize themselves with less expensive services and authorization procedures for public insurance plans (Centers for Disease Control and Prevention, 2018; Sabesan et al., 2017; Schaffer et al., 2020; Zhang et al., 2021).

Social workers can help homeless patients obtain the help and care they need to transition from hospitalization to community life, minimizing re-admissions and emergency department visits (Schaffer et al., 2020). Social workers can also help address insurance-related barriers, such as misinformation about public insurance and program eligibility, ambiguity about enrollment procedures, and discrimination, to help minimize insurance coverage discrepancies (Wilson et al., 2014).

Lack of access to mental health resources is a complex issue, and solving this problem requires special attention (National Association of Social Workers, 2021; Sabri et al., 2021; Dennelly, 2019; Hodge et al., 2009; Opara et al., 2021). The first step in this process is to establish embedded mental health clinics within the Level 1 trauma centers (Burgess, Hoyt-Hudson, & Smith-Osborne, 2021). However, establishing such facilities alone is not enough. Given the pervasiveness of the biomedical model of care in orthopedic settings, many medical providers are not equipped with the skills needed to discuss mental health issues and make appropriate referrals (Vranceanu et al., 2017). Educating medical providers about psychological factors involved in orthopedic trauma and related referrals can help address this shortcoming (Vranceanu et al., 2021). Use of data-driven and concise educational/training resources (scripts, web-based platforms with embedded videos), focused on process of and scientific evidence of psychosocial care integrations could increase the efficacy of such programs (Vranceanu et al., 2021). Alternatively, self-management mental health programs (e.g., web-based mind-body interventions) with a focus on improving patient's self-efficacy and healing trajectory may serve as another good option for in-house mental health resources (Archer et al., 2010). Social workers can assist patients in identifying their external psychosocial resources via a comprehensive discharge plan or review them during follow-up visits (Girona et al., 2006).

Finally, providers reported cultural factors, such as machismo and the stigmatization of seeking mental health support, as determinants of orthopedic healthcare disparities. The rates of these observations were higher in one of the sites with patients from rural areas. Other studies have shown the impact of patients' attitudes (e.g., problems will solve on their own) or mistrust toward healthcare systems on quality of care and outcome of orthopedic patients. Strategies to address cultural factors impacting producing health disparities include educational programs for patients, cultural sensitivity training for providers, and tailoring healthcare plans to the special needs and goals of the patients (Kim et al., 2018; Changoor

et al., 2019). Social workers may act as cultural brokers, assisting patients and families in overcoming stigma, developing trust, and learning to navigate complicated healthcare systems (Wilson et al., 2014).

Of note, no provider mentioned race/ethnicity as a factor related to orthopedic healthcare disparities. Several studies have emphasized the unique negative impact of minority racial status on care and outcomes of orthopedic patients (interaction factor-patient and provider), which has been shown to include longer wait times, delay in surgery, and worse postoperative adverse events (Chaudhary et al., 2018). Our study participants underreporting of ethno-racial factors could be a reflection of orthopedic providers' lack of awareness of racial factors in healthcare disparities, or low rates of ethno-racial minority participants (see the limitations section). It is also possible that the format of the focus groups prevented participants from directly discussing race-related disparities. Methods to address race-related disparities in orthopedic trauma healthcare include provision of education for patients and providers, use of a patient-focused care model, and workforce diversification (Pandya et al., 2018). Concerning workforce diversity, we observed that the site where social workers were a part of the orthopedic trauma care team (site 1) exhibited the highest level of insight into the psychosocial factors involved in care and recovery, including healthcare disparities. This finding underscores the importance of comprehensive, integrated orthopedic trauma models in optimizing care. Finally, providers did not mention medical comorbidities (possibility due to the psychosocial nature of the study) and gender (maybe due to low representation of females in the sample) as factors involved in disparities in orthopedic trauma healthcare (Ricci et al., 2015). Future work should examine the perception of medical providers on these factors in other research contexts.

Limitations

The current study has several limitations. First, there was a lack of racial and gender diversity of participants involved in the study which limits the transferability of our findings. Only about one-third of participants identified as an ethno-racial minority, or female. Second, we did not aim to capture differences in views across participants from different sites or in different roles. Thus, the ideas described only apply generally to diverse orthopedic providers. Third, only one of the surgeons in all 3 sites was female. Future work should aim to examine these findings in a more diverse sample. Finally, given that participants did not mention sensitive subjects such as race related disparities, future studies should include anonymous, post-interview debriefing questionnaires to reduce the risk of not capturing such information.

Conclusions

Through our focus groups with orthopedic care providers at a Level 1 trauma center, we identified healthcare disparity factors that are determinants of orthopedic trauma care and recovery. Providers described a range of factors mainly related to socioeconomic status and environment which could impact the care and outcome of patients with orthopedic trauma. These results suggest that orthopedic providers recognize how orthopedic trauma healthcare disparities affect optimal patient outcomes, and thus may be open to interdisciplinary approaches addressing these factors. In addition, the study's exploration of providers'

perspectives on trauma care disparities and its practical recommendations can serve as a valuable resource for social workers striving to promote equity in this field. Future work should focus on implementing an integrated interdisciplinary system for combining research, performance improvement, and education efforts to address orthopedic trauma healthcare disparities related to patients' social determinants of health, leveraging the expertise of social workers.

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Data availability statement:

The data that support the findings of this study are available on request from the corresponding author, *Ana-Maria Vranceanu, PhD*. The data are not publicly available due to their containing information that could compromise the privacy of research participants.

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Table 1.

Factors Included in Health Disparities Codes and across Different Levels of Socio-Ecological Model (Individuals, Relationship, Community, Societal).

Factors (Sub-Factor, If Applicable)	Representative Quotation
Individual Level	
Education (Comprehension)	"...education level of the patient...when we're talking to patients, we need to bring it down to normal levels, to—I think the standard is that you should explain things on, like, a 3rd-5th grade level" -Support Staff
Education (Health-Literacy)	"—we can often get caught up in our medical talk, and it sounds like a fancy name, and the patient is like, 'I have no idea what you just told me, but sure, that's my diagnosis.' -Support Staff
Language Barriers	"I think that sometimes it's hard, through a translator, to discuss complex conditions for someone who is not Spanish-speaking or other language...people with other languages come through, and, so, I think that that can be a barrier." -Physical Therapist and Social Worker
Psychological Health (Emotional Distress)	"...trauma happens to a very specific subset of people who have prior existing psychosocial problems, and those psychosocial problems...are things that predict whether they are probably going to have trauma and it certainly predicts how they will do after they receive their surgery, too." -Resident
Psychological Health (Alcohol and Drug Use)	"...(drugs are their) coping mechanism... they already have chronic pain at baseline and...then by the time...something terrible, like an accident, or...some sort of injury happens, they have no tools at all to be able to cope with any kind of bump in the road because they already just—life's daily things—they can't deal with and they have to reach for drugs and stuff." -Nurse
Psychological Health (Learned Helplessness)	"That first point about the people who are, kind of, recurrent trauma teams, if you will—I think, a lot of the times, you end up realizing that they view this as just, like, chronic setbacks in an overall decline in their overall health, and it can be very demoralizing" - Resident
Physical Health (Obesity)	"I mean, other health issues. You know, things like obesity... Those kinds of things can definitely slow down healing." -Resident
Physical Health (Smoking)	"Smoking is one of the biggest things in orthopedics, okay, complicates every organ system in the body, orthopedics being one of the biggest ones." -Support Staff
Access to Technology	"some of our patients don't have or can't afford computers and they don't have, or they can't afford Internet access, or don't even have service..." -Surgeon
Relationship Level	
Social Support Network	"...it's mostly just people that don't have social support at home, whether that's like a homeless person, or widow..." -Medical Assistant
Community Level	
Transportation	"I think if there's any sort of increase in their clinic visits, you may need to help arrange transportation. You know, I think a lot of times, that can be a real, you know, these patients come from, sometimes, two and half, three hours away" -Surgeon
Employment Security	"You know, if you're a poor person who needs to get back to the construction yard...nobody is really looking out for you to see whether or not your pilon is fully healed, or whether you can really be putting weight on it, or whether you have adequate range of motion, or anything like that..." -Resident

Factors (Sub-Factor, If Applicable)	Representative Quotation
Societal Level	
Access (Safe and Clean Housing)	<p>“... the other kind of population that came up for me was...the homeless population. Sometimes...there are just not resources or the resources that are out there have, you know, really long wait lists.”</p> <p style="text-align: right;">-Nurse Practitioner</p>
Access (Insurance)	<p>“I work in a clinic and the majority of them are homeless or uninsured patients who don’t really have all the resources and medications to kind of help them out.”</p> <p style="text-align: right;">-Medical Assistant</p>
Access (Mental Health Resources)	<p>“...You know, I think we have this view—it’s like, ‘Well, we’re orthopedics, we’re just treating that fracture, or that injury,’ and if the patient does have psych needs, it’s, you know, often kind of a culture as ‘Well, that’s for the PCP to, sort of, deal with, or that’s for the psychologist, or the psychiatrist,’ and that’s not because we don’t want to, or, we don’t want recognize that the need is there, but I think we need more resources, too, as a specialty practice. It’s incredibly challenging for us to refer patients to psych, that’s a really big issue here. ...it is, like, this incredibly complex system to navigate getting them an appointment, getting them set up at—with a psych appointment...that we just need more resources in place.”</p> <p style="text-align: right;">-Support Staff</p>
Culture	<p>“There might be some varied perceptions... to seeking psychological (help)... (In rural [redacted] there is a) stigma attached to reaching out for mental health. So, you know, that could be a potential barrier too.”</p> <p style="text-align: right;">-Surgeon</p>

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