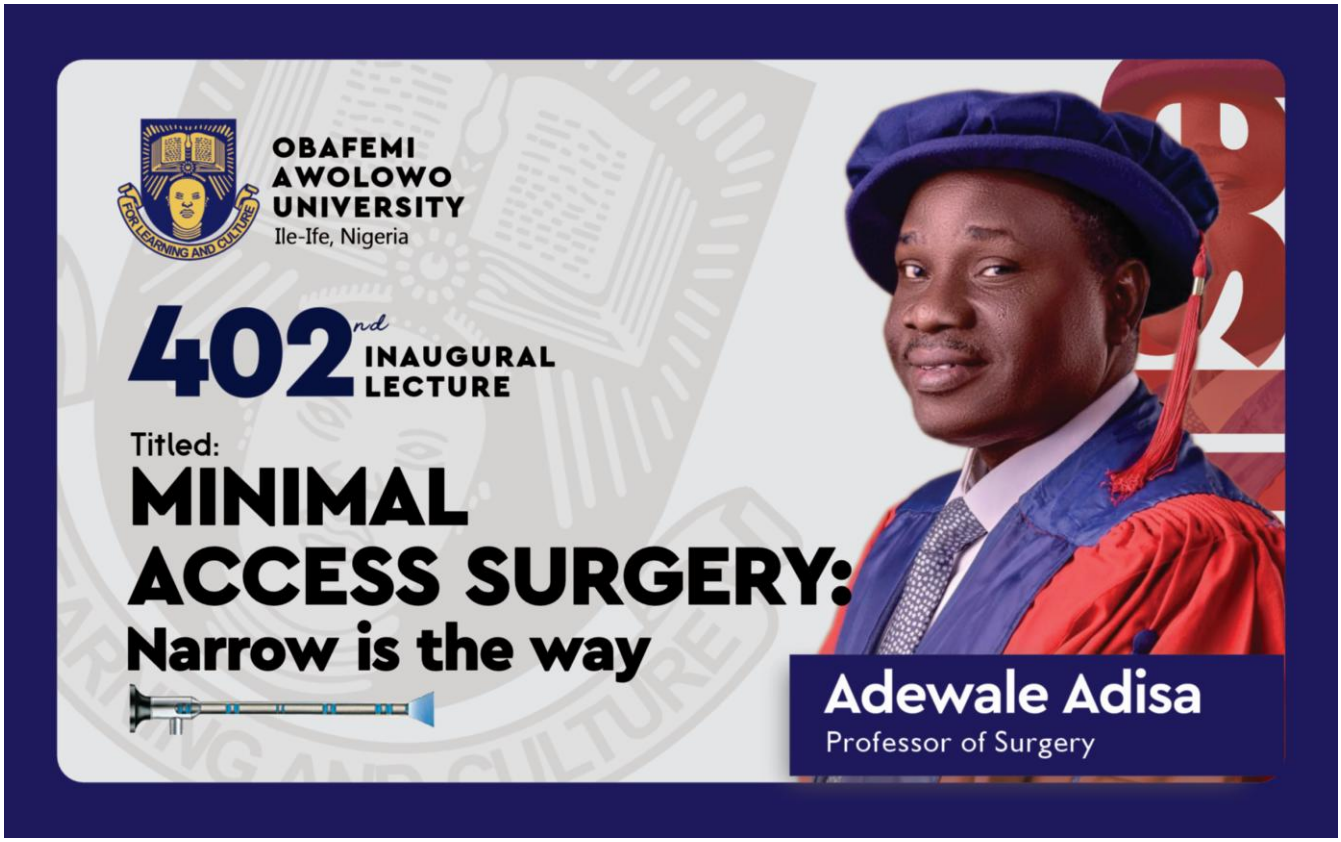
Inaugural Lecture Series 402

MINIMAL ACCESS SURGERY: Narrow is the Way



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Delivered at Oduduwa Hall, Obafemi Awolowo University, Ile-Ife, Nigeria On Tuesday, 22nd July 2025

Preamble

The Vice-Chancellor, esteemed Deputy Vice-Chancellors, Academic, Administration, and Research, Innovation, and Development (RID), The Registrar, Librarian, Bursar, Provosts of the College of Health Sciences and the Postgraduate College, Deans, distinguished Professors, Directors of Institutes, Heads of Departments and Units, colleagues, students, guests, distinguished ladies and gentlemen.

Reflecting on the boundless grace bestowed by God, Apostle Paul affirmed to the Ephesian church in his letter around 62 AD that in fulfillment of divine purpose, God can release a force into our lives that surpasses our highest desires, thoughts, hopes, or dreams. As a child, my dream was limited to becoming a doctor who could help the sick recover. Yet, today, I stand before you as a Professor of Surgery, specializing in Minimal Access Surgery. This lecture marks the 402nd Inaugural Lecture in this great university. Truly, our gracious God exceeds all human expectations and this lecture today is a testament to His grace.

Genesis

My dream of becoming a doctor was borne out of tragedy. When I was just two years old, my mother died of puerperal sepsis at the Wesley Guild Hospital, Ilesa, shortly after giving birth to my younger sister. At six, as a primary school pupil, I was struck by a mysterious illness that left me paralysed from the waist down. For eight months, my family took me from one hospital to another and from one spiritual healer to another. Against all odds, I regained my ability to walk, returned to school, and ranked first in my promotion examination despite missing two terms that year. From then until midway through secondary school, I regularly visited Dr. Fadahunsi, a paediatrician at State Hospital, Osogbo, for monthly follow-ups. His compassionate approach, remarkable memory, and professionalism left a lasting impression on me. I realized then that no career impacted lives more profoundly than medicine. I concluded I must be a doctor.

My passion for surgery ignited when, as a 9-year-old child, I watched a television documentary featuring surgeons performing open abdominal operations. A few weeks later, one of my sisters needed a toad and lizard for her biology practical. Eager to experiment, I caught a lizard for myself, performed a rudimentary abdominal operation with my father's spent shaving blade, and attempted to close it using needle and thread. Sadly, my "patient" did not survive. Just as I pondered what had gone wrong, my sister walked in and screamed, "Wale is doing an experiment with a lizard!" The rest, as they say, is history.

Academic Journey and Career

I attended St. James RCM Primary School A, Osogbo, and Anglican Commercial Grammar School, Osogbo for secondary education. While in secondary school, my late father, Chief Solomon Adedokun Adisa, drove me to Sultan Bello Hall, University of Ibadan, expressing his wish for me to study there,

just as he had. However, after visiting a teacher at Obafemi Awolowo University (OAU), I was captivated by the university's grandeur, flowers, and aesthetic buildings. I later informed my dad I have decided that my academic journey could only unfold in a beautiful environment like OAU. **Great Ife.**

I graduated from the College of Health Sciences in 1999, completed my housemanship rotations at the Ife Hospital Unit, OAU Teaching Hospitals Complex in 2000, and had the mandatory National Youth Service in Amaigbo, Nwangele LGA, Imo State. Following this, I worked for a year as a Medical Officer at Abake Medical Center, Osogbo, gaining experience in general surgery and obstetric ultrasonography. In April 2003, I joined the Department of Surgery, Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), as a Junior Resident. I was unexpectedly assigned to assist Dr. Anthony Arigbabu in the Endoscopy Room just a few weeks into my residency. After the session, "Baba Arigbabu" called me aside and said, *"I see a bright future for you in surgery. You belong here."* His words remained with me throughout my career, and even on his sickbed, he recalled that moment and narrated the story again.

I obtained the Fellowship of the West African College of Surgeons in 2008 and the Fellowship of the National Postgraduate Medical College of Nigeria in Surgery in 2010. I obtained a Diploma in Minimal Access Surgery from India in 2007, a Certificate in Advanced Laparoscopic Surgery from Israel in 2010, the Fellowship of the American College of Surgeons in 2016, and the Doctor of Medicine degree of the National Postgraduate College of Nigeria in 2023.

My pursuit of a career in academics was also arranged divinely. My dad worked as a research assistant to a Professor of Adult Education in the University of Ibadan between 1967 and 1969. As I tagged along with him in childhood, my dad spoke of his admiration for the academic profession and introduced me early to the concept of teaching and research in the University. Then came one young man who was courting one of my sisters, now Professor Abiodun Akinpelu of the Lagos State University. He was my first mentor in academics. My first manuscript writing lessons were as a House Officer under Professor Greg Erhabor.[1] It was however under Professor Oladejo Lawal that I learnt to write as a surgeon. On one occasion when I reminded him the manuscript I returned to him was the fifth version of his correction, my Oga said "The only way to get a better Lawal is to keep correcting the current version".
I was employed as Lecturer 1 in the Department of Surgery of this University in December 2008 and was pronounced a full professor effective 1st October 2017. I have cherished my career as an academic general surgeon, particularly in the fields of **surgical gastroenterology, breast cancer research, global surgery, and minimal access surgery**. My journey, shaped by personal trials and unwavering determination, continues to reinforce my belief that true impact stems from dedication, mentorship, and faith in God's infinite grace.

Breast cancer

I devoted a significant part of my career to the detection and treatment of breast cancer because of the huge burden of the disease among Nigerian women. For several decades, women across Nigeria have suffered due to late detection, inaccurate and inadequate diagnosis, and limited treatment options. In a 2011 publication on the subject, my colleagues and I described the burden of metastatic breast cancer among our women.[2] Our hospital records over 15 years showed that more than half, 202 out of 385 (52.5%) of the patients; had metastatic diseases, even with the limited imaging techniques we employed for staging. Only 70 out of 202 (34.7%) patients presented within 3 months of noticing a breast lump. Two-thirds of the patients had more than one metastatic site at presentation. The Liver was the commonest metastatic site 126(62.6%), followed by the lungs 102(50.7%), pleural 52(25.9%) and contralateral breast/axilla 50(24.9%). Overall survival rate was abysmal with only a quarter of patients confirmed to be alive at one year. We realized that public education may help reduce the high rate of metastatic breast diseases. In 2023, more than a decade later, Dr. Olasehinde led our team to review the pattern of presentation again and observed that the majority now presented with stage 3 diseases with a significant decline in presentation with metastatic diseases over time.[3] This trend followed the various community engagement initiatives of our unit in providing information to enhance breast cancer awareness, early detection, and early presentation among Nigerian women.

The aetiology of breast cancer is multifactorial with genetic, hormonal, family, social, and environmental factors already described. Our team investigated the behavioural pattern and dietary factors that may influence the development of breast cancer in Nigerian women.[4] We observed an association between alcohol consumption and the use of high-fat oils in women with an increased risk of breast cancer. In another study led by Awe and Onayade, higher levels of dichloro-diphenyl-trichloroethane (DDT) and hexachlorocyclohexane (HCH) were found in the serum of women with breast cancer compared to age-matched controls.[5] These chemicals are components of the pesticides commonly used in our country and suggest that remnants of these pesticides may be a significant risk factor for breast cancer in Nigeria. This finding requires further investigation. The Mechanisms for Established and Novel Risk Factors for Breast Cancer (MEND) study[6] observed that women with low-grade breast cancer (BC) were more likely to have highly educated fathers. After adjusting for age, comorbidities, marital status, and mammogram screening, participants with highly educated fathers were 60% less likely to have high-grade BC compared to those with less-educated fathers. The factors influencing this association between the father's education, its impact on the early life socioeconomic status, and the occurrence of high-grade breast cancer in their daughters require further investigation. The MEND study group also investigated the association of high-sensitivity C-reactive protein (hs-CRP) with the risk and aggressiveness of breast cancer[7] and observed that high levels of hs-CRP (> 3 mg/L) were observed in 57% of cases and 31% of controls being associated with 4 times increased odds of breast cancer. This association persisted

regardless of menopausal status and body mass index (BMI) category. High hs-CRP was associated with increased odds of triple-negative breast cancer, Luminal A breast cancer, and HER-2-enriched breast cancer.[8,9]

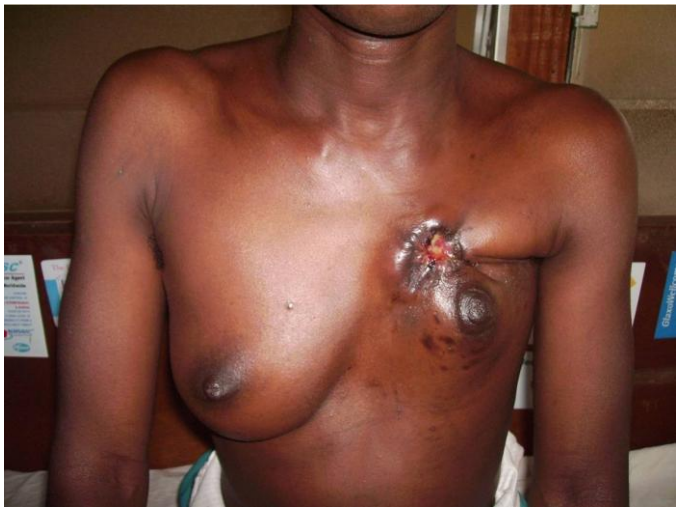


Figure 1: Breast cancer in a young Nigerian woman

Breast cancer screening

On a fateful day in the year 2007, I made a presentation at the OAUTHC on breast cancer and described the ugly picture of late presentation leading to poorer outcomes in our patients compared to reports from Caucasian studies. After the presentation, a man approached me that his boss would love to meet me. That was the beginning of my involvement with the Breast Cancer Association of Nigeria (BRECAN), founded in 1997 by Mrs. Betty Anyanwu-Akeredolu after she survived the disease. I was one of the speakers at the 10th anniversary of BRECAN later that year. I was involved in the biannual breast cancer awareness campaigns organized by the association in boot camps during which numerous Nigerian women were offered training on self-breast examination, free clinical breast examination, and consultations. The founder referred women detected during those screening programs to our clinic where she committed her funds to OAUTHC to cover the treatment cost of a large number of women. As fate would have it, she later became the first lady of Ondo State during which she expanded breast cancer screening and sponsorship of treatment for women with breast cancer. My colleagues and I treated several dozens of such women with good outcomes in those presenting early. On her 60th birthday, she made me write a book on the burden of breast cancer in Nigeria, which I read out to a gathering of nearly all the first ladies of states in southwest Nigeria.[9] This exemplary attitude of Her Excellency, Dr. Mrs Betty Anyanwu-Akeredolu towards a disease of huge public health concern should be emulated by people of influence in Nigeria to raise awareness and encourage early presentation for treatment among Nigerians with different types of cancers. Her mantra in all community engagement meetings was "*Attitude is Everything*". I completely agree that a different attitude towards breast cancer screening is crucial to change the ugly picture of poor outcomes we currently have.

Dr Olasehinde has coordinated our unit activities aimed at improving access to breast cancer screening for Nigerian women. In a cross-sectional survey of 1169 women aged 40 years or older in Ile-Ife, only 6% had had breast screening within a year of the survey, even though 94% knew about breast cancer and a quarter of the women knew someone who had died of breast cancer.[10] In another study focusing on undergraduates of the Obafemi Awolowo University, the majority of the 127 young ladies surveyed were aware of breast cancer and the need for self-breast examination, but less than half of them have ever examined themselves![11] We also identified barriers to breast cancer screening and early presentation in our community. In a population-based study in southwest Nigeria, 609 women with breast cancer were geolocated and their locations correlated to their stage at presentation and treatment outcome. Patients in the highest travel-time quintile had a 2.8-fold increase in the odds of presenting with stage III or IV disease relative to patients in the lowest travel-time quintile. Travel time ≥30 minutes was associated with an increased risk of death.[12] This study was conducted several years ago and the implications of the current marked increase in transportation costs on the time and stage of cancer presentation can be imagined.

Mr Vice Chancellor sir, I was invited by the Editor of the Lancet Global Health to write a commentary on the findings of research conducted in five sub-Saharan African countries.[13] The authors reported increased mortality associated with further distance from the specialist hospitals and increased transit time to care. This has implications for policymakers in Nigeria regarding access to specialist cancer care. The majority of Nigerians still travel from one state to another and in some instances from one geopolitical zone to another just to access care. The provision of adequate cancer care facilities and personnel in already established tertiary care centres in each state of Nigeria is crucial to reducing mortality from the disease.

Artificial intelligence and machine learning tools are already being deployed for breast cancer detection worldwide. AI algorithms are very useful for analysing mammograms to detect signs of early breast cancer. With the shortage of medical personnel including radiologists across the country, the use of these tools can enhance personalised screening for Nigerian women. Apart from screening, AI tools can also be deployed for pathologic diagnosis and biomarker detection, clinical staging, and treatment planning. Many such AI algorithms are commercially available today and are being utilized by healthcare facilities. I collaborated with computer science experts to develop a system for staging breast cancer in Nigeria.[14] This system employed the traditional rule-based approach to develop an expert system using the JAVA programming language. It aims to serve as a decision support system for inexperienced doctors in staging breast cancer. The developed system was evaluated for accuracy, reliability, and usability and it produced Mean Opinion Scores of 4.12, 4.12, and 4.08 respectively.

Breast cancer treatment

Breast cancer treatment in Nigeria has been a challenge all along. Optimal treatment depends on the ability to obtain a pathological diagnosis and define the biological characteristics of the tumor to enhance the decision for personalized treatment. Diagnosis still constitutes a challenge as many middle-aged women presenting with the typical painless breast lumps visit local hospitals for removal of the mass without subjecting it to histopathologic examination. The majority of these women would end up presenting later with very advanced diseases with attendant poor outcomes. On the other hand, those sent for histopathological appraisal often experience delays due to the shortage of pathologists and numerous logistic challenges in pathology laboratories. When breast cancer is eventually diagnosed, characterization by immunohistochemistry (IHC) is a necessity. In our earlier report, very few patients in our hospital had immunohistochemical analyses of their tumors.[2] I was a part of the team of surgeons who worked with our pathologists to establish IHC services in breast cancer with a cohort of 89 patients between 2004 and 2006.[15-17] This paved the way for further collaborations with Roche Pharmaceutical and later the African Research Group for Oncology (ARGO) led by Professors Isaac Alatise and Peter Kingham. In spite of their efforts, the sustainability of routine access and timely report for patient's treatment decisions is still a challenge.

The use of chemotherapeutic drugs is central to the treatment of malignancies including breast cancer.[18-21] This has however remained a challenge in Nigeria due to the out-of-pocket payment for these expensive drugs over the years. We have conducted studies to ascertain the challenges faced by our patients and identified ways of overcoming them.[22,23] In a retrospective study of 225 patients with breast cancer between 1998 and 2002 in Ile-Ife, a non-adherence rate of 80.9% was observed in 152 of 188 patients treated with chemotherapy. Reasons for non-adherence were lack of funds in 45%, "feeling well" in 18%, fear of mastectomy in 15%, and unbearable drug side effects in 11%.[24] In another study, we reported a paradox of wellness and nonadherence among Nigerian women in which women absconded from further treatment after the tumour shrank significantly with the initial doses of chemotherapy![25-26] Efforts of the Federal Ministry of Health at improving chemotherapy access have been restricted and inconsistent making the same catastrophic expenditure persist with out-of-pocket payment by patients. The challenge of affordability has worsened in the past few years as inflation soared and the cost of drugs heightened with grave consequences, particularly for vulnerable women with breast cancer.

Surgical treatment for breast cancer has evolved over time and our unit has consistently provided new options for surgical treatment to patients as appropriate. A woman presenting with early disease can have operations to remove the tumour and conserve the breast but when the cancer is adjudged not to be early, removal of the breast (mastectomy) is necessary. We have identified in a review that breast-conserving surgeries are rarely used for our patients in Nigeria, largely due to the late presentations with locally advanced disease.[27] Albeit, those who qualify for surgical options that preserve the breast should not be

made to undergo mastectomy. Unfortunately, if a breast-conserving option is chosen, the patients usually require radiation to the breast to prevent recurrence of the cancer. This brings to the fore the chronic challenge of access to radiation therapy in our country. The Federal Government decided that the facility would be provided only on a public-private partnership basis and several teaching hospitals were designated for the project. The majority of these never took off after close to a decade of promises. The arrangement has sadly increased costs of radiation therapy from between ₦70,000 and ₦100,000 in 2015 to more than two million naira today in the different centres in Lagos. In a study from our hospital database, only 6% of women with breast cancer had radiation therapy and the percentage has certainly dropped further with the economic downturn of the past two years.[28] Indeed, a recent prospective study of women undergoing treatment for breast cancer in our hospital revealed that up to 70% experience catastrophic health expenditures due to out-of-pocket payments.[29] We all need to work together to prevent families from being impoverished because a loved one developed a treatable disease. Our team has successfully introduced a protocol for early discharge of women who had mastectomy and we observed that home wound drain management was safe among them.[30,31]

Cancer survivors

There is a growing population of breast cancer survivors in Nigeria. With the advocacy of public figures like Her Excellency Dr. Mrs. Betty Anyanwu Akeredolu, we now have public figures and celebrities who are bold enough to share their stories with recently diagnosed patients and indeed the larger population. Dr. Wuraola-Ajayi, who now leads breast cancer research and community engagement in our team, recently led a qualitative evaluation of 163 breast cancer survivors.[32] We observed that the age, stage at presentation, tumor size, and completion of prescribed multimodal treatment were significantly associated with survival. Of the five different themes explored in the qualitative analyses, strong family support and spirituality were identified as prominent coping strategies in the cohort highlighting the need to formulate policies to enhance psychosocial support systems for every newly diagnosed patient with breast cancer and continued support after they have completed treatment.

Male breast cancer

We have reported the occurrence of breast cancer in men, accounting for 3% of all breast cancers in OAUTHC.[2,33] Mean age at presentation among men was 64 years. The rarity of the disease in men and its occurrence in older age groups meant most of them delayed presentation while treating the lump as a "boil". The small size of the male breast implies that a cancerous growth left unattended in it will easily grow beyond the boundaries of the breast. Indeed, most of the men we have treated for breast cancer presented with stages III and IV cancers and a high rate of loss to follow-up. This highlights the need to extend community engagement for breast cancer to include awareness and encouragement for early presentation.

General Surgery

The peculiarities of general surgery practice in settings such as ours presents numerous opportunities to impact the health of the people. The unmet surgical needs in Nigeria with limited access to surgical services especially at the primary and secondary care levels, results in a deluge of cases referred to general surgery practitioners in tertiary hospitals. The result is the late presentation of cases with the diversity of conditions and attendant impact on their outcomes. I will review just a few of the general surgical conditions we have been involved in.

Abdominal wall hernia, the protrusion of contents through a defect, is one of the most prevalent general surgery conditions in our country and still constitutes a major burden with complicated primary hernia as well as complications of poorly repaired hernia presented to general surgeons. In one of our hospital-based studies, we observed that occupation had no significant influence on the occurrence of hernia but manual workers had a significantly higher degree of posterior wall defects by the Nyhus classification compared to professionals.[34] My amiable and much-respected teacher, Professor Augustine Agbakwuru, devoted a huge part of his career to studying and treating abdominal wall hernias in our hospitals and the community. In a prospective observational study of 565 patients with groin hernias, we observed that 580 (95%) had inguinal hernias with 529(88.9%) being unilateral, and 36(11.1%) having bilateral hernias. Only 21(3.5%) were femoral hernia. Of the inguinal hernias, 443(76.4%) were indirect, 124(21.4%) were direct while 23(2.2%) were pantaloon. 152(26.2%) of the inguinal hernia were bubonoceles, 323(55.7%) were funicular while only 105(18.1%) were inguino-scrotal.[35]

Our team conducted several studies to improve the outcome of hernia treatment in Nigeria. We described the use of the Darning technique of inguinal hernia repair in 132 patients in Ile-Ife. The method aims to achieve a near tension-free repair without the use of mesh. Most procedures, 110 (83.3%) were performed under local anesthesia. Surgical site infection occurred in six patients (4.5%), while four (3%) had chronic groin pain. At a mean follow-up period of 15 months, there were two recurrences (1.5%) both occurring in patients with bilateral hernias. We concluded that the Darning technique of inguinal hernia repair is a safe and effective method for inguinal hernia repair in our setting.[36] We introduced mesh inguinal repair in our hospital and evaluated the impact, outcome, and cost implication of tension-free inguinal hernia repair in our community. We performed mesh repair of inguinal hernias in 30 consecutive patients aged 21-78 years. Mesh fixation took an average of 15 minutes and was well tolerated. Only 2 (6.7%) cases of superficial wound sepsis complicated the procedure and after one year of follow-up, none of the patients had recurrence demonstrating the main advantage of this method over all the other techniques without mesh.[37] We then compared our Darning technique with the Lichtenstein technique in terms of frequency of postoperative complications, recovery, and cost.[38] We compared 33 patients who had Lichtenstein repair to 34 who had Darning repair. Lichtenstein repair was associated with less post-operative pain, less

analgesic requirement, and shorter time of return-to-work activities. We observed that Lichtenstein is superior to Darning in terms of post-operative recovery while both techniques are comparable in terms of frequency of early post-operative complications and total cost. There was no recurrence in any of the groups. Total cost was comparable between the two groups. As we expanded and domesticated the practice of mesh repair of inguinal hernias, we described our experience with 500 cases of mesh hernia repair performed over 10 years up to the year 2017.[39] We used polypropylene mesh in most cases with a recurrence rate of 1.4% at a median follow-up period of 15 months. Since then, mesh hernioplasty has become routine in our practice.

Figure 2: Some conditions encountered in general surgical practice

Surgical gastroenterology and oncology

Our team provided active service, conducted research, and offered training in surgical gastroenterology and surgical oncology. We commonly treat patients with obstructive jaundice which requires detailed radiological investigations to make a diagnosis. Our team collaborated with our radiologists to evaluate the accuracy of ultrasonography in diagnosing causes of obstructive jaundice. With a dedicated sonologist, we found ultrasound a reliable imaging modality for diagnosing the cause and level of obstruction in surgical jaundice with a strong correlation between the definitive diagnosis and the sonographic level of obstruction. The overall sensitivity of ultrasound for detecting the cause of obstruction was 76.6%, while the specificity was 98%.[40] Way back in 2018, we described our experience with open common bile duct exploration in patients with choledocholithiasis. We reported the good outcomes along with the progressive adoption of primary closure over and above the use of T-tubes after the exploration.[41] Our lamentation in that paper about the non-availability of endoscopic retrograde cholangiopancreatography (ERCP) as an option for our patients has since been solved by the dogged efforts of Professor Olusegun Alatise, who has performed the largest number of this procedure in any Nigerian public teaching hospital.[42]

Gastrointestinal malignancies are diverse in location, peculiarities and treatment. In particular, colorectal cancers are a huge burden in Nigeria, A much-cited publication from our unit highlighted the disparities in cancer presentations between high and low-development index countries. We compared the pattern of presentation and spread of colon and rectal cancers among 160 patients in OAUTHC, Nigeria with that of 1947 patients in a North American hospital.[43] Nigerian patients were younger and presented with a later stage of disease. Only 2.2% of Nigerian patients presented with liver metastases compared with 48.1% of North American patients. Conversely, 61.3% of patients in Nigeria presented with peritoneal metastases only compared with 5.4% in North America. Overall survival stratified by stage at presentation (III/IV) showed a worse prognosis for patients in either stage subgroup in Nigeria than in North America. Efforts are ongoing locally and internationally to address these disparities and improve outcomes for our patients.[44,45]

In Nigeria, gastric cancer, i.e. cancer arising within the stomach, is the 10th most common malignancy, but its frequency betrays its potency as a killer. I constantly remind our students that from ages past, gastric cancer has remained one of the "captains of the men of death". In a recent review, we observed that nearly all (90.2%) presented late with advanced cancers.[46] We therefore needed multimodal treatment for them with half of the patients undergoing both chemotherapy and surgery. Although two-thirds of those undergoing surgery had resection of their tumor, half of the total patients diagnosed and treated for gastric cancer were dead within 3-4 years of diagnosis. We also treated patients with gallbladder cancers, which fortunately is a rare malignancy. In our series, the overall survival rate of this disease was 32% in 1 year falling to 10% in 5 years consistent with its reputation of high mortality owing to the usual late diagnosis. Despite multimodal radiological investigations, 67.7% of the diagnoses in our patients were made intra-operatively! We could only offer surgical treatment of radical cholecystectomy and lymphadenectomy in 4.1% of them.[47]

As with every general surgeon across the world, acute appendicitis has also attracted our attention in practice and in research. It is apparent that too many appendectomies are performed without the need for it, while paradoxically too little of appendectomy is performed when needed.[48] The debate about appendectomy ignited with the shift in global trend towards antibiotic treatment of acute appendicitis. Aside the many RCTs already carried out, large patient meta-data analyses are also being carried out. I was recently invited by the editorial team of The Lancet Gastroenterology and Hepatology to write a commentary on one such independent patient data meta-analysis. Many centers abroad would diagnose acute appendicitis with Abdominal CT scan and characterize the aetiology by radiologically identifying the presence of a faecolith (a stony hard faeces) within the lumen of the appendix before stratifying patients into possible medical treatment of the condition. It is glaring that for us in countries with challenges of healthcare infrastructure, adoption of non-operative treatment should be with caution as

our patients usually present after some initial delays. In such cases, delaying appendectomy further may be attended by complications.[49]

We have participated in several international collaborative research to reduce the incidence of surgical site infections, some of which I will highlight later. Locally, we have conducted randomized controlled trials to identify interventions to reduce the burden of these infections. We conducted an RCT investigating the influence of two methods of preoperative hair removal on surgical site infections in our hospital.[50] We also compared plain polydioxanone sutures to triclosan-coated sutures for fascia closure and observed that the use of triclosan-coated polydioxanone for fascia closure in open appendectomy did not significantly affect the rate or severity of SSI.[51] Though antimicrobial-impregnated sutures are very expensive, they may not be the much-needed magic wand to reduce surgical site infections in our setting. We also investigated the influence of adhesive incise drape use on surgical site infection rates in contaminated and dirty abdominal operations.[52] We compared the rate of SSI when we used iodine-impregnated incise drapes compared to plain drapes in these categories of patients. While 46.4% of patients had SSI in the iodine-impregnated adhesive incise drape group, 63% of patients had SSI in the conventional drape group. The difference was however not statistically significant, again proving that the more expensive interventions may not necessarily change the outcomes of our patients' operations.

One of the delightful yet challenging aspects of general surgery practice in our environment is the management of rare abdominal surgical conditions.[53-58] In more advanced settings, surgical surprises are less frequent due to the wide array of radiological investigations patients undertake before a surgical referral. In our practice, we commonly treat patients who have had scanty investigations before referral due to the cost and non-availability of such facilities. Our team has described the finding of complete situs inversus (with all organs occurring on the opposite side of the normal anatomical position) in a 53-year-old man who had been involved in a road traffic accident and required emergency operation.[59] In another instance, we operated on a patient with severe abdominal pain with findings of torsion of a wandering spleen, one which rather than being fixed in a location can freely move around the abdomen due to an unusually long attachment.[60] A choledochal cyst is a congenital anomaly of the extrahepatic biliary tree usually presenting with jaundice in infants. We successfully managed a 26-year-old lady with the condition which was neglected since childhood and presented during her National Youth Service in Ile-Ife.[61] We have also seen several cases of congenital Hirschsprung's disease in which newborns develop constipation and parents neglect it, only to present in adulthood, at times as late as the third decade of life.[62,63] Gastrointestinal bleeding can occur from several causes and as surgeons, we usually have a high index of suspicion for uncommon causes. We managed a 56-year-old man with severe gastrointestinal bleeding from Kaposis' sarcoma! He was negative for Human Immunodeficiency Virus which is commonly associated with the condition.[64] Similarly, in a retrospective review of 956 patients treated for appendicectomy over 10 years, we found that 22 (2.3%) had schistosomal appendicitis. The

main intraoperative findings in them were appendiceal and peri-appendiceal adhesions in 11(50%) with meso-appendiceal lymphadenopathy in three. Histopathologic findings suggest features of chronic schistosomal infection characterized by sub-mucosal fibrosis and oviposition.[65] We also reported cases of abdominal tuberculosis in 47 patients including 21 males and 26 females. Nearly all presented with abdominal pain, ascites, and weight loss but luckily 93% of them had complete resolution with antituberculosis therapy.[66]

The General Surgery Unit of our Hospital has, since its inception, been in the vanguard of local adoption of modern techniques in international current surgical practice. I will discuss this further later. While gastrointestinal anastomoses are traditionally performed by hand-sewn techniques in Nigeria, our unit published the first article in Nigeria describing experience with stapled gastrointestinal anastomoses in 2015.[67] We utilized linear stapling techniques for Roux-en-Y gastrojejunostomies, ileo-colic, ileo-ileal, and colo-colic anastomoses. That report demonstrated the feasibility of stapled anastomoses in our setting as we did not record any intraoperative complications and no anastomotic leakage occurred. In 2022, we also published the first Nigerian series of 14 patients who had low anterior rectal resection with circular stapled anastomoses.[68] This elegant procedure provides a unique opportunity for patients who previously may have been offered permanent colostomy following operations for cancers occurring in the lowermost parts of the rectum. With the techniques, many of such patients are spared the difficulties of a permanent colostomy which is quite challenging in our setting.[69] We also introduced the use of modern energy devices including ligasure and harmonic scalpel for haemostasis during our operations. We have reported the use of these devices in various abdominal operations and thyroidectomy.[70,71] Operations that were typically performed with transfusion of one or several units of blood are now routinely performed with no transfusions or much reduced when necessary. Open haemorrhoidectomy has similarly evolved in our practice as we have recently adopted the use of the ligasure energy device for the treatment of prolapsed haemorrhoids.[72,73] In a randomized controlled study, the use of the device for haemorrhoidectomy was compared to the Milligan-Morgan technique of open haemorrhoidectomy. Using ligasure resulted in a shorter duration of operation, less blood loss, and reduced postoperative pain. Our general practice of surgery has also covered traumatic injuries especially to abdominal organs,[74-77] gastrointestinal bleeding,[64,78] and a wide range of other conditions.[79-88]

Global surgery

Global surgery is a relatively new field that aims to improve surgical care worldwide by providing safe, timely, and affordable surgery. This is achieved through research into disparities in surgical practice and outcomes in countries with different human development indices and by implementing policies to improve outcomes in underserved regions. This is in tandem with Sustainable Development Goal number 3: Ensuring healthy lives and promoting well-being for all, at all ages. The Lancet Commission on Global Surgery in 2015 highlighted that nearly 5 billion people around the world lack access to safe and

affordable surgery and anaesthesia. It is estimated that around 160 million additional surgical procedures are required yearly to save lives and prevent disabilities, especially in low- and middle-income countries (LMICs).[89] Sadly, in Nigeria, this gap is widening further yearly with the unbridled migration of surgical workforce away from the country. The Commission further encouraged governments and healthcare policy formulators in LMICs to integrate surgery and anaesthesia into national health plans and health systems strengthening as vital components of universal health coverage for citizens. The need for improved access to safe surgery is increasingly concerning as postoperative deaths now outnumbers those from HIV, malaria, and tuberculosis combined.[90]

Collaborative Research

Mr Vice Chancellor, sir, a popular African adage says *"If you want to go fast, go alone; if you want to go far, go together."* The popular Zulu terminology "*Ubuntu*" is frequently translated "I am because we are", and largely describes societal interconnectedness. The pride of the African community, home and abroad, is the togetherness of our communal living, working together and building relationships that transcend generations.

Several decades of scientific research have seen individuals and institutions excel in telling their stories and professing their discoveries. In the health sciences, individual and institutional research led to the formulation of nuanced opinions, recommendations, and guidelines that cannot be adopted in other settings due to geographical, sociocultural, and economic factors. The role of collaboration and collaborative research in surgical practice in underdeveloped societies cannot be overemphasized. Collaboration paves the way for improved access and equity with opportunities for capacity building, improved quality, and systems strengthening. On the other hand, collaborative research in settings such as Nigeria aids the development of evidence-based surgical practices. The multi-center studies carried out provide large, diverse, patient datasets with higher statistical power and external validity, allowing for more generalizable conclusions that ultimately enhance patient care and safety. In the conduct of these studies, we usually standardize procedures and protocols, leading to improved quality of practice and potentially improved patient outcomes. North-south and south-south collaboration facilitates the recruitment of larger and more diverse patient populations, strengthening the methodological rigor of clinical studies and enhancing research capacities in our institutions. Today, the only way to accelerate innovations of novel techniques, devices, and policies to address global disparities in surgical care is through collaborative research. I therefore challenge our university to provide incentives to attract and promote collaborative research

A quintessential example of collaborative research in surgical practice is the GlobalSurg Collaborative, coordinated by the National Institute of Health Research-Global Surgery Unit (NIHR-GSU) at the University of Birmingham and the University of Edinburgh, United Kingdom. Today, over 5000 clinicians in more than 100 countries are hosted in seven Hub countries where several institutions are

organised as spokes for effective conduct, dissemination, and implementation of research and its outputs.[91] Prof Adesoji Ademuyiwa, of the Department of Surgery, University of Lagos, is the Director of the Nigerian Hub of the Collaborative. His hard work as the Lead has attracted several research opportunities, funding, and infrastructure to the Nigerian hub, which he has grown from a few centers at inception in 2013 to a network of about 50 hospitals today. It was he who invited me to serve as his deputy in 2016, and I remain grateful for the opportunity to contribute to the transformation of surgical research in Nigeria over the years.

Today, the GlobalSurg Collaborative has initiated many practice-defining studies and published more than a hundred high-impact articles in top-notch surgical journals. These include international multicenter observational studies investigating outcomes of surgical practice in different settings including mortalities and infective complications following abdominal surgeries, outcomes of cancers surgeries and procedure-specific studies such as cholecystectomy. GlobalSurg 1 study perhaps launched the collaborative into the lead in providing real world data on disparities in global surgical practice and outcomes. The study prospectively observed mortality following emergency abdominal operations in 357 hospitals across 58 countries.[92] Overall mortality was 1.6% within 24hours of operation, with 1.1% deaths in high-income countries, 1.9% in middle-income, and 3.4% in low-income countries. After 30 days of operation, mortality had increased to 5.4% overall (4.5% in HICs, 6.0% in MICs, and 8.6% in LICs). This indicates that a patient who had an emergency operation in a low-income country has a 3-fold chance of dying within 30 days compared to a patient treated for the same condition in a high-income country. GlobalSurg 2 study observed the incidence of surgical site infections in patients undergoing abdominal operations across the world.[93] A total of 12539 patients from 343 hospitals in 66 countries were included. The observed rates, stratified according to the human development indices of the participating countries showed that low-HDI countries carry a disproportionately high burden of SSI and have higher rates of antibiotics resistance.

During the COVID-19 pandemic, the collaborative expanded rapidly to conduct studies on surgical practice and outcomes during the pandemic. These studies enhanced global knowledge on elective surgery cancellations during the pandemic[94] and its effects on cancer surgeries,[95] optimal timing of elective operations after the infection, [96] and effect of patient isolation on postoperative complications.[97] In the year 2020, the collaborative conducted a survey that included more than 130,000 patients recruited over a month by 15,025 surgeons and anaesthetists in 116 countries! This was awarded the Guinness World Record for the most authors in a scientific publication in 2020.

GlobalSurg Collaborative has continued to improve knowledge and inspire changes in surgical practice across the globe through pragmatic interventions. The first interventional study of the collaborative tested the use of chlorhexidine versus povidone iodine for skin preparation, and the use of antimicrobial-

impregnated sutures versus plain sutures for closure of the fascia layer of the abdominal wound in a 2x2 factorial randomized trial.[98-103] That first of its kind study, the FALCON trial, recruited 5,800 patients from 57 hospitals in 7 LMICs and our team in OAUTHC contributed about 11% of the total recruitment. Today, strengthened by the result of that study, surgeons in our setting can effectively choose any of the two antiseptic solutions for skin preparation, and also avoid the very expensive antimicrobial impregnated sutures without increasing risk of wound infections in our patients.

CHEETAH trial was a cluster randomized intervention that investigated the influence of routine change of gloves by all scrubbed team at operation and instrument change at the time of abdominal wound closure on surgical site infections. Our hospital was one of the 81 hospitals randomized across seven LMICs to test the influence of this behavioural change in the operating theatre.[104-106] The study recruited 13,331 patients and showed a significant reduction in SSI following the adoption of this low-cost intervention.[107-108] Following robust advocacy from the Prof Ademuyiwa-led NIHR Nigeria group, the Federal Ministry of Health adopted this intervention and mandated its inclusion in the WHO Surgical Safety Checklist to be used in each hospital in Nigeria. In the HIPPO study, we highlighted the current demographics of access and current practices of inguinal hernia repair globally by recruiting 18,058 patients from 640 hospitals in 83 countries.[109-111] The GECKO study collected data on more than 50,000 cholecystectomies performed worldwide to determine the pattern of practice and outcome up to a year. The collaborative has contributed vastly to global surgical practice in the areas of surgical oncology, surgical infections and research methodology.[112-127] Ongoing Globalsurg studies include PENGUIN, ALLIGATOR, GIRAFFE, and TIGER studies to mention a few.

A notable impact of the collaborative is the Community Engagement Initiative through which surgeons in the different hubs are encouraged to engage with patients, communities and policy makers to initiate research, disseminate findings and influence local, regional and national policies on healthcare, particularly surgery. This initiative, currently led by Dr Funmilola Wuraola-Ajayi in our institution and Dr Omolara Williams, Associate Professor at the Lagos State University, has seen us as surgeons engage our community with surgical health education. We are incorporating patients into research design, enhancing surgical experience by including navigated patient support service in research design, and engaging our community health workforce in local advocacy for surgical healthcare. I believe this initiative has the potential to transform surgical services in our community, improve surgical health seeking behaviour, and improve acceptance or adherence to surgical treatment schedule including follow-up in our practice.

Within our continent, the African Surgical Outcome Study (ASOS) Group has also conducted research focused on surgical outcomes of patients particularly in sub-Saharan Africa. I have had the privilege of collaborating in snapshot audits of surgical outcomes after surgery in children,[128] as well as maternal and

neonatal outcomes following caesarean section in Africa.[129] We have described the impact of surgical delay on resectability of colorectal cancers across the continent,[130] postoperative outcomes associated with procedural sedation,[131] and carried out a cost effectiveness analysis of preoperative mouthwash with chlorhexidine to prevent postoperative pneumonia.[132] Taking a cue from these, the Association of Surgeons of Nigeria at its 2023 Annual Congress with Prof Adesoji Ademuyiwa as President, engaged senior surgeons from different specialties across Nigeria who lamented the lack of robust, reliable, and truly national data for variables as simple as surgical site infection. At the meeting, a Nigeria Surgical Research Collaborative was formed which conducted a prospective study of surgical site infections following abdominal surgery across Nigeria in 2024. That study, delivered by 320 surgeons and trainees, recruited nearly 2,500 patients in just three months from 53 hospitals across 32 states of Nigeria and the Federal Capital Territory. Mr. Vice Chancellor sir, I served as the National Lead for that study which is currently undergoing review towards publication in a high-impact international journal. It is therefore curious that even now, some people still wrongly define collaborative research as one in which some foreign partners dictate research priorities or outcome and force it on partners in less developed countries. Some even teach that every collaboration has an underlying mischievous intent of the funder. This is not strange based on the opacity with which academic research was conducted in the past. Today, particularly in the surgical field, collaborative research is the only way we can deliver reliable scientific evidence for planning, interventions, and policies to improve our healthcare as a nation.

While conducting these international collaborative studies, we have initiated and inserted undergraduate medical students of the Obafemi Awolowo University into research at different levels. At least 18 medical students of our university have participated in high impact international research and named as co-authors in reputable international journals including The Lancet and British Journal of Surgery. Mr Vice Chancellor sir, it is a great feeling of fulfillment seeing these exceptional students making us proud on the international stage at these early stages of their careers. More importantly, in the past few years, I have seen some of them graduate from our university and go on to compete at levels we did not imagine. Indeed, the saying “catch them young’” is extremely useful in today’s global research field.

In a number of our global surgery studies, I had the privilege of being the Nigerian national lead for research projects conducted in up to a hundred countries concurrently. All of us had equal stakes in the research, from the conceptualization through to publication, and in many instances, authors are often listed in alphabetical order. This brings to fore the shortfalls of ranking authorship in publications solely by the order of listing recently adopted by our university. Mr Vice Chancellor sir, with the great shift towards collaboration in scientific research publications, I believe our university must go on to adopt criteria for rating research and authorship which may include the citations of a research article, the number of downloads, local and international importance, impact on current practice, contributions of

individual authors, and innovations for the future among others. This will encourage our junior faculties to embrace international best practices and opportunities early on.

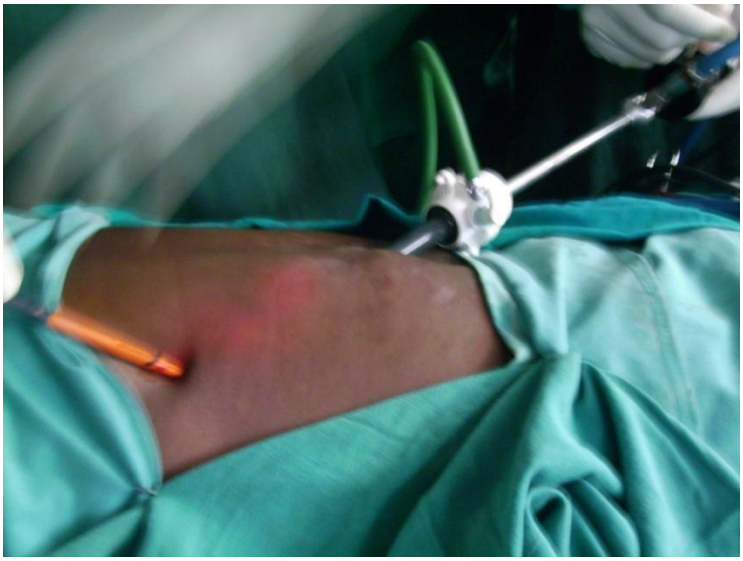


Figure 3: Laparoscopic operation

Minimal Access Surgery

Mr Vice Chancellor sir, so far, I have described my surgical practice based on what I was taught and what surgical disease burden in our community presented to me. There is however an aspect of my practice that evolved through my passion to offer Nigerian patients equitable surgical care, a desire to make patients in Ile-Ife access the same quality of surgical care as one in a high-income country. That is Minimal Access Surgery (MAS).

Apart from the discovery and use of anaesthesia for pain control during surgical operations, the greatest revolution in surgical practice to date is the development of MAS techniques. While conventional open surgery involves making a large incision to allow direct inspection and the insertion of the surgeon's hands and instruments, the concept of MAS—commonly referred to as minimally invasive, keyhole, or endoscopic surgery—relies on technological assistance to visualize and operate on internal organs through a narrow opening, i.e., minimal access. The term "minimally invasive" was initially adopted when such procedures were limited to inspection and diagnosis. However, today, a wide range of complex surgical interventions can be performed using this technique. Personally, I prefer the term "**minimal access**," as it more accurately reflects that the key distinction lies in the method of access, not the extent of the intervention. Endoscopy, involving the use of a camera to visualize an interior organ, being the first form of MAS, dates back to the 19th century, with Philip Bozzini developing a rudimentary lighted tube in 1806. Laparoscopy, which entails the use of such a camera to visualize the abdominal cavity, was first performed by George Kelling in 1901 on a dog. The 20th-century revolutions were however very significant with the introduction of optical rod-lens system in the 1950s improving visualization. This opened a world of opportunities for procedures within different body cavities utilizing different flexible and rigid telescopes called endoscopes. In the 1980s, laparoscopic cholecystectomy, i.e. removal of the

gallbladder, became the first widely accepted MAS technique. From then, laparoscopic surgery became the gold standard in treating many abdominal surgical conditions.

Techniques for other operations were similarly developed in quick succession and the principles were adapted to other procedures. Single incision laparoscopic surgery is one in which all instruments are introduced through the same opening on the abdomen. This often requires the use of instruments that can angulate for ergonomic purposes. Natural orifice translumenal endoscopic surgeries (NOTES) involves the use of flexible endoscopes adapted with working instruments to carry out operations going through the natural orifices of the body such as the mouth (transoral) or the vagina (transvaginal) NOTES. The evolution of MAS techniques was demonstrated in the removal of goitres from open dissection in the neck, then through MAS via the areola region, later through the armpit and nowadays through the mouth of a patient thereby having no scars on the neck.

By the 2000s, Robotics and Computer-aided systems like the da Vinci Surgical System were produced. These have greater precision, reducing surgeon fatigue and extending the possibilities of MAS beyond the limits of human ergonomics. Today, there are continuing advances in technology, High-definition imaging, 3D visualization, and AI tools for intraoperative decision making. The integration of robotics, augmented reality, and nanotechnology may further enhance MAS precision. Remote and telesurgery have emerged, allowing surgeons to operate on patients from distant locations. The journey from crude surgical tools to the sophisticated techniques of MAS demonstrates remarkable progress. This evolution underscores the importance of technology, innovation, and the relentless pursuit of patient-centered care.[133-136]

Narrow is the way that leads to life…….

Mr Vice Chancellor sir, in the gospel according to St Matthew, Chapter 7 verse 14, the Lord Jesus Christ, in describing the only way of salvation and eternal life made a categorical statement "*Narrow is the gate and difficult is the way which leads to life, and there are few who find it*". In that sentence, Christ was emphatic about the uniqueness, challenges and joyous outcome of finding and adhering to the only true way of salvation. I can attest to this on a personal basis. From my adventure into the field of MAS, the challenges encountered in the process as well as the good outcomes recorded in our patients, I have drawn inspiration from the **narrow gate**, the **difficult way**, the **life** that attends the way, and the fact that **only a few are found in it**.

MAS offers several advantages over conventional open operations, making it a preferred option in many surgical scenarios. These benefits include:[137]

1. Reduced trauma to the body: Smaller incisions result in less disruption to surrounding tissues, muscles, and organs compared to large incisions in open surgery.

2. Less pain and discomfort: Smaller incisions reduce postoperative pain, often minimizing the need for pain medications.
3. Shorter recovery time: Patients typically experience faster healing and can return to normal activities more quickly.
4. Shorter hospital stays: Many MAS procedures are performed on an outpatient basis or require only a short hospital stay, reducing healthcare costs and improving patient convenience.
5. Lower risk of infection: Reduced exposure of internal organs during surgery decreases the risk of surgical site infections. A small wound is also less likely to develop severe infections.
6. Reduced blood loss: Smaller incisions and precise surgical techniques lead to less bleeding during the procedure.
7. Minimal scarring: The smaller cuts heal more neatly, resulting in less visible scars compared to open surgery.
8. Improved precision: Advanced tools such as laparoscopes and robotic-assisted systems allow surgeons to perform highly precise movements, improving surgical outcomes.
9. Better cosmetic outcomes: The smaller scars from MAS are less noticeable, which can have psychological benefits for patients concerned about their appearance.
10. Lower risk of complications: With less trauma, there is a reduced risk of complications such as adhesions after operation.

These advantages led to the widespread adoption of MAS techniques in fields such as general surgery, gynecology, urology, orthopedics, cardiothoracic surgery and indeed most surgical subspecialties. Indeed, ***the narrow way of operation***, that is, the use of minimal access, ***is the gateway that leads to improvement*** of the surgical outcome and better quality of ***life*** for surgical patients.

Unfortunately, there are many barriers to the adoption of MAS in Nigeria, similar to many other poorly funded healthcare systems in LMICs. The initial cost of acquiring laparoscopic towers and instruments is high and requires commitment from healthcare policymakers.[138] This is accompanied by the need to provide reusable or disposable consumables for general use as well as procedure-specific requirements. Being a specialised skills-based technique, there is a need for training and retraining of surgeons and the surgical team. This was a major constraint two decades ago as nearly all surgeons needed to travel abroad to access training. After training, many returned to Nigeria and were unable to domesticate the practice due to a lack of proctoring. This paved the way for a generation of "mission practices" where foreign surgeons visit institutions to perform laparoscopy over a short period. Many of these were heavily funded and publicised but unsuccessful in long-term skills transfer. Another major barrier to the local adoption of MAS in Nigeria was the requirement for dedicated surgical teams. While the equipment and consumables require dedicated and committed surgical teams including perioperative nurses and biomedical engineers, experienced anaesthesiologists play a key role in successful laparoscopic surgeries.

The mere fact that the whole operation technique is dependent on image generation and transmission to guide inspection, dissection, and or resection depending on the cases, it stands to reason that a constant power supply must be guaranteed. Two decades ago, power supply was a big challenge in Nigerian tertiary hospitals, but sadly, it is a bigger challenge today than ever before. Equipments for laparoscopic and robotic surgeries are continuously evolving with sophisticated devices that cannot stand the rigors of unstable power supply and voltage fluctuations. Over the years, we have lost many expensive devices and equipments to the poor quality of electricity supply. Supply chain has equally been a challenge with many of the manufacturers having no dedicated suppliers in Nigeria. This creates a challenge of access and maintenance of the items. These are some of the reasons why even today, the adoption of laparoscopy is still low in Nigeria.

Development of MAS in general surgery in OAUTHC, Ile-Ife: *difficult is the way*……

In 2005 as a Senior Registrar, though I was on the path to the Fellowship of the West African College of Surgeons by training, I elected to also carry out a dissertation for the Fellowship of the National Postgraduate Medical College of Nigeria and held discussions with my mentor, Professor Olusanya Adejuyigbe who directed me to Professor Oladejo Lawal. Both of these great teachers eventually supervised my dissertation in which I tested different methods of hair removal in reducing surgical site infections among patients undergoing day-case operations in hair-bearing areas of the body.[50] That very simple randomized controlled trial was later cited by the WHO expert panel who developed guidelines for prevention of surgical site infections. I remain grateful to my supervisors for their mentorship on that very simple project which set me on the path to a successful career in surgical research locally and globally.

In carrying out a literature search for that dissertation, I realised that nearly every new publication in reputable international journals on common abdominal surgical operations was on laparoscopic surgeries, highlighting the huge gap in our training. While I was training for the future with conventional open abdominal operations, MAS were already regarded as the standard of care. Even though diagnostic laparoscopy for infertility was commonly performed in our hospital by gynaecologists, laparoscopy for general surgical procedures was rare. I took the opportunity of the mentorship of my supervisors to discuss my desire to train in and start laparoscopy for general surgeries with them. They, along with my other teachers in general surgery identified all the barriers I would need to overcome to establish the practice. As God would have it, Prof Adejuyigbe became the Chief Medical Director (CMD) of the Hospital and sustained his enthusiasm for the development of laparoscopy in the hospital. I enjoyed tremendous support from all consultants in the department as I went from one stage to another in developing the practice.

Mr. Vice Chancellor sir, for an ambitious young surgeon who desires to try something new and impact surgical practice in Nigeria, the Department of Surgery of this great University is perhaps the best for incubating brilliant surgical ideas. Our teachers of the past pioneered uncommon services in the department, such as separation of Siamese twins, neurosurgery, kidney transplantations, cochlear implantations, and many more. However, the pioneering role of Professor Anthony Arigbabu in diagnostic and therapeutic gastrointestinal endoscopy in Nigeria is a tall foundation upon which our subsequent modest achievements in laparoscopy stand. While undergoing junior residency rotations, I was also greatly inspired by the doggedness of one of my teachers and current Dean of Faculty of Clinical Sciences, Professor Ayo Salako, who used various locally fabricated materials and equipment to facilitate the establishment of endoscopy in urology practice in our hospital.

In September 2007, I travelled out of Nigeria for the first of my several stints of training abroad. I returned home later with so much zeal but faced the stark reality of our lack of facilities for the project. I observed that all the equipment previously used by the gynaecologists for laparoscopic surgeries were dysfunctional. In desperation, I started tearing through the theatre storage rooms and stumbled on a carbon dioxide insufflator that was purchased by Prof Anthony Oluwole Arigbabu from Germany in 1982 and has never been used. It was such a crude old version that worked without electricity and does not have the required pressure monitors. An individual need to stand by it and pump the gas to go through! I then retrieved and repaired the broken light source previously used by gynaecologists. Having tested these, I approached the then CMD who facilitated the purchase of a single-chip camera from India which I coupled with a monitor in one of the stores in the theatre. With that improvised setup I performed our first diagnostic laparoscopy in January 2008 as a Senior Registrar! My consultants in general surgery were so supportive they recruited more patients for me within a few weeks. This enabled us to build infrastructure and experience over time. Unfortunately, our hospital had no Board of Management back then and the CMD, even though very enthusiastic to buy a laparoscopic tower, was limited in spending approvals. That limitation inspired us to innovate solutions through local adaptations and improvisations. I supervised a roadside welder to fabricate a laparoscopic tower and we purchased a cheap insufflator with a Quadro-manometric parameter display to enhance intraoperative patient monitoring. With that, we consistently performed therapeutic and diagnostic laparoscopic procedures. In 2010, after I had performed more than seventy cases, I went to Sheba Medical Center, Tel Hashomer, Israel, the largest hospital in the Middle East for training in advanced laparoscopy. The experience of large-volume, advanced operations performed daily by experienced surgeons heightened my desire to return home for greater impact.

Figure 4: Evolution of laparoscopic set-up in Ile-Ife: how to start with a lean budget[139]

Mr Vice Chancellor sir, when I started, I only desired to demonstrate the ability to perform laparoscopy on some patients. But indeed, God is able to do exceedingly, abundantly, above all we can ask or imagine! To the glory of God, I performed a diagnostic laparoscopy on a young man with acute abdomen in January 2008. Since then, we have gone ahead to carry out the first laparoscopic appendectomy in OAUTHC, Ile-Ife, in June 2008 and the first laparoscopic cholecystectomy in June 2009. I performed the first laparoscopic hernia repair in January 2011, laparoscopic colon cancer resection in July 2011, laparoscopic distal gastrectomy for gastric cancer in November 2016, and laparoscopic distal pancreatectomy in 2021. We have performed single incision laparoscopic operations, laparoscopic operations for weight reduction, and laparoscopic Roux-en-Y diversion for cancer of the biliary tree. We have also used laparoscopy to treat other conditions such as achalasia, hiatus hernia and ventral hernia. Today, we have successfully carried out more than 1,400 laparoscopic procedures in the general surgery units alone besides hundreds performed with colleagues in other specialties in OAUTHC and in some other teaching hospitals across Nigeria. We have also been able to consistently offer laparoscopic services every month since 2008 till date except when hindered by industrial actions in the hospital. I have also been involved in assisting six teaching hospitals set-up laparoscopic services and proctor their young surgeons. I am grateful to God.

In most instances, our experience with laparoscopic services was the first of its kind in a Nigerian public teaching hospital. We therefore painstakingly documented our patient outcomes and published them in scientific journals.[140-141] Most of the early advantages of laparoscopic surgery were demonstrated in patients undergoing cholecystectomy, the removal of the gallbladder, which is carried out in many

instances due to the presence of gallstones and its complications. We retrospectively examined the trend over time for cholecystectomy following the introduction of laparoscopy in our hospital to evaluate the impact of MAS on our patients.[142] Over ten years covering the period before and after introducing laparoscopy, 173 cholecystectomies were performed in the hospital. The yearly total gallbladder operations in our hospital rose from 7 in 2005 to 31 in 2015 corresponding to 2.7% of total elective major general surgery procedures in 2005 and 9.1 % in 2015. In terms of ratio, from 0% in 2005, laparoscopic cholecystectomy rose to 90% of all cholecystectomies in 2015. The mean postoperative length of stay of patients undergoing cholecystectomy declined from 5.2 days in 2005 to 3.0 days in 2009 and 1.8 days in 2015. Our patients benefited from all the advantages of MAS, including minor wounds, less pain, and the ability to return home and resume their normal activities quickly. ***Indeed, the narrow gate leads to life!***

In carrying out these operations, we have conducted several studies highlighting the impact of laparoscopic surgeries on Nigerian patients. We described our initial experiences with patients undergoing laparoscopic appendectomy in comparison to open operation. Laparoscopy reduced the postoperative duration of hospital stay in half and also reduced wound infection rate significantly[143] This publication attracted discussion on gains of MAS across the country where many surgeons earlier held the opinion that appendectomy is too basic and commonplace for the deployment of this "elegant" technique. We went on to publish similar findings of improved patient outcomes in our initial series of patients who had laparoscopy.[144]

In a report of the first 150 patients undergoing laparoscopic cholecystectomy in our hospital, we observed that nearly one-third, (30%) presented with acute calculous cholecystitis.[145] One-third of our patients had markedly thick gallbladder walls and 7% had significant pericholecystic fluid collection in keeping with late disease presentation among our patients. We encountered gallbladder mucocele in 6%, empyema in 4%, and gangrenous gallbladder in two patients. Ten (6.7%) procedures were converted to laparotomy including two patients with hemoglobinopathies. Postoperatively, bile leaks occurred in two patients, bleeding requiring re-exploration in one, and bile duct dilatation after 4 months in one patient. Acute cholecystitis, hemoglobinopathy, and thickened gallbladder wall significantly influenced conversions and the occurrence of complications in our patients. Overall, our rate of conversion and complication following laparoscopic cholecystectomy is low.

For a technique initially touted to be mainly for cosmesis, wound complications of laparoscopic operations are of optimal concern. We described the wound outcomes of 236 patients in our initial experience.[146] These patients had undergone procedures such as cholecystectomies, appendectomies, colonic surgeries, and hernia repairs among others. Port site complications occurred in only 17 (7.2%) ports and included port site infections in 11 (4.7%) and hypertrophic scars in 4 (1.7%) patients while one

patient each had port site bleeding and port site metastasis. Indeed, laparoscopic surgery is associated with much-reduced wound complications that commonly follow conventional open surgeries among Nigerian patients.

A constant challenge of surgical practice in our setting is the late presentation of diseases by patients. With intrabdominal malignancies, this becomes a daunting task with patients presenting with advanced malignancies that often require extensive radiological and ancillary investigations to make a diagnosis before instituting any treatment. Sadly, many of these patients cannot afford these advanced imaging studies and at some points in our hospital, we did not have a functioning CT scan machine. Our unit therefore started deploying laparoscopy to attain anatomic diagnosis and obtain biopsies for histopathologic appraisal. By 2012, 152 patients with advanced intra–abdominal tumours had been treated. Of these, 74 (48.7 %) had advanced conditions that could not be resolved clinically. While 33 (44.6 %) were able to afford and had computed tomography (CT) scan, the remaining (N = 41; 55.4 %) less endowed only had an ultrasound scan. This cohort underwent laparoscopic evaluation, and biopsies confirmed the following: 27 (36.5 %) metastatic adenocarcinomas, 12 (16.2 %) primary hepatic malignancies, 11 (14.9 %) cases each of lymphomas and colonic adenocarcinomas, 4 (5.4 %) gastrointestinal stromal tumors, 3 (4.1 %) pancreatic carcinomas, 2 (2.7 %) cases each of carcinoid tumors and abdominal tuberculosis, and one case each of Schistosomiasis and HIV-related Kaposi's sarcoma. Additionally, 26 (35.1 %) had ascites, while 29 (39.1 %) had peritoneal surface malignancies.[147] Today, after treating several hundreds of patients with similar conditions, I still advocate for general surgeons in Nigeria to adopt diagnostic laparoscopy in complementing clinical diagnosis and staging of intra-abdominal tumours and attaining histopathological confirmation in our setting rather than perform the "open and close" laparotomy with attendant morbidity and mortality in such patients.

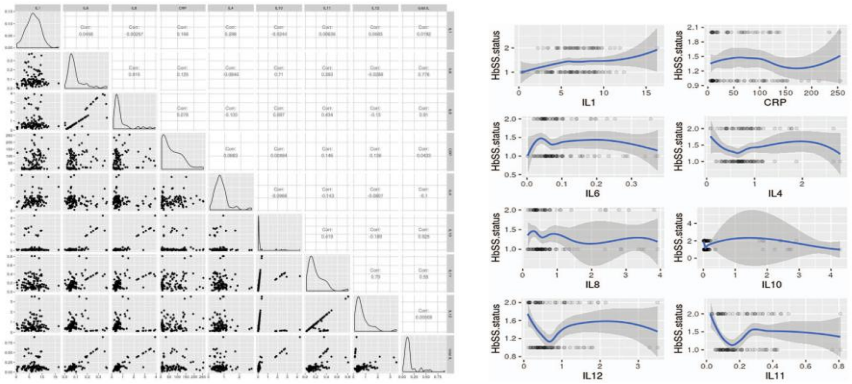
My teachers, Professors Sanya Adejuyigbe and Dayo Sowande ensured that we developed MAS in the paediatric surgery unit. By 2015, Prof Talabi and I had published a descriptive study of laparoscopic procedures carried out in children in OAUTHC, Ile-Ife, including laparoscopic appendectomies, laparoscopic ventriculoperitoneal shunt revision, biopsies of intra-abdominal masses and other diagnostic procedures.[148] A conversion rate of 17% was recorded demonstrating that laparoscopy is safe and feasible in treating surgical disease in Nigerian children. Prof Adejuyigbe later brought his then senior registrar, Dr Arua Igwe to me with the mandate that I must “make a laparoscopic paediatric surgeon” out of him! The young man encouraged me by taking up the challenge and perfecting the skills while carrying out his dissertation on the laparoscopic repair of inguinal hernia in children. He is one of my most successful trainees and has gone on to do great exploits in paediatric laparoscopic surgery in Nigeria.[149,150] I am equally proud of the achievements of his colleagues, Dr Collins Adumah and Dr Ibukun Ogundele, who constituted the first generation of laparoscopic paediatric surgeons trained in our unit and have gone further to train new generations of paediatric surgeons in MAS techniques across the country.

As our profile improved, we began to initiate and participate in local and international collaborative studies. In collaboration with an Italian research group, we participated in a randomized controlled trial to evaluate the efficacy of drains in preventing postoperative abdominal fluid collection following laparoscopic cholecystectomy and recruited more than 25% of the study population from Ile-Ife.[151] The study had 53 patients across five hospitals randomized to have a suction drain in the sub-hepatic space while another 53 were randomized not to have a drain. All the patients had ultrasound evaluation 24 hours postoperatively. The study found no statistically significant difference between the groups in terms of fluid collection, postoperative abdominal and shoulder pain, use of analgesia, nausea, and vomiting. This study carried out in 2011, opened up our unit to further international collaborations.

We also developed collaborations with our colleagues in several units to evaluate the physiologic impact of laparoscopic surgeries on Nigerian patients in studies that were only previously referenced among Caucasian populations. In conjunction with our ophthalmologists led by Prof Mrs Oluwatoyin Onakpoya, we carried out a prospective case-control observational study on intraocular pressure changes in patients undergoing elective laparoscopic operations requiring either Trendelenburg (n=20) or reverse Trendelenburg (n=20) positioning.[152] Intraocular pressure, mean arterial pressure, heart rate, peak and plateau airway pressure, and end-tidal carbon dioxide measurements were taken at seven-time points. We observed a decrease in IOP in both groups following induction of anaesthesia, while pneumoperitoneum creation produced a mild increase in IOP in both groups. Trendelenburg tilt produced IOP elevations in 80% of patients compared to 45% following reverse Trendelenburg tilt. A significant IOP increase of 5mmHg or more was recorded in 3 (15%) patients following Trendelenburg tilt and in none of the reverse Trendelenburg group. IOP returned to preoperative levels in all but 3(15%) in the Trendelenburg and 1(5%) in the reverse Trendelenburg group in the recovery room. Reversible changes were also observed in the MAP, HR, ETCO2, and airway pressures in both groups. We concluded that IOP changes induced by laparoscopy are realigned following evacuation of pneumoperitoneum while a Trendelenburg tilt produced significant changes that may require careful patient monitoring during laparoscopic procedures.

Being a disease predominant in the black populations, the inflammatory response of Sickle Cell Anaemia (SCA) patients following MAS has not been fully explored. Inspired by the passion of Prof Mrs. Norah Akinola for the welfare of sickle cell patients who are particularly prone to developing gallstones and requiring laparoscopic cholecystectomy, we carried out a study in conjunction with haematologists and chemical pathologists. We obtained blood samples from nine consecutive SCA and 14 hemoglobin AA (HbAA) patients undergoing laparoscopic cholecystectomy for acute cholecystitis before induction of anesthesia (0 hours), and at 4h, 12h, 24h, and 48h, and postoperative day 7. Samples were analyzed for serum C-reactive protein and Interleukins 1-18. At 0 hours, pro-inflammatory IL-1 levels (6.1 versus 4.8) and CRP levels (32.5 versus 26.6) were higher in SCA than in HbAA patients respectively. Over time,

inflammatory markers were generally higher at each time point for SCA patients compared to HbAA patients for both pro- and anti-inflammatory cytokines, rising immediately after operation and up to 48 hours, then returning to baseline by postoperative day 7. There was a higher mean IL-1 level across all time points in the SCA than the HbAA group.



A B

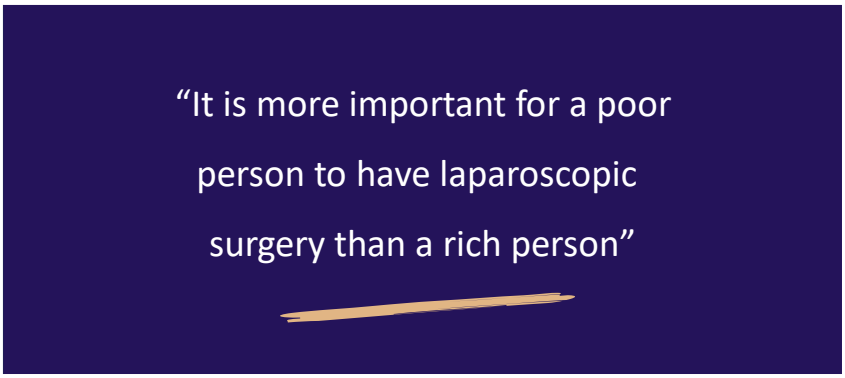
Figure 5: A: Scatterplots demonstrate an association between protein levels across all time points. Histograms display spread and normality; B: Cubic spline curves demonstrating the relationship between pro- and anti-inflammatory acute phase proteins and sickle cell status. IL = interleukin. CRP = C-reactive protein. Data presented as smoothed conditional mean levels of included interleukins and CRP. SCA (HbSS) transformed into y=2, and HbAA transformed into y=1.[153]

This exploratory study demonstrates that MAS strategies for SCA patient may help to mitigate their enhanced inflammatory response to trauma.[153] Mr Vice Chancellor sir, this study was carried out through a grant from the Obafemi Awolowo University Research Committee and I am grateful to the University.

We carried out a feasibility study on the management of pain following laparoscopic surgeries in conjunction with our colleagues in the Anaesthesia Department. We conducted a placebo-controlled, patient- and outcome-assessor-blinded, external feasibility randomised controlled trial on patients undergoing elective laparoscopic cholecystectomy for symptomatic ultrasound-proven gallstones. We randomized the patients into three groups: lidocaine with adrenaline (epinephrine), bupivacaine, or saline control. Overall, compliance with randomized treatment allocation was achieved in 64 patients (93%). All pain and nausea assessments were completed in these 64 patients. On the NRS, most patients had moderate to severe pain at 2 h (39 of 64, 61%), which gradually reduced. Only six patients (9%) had moderate to severe pain at 24 h**.** At 2h, both bupivacaine and lidocaine performed better than placebo.[154]

Sadly, some people still view laparoscopic surgery as a luxury procedure, meant for those who can afford it. In Nigeria today, many public and private hospitals attach prices to laparoscopy procedures that make it beyond the reach of the average Nigerian. Some hospitals perform only a handful a year due to the high cost to patients. Over time, the National Health Insurance Authority also removed laparoscopy from procedures covered by the scheme. This particularly ill-advised decision ensured that hospitals and patients would rather prefer open operation to laparoscopy. We carried out a prospective study of 105

patients undergoing open appendectomy (OA) or laparoscopic appendicectomy (LA) in Ile-Ife, Lagos, and Owerri and performed a first-of-its-kind health economic analysis of the two techniques in West Africa.[155] The average healthcare cost, including direct and indirect costs of LA was 162,793 Naira ($368 at the time) which was higher than OA (146,556 Naira ($353). The average time for return to work was shorter with laparoscopic than open appendectomy. (mean: 8 days vs 14 days). LA was associated with 9778 Naira or $24 cost savings in return to work. Further, 5.1% of LA patients had surgical site infections compared to 22.7% for OA. Regression analysis showed that LA was associated with $14 higher costs than OA. LA was associated with a slightly higher overall cost, a lower societal cost, a lower infection rate, and a faster return to work than OA. The findings of this prospective national study corroborate that of a study earlier carried out by a postgraduate fellow, Dr Kate Smiley, who visited from Salt Lake City and compared the cost of laparoscopic and open operations in our hospital.[156,157] It is technically and financially feasible, and its availability in Nigeria should be expanded. I, therefore, appeal to all healthcare policymakers in Nigeria to prioritize MAS not only for the benefit of the patients but also because of their ability to reduce poverty thereby aiding the attainment of sustainable development goal 3 in Nigeria. On the other hand, I have frequently quoted the sayings of Dr. Ray Price of Salt Lake City, USA, who devoted several years to expanding laparoscopic service in Mongolia, and Dr. Paul Severson of Project Haiti International:[139]



Today, many affluent Nigerians travel abroad for "medical tourism" building fun and vacation into receiving care for common ailments that can be treated locally. But a poor person, who may equally be the breadwinner of the family and often self-employed, undergoes an open operation and has a prolonged length of hospital stay, delayed return to normal activities and return to work, with catastrophic expenditure from out-of-pocket payments. In many instances, families have undergone untold hardships just by undergoing operations. If our society can ensure poor patients can equitably access laparoscopic surgeries and get the benefits of shorter hospital stay and early return to work, we will be reducing poverty among the poor.

Along with Dr. Ray Price of the Intermountain Hospital, Salt Lake City, USA, I had the priviledge of co-authoring a chapter on challenges and solutions to performing MAS in underdeveloped settings in the

book “Operative Endoscopic and Minimally Invasive Surgery”. We identified the strategy adopted by the government of Mongolia, a country with low human development index, to adopt MAS as a public health policy, and as a major solution to improve access and maximize the gains of the technique for the benefit of people living in LMICs.[138] The Nigerian government should adopt the practice of MAS as a public health policy, invest in training, and procure equipment to facilitate mandatory adoption in all our secondary and tertiary hospitals, knowing fully well that there is maximum economic benefit to the nation along with improved quality of life of the citizens.

Mr Vice Chancellor sir, before starting my journey with MAS in Nigeria, I made deductions from around the world regarding the advantages of MAS. However, with the experience of more than 1400 patients and having carried out several studies among Nigerian patients, I return like King Solomon, author of many great biblical proverbs, to say:
“*Narrow is the way: the narrow way of operation, using minimal access incisions, is the way that leads to improved outcomes and better quality of life for Nigerian surgical patients”.*

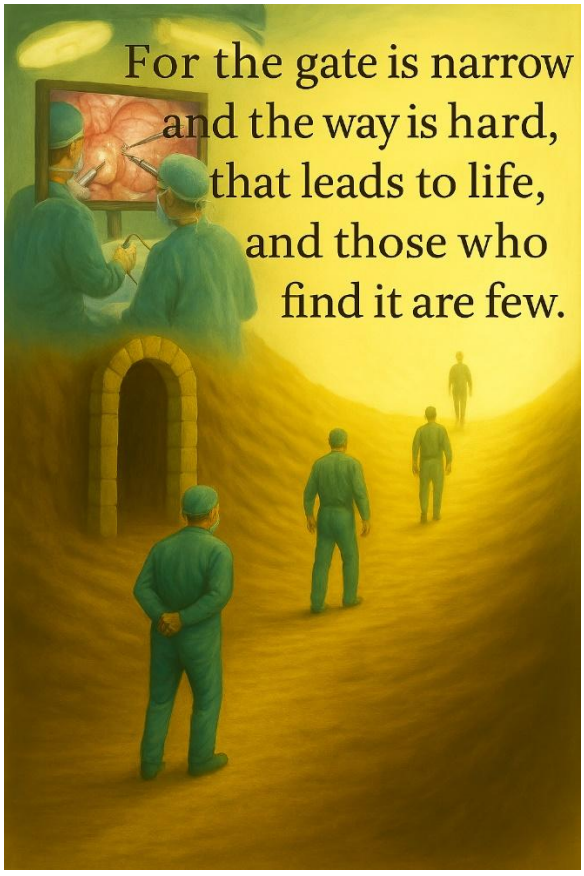


Figure 6: Minimal access surgery, narrow is the way!

Having acknowledged the unflinching support of all my professors and all consultant surgeons, I want to also place on record the extensive support of our nurses in this success story. We have excellent perioperative nurses who not only started with us when the journey was rough but have also grown with us by maintaining the equipment and training junior nurses along the way. On the surgical wards, our nurses professionally cared for the patients to ensure that we continue to have successful surgical

outcomes. I am immensely grateful to all our nurses. My colleagues and our surgical residents have all played different roles in the successes recorded as well. Our patients, who believed in us even when we informed them of our initial struggles with equipment, encouraged us not only to succeed but to continue to strive to do more.

Awards and recognitions

On a fateful day in August 2011, I was on my routine clinical duties when I was summoned by the then Chief Medical Director, Professor Olusanya Adejuyigbe to meet with the Management of the Hospital. It turned out to be that Prof Onyebuchi Chukwu, an orthopaedic surgeon who was then the Honourable Minister of Health came on an inspection visit to OAUTHC and visited the operating theatre to inspect the (VAMED) renovations commissioned by the Federal Government. He then sighted our improvised laparoscopy tower and register of operations which showed that we had performed about 200 cases without publicizing up to Abuja. A few moments later I was in front of journalists receiving a Ministerial Award for excellence! Following that, the Management Board of OAUTHC headed by Professor Oluwole Akande gave me a Merit Award. Both Professors Akande and Onyebuchi Chukwu continued to encourage and monitor my career progress on a personal note for several years, even after they had left their respective offices.

A B

Figure 7: Awards by the Federal Minister of Health (A) and the OAUTHC Board of Management (B)

On the international stage, I have had the opportunity to share our humble experiences in different surgical for a abroad. In April 2012, my abstract for the Annual Scientific Meeting of the Society of American Gastrointestinal Endoscopic Surgeons (SAGES) in San Diego, California, titled "Local Adaptations and improvisations for Laparoscopy in Nigeria" aimed to share our experience was selected to be presented in a special session titled "Stories of SAGES Heroes". Other panellists were distinguished surgeons who have facilitated the establishment of laparoscopy in difficult terrains including war-torn settings. That presentation not only enhanced my membership of SAGES but also facilitated contacts and connections for donations of equipment and consumables to our hospital. I was later selected as the SAGES Ambassador representing Nigeria at the 2018 Meeting of the Society in Seattle, Washington where I was

invited to speak on the topic “Innovations to establish MIS Center in Nigeria”. Our unit has also hosted residents and fellows from within and outside Nigeria for training and or research collaboration.

Mr Vice Chancellor sir, for the past 15 years, we have been in the vanguard of providing laparoscopic surgeries at affordable rates to Nigerian patients. The affordable cost in Ife has attracted patients from every geo-political zone of Nigeria to our Institution creating local medical tourism to Ife. To date, more than half of the patients we operated on are from outside Osun State. We have largely benefitted from donations of consumables from several colleagues and institutions abroad arising from some of our collaborative research. Of note is MedWish Incorporation, Cleveland Ohio, from whom OAUTHC has received pallets of surgical consumables on four occasions. Secondly, my very good friend, Mr Segun Komolafe, a British colorectal surgeon of Nigerian descent, has not only repeatedly sent equipments and consumables but has also visited Ile-Ife several times to facilitate laparoscopic training for our residents. With the support of Prof Victor Adetiloye as Chief Medical Director, we hosted many local and international guests and organized Masterclass sessions in laparoscopy and advanced gastrointestinal surgical techniques attracting participants from nearly all geopolitical zones of Nigeria.

Few are therein……

Globally, general surgery training now places a premium on competency as against the length of training and log of procedures that is still emphasized in our setting. The practice of MAS, perhaps more than any other sub-specialization, brings to the fore the need for skills training and re-training as well as competency assessment to transition from training to practice. In my pioneering role with MAS, finding capable assistants for operative procedures became a huge challenge and a potential obstacle to performing advanced laparoscopic procedures. This realization led me to spearhead the establishment of a Surgical Skills Laboratory in the Department of Surgery in 2012. For over a decade, the laboratory has facilitated skills acquisition for consultants, residents, and medical students. The laboratory now provides training in basic surgical skills, gastrointestinal stapling techniques, gastrointestinal endoscopy, laparoscopic surgeries, urology, head and neck surgery and cardiothoracic skills. At the last count, surgeons and trainees from all the six geo-political zones of the country have come for training in our skills laboratory.

Figure 8: Surgical skills laboratory, Department of Surgery, OAUTHC.

We published the first journal article in Nigeria describing the introduction of basic surgical skills training to undergraduate students. We have described the development and use of locally fabricated suturing pads to train undergraduate medical students in basic suturing skills. We observed the improved confidence levels of our trainees and documented their desire to acquire a list of basic surgical skills during their training.[158] I wish to appreciate Dr Adewale Aderounmu for sustaining this training for our medical students over the years. Our Laboratory collaborated with Prof Fadeke Oginni of the Oral and Maxillofacial Surgery Department of this University, and an Italian colleague in the USA to describe the use of an affordable laparoscopic camera system for training. A common zero degrees 10 mm telescope with a light source is attached to the camera of a low-price smartphone and the image can be transmitted to the monitor through USB/ HDMI. The device enabled the performance of the five tasks of the Fundamentals of Laparoscopic Surgery curriculum and tubal ligation in a pig model thereby providing a low-cost laparoscopic camera system that can benefit surgeons and trainees in LMICs.[159] We have also documented the impact of locally improvised models for teaching the use of circular staplers for low rectal anastomoses and how this aided the adoption of the technique in our hospital.[160]

Across Nigeria, I have also had the priviledge of facilitating training in laparoscopic surgeries in six teaching hospitals. In the year 2016, under the leadership of Dr. Jimi Coker, a renowned surgical educator with experience across sub-Saharan Africa, and with the huge support and mentorship of Prof Chris Bode, then Chief Medical Director of Lagos University Teaching Hospital, we established the Laparoscopic Surgery Society of Nigeria, LASSON, as an umbrella body for those practicing laparoscopic surgeries in Nigeria. LASSON has contributed immensely to the delivery of training to surgical residents across Nigeria. During the COVID-19 pandemic, the Educational Committee of LASSON, led by me, provided leadership in publishing recommendations for the safe practice of MAS in Nigeria.[161]

On the international scene, I have been a facilitator at several laparoscopic training programmes organized by the West African College of Surgeons and or commercial equipment suppliers across West Africa. I was the Co-lead of the team that developed the curriculum for laparoscopic training in Africa for Medtronics. In October 2016, I was awarded the International Scholarship for Surgical Education by the American College of Surgeons. This Scholarship granted me the unique opportunity of being hosted by Prof Gary Dunnington and Dr Dimitrios Stefanidis, front-leading surgical educators in Indiana University, USA. Through this linkage, I became a member of the Association for Surgical Education and have served as the representative of Africa on the International Task Force of the Association from 2018 till date. The Task Force conducted a global needs assessment of surgical trainees and educators and I was delighted to coordinate and present the responses from Africa.[162] The survey revealed critical gaps in surgical training, including limited access to simulation training and insufficient support for educators, particularly in developing regions. It became clear that we must address these disparities by

expanding simulation resources and offering formal training for educators to improve the experience of surgical trainees globally. In May this year, I was invited as Faculty to the 2025 Annual Meeting of the Association for Surgical Education to speak on the Nigerian experience with simulation training in resource-limited settings in the session titled “Global Perspectives on Simulation in Surgical Education: From DIY to Advanced Training”. At the recommendation of Dr Jimi Coker, I have also served as an Expert for training in Advanced Laparoscopic Skills training courses at Institut de Recherche contre les Cancers de l'Appareil Digestif (IRCAD) Africa in Kigali, Rwanda since 2023 in which I have volunteered to train surgeons and surgical trainees from across Africa and the Middle East in laparoscopic surgery using the excellent facilities provided by IRCAD.

We have made efforts to improve the training of trainers in the form of consultants who would train their residents and populate the "few that be therein". We have also successfully trained residents whom we are proud to see improving the number and quality of the practice of MAS in different surgical specialties across Nigeria. At least 52 residents from across Nigeria have been successfully trained in laparoscopy in our institution. Of these, 11, who are now consultant surgeons are independently performing laparoscopy in other institutions across Nigeria while many have relocated outside Nigeria. 18 consultant surgeons have attended our laparoscopic training workshops or undergone attachment in our unit. In OAUTHC where I started alone, we now have four consultants independently performing laparoscopy. Today, at least five senior registrars routinely perform emergency laparoscopic appendectomies in general surgery and paediatric surgery units. We have certainly evolved, we are still evolving, and we give glory to God.

The success of our training has however been significantly eroded by the unbridled migration of trained medical experts from Nigeria in the so-called "*japa syndrome*". Many of our skilled trainees who would have significantly improved laparoscopic surgical services in Nigeria have and still continue to relocate abroad. It is mind-blowing that successive federal and state governments have continued to neglect the resultant manpower shortages, across all healthcare professions, specialties, and cadres, with the glaring grave implications reflected in our static or worsening statistics in almost every domain of healthcare system performance.

On our part, we attempted to mitigate the disruption caused by constantly losing our brilliant, young, and motivated trainees. The only way we sustained our practice was to continue training young ones. We got lucky in 2022 when we were contacted to make OAU a lead site for the Wellcome Leap SAVE project for laparoscopic training in Nigeria. While the main aim of the funder for the research was to demonstrate that the motor skills of laparoscopic surgery can be acquired by non-surgeons through an artificial intelligence-powered training platform, we successfully convinced the team to adopt this process for training of medical students. This project, titled “Creating New Models of Laparoscopic Surgery Skills

Acquisition and Assessment" (CAMELS and CAMELS Plus) has enabled us to facilitate acquisition of basic laparoscopic skills by more than 100 medical students and more than 20 surgical residents over the past two years. This is an incredible opportunity judging by the fact that my own generation needed to travel outside Nigeria as consultants to undergo basic training on crude models while today, OAU medical undergraduates, including pre-clinical students are able to get trained with advanced facilities. This project has engaged the participants in both quantitative and qualitative studies providing real-time, objective records of training.

Figure 9: Undergraduate students undergoing training in laparoscopy

Mr. Vice-Chancellor, sir, as the National Lead for this study and one of the assessors of the trainees online videos, I can confidently attest that some of our medical students rank among the best globally—not only in skill acquisition but also in how rapidly they progress along the learning curve. It therefore leaves us the responsibility of expanding opportunities and improving facilities for training and exposure of our students. Gone are the days when we only focus on students just passing exams and graduating. Our students will consistently excel on the global stage if we avail them these opportunities early on, not only to acquire knowledge but to develop skills to compete in today's continuously evolving scientific community.

Green surgery

The practice of surgery is associated with the generation of waste, the use of various anaesthetic gases, and the consumption of high energy, which can account for up to 40% of the total energy utilized in many hospitals. All these activities impact carbon emissions and consequent environmental harm. In Nigeria, for several decades, most of our hospitals relied heavily on power generators using fossil fuel due to the erratic supply from the national grid. In many instances, we bother a lot with the cost of diesel consumed but are less concerned with the environmental harm. Today, the concept of green surgery demands surgical practice that aims to minimize environmental harm while maintaining the highest possible standards of patient care. We are encouraged to build sustainability into our surgical practice by adopting

techniques and innovations that encompass a triad of good clinical outcomes, reduced cost, and reduced carbon impact.[163] By reducing wastes generated in each operation, reducing environmentally harmful energy consumption, reducing the release of greenhouse gases during operation, and enlightening our patients and surgical workforce, we can indeed attain "green surgery".[164]

The beauty of laparoscopy and other forms of MAS in reducing overall hospital stays and readmissions will certainly reduce the environmental impact of surgical care. On the other hand, laparoscopic surgery has the demerits of employing a large number of disposable items thereby generating a lot of waste per operation and the use of carbon dioxide may also impact the environment. As our practice has grown and in our privileged position of expanding access to the technique, we have deliberately built sustainability and the green surgery concept into our practice as well as the training we offer. We are creating local awareness by organizing local competitions, the first of which was made open to students of the College of Health Sciences in 2024. We are currently working with the perioperative nursing staff of our main theatre and the hospital Environmental Health Department to collect all plastic and metal wastes from the operating theatre. This would be used to create a "Green Surgery Park" in Phase 2 of OAUTHC. We are adopting local innovations for sustainability including the use of reusable trocars, cannulae, and hand instruments. We are seeking renewable, affordable, clean, and sustainable energy solutions for our operations. Through the research collaborations we have built over the years, our hospital has been selected as a pilot site for the green energy initiative of the NIHR-GSU of the University of Birmingham, UK, seeking to deploy solar energy to power theatres in LMICs.[165] I believe our main theatre and intensive care unit will soon enjoy this facility.

I am currently involved in the PhD project of a candidate at the University of Birmingham, UK, who is conducting an energy audit of selected hospitals in India and Nigeria including our hospital, OAUTHC. His project will ultimately propose innovative solutions and make recommendations for healthcare policies that would enhance green surgery in our setting. We are also geared up to participate in the first-of-its-kind cluster randomised trial of reuseable versus disposable surgical gowns and drapes for the prevention of surgical site infection while measuring the carbon impacts of the different arms. This trial, tagged "DRAGON" will certainly contribute to knowledge on this subject. On the international scene, at the invitation of my very good friend, Professor Aneel Bhangu of the University of Birmingham, I have participated twice at the Greener Surgery Conference where topical issues in this emerging field are discussed, practical solutions shared, and potential barriers identified.

Future trends in minimal access surgery

The past two decades have demonstrated that the way forward is the deployment of MAS techniques in all aspects of surgical care. The advantages demonstrated in the "**narrow way**", initially limited to abdominal operations, are now vastly replicated in nearly all surgical subspecialties and procedures.

Today, procedures such as minimal access brain surgeries, spine surgeries, heart operations, and lots more are routine in centers where resources and personnel are available. The future prospects in surgery are visible in three aspects including: the expansion of robotic surgery, the incorporation of artificial intelligence and machine learning tools into surgery, and the use of real-time imaging for surgical interventions.

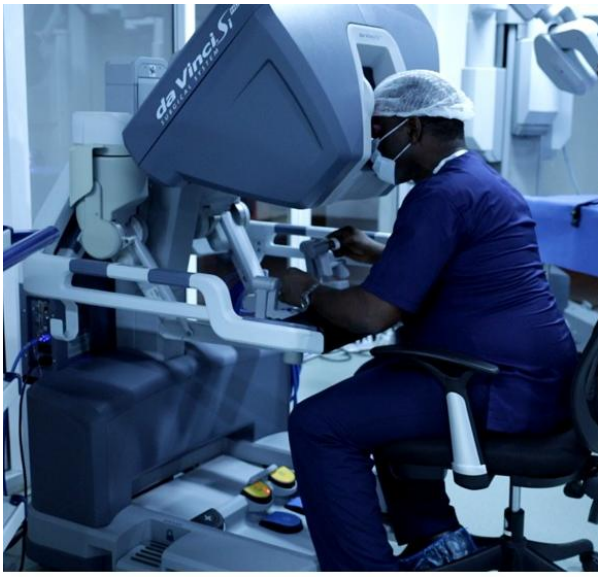


Figure 10: Robotic surgery console

Robotic surgery

The use of robots in MAS has come to stay. While I do not believe robotic surgery has any advantage over conventional laparoscopy for basic procedures like cholecystectomies, the ergonomic advantage of robotic arms over that of the human employed in laparoscopic surgery implies that the robot enhances operations in challenging spaces such as operations on the rectum and prostate. In recent news, more than fifty Asian companies are licensed to produce robots for healthcare use. The likelihood is that many of these products will cost only a fraction of the currently available robotic systems. We will also have increased dexterity, with products more flexible for use in other procedures outside the abdomen. Nigeria and many other sub-Saharan African countries have shied away from robotic surgeries due to the very high cost until early this year when a privately owned facility carried out the first robotic prostate surgery in Lagos. In the recent past, smaller African countries such as Angola and Rwanda are embracing robotic surgeries with governments providing incentives for equipment and training. The challenge is that when the cheaper robots become available in a couple of years, Nigeria will need to play our usual catch up with the rest of the sub region. In my opinion, we need to urgently acquire facilities and embrace training in robotic surgery. We are already way behind the rest of the world.

Artificial intelligence and surgery

We are deploying AI tools locally in making diagnoses of surgical conditions and in preoperative risk assessment and stratification before surgery. We have also participated in studies evaluating telemedicine in follow up of surgical wounds after discharge from hospital.[166,167] I foresee the incorporation of more of these tools into hospital Electronic Medical Record systems to enhance early diagnosis, prompting recognition of deteriorating patients and reduce the secondary delay or rescue from complications which are the harbingers of poor surgical outcome in our setting. The use of AI in rapidly creating 3D models for operative planning is quite exciting as it makes surgical preparation more precise, efficient, and tailored to individual patient anatomy, ultimately improving outcomes and reducing operative risks. The integration of AI speeds up the modeling process, allowing medical professionals to visualize complex procedures with greater accuracy before making critical decisions. Here in Ile-Ife, we are already deploying AI for simulation, training, and assessment of skills acquisition in the skills laboratory. While intraoperative assessment of competencies and skills of operating surgeons and trainees remains challenging today, we are all likely to adopt AI tools for such assessments in the nearest future and I believe this should bring more objectivity into our certification processes in the surgical colleges.

Real-time imaging for surgical intervention

While our current imaging systems depends in experts viewing and interpreting medical images onsite or remotely, interpretation of medical imaging (e.g., Xrays, CT scans) will likely evolve into AI based systems, much as other image and pattern recognition services such as tissue slides in histopathology, or blood and body fluid slides in microbiology, haematology and others. This will increasingly enhance the multi-disciplinary management of surgical patients by providing an expert opinion where unavailable or a second opinion when in doubt. Often, surgeons may require live translation services such as frozen section to determine appropriate resection margins for benign or malignant conditions but such services are limited in our setting. AI tools may enhance intraoperative decision making in the near future. Postoperative tools for patient monitoring and early pattern recognition are currently being developed. We have facilitated the introduction of enhanced sensors for postoperative patient monitoring at OAUTHC where wearable sensors are being placed on patients and the surgical team can remotely access, review and take decisions for patient care. This is currently running through the EMUS trial in our general surgery units and the IMPALA study in obstetrics. Undoubtedly, there are challenges with the large language models currently available in healthcare services. These include challenges of accuracy and reliability of the generated information, poor specificity in application to local and regional conditions, and the potential for hidden bias in some models.

Closing reflections

Mr Vice Chancellor sir, over the course of my academic journey so far, I have found immense fulfillment in teaching and mentoring undergraduate and postgraduate students of outstanding calibre. To date, I have

successfully supervised 18 postgraduate dissertations—12 of these scholars earned Fellowships from the National Postgraduate Medical College of Nigeria, four from the West African College of Surgeons, one obtained a Fellowship in Global Surgery from the University of Utah, USA, and another earned a Master's degree with Distinction from the University of Edinburgh, UK. Presently, I am guiding five candidates through their Fellowship examinations, supervising three PhD candidates across various Nigerian universities, and co-supervising a PhD candidate at the University of Birmingham, UK. I have served as an examiner for the Parts I & II Fellowship examinations in Surgery at the National Postgraduate Medical College of Nigeria and been on the team of the College to accredit Tertiary Hospitals in Nigeria for training of surgical residents. I have also contributed as an external examiner at final examinations for five medical schools within Nigeria. From 2017 through 2018, I served as a member of the Federal Ministry of Health Technical Expert Group that developed Guidelines for the management of Pain in Nigeria. In addition, I have served as a peer reviewer for several esteemed journals, including The Lancet, British Journal of Surgery, Surgical Endoscopy, and the Journal of the West African College of Surgeons among others. I have had the privilege of reviewing promotion cases to the professorial rank at universities both within and outside Nigeria. To God be the glory.

Mr Vice Chancellor sir, I have described how we have navigated the difficult way to establish the narrow way of operation. We have observed that this narrow way leads to improved quality of life of our patients and this has motivated us to increase the number of those found in "the way". As I bring this lecture to a close, I wish to remind us of the following:

- ✓ Minimal access surgery has demonstrated superior outcomes for Nigerian patients. It should therefore be integrated into national policy as a cornerstone for addressing the country's surgical healthcare needs.
- ✓ Although the initial cost of MAS infrastructure is high, the long-term benefits—faster recovery, reduced hospital stays, and quicker return to productivity—translate to significant economic gains that far outweigh the startup expenses.
- ✓ *"Laparoscopic surgery yields greater benefits for the poor than the wealthy."* Yet, despite Nigeria having Africa's largest population of economically disadvantaged people, cutting-edge procedures like MAS remain largely inaccessible to them. There must be a national commitment to ensuring equity in healthcare delivery, especially for our vulnerable populations.
- ✓ Continuous training and capacity building across the entire surgical ecosystem—including surgeons, anaesthetists, perioperative nurses, and allied professionals—must be prioritized to safeguard the health of both current and future generations.
- ✓ The future of surgery is being shaped by modern technology and artificial intelligence. Nigeria must act decisively by strategic healthcare investment to close the digital and infrastructure divide and reduce medical tourism.

- ✓ The unchecked migration of skilled young healthcare professionals is eroding decades of surgical innovation and threatens the survival of Nigeria's public health system. While talent may leave, over 220 million Nigerians remain—most of whom still lack access to quality care. This reality demands urgent, strategic action.

I would like to deeply acknowledge the immense impact of my many mentors in general surgery. Professors Arigbabu, Adeyemo, Adejuyigbe, Akinola, Lawal, Adesunkanmi, Agbakwuru and Dr Akinkuolie served as the foundational pillars of our training, and it was truly a privilege to learn under their guidance. Late Dr Arowolo was my teacher who left the scene early but made a great impact within a short time. I also extend my sincere appreciation to all the Professors in the Department of Surgery, the Faculty of Clinical Sciences, and the College of Health Sciences at this esteemed university. Their dedication shaped my journey as both a student and faculty member.

It has been equally rewarding to contribute to the growth of junior colleagues—and humbling to learn from them in return. I am profoundly grateful to my friends at the National Institute of Health Research Global Surgery Unit at the University of Birmingham, and the University of Edinburg, UK. I appreciate all the leads of the seven Hubs of the collaborative, Professor Adesoji Ademuyiwa, the Director, my co-Deputy Directors, and the dedicated staff of the Nigeria Hub, for their collaboration and support. Professor Chris Bode has not ceased to amaze me for his constant encouragement while Dr Jimi Coker speaks highly of me everywhere across the continent.

My heartfelt appreciation goes to the leadership and members of New Covenant Church, Ife City Center, where I have the honor of serving as the Satellite Pastor. The unwavering love and support from the congregation have been a continuous source of encouragement. The Pastoral team comprising Rev Prof Dolapo Amole, Rev Prof and Rev Prof Mrs. Kolawole, Rev Prof and Prof Mrs. Aregbesola, Rev Prof Onakpoya, Rev Dr Akinjokun, Dr Dimeji Babatunde and Rev Dr Buki Adisa have all been instrumental in my personal life and spiritual journey. I'm especially grateful to Rev. and Mrs. Paul Jinadu, Rev. Emmanuel Ajao, Rev. and Mrs. Olufemi Oyelade, Rev. and Rev. Prof. Mrs. Soetan, Rev and Rev Mrs. Abimbola Oladipo, Rev. Prof. and Rev. Prof. Mrs. Ogunfowokan, and all the pastors of the Ile-Ife Conference. I give special thanks to God for Rev. Dr. and Dr. Mrs. Francis Olonade, whose spiritual mentorship has enriched my walk with the Lord.

I remember my late father, Chief Solomon Adedokun Adisa, with deep affection. Though he yearned to witness this academic milestone in my life having witnessed my photocopying loads of papers for the Appointment and Promotions Committee meetings, he departed nearly five years ago, leaving behind cherished memories and a legacy of compassion and community service. I'm also grateful for the love

and support of my sisters, their families, my father-in-law, and my extended family—many of whom are here today.

While I have often spoken of God's grace in my professional journey, the most profound physical expression of that grace is my wife of nearly 23 years, Olubukonla Oluyomi Adisa. She has been a God-given source of peace and strength, helping me better understand the beauty of covenant partnership. I will not be here today without her sacrifices for me. Our children, Oluwadarasimi Joy and John Oluwatobiloba, continue to be incredible blessings and constant sources of inspiration. I am blessed.

Now to the King eternal, Immortal, Invisible, the only wise God, be honour and praise, now and forevermore.

References

1. Erhabor GE, Adewole O, **Adisa AO**, Olajolo OA. **(2003)** directly observed short course therapy for tuberculosis – a preliminary report of a three-year experience in a teaching hospital. *Journal of National Medical Association*. 2003; 95:1082-1088.
2. **Adisa AO,** Arowolo OA, Akinkuolie AA, Alatise OI, Lawal OO, Adesunkanmi ARK. **(2011)** Metastatic breast cancer in a Nigerian Tertiary Hospital. *African Health Sciences*. 2011 June;11(2):279-284
3. Olasehinde O, Aderounmu A, Wuraola F, Omisore A, Akinkuolie A, Towoju A, Mohammed T, Mango V, Kingham PT, **Adisa A**, Alatise O. Breast Cancer Stage at Diagnosis in a Nigerian Hospital: Trend over a Decade. *West Afr J Med*. 2023; 40(12):1298-1303.
4. Arowolo O. A., Olasehinde O., Oyekunle A. A., **Adisa A. O.,** Alatise O. I., Adesunkanmi A. R. K. The influence of life behaviour, diet, physical activities on the incidence of breast cancer among women attending Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife. *Journal of Cancer Research and Experimental Oncology* 2018;10(1):1-9
5. Awe YT, Onayade AA, Sosan MB, Oyekunle JA, Alatise OI, Olasehinde O, **Adisa A**. Levels of Dichlorodiphenyltrichloroethane (DDT) and Hexachlorocyclohexane (HCH) pesticide residues in Sera of Breast Cancer Patients and Controls: A Case-Control Study in Ile-Ife, Southwestern Nigeria. *International Journal of Toxicology and Environmental Health* 2018 July Vol. 3(1):027-035
6. Akinyemiju T, Salako O, Daramola A, Alatise O, Adeniyi A, Ogun G, Ayandipo O, Olajide T, Olasehinde O, Arowolo O, **Adisa A**, Afuwape O, Olusanya A, Adegoke A, Ojo A, Tollefsbol T, Arnett D. Collaborative Molecular Epidemiology Study of Metabolic Dysregulation, DNA Methylation, and Breast Cancer Risk Among Nigerian Women: MEND Study Objectives and Design. *Journal of Global Oncology*. 2019; 5:1-9. doi: 10.1200/JGO.18.00226.
7. Gupta A, Jones K, Deveaux A, Bevel M, Salako O, Daramola A, Hall A, Alatise O, Ogun G, Adeniyi A, Ojo A, Ayandipo O, Olajide T, Olasehinde O, Arowolo O, **Adisa A,** Afuwape O, Olusanya A, et al. Association of Life-Course Educational Attainment and Breast Cancer Grade in the MEND Study. *Annals of Global Health*. 2021; 87(1): 59, 1–11.
8. Gupta A, Oyekunle T, Salako O, Daramola A, Alatise O, Ogun G, Adeniyi A, Deveaux A, Saraiya V, Hall A, Ayandipo O, Olajide T, Olasehinde O, Arowolo O, **Adisa A,** Afuwape O, Olusanya A, et al Association of high-sensitivity C-reactive protein and odds of breast cancer by molecular subtype: analysis of the MEND study. *Oncotarget.* 2021; 12(13):1230-1242.
9. **Adisa AO**. It's time to make breast cancer a national health priority. NT press, Ibadan
10. Olasehinde O, Boutin-Foster C, Alatise OI, **Adisa AO**, Lawal OO, Akinkuolie AA, Adesunkanmi AK, Arije OO, Kingham TP. Developing a Breast Cancer Screening Program in Nigeria: Evaluating Current Practices, Perceptions, and Possible Barriers. *Journal of Global Oncology*. 2017; 3(5):490-496.
11. Makinde OY, Wuraola FO, Aderounmu AA, UgalahiTO, Olasehinde O, **Adisa AO**. Awareness and Knowledge of Breast Cancer and Breast Examination amongst Undergraduate Students. Mixed Method Approach. *West African Journal of Medicine.* 2023;40(8):857-862.
12. Knapp GC, Tansley G, Olasehinde O, Wuraola F, **Adisa A,** Arowolo O, Olawole MO, Romanoff AM, Quan ML, Bouchard-Fortier A, Alatise OI, Kingham TP. Geospatial access predicts cancer stage at presentation and outcomes for patients with breast cancer in southwest Nigeria: A population-based study. *Cancer.* 2020. doi: 10.1002/cncr.33394
13. **Adisa AO.** Geospatial disparities in breast cancer care in sub-Saharan Africa: time to act. *Lancet Glob Health*. 2024:S2214-109X(24)00180-3..
14. Adenike Adegoke-Elijah, **Adewale Adisa** and Chidiebere Raphael. Expert System for Staging Breast Cancer. *International Journal of Computer Applications* 183(52):34-39, doi: 10.5120/ijca2022921941

15. Titiloye NA, Omoniyi-Esan GO, **Adisa AO,** Komolafe AO, Afolabi OT, Adelusola, KA (**2013**) Breast cancer in a Nigerian cohort: histopathology, immunohistochemical profile and survival. *Postgraduate Medical Journal of Ghana.* 2013;(2):43-49
16. Omoniyi-Esan GO, Olaofe OO, Aremu OA, Omonisi AE, Olasode BJ, **Adisa AO. (2015)** Hormonal and Her2 Receptor Immunohistochemistry of Breast Cancers in Ile-Ife, Nigeria. *Austin J Womens Health*. 2015;2(1):1009.
17. Titiloye N.A., Foster A., Omoniyi-Esan G.O., Komolafe A.O., Daramola A.O., Adeoye O.A., **Adisa A.O.,** Manoharan A. Pathak D., D'Cruz M.N., Alizadeh Y., Lewis P.D., Shaaban A.M. Histological Features and Tissue Microarray Taxonomy of Nigerian Breast Cancer Reveal Predominance of the High-Grade Triple-Negative Phenotype. *Pathobiology* 2016;83:24-32
18. Olasehinde O, Bernardo MD, Komolafe AO, Omoyiola OZ, Wuraola FO, Omolade B, Ogunrinde O, Aderounmu A, Olaofe OO, Adefidipe A, Ewoye E, Mohammed TO, Oyeneye F, **Adisa AO,** Alatise OI, Omoniyi-Esan G. Immediate lymph node extraction improves retrieval rate following axillary lymph node dissection: an effective approach to improving guideline-concordant breast cancer care in Nigeria *ecancer* 2023;17:1609
19. Wuraola FO, Olasehinde O, Bermado M, Akinkuolie A, **Adisa AO**, Aderounmu A, Mohammed T, Kingham P, Alatise OI. Breast Cancer in the elderly patients: A clinicopathological review of a Nigeria database. *ecancer* 2022;16:1484
20. Arowolo OA, Akinkuolie AA, **Adisa AO**, Obonna GC, Olasode BJ. Neglected Giant Fibroadenoma of the Breast presenting as Fungating Breast Cancer in a Premenarchal Nigerian Teenager. *West African Journal of Medicine* 2012; 31(3):211-3
21. Olasehinde O, Wuraola F, Bernardo DM, Knapp G, Omisore A, Aderounmu A, Oladele A, Awe MA, Mohammed T, Romanoff A, Kingham TP, Mango T, **Adisa A**, Alatise O. Breast cancer related lymphedema in a cohort of Nigerian breast cancer survivors. *Research Square* doi.org/10.21203/rs.3.rs-4490780/v1]
22. Romanoff A, Olasehinde O, Goldman D, Alatise OI, Constable J, Monu N, Knapp GC, Odujoko O, Onabanjo E, **Adisa AO**, Arowolo AO, Omisore AD, Famurewa OC,Anderson BO, Gemignani ML, Kingham TP. Opportunities for improvement in the administration of neoadjuvant chemotherapy for t4 breast cancer: a comparison of the United States and Nigeria. *The Oncologist*. 2021;26:1-10
23. Arowolo OA, Akinkuolie AA, Lawal OO, Alatise OI, Salako AA, **Adisa AO**. The Impact of Neoadjuvant Chemotherapy on Patients with Locally Advanced Breast Cancer in a Nigerian Semiurban Teaching Hospital: A Single-center Descriptive Study. *World Journal of Surgery*. 2010; 34(8)1771.
24. **Adisa AO,** Lawal OO, Adesunkanmi ARK. Evaluation of patients' adherence to chemotherapy for breast cancer. *African Journal of Health Sciences*. 2008;15:22-27
25. **Adisa AO,** Lawal OO, Adesunkanmi ARK. Paradox of wellness and nonadherence among Nigerian women on breast cancer chemotherapy. *Journal of Cancer Research and Therapeutics.* 2008;4(3):107-110
26. **Adisa AO**, Gukas ID, Lawal OO, Adesunkanmi ARK. Breast Cancer in Nigeria: Is Non-Adherence to Chemotherapy Schedules a Major Factor in the Reported Poor Treatment Outcome? *The Breast Journal* 2010;16(2):206-207
27. Adesunkanmi AO, Wuraola FO, Fagbayimu OM, Calcuttawala MA, Wahab T, **Adisa AO**. Oncoplastic Breast-Conserving Surgery in African Women: A Systematic Review. *JCO Glob Oncol*. 2024 Jul; 10:e2300460.
28. Olasehinde O, Alatise O, Omisore A, Wuraola F, Odujoko O, Romanoff A, Akinkuolie A, Arowolo O, **Adisa A,** Knapp G, Famurewa O, Omisile I, et al. Contemporary management of breast cancer in Nigeria: Insights from an institutional database. *International Journal of Cancer*. 2021; 148(12):2906-2914. doi: 10.1002/ijc.33484
29. Wuraola FO, Blackman C, Olasehinde O, Aderounmu AA, Adeleye A, Omoyiola OZ, Kingham TP, Fodero RF, **Adisa AO**, Lumati J, Dare A, Alatise OI, Knapp G. The out-of-pocket cost of breast cancer care in Nigeria: A prospective analysis. *J Cancer Policy*. 2024; 42:100518. doi: 10.1016/j.jcpo.2024.100518.
30. Olasehinde O, Alatise O, Arowolo O, **Adisa AO**, Wuraola F, Boutin-Foster C, Kingham P. Safety and feasibility of early postmastectomy discharge and home drain care in a low resource setting. *Journal of Surgical Oncology*. 2018; 1-6. https://doi.org/10.1002/jso.25215
31. Olasehinde O, Fagbayimu MO, Aderounmu A, Komolafe T, Ameen M, Alatise O, **Adisa A**. Translating Evidence into Practice: A Review of Clinical Practice and Outcomes following the Adoption of an Early Post-Mastectomy Discharge Protocol in a Nigerian Hospital. *Breast Care (Basel*). 2024 Jun;19(3):135-141
32. Wuraola FO, Olasehinde O, Di Bernardo M, Aderounmu AA, **Adisa AO**, Omoyiola OZ, Omisore AD, Kingham TP, Mango V, Alatise OI. Clinicopathologic Profile and Psychosocial Experiences of Nigerian Breast Cancer Survivors. *JCO Global Oncology.* 2023 Sep; 9:e2300022.
33. **Adisa AO**, Arowolo OA, Alatise OI, Lawal OO, Adesunkanmi ARK**.** Clinical pattern of male breast cancer in Ile-Ife, Nigeria. *Sahel Medical Journal*. 2008;11(1):17 – 20
34. Akinkuolie AA, Arowolo OA, Omotola CA, **Adisa AO**, Alatise OI, Agbakwuru EA, ARK Adesunkanmi. **(2011)** Indirect inguinal hernia: the implication of occupation in a semi-urban center. *African Journal of Health Sciences*. 2011;19(3-4):16-19
35. Agbakwuru EA, Alatise OI, **Adisa AO**, Salako AA, Adesunkanmi ARK. Relations of the neck of groin hernias to pubic tubercle. *Nigerian Journal of Clinical Practice.* 2009;12(2):156-161
36. Olasehinde O, **Adisa AO**, Agbakwuru EA, Etonyeaku EC, Kolawole OA, Mosanya AO. A 5-year review of Darning technique of inguinal hernia repair. *Nigerian journal of surgery* 2015 Jan-Jun;21(1):52-55
37. Arowolo OA, Agbakwuru EA, **Adisa AO**, Lawal OO, Ibrahim MH, Afolabi AI. Evaluation of tension free mesh inguinal hernia repair in Nigeria: A preliminary report. *West African Journal of Medicine*, 2011 Mar;30(2):110-113
38. Olaseinde O., Lawal O.O., Agbakwuru E.A., **Adisa A.O.**, Alatise O.I., Arowolo O.A., Adesunkanmi A.R.K., Etonyeaku A.C. Comparing Lichteinstein with darning for inguinal hernia repair in an African population. *Hernia* 2016; 20(5):667-74

39. Agbakwuru E.A, Olasehinde O, Onyeze C, Etonyeaku A.C, Mosanya A.C, Wuraola F.O, Akinkuolie A.A, Aderounmu A.A, **Adisa A.O**. Use of commercial mesh for hernia repair in a low resource setting: Experience after 500 cases. *Hernia* 2019 2020 Jun; 24(3):613-616. doi: 10.1007/s10029-019-01987-9
40. Fadahunsi OO, Ibitoye BO, **Adisa AO,** Alatise OI, Adetiloye VA, Idowu BM: Diagnostic accuracy of ultrasonography in adults with obstructive jaundice. *Journal of Ultrasonography* 2020; 20: e100–e105. doi: 10.15557/JoU.2020.0016
41. **Adisa A.O**., Alatise O.I., Olasehinde O., Ibitoye B.O., Arowolo O.A., Lawal O.O. Open common bile duct exploration in a Nigerian tertiary hospital. *Annals of African Surgery* 2018;15(2):62-67
42. Alatise OI, Mann E, Zivanov CN, Ojumu TA, Aderounmu AA, **Adisa AO**. Starting a Hepato-Pancreato-Biliary Surgery Program from scratch: closing the gap in West Africa. *Surgical Oncology Insight,* 2025 doi:https://doi.org/10.1016/j.soi.2025.100132
43. Saluja S, Alatise OI, **Adisa A**, Misholy J, Chou J, Gonen M, Weiser M, Kingham TP. A comparison of colorectal cancer in Nigerian and North American patients: is the cancer biology different? *Surgery*. 2014;156(2):305-10
44. Aderibigbe AS, Dare AJ, Kalvin HL, Olasehinde O, Wuraola F, **Adisa A,** Omisore AD, Komolafe AO, et al. Analysis of Risk Factors, Treatment Patterns, and Survival Outcomes After Emergency Presentation with Colorectal Cancer: A Prospective Multicenter Cohort Study in Nigeria. *J Surg Oncol*. 2024 Nov 21. doi: 10.1002/jso.27878.
45. Sharma A, Alatise OI, **Adisa AO,** Arowolo OA, Olasehinde O, Famurewa OC, Omisore AD, et al. Treatment of colorectal cancer in Sub-Saharan Africa: Results from a prospective Nigerian hospital registry. *Journal of Surgical Oncology*. 2019 Nov 19. doi: 10.1002/jso.25768.
46. Yibrehu B, Mohammed TO, Murthy S, Aderibigbe AS, Daramola OB, Arije O, Owoade I, Wuraola FO, Olasehinde O, Betiku O, Folorunso SA, Omoyiola O, Aderounmu A, **Adisa AO,** Kingham PT, Alatise OI. Gastric cancer at a Nigerian tertiary referral center: Experiences with establishing an institutional cancer registry. *J Surg Oncol*. 2024 Nov 18. doi: 10.1002/jso.27993.
47. Alatise OI, Lawal OO, **Adisa AO,** Arowolo OA, Ayoola OO Agbakwuru EA, Adesunkanmi AR, Omoniyi-Esan GO, Olaofe OO. Audit of management of gallbladder cancer in a Nigerian Tertiary Health Facility. *Journal of Gastrointestinal Cancer.* 2012; 43(3):472-480.
48. **Adisa A.** Appendicectomy in sub-Saharan Africa: a tale of too many and too few. *Impact Surgery* 2024;1(2):26-27 doi.org/10.62463/surgery.40
49. **Adisa AO.** Antibiotics versus appendicectomy in acute appendicitis: delay is not denial. *Lancet Gastroenterol Hepatol*. 2025; 10(3):187-188. doi: 10.1016/S2468-1253(24)00391-1
50. **Adisa AO,** Lawal OO, Adejuyigbe O. Evaluation of two methods of preoperative hair removal and their relationship with postoperative wound infection. *Journal of Infection in Developing Countries* 2011; 5(10):717-722
51. Aderounmu AA, Olasehinde O, Wuraola FO, **Adisa AO,** Lawal, OO. Effect of fascia closure with triclosan-coated polydioxanone suture on surgical site infection in open appendectomy wounds: A comparative study. *Journal of West African College of Surgeons* 2024;14(2):154-158
52. Adeleke AA, Olasehinde O, **Adisa AO**. Influence of Adhesive Incise Drape Use on Surgical Site Infection Rates in Contaminated and Dirty Abdominal Operations. *West African Journal of Medicine*. 2024; 41(1):42-47.
53. Arowolo OA, Lawal OO, Akinkuolie AA, **Adisa AO**. A middle-aged woman presenting with massive empyema of the gallbladder: a case report. *Cases journal*. 2009;2:7827
54. Salako AA, Arowolo OA, Omonisi EA, **Adisa AO**, Titiloye NA, Adelusola K. Incidental carcinoma of the prostate gland presenting with initial manifestation of disseminated intravascular coagulopathy (DIC) in a middle-aged man: a case report. *Cases journal* 2009;2:144
55. Oladeji S, Amusa Y, Olabanji J, **Adisa A. O**. Rhinocerebral Mucormycosis in a diabetic: Case Report. *Journal of the West African College of Surgeons*. 2013;3(1):93-102
56. Omonisi AE, **Adisa AO**, Olaofe OO, Omoniyi-Esan GO, Olasode BJ. Carcinoma head of the pancreas masquerading as hepatocellular carcinoma: a case report. *Nigerian Journal of Medicine*. 2014 ;23(4):355-7.
57. Adeoti ML, Fadiora SO, Oguntola AS, **Adisa AO**. Recurrent typhoid ileal perforation after two months. *Nigerian Clinical Review*. 2003; 7: 18- 19.
58. Adeolu AA**, Adisa AO,** Ayoola OO, Olateju SO, Ibitoye BO, Adegbehingbe BO, Komolafe EO. Neglected massive intracerebral abscess: An unusual cause of bilateral visual loss. *Nigerian Postgraduate Medical Journal*. 2008;15(1):52-54
59. Olasehinde O, Owojuyigbe AM, **Adisa AO**, Awowole IO. Incidental finding of complete situs inversus in a polytraumatized adult. *African Journal of Medicine and Medical Sciences*. 2014;43(2):183-6
60. Olasehinde O, Aderibigbe AS, Akinkuolie AA, **Adisa AO**, Ajenifuja KO, Aladesuru OA, Oyekunle O. Torsion of wandering spleen, an unusual cause of acute abdomen; a report of two cases. *African Journal of Medicine and Medical Sciences*. 2014;43(1):75-8
61. Adebajo G, Adebunmi A, Olugbami A, Ijarotimi O, Aderibigbe A, Ojumu T, **Adisa A**. Huge Choledochal Cyst in a 26-Year-Old Female: A Case Report. *J West Afr Coll Surg*. 2024; 14(4):432-434. doi: 10.4103/jwas.jwas_163_23.
62. Arowolo OA, Lawal OO, **Adisa AO,** Adetiloye VA, Afolabi AI, Sowande OA. Adult Hirschsprung's disease: a report of 4 cases in Ile-Ife, Nigeria. *African Journal of Medicine and Medical Sciences* 2013;42:277-282.
63. **Adisa AO**. Images in Surgery. Nigerian Journal of Health Sciences.2020;20:69-70
64. Salako AA, **Adisa AO**, Ojo OS, Arigbabu AO. Severe gastrointestinal haemorrhage due to primary intestinal Kaposi's Sarcoma – A case report. *Nigerian Postgraduate Medical Journal.* 2007;14(4):352-4
65. **Adisa AO**, Omonisi AE, Osasan SA, Alatise OI. Clinicopathological review of schistosomal appendicitis in south western Nigeria. *Tropical Gastroenterology.* 2009;30(4):230-232
66. Akinkuolie AA, **Adisa AO**, Agbakwuru EA, Egharevba PA, Adesunkanmi ARK. Abdominal Tuberculosis in a Nigerian Teaching Hospital. *African Journal of Medicine and Medical Sciences.* 2008; 37(3):225-9.

67. **Adisa AO**, Olaseinde O., Arowolo O.A., Alatise O.I., Agbakwuru E.A. Early experience with stapled gastrointestinal anastomoses in a Nigerian hospital. *Nigerian Journal of Surgery.* 2015; 21:140-2.
68. **Adisa AO**, Olasehinde O, Alatise OI, Arowolo OA, Wuraola FO, Sowemimo SO. Steps to adoption of stapling technique for low rectal anastomoses in a Nigerian tertiary hospital. *Journal of Surgical Research* 2022;276:189-194
69. Wuraola FO, Adesunkanmi AO, Mohammed TO, **Adisa AO.** An Audit of Colostomy among Adult Patients in a Nigerian Tertiary Hospital. *Journal of Medical and Basic Scientific Research*. 2023;4(3-4):43-7
70. Arowolo O.A., Olaseinde O., **Adisa A.O.**, Adeyemo A., Alatise O.I., Wuraola F. Early experience with ligasure thyroidectomy in a Nigerian teaching hospital. *Nigerian Journal of Surgery* 2019;25:64-9
71. Olasehinde O, Owojuyigbe A, Adeyemo A, Mosanya A, Aaron O, Wuraola F, Owoniya T, Owojuyigbe T, Alatise O, **Adisa A.** Use of energy device in general surgical operations: impact on peri-operative outcomes. *BMC Surg*. 2022; 22(1):90. doi: 10.1186/s12893-022-01540-z
72. Alatise OI, Agbakwuru EA, Takure AO, **Adisa AO**, Akinkuolie AA. Open haemorrhoidectomy under local anaesthesia for symptomatic haemorrhoids; our experience from Nigeria. *Arab Journal of Gastroenterology* 2011; 12(2):99-102.
73. Mustapha B, Alatise OI, Olasehinde O, **Adisa A,** Wuraola FO, Mohammed TO, Aderounmu A, Henry AO, Adesunkanmi AO, Adeyeye A, Qozeem AO, Mohammed M. LigaSure versus conventional Milligan Morgan hemorrhoidectomy in Nigerian patients with symptomatic hemorrhoids. *World J Surg.* 2025; 49(2):334-342. doi: 10.1002/wjs.12416
74. Arowolo O.A., **Adisa A.O.**, Kolawole O.A., David R.A., Wuraola F.O. Severity, challenges and outcome of retroperitoneal hematoma in a Nigerian tertiary hospital. *Nigerian Journal of Surgery* **22**(2):96-101
75. Olasehinde O, **Adisa AO**, Aderibigbe AS, Alatise OI, Etonyeaku AC, Adesunkanmi ARK, Agbakwuru EA. Pattern and outcome of traumatic gastrointestinal injuries in Ile-Ife. *Nigerian Postgraduate Medical Journal* 22(1):37-40.
76. Salako AA, **Adisa AO**, Eziyi AK, Banjo OO, Badmus TA. Traumatic urologic injuries in Ile-Ife, Nigeria. *Journal of Emergency Trauma & Shock* 2010; 3:311-3.
77. Agbakwuru EA, Akinkuolie AA, Sowande OA, **Adisa AO,** Alatise OI, Onakpoya UU Uhumwango O, Adesunkanmi ARK. Splenic injuries in a semi urban hospital in Nigeria. *East and Central African Journal Of Surgery.* 13:95-100
78. Alatise OI, Aderibigbe AS, **Adisa AO**, Adekanle O, Agbakwuru AE, Arigbabu AO. Management of overt upper gastrointestinal bleeding in a low resource setting: a real-world report from Nigeria. *BMC Gastroenterology* 2014, 14:210. Doi:10.1186/s12876-014-0210-1
79. Durosinmi MA, Salawu L, Lawal OO, Ojo OS, Alatishe OI, Oyekunle AA, Bolarinwa RA, **Adisa AO**, Badmos K, Anomneze EE, Ayansanwo AO. Imatinib (Glivec) and Gastrointestinal Stromal Tumours in Nigerians. *African Journal of Medicine and Medical Sciences.* 2013;42(4):325-32
80. **Adisa AO**, Adeoti ML. Jehovah's Witness' stand in severe anaemia: the challenges of management – a case report. *Nigerian Journal of General Practice* 2003; 7(3): 24-26.
81. Amusa BY, **Adisa AO**, Adediran AO, Durosimi M. Otorrhinolaryngologic associated features of HIV/AIDS patients in Ile-Ife, Nigeria. *Nigerian Journal of Clinical Practice* 2004; 7(2):69-73.
82. Akinkuolie AA, Oladele OA, Omotola CA, **Adisa AO**, Adesunkanmi ARK, Kumuyi OJ. Crepe bandage in management of soft tissue limb abscesses. *East and Central African Journal Of Surgery.* 13:116-119
83. **Adisa AO**, Onakpoya UU, Oladele AO, Lawal OO. Informed Consent in Surgery: An audit of practice in Ile-Ife, Nigeria. *Nigerian Journal of Clinical Practice*. 2008;11(3):206-210
84. Alatise OI, Komolafe MA, Agbakwuru EA, **Adisa AO**, Amusa YB. Percutaneous endoscopic gastrostomy in Ile-Ife, Nigeria: an initial report. *West African Journal of Medicine.* 2013; 32(3):190-5.
85. Ibitoye BO, **Adisa AO,** Makinde ON, Ijarotimi AO**.** Prevalence and complications of gallstone disease among pregnant women in a Nigerian hospital. *International Journal of Gynecology and Obstetrics*. 2014; 125:41-43.
86. Adesunkanmi ARK, Badmus TA, Sowande AO, Arowolo OA, **Adisa AO**, Alatise OI, Olasehinde O, et al. Audit of day case surgery in Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife. *Nigerian Journal of Health Sciences* 2014; 14(2):23-27.
87. Ndegbu CU, Olasehinde O, Sharma A, Arowolo OA, **Adisa AO,** Alatise OI, Adesunkanmi ARK, Lawal OO. Daytime Versus Night-Time Emergency Abdominal Operations: Perspective from a Low-Middle-Income Country. *World J Surg.* 2019;43(12):2967-2972. doi: 10.1007/s00268-019-05160-2.
88. Ikokoh MO, Ojo AK, **Adisa AO**, Oria AI, Ajefolakemi JO. Challenges of Thyroidectomy Anaesthesia for a Huge Retrosternal Goitre in a Jehovah's Witness: A Case Report. *Annals of Health Research*. 2024; 10(2): 190-197. doi:10.30442/ahr.1002.11.239
89. Meara JG, Leather AJ, Hagander L, Alkire BC, Alonso N, Ameh Ea, et al. Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development. *Lancet*;386 (9993):569-624
90. National Institute for Health Research Global Health Research Unit on Global Surgery (**Adisa A.O.**: Collaborator) Global burden of postoperative death. *Lancet*. Vol 393 February 2, 2019 pp 401
91. NIHR Global Research Health Unit on Global Surgery (**Adisa AO:** Writing Group Member and Collaborator). Global guidelines for emergency general surgery: systematic review and Delphi prioritization process. *BJS Open*. 2022;6(1):zrac005. doi: 10.1093/bjsopen/zrac005
92. GlobalSurg Collaborative. Mortality of emergency abdominal surgery in high-, middle- and low-income countries. *Br J Surg*. 2016; 103(8):971-988. doi: 10.1002/bjs.10151.
93. GlobalSurg Collaborative (**Adisa A.O**., member of Writing Committee) Surgical site infection after gastrointestinal surgery in high-income, middle-income, and low-income countries: a prospective, international, multicentre cohort study. *Lancet Infectious Disease.* 2018. pii: S1473-3099(18)30101-4

94. COVIDSurg Collaborative (**Adisa A.O.**; Writing group). Elective surgery cancellations due to the COVID-19 pandemic: global predictive modelling to inform surgical recovery plans *British Journal of Surgery*. 2020;107(11):1440-1449 doi:10.1002/bjs.11746
95. COVIDSurg Collaborative (**Adisa AO:** Writing group member and Collaborator). Effect of COVID-19 pandemic lockdowns on planned cancer surgery for 15 tumour types in 61 countries: an international, prospective, cohort study. *The Lancet Oncology* 2021 Nov; 22(11):1507-1517. doi: 10.1016/S1470-2045(21)00493-9.
96. COVIDSurg Collaborative; GlobalSurg Collaborative. (**Adisa AO:** Writing Group and Collaborator). Timing of surgery following SARS-CoV-2 infection: an international prospective cohort study. *Anaesthesia*. 2021; 76(6):748-758. doi: 10.1111/anae.15458
97. COVIDSurg Collaborative; GlobalSurg Collaborative. (**Adisa AO:** Collaborator) Effects of pre-operative isolation on postoperative pulmonary complications after elective surgery: an international prospective cohort study. *Anaesthesia*. 2021; 76(11):1454-1464. doi: 10.1111/anae.15560.
98. NIHR Global Research Health Unit on Global Surgery, Bhangu A, **Adisa AO** (protocol development group). Pragmatic multicentre factorial randomised controlled trial testing measures to reduce surgical site infection in low- and middle-income countries: study protocol of the FALCON trial *Colorectal Disease*. 2020; 2021 Jan; 23(1):298-306.10.1111/codi.15354. doi:10.1111/codi.15354
99. NIHR Global Research Health Unit on Global Surgery. (**Adisa AO**: Member of Writing group, Hospital Principal Investigator) Reducing surgical site infections in low-income and middle-income countries (FALCON): a pragmatic, multicenter, stratified, randomized controlled trial. The *Lancet* 2021 Nov 6;398(10312):1687-1699
100. Ademuyiwa AO, **Adisa AO,** Bach S, Bhangu A, Harrison E, Allen Ingabire JC, Haque PD, Ismail L, Glasbey J, Ghosh D, Kadir B, Kamarajah SK, Li E, Lillywhite R, Mann H, Martin J, Ramos de la Madina A, Moore R, Morton D, et al. Alcoholic chlorhexidine skin preparation or triclosan-coated sutures to reduce surgical site infection: a systematic review and meta-analysis of high-quality randomised controlled trials. *Lancet Infectious Diseases*. doi.org/10.1016/S1473-3099(22)00133-5
101. NIHR Global Health Research Unit on Global Surgery (**Adisa AO:** Collaborator, Hospital Lead). The importance of post-discharge surgical site infection surveillance: an exploration of surrogate outcome validity in a global randomized controlled trial (FALCON). *Lancet Glob Health*. 2023; 11(8):e1178-e1179.
102. NIHR Global Health Research Unit on Global Surgery (**Adisa AO**: Hospital lead, writing committee member, and collaborator). Mechanisms and causes of death after abdominal surgery in low-income and middle-income countries: a secondary analysis of the FALCON trial. *Lancet Glob Health*. 2024 Sep 5:S2214-109X(24)00318-8. doi: 10.1016/S2214-109X(24)00318-8
103. NIHR Global Health Research Unit on Global Surgery (**Adisa AO**: Hospital Lead and Collaborator). Microbiology testing capacity and antimicrobial drug resistance in surgical-site infections: a post-hoc, prospective, secondary analysis of the FALCON randomised trial in seven low-income and middle-income countries. *Lancet Glob Health*. 2024:S2214-109X(24)00330-9. doi: 10.1016/S2214-109X(24)00330-9
104. NIHR Global Health Research Unit on Global Surgery (**Adisa AO:** Member trial design and management group). Study protocol for a cluster randomised trial of sterile glove and instrument change at the time of wound closure to reduce surgical site infection in low- and middle-income countries (CHEETAH). *Trials*. 2022; 23(1):204. doi: 10.1186/s13063-022-06102-5.
105. NIHR Global Research Health Unit on Global Surgery. (**Adisa AO**: Member of Writing group, Hospital Principal Investigator) Routine sterile glove and instrument change at the time of abdominal wound closure to prevent surgical site infection (ChEETAh): a pragmatic, cluster-randomised trial in seven low-income and middle-income countries. *Lancet*. 2022;400(10365):1767-1776
106. NIHR Global Research Health Unit on Global Surgery. (**Adisa AO**, Hospital PI) Strategies to minimise and monitor biases and imbalances by arm in surgical cluster randomised trials: evidence from ChEETAh, a trial in seven low- and middle-income countries. *Trials* **24**, 259 (2023). https://doi.org/10.1186/s13063-022-06852-2
107. NIHR Global Health Research Unit on Global Surgery. (**Adisa AO**: Collaborator, Hospital Lead). Routine sterile glove and instrument change at the time of abdominal wound closure to prevent surgical site infection (ChEETAh): a model-based cost-effectiveness analysis of a pragmatic, cluster-randomised trial in seven low-income and middle-income countries. *Lancet Glob Health.* 2024 Feb; 12(2):e235-e242. doi: 10.1016/S2214-109X(23)00538-7
108. NIHR Global Health Research Unit on Global Surgery. Structures, processes and outcomes between first referral and referral hospitals in low-income and middle-income countries: a secondary preplanned analysis of the FALCON and ChEETAh randomised trials. *BMJ Glob Health*. 2024 Nov 7; 9(Suppl 4):e015599. doi: 10.1136/bmjgh-2024-015599
109. M Picciochi, A O Ademuyiwa, **A Adisa,** A E Agbeko, J A Calvache, D Chaudhry, R Crawford, A C Dawson et al. Global access to technologies to support safe and effective inguinal hernia surgery: prospective, international cohort study. *Br J Surg*. 2024 Jul 2; 111(7):znae164. doi: 10.1093/bjs/znae164
110. Anyomih, T., Picciochi, M., Ademuyiwa, A. O., **Adisa, A.,** Bhangu, A., Ghosh, D., Glasbey, J., Haque, P.D., Ingabire J.C., Lawani, I., de la Medina, A.R., Nepogodiev, D., Tabiri, S. Photomapping hospitals from a major surgical randomised controlled trial. *Impact Surgery*, 2024; 1(6), 233–235. https://doi.org/10.62463/surgery.101
111. NIHR Global Health Research Unit on Global Surgery. (**Adisa AO**: Hospital Lead). Access to and quality of elective care: a prospective cohort study using hernia surgery as a tracer condition in 83 countries. *Lancet Glob Health*. 2024 Jul; 12(7):e1094-e1103. doi: 10.1016/S2214-109X(24)00142-6
112. Kamarajah, S., Li, E., Ademuyiwa, A., **Adisa, A**., Harrison, E., Allen Ingabire, J., Haque P.D., Lawani, I et al. Development of a risk of bias assessment tool specifically for meta-analysis of trials for surgical site infection. *Impact Surgery*, *1*(6), 240–242

113. GlobalSurg Collaborative (**Adisa A.O**: Writing Committee Member). Management and outcomes following surgery for gastrointestinal typhoid: an international, prospective, multicentre cohort Study. *World Journal of Surgery.* 2018; 42:3179–3188. doi: 10.1007/s00268-018-4624-8
114. GlobalSurg Collaborative. (**Adisa AO**: Collaborator). Pooled analysis of WHO Surgical Safety Checklist use and mortality after emergency laparotomy. *British Journal of Surgery*. 2019 Jan;106(2): e103-e112. doi: 10.1002/bjs.11051
115. National Institute for Health Research Global Health Research Unit on Global Surgery (**Adisa A.O.**: Collaborator) Prioritizing research for patients requiring surgery in low- and middle-income countries *British Journal of Surgery* 2019; 106: e113–e120
116. GlobalSurg Collaborative (**Adisa A.O**., Glasbey J - joint lead authors). Global variations in anastomosis and end colostomy formation following left-sided colorectal resections. *British Journal of Surgery Open*. 2019; 3(3):403–414. doi:10.1002/bjs5.50138
117. NIHR Global Health Research Unit on Global Surgery (**Adisa AO**: Collaborator) Quality and outcomes in global cancer surgery: protocol for a multicentre, international, prospective cohort study (GlobalSurg 3). *British Medical Journal Open. 2019*;9(5): e026646
118. GlobalSurg Collaborative. (**Adisa A.O.**: Collaborator) Surgical site infection after gastrointestinal surgery in children: an international, multicentre, prospective cohort study. *BMJ Glob Health*. 2020 Dec; 5(12):e003429. doi: 10.1136/bmjgh-2020-003429.
119. GlobalSurg Collaborative and National Institute for Health Research Global Health Research Unit on Global Surgery (**Adisa A.O.**: Nigeria National Co-Lead, Writing Group Member, Hospital Lead and Collaborator). Global variations in postoperative mortality and complications after cancer surgery: a multicenter, prospective cohort study in 82 countries. *Lancet* 2021: 2021 Jan 30;397(10272):387-397 doi /10.1016/S0140-6736(21)00001-5
120. Ademuyiwa A, **Adisa A,** Bhangu AA, Glasbey JC, Lapitan MC, Msosa V, Sacdalan D, Simones J. Stoma care research in low- and middle-income countries: update from the NIHR global health research unit on global surgery. *British Journal of Surgery Open.* 2021 May 7;5(3):zrab046. doi: 10.1093/bjsopen/zrab046
121. GlobalSurg Collaborative and NIHR Global Health Research Unit on Global Surgery (**Adisa AO,** Collaborator). Effects of hospital facilities on patient outcomes after cancer surgery: an international, prospective, observational study. *Lancet Glob Health*. 2022:S2214-109X(22)00168-1. doi: 10.1016/S2214-109X(22)00168-1.
122. **Adisa A,** Enright A, Glasbey J, Hyman G. Global perioperative care: From prioritization to patient impact. *Anesthesia and Analgesia*.2023;136(1):14-16
123. GlobalSurg Collaborative and NIHR Global Health Unit on Global Surgery (**Adisa AO:** Writing group member and collaborator). Impact of malnutrition on early outcomes after cancer surgery: an international, multicentre, prospective cohort study. *Lancet Glob Health*. 2023 Mar;11(3):e341-e349. doi: 10.1016/S2214-109X(22)00550-2.
124. Reuter A, Rogge L, Monahan M, Kachapila M, Morton DG, Davies J, Vollmer S; NIHR Global Surgery Collaboration. (**Adisa AO:** Collaborator) Global economic burden of unmet surgical need for appendicitis. *Br J Surg*. 2022 Sep 9; 109(10):995-1003. doi: 10.1093/bjs/znac195.
125. NIHR Global Health Research Unit on Global Surgery; (**Adisa AO**: Hospital Lead and Collaborator) Exploring the cost-effectiveness of high versus low perioperative fraction of inspired oxygen in the prevention of surgical site infections among abdominal surgery patients in three low- and middle-income countries. *BJA Open*. 2023 Jul 15; 7:100207. doi: 10.1016/j.bjao.2023.100207
126. NIHR Global Health Research Unit on Global Surgery; STARSurg Collaborative. Bravo L, Simões J, Cardoso VR, **Adisa A**, Aguilera ML, Arnaud A, Biccard B, et al. A prognostic model for use before elective surgery to estimate the risk of postoperative pulmonary complications (GSU-Pulmonary Score): a development and validation study in three international cohorts. *Lancet Digit Health*. 2024;6(7):e507-e519. doi: 10.1016/S2589-7500(24)00065-7.
127. NIHR Global Health Research Unit on Global Surgery (**Adisa AO**: Hospital Lead and Collaborator). Accuracy of the Wound Healing Questionnaire in the diagnosis of surgical-site infection after abdominal surgery in low- and middle-income countries. *Br J Surg*. 2024; 111(2):znad446. doi: 10.1093/bjs/znad446.
128. ASOS-Paeds Investigators (**Adisa AO**: Collaborator). Outcomes after surgery for children in Africa (ASOS-Paeds): a 14-day prospective observational cohort study. *Lancet*. 2024 Mar 22:S0140-6736(24)00103-X. doi: 10.1016/S0140-6736(24)00103-X
129. Bishop D, Dyer RA, Maswime S, Rodseth RN, van Dyk D, Kluyts HL, Tumukunde JT, Madzimbamuto FD, Elkhogia AM, et al; ASOS investigators (**Adisa AO**: Collaborator). Maternal and neonatal outcomes after caesarean delivery in the African Surgical Outcomes Study: a 7-day prospective observational cohort study. *Lancet Glob Health*. 2019 ;7(4):e513-e522.
130. ASOSSurg Collaborative (**Adisa AO**:Writing group member and collaborator). The impact of surgical delay on resectability of colorectal cancer: An international prospective cohort study. *Colorectal Dis*. 2022 Mar 14. doi: 10.1111/codi.16117.
131. van der Merwe F, Vickery NJ, Kluyts HL, Yang D, Han Y, Munlemvo DM, Ashebir DZ, Mbwele B, Forget P, Basenero A, ..., Biccard BM; African Surgical Outcomes Study (ASOS) investigators. (**Adisa AO**: Collaborator) postoperative outcomes associated with procedural sedation conducted by physician and nonphysician anesthesia providers: Findings from the prospective, observational African Surgical Outcomes Study. *Anesth Analg*. 2021 Dec 28. doi: 10.1213/ANE.0000000000005819.
132. Kachapila M, Ademuyiwa AO, Biccard BM, Ghosh DN, Glasbey J, Monahan M, Moore R, Morton DG, Oppong R, Pearse R, Roberts TE; NIHR Global Health Research Unit on Global Surgery; ASOS Investigators; STARSurg Collaborative (**Adisa AO**: Collaborator). Preliminary model assessing the cost-effectiveness of preoperative chlorhexidine mouthwash at reducing postoperative pneumonia among abdominal surgery patients in South Africa. *PLoS One*. 2021 Aug 12; 16(8):e0254698. doi: 10.1371/journal.pone.0254698

133. **Adisa AO**, Mishra RK. Changing role of laparoscopy in the management of patients with cirrhosis. *Journal of Minimal Access Surgery*. 2008;4(3):65-72
134. **Adisa A.O.** Laparoscopic cholecystectomy. In: Ray-Offor E (Ed). Principles and practice of laparoscopy surgery. 2019; Volume 1, First Edition, Port Harcourt, Nigeria. TND Press pp102-109
135. **Adisa AO**, Adesunkanmi AO. Laparoscopic distal pancreatectomy for a large multicystic pancreatic tumour in Ile-Ife, Nigeria. *West African Journal of Medicine*.2022; 39(9)737-40.
136. **Adisa AO**. Evolution of minimally invasive surgeries in Ile-Ife, Nigeria. *Nigerian Journal of Health Sciences*. 12(2):25-27.
137. **Adisa A.O**. Exploring ways of expanding access to minimal access surgeries in Nigeria: A review. *West African Journal of Medicine*. 2019;36(1):43-47
138. Raymond R. Price and **Adewale O. Adisa**. (2019) The challenges and solutions of performing minimally invasive surgeries in underdeveloped environments. In: Daniel B. Jones and Steven D. Schwaitzberg (Editors) Operative Endoscopic and Minimally Invasive Surgeries. *CRC Press Taylor and Francis,* February 28, 2019. ISBN 9781498708302
139. **Adisa AO**, Lawal OO, Arowolo OA, Alatise OI. Local adaptations aid establishment of laparoscopic surgery in a semi-urban Nigerian Hospital. *Surgical Endoscopy*.2013;27:390-393
140. **Adisa AO**, Arowolo OA, Salako AA, Lawal OO. Preliminary experience with laparoscopic surgery in Ile-Ife, Nigeria. *African Journal of Medicine and Medical Sciences.* 2009; 38:351-356.
141. **Adisa AO**, OO Lawal, OI Alatise, ARK Adesunkanmi. An audit of laparoscopic surgeries in Ile-Ife, Nigeria. *West African Journal of Medicine* 2011;30(4):273-276
142. **Adisa A.O.**, Lawal O.O., Adejuyigbe O. Trend over time for cholecystectomy following the introduction of laparoscopy in a Nigerian tertiary hospital. *Nigerian Journal of Surgery* 2017; 23(2):102-5.
143. **Adisa AO,** Alatise OI, Arowolo OA, Lawal OO. Laparoscopic appendectomy in a Nigerian Teaching Hospital. *Journal of the Society of Laparoendoscopic Surgeons*.201216:576-580
144. **Adisa AO**, Lawal OO, Arowolo OA, Akinola DO. Laparoscopic cholecystectomy in Ile-Ife, Nigeria. *African Journal of Medicine and Medical Sciences*. 2011;40:221-224
145. **Adisa A.O.**, Olasehinde O., Alatise O.I., Ibitoye B.O., Faponle A.F., Lawal O.O. Conversions and complications of elective laparoscopic cholecystectomy in a West African population. *Egyptian Journal of Surgery* 2018 Oct-Dec;37(4):440-444
146. **Adisa AO**, Alatise, OI Agbakwuru EA, Akinola DO, Adejuyigbe O. Wound complications following laparoscopic surgeries in a Nigerian hospital. *Nigerian Journal of Surgery*. 2014 Jul;20(2):92-5
147. **Adisa AO**, Lawal OO, Adesunkanmi ARK, Adejuyigbe O. Impact of introduction of laparoscopic surgery on management of unresolved intra-abdominal malignancies in a semi-urban Nigerian hospital. *World Journal of Surgery.* 2014 Oct;38(10):2519-24
148. Talabi AO, **Adisa AO**, Adefehinti O, Sowande OA, Etonyeaku AC, Adejuyigbe O. Early experience with laparoscopic surgery in children in Ile-Ife, Nigeria. *African Journal Of Paediatric Surgery* 2015 Jan-Mar 12(1):29-32
149. Igwe AO, Talabi AO, **Adisa AO**, Adumah CC, Ogundele IO, Sowande OA, Adejuyigbe O. Comparative study of laparoscopic and open inguinal herniotomy in children in Ile-Ife, Nigeria: A prospective randomized trial. *Journal of Laparoendoscopic and Advanced Surgical Techniques*. 2019 Dec; 29(12):1609-1615. doi: 10.1089/lap.2019.0354.
150. Igwe AO, Talabi AO, Adumah CC, Ogundele IO, **Adisa AO**, Sowande OA, Adejuyigbe O. Mitigating the challenges of laparoscopic paediatric surgery in Ile-Ife: the trend so far and lessons learned. *African Journal of Paediatric Surgery.* July-Dec 2020:17(3&4):68-73
151. Picchio M, De Angelis F, Zazza S, Di Filippio A, Mancini R, Pattaro G, Stipa F, **Adisa AO**, Marino G, Spaziani E. Drain after elective laparoscopic cholecystectomy. A randomized multicenter controlled trial. *Surgical Endoscopy.* Oct;26(10):2817-22
152. **Adisa A.O.**, Onakpoya O.H., Adenekan A.T., Awe O.O. Intraocular pressure changes with positioning during laparoscopy. *Journal of the Society of Laparoscopic Surgeons* 20(4):1-7 e2016.00078
153. **Adisa A.O.**, Adedeji T.A., Bolarinwa R.A., Owojuyigbe T.O., Jeje O.A., Glasbey J., Akinola N.O. The inflammatory response of sickle cell disease patients to cholecystectomy. *Journal of the Society of Laparoscopic Surgeons,* 2019;23(2) e2019.00027 pp1-9
154. Adenekan A.T., Aderounmu A.A., Wuraola F.O., Owojuyigbe A.M., Adetoye A.O., Nepogodiev D., Magill L., Bhangu A., **Adisa A.O**. Feasibility study for a randomized controlled trial of bupivacaine, lignocaine with adrenaline, or placebo wound infiltration to reduce postoperative pain after laparoscopic cholecystectomy. *British Journal of Surgery Open* 2019:3:453-460 https://doi.org/10.1002/bjs5.50159
155. **Adisa A**. Kachapila M, Ekwunife C, Alakaloko F, Olanrewaju B, Kadir B, Nepogodiev D, AderounmuA, Igwilo I, Omar O, Oppong R, Simoes J, Bhangu A, Ademuyiwa A, NIHR Global Health Unit on Global Surgery. A prospective, observational cost comparison of laparoscopic and open appendicectomy in three tertiary hospitals in Nigeria. *World J Surg* 2023 Oct 11, doi:10.1007/s00268-023-07148-5
156. Smiley KE, Wuraola F, Mojibola BO, Aderounmu A, Price RR, **Adisa AO**. Laparoscopy in a semi-urban nigerian hospital: an outcomes-focused comparative analysis of laparoscopic and open surgery. *Journal of the American College of Surgeons* 225 (4), S10. 5DOI: https://doi.org/10.1016/j.jamcollsurg.2017.07.231
157. Smiley KE, Wuraola F, Mojibola BO, Aderounmu A, Price RR, **Adisa AO**. An outcomes-focused analysis of laparoscopic and open surgery in a Nigerian hospital. *Journal of the Society of Laparoscopic Surgeons,*. 2023; 27(1):e2022.00081. doi: 10.4293/JSLS.2022.00081
158. Aderounmu A.A., Wuraola F.O., Olasehinde O., Sowande O.A., **Adisa A.O.** Feasibility of introducing suturing skills acquisition into undergraduate surgical education in Ile-Ife, Nigeria. *Nigerian Journal of Surgery* 2019;25: 188-91

159. Gheza F., Oginni F.O., Crivellaro S., Masrur M.A., **Adisa A.O**. Affordable Laparoscopic Camera System (ALCS) Designed for Low- and Middle-Income Countries: A Feasibility Study. World Journal of Surgery. 2018; 42:3501-3507 doi: 10.1007/s00268-018-4657-z.
160. **Adisa AO**, Olasehinde O, Alatise OI, Arowolo OA, Wuraola FO, Sowemimo SO. Steps to adoption of stapling technique for low rectal anastomoses in a Nigerian tertiary hospital. *Journal of Surgical Research* 2022;276:189-194
161. **Adisa AO**, Balogun OS, Osinowo A, Gagarawa AY, Ray-Offor E, Oke AO, Coker OA, Bode CO, Laparoscopic Surgery Society of Nigeria (LASSON). Recommendations of the Laparoscopic Surgery Society of Nigeria (LASSON) on the conduct of minimal access surgeries during and after the COVID 19 pandemic in Nigeria. *Nigerian Journal of Surgery*. 2021; 27:1-4.
162. Poudel S, Kurashima Y, Kapsampelis P, Tsoulfas G, Calsolari B, Colleoni R, **Adisa A**, Josh A, Nayahangan LJ, Konge L, Meterissian S, Varas J, Xiao T, Rasa K, Stefanidis D. What do surgical trainees and educators around the world need: a global needs assessment survey from 6 regions around the world. *Global Surgical Education - Journal of the Association for Surgical Education.* 2025; 4(18) doi.org/10.1007/s44186-024-00325-7
163. Ledda V, **Adisa A**, Agyei F, Caton L, George C, Ghaffar A, Ghosh D, Hachach-Haram N, Haque PD, Ingabire JCA, Kudrna L, Li E, McClain C, Nepogodiev D, Ntirenganya F, Shrime MG, Williams I, Bhangu A. Environmentally sustainable surgical systems. *BMJ Glob Health*. 2024 Nov 7; 9(Suppl 4):e015066. doi: 10.1136/bmjgh-2024-015066
164. Ademuyiwa AO, **Adisa A,** Allen-Ingabire JC, Bhangu AA, Crawford R, Galley F, Ghaffar A, Ghosh D, Glasbey J, et al, NIHR Global Health Research Unit on Global Surgery. Prioritizing clean, secure energy for operating theatres in the Global South. *Br J Surg.* 2024 Apr 3; 111(4):znae086. doi: 10.1093/bjs/znae086.
165. V Ledda, **A Adisa**, D Ghosh, S Kamarajah, D Nepogodiev, A Bhangu. The 100-4-100 programme: Clean and reliable energy for 100 district hospitals in the Global South. *Impact Surgery* 1 (3), 86-87
166. Glasbey J; NIHR Global Health Research Unit on Global Surgery (**Adisa AO:** Member of Writing Group and Collaborator). Adaptation of the Wound Healing Questionnaire universal-reporter outcome measure for use in global surgery trials (TALON-1 study): mixed-methods study and Rasch analysis. *Br J Surg.* 2023 Apr 3:znad058. doi: 10.1093/bjs/znad058
167. NIHR Global Health Research Unit on Global Surgery, GlobalSurg Collaborative (**Adisa AO**: Collaborator, Hospital Lead). Use of Telemedicine for post-discharge assessment of the surgical wound: International cohort study, and systematic review with meta-analysis. *Ann Surg.* 2023 Jun 1; 277(6):e1331-e1347. doi: 10.1097/SLA.0000000000005506