

## Comparison of the Outcomes of Open Haemorrhoidectomy Versus Procedure for Prolapse and Haemorrhoids (PPH) in the Treatment of Grades III and IV Haemorrhoids

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**Abstract:** Haemorrhoidal disease is common in Pakistan, with grades III and IV often requiring surgical intervention. While open haemorrhoidectomy has long been the standard, PPH is gaining popularity due to its minimally invasive nature. This study compares outcomes between these two surgical techniques. **Objective:** To compare operative time, intraoperative blood loss, postoperative pain, and healing time between open haemorrhoidectomy and PPH in patients with grade III and IV haemorrhoids. **Methods:** A randomized controlled trial was conducted at the Department of Surgery, Bahawal Victoria Hospital, Bahawalpur, from 16 January 2025 to 16 April 2025. Sixty patients with grade III or IV haemorrhoids were randomly assigned to undergo either PPH (Group A, n=30) or open haemorrhoidectomy (Group B, n=30). Outcomes were assessed using intraoperative and postoperative measures, including operative time, blood loss, pain (VAS), and wound healing. Data were analyzed using SPSS v25, with  $p \leq 0.05$  considered significant. **Results:** The mean operative time was significantly lower in the PPH group ( $15.1 \pm 4.2$  min) than in the open group ( $28.4 \pm 5.9$  min;  $p < 0.001$ ). Blood loss was also lower in the PPH group ( $76.3 \pm 20.8$  ml vs.  $97.6 \pm 31.1$  ml;  $p < 0.001$ ). Postoperative pain scores were reduced (VAS:  $2.9 \pm 1.1$  vs.  $6.3 \pm 1.4$ ;  $p < 0.001$ ), and healing was faster ( $8.1 \pm 2.4$  vs.  $14.8 \pm 4.7$  days;  $p < 0.001$ ). Stratified analysis showed these benefits were consistent across gender, BMI, and comorbidities. **Conclusion:** PPH provides superior outcomes compared to open haemorrhoidectomy in terms of operative efficiency and postoperative recovery. It is a safe and effective alternative for the surgical management of advanced haemorrhoids in the Pakistani population.

**Keywords:** Haemorrhoids, PPH, Open Haemorrhoidectomy, Postoperative Pain, Healing Time

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### Introduction

Haemorrhoidal disease, commonly referred to as piles, is one of the most prevalent anorectal conditions worldwide, including in low- and middle-income countries such as Pakistan. It significantly affects the quality of life and imposes a considerable burden on healthcare systems due to chronic pain, bleeding, prolapse, and related complications. Haemorrhoids are essentially vascular structures located in the anal canal that become pathologically enlarged due to increased venous pressure and degeneration of supporting connective tissues. Multiple factors contribute to their development, including chronic constipation, prolonged straining during defecation, low fiber intake, sedentary lifestyle, pregnancy, obesity, and a family history of anorectal disorders (1).

In Pakistan, although the exact national prevalence is not well documented, clinical observations suggest that haemorrhoidal disease is among the leading causes of outpatient visits to surgical departments. According to regional studies, up to 15–20% of the adult population may be affected by symptomatic haemorrhoids requiring some form of medical or surgical intervention (2). Despite its high prevalence, there remains a lack of standardized national guidelines for its management, and practices vary widely between healthcare facilities, often depending on available expertise and resources (3).

Haemorrhoids are classified into four grades based on the extent of prolapse and reducibility. Grades I and II can often be managed conservatively or with office-based procedures such as sclerotherapy or rubber band ligation. However, grades III and IV, which involve prolapse requiring manual reduction or being irreducible, usually necessitate surgical intervention (4). Traditionally, open haemorrhoidectomy, such as the Milligan-Morgan or Ferguson technique, has been the gold standard for treating advanced cases. While effective in terms of symptom resolution and recurrence prevention, open haemorrhoidectomy is often

associated with significant postoperative pain, prolonged recovery time, and higher risk of complications such as anal stenosis, urinary retention, and wound infection (5).

In recent years, alternative surgical methods have emerged, aiming to reduce these complications while providing similar or superior outcomes. The Procedure for Prolapse and Haemorrhoids (PPH), also known as stapled haemorrhoidopexy, has gained international traction. It involves circumferential resection of the mucosa and submucosa above the dentate line, followed by stapling of the remaining tissue to reposition the haemorrhoidal plexus. The PPH technique is particularly noted for its advantages in reducing operative time, blood loss, postoperative pain, and duration of hospital stay (6).

Several international studies have demonstrated the efficacy of PPH in treating grade III and IV haemorrhoids. A systematic review concluded that PPH was associated with significantly lower postoperative pain and faster return to daily activities compared to conventional haemorrhoidectomy (7). Similarly, it is also reported that PPH resulted in shorter operative time and reduced intraoperative blood loss, without compromising long-term outcomes (8). However, some studies have raised concerns regarding recurrence rates and cost-effectiveness, particularly in low-resource settings (9).

In the South Asian context, including Pakistan, limited but growing evidence suggests that PPH is a feasible and effective option. A prospective study conducted at a tertiary hospital in Lahore showed that PPH was associated with significantly less postoperative pain and faster wound healing compared to traditional haemorrhoidectomy (10). Nevertheless, the procedure is not yet universally adopted across Pakistan, partly due to its relatively higher cost, lack of awareness, and limited availability of trained colorectal surgeons.

Moreover, much of the existing literature on PPH versus open haemorrhoidectomy is either retrospective or limited to grade III disease.

There is a conspicuous gap in robust, controlled trials that specifically compare the outcomes of these two procedures in grade III versus grade IV haemorrhoids separately. This distinction is particularly important as grade IV haemorrhoids are associated with more extensive prolapse, higher risk of strangulation, and increased technical difficulty during surgery (11).

From a health economics standpoint, optimizing the surgical management of haemorrhoidal disease is of paramount importance in Pakistan, where public healthcare resources are already strained. Reducing hospital stay, minimizing complications, and promoting faster recovery through evidence-based practices can contribute significantly to the overall efficiency and quality of surgical care. Additionally, patient satisfaction and quality of life post-surgery are critical parameters that must be considered when selecting the appropriate surgical approach (12).

Despite the promising outcomes associated with PPH, its role in the treatment of advanced haemorrhoidal disease—particularly in the Pakistani population—remains to be fully defined. The differences in patient demographics, dietary habits, comorbid conditions (such as diabetes and hypertension), and access to healthcare services necessitate locally conducted trials that can guide context-specific surgical decision-making (13). The present study was therefore designed as a randomized controlled trial at Bahawal Victoria Hospital, Bahawalpur, to compare the outcomes of open haemorrhoidectomy and PPH in patients diagnosed with grade III and IV haemorrhoids. This includes a detailed analysis of operative time, intraoperative blood loss, postoperative pain, and healing time. By evaluating these critical parameters, the study aims to provide evidence-based insights into the efficacy and safety of PPH in comparison with conventional surgical techniques, tailored to the needs and challenges of the Pakistani healthcare setting.

The rationale of this study lies in addressing a critical gap in the existing literature: the lack of high-quality comparative data on PPH versus open haemorrhoidectomy for advanced grades of haemorrhoids, specifically in the context of the Pakistani population. The results are expected to inform national surgical guidelines and contribute to optimizing patient care in resource-limited environments.

Methodology

This randomized controlled trial was conducted at the Department of Surgery, Bahawal Victoria Hospital, Bahawalpur, Punjab, Pakistan, over three months following the approval of the study synopsis from 16 January 2025 to 16 April 2025. The study was designed to compare the outcomes of two surgical interventions—open haemorrhoidectomy and the Procedure for Prolapse and Haemorrhoids (PPH)—in the management of patients diagnosed with grade III and IV haemorrhoids. Ethical approval was obtained prior to the commencement of the study, and written informed consent was secured from all participants after thoroughly explaining the purpose, benefits, and potential risks of the study.

The sample size was calculated using previously published data on operative blood loss, where the mean blood loss was reported as 78.8 ± 26.1 ml for PPH and 98.7 ± 34.2 ml for open haemorrhoidectomy. Utilizing a significance level of 5% and a power of 80%, a total of 60 patients were required for the study, with 30 participants in each group. A non-probability consecutive sampling technique was employed to recruit eligible patients admitted to the surgical ward. Inclusion criteria comprised adult patients aged between 20 and 70 years of both genders, with a confirmed diagnosis of grade III or IV haemorrhoids of more than one month's duration. Patients were excluded if they had recurrent

haemorrhoidal disease, anorectal carcinoma, coagulopathies (INR >1.5), thrombosed haemorrhoids, chronic liver disease (bilirubin >1 mg/dl), chronic renal failure (creatinine >1.5 mg/dl), or were undergoing additional procedures for fissures or fistulas. Once recruited, patients were randomly allocated into two equal groups through the lottery method. Each patient picked a slip containing either an 'A' or 'B'; group A underwent PPH while group B underwent open haemorrhoidectomy. All surgeries were performed by a single qualified surgeon with over three years of post-fellowship experience in colorectal surgery to minimize inter-operator variability. Standard preoperative protocols were followed for all participants, including administration of prophylactic antibiotics. Intraoperative parameters were meticulously recorded. Operative time was defined as the duration from skin incision to closure, measured in minutes. Blood loss was assessed by weighing soaked surgical swabs (assuming 1 gram equals 1 ml of blood) and adding the volume of blood collected via suction during surgery.

Postoperative assessments were carried out by the principal investigator himself. Postoperative pain was measured using a 10-point visual analog scale (VAS), with 0 representing no pain and 10 representing the worst possible pain. Pain assessments were conducted at regular intervals to ensure accuracy. Healing time was defined as the number of days until the absence of symptoms and complete re-epithelialization of the wound as confirmed on clinical examination. All demographic and clinical variables including age, sex, body mass index (BMI), place of residence, presence of diabetes mellitus or hypertension, and the grade of haemorrhoidal disease were documented using a structured data collection form. Data entry and analysis were performed using SPSS version 25. The normality of continuous variables was tested using the Shapiro-Wilk test. Descriptive statistics were expressed as mean and standard deviation (SD) for normally distributed variables, and median with interquartile range (IQR) for skewed data. Frequencies and percentages were reported for categorical variables. To compare operative outcomes between the two groups, independent sample t-tests or Mann-Whitney U tests were applied based on the distribution of data. A p-value of ≤0.05 was considered statistically significant. Furthermore, stratified analysis was carried out for age, gender, BMI, place of residence, degree of haemorrhoids, and comorbid conditions like diabetes and hypertension to identify their effect on surgical outcomes, followed by post-stratification testing using the appropriate statistical methods.

Results

The study included a total of 60 patients undergoing surgical treatment for grade III and IV haemorrhoids, with 30 patients each in the PPH group (Group A) and the open haemorrhoidectomy group (Group B). The mean age of the participants was 44.6 ± 12.1 years, with a male predominance (58.3%). A majority of the patients (63.3%) belonged to urban areas. The prevalence of comorbidities included hypertension (33.3%) and diabetes mellitus (26.7%). The mean BMI was 26.8 ± 3.5 kg/m², with 60% of patients categorized as obese (Table 1).

Table 2 shows that the PPH group had significantly shorter operative time, less blood loss, lower post-operative pain scores, and faster healing compared to the open haemorrhoidectomy group.

Table 3 demonstrates significantly lower VAS scores for pain in the PPH group across all subgroups, with slightly higher pain in patients with grade IV disease and obesity (*p* < 0.001).

Healing was significantly delayed in diabetic and hypertensive patients in both groups, but the PPH group still showed faster recovery. (Table 4)

Table 1: Demographic and Baseline Clinical Characteristics of the Study Population (N = 60)

| Variable         | Group A: PPH (n = 30) | Group B: Open Haemorrhoidectomy (n = 30) | Total (N = 60) | p-value |
|------------------|-----------------------|------------------------------------------|----------------|---------|
| Mean Age (years) | 43.5 ± 11.2           | 45.7 ± 13.0                              | 44.6 ± 12.1    | 0.48    |
| Gender           |                       |                                          |                |         |
| - Male           | 18 (60.0%)            | 17 (56.7%)                               | 35 (58.3%)     | 0.61    |
| - Female         | 12 (40.0%)            | 13 (43.3%)                               | 25 (41.7%)     |         |

|                       |            |            |            |      |
|-----------------------|------------|------------|------------|------|
| BMI (kg/m²)           | 26.5 ± 3.7 | 27.1 ± 3.4 | 26.8 ± 3.5 | 0.44 |
| - Obese (>25 kg/m²)   | 18 (60.0%) | 18 (60.0%) | 36 (60.0%) | 1.00 |
| Place of Residence    |            |            |            | 0.43 |
| - Urban               | 20 (66.7%) | 18 (60.0%) | 38 (63.3%) |      |
| - Rural               | 10 (33.3%) | 12 (40.0%) | 22 (36.7%) |      |
| Grade of Haemorrhoids |            |            |            | 0.79 |
| - Grade III           | 16 (53.3%) | 17 (56.7%) | 33 (55.0%) | 1.00 |
| - Grade IV            | 14 (46.7%) | 13 (43.3%) | 27 (45.0%) |      |
| Hypertension          | 10 (33.3%) | 10 (33.3%) | 20 (33.3%) |      |
| Diabetes Mellitus     | 7 (23.3%)  | 9 (30.0%)  | 16 (26.7%) | 0.55 |

Table 2: Operative and Postoperative Outcomes Between the Two Groups

| Outcome Measure                 | Group A: PPH (n = 30) | Group B: Open Haemorrhoidectomy (n = 30) | p-value |
|---------------------------------|-----------------------|------------------------------------------|---------|
| Mean Operative Time (minutes)   | 15.1 ± 4.2            | 28.4 ± 5.9                               | <0.001  |
| Mean Operative Blood Loss (ml)  | 76.3 ± 20.8           | 97.6 ± 31.1                              | <0.001  |
| Post-operative Pain (VAS score) | 2.9 ± 1.1             | 6.3 ± 1.4                                | <0.001  |
| Mean Healing Time (days)        | 8.1 ± 2.4             | 14.8 ± 4.7                               | <0.001  |

Table 3: Stratified Analysis of Post-Operative Pain by Key Variables

| Variable         | Category        | Mean VAS Score (PPH) | Mean VAS Score (Open) | p-value |
|------------------|-----------------|----------------------|-----------------------|---------|
| Gender           | Male            | 2.8 ± 1.2            | 6.2 ± 1.3             | <0.001  |
|                  | Female          | 3.0 ± 1.0            | 6.4 ± 1.6             | <0.001  |
| BMI              | ≤25 (Non-obese) | 2.7 ± 1.0            | 6.1 ± 1.2             | <0.001  |
|                  | >25 (Obese)     | 3.1 ± 1.1            | 6.5 ± 1.4             | <0.001  |
| Grade of Disease | Grade III       | 2.6 ± 0.9            | 6.1 ± 1.2             | <0.001  |
|                  | Grade IV        | 3.3 ± 1.2            | 6.6 ± 1.5             | <0.001  |

Table 4: Comparison of Healing Time Stratified by Comorbidities

| Comorbidity       | Status | Healing Time (PPH) (days) | Healing Time (Open) (days) | p-value |
|-------------------|--------|---------------------------|----------------------------|---------|
| Hypertension      | Yes    | 8.4 ± 2.7                 | 15.2 ± 5.0                 | <0.001  |
|                   | No     | 7.9 ± 2.3                 | 14.5 ± 4.6                 | <0.001  |
| Diabetes Mellitus | Yes    | 8.6 ± 2.9                 | 15.6 ± 5.1                 | <0.001  |
|                   | No     | 7.8 ± 2.1                 | 14.3 ± 4.3                 | <0.001  |

Discussion

The study comparing Procedure for Prolapse and Haemorrhoids (PPH, Group A) with open haemorrhoidectomy (Group B) in 60 patients with grade III and IV haemorrhoids provides valuable insights into their efficacy. Both groups, each with 30 patients, were well-matched in baseline characteristics, with a mean age of 44.6 ± 12.1 years, 58.3% male predominance, and 63.3% urban residents. The mean BMI was 26.8 ± 3.5 kg/m², with 60% classified as obese. Comorbidities, including hypertension (33.3%) and diabetes mellitus (26.7%), were evenly distributed (p-values 0.43–1.00), ensuring comparability and minimizing confounding factors (14). This homogeneity strengthens the reliability of outcome differences observed between the two procedures.

Operative and postoperative outcomes significantly favored PPH. The PPH group exhibited shorter operative times (15.1 ± 4.2 vs. 28.4 ± 5.9 minutes, p<0.001), reduced blood loss (76.3 ± 20.8 vs. 97.6 ± 31.1 ml, p<0.001), lower pain scores (VAS: 2.9 ± 1.1 vs. 6.3 ± 1.4, p<0.001), and faster healing (8.1 ± 2.4 vs. 14.8 ± 4.7 days, p<0.001). These findings align with recent literature indicating that PPH’s stapling technique minimizes tissue trauma and avoids dissection near sensitive anal tissues, reducing pain and blood loss (15, 16). The shorter operative time likely reflects the streamlined nature of PPH, which targets mucosal prolapse above the dentate line, sparing somatic nerves (17).

Pain analysis across subgroups revealed PPH’s consistent advantage, with lower VAS scores in all categories (p<0.001). Patients with grade IV haemorrhoids (3.3 ± 1.2 vs. 6.6 ± 1.5) and obesity (3.1 ± 1.1 vs. 6.5 ± 1.4) reported slightly higher pain in both groups, yet PPH maintained significantly lower scores. This suggests that while advanced disease and obesity exacerbate postoperative pain, PPH mitigates these effects compared to open haemorrhoidectomy, possibly due to less invasive

tissue handling (8). Gender differences were minimal, with females reporting slightly higher pain scores, though not statistically significant within groups.

Healing times were delayed in patients with hypertension and diabetes across both groups, but PPH consistently showed faster recovery (p<0.001). Hypertensive patients healed in 8.4 ± 2.7 days (PPH) versus 15.2 ± 5.0 days (open), and diabetic patients in 8.6 ± 2.9 days (PPH) versus 15.6 ± 5.1 days (open). These delays in comorbid patients may stem from microvascular or immune impairments, yet PPH’s less invasive approach likely facilitates quicker tissue repair (16, 17). The open technique’s larger incisions may exacerbate healing challenges in these populations.

PPH appears superior for grade III and IV haemorrhoids, particularly in patients with comorbidities or obesity, offering reduced morbidity and faster recovery. These benefits could lead to shorter hospital stays, though cost-effectiveness was not assessed (15). However, PPH requires specialized equipment, potentially limiting its use in resource-constrained settings (8). The study’s small sample size (N=60) and lack of long-term outcomes, such as recurrence rates, are limitations. Future research should involve larger cohorts, extended follow-up, and additional subgroup analyses to confirm these findings and assess durability (14, 16).

The study’s sample size (N=60) is relatively small, which may limit generalizability. Additionally, long-term outcomes, such as recurrence rates or complications like anal stenosis, were not reported, which are critical for assessing the durability of PPH . Future studies should include larger cohorts, longer follow-up periods, and cost-effectiveness analyses to better inform clinical decision-making. Stratification by additional factors, such as smoking or preoperative pain severity, could further elucidate subgroup differences.

## Conclusion

The findings of this randomized controlled trial demonstrate that the Procedure for Prolapse and Haemorrhoids (PPH) offers significant advantages over open haemorrhoidectomy in terms of reduced operative time, less intraoperative blood loss, lower postoperative pain, and faster wound healing in patients with grade III and IV haemorrhoids. These benefits were consistently observed across demographic subgroups and comorbid conditions, supporting the utility of PPH as a preferred surgical approach in suitable patients within the Pakistani population.

## Declarations

### Data Availability statement

All data generated or analysed during the study are included in the manuscript.

### Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-24)

### Consent for publication

Approved

### Funding

Not applicable

## Conflict of interest

The authors declared the absence of a conflict of interest.

## Author Contribution

### HMZ (PGR), MIK (Professor)

*Review of Literature, Data entry, Data analysis, and drafting article.*

*Manuscript drafting, Study Design,*

### MF (MO), AM (PGR)

*Study Design, manuscript review, critical input.*

*Conception of Study, Development of Research Methodology Design*

*All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.*

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