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Surgical Interventions in Public Health: Enhancing Surgical Care in Underserved Communities

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Abstract: Surgical interventions in underserved populations using a public health lens have not been explored to the extent of research conducted in surgery worldwide. Therefore, the purpose of this essay is to investigate this potential rationale for underserved communities. This paper features a discussion of the background of surgical care in public health along with the issues causing disparities in underserved communities. Following this discussion, the article covers the use of innovative strategies to improve the quality and access of surgical care in the underserved populations. In total, the essay aims to serve as an informative piece for any policymaker or health professional and discuss the ability of surgical care to address varying public health concerns within the remainder of the paper. Through and through, surgery plays an integral role in public health. However, individuals living in underserved regions are disproportionately affected by this lack of care—referred to as the surgical care gap. A few populations in the United States that are known to have inadequate access to care will be used as examples henceforth in this paper, though large numbers of individuals are left behind globally as a result of a myriad of other variables. These groups include individuals who are homeless, live in rural communities lacking surgical care, and those who may find it excessively difficult to travel to healthcare locations. It is necessary to address the disparities in both the availability of surgical care as well as its quality. In order to reduce these inequities, approaches can be employed to address the issues at large and improve individual and community health. (Jayaram et al.2021)

Keywords: *surgical interventions; public health; underserved communities*

1. Introduction

The fruitful crossing of surgery and public health is resulting in a new way of seeing and delivering surgery. As recent global health management manuals reaffirm that surgery is a part of public health, the urgency of uniting these two essential arms of human welfare – the surgery required by some and the access to surgical care desperately needed by all – grows more vital each day. As one recent report underscores, surgical care and ability are vital to economic growth and equity at the national and global levels. (Health Organization, 2021)

Furthermore, there is an urgent need for surgical operations in all parts of the world. The joy of fixing people and the life-changing impact of surgery in communities such as Bellary, India, are now well-documented. Nonetheless, access to surgical care has never been equal. In America, the armature of health care is broken in

rural regions such as Mendota, California, and Prestonburg, Kentucky, where there exists not only a critical shortage of general surgeons but also the local wealth and state resources required to adequately recruit and retain these skilled personnel. In Africa, where it is estimated that 2-4 billion people do not have access to the surgery they need, surgery is often considered a luxury. Given the weight of these backlogs of disease and the problematic access to essential surgeries and unacceptable risks, we must finally realize that the status quo is simply not safe. (Xepoleas et al.2020)

1.1. Background and Rationale

Surgical care, particularly in underserved populations, is impacted by historical perspectives on the role of surgery in public health, as well as negative contextual factors. Beginning with its development primarily as a tool for exploration, discovery, and therapy, early surgical endeavors were often focused on the individual patient. Surgery was designed to benefit only the patient receiving it, much like other forms of medical care. Early on in the development of medical care, this began to change somewhat. Public health has historically recognized the forced combination of many types of care, including the economic health, mental health, and physical health of a person within a population. All of these form critical components of classical conceptions of "health." By the definition of "health," it is no longer simply the absence of disease. Modern conceptions include spiritual, mental, and social well-being, highlighting the importance of work such as surgical care in any holistic approach to health. (Søreide et al.2020)

Even with this recognition, surgeons have historically been slow to formally integrate their work into public health frameworks. While the practice of surgery may serve a public health role, surgeons' own sense of identity as individual practitioners might logically drive them away from technical tools in unfamiliar clinical disciplines. A future definition of surgery, as public health, must therefore redefine the surgical practitioner as someone for whom community responsibility is as important as direct care to individual patients. This is reflected in a surgical identity in the surgical systems that emphasizes inclusivity, community health, and an engagement with the needs and priorities of marginalized and underserved communities. This vision, held by many surgeons who currently practice within these communities, recognizes that entire populations suffer from this collective risk, and that potential benefits to these communities from health surgical care are far-reaching. With a global estimated 5 billion people who lack access to safe surgical care and anesthesia, the population of those suffering from "unmet surgical need" includes approximately 156 million additional cases of unmet surgical need within the United States. A focus on surgical care in public health must address these negative health effects that the current barriers bring with them. At present, people with surgical conditions and no access to timely surgical care experience devastating impacts related to loss of life, life years, and sheer human potential. (Jumbam et al.2020)

2. The Intersection of Surgery and Public Health

The intersection of surgery and public health is underappreciated. Surgery is a means to treat and cure diseases, and while infectious diseases are what many in public health have historically worked to prevent and control, the delivery of surgical care currently presents significant public health interest. Surgery is also necessary for prevention; as with vaccines for HPV, smokers can continue to be at risk for lung cancer until they quit. Surgery is therefore the best access to cure at any stage of disease, including early onset. If adequately addressed utilizing a population health perspective, then surgeries for this group of smokers could be truly defined as "preventative surgeries." For many research papers, it is easy to use the word "prevention." But when it comes to providing a smoker with the most effective prevention for them, try getting that same coverage, like vaccines get, from an insurance company. These words have an important ring of truth. (Momenaei et al.2023)

The publication presented the first of three core functions of public health as being assessment: "…Regularly and systematically collecting, assembling, analyzing, and making available information on the public's health. This is the first essential element of public health practice. The assessment function compels public health to constantly do the analysis on the population and the problems that exist in their specific communities and to report those findings. Often, when public health experts perform these assessments in the area of surgical care, they present that which already exists in challenge. In our work for years with one region of Myanmar, a country

with many challenges in providing even basic health care but tragically so in surgery, the results of our extensive surveys seem to present the same challenging inequity in all of these intermediate barriers to accessing and affording surgery. In poverty due to disease, there is neither primary care nor surgery; the connective tissue components of the health care system need funding, human resource help, and policy expertise in equal measure.

2.1. Defining Surgical Interventions in Public Health

Surgical interventions in the context of public health are defined as largely interdisciplinary strategies that serve to advance health equity by specifically targeting surgical care and health care delivery in the underserved communities of low-resource settings using a socially responsible, innovative mindset. Surgical care involves the broader bundle of patient and population health outcomes resulting from the previous interventions in the time period before, during, and after surgical procedures, reflecting the complementary interdependence of humane medical therapy, psychosocial counseling, public health risk reduction, and technologies advanced by clinical, translational, and surgical research. Surgical output is a combination of direct material product created by surgical treatment and the product of other indirectly related health resources necessary for surgical care delivery, such as anesthesia and patient or referral nodes. Surgical interventions, therefore, act upon both the surgical and non-surgical components of the health system required to maintain overall system effectiveness.

Categorizing surgical network interventions and supply-side outputs relevant to underserved communities is essential for health care delivery. Elective surgeries are interventions performed to prevent immediate maternal death, urgent deterioration in health status, or moderate or severe morbidity defined within, at maximum, a 180-day window from the time of the necessary intervention's identification. Emergency surgical care involves rapid intervention or rescue treatments required to minimize death, avert long-term disability, or prevent further harm to unwell patients, and will be mainly expounded upon within Section 3. Preventive surgeries are performed to mitigate communicable and non-communicable disease risk of chronically debilitated, severely impoverished, and/or malnourished people to proactively reduce rather than treat surgical disease largely seen in the burden of living with great bodily difficulty, extended non-union spinal injuries, and chronic head and neck deformities. Policy trends in the fields of economics and public health, therefore, exhibit a transfer of resources away from acute and elective surgery into the promotion of preventive technologies, which is one of many areas of opportunity in surgical system innovation. In summary, to equitably address the surgical care challenge, a shared language and understanding of the multifaceted nature of surgical interventions are required to facilitate targeted intervention designs to the varied needs and determinants of underserved populations. Common misconceptions regarding the applicability of surgical care to various segments of the population are summed. (Petrigna and Musumeci2022)

3. Challenges in Providing Surgical Care to Underserved Communities

Obtaining timely and critical surgical care in various parts of the world, particularly in underserved communities, is a complex issue. While many factors may prevent timely surgery in underserved areas, contributing factors include one's geographic location and financial well-being, the inaccessibility and unavailability of surgical facilities, poor pathways and systems in place for surgical care, and a scarcity of trained surgical staff in these areas. These issues result in surgical disparities that affect a significant proportion of people worldwide. These issues challenge public health officials, decision-makers, surgical advocates, and others to work collectively to address this important aspect of healthcare delivery. Many people suffer emotionally and economically, and have developed a social bias due to a lack of timely access to surgical care. There is a lack of understanding of the dynamics of local healthcare systems, as well as a lack of access to and understanding of the pathways from medical or surgical assistant facilities to higher levels of care where surgical interventions are feasible. Collaboration challenges decision and policy makers, health practitioners, educators, the general community, and stakeholders in prioritizing and delivering effective meeting points for care and disseminating information to those impacted by the barriers to timely surgical consultation and treatment. Thus, successfully designing locally appropriate meeting points for surgical educational consultation requires understanding these issues. (Santhirapala et al.2020)(Mac Quene et al., 2022)

3.1. Barriers to Access

Geographical isolation and lack of transportation act as an insurmountable barrier to access for many in the world, as clinics are not within a manageable distance of the afflicted person's home. In rural areas that provide the most enrichment from surgical disease, patients may also have limited financial resources, acting as a second economic barrier to getting to the clinic. Even if someone overcomes basic geography and economic issues, they may find it difficult to travel to the clinic due to a lack of safe, reliable public transportation—jeopardizing their health in the process. Others may not be able to afford days off work and subsequently lose income. These compounding hidden costs of time, travel, transportation, and days absent from work represent barriers at the systemic level. Negligent preoperative care acts as yet another systemic challenge; fear of operative complications results in patients avoiding the dysfunctional healthcare system until they need emergency surgery, at which time their chances of survival are substantially decreased. Furthermore, pre-existing cultural beliefs about abscesses, surgery, and the surgical team may deter individuals from seeking surgical care and represent the final barrier to receiving surgical care.

These barriers to access are not evenly distributed; they disproportionately impact the most rural areas and vulnerable populations. Such disparities are partially a result of racial and ethnic bias within our healthcare system; enhanced investment in public health would provide targeted access through financial assistance for specific populations most affected by rural disequilibrium in surgical access, while equalizing access to care overall would drastically reduce chronic surgical disease in all similar areas. These systemic issues should inform our thinking and inspire relatively high intervention. Of equal importance, though, are the policy-induced systemic issues, without the intervention to which increased spending would yield only marginal returns. These issues include, but are not limited to, managed care models that must "right-size" a healthcare budget and consequently expect no revenue generation from investments in preoperative surgical disease management because they don't pay for inpatient surgical services. In reality, these programs are unable to "right-size" care delivery and are instead systematically biased by age, race, and geography. Further exacerbating this discrepancy is the treatment of fixed expenses such as geography. No benefit options additionally allow states that choose not to invest in surgical services in their state-sponsored healthcare to deny that investment without the consequence of not being able to offer their people access to proper healthcare.

4. Innovative Approaches to Improve Surgical Care

Other disciplines have traditionally made use of innovative approaches to address seemingly intractable problems, drive down costs, and improve quality. This section will outline some of the common strategies developed by various sectors, which demonstrate the kind of creative problem solving that will be necessary to institute the kind of change outlined in the preceding sections. These strategies seek to build long-term partnerships across multiple sectors, including a variety of health specialties, public health, education, and technology in order to improve surgical care in underserved communities. The objectives of strategies in this section may differ, ranging from increasing access to high-quality surgical care to seeking efficiency and improving quality while lowering costs. However, the common thread of creative and effective imaging supporting the delivery of care in these communities is continual across these approaches, each suggesting a parallel way to address the challenges faced by rural surgical patients and clinicians. (Saether et al.2021)

The innovative strategies outlined below encompass a wide spectrum of approaches that increase access to surgical care: community engagement to health care policy reform, capacity building at a local level, and health systems improvement from the top down. Case studies and examples will demonstrate that both small and large scale, high and low cost programs can have a significant impact on surgical outcomes. While these creative approaches help build surgical capacity and meet patient needs, hospital capacity must be improved in tandem to support these initiatives. Overall, the solutions outlined are incumbent on positive support from the community as well as public support from the public health sector in order to be successful. These are scalable solutions that can be adapted to a wide variety of urban and health settings, allowing for broad flexibility in addressing the needs of vulnerable rural patients. The recent success of these models in national systems of care indicates that real reform is possible in the United States, provided similar attention is given to expanding general surgical

capacity, improving specialized surgical care, and addressing surgical needs in underserved urban communities. (Deo et al., 2022)(Mollura et al.2020)

4.1. Telemedicine and Telehealth Solutions

Telemedicine and telehealth technologies aim to bridge the gap in healthcare delivery by granting remote access to healthcare services. In the case of underserved communities, they provide the best opportunity to improve access to surgical care. Virtual solutions come in a variety of forms, from apps and other online platforms that offer direct-to-consumer consultations with physicians to store-and-forward connections that make it possible to send vital diagnostic imagery and information to providers in remote locations. This interaction can support diagnostic accuracy at a local level and can enable virtual appointments with a specialist. In some cases, it can obviate the need for travel. The advantages of telemedicine and telehealth services often lead to a change in treatment plans. Virtual tools are more accurate and valid than telephone interview diagnoses, increasing accuracy in surgical decision-making. Notably, a significant percentage of telemedicine interactions reduce the need for in-person care.

However, large-scale implementation of telehealth solutions can be impeded by technical competency, adequate smartphone, tablet, or computer hardware, reliable internet connections, and training for patients in its use. The largest barriers for telehealth application at a hospital or health system were a concern about return on investment and technical, compliance, and security issues. Providers' concern about missing nonverbal cues vital to diagnosis, the lack of tactile examination, and the possibility of new legal liabilities may present further barriers, as will patients' concerns about the security of patient information. As advocates for evidence-based strategies, it is challenging to promote a large-scale transition to practice that currently lacks a substantial evidence base, however promising it might seem in some circles. Furthermore, moving forward with this altogether likely requires careful consideration of if and how telemedicine and telehealth can improve efficiency and provide benefits to patients and providers. One way might be for telemedicine to be integrated into care pathways, the better to package it as bundled activities and understand the true return on investment. Safety and efficacy concerns have been the largest barrier to telehealth initiatives in surgical services, but excellent case studies have demonstrated the effectiveness and safety.

5. Conclusion and Future Directions

In conclusion, surgical care is a critical component of public health that has been overlooked for generations. While offering myriad benefits, the underlying challenges of providing high-quality surgical care call for innovative interventions capable of circumventing obstacles in underserved communities. In this essay, we detail a number of undercapitalized efforts to expand the scope of surgical practice, discuss barriers to care, and offer an innovative response. From the proliferation of surgical simulators to dedicated educational programming in low- and middle-income countries, a number of innovative interventions exist that could bring the benefits of surgical care to a greater number of patients. (Truché et al.2020)(Filip et al.2022)

As of right now, few interventions have been comprehensively proven to enhance the delivery of surgical care in resource-scarce settings. As a result, surgery is often seen as an afterthought. Our call to action is best articulated in the words of a report: “Unless there is a paradigm shift in the way research in this field is conducted, and unless there is a global commitment to implement and evaluate these interventions, then the deficit will continue, and public health will continue to be ignored.” Developing policy that adequately supports initiatives that extend the reach of surgery and health in underserved populations is a necessary future step. These policies should account for the results contained in this essay. Providing surgical care to the world’s underserved requires more than just physicians. It requires investment in surgery from all sectors. Policymakers must have surgery on their agenda. Economists must have surgery on their agenda. Physicists must have surgery on their agenda. Focusing only on new surgical tools, theories, and technologies is comparable to designing a plane under the assumption that there are no people on the ground. Heading into the future requires a welcome dialogue discarding traditional scholarly practices and focusing on innovative solutions for health inequalities.

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