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The Impact of Rural Healthcare on Surgical Outcomes

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University of North Dakota

Title                      The Impact of Rural Healthcare on Surgical Outcomes  
Department              Nursing  
Degree                     Master of Science

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### Abstract

Improving access to health care in rural areas is of concern as these areas contain almost 20% of the US population. This paper explores ten published articles that report on results from research conducted on the effects of rural healthcare on patient outcomes, with the focus on surgery. The case in which this report is centered around is a 62-year old female who was seen in the clinic in need of preoperative clearance for her upcoming right total knee arthroplasty, of which was to be performed in a facility two hours away.

The literature review was conducted using both CINAHL and PubMed databases. There were 500 articles initially identified using the keyword rural and additional keywords patient outcomes, surgical outcomes, orthopedic surgical outcomes, postoperative care and access. English language, 5 years old or less, and peer reviewed were used as limitations. The limitations reduced articles to 64. However, 2 articles were used that are greater than 5 years old due to their relevancy to the topic. Upon further review, 10 were identified as relevant for this review. Keywords: rural, patient outcomes, surgical outcomes, orthopedic surgical outcomes, postoperative care, rural access.

The result of this review alludes to a negative association between those living in rural areas and surgical or health outcomes. Even though there are some suggested solutions to this issue, many obstacles remain. The main points found in this review include: the importance of assuring access to primary care providers (PCPs) for those living in rural communities; multiple problems hinder specialty care and coverage in rural areas such as call time and practices and the decline in the number of general surgeons; barriers are faced in the discussion of broadening surgical services in rural areas such as costs and trained staff; patient willingness to commute is

affected by multiple variables such as finances or work and family obligations; and technology could prove to be a vital solution to some of the issues discussed.

### Background

A 62-year old female was seen in the clinic in need of preoperative clearance for her upcoming right total knee arthroplasty. One of the patient's greatest challenges her upcoming surgery poses is the postoperative outcomes related to her rural living status. This patient is a two-hour commute from the surgeon.

Studies continue to confirm one of the nation's biggest hurdles when it comes to improving healthcare: treating people who live in rural America. Researchers have found one of the vital issues was that many patients were not getting proper follow-up care. One particular study found that people in isolated rural areas were 19% less likely to receive follow-up care compared with those from urban areas (Troth et al., 2015).

Rural residents experience many difficulties in accessing healthcare services. These disadvantages result in higher morbidity and mortality rates compared to those of their urban counterparts (Stanford Medicine, 2018). Even though rural communities contain about 20% of America's population, less than 10% of all physicians practice in these communities (Stanford Medicine, 2018). In rural areas, residents need to travel to greater distances to access different points of the healthcare delivery system. Often, due to geographic distance, extreme weather conditions, environmental and climatic barriers, lack of transportation, and challenging roads, rural residents may be limited to or prohibited from accessing the necessary healthcare services.

### Case Report

A 62-year-old Caucasian female presents to the clinic for pre-operative clearance. The patient is scheduled for a right total knee arthroplasty to be done by an orthopedic provider at an

urban hospital. The patient has failed previous treatments for her right knee arthritis including medications such as acetaminophen, nonsteroidal anti-inflammatory drugs, corticosteroid injections and physical therapy. The patient described the symptoms as worsening and starting to affect her activities of daily living. The patient resides in a rural community and stated that she will have support from her family, to include her spouse and children after surgery. The patient's spouse will provide transportation for her to follow-up with her surgeon which is a two-hour drive. She does report concerns with completing necessary follow-up due to the distance.

Upon interview, the patient stated she is feeling well. Denied any recent illness or fevers. Patient denied any personal or family history of anesthesia or bleeding issues. Patient smokes tobacco, reporting 1 pack daily for 40 years, as well as alcohol use of 1-2 glasses of wine each night. The patient is counseled to stop smoking 4 to 8 weeks before surgery and educated on the benefits of this. She denied any drug use. The patient has no known drug allergies. Immunizations are reviewed and all vaccines are up to date.

The patient's medical records were reviewed. The patient's past medical history is positive for hypertension, diabetes mellitus type II, hyperlipidemia and bilateral knee arthritis. She denies any surgical history. The patient takes the following medications: Lisinopril 10mg daily, Metformin 1000 mg twice daily, Simvastatin 20 mg daily, and Aspirin 81 mg daily.

On exam, the patient is alert, oriented and in no acute distress. Her head is atraumatic and normocephalic. Her pupils are equal, round, and reactive to light; sclera and conjunctiva are normal. Her ear canals are patent, TMs are clear and bony landmarks are noted. Her nares are clear with no rhinorrhea noted. Her posterior pharynx is unremarkable without tonsillar hypertrophy, exudate or erythema. Her neck is supple with no palpable lymph nodes. Heart rate is regular; no murmurs heard. Normal respiratory effort and lungs are clear to auscultation. Skin

is warm, dry and well perfused with no rash. Her abdomen is soft, non-tender, no organomegaly and normal bowel sounds. No edema noted to extremities. She moves well in exam room without difficulty, however ROM to right knee is diminished with pain reported by patient on exam. Mood and affect are normal.

Patient's vital signs are as follows: blood pressure 142/92, pulse 78, respirations 24 and temperature 98.6 degrees Fahrenheit. Patient's height is 5 feet 4 inches, weight 184 pounds and BMI 31.6 which classifies patient as obese. Preoperative laboratory studies included a complete blood count, complete metabolic panel, prothrombin time, partial thromboplastin time, electrocardiogram (ECG) and chest radiograph. Mild elevation was noted on blood glucose level, ECG showed normal sinus rhythm and chest radiograph was negative for any acute processes. Patient was cleared for surgery.

#### Literature Review

Most rural communities have restricted access to healthcare services and are too small and remote to sustain specialist services such as surgery (Atiyeh, Gunn, & Hayek, 2010). In addition, rural patients often do not want to travel long distances for healthcare such as routine checkups and screenings, specialist services or follow-up. Many rural residents dislike visiting urban hospitals for multiple reasons such as finances, fear, ignorance, distance, or unpleasant city experience (Atiyeh et al., 2010). The studies reviewed offer insight, address issues, and some offer suggestions to obstacles related to healthcare access and outcomes for patients living in rural areas.

An important step in assuring access to care for those living in rural communities is providing access to primary care providers (PCPs). PCPs offer benefits such as managing chronic conditions like hypertension and diabetes; providing preventative care such as cancer

screenings; and acute care for symptoms like cough, fever, or pain. Coordinating care for patients such as referrals to specialists is also crucial, especially in rural locations.

Access to primary care physicians (PCPs) is particularly important in areas with lower orthopedic surgeon availability according to Canizares, Davis & Badley (2014). One study discusses their findings related to this and found their discovery to be three-fold. Access to PCPs, geographic availability of orthopedic surgeons, and office visits with orthopedic surgeons will result in a positive association with orthopedic surgery rates (Canizares et al., 2014).

Even though access to PCPs is a great first step to assuring better health outcomes for those living in rural areas, there are still many obstacles found when discussing access to specialists. A study by Halverson & Johnson (2017) as well as a study by Sanchez, Barach, Johnson & Jacobs (2017) both provided insight regarding access to surgical care in resource-poor countries as well as the many locations in the US that lack access to surgical services. Rural surgeons face obstacles such as practicing alone, frequent call responsibilities, lack of highly skilled assistance for difficult cases, and lack of coverage for time away (Halverson & Johnson, 2017). According to Sanchez et al. (2017), a successful rural health care network relies on rural hospitals to provide readily accessible, high quality care. In addition, there must be established, formal relationships between small rural hospitals and regional hospitals to facilitate the transfer of patients when they require a higher level of care (Sanchez et al., 2017).

According to Nakayama & Hughes (2014), the issues that encumber rural communities in the United States fell into three broad areas that parallel the tectonic pressures on rural America and medical economics: the demographic and economic decline of rural communities; a change in surgery in America brought on by the workforce shortage in general surgery; and a shift in the structure of surgical practice from an independent practitioner – single hospital relationship to an



employed corporate model. The shortage of general surgeons in rural America continues to be of concern with regards to rural access to care and health outcomes, but has been proven to not be an obstacle specific to rural communities, as there is an overall shortage of general surgeons throughout the United States. Nakayama & Hughes (2014) stated that the number of general surgeons in practice in 2005 was actually 723 fewer than in 1981. The general surgeon to population ratio has declined during that period, to 5.7 per 100,000 from 7.7, respectively (Nakayama & Hughes, 2014). Shortages are, however, proven to be worse in rural regions, where the ratio in 2005 was 5.0 per 100,000 (Nakayama & Hughes, 2014).

The recurring theme throughout these studies seemed to be the multitude of obstacles and uncertainty of solutions. Atiyeh, Gunn & Hayek (2010) reiterate this by stating, the best means of bringing surgical care to rural residents is yet to be clearly determined. They found the common perception that surgical care is merely a luxury in rural areas and poor countries (Atiyeh et al., 2010). However, a startling statistic is presented in that, as estimated in 1990, 10% of all deaths and almost 20% of deaths in young adults are still likely due to an untreated surgical condition (Atiyeh et al., 2010).

Even though there are concerns with regards to the lack of surgical care in rural communities, some studies proved that there are lower-risk general surgeries occurring at rural facilities with no increased risk of negative outcomes. These surgeries are occurring, however, not without their own barriers and concerns in the discussion of broadening surgical services in rural areas, such as costs and trained staff. Gadzinski, Dimick, Ye & Miller (2013) did some research into the quality and cost of care provided at critical access hospitals (CAHs), the predominant source of care for many rural populations in the United States. A retrospective cohort study of patients undergoing inpatient surgery from 2005 through 2009 at CAHs or non-

CAHs was performed using data from the Nationwide Inpatient Sample and American Hospital Association (Gadzinski et al., 2013). It was found that inpatient surgical care in CAHs revolved mainly around lower-risk general surgical, gynecologic, and orthopedic procedures (Gadzinski et al., 2013). In-hospital mortality for these procedures was largely indistinguishable from that at non-CAHs (Gadzinski et al., 2013). There were higher costs associated with surgical care at CAHs, however (Gadzinski et al., 2013).

Since most surgeries are occurring in urban health facilities, it is important to consider the distances patients are willing to commute for healthcare, in the discussion of health and surgical outcomes in rural communities. According to a study completed by Kelly, Hulme, Farragher & Clarke (2016), communities where the population was sparsely located were found to be willing to travel a maximum of 22.2 minutes more to visit the primary care practice than those in closely settled communities. According to Fitzgerald, SooHoo, Losina & Katz (2012), if referrals continue to be made to specialists at high-volume hospitals than patients in rural areas would be forced to travel anywhere from 50-100 miles to reach these hospitals. Even though it is shown in this study that hospitals with higher surgical volumes are associated with lower complication rates following a variety of surgical procedures, a policy to direct patients away from low-volume (rural) hospitals could increase patient-hospital travel time and restrict access of minority and low-income patients (Fitzgerald et al., 2012).

Distance has proven to be the most important barrier to accessing healthcare for patients, in addition to health status, financial impairment, travel costs and work or family obligation (Kelly et al., 2016). Therefore, all factors need to be considered when focusing on where to locate a healthcare facility or improve access for patients to an existing facility and ultimately improve health outcomes (Kelly et al., 2016). It is important to keep all patients in mind when

discussing policies as well, as even though high-volume hospitals perform the majority of all surgeries and have proven lower costs, access to specialists such as surgeons should not be limited for those who are unable to seek care in facilities in locations where the distance is too great.

Distance decay is a geographical term which describes the effect of distance on cultural or spatial interactions. A study completed by Kelly, Hulme, Farragher, & Clarke (2016) identified evidence of distance decay in 77% of 108 studies reviewed. This means that patients living farther away from the health care facilities they needed to attend had worse health outcomes (e.g. survival rates, length of stay in hospital and non-attendance at follow-up) than those who lived closer (Kelly et al., 2016).

The challenges facing those in rural communities are evident when it comes to healthcare, however some solutions to access in these rural areas do exist. Some of these include technology such as telehealth; specialist outreach from regional centers; and visiting consulting clinics where specialists travel to outlying, rural facilities. Technology has introduced one promising solution to the barriers to follow-up care in rural communities. According to Broman, Vella, Tarpley, Dittus & Roumie (2016), postoperative follow-up using telehealth may increase patient access. This study examined cases in which patients underwent general operations that they characterized as suitable for telehealth follow-up (Broman et al., 2016). Telehealth-amenable follow-up was defined as: postoperative care accomplished in a single clinic visit without an invasive procedure, focal concern and no new complication diagnosed or managed (Broman et al., 2016). They concluded that telehealth postoperative follow-up may be feasible for patients undergoing select abdominal, neck, and skin/soft tissue operations with

uncomplicated courses, operative duration of stay < 4 days, and no interval contact with the operative team (Broman et al., 2016).

Another suggested fix with regards to access to surgical or specialty care in rural populations was examined by Gruca, Pyo, & Nelson (2016). Visiting consulting clinics (VCCs) are specialty clinics staffed by visiting medical consultants which provide rural hospitals with increased local access to specialty care. The focus of this study was orthopedic surgery outreach in Iowa, a state with a large rural population. Gruca et al. (2016) found that, due to VCCs staffed by orthopedic surgeons in Iowa, the number of counties with an orthopedic surgeon increased from 35 to 88 of 99 total (Gruca et al., 2016). Forty-five percent of all Iowa-based orthopedic surgeons participated in a VCC (Gruca et al., 2016). Visiting orthopedic surgeons who were willing to staff these clinics were able to reduce the driving distance to the nearest orthopedic surgeon from an average of 19.2 miles to 8.4 miles for rural Iowans (Gruca et al., 2016). Monthly VCCs improved access to orthopedic surgeons for between 450,000 to 670,000 Iowans from a total population of approximately 3 million (Gruca et al., 2016).

It is easy to see that isolated dispersed populations in rural areas with large distances separating them from available healthcare facilities is a situation associated with negative outcomes. The challenges that seem to parallel these circumstances are seemingly insurmountable. The discussion of possible solutions proves difficult when determining the best means of bringing surgical care to those in rural communities. Surely, simple surgical services can be offered to rural populations and basic surgery is feasible, highly cost-effective, and safe. Ultimately, in a setting where there is a disadvantaged population with inadequate access to medical care, specialist outreach from a regional center can provide an alternative more equitable

means of service delivery than rural hospital-based services alone, as well as other solutions that technology can provide such as telehealth.

#### Learning Points

1. The most important action in assuring access to care for those living in rural communities is providing access to primary care providers (PCPs). PCPs provide a vital first step to care by assessing and diagnosing patients. They then play a key role in assuring patients obtain the treatment needed by referring them to specialists.
2. There are many obstacles found when discussing access to specialists in rural areas such as the obstacles faced by rural surgeons themselves (call time, practicing alone, lack of assistance for difficult cases), the decline in the number of general surgeons, and the influence of corporate models to which they are employed.
3. Lower-risk general surgeries are occurring at rural facilities with no increased risk of negative outcomes, however there proves to be many barriers to broadening surgical services in rural areas such as costs and trained staff.
4. Distances patients are willing to commute for healthcare is affected by multiple variables such as finances, work or family obligations, fears, health status and age.
5. Some solutions to this issue include ones that technology can provide such as telehealth; specialist outreach from regional centers; and visiting consulting clinics where specialists travel to outlying, rural facilities.

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