Community experiences of surgery in peri-urban Cape Town

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Background. Surgical care is critical for addressing universal access to healthcare, but access to safe and timely surgery is limited, especially in poorly resourced settings.
Objective. To determine the surgical experiences of individuals in a peri-urban community in Cape Town, South Africa.
Methods. A cross-sectional household survey of individuals in a peri-urban Cape Town community was conducted with door-to door interviews by trained community assistants, who provided multilingual translation of study materials as needed. The study (*i*) describes the surgical burden of disease and outcomes; (*ii*) assesses health-seeking behaviour and barriers to care using the Three Delays framework; and (*iii*) uses descriptive statistics to characterise respondent demographics and surgical experiences and χ^2 tests to compare awareness, attitudes and acceptability across genders and locations.
Results. Data from 432 valid responses of 450 surveys conducted showed that chronic diseases were common, affecting 240/431 (56%), with a higher prevalence in females than in males (171/285 (60%) v. 63/133 (47%), $p<0.05$). Most participants (208/432, 44%) lived within 10 km of their nearest healthcare facility, predominantly public facilities (417/432, 97%). The Three Delays framework showed that 87/432 (20%) delayed seeking surgical care, 114/432 (26%) experienced delays reaching facilities and 95/432 (32%) faced delays in receiving appropriate care, while 95/432 (22%) reported no delays. The surgical burden was substantial, with 260/428 (60%) having undergone surgery in their lifetime and 195 surgical procedures performed in the last 5 years. Postoperative disability affected 43/432 (10%) of participants, primarily manifesting as body function impairments (22/43, 51.2%) and activity limitations (7/43, 16.3%). Only 67% understood post-surgical treatment protocols.
Conclusion. This study reveals significant challenges in surgical care delivery in this peri-urban community. Key findings include a high chronic disease burden, substantial delays in accessing surgical care and significant postoperative disability rates. These results provide the first comprehensive assessment of surgical experiences in peri-urban Cape Town, highlighting the need for comprehensive interventions targeting chronic disease and surgical care, even in peri-urban areas close to public health facilities.

Keywords: global surgery, community experiences, surgery, low-resourced setting

S Afr Med J 2026;116(1):e3631. https://doi.org/10.7196/SAMJ.2026.v116i1.3631

Access to surgery is an important component of universal health coverage and there is an urgent need to increase the volume and quality of surgical care to address the estimated 17 million annual deaths from surgically treatable diseases.[1] Unfortunately, access to safe, timely and affordable surgery is lacking, especially in low- and middle-income countries (LMICs), where up to 4.8 billion people do not have this crucial access.[2] Access to quality, safe and affordable healthcare, including obstetrics, gynaecology and anaesthesia, is essential for overall population health.[3] The world's poorest third only receives 6% of the global surgical volume, despite a more considerable burden of surgical diseases.[2]

Challenges in healthcare access can be categorised by the three levels of delay model: the decision to seek care; accessing a healthcare facility; and receiving adequate care.[4] It is important to consider factors impacting these levels of delay when analysing the delivery of a surgical service.[4,5] A systematic review describing the barriers to surgical care in LMICs highlights a lack of facilities and equipment in district hospitals across many such countries, which constitute significant barriers to surgical care access.[6] The barriers have cultural, structural and financial aspects, which point to the complex and multifactorial nature of the challenge.[6] Strategies to overcome the barriers to surgical capacity in LMICs can be categorised into four dimensions, namely accessibility, availability, affordability and acceptability, further determined by social, economic, geographical and political factors.[7]

While previous studies have examined surgical care in rural African settings, limited research has specifically investigated community experiences of surgery in peri-urban areas of South Africa (SA).

Peri-urban areas face unique challenges, being neither fully urban nor rural, often with mixed access to healthcare facilities but persistent socioeconomic barriers. Understanding these community perspectives is crucial for developing targeted interventions.[7,8]

Acceptability of care refers to a measure of how appropriate people find a healthcare intervention. Community perspectives and past surgical experiences provide important insights into patient care and outcomes,[8] which vary across communities, underscoring the importance of the interactions between healthcare providers and patients, cultural and structural impediments and the impact of sociocultural factors on surgical patients' health-related quality of life, particularly in LMICs.[7-9] Some of these factors may contribute to the poor outcomes reported in SA surgical studies,[10,11] and may be influenced by comorbidities, illness severity and the burden of non-communicable diseases (NCDs).[10,11]

The aim of the study was to describe community experiences of surgical care from peri-urban Cape Town, SA, including surgical burden, health-seeking behaviours, barriers to care and postoperative outcomes from a patient perspective.

Methods

Study design and setting

This was a cross-sectional study in the Klipfontein subdistrict in the Western Cape Province of SA, in 10 local neighbourhoods, namely Barcelona, KTC, Europe, Gugulethu, Heideveld, Manenberg, Nyanga, Sherwood Park, Silverton and Tambo village. These neighbourhoods were selected based on the following criteria: (*i*) classification as peri-urban according to Statistics SA definitions;[12] (*ii*) mixed socioeconomic status populations; (*iii*) presence of established community health worker/community liaison officer networks; and (*iv*) accessibility for research team safety.

Study population and sampling

The study population comprised adults aged ≥18 years who were permanent residents (>12 months stay) of the selected neighbourhoods. The target population was estimated at ~50 000 adults based on the 2021 census of Klipfonten subdistrict.[12] For establishing the sample size, we used the sample size calculator at https://www.calculator.net/sample-size-calculator.html. This calculator computes the minimum number of necessary samples to meet the desired statistical constraints. In order to establish an initial insight into the experiences of the community, we used a 50% population proportion (as no prior data existed for surgical experiences in this specific population), a confidence level of 95% and a margin of error of 5%. The resultant sample size was 384 participants. To account for potential non-responses and incomplete surveys, we targeted 450 participants, representing a 17% buffer above the minimum requirement.

A household survey was distributed to a convenience sample of 450 adults from the identified regions who were regular members of community groups. Convenience sampling was chosen owing to: (*i*) safety considerations in high-crime areas, requiring community leader facilitation; (*ii*) the need for community trust to ensure honest responses about sensitive health topics; and (*iii*) practical constraints of door-to-door surveys in informal settlements.

Ethical approval

The University of Cape Town (UCT)'s Faculty of Health Sciences Human Research Ethics Committee approved the study (ref. no. HREC 479/2022). A request for permission to conduct the research was obtained through the health forum leaders and community liaison officers in Klipfontein.

Study objectives

The study objectives were:

(*i*) to describe the surgical burden of disease and postoperative outcomes in the community
(*ii*) to assess health-seeking behaviour and barriers to surgical care using the Three Delays framework
(*iii*) to evaluate the acceptability and accessibility of healthcare services from a community perspective
(*vi*) to identify community-specific factors influencing surgical care experiences.

Data collection tool

The survey instrument (Community Experiences Of Surgery In Peri-Urban Cape Town Participant Questionnaire) was developed through adaptation of the SA household survey,[12] with specific modifications to contextualise it culturally, including specific terminology, e.g. 'traditional healers', and integration of the Three Delays framework (a model categorising healthcare access barriers as: delay 1 – deciding to seek care; delay 2 – reaching a health facility; delay 3 – receiving adequate care).[13]

Validation process

Prior to development, the questionnaire underwent validation through expert review by academic professionals from UCT, Makerere University and Spatial Sciences Institute, the University of Southern California (including academics, clinicians and students), discussion with community liaison officers from Klipfontein and pilot testing with eight healthcare providers, resulting in further clarification to unclear questions.

The survey gathered demographic information including nationality, address, age, gender, employment status and educational level. Health status and risk factors were assessed through questions regarding comorbidities such as hypertension, diabetes, asthma, epilepsy, smoking status and alcohol usage/intake. The participants' height was measured using a portable stadiometer (Seca 213, Seca, Germany), and weight was measured using a digital scale (Seca, model 8741321009, Germany) with a maximum capacity of 200 kg. Body mass index (BMI) was then calculated as weight/height^2 (kg/m^2).

The survey assessed health-seeking behaviour and acceptability of health services, hospital admissions, history of surgical procedures and accidents. Surgical procedures were categorised according to Essential Surgery: Disease Control Priorities (3rd edition) (DCP3) classification.[14] Questions on the surgical experience considered complications or disabilities related to the injuries or surgical condition, which included the loss of sight, limbs, or hearing post surgery.

The adherence to treatment procedures necessary for surgical recovery were not assessed. A section was devoted to the acceptability and utilisation of health services, including a thorough assessment of barriers to accessing surgical care, proximity and characteristics of the nearest health facility, including whether it was private or publicly funded, and medical aid coverage status.[13]

The full survey is shown in Appendix 1.

The surgical procedures that the participants had undergone within the last 5 years were classified according to DCP3.[14] Postoperative disability was categorised according to the standards of the International Classification of Functioning, Disability and Health.[15]

Data collection process

Data were collected by a team consisting of the principal investigator, four research assistants and community liaison officers. The process began by sending introduction letters to health forum leaders in

targeted communities, and was followed by training community participants (who served as cultural interpreters and community guides), who were recruited by the UCT liaison officer. These assistants conducted door-to-door interviews, with each handling 15 questionnaires, using their multilingual capabilities to translate study information and consent forms, when necessary, with translations verified by the community liaison officer and principal investigator to ensure participant comprehension.

The data collection timeline spanned 10 weeks, with intensive fieldwork occurring during the first 2 weeks, followed by 6 weeks of data cleaning and processing before the study was officially closed. Participant confidentiality was maintained through a coding system that allowed for potential follow-up by retaining participant details and demographics, with written informed consent obtained from all participants.

Data analysis

Categorical variables were summarised as *n* (%) and continuous variables as median (interquartile range (IQR)) or mean (standard deviation (SD)), as appropriate. Normality testing was performed using the Shapiro-Wilk test for continuous variables. Simple descriptive statistics were used to describe the demographic characteristics of the respondents and the distribution of their responses to questions regarding their experiences of surgery, including a history of surgical diseases, surgical operations, surgical outcomes, perioperative experiences and access to care.

Awareness of surgical services, attitudes towards surgical treatment and the acceptability of healthcare services across different genders and locations were compared using a χ^2 test with statistical significance set at $p<0.05$. Statistical consultation was provided by the Statistical Unit in the Department of Surgery, UCT. All data were analysed using Statistica version 14.0 (IBM Corp, USA).

Results

Demographics and study population

This study included 432 (96%) valid responses from 450 distributed surveys. The study population characteristics are shown in Table 1. Participants ranged in age from 18 to 79 years, with a median age of 47 years. The majority of the participants (*n*=285, 66%) were female. Geographical distribution across the 10 neighbourhoods was: Gugulethu *n*=89 (21%), Nyanga *n*=67 (16%), Manenberg *n*=54 (13%) and KTC *n*=43 (10%), with remaining participants distributed across Barcelona, Europe, Heideveld, Sherwood Park, Silverton and Tambo Village.

The patient demographics, comorbidities and surgical burden are shown in Table 1. The male and female cohorts were of similar age and educational status. Chronic diseases affected 56% of the community, with significantly higher prevalence in females than males (60% v. 47%, $p<0.05$). Hypertension was the most common condition, affecting 42% of females v. 30% of males ($p<0.05$). The female cohort also had a significantly higher BMI than males (mean 31 kg/m^2 v. 25 kg/m^2, $p<0.01$).

Surgical procedures and outcomes

A total of 60% of the respondents reported having undergone surgery in their lifetime (Table 1), representing 195 surgical procedures (males 67, females 128) performed within this cohort within the previous 5 years (Table 2). The most common procedures were pregnancy related, with 52 (26.7%) caesarean deliveries and 7 (3.6%) ectopic pregnancies. The most common non-pregnancy related procedures were appendectomies (8, 4.1%) and knee operations (6, 3.1%). Specialised procedures were reported in 22% of all surgical cases (*n*=44), with the most common procedure being laparotomy (8, 4.1%).

The DCP3 categorisation of disabilities[14] necessary to prioritise interventions based on their impact and feasibility in resource-constrained LMIC settings is shown in Table 3. Of the cohort, 43/432 (10%) experienced postoperative disability (defined as a postoperative functional decline characterised by significant reduction in patients' ability to perform activities of daily living). Impairment in bodily functions was the most common category (22/43, 51.2%), with pain and headaches being the predominant symptom. Activity limitations, particularly mobility-related, formed the second largest category (7/43, 16.3%). Five of the 43 (11.6%) with postoperative disability reported conditions affecting multiple bodily areas. No explicit environmental factors were reported.

Health-seeking behaviour and accessibility

The community health-seeking patterns and acceptability of services are presented in Table 4. Public healthcare facilities (health clinic or hospital) were the primary point of contact, with 226/432 (52%) initially consulting public health clinics and 150/432 (35%) public hospitals. One-third (157/432) of the community respondents reported hospital admissions in the previous 5 years, predominantly in public facilities (147/157, 94%) compared with 6% in the private sector.

When applying the Three Delays framework for accessing appropriate surgical care,[5] one in four respondents (114/432, 26%) had a delay in reaching a healthcare facility, and one in three (136/432, 32%) had a delay in receiving appropriate care. Notably, 22% of the participants reported no delays in their surgical care journey. One in five patients (87/432, 20%) had a delay in seeking care. However, 208/42 (48%) participants lived within 10 km (12% within 5 km and 36% between 5 and 10 km) of a healthcare facility.

Discussion

This study provides the first comprehensive community-level assessment of surgical experiences in peri-urban Cape Town, addressing a significant gap in the literature in intermediate urban settings. The findings highlight several key and multifaceted challenges in surgical care access and outcomes in a peri-urban Cape Town community, even one with acceptable geographical access to healthcare facilities.

Our study makes several important contributions to global surgery literature. First, it provides empirical evidence of surgical burden and outcomes from a community perspective in a peri-urban African setting, complementing facility-based studies. Second, the application of the Three Delays framework to surgical care access represents a novel methodological approach that could be replicated in other LMIC settings. Our findings demonstrate that geographical proximity to healthcare services does not guarantee equitable access to surgical care, highlighting the importance of addressing structural and systemic barriers.

The findings underscore a high burden of chronic diseases, with more than half of the community reporting at least one chronic condition. The surgical burden is also large, with 60% having had surgery. Access to safe and affordable surgery is compromised, with one in five patients failing to seek surgical care, one in five having had a significant delay in seeking care, one in five having had a delay in reaching appropriate facilities and one in three having had delays in receiving appropriate surgical care. The result is that 1 in 10 patients have postoperative disability associated with a functional decline. This is despite nearly half of the patients living within 10 km of a healthcare facility.

Chronic disease burden and surgical implications

The high prevalence of chronic diseases (56% of participants) has significant implications for surgical care. The predominance of hypertension (37% overall, 42% in females) aligns with recent

SA studies showing NCDs as the leading causes of morbidity and mortality.[16,17] Similar patterns have been observed in other sub-Saharan African settings, where chronic disease management is increasingly challenging.[17] Our findings also align with other studies that have shown high incidences of chronic conditions such as hypertension and diabetes in the Klipfontein subdistrict.[11] The chronic disease burden likely contributes to increased surgical risk, longer hospital stays and higher rates of postoperative complications, as demonstrated in the African Surgical Outcomes Study.[11] The gender disparity (female v. male) in chronic disease prevalence (60% v. 47%, $p<0.05$) may reflect differential healthcare utilisation patterns, occupational exposures, or biological factors requiring further investigation.

Access barriers using the Three Delays framework

Our systematic application of the Three Delays framework reveals significant barriers to accessing surgical care. Although a large proportion of community members lived within a reasonable distance of healthcare facilities, with 48% residing within 10 km of a facility, significant barriers to accessing surgical care persist. This suggests that geographical access, while important, is insufficient to ensure timely surgical care, and for the 52% that reside beyond 10 km, this is increased. This accessibility metric compares with other low-resource settings where many communities on the African continent face journey times >2 hours to reach surgical facilities.[18-22]

A concerning finding was that one in five (20%) patients delayed seeking surgical care. This delay in health-seeking behaviour mirrors findings that identified cultural, financial, structural and institutional barriers as key factors influencing surgical care-seeking in low-resource settings.[6] This underscores potential underlying factors such as lack of awareness, fear of surgical procedures and distrust in the healthcare system.[6,20] Even more concerning is that one in three (32%) community members had experienced delays in receiving appropriate care once they reached the healthcare facility. Current research shows that such delays significantly impact the 30-day mortality in LMICs.[23] Ologunde *et al.*[7] demonstrate that surgical delays do not only affect clinical outcomes in LMICs but also socioeconomic status and quality of life. The delay in accessing appropriate surgical care mirrors the proportion of elective v. emergency surgeries in the community, suggesting possible systematic delays in accessing elective surgical care. To mitigate surgical care delays in LMICs, key measures include**:** strengthening referral systems with clear protocols and communication channels between primary care and surgical facilities; expanding surgical capacity through task-shifting to trained non-physician clinicians and mobile surgical units for remote areas; and implementing triage systems that prioritise cases based on urgency, while establishing dedicated elective surgery scheduling to prevent emergency cases from overwhelming the system.

Comparison with international literature

Our prospective disability rate of 10% is alarming when compared with high-income countries whose rates range from 3% to 7%.[24] This elevated rate may reflect a multitude of factors, including: (*i*) delayed presentation, leading to more advanced disease requiring complex procedures; (*ii*) resource constraints affecting surgical quality; and (*iii*) limited postoperative rehabilitation services. This predominance of pain and functional limitations among reported disabilities aligns with patterns observed in other LMIC settings.[25]

The surgical burden of 60% having undergone surgery in their lifetime is notably higher than reported of peri-urban communities with better healthcare access, reflecting persistent socioeconomic barriers.[19,20]

Table 1. Demographic characteristics of the surgical burden of disease cohort (*N*=431)

Characteristic	Whole cohort (*N*=431)	Male (*n*=133)	Female (*n*=285)	*p*-value
Age, years, median (IQR)	47 (36 - 59)	47 (35 - 59)	48 (37 - 59)	0.80
Education level, *n* (%)				**<0.05**
No formal schooling	41 (9)	16 (12)	25 (9)	
Some primary school	39 (9)	18 (14)	19 (7)	
Completed primary school (Grade 7)	228 (53)	62 (47)	159 (56)	
Completed some high school	94 (22)	32 (24)	61 (21)	
Completed high school	23 (5)	4 (3)	17 (6)	
Weight (kg), mean (SD)	76 (12.3)	70 (11.8)	79 (12.5)	**<0.01**
Height (cm), mean (SD)	158 (8.2)	166 (7.9)	154 (8.4)	**<0.01**
BMI (kg/m^2), mean (SD)	29 (5.4)	25 (4.9)	31 (5.6)	**<0.01**
Comorbidities, *n* (%)				
Any chronic disease	240 (56)	63 (47)	171 (60)	**<0.05**
Hypertension	161 (37)	39 (30)	119 (42)	**<0.05**
Diabetes	48 (11)	9 (7)	38 (13)	0.28
Asthma	37 (8)	5 (4)	30 (11)	0.27
HIV	29 (7)	3 (2)	25 (9)	0.28
Epilepsy	6 (1)	3 (2)	3 (1)	0.84
Smoking (cigarettes)	136 (32)	57 (43)	72/284 (25)	**<0.01**
Consumption of alcohol	151 (35)	58 (43)	93 (32)	0.07
Surgical history and understanding, *n/n* (%)				
History of a surgical operation	260/428 (60)	78/132 (38)	174/283 (61)	0.64
Understands importance of following treatment protocols	288/428 (67)	86/132 (68)	194/271 (67)	0.40

IQR = interquartile range; SD = standard deviation; BMI = body mass index.
Bold = statistically significant.

Health system implications

Our findings suggest that while SA's constitutional guarantee of healthcare access[26] has achieved geographical coverage in this peri-urban area, quality and timeliness of care remain problematic. The predominant reliance on public facilities (97% of the nearest facilities are public), combined with high delay rates, suggests system capacity constraints rather than barriers *per se*. The healthcare system in SA is two-tiered, with a significant public sector serving the majority of the population.[27] In many LMICs, a large proportion of the population relies on public healthcare facilities owing to affordability and accessibility issues,[27] and the health system is often characterised by an underfunded and overburdened public healthcare system. For example, in countries such as India, Nigeria and SA, public healthcare facilities are the primary source of care for the majority.[27-29]

The low rate of medical aid coverage (4%) underscores and reflects the socioeconomic profile in this population and their dependence on public healthcare services. This has implications for surgical care quality, as public hospitals in SA often face resource constraints, including staff shortages, equipment limitations and infrastructure challenges.[27]

Community-specific factors

Several community-specific factors emerged from our analysis. The absence of traditional healer consultation (0%) in initial healthcare seeking differs from other SA studies, possibly reflecting the peri-urban setting's cultural transition from rural to urban health-seeking patterns.[24]

Postoperative disability resulting in functional limitations is a critical concern, affecting 1 in 10 patients within the last 5 years. The rate

Table 2. Surgical procedures reported by participants: DCP3 classification of community self-report on surgeries[14]

Essential surgeries, *n*	Specialised surgical procedures, *n*	Emergency and trauma procedures, *n*
Males	**Males**	**Males**
Appendectomy (8)	ACL repair (2)	Dog bite on hand (1)
Circumcision (medical) (4)	Arm amputation (1)	Foot operation (2)
Circumcision (traditional) (3)	Back surgery (2)	Right wrist (fracture) (1)
Hernia repair (3)	Chest surgery (1)	Shoulder arthroscopy (2)
Vasectomy (2)	Coronary artery bypass grafting (1)	Eye operation (2)
Removal of bullet (1)	Elbow surgery (2)	Hand surgery (3)
Skin graft (1)	Eye surgery (3)	
Testicular operation (1)	Head operation (3)	
Tonsillectomy (1)	Heart surgery (2)	
	Hip surgery (1)	
	Knee operation (6)	
	Leg Surgery (5)	
	Mitral valve replacement (1)	
	Nose operation (1)	
	Shoulder arthroscopy (2)	
	Spinal surgery (2)	
	Stomach operation (4)	
Females	**Females**	**Females**
Caesarean section (total 52, includes all variations)	Arm surgery (2)	Ankle surgery (5)
Appendectomy (included in total above)	Back operation (2)	Elbow surgery (4)
Biopsy – cervix (1)	Brain aneurysm surgery (1)	Eye operation (3)
Biopsy – cysts on the breast (1)	Breast surgery (4)	Hand surgery (3)
Breast surgery (4)	Cataract surgery (1)	
Fibroids removal (2)	Chest surgery (2)	
Gallbladder removal (2)	Colon surgery (2)	
Hysterectomy (4)	Gallstones removal (3)	
Oophorectomy (1)	Hand surgery (3)	
Tubal ligation (2)	Jaw operation (1)	
Vaginal cysts removal (1)	Kidney transplant (3)	
	Knee surgery (3)	
	Laparotomy (8)	
	Leg surgery (4)	
	Mitral valve replacement (1)	
	Nose operation (2)	
	Sacro colpopexy (1)	
	Sepsis treatment (2)	
	Throat cancer surgery (1)	
	Tooth surgery (1)	

DCP3 = Essential Surgery: Disease Control Priorities (3rd edition);[14] ACL = anterior cruciate ligament.

Table 3. Surgical outcomes of the participants reported as postoperative disabilities: Classification based on International Classification of Functioning, Disability and Health standards[15]

Body functions and structures, *n*		Activities and participation, *n*			
Impairments in body functions	**Impairments in body structures**	**Activity limitations**	**Participation limitations: restrictions**	**Environmental factors, *n***	**Conditions affecting multiple areas, *n***
Anxiety/nervous challenges (2)	Loss of vocal cord (1)	Cannot stand for extended periods (2)	Unable to work (1)	Participants did not explicitly name these factors	Weight loss (2)
Dizziness (1)	SOB (Shortness of Breath) (1)	Cannot walk (1)			Increased blood loss (1)
Numbness (1)	Loss of vocal cord (1)	Right hand is not working (1)			Occasional pain (1)
Headaches (3)	Heart disease/ myocardial infarction (2)	Constant ankle elevation required (1)			Vaginal discharge (1)
Pain various types (5)					
Irregular heartbeat (1)					
Pain; nose bleeding (1)					
Fatigue/tiredness (2)					
Vomiting (1)					

Table 4. Health-seeking behaviour and acceptability of services

Characteristic	Whole cohort (*N*=432), *n* (%)	Male (*n*=133), *n* (%)	Female (*n*=285), *n* (%)	*p*-value
Initial/first consultation				
Traditional healer	0 (0)	0 (0)	0 (0)	1.00
Religious leader	1 (0)	1 (1)	0 (0)	0.32
Public health clinic	226 (52)	76 (58)	141 (50)	**<0.05**
General practitioner	19 (4)	2 (2)	15 (5)	**<0.05**
Pharmacist	15 (3)	8 (6)	7 (2)	**<0.05**
Public hospital	150 (35)	40 (30)	105 (36)	**<0.05**
Private hospital	8 (2)	3 (2)	5 (2)	0.72
Family	11 (2)	3 (2)	8 (3)	0.82
Hospital admission (last 5 years)				
Public hospital	147 (34)	39 (30)	104 (35)	0.14
Public clinic	28 (6)	9 (7)	19 (7)	0.98
Private hospital	10 (2)	1 (15)	9 (3)	**<0.05**
Private clinic	2 (0)	1 (1)	1 (1)	0.92
Barriers to accessing care Three Delays framework				
1. Delay in seeking care	87 (20)	27 (20)	57 (20)	0.98
2. Delay in reaching healthcare facility	114 (26)	36 (27)	75 (26)	0.84
3. Delay in receiving appropriate care	136 (32)	38 (28)	94 (33)	0.04
4. No delays reported	95 (22)	32(25)	59 (21)	0.52
Experience of barriers	167 (38)	48 (36)	114 (40)	0.04
Availability of medical aid	16 (4)	4 (3)	75 (26)	**<0.01**
Distance to the nearest facility, km				
<5	51 (12)	16 (12)	32 (11)	0.81
5 - 10	157 (36)	44 (33)	108 (38)	0.05
10 - 15	102 (24)	40 (30)	60 (21)	<0.05
>15	122 (28)	33 (25)	85 (30)	<0.05
Nearest facility type				
Private	9 (2)	4 (3)	4 (1)	0.22
Public	417 (97)	129 (97)	277 (97)	**<0.01**

Bold = statistically significant.

corroborates the findings of the African Surgical Outcomes Study, which demonstrated higher mortality following surgical complications in African settings when compared with global averages.[11] Similarly, the GlobalSurg Collaborative underscores how resource constraints can impact post-surgical outcomes.[24]

The disabilities in the study manifested across various domains, including physical impairments, psychological effects and functional limitations.

To address the challenges, three interventions are necessary:

- There is an urgent need for enhanced education on chronic disease management and primary healthcare in the community through community-based education programmes, regular screening initiatives and improved chronic disease monitoring systems.[30]
- The capacity of elective surgery needs to be increased to address significant delays in receiving surgical care. Most facilities operate below capacity, with staffing and infrastructure among key limitations.[7]
- Implementing improved surgical care systems through structured programmes may improve care delivery in resource-limited settings.[30] Ng-Kamstra *et al.*'s[31] analysis of global postoperative death patterns further highlights the need for enhanced postoperative care in LMICs.

The success of interventions in our context will necessitate careful consideration of resources. As demonstrated by Chu *et al.*,[32] building sustainable healthcare improvements in Africa requires collaborations with an equity-focused lens. This approach has been successfully implemented in various settings, showing how locally adapted solutions can effectively address surgical care challenges.

Study limitations and strengths

The study limitations are consistent with those encountered in community-based research reporting. Several limitations warrant consideration. Our convenience sampling approach, while necessary for safety and community engagement reasons, may limit generalisability. However, the demographic characteristics of our sample align well with census data for the Klipfontein subdistrict, suggesting reasonable representativeness. Self-reported surgical history and outcomes may be subject to recall bias, particularly for procedures performed several years prior. However, for major surgical events, recall accuracy is generally good.[33] We were unable to verify medical records for most participants owing to ethical and practical constraints. Important limitations in our data collection tool should be acknowledged. Our questionnaire did not include comprehensive assessment of postoperative treatment adherence (such as medication compliance, follow-up appointment attendance, or understanding of post-surgical instructions), or detailed accessibility measures beyond the core Three Delays framework components. Specifically, we did not systematically assess facility operating hours, physical accessibility features, health literacy levels, or detailed communication barriers. These represent important areas for future research that could provide deeper insights into the granular factors contributing to surgical care delays and outcomes.

The cross-sectional design limits our ability to establish causal relationships between identified factors and surgical outcomes. Longitudinal studies would provide stronger evidence for intervention planning.

However, this study provides insight into community members' perceptions of surgical experiences, and underscores contextual factors to consider when implementing surgical interventions in SA. Community perceptions are crucial in shaping surgical experiences, including shaping risk factors for disease, thereby influencing health behaviours, disease prevention, health-seeking behaviour, social determinants, stigma and discrimination and cultural and traditional practices.

Policy and practice implications

Our findings have several important implications for policy and practice:

(*i*) Health system strengthening: the high rates of delays in receiving appropriate care suggest the need for health system capacity-building, particularly in public facilities serving peri-urban populations.[25]

(*ii*) Chronic disease integration: the high NCD burden requires integration of chronic disease management with surgical care pathways to optimise outcomes.[30]

(*iii*) Community engagement: the community perspective provided by this study should inform patient-centred surgical care improvements and health promotion strategies.[8,34]

(*iv*) Resource allocation: evidence of significant surgical burden and disability suggests a need for enhanced surgical capacity and postoperative rehabilitation services in peri-urban areas.[5]

Future research directions

Building on our findings, future research should address several key areas identified through this study:

Detailed treatment adherence studies: Future research should include comprehensive assessment of postoperative treatment adherence, including medication compliance, follow-up appointment attendance, understanding of post-surgical instructions and barriers to adherence completion.[8]

Comprehensive accessibility assessment: While our study applied the Three Delays framework effectively, future studies should explore detailed accessibility factors, including facility operating hours, physical accessibility features, health literacy levels, transportation costs and specific communication barriers that may contribute to delays within each framework category.[13]

Longitudinal outcome studies: Follow-up studies tracking surgical patients over time would provide stronger evidence for causal relationships between identified barriers and surgical outcomes.[35]

This study provides crucial evidence for policy-makers and healthcare providers working to improve surgical care access and quality in SA peri-urban communities. The findings suggest that achieving universal surgical access requires attention not only to geographical coverage but also to system capacity, care quality and community-specific barriers.

Conclusion

The study reveals significant challenges in surgical care delivery, and underscores the complex interplay of factors that influence access to healthcare in a low-resource peri-urban setting. Key findings demonstrate that geographical proximity to healthcare facilities is necessary but insufficient for ensuring optimal surgical care access. The findings emphasise the need for comprehensive interventions targeting education, healthcare capacity and post-surgical care to improve surgical outcomes in resource-limited settings. Our findings provide novel evidence from a community perspective that can inform targeted interventions to improve surgical care access and outcomes in similar peri-urban settings across sub-Saharan Africa.

Data availability. The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Declaration. None.

Acknowledgements. None.

Author contributions. MI, BMB and SM conceptualised the study and contributed to investigation, data curation, methodology, data analysis, original draft preparation and write-up, formal analysis and software validation. MI, BMB, MK, SlR, NW, MaK, OM, JG, RV, EA, LF, YP and SM were involved in writing review, formal analysis, data curation and revising the original draft critically for important intellectual content, and approved the version to be published. BMB and SM contributed to the review and editing, resource allocation in the form of funds, transport, final draft preparation and writing the original draft.

Funding. This research was partially funded by the National Institute for Health and Care Research (NIHR) 133850 (NIHR Global Health Group on Perioperative and Critical Care) using UK international development funding from the UK government to support global health research. The views expressed in this publication are those of the authors and not necessarily those of the NIHR or the UK government.

Conflicts of interest. None.

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Received 14 May 2025; accepted 28 July 2025.