



# Acute Appendicitis in Rural KwaZulu-Natal, South Africa

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## Abstract

The Lancet commission on Global Surgery identified a huge global burden of surgical illness which is not adequately treated, as the resources needed to effectively treat these many common surgical conditions are not readily available in many regions. This review aims to provide a comprehensive overview of the epidemiology, management, and outcomes of acute appendicitis in South Africa.

## Methods

A scoping search was conducted across major electronic databases to identify relevant studies published between January 2000 and December 2023. Articles reporting on the incidence, presentation, diagnostic methods, surgical interventions, and outcomes of acute appendicitis in South Africa were included.

## Results

The literature review revealed an increasing incidence of acute appendicitis among African patients in South Africa, potentially linked to dietary changes accompanying urbanization. Despite advancements in surgical techniques, open appendectomy remains the primary approach, particularly in public healthcare facilities, indicating disparities in access to laparoscopic surgery. Complications such as wound infections and hospital-acquired pneumonia contribute to prolonged hospital stays, high morbidity, and high mortality. However, outcomes in private healthcare settings demonstrate higher rates of laparoscopic procedures and lower complication rates compared to public institutions.

## Conclusion

Acute appendicitis in South Africa presents unique challenges, including disparities in surgical access and outcomes between public and private healthcare sectors. Addressing these challenges requires efforts to improve healthcare infrastructure, enhance surgical training, and promote equitable access to laparoscopic techniques. Collaborative research endeavors and evidence-based interventions are essential for optimizing the management and outcomes of acute appendicitis across diverse socio-economic contexts in South Africa.

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## Introduction

The Lancet Commission on Global Surgery highlighted a significant global burden of untreated surgical illnesses due to inadequate resources in many regions to effectively treat common surgical conditions (1). Recognizing that disease profiles and outcomes are significantly influenced by various local factors, both within and beyond the control of individual surgeons, underscores the relevance of the adage "think globally, act locally" in modern surgery. Despite acute appendicitis being a common condition with a well-described and standardized surgical treatment, there are substantial outcome variations both locally and internationally (1-5).

The reasons for these differences are multifaceted, including the significant impact of socio-economic factors on disease profiles and outcomes. Hence, it's crucial to adopt a global perspective rather than a solely local one regarding the disease. Moreover, most literature on acute appendicitis originates from high-income countries rather than low and middle-income ones, inadvertently introducing bias into the scientific understanding of the disease (2-5).

This paper aims to address this bias by focusing on acute appendicitis in a specific geographical region—the Midlands and Western third of KwaZulu-Natal Province, South Africa. By offering both historical and contemporary insights into acute appendicitis in the region, this review serves as a counterbalance to perspectives from other parts of the world with varying surgical capacities. This will contribute to the broader goal of raising global awareness about acute appendicitis and its impact on the overall burden of surgical disease.

## Acute appendicitis in South Africa

Appendicitis stands as the most common abdominal surgical emergency in the developed world, with an estimated incidence of approximately 52 cases per 100,000 individuals (1-4). However, in South Africa, the situation is less straightforward due to racialized disease patterns and healthcare access (5-20). Interestingly, the American surgical missionary, McCord, who exclusively treated Zulu patients in the early 20th century, noted in his memoirs that he had never encountered a case of acute appendicitis (6). While anecdotal, historical data from South Africa suggests a lower incidence of acute appendicitis among African patients compared

to white and Indian patients (6-20). This discrepancy has been attributed to the traditional high-fibre, low-fat diet among Africans versus the low-fibre, high-fat diet of other racial groups (20,21).

The first documented paper on acute appendicitis in South Africa dates back to 1939, highlighting a significantly higher incidence among white patients, yet the burden of morbidity predominantly affects Africans (6). This trend has persisted over time (6-19). Moreover, there seems to be a rising incidence of the disease among Africans, accompanied by increased disease severity, leading to worse outcomes. Notably, African patients tend to present with more severe disease compared to other racial groups, as emphasized by Kong in his 2012 paper, "Acute appendicitis in a developing country" (22). This underscores the critical nature of appropriate management of acute appendicitis, as inadequate treatment can lead to significant morbidity.

## Management of acute appendicitis in South Africa

The incidence of acute appendicitis among Africans seems to be on the rise, with concerning implications. This trend is associated with delays in diagnosis and treatment, leading to more severe disease grades and unfavourable outcomes. For instance, a 2012 study in Pietermaritzburg revealed that out of 200 cases, 35.5% showed macroscopic inflammation without perforation, while 57% presented with perforation, often resulting in localized or generalized intra-abdominal contamination (22). Of the perforated appendices, 44 % (51/114) were associated with localised intra-abdominal contamination and 55 % (63/114) had generalised four-quadrant soiling (22). Similarly, a 2017 report on 1,415 patients undergoing appendectomy demonstrated a predominance of advanced disease grades, correlating with increased complications and lengthened hospital stays (23). Reviews of paediatric appendicitis also showed elevated rates of morbidity and mortality, escalating with disease severity (24,25). Several factors contribute to this concerning trend, primarily revolving around limited access to healthcare and barriers to care (26). Additionally, African patients from rural areas exhibit significantly higher morbidity and perforation rates compared to their urban counterparts, highlighting the impact of healthcare accessibility on disease progression (27,28). This underscores the urgent need to address barriers to care to mitigate the prevalence of complicated appendicitis cases.

### Contrasting Acute Appendicitis in South Africa with Global Patterns

In South Africa, while there has been significant interest in non-operative approaches and laparoscopic surgery for acute appendicitis in developed countries, the predominant focus remains on operative management through open access procedures (29,30). This trend persists, particularly in KwaZulu-Natal (KZN), with minimal change observed over the past decade (2, 22-28, 31,32). A 2017 report on 1,415 patients undergoing appendectomy revealed that 63.5% required midline laparotomy, 31.8% underwent a McBurney incision, and only 4.7% underwent laparoscopy (22). Similarly, a 2018 review of pediatric appendicitis demonstrated that only 2.4% underwent laparoscopic surgery, with the majority opting for a midline laparotomy (60%) (22). However, the approach differs in the private sector, where laparoscopic appendectomy is predominant (33). Between 2010 and 2015, 66.5% of appendectomies in the private sector were laparoscopic, with a significantly shorter length of stay and fewer repeat surgeries compared to the state sector (33). Conversely, in state hospitals, only 3% of appendectomies were performed laparoscopically, with longer hospital stays and a higher incidence of repeat surgeries, reflecting more severe disease and barriers to healthcare access (22,31,32). Thus, while laparoscopic surgery is widespread in the private sector, its use remains limited in state facilities in KZN (2,31,32).

### Outcomes of appendicitis in South Africa

In recent literature concerning acute appendicitis in South Africa, a consistent finding is the substantial morbidity and mortality associated with the condition (22-29). For instance, out of 200 patients undergoing appendectomy at Edendale Hospital within a single year, thirty percent necessitated temporary abdominal (TAC) closure followed by a planned repeat operation. Among the 60 patients requiring TAC, 97% underwent the planned repeat operation, while two individuals succumbed before surgery. Conversely, of the 140 patients undergoing primary abdominal wall closure, 9% required an unplanned repeat operation. Major complications encompassed hospital-acquired pneumonia (13%), wound dehiscence (7%), and renal failure (3%). Additionally, one patient developed an entero-cutaneous fistula, and two patients experienced adult respiratory distress syndrome in the ICU. Postoperatively, 11% necessitated ICU admission. The overall mortality rate stood at 2%, with an average hospital stay of 6 days.

### Conclusion

Based on available evidence, acute appendicitis in KwaZulu-Natal (KZN) demonstrates an escalating incidence among African patients, potentially attributed to dietary shifts coinciding with rapid urbanization over the past five decades. Notably, African patients present with a disproportionately severe form of the disease, coupled with heightened morbidity. These disparities likely stem from barriers to healthcare access and deficiencies in safe and effective surgical interventions.

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