Creating Equitable Access to Orthopedic Devices & Treatment for Low-Income Populations

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

Musculoskeletal disorders such as osteoarthritis, back pain, and chronic ankle instability are among some of the most common medical issues affecting people worldwide. Conditions such as these can lead to physical debilitation and work loss, and typically worsen if not adequately treated or addressed. A study conducted by the National Health Interview Survey estimated that nearly 50% of U.S. adults had a musculoskeletal condition from 2013-2015 (National Academies of Sciences, Engineering, and Medicine, 2020). People often seek treatment for musculoskeletal conditions at orthopedic centers or clinics, which serve to provide specialized recommendations and care. Orthopedic treatments can range from non-invasive therapies such as physiotherapy, to surgical interventions, to assistive devices such as prosthetics or bracing. However, access to these treatments can be limited for individuals in low-income communities due to a variety of factors. This paper seeks to investigate the ways in which low-income communities are restricted adequate access to orthopedic treatment.

According to an observational health care quality survey, approximately 29.8% of low-income individuals with musculoskeletal conditions either delay or forego seeking treatment options (Weinick et al., 2005). This eclipses the 16.9% of *all* Americans who report at least one financial barrier – which also includes the low-income group. Access to orthopedic treatment is crucial for individuals because untreated conditions may hinder one's ability to perform routine tasks or stay physically active. Untreated conditions can lead to chronic pain, decreased mobility, and overall reduced quality of life. However, socioeconomic factors such as poverty, lack of health insurance, and limited access to healthcare facilities can limit accessibility to necessary treatment. Additionally, social determinants of health such as education, employment, and housing can also impact access to orthopedic treatment. These factors can contribute to disparities in orthopedic treatment outcomes, as individuals in low-income communities may not receive timely or appropriate care.

My research will examine the various barriers to accessing orthopedic treatment in low-income communities, including financial constraints and limited healthcare infrastructure in certain regions. Additionally, the impact of systemic factors such as healthcare policy, insurance coverage, and implicit bias within clinics will be explored and used to examine orthopedic outcomes. I will first perform a literature review to further identify the most relevant issues pertaining to restricted accessibility to orthopedic care. Then, an analysis will be conducted by synthesizing a number of sources which provide both quantitative and qualitative evidence to support the notion that orthopedic care accessibility is restricted within low-income communities. My research will also take into account correlations between socioeconomic status and race, presenting another argument related to structural racism and discrimination in healthcare more broadly. Findings will serve to inform future policy recommendations and interventions aimed at improving access to orthopedic treatment in similar communities.

Overall, my research aims to shed light on the limiting factors that low-income communities experience when seeking orthopedic treatment. An in-depth analysis of systemic barriers in healthcare, including historical policy shifts that favor affluent groups, disparities within health insurance, and social factors such as implicit bias, will serve to illuminate the lack of accessibility that low-income populations have to orthopedic treatment. By further understanding these barriers, society as a whole can work towards creating more equitable healthcare systems that prioritize the needs of all individuals, regardless of socioeconomic status.

Literature Review

There is a clear correlation between low-income demographics and susceptibility to degenerative musculoskeletal disorders. The impact of this correlation on individual well-being has been assessed using a number of different metrics, including Health-Related Quality of Life (EQ-5D) and Quality-Adjusted Life Years (QALY). One study found that white-collar workers with arthritis lose only 4 QALYs, while blue-collar workers with arthritis lose nearly 6 (Caban-Martinez et al., 2011). This suggests that individuals in lower socioeconomic classes with more physically demanding jobs are more susceptible to musculoskeletal disorders and may experience greater hardships as a result. Additionally, a study of 255 orthopedic trauma patients found that over half experienced an outcome other than "return to work" when subjected to treatment and recovery (O'Hara et al., 2020). This highlights the negative impact that musculoskeletal disorders can have on employment and financial stability, particularly for those in lower socioeconomic classes. Finally, according to a meta-analysis on ethnic differences in health, clinical pain severity and disability in osteoarthritis (OA) was found to be higher among African Americans (Vaughn et al., 2018). Coupled with the fact that minority demographics such as African Americans and Hispanics are often underserved and underrepresented in healthcare, this shows that there is a substantive need to more adequately address OA and other orthopedic conditions in a more equitable manner. Overall, these studies underscore the need for improved access to healthcare and greater attention to socioeconomic factors in musculoskeletal disorder research and treatment.

Another important factor related to accessibility is cost. The high cost of orthopedic treatment, particularly for osteoarthritis patients, is a well-known and documented issue in the medical field. This issue limits the ability of financially unstable individuals to seek proper care. Osteoarthritis is the most common form of joint disease and is associated with an extremely high economic burden, which is primarily due to the chronic nature of the condition and needing ongoing treatment and therapy. In particular, although surgical options are only explored by 5% of OA patients, they make up over 50% of total costs (Bitton, 2009). This illustrates the exclusive nature of certain treatments, like surgery, that are typically more effective. Further, the cost of osteoarthritis is so high that according to a 2013 study, arthritis-attributable medical costs were $140 billion nationwide, which is equivalent to an extra $2,117 in medical costs per adult with arthritis (Centers for Disease Control and Prevention, 2020). This financial burden can have a severe impact on individuals who may not be able to afford the cost of necessary treatment, leading to delayed care or lack of treatment altogether. In addition, funding in healthcare is not allocated in an equitable manner, and this results in the perpetuation of treatment disparities, particularly in the orthopedic space. One study shows that low-income neighborhood residence is strongly associated with less reliance on physician offices (nearly a 5% decrease in seeking professional diagnoses for musculoskeletal conditions). On top of this, the clinics that are properly accessible for these low-income populations typically have a greater density of foreign-trained physicians and less of the top-quality MDs from elite universities (Hussein et al., 2016). These findings prove that systemic change is necessary, since both price of care and allocation of funds are crucial determinants of orthopedic outcomes.

Lastly, insurance plays a large role in granting access to necessary orthopedic care. In the US specifically this remains a challenge, particularly for those who live in low-income communities. As previously mentioned, high costs of treatment often deter uninsured individuals from seeking medical attention, with 69.6% of uninsured non-elderly adults citing unaffordability as the primary reason for being uninsured (Tolbert et al., 2022). However, it is important to consider disparities in insurance coverage leading to significant disparities, as

Medicaid holders regularly struggle to get referrals for orthopedic appointments. A 2018 study found that only 55% of Medicaid holders were able to get an orthopedic appointment with a referral, while the remaining 45% were denied treatment entirely (Segal et al., 2018). The lack of access to healthcare for low-income individuals is also evidenced by the fact that a quarter of the population classified as low-income experienced difficulties paying their medical bills in 2016, according to a CDC study (Cunningham, 2018). This population lacked a usual source of care as well as coverage from insurance that most others have the comfort and privilege of having. These disparities in access to care lead to significantly negative health outcomes in lower-income communities, perpetuating the cycle of poverty and poor health. To combat these disparities, the healthcare infrastructure must be transformed to broaden its social reach. Policy changes should focus on providing affordable insurance coverage to low-income communities and expanding the availability of orthopedic treatment.

The Social Construction of Technology (SCOT) framework, which explores how technology and society shape each other, ties into the discussion of orthopedic access for low-income individuals (Pinch & Bijker, 1984). In the case of the American healthcare system, SCOT can be applied to understand how the system perpetuates inequalities. This system is not a neutral entity; it is shaped by social, cultural, and economic factors, such as bias and classism. The adoption of systems related to insurance and billing, along with the development of healthcare infrastructure, are not solely based on scientific advancement. Rather, they are influenced by various interests and power structures. These interests and power structures are often driven by economic gains rather than the public good. This creates a system where healthcare, particularly orthopedic treatment, is often unaffordable or inaccessible to marginalized communities, perpetuating disparities in health outcomes. The SCOT framework highlights how the healthcare system is not just a product of technology, but also a result of numerous sociopolitical factors that have influenced its development. Applying SCOT to the American healthcare system highlights the fact that although it was not designed to be exclusive, it has been shaped to favor those with the ability to pay out of pocket.

Methods

To demonstrate the lack of access to orthopedic care in low-income groups, I analyze trends that both directly and indirectly relate to patient outcomes. This section details the methods that will be used and what kind of data will be gathered in order to achieve this. First, I look at historical trends in healthcare, primarily gathering information on relevant policy changes and how these changes impacted lower socioeconomic status groups. Notable policy shifts from both the 20th and 21st century will be juxtaposed and used as evidence regarding the lack of consideration given to low-income groups. Secondary sources, such as academic journals, government reports, and news articles, will provide this information. In doing this, I am able to identify patterns in healthcare policy that have either perpetuated or alleviated disparities in access to care for low-income individuals. By examining policy changes over time, it is possible to identify which policies have been successful in promoting health equity and which policies have had unintended consequences that worsen health disparities.

Second, I synthesize insurance data from multiple studies to prove that low-income groups are inherently disadvantaged when it comes to receiving adequate and timely orthopedic care. This analysis serves to identify the specific barriers that low-income individuals face in accessing orthopedic care, such as lack of insurance coverage, limited access to orthopedic specialists, and longer wait times for appointments. By synthesizing data from multiple studies, it is possible to gain a more comprehensive understanding of the scope and magnitude of these disparities. This method will also help identify potential solutions, such as expanding insurance coverage and increasing the number of orthopedic specialists in underserved areas.

The last method involves assessing data on implicit biases in healthcare to demonstrate how the system has impacted people's attitudes towards treatment disparities. Implicit biases are defined by the National Institutes of Health as "attitudes and stereotypes that people hold unconsciously and can affect their behavior towards others" (National Institutes of Health, 2022). This method will help identify how implicit biases among healthcare providers can contribute to disparities in access to care for low-income individuals. By identifying and addressing implicit biases in healthcare, it is possible to improve the quality of care for all patients, regardless of their socioeconomic status. This method involves reviewing previously conducted research on implicit biases in healthcare, such as surveys and interviews with healthcare providers. Ultimately, this section intends to illustrate that social factors contribute to the current lack of access within low-income communities. I also provide a rebuttal to the claim that implicit bias is not a relevant or measurable factor when it comes to orthopedic treatment outcomes.

Analysis

The United States' healthcare policy has long favored individuals who are financially stable, resulting in disparities in access to care and health outcomes. The repeal of the individual mandate under the Affordable Care Act (ACA) is one example of such policies that have negatively impacted low-income individuals. The mandate required individuals to have health insurance or pay a penalty, but its repeal disproportionately affected low-income individuals who could not afford insurance without it (American University, 2022). This repeal led to a higher likelihood of becoming uninsured, thereby reducing accessibility to orthopedic treatment, as seen in Figure 1 (Soni, 2022). This pattern of healthcare policy that favors affluent communities reinforces existing social and economic inequalities and perpetuates disparities in orthopedic outcomes based on income and race. When individuals lack access to adequate healthcare, they are at greater risk for chronic diseases, higher mortality rates, and reduced quality of life. These disparities have far-reaching effects on individuals, families, and communities and perpetuate a cycle of poverty and inequality. Therefore, it is crucial that healthcare policy prioritizes equity and addresses systemic barriers that prevent marginalized populations from accessing necessary healthcare services. All individuals should have the right to access affordable, high-quality healthcare regardless of their financial status or race. By implementing policies that prioritize equity, the healthcare system can become more inclusive, just, and ultimately lead to better health outcomes for all individuals, irrespective of their socioeconomic status.

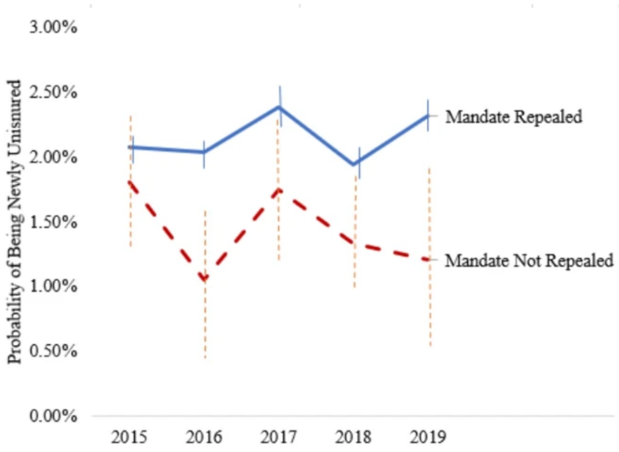


Figure 1: Probability of Becoming Uninsured Before & After Mandate Repeal

Going back further in American history, the Social Security Act of 1935 had a significant impact on the accessibility of healthcare for low-income individuals. According to the Social

Security Administration, this act excluded healthcare coverage for about half the workers in the American economy, including agricultural and domestic workers, who made up a significant portion of the African American population at that time. This has led scholars to conclude that policymakers in 1935 “deliberately excluded African Americans from the Social Security system due to prevailing racial biases during that period” (DeWitt, 2010). The exclusion of healthcare coverage from the SSA was not an isolated incident. It occurred at a time when racial discrimination was rampant in various systems, including healthcare, housing, and education (Meisenhelter, 2018). The healthcare system, in particular, was built on a foundation that favored affluent white people and excluded minorities. This exclusion not only denied African Americans healthcare coverage but also reinforced existing racial disparities in healthcare access and outcomes. Although strides have been made to make healthcare more inclusive and accessible for all individuals, the legacy of racial discrimination and biases persists to this day. The social and structural factors that underpin healthcare disparities for low-income populations, particularly communities of color, are deeply ingrained and cannot be easily remedied by policy changes alone. Addressing the root causes of these disparities requires a concerted effort to dismantle systemic racism and other forms of discrimination that continue to affect healthcare access and outcomes for vulnerable populations.

Related to policy is the American health insurance system, which encompasses both private and public insurance plans. This system contributes to inequities in orthopedic care and treatment by limiting access to care for marginalized populations. This is supported by the fact that despite health insurance coverage directly correlates to positive health outcomes, especially in the orthopedic sector, nearly 28 million U.S. residents remain uninsured (American Hospital Association, 2023). As seen in Figures 2 and 3 (Tolbert et al, 2022), the majority of uninsured adults cite cost limitations as a reason for not having coverage, and out of this group there is an overwhelming proportion of minority populations. The profit-driven nature of the insurance system means that insurance companies prioritize their own financial interests over the needs of patients, which can result in restricted coverage and reduced access to care for low-income individuals and people of color. Furthermore, private insurance companies often create incentives for providers to prioritize more profitable procedures and treatments, which leads to an unequal and unjust distribution of care. This reinforces existing social and economic inequalities in healthcare, perpetuating a cycle of poverty and inequality. All individuals deserve access to high-quality orthopedic care and treatment, regardless of their insurance status or financial means. By recognizing the limitations and inequities of the current system, we can strive for more equitable healthcare outcomes that prioritize the needs of patients over the profits of insurance companies.

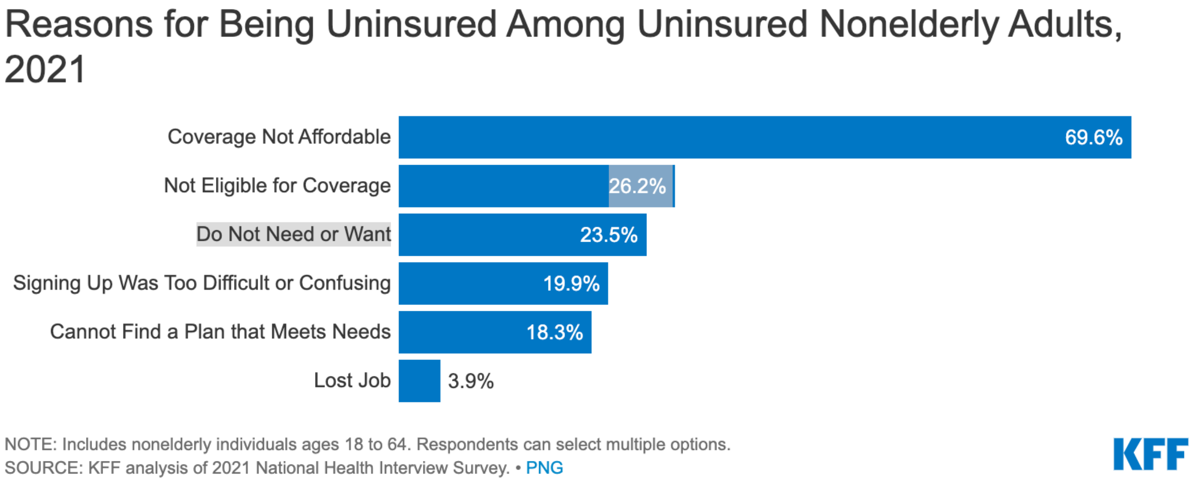
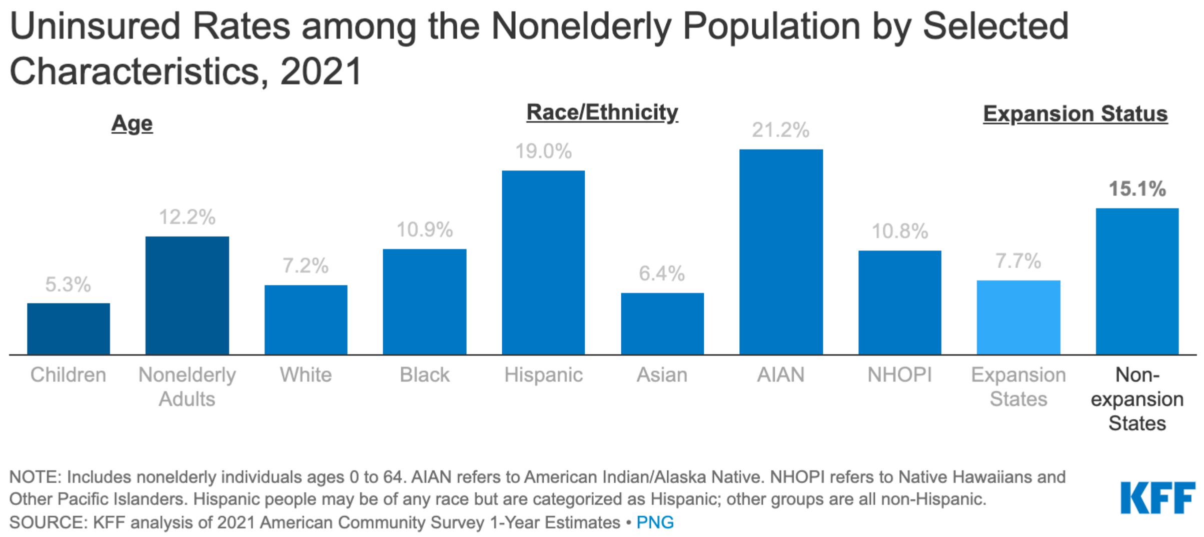


Figure 2: A survey showing why uninsured people do not have coverage


Uninsured Rates among the Nonelderly Population by Selected Characteristics, 2021

NOTE: Includes nonelderly individuals ages 0 to 64. AIAN refers to American Indian/Alaska Native. NHOPI refers to Native Hawaiians and Other Pacific Islanders. Hispanic people may be of any race but are categorized as Hispanic; other groups are all non-Hispanic.
SOURCE: KFF analysis of 2021 American Community Survey 1-Year Estimates • PNG

Figure 3: Correlation between uninsured rates and age, race, and expansion status

Limitations in access are also a product of social factors, such as implicit bias, in addition to systemic financial barriers. Implicit bias among healthcare providers can have a significant impact on the quality of orthopedic care and treatment that marginalized populations receive. This is evidenced through a survey of pediatric orthopedic surgeons, which produced two main findings. First, the survey found that 87% of surgeons had an implicit bias of any strength toward either race, which can affect their perceptions and decisions about patient care. More strikingly, it found a specific pro-white bias in a statistically significant number of surgeons (Guzek et al., 2022). Assumptions about patients' socio-economic status, race, or ethnicity can lead to differential treatment and outcomes, ultimately affecting the quality of care received. The need to address partiality in healthcare providers is clear: implicit biases can lead to inequitable treatment and outcomes. By recognizing and addressing implicit biases in healthcare, a more equitable system can be achieved that provides adequate care for all individuals. In order to do this, there must be a shift in the mindset and training of healthcare providers to prioritize equitable care for all patients, regardless of their race or other factors.

Despite the belief held by some that healthcare providers are trained to provide unbiased care, research indicates that implicit biases are still prevalent in healthcare. Implicit biases may occur even despite active training and awareness of social factors within clinics or orthopedic centers. While implicit bias training has been implemented in many healthcare settings, studies have shown that this training alone may not be sufficient to overcome implicit biases (Gopal et al., 2021). In addition, the argument that implicit bias is not directly measurable and thus not worth addressing is shortsighted and does not account for recent developments in scientific research. The implicit association test (IAT) is a common and standardized method for measuring implicit biases in the workplace, and using this test allows for researchers to adequately gauge the presence of bias, which is the first step toward counteracting it (Gopal et al., 2021). Nonetheless, more comprehensive strategies, such as diversifying the healthcare workforce and implementing institutional policies to address bias, are necessary to combat the effects of implicit bias in healthcare.

The concept of SCOT is relevant to understanding how implicit biases manifest in the healthcare system. The technologies and tools used by healthcare providers, such as electronic medical records and diagnostic tools, are designed to be “neutral” but are constructed within social contexts that can perpetuate biases and inequalities. For example, algorithms used to predict patient outcomes may be biased against certain groups. The social context in which these technologies are developed and used must be taken into account to understand how implicit biases are perpetuated and how they can be addressed. Furthermore, SCOT emphasizes that technologies are not simply designed and implemented without being shaped by relevant social groups. In the case of orthopedic care, this means that healthcare providers, policymakers, and insurance companies all have a role in shaping the technologies used in healthcare and the ways in which care is delivered. Addressing implicit biases in healthcare requires a collaborative effort among these actors to identify and dismantle the social structures that perpetuate bias. Thus, acknowledging the role of social construction in healthcare technology and the ways in which implicit biases can be perpetuated is essential to addressing disparities.

Conclusion

Through an in-depth literature review, mixed-methods research, and sociotechnical analysis of limitations in healthcare, I have demonstrated that orthopedic care is severely limited in low-income populations. This represents some of the groups that are in the most dire need of orthopedic treatment due to higher risk factors for musculoskeletal disorders. My comprehensive research process allowed me to discover that a lack of access to orthopedic care is not solely a result of financial instability, but is also the product of classist and racist attitudes ingrained in the healthcare system. By shedding light on this issue, while highlighting the impact of historical policy shifts, health insurance disparities, and implicit bias on low-income accessibility, I ultimately aim to provide a groundwork for future actions that may be taken to combat inequalities. These barriers have created significant challenges for low-income communities in accessing orthopedic treatment, resulting in long-term negative health outcomes which no person should be subjected to regardless of race, creed, sexuality, or socioeconomic status.

My research seeks to ignite an initiative among policymakers, healthcare providers, and insurance companies alike to prioritize marginalized communities' healthcare access and improve the methods and practices for orthopedic care. Elected officials should find a common ground on healthcare policies because it is a human right. Physicians and other healthcare providers should work beyond the scope of implicit bias training, immersing themselves and peers in community outreach and encouraging clinics to allocate funding to areas that need it most. Insurance companies should refine their model to limit profit-driven consequences for those who cannot afford it. Through the existing social data, my outlook for future change is optimistic. My research findings will contribute to bridging the gap in access to orthopedic care and ensure that all individuals, regardless of their socio-economic status, have equal opportunities to lead healthy lives.

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