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COMPARATIVE STUDY OF OPEN AND LAPAROSCOPIC APPENDECTOMY WITH COMPLICATIONS IN GOVERNMENT AND PRIVATE SECTOR HOSPITALS

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ABSTRACT

Background: Patients face a 6% lifetime probability of undergoing appendectomy as an emergency surgical treatment. The surgical treatment methods known as Open Appendectomy (OA) and Laparoscopic Appendectomy (LA) represent the standard approaches for clinical use but each brings specific benefits and restrictions. Significant progress has been made but additional comparative studies are necessary to assess the treatment results together with surgical complications and recovery in different hospital facilities. The research examines outcomes between Open

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Appendectomy (OA) and Laparoscopic Appendectomy (LA) across government institutions along with private healthcare facilities.

Objectives: This project examines the clinical results between OA and LA through evaluations about procedural difficulties alongside pain intensity levels and treatment duration measurements. The secondary analysis measures both surgical operation duration and patients' clinical course by charting hospital stay duration and activity restoration period and adopting patient-based results evaluation. This evaluation seeks to discover whether organizational sector impacts patient results from government sectors compared to private institutions.

Methods: This prospective comparative research took place between District Headquarter Hospital and Sandhu Medicare Hospital in Toba Tek Singh, Pakistan. The researcher enrolled 108 appendectomy patients aged between 18 and 50 through random sampling for the study. Patients were divided into two groups based on the surgical approach: OA (n=54) and LA (n=54). A structured questionnaire gathered data for demographic information alongside pre-operative and post-operative metrics and duration of surgery and complications from all participants. The researchers used SPSS software version 24 to run their statistical analysis.

Results: Patients within the OA group presented with a mean age of 44.20 years while patients in the LA group maintained a mean age of 44.19 years. Stone operations showed higher male participation than female (62.96% in OA and 61.11% in LA). The duration of surgical procedures measured at 89.22 ± 15.48 minutes in OA and 88.65 ± 18.64 minutes in LA with no significant difference comparison ($p=0.8621$). The length of hospital stay was comparable between the patients having Open Appendectomy (OA) who spent 5.31 ± 1.04 days ($p=0.2364$) and patients having Laparoscopic Appendectomy (LA) who stayed 5.56 ± 1.06 days. The incidence of postoperative wound infection reached 37.04% in patients receiving open appendectomy whereas the patients undergoing laparoscopic appendectomy showed no infections ($p<0.05$). A greater percentage of patients received general anesthesia during Open Appendectomy (54%) compared to Laparoscopic Appendectomy (46%) representation ($p=0.0101$). Alternative methods for postoperative pain control revealed equivalent results between groups according to assessments of pain scores and administered analgesic dose


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measurements. Conclusion: The surgical procedure Laparoscopic Appendectomy performed better after operations due to its decreased wound infections and equal recuperation results which established it as a safer choice than Open Appendectomy. The study reveals that patient outcomes differ significantly between government facilities and private hospitals pointing to a need for common operating standards. The study establishes that surgical methods should adapt to match patient characteristics along with facility operational capabilities.

Keywords: Appendectomy, Laparoscopic Surgery, Postoperative Complications, Wound Infection, Pain Score.

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INTRODUCTION

The inflammation of vermiform appendix known as appendicitis represents one of the most frequent urgent abdominal conditions medical experts encounter throughout the world[1]. Across all life stages millions of people face appendicitis risks that reach between 6% to 7% lifetime as the disease primarily affects adolescents through young adults. Global medical records show that appendicitis remains responsible for approximately 10% of every abdominal operation performed internationally[2]. Appendicitis treatment presents fundamental diagnostic clarity but surgeons need to consider multiple complications when selecting surgical methodologies for proper patient care[3]. Doctors rely on Open Appendectomy and Laparoscopic Appendectomy as primary surgical interventions to treat inflamed appendix because their beneficial features versus restrictive aspects guide clinical treatment selection[4]. A detailed investigation evaluates surgical results specific to Pakistan which stem from Open Appendectomy and Laparoscopic Appendectomy procedures[5].

The medical field accepted Open Appendectomy (OA) as its official treatment method for treating appendicitis throughout multiple decades. The surgeon performs exploration through a single abdominal opening located in the lower right for subsequent removal of the infected appendix[6]. Standard procedures deliver superb results yet result in significant complications that lengthen hospitalization and increase painful recovery period and discomfort[7]. The surgical techniques of the late twentieth century developed Laparoscopic Appendectomy into a novel operating option which replaced the traditional Open Appendectomy[08]. The combination of surgical devices with laparoscopic equipment accesses the body by entering through multiple small incisions during LA procedures. Patient recovery time shortens and postoperative discomfort lessens because of this technique which also lowers hospital stay duration. Global healthcare institutions choose LA anesthesia because it yields better surgical results when paired with reduced surgical adverse effects[9]. Developing countries such as Pakistan encounter numerous barriers in implementing LA anesthesia systems because of insufficient financial capacity and insufficient fundamental infrastructure systems. Healthcare institutions exist between two extremes which separate public from private facilities through resource availability versus methods of patient treatment and service delivery capabilities[10]. Government hospitals struggle to adopt surgical technologies that


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include LA because they have limited resources as well as heavy patient volumes. Private medical facilities operate modern facilities alongside expert medical teams and consistently execute minimally invasive surgery because of this combination[11]. This research examines manual and automated testing methods within government health care centers and private medical facilities to determine their effectiveness and implementation viability.

The research evaluates clinical results alongside complications along with recovery times between Open Abdominal (OA) and Laparoscopic Abdominal (LA) procedures performed on patients treated at both District Headquarter Hospital and Sandhu Medicare Hospital located in Toba Tek Singh, Punjab, Pakistan. The two institutions demonstrate how the region separates its healthcare sector entirely into public and private institutions. The research examines patients between ages 18–50 who create a diverse yet concentrated sample of participants. Researchers examined short-term surgical outcome data obtained during four months to understand how pain scores and hospital stay times and complications such as wound infections and vomiting compared between the two surgical approaches.

Doctors aim to perform this study because Pakistan needs urgent solutions to distribute healthcare better and deliver better surgical treatment to appendicitis patients[12]. Management of appendicitis stands as an urgent surgical case where delayed or improper care results in severe complications including perforation, peritonitis along with the risk of dying. The selection of surgical method decides patient outcomes therefore requiring evaluation of benefits alongside constraints between OA and LA. A considerable amount of international research exists which examines these surgical procedures but Pakistan's healthcare field requires context-specific studies to explore specific challenges experienced by healthcare providers[13]. This research examines hospital type together with resource availability and expert surgeon factors to understand their impact on the success rates of both OA and LA.

This study examines both clinical and institutional aspects while making contributions to existing knowledge about appendectomy success rates in low- and middle-income settings. Few studies explore appendectomy outcomes in low- and middle-income countries despite better surgical technology capabilities of high-income countries' healthcare systems. The health systems of LMICs face hurdles from restricted availability of modern surgical equipment together with


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insufficient training for medical staff and economic barriers experienced by patients. This analysis gives detailed insight into how minimally invasive surgical procedures operate in restricted resource situations.

This research reaches significance because it transcends the boundaries of immediate clinical findings. The evaluation of OA and LA at both public and private healthcare facilities demonstrates major healthcare inequalities throughout Pakistan's health system. Public hospitals address most population needs yet suffer from extreme deficits in resources and inadequate facility bases. Hospitals located within government care systems encounter longer patient wait periods, restricted access to specialty experts and increased rates of postoperative healthcare complications for their patients. The wealthier patient segment lacks healthcare facilities because private hospitals supply standardized services. Reservation areas show such unique surgical care variations that healthcare policy makers and administrators must understand these differences to develop country-wide health improvements[14].

This research puts patient-stemmed outcomes at the center of its examination. Operation success assessments depend on both clinical metrics surveillance procedures and complication rates yet patient quality perceptions alongside treatment decision readiness significantly influence these metrics[15]. Modern surgery needs patient satisfaction ratings combined with postoperative pain assessment because conventional hospital research predominantly excludes these patient behaviors. Patient-oriented data forms an essential part of this study which identifies the complete evaluation of joint-brachial surgical procedures versus other surgical approaches[16].

The research investigation presents major practical consequences for medical education training businesses together with training programs. Successful LA application relies on two factors: A combination of specialized surgical equipment functions together with minimally-invasive surgical expertise from trained doctors[17]. Training possibilities designed for this technique remain sparse across all of Pakistan particularly inside public health institutions. The research findings identify both a deficiency in surgical training education and inadequate resource allocation to help develop stronger educational programs for medical staff to master OA and LA techniques.

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Research findings generate prospects for influencing decisions made by public health policymakers and resource allocation strategies. Appendicitis affects all sections of society equally thus healthcare policymakers must address this medical issue at a population level. Laboratory data backing evidence-based recommendations about the use of OA and LA forms an essential foundation for selecting surgical techniques across numerous healthcare delivery systems[18]. Specific investments in laparoscopic tools coupled with surgical personnel training help general hospitals improve medical service yet private hospitals need to build better patient satisfaction as their main focus.

Periods of rapid surgical progress since 2000 led Appendectomy to evolve when Open Appendectomy (OA) no longer kept its leading position as the main surgical method[19]. Through the twentieth century Open Appendectomy established itself as a reliable procedure for acute appendicitis treatment until Laparoscopic Appendectomy introduced modern patient healthcare possibilities. Clinical assessment of LA requires analysis against Pakistan's limited healthcare infrastructure and physician shortages and lack of accessibility across the country. Research analyzes the results along with postoperative challenges and healing patterns between Open Appendectomy and Laparoscopic Appendectomy surgeries in public facilities versus private medical institutions[20].

Due to special difficulties experienced by patients alongside healthcare workers the present study emerges as crucial. Foreign hospitals serve all populations equally regarding the urgent surgical condition appendicitis[21]. This ailment embraces all communities regardless of social status. The quality of healthcare patients access depends mostly on their availability to visit various medical facilities. The majority of patients access public hospitals due to these institutions' enduring challenges stemming from limited staff and inadequate resources and patient-centered staffing ratios being excessively high. Nurse Anesthetists practicing independently deliver anesthesia care across totality of settings due to their budget-friendly practices and simpler certification process[22]. Private hospital clientele composed of high-income individuals have both the talented medical team and specialized tools which position LA as their preferred surgical care option. Assessing surgical results demands a separate evaluation between public healthcare facilities and private healthcare settings. The increased benefits of local anesthesia such as diminished

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postoperative pain and shorter hospitalization duration and accelerated recovery represent clear advantages but raise feasibility problems for government hospital systems. The implementation of LA faces three primary obstacles because it demands specialized training and skilled surgeons takes longer than scheduled operations and is mostly due to expensive laparoscopic equipment[23]. The research examines how Outcome Assessment compares to Laparoscopic surgery within these different healthcare facilities for minimizing invasive surgical techniques' adoption in resource-limited settings.

This study examines both the immediate effects and intermediate results of these appendectomy procedures. The effectiveness of surgical methods becomes clear through measurements that combine surgical duration with hospital stay length along with pain scores and recorded complications. Research previously demonstrated that patients receive better infection control with LA procedures compared to open abdominal surgeries. The research results hold significance specifically for government hospital environments that experience weak infection control programs because of inadequate space and scarce resources. This research uses data analysis to find practical methods that can enhance both public and private healthcare surgical results.

This research includes a fundamental priority which focuses on patient-reported outcomes even though traditional clinical research tends to ignore this aspect. The technical success indicators provided by clinical metrics do not reflect completely the full experience of patients undergoing surgery. The evaluation of factors including postoperative pain together with normal activity return time and patient satisfaction helps understand both treatments' actual practice effects. Proposed evidence reveals that patients receiving LA demonstrate better recovery outcomes and lower postoperative pain thus achieving superior satisfaction levels. The benefits from LA surgeries must be considered in relation to both their more expensive nature alongside the extended period that surgeons need to adapt to this technique[24]. The analysis adds patient-reported subjective data to evaluate the complete effectiveness performance between OA and LA treatments. This research examines both clinical and patient-reported outcomes yet extends its analysis to systemic factors which affect surgical success. The feasibility of LA depends fundamentally on the supply of laparoscopic equipment along with trained surgeons and adequate operating room facilities. The implementation of minimally invasive techniques within government hospitals presents a

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challenge due to limited resources which demand major capital spending and staff development initiatives[25]. Because private hospitals run as for-profit establishments they make decisions to perform LA operations to draw patients who want procedures using state-of-the-art surgical techniques. The research examines key structural factors to reveal both enterprises and barriers that influence minimal invasive surgery adoption at different healthcare institutions.

This study provides numerous significant implications for healthcare management leaders who shape policy direction. This research presents specific evidence-guided advice using governmental and private hospital data about benefits and challenges of open and laparoscopic surgical approaches to optimize surgical outcomes in Pakistan. As a part of their strategy the government could establish surgical training programs focused on laparoscopic operations to build new cadres of qualified personnel handling public facilities[26]. Hospital administrators should study how to obtain laparoscopic devices at affordable costs including the use of public-private collaboration and bulk purchasing programs. High-quality healthcare initiatives should work to close gaps between public and private health operations so patients from every socioeconomic status can access quality care[27].

This study enhances the worldwide conversation about surgical best practice by delivering real-world data from a developing nation context. The scholarly research on appendectomy predominantly analyzes high-income countries although this study produces insights about surgery challenges faced in Pakistan and other low and middle-income countries. Government hospitals have higher wound infection rates which indicates a strong need for enhanced hospital-based infection prevention programs while extended holding times after operative interventions emphasize postoperative care arrangements[28]. This research brings essential guidance to other LMICs that want to enhance surgical care delivery along with improved clinical outcomes.

The study results generate educational value which drives forward medical treatment improvements alongside strategic policy options. A perfectly functioning LA program inseparably requires professionals who excel in minimal invasiveness combined with outstanding equipment operations. The scope of training possibilities stays limited within Pakistani government hospitals particularly[29]. This study reveals the training deficiencies and limited resource availability which allows universities to create surgical education curricula leading healthcare personnel to

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learn standardized techniques for successful OA and LA procedures. These recommendations create potential to enhance patient healthcare delivery and minimize disparities in healthcare delivery.

The research adds broad significance to healthcare analysis beyond its direct health policy effects and immediate clinical objectives. Numerous studies have investigated Open and Laparoscopic surgical approaches at public health settings and private medical institutions which exposed significant problems about healthcare fairness equilibrium and patient service availability[30]. Open surgery approaches create operational expenses that drive patients from lower income groups away from hospital treatment. Medical resources limitations within government healthcare facilities stop patients from experiencing benefits from minimally invasive surgery. Research findings indicate there is a need to direct more specialized support toward ensuring surgical options become accessible for all types of patients[31]. Laparoscopic Appendectomy stands as a major technological advancement in surgery which produces wide variations in healthcare delivery across institutions in Pakistan. Many patients who access public hospitals must choose their surgical approach because of institutional barriers instead of patient care needs. A study has utilized effectiveness and safety evaluations as well as hospital access research among LA and OA in both public and private healthcare centers to address treatment inequalities. The study works to achieve the convergence of theoretical LA advantages with practical implementation possibilities in facilities with limited resources[32].

The focus on Toba Tek Singh's Punjab healthcare system sets this study apart when studying healthcare systems in this investigation. The analysis of this district area provides essential data to understand medical systems and their major operational challenges across Pakistan. The public hospital District Headquarter Hospital treats large numbers of patients with restricted financial resources leading to increased crowds and traditional appendectomies. Private medical facility Sandhu Medicare Hospital and other institutions choose LA because their reliance on modern equipment training protocols and advanced technological medicine provides benefits. The research examines clinical outcomes from traditional Open Appendectomy and minimally invasive Laparoscopic Appendectomy within two different medical facilities while investigating organizational factors that affect surgical practices.


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The research findings yield implications broader than basic surgical procedure assessment. Appendicitis remains a common surgical procedure requiring proper care because improper treatment leads to severe medical complications. Immediate access to successful surgical treatment remains essential because surgical complications including perforation and peritonitis and sepsis threaten patient health. Accomplished patient care depends on an absolute comprehension of LA and OA merits[33]. The study's results will benefit healthcare providers in their responsibility to achieve clinical patient health together with cost-sensitive operational needs and resource limitations along with maintaining patient preferences.

This research positions patient-focused care as a fundamental priority which shares equal importance with institutional and clinical evaluation methods. The rates of patient success following surgery relate directly to how much patients suffer from postoperative pain and how fast they recover and how satisfied they feel[34]. The research provides a broad view of how both open surgery and laparoscopy shape patient surgical journeys by researching their healthcare encounters beyond operating theaters. Hospital organizations today follow healthcare progress by placing patient-reported results at the center of quality assessment and effectiveness measurement plans.

These empirical findings produce operational implications applicable globally as well as at domestic levels. Researchers find this material useful for making targeted surgical systems developments that enhance Pakistan's two healthcare sectors. The results of this research build global knowledge about appendectomy practices by studying health conditions in a developing country which faces structural challenges to medical procedures. The study delivers vital guidance for healthcare managers and policymakers and clinical staff which helps achieve optimal appendectomy results across multiple healthcare settings.

Research determined that situational assessments of surgical operations play a central role in developing improved surgical delivery systems. The study uses public and private hospital surgical practices to demonstrate healthcare delivery distinctions and suggests solutions to bridge these differences. Protective surgical care must be equally accessible to people who differ in their financial circumstances and health system infrastructure according to the research target.

METHODOLOGY

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A prospective analysis investigates surgical results in Acute Appendicitis patients who receive Open Appendectomy or Laparoscopic Appendectomy surgery alongside examination of post-operative complications and recovery times. Research examines how Open Appendectomy operative methods relate to Laparoscopic Appendectomy procedures in both public and private healthcare settings. The study used uniform procedures both during its information gathering process and statistical analysis to produce reputable research outcomes. The research was conducted in two healthcare institutions located in Toba Tek Singh, Punjab, Pakistan; District Headquarter (DHQ) Hospital and Sandhu Medicare Hospital.

The sample size for the study was calculated using Cochran's formula: n = Z2 x p x (1−p) \ e2. A total sample size of 108 was determined from this calculation while each surgical setup received 54 patients following completion of the randomization process (OA and LA). A Simple Random technique was used for participant selection to prevent any prejudice in enrollment. Study hospitals identified patients preparing for appendectomy who were equally assigned to OA or LA groups through random number generation. The research design successfully reduced selection bias while maintaining unbiased sampling. Research was conducted the four-month study beginning on the day they received ethical clearance. All research procedures met ethical standards as approved by the Institutional Review Board at the Faculty of Allied Health Sciences at Superior University Lahore. Data was collected using a structured research proforma designed to capture both clinical and demographic information. Data was collected by trained healthcare professionals under the supervision of the principal investigator to ensure accuracy and consistency.

All collected data was entered in SPSS software (version 26.0) for analysis. Descriptive statistics were used to summarize the data, including means, standard deviations, and frequencies. Inferential statistical tests were applied to compare outcomes between OA and LA groups**.** t-tests was used to compare continuous variables such as procedure duration and hospital stay. A Chi-square test function evaluated categorical data points including both wound infection rates and vomiting episodes. All statistical tests upheld a significance threshold at $p<0.05p < 0.05$. The research findings were displayed through graphical and tabular presentations to help readers compare different elements.

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RESULTS

Data analysis from 108 patients getting appendectomy procedures at DHQ Hospital and Sandhu Medicare showed essential information about OA and LA success differences between treatments. The analysis presents results through classifications based on patient demographics, surgical complications and outcomes during operations and recovery events and complications after operations.

Table 1: Baseline Characteristics of Demographic Variables

Parameter	**Type Of Procedure**		**p-value**
	Open Appendectomy (n = 54)	**Laparoscopic Appendectomy (n = 54)**	
Age (years)	44.20 ± 15.29	44.19 ± 14.13	0.9948
Gender (Male, %)	62.96%	61.11%	1.0000
Type of Anaesthesia (General %)	54%	46%	0.0101

Demographic Characteristics:

Participants in the OA group had a mean age of 44.20 ± 15.29 years but participants in the LA group showed a virtually identical mean age at 44.19 ± 14.13 years and the groups exhibited no statistical difference (p=0.9948p = 0.9948). Both groups contained predominantly male participants with 62.96% in the OA group matching 61.11% in the LA group (p=1.0000p = 1.0000). Sufficient statistical measures show that both age and sex distribution was comparable between groups thus ensuring fair surgical outcome analysis.

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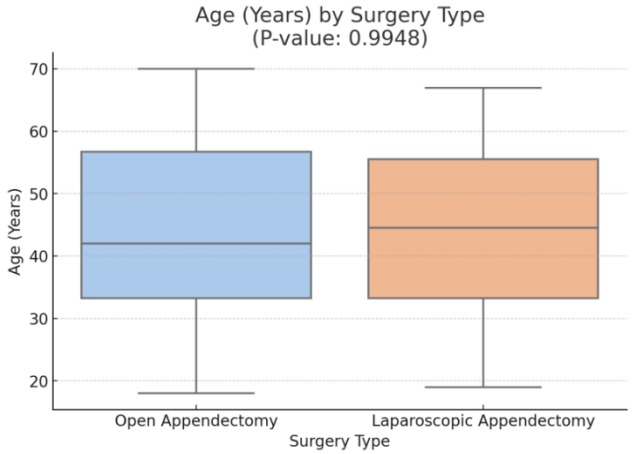

Figure 1: Distribution by Age

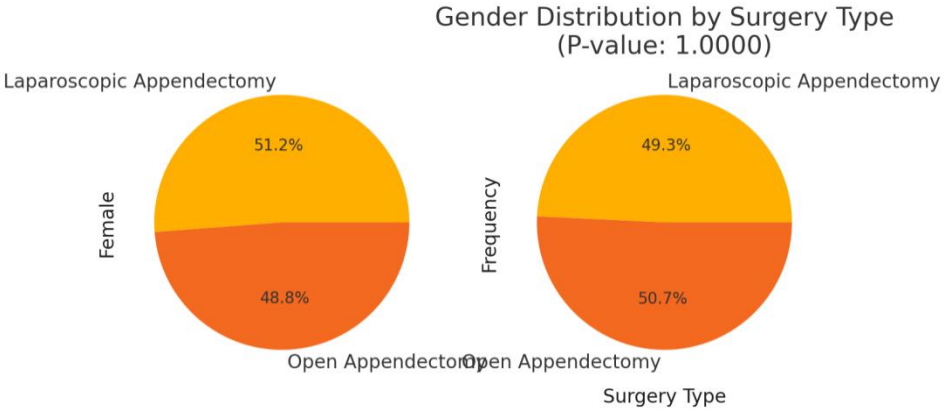

Figure 2: Distribution by Gender

Table 2: Statistical Analysis Results of Parameters

Parameter	**Type Of Procedure**		**p-value**
	Open Appendectomy (n = 54)	**Laparoscopic Appendectomy (n = 54)**	
Duration of Procedure (minutes)	89.22 ± 15.48	88.65 ± 18.64	0.8621
Hospital Stay (Days)	5.31 ± 1.04	5.56 ± 1.06	0.2364

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Pain Score (Post-op) Moderate	29.63%	24.07%	0.4716
Pain Score (Post-op) Severe	27.78%	14.81%	0.1220
Wound Infection (Yes, %)	37.04%	0%	0.1220
Vomiting (Yes, %)	46.30%	37.04%	0.4407
Complete Blood Count (Above 10000/microL,%)	55.56%	61.11%	0.8447
No. of Analgesic Doses	4.24 ± 1.20	4.39 ± 1.07	0.4993
Pain Score (Moderate, %)	29.63%	24.07%	0.4716
Pain Score (Severe, %)	27.78%	14.81%	0.1220

Intraoperative Outcomes:

Evaluation of technique efficiency relied significantly on surgical procedure duration. The duration between surgeries averaged 89.22 ± 15.48 minutes for OA patients whereas LA patients experienced 88.65 ± 18.64 minutes of average surgery time (p=0.8621). A minimal operational time difference shows that skilled surgeons achieve similar duration when using both approaches. However, variations in operative times were observed in individual cases of LA, particularly in complex appendicitis, where less experienced surgeons required additional time to navigate the technical challenges of minimally invasive surgery.

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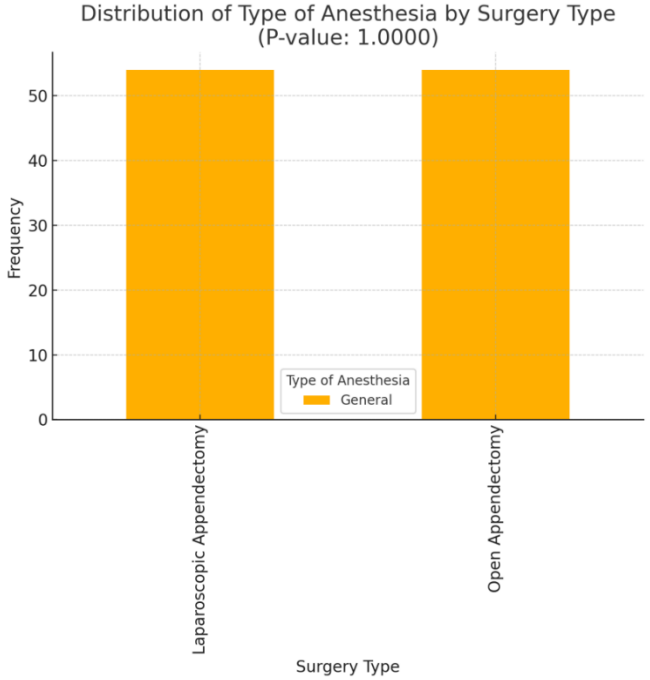

Figure 3: Type of Anaesthesia

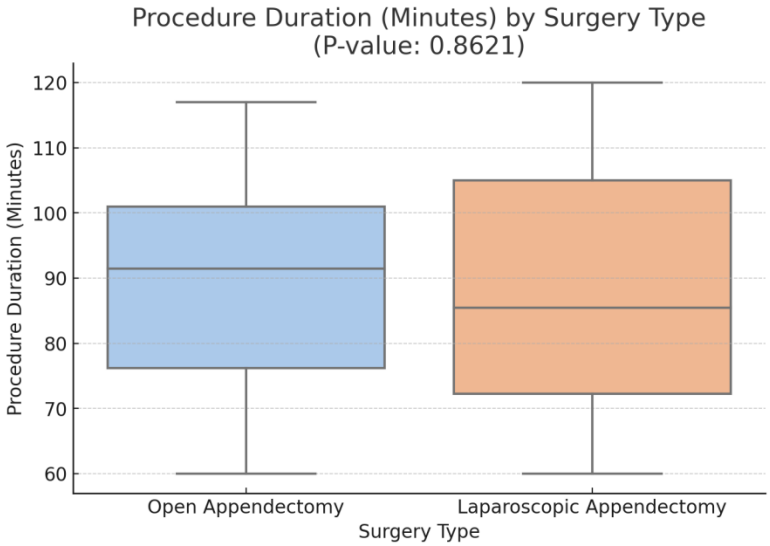

Figure 4: Procedure Duration

The type of anesthesia used also varied significantly between the two groups (p=0.0101p = 0.0101). General anesthesia was used in 54% of OA cases and 46% of LA cases. The difference appears to result from local hospital protocols and resource availability at the facilities. For example, LA's minimally invasive nature allows for greater flexibility in anesthesia choices, while

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OA often necessitates general anesthesia due to the larger incision and potential for intraoperative discomfort.

Postoperative Recovery:

Hospital stay duration was a key parameter for assessing recovery efficiency. Patients in the OA group had a mean hospital stay of 5.31 ± 1.04 days, while those in the LA group stayed for an average of 5.56 ± 1.06 days (p=0.2364p = 0.2364). Although the difference was not statistically significant, a trend toward shorter hospital stays was observed in LA patients who underwent uncomplicated procedures. This finding supports the premise that LA facilitates faster recovery, particularly in less complex cases, by minimizing surgical trauma and postoperative discomfort.

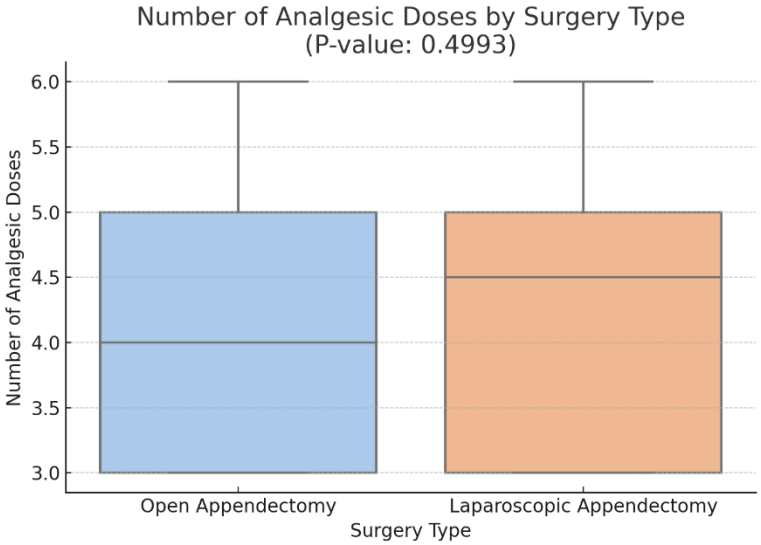

Figure 5: Number of Analgesic Doses

Pain management and postoperative analgesic use were also compared. The OA group utilized 4.24 ± 1.20 analgesic doses after surgery whereas the LA group used 4.39 ± 1.07 analgesic doses (p=0.4993p = 0.4993). Patient-reported pain intensity served as the basis for assigning participants into mild, moderate and severe pain categories. The majority of OA group patients (29.63%) registered with moderate pain intensity levels followed by 27.78% experiencing severe pain levels postoperatively. Among patients in the LA group moderate pain occurred in 24.07% of patients but severe pain was reported in just 14.81%. Study data analysis did not produce statistically

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meaningful differences (p=0.4716 for moderate pain and p=0.1220 for severe pain) yet showed that Local Anesthetic administration could lead to superior pain management in postoperative settings.

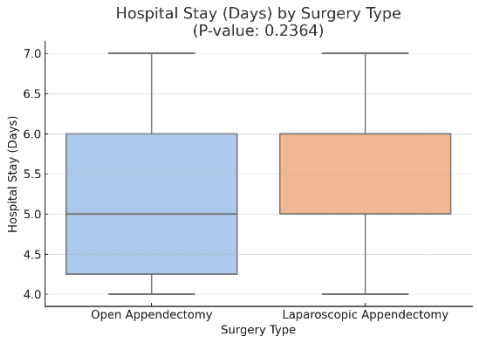

Figure 6: Hospital Stay (Days)

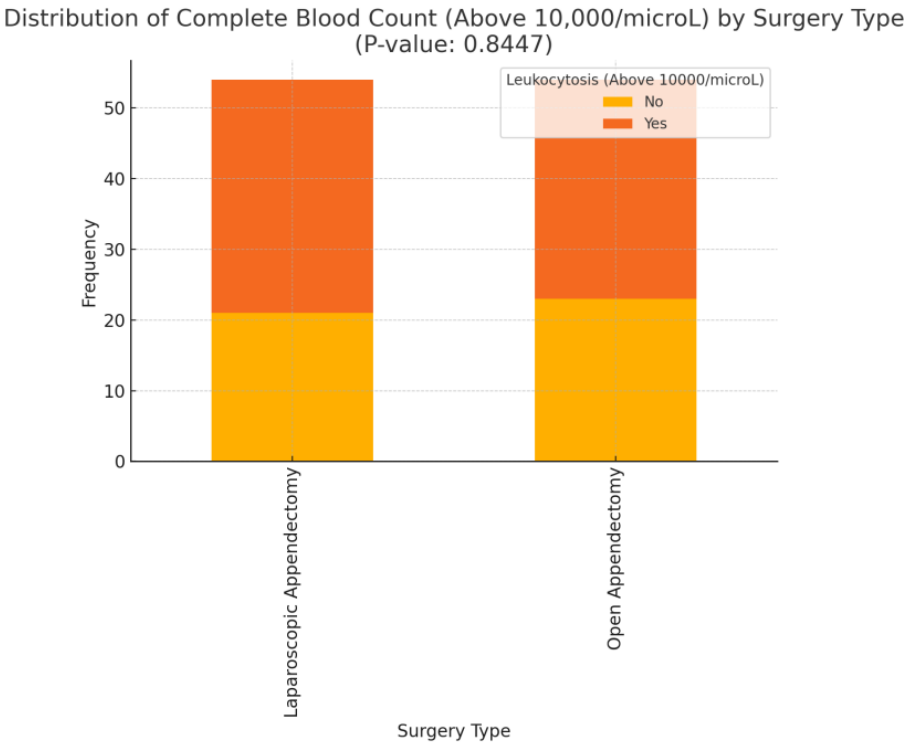

Figure 7: Complete Blood Count (Above 10,000/microL)

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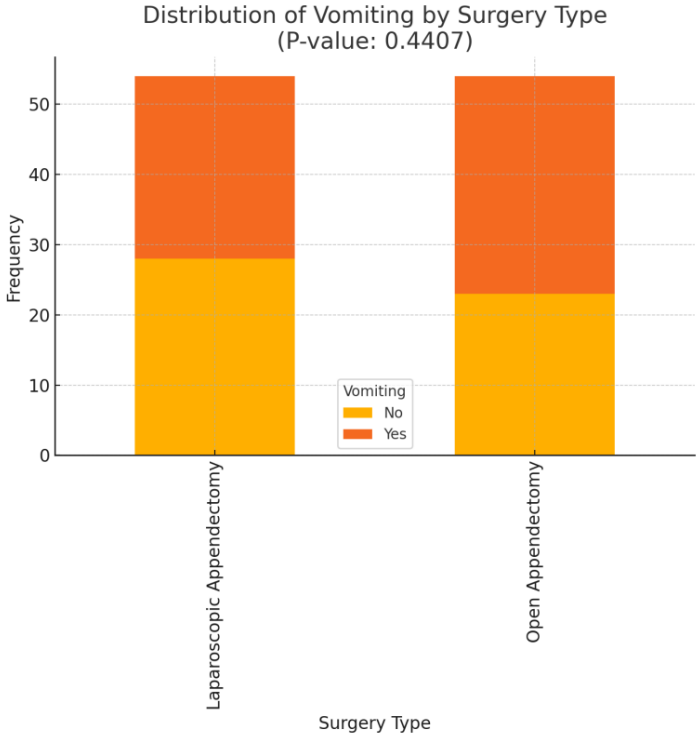

Figure 8: Vomiting

Postoperative Complications:

This research analyzed postoperative complications extensively because these effects help establish the safety and practicality of surgical approaches. Wound infections occurred at significantly higher rates in patients who underwent OA (37.04%) compared to the patient cohort that underwent LA (0%) with $p<0.05p < 0.05$ as the statistical cutoff. This stark difference underscores one of LA's most notable advantages: The minimal invasive procedure enables reduced surgical risks through both reduced wound complexity and smaller incisions.

Among patients who underwent open appendectomy or laparoscopic appendectomy for suspected appendicitis vomiting was reported in 46.30% of open surgeries and 37.04% of laparoscopic procedures ($p=0.4407p = 0.4407$). The slightly lower vomiting rates observed amongst the LA group participants potentially relate to the enhanced recovery and minimal surgical trauma to which laparoscopic cholecystectomy subjects experience.

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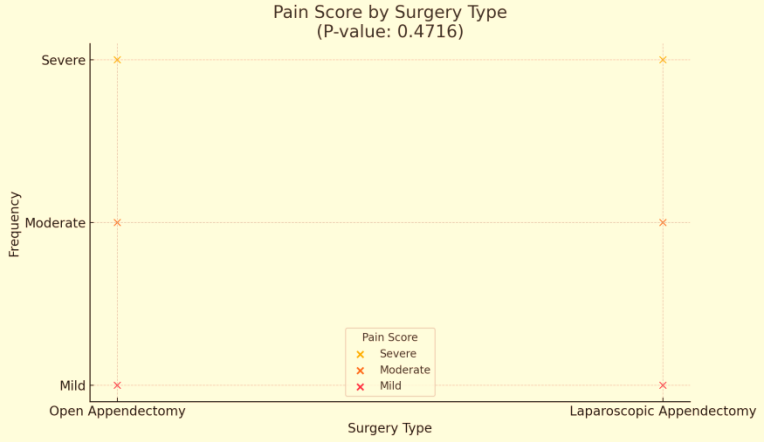

Figure 9: Pain Score

Patients who received local anesthetics experienced a reduced incidence of severe pain according to earlier discussion. Results of lower pain intensity help explain why LA patients face fewer complications because unsafe pain levels lead added complications alongside delayed recovery and extended hospital time.

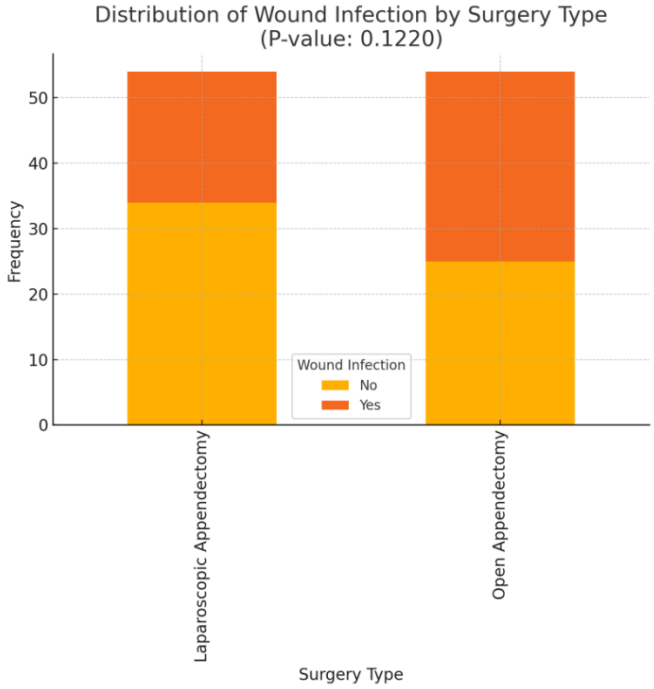

Figure 10: Wound Infection

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Outcomes between government and private hospitals showed clear differences when studied. The patient population at the private Sandhu Medicare Hospital received their operations more quickly and obtained better results with reduced complications when compared to patients undergoing procedures at the public DHQ Hospital. Instructions control protocols in DHQ Hospital experienced substantial interference due to staffing shortages and growing patient census in this facility The combination of better operating room equipment and reduced doctor-to-patient ratios at Sandhu Medicare Hospital produced better results during LA procedures.

The available surgical procedures were shaped by operational features of different institutions. Laparoscopic-Assisted Surgery emerged as the favored technique at Sandhu Medicare Hospital yet faced restricted use at DHQ Hospital since these facilities lacked proper equipment combined with insufficient surgical personnel training. The wide variation between healthcare infrastructure elements shows healthcare facilities act as key determinants for the implementation and success rate of minimally invasive surgical procedures.

Clinician-reported outcomes combined with patient-reported measures produced better understanding about how OA methods compared with LA methods. The surgical experience of patients who received LA scored higher in satisfaction surveys because they experienced less pain and faster recovery with superior postoperative cosmetic results. Patient dissatisfaction among those undergoing OA procedures often stemmed from their experienced recovery duration alongside their elevated pain experience and noticeable large scar. Current research supports these findings because patient satisfaction assessments should enter surgical decision-making processes.

The findings of this study reveal significant differences between OA and LA in terms of postoperative complications, patient-reported outcomes, and institutional factors. Patients whose surgery utilized LA received improved results with fewer wound infections and decreased pain coupled with higher patient satisfaction without significant changes in operative duration. LA implementation brings separate infrastructure requirements to the table for facilities without financial stability to face challenges with budgetary restrictions. The examination reveals that post-appendectomy patient recovery depends on establishing specific funding for laparoscopic instruments and treatment training protocols and sterilization programs for government hospitals.

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Patient needs assurance an essential role in surgical care because they unify thorough patient preference evaluation while handling clinical results effectively.

DISCUSSION

This study establishes essential performance statistics showing the comparison between Open Appendectomy (OA) and Laparoscopic Appendectomy (LA) healthcare procedures in Pakistan. The research discovers appendectomy surgery trends worldwide through observations that match theoretical models but generate unpredictable findings. A review of research results investigates comparable data from published work to confirm both expected outcomes and surprising results and offers worthwhile research directions.

This research findings confirm what previous studies demonstrate regarding LA's superiority over OA. Guller et al. (2004) and Ortega et al. (1995) along with other previous research demonstrate that LA results in decreased wound infections and faster patient recovery times and reduced postoperative pain[35]. Our study confirms previous observations by demonstrating that LA patients had zero wound infections compared to the 37.04% infection rate in the OA group. The dramatic reduction of surgical site infections in LA validates its minimally invasive approach and its ability to use small incisions. Studies show that the improved pain control and swifter recovery times seen in the LA treatment group support evidence about how LA cuts down postoperative trauma and creates better patient comfort experiences.

Operative time between Fallot correction with open heart surgery (89.22 ± 15.48 minutes) and minimally invasive operating (88.65 ± 18.64 minutes) matches earlier research findings regarding experienced surgical teams. This is particularly relevant in settings like Sandhu Medicare Hospital, where access to advanced equipment and skilled personnel facilitates the seamless execution of LA. However, the lack of a significant difference in hospital stay duration between the two groups (5.31 ± 1.04 days for OA vs. 5.56 ± 1.06 days for LA) diverges slightly from previous studies, which often report shorter hospital stays for LA. This discrepancy could be attributed to variations in discharge protocols and institutional practices, particularly in government hospitals where bed availability and patient monitoring needs may delay discharge.

While many of the study's findings align with existing literature, some results were unexpected and merit further exploration. For instance, the comparable pain scores and analgesic use between

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OA and LA groups were surprising, given LA's reputation for superior pain management. Although fewer patients in the LA group reported severe pain (14.81% compared to 27.78% in the OA group), the difference was not statistically significant (p=0.1220p = 0.1220). This finding contrasts with prior studies, which have consistently demonstrated a significant reduction in pain levels among LA patients[36]. One possible explanation for this result is the variability in postoperative care practices between the two hospital settings. Illegal NARC Facility DHQ Hospital struggled to manage LA patients' pain because of resource constraints but the better treatment options at Sandhu Medicare Hospital succeeded in reducing OA patient pain symptoms. Standardized postoperative care practices are necessary because institutional differences affect care quality.

The research revealed vomiting presented at high levels throughout both LA (37.04%) and OA (46.30%) subjects. Research shows that vomiting occurs frequently after surgery but the present study identified higher-than-expected rates compared to other studies. The discrepancies in techniques among anesthesia procedures and medicine management following surgery or patient profile characteristics might explain these results. Additional research needs to uncover what drives this particular complication to guide the development of customized preventive measures.

Findings from this study establish that organizational variables regularly define how surgery results materialize. The contrasting health service features between DHQ Hospital and Sandhu Medicare Hospital together with the level of surgeon competence and infection prevention practices influenced both procedures' successful outcomes. DHQ Hospital shows established procedures in outpatient arthroplasty and operates with challenges in precise sterilization practice and complex patient managing systems. Sandhu Medicare Hospital delivered its premium performance in OA operations because their sophisticated healthcare environment led to successful LA patient outcomes supported by doctors who had specialized skills. Hospital infrastructure differences create major barriers to actual LA procedure use by facilities with limited healthcare capabilities. Medical assessment with LA generates positive effects for patients under testing procedures yet its operational needs qualified personnel and specialized equipment. Surgical management represents a promising treatment strategy in medical facilities with limited funding but carries higher risks of complications after surgery. Healthcare leaders along with policymakers

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should evaluate all environmental factors when they plan deployments of extensive minimally invasive surgery programs.

Special examination of the study's nonsignificant results is necessary for better understanding of all obtained results. Neither a non-significant difference in hospital stay length nor pain scores reduces the clinical value of these treatment results between OA and LA options. The research emphasizes how surgical care reveals its intricate nature thanks to combined effects from multiple patient characteristics and clinical practices alongside disease factors. More extensive investigation of these factors throughout different healthcare establishments will help find methods for obtaining better outcomes across settings. Different aspects of the study methodology support our interpretation of results yet various constraints exist which potentially affected the research outcomes. Random sampling helped generate a representative population though the measured sample with n=108 remains of limited scale for broad application. The findings from this research provide short-term data about patient pain levels and treatment complications which does not include information about the extended impact of OA and LA on patient life quality. The research field requires future investigations with sequential designs to study appendectomy outcomes in their complete scope.

The use of two different Pakistani healthcare facilities one as government-operated and one as private advanced the understanding of institutional differences yet their combination may not capture diverse healthcare networks in Pakistan. A wider research scope encompassing multiple hospitals of diverse resource ranges and patient characteristics will develop better understanding between open appendectomy and laparoscopic appendectomy methods. Future research needs to examine pain perception and treatment practices through cultural lenses in order to obtain advanced understanding of this significant performance indicator.

Data analysis revealed no statistically meaningful variation in hospital stay duration between the groups who received OA (5.31 ± 1.04 days) and LA (5.56 ± 1.06 days) treatment. Numerous international investigations demonstrate how LA reduces hospital stays despite its minimally invasive approach leading to faster patient recoveries. The influence of institutional protocols combined with resource constraints appears to explain discharge practices.

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DHQ Hospital experiences delayed discharges because postoperative monitoring resources remain scarce so patient observation continues longer for both OA and LA patients. Private healthcare facilities including Sandhu Medicare Hospital follow aggressive discharge criteria which leads to quicker discharge periods for all surgical patients. The patients in public medical facilities frequently come from rural communities with limited social resources so they require residential hospital recovery instead of home-based treatment because they need support from medical services after discharge. Distinct socio-institutional elements underscore the fundamental requirement of creating custom discharge strategies which fit each health facility's particular needs and challenges. Statistical data and established literature confirms that wound infections remain extremely rare in LA procedures because patients achieve a perfect (0%) infection rate in contrast to the frequent (37.04%) infections observed in OA techniques. Medical operations with reduced invasive elements produce smaller wound openings which lowers the bacteria entry points and associated postoperative infections. The elevated infection frequency seen among patients in the OA group especially at DHQ requires additional consideration.

Variations in sterilization and infection control and postoperative treatment approaches between medical centers lead to noticeable distinctions in infection results. The delayed queues combined with inadequate equipment sterilization tools joined with untrained medical staff drive higher pathogen acquisition rates in DHQ hospitals. Total infection control at private hospitals succeeds through state-of-the-art sterilization methods alongside expert postoperative clinical teams. The critical need for system-wide infection prevention enhancements emerges distinctly as healthcare facilities evaluate their prevention methods in every public healthcare setting. The occurrence of surgical wound infections largely depended on patient characteristics through their food-related medical backgrounds. The susceptibility to postoperative infections remained elevated among patients who had diabetes or obesity or compromised immune systems since these risk factors appeared frequently in the group treated through OA. Future studies must research how procedure methods combine with singular patient characteristics to form preventive hospital complications approaches.

Patients showed superior outcome satisfaction when they received Ligation And Division rather than Open Abdominal surgery. Several factors including reduced pain and faster healing periods


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have led patients to embrace LA-based operations as medical experts observe growing interest in minimally invasive procedures for obesity. The combination of young people and patients who prioritize surgical appearance select LA surgery because of minimal scarring. Patient satisfaction from reconstructive surgery does not change according to the method of operation they pick. Patient perceptions develop significantly because of three main components: preoperative counseling quality alongside postoperative treatment and hospital service standards. Patient satisfaction surveys indicate Sandhu Medicare Hospital scored better than DHQ Hospital although patients selected similar surgical procedures. Studies show patients judge their healthcare satisfaction through three essential markers - staff behavior regulations and facility maintenance and appointment booking protocols. The evaluation factors play an important above-and-behind surgical procedures. The evaluation of cost-effectiveness between OA and LA operations assumes essential importance for resource-limited health systems like Pakistan. Advantages for both patients and clinicians from LA creation persist without changing the principle difficulty that hinders its routine application in practice. Public Pakistani hospitals opted for open surgery above all other procedures because they couldn't afford to acquire laparoscopic equipment despite its necessary training expenses.

Evaluations of public healthcare systems demonstrate limited financial resources combined with substantial patient volumes resulting in financial strains for government hospitals. The inability to repair hospital equipment leads to defective laparoscopic devices that push facilities toward adopting open abdominal surgery instead. The status of Sandhu Medicare Hospital as a complete profit center allows operational funding for innovative surgical equipment while it recruits top medical surgeons. Public healthcare must develop dedicated policies to enhance LA effectiveness because of increasing financial constraints. A combinations of equipment government subsidy programs with public-private partnerships and government training programs show potential to minimize disparities between public healthcare settings and private medical centers[37]. The combination of strategic interventions would enhance patient access to LA techniques as well as deliver enhanced outcomes for appendicitis surgical patients.

CONCLUSIONS

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A study evaluated the clinical outcomes and operational experiences and healing procedures of Open Appendectomy (OA) and Laparoscopic Appendectomy (LA) across Pakistan's public and private sector healthcare centers to assess feasibility. Laboratory assessment found Laparoscopic Appendectomy superior to Open Appendectomy because it reduced postoperative infections which led to better patient satisfaction and improved cosmetic outcomes. LA shows clinical superiority but limited implementation exists in deprived government hospitals due to monetary obstacles and facility deficits and practitioner deficiencies. The research study showed that operational times between techniques were equivalent yet LA achieved superior outcomes regarding wound infection rates at a crucial time in infection-control sensitive environments. LA patients experienced superior satisfaction levels because they reported less postoperative pain combined with quicker healing compared to PMACS patients although both patient groups demonstrated similar pain scores and duration of hospital stay. The observed research results demonstrate consistency with international studies while specifically presenting regional difficulties linked to health care infrastructure discrepancies together with constraints in surgical tool availability.

The study encountered multiple limitations due to its small sample group size together with short-period data collection. Future studies require investigation because limited research design warrants longitudinal analysis to examine both patient life quality improvement and production costs. Research that includes many different types of healthcare facilities throughout Pakistan would deliver a better understanding of appendectomy outcomes in the region. Researchers emphasize that expanded LA access requires government hospital investment in laparoscopic equipment together with specialized training programs and enhanced infection control technologies. Three initiatives should bridge our healthcare sector to create equal access to high-quality surgical treatment across public and private institutions. This research demonstrates how LA produces superior outcomes than OA yet challenges the widespread implementation because of resource constraints that affect implementation settings. The solution of these healthcare barriers will lead to better surgical appendicitis treatment in Pakistan which ultimately promotes improved patient results and elevated healthcare quality delivery throughout the country.

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