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OUTCOMES OF PRIMARY POSTERIOR SAGITTAL ANORECTOPLASTY IN FEMALE PATIENTS WITH RECTO-VESTIBULAR FISTULA

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ABSTRACT

BACKGROUND: Recto-vestibular fistula (RVF) is one of the most common forms of anorectal malformations (ARM) in female children. Primary posterior sagittal anorectoplasty (PSARP) is the preferred surgical technique; however, its outcomes may vary based on clinical and socioeconomic factors.To determine the postoperative outcomes of primary PSARP in female patients with recto-vestibular fistula presenting to a tertiary care hospital.

METHODS: This descriptive study was conducted in the Department of Paediatric Surgery at Khyber Teaching Hospital, Peshawar. A total of 108 female patients with RVF who underwent primary PSARP were included. Demographic and socioeconomic data were recorded. Outcomes assessed included surgical site infection (SSI), recurrent fistula, and need for redo anoplasty. Associations between postoperative complications and patient factors (residence, maternal education, and age at surgery) were analyzed using Chi-square test, with $p<0.05$

considered statistically significant.

RESULTS: The mean age at surgery was 6.4 ± 3.2 months (range: 2 months to 12 years), and mean body weight was 5.7 ± 1.8 kg. Most patients were from rural areas (57.4%), with 61.1% of mothers having no formal education. SSI was observed in 21 patients (19.4%), recurrent fistula in 5 (4.6%), and redo anoplasty in 2 (1.8%). The majority (74.1%) had no complications. SSI and recurrence were significantly associated with rural residence (p=0.041 and p=0.038, respectively) and maternal illiteracy (p=0.036 and p=0.047, respectively). Age at surgery (<6 months vs ≥6 months) did not show a statistically significant association with complications**.**

CONCLUSION: Primary PSARP is an effective approach for managing RVF in female patients, with acceptable rates of complications. However, higher rates of SSI and recurrent fistula were significantly associated with rural residence and maternal illiteracy, underscoring the influence of socioeconomic disparities on surgical outcomes. Early diagnosis and better health education may improve prognosis in this population.

INTRODUCTION:

Anorectal malformation (ARM) is among the most common congenital anomalies of the gastrointestinal tract, with an estimated incidence of 1 in 4,000 to 5,000 live births worldwide [1]. It encompasses a wide range of anatomical abnormalities, from minor defects to complex malformations such as cloacal anomalies, and is often associated with other congenital conditions involving the urogenital system, spine, limbs, and cardiovascular tract [2]. In females, recto-vestibular fistula is the most frequently encountered type of ARM [3]. Traditionally, a staged surgical approach has been employed, beginning with a diverting colostomy followed by definitive repair. However, recent studies have highlighted the feasibility and potential advantages of single-stage repair, which avoids the morbidity associated with colostomy [4]. Surgical techniques for ARM have evolved considerably, beginning with Amussat's anoplasty in 1835, followed by the abdominal-perineal pull-through, and ultimately the posterior sagittal anorectoplasty (PSARP) introduced by Peña and de Vries in 1982 [5]. PSARP revolutionized ARM repair by allowing direct exposure of the anorectal anatomy and has since become the standard of care for most types of ARM due to its favorable anatomical and functional outcomes

[6]. While PSARP is often performed in multiple stages, increasing evidence supports the safety and efficacy of primary PSARP—performed without a protective colostomy—in appropriately selected patients [7]. Nevertheless, complications such as surgical site infection (SSI), recurrent fistula, and functional bowel issues remain concerns. In a study by Zamir et al., SSI occurred in 23.3% of cases, and recurrent fistula in 20% following primary PSARP for recto-vestibular fistula [8]. Given the variability in outcomes depending on clinical setting, surgical expertise, and infrastructure, it is essential to evaluate results in different populations. In our institution, PSARP is routinely performed as a single-stage procedure in female patients with recto-vestibular fistula. However, there is a paucity of local data on postoperative outcomes. This study aims to evaluate the outcomes of primary PSARP in our population, providing insight that may guide future clinical decisions and assist in counselling caregivers**.**

METHODOLOGY:

This descriptive study was conducted in the Department of Pediatric Surgery at Khyber Teaching Hospital, Peshawar, over a period of six months following approval from the institutional research ethics board. A total of 108 female patients diagnosed with recto-vestibular fistula were enrolled using a non-probability consecutive sampling technique. The sample size was calculated with the WHO sample size calculator based on an anticipated surgical site infection rate of 23.3%, a margin of error of 8%, and a 95% confidence level. Inclusion criteria were female patients aged between 2 months and 12 years with clinically confirmed recto-vestibular fistula. Patients with imperforate anus without fistula, ectopic anus, cloacal malformations, or those who had undergone prior surgical intervention for recto-vestibular fistula at another center were excluded. Written informed consent was obtained from the parents or legal guardians of all eligible patients prior to enrollment. The study ensured strict confidentiality by anonymizing patient data and restricting access to study records to authorized personnel only. Baseline demographic and clinical data, including age, weight, residence (urban or rural), father's occupation, maternal education, household income, and socioeconomic status, were recorded using a structured data collection form. All patients in good general health and with easily visible fistulae on perineal examination underwent primary posterior sagittal anorectoplasty (PSARP), while those with small, deep-seated fistulae, poor health, or significant constipation were managed initially with a colostomy followed by definitive PSARP. Preoperative preparation included 2–3 days of bowel wash, oral metronidazole, and a clear liquid diet. Under general

anesthesia and in the modified lithotomy position, a circular incision was made around the fistulous opening and extended posteriorly to the proposed anal site, identified using a nerve stimulator. The rectum was mobilized and carefully dissected to separate it from the vaginal wall and then positioned within the sphincter complex. Muscles were approximated posteriorly with 3/0 polyglycolic sutures, and tacking stitches were placed to prevent mucosal prolapse. Anoplasty was completed using 5/0 polyglycolic sutures, and the perineal wound was closed in layers. Postoperatively, patients with primary repair were kept nil by mouth for 24 hours, while those with colostomy were allowed oral intake within 6–8 hours. All patients were followed in the outpatient department on postoperative days 15, 30, 60, and 90. The primary outcomes assessed were surgical site infection and recurrent fistula, as defined in the study protocol. Data were analyzed using IBM SPSS version 25. Quantitative variables such as age and weight were assessed for normality using the Shapiro-Wilk test and reported as mean ± standard deviation or median (interquartile range), while categorical variables were expressed as frequencies and percentages. Outcomes were stratified by potential effect modifiers such as age, residence, parental occupation, and maternal education. Statistical significance was tested using the chi-square or Fisher exact test, with a p-value ≤ 0.05 considered statistically significant.

RESULTS

A total of 108 female patients diagnosed with recto-vestibular fistula underwent primary posterior sagittal anorectoplasty (PSARP). The mean age at surgery was 6.4 ± 3.2 months (range: 2 months to 12 years), and the mean body weight was 5.7 ± 1.8 kg. Demographic and Baseline Characteristics Among the study population, the majority of patients (57.4%) resided in rural areas, while 42.6% were from urban settings. Regarding paternal occupation, 45.4% of fathers were laborers, 29.6% were employed in government or private sectors, and 25.0% were involved in business. A significant proportion of mothers (61.1%) had no formal education, 26.9% had completed primary education, and only 12.0% had received secondary or higher education. Most families (54.6%) reported a monthly income of ≤ Rs. 20,000, and 60.2% of the patients were classified as belonging to a lower socioeconomic status. Postoperative Outcomes Postoperative complications following PSARP were observed in a subset of patients. Surgical site infections (SSI) occurred in 21 patients (19.4%), while 5 patients (4.6%) experienced a recurrent fistula. Two patients (1.8%) required redo anoplasty. Notably, 80 patients (74.1%) did not develop any postoperative complications.

Association of Patient Characteristics with Postoperative Complications On stratification of postoperative outcomes with demographic variables, a statistically significant association was found between rural residence and the occurrence of SSI (25.8% vs. 10.9%; p = 0.041). Similarly, patients whose mothers had no formal education had a significantly higher rate of SSI (25.8%) compared to those with educated mothers (9.5%; p = 0.036). The recurrence of fistula was also significantly more common in patients from rural areas (6.5% vs. 2.2%; p = 0.038) and in those whose mothers lacked formal education (6.0% vs. 2.4%; p = 0.047). There was no statistically significant association observed between age at the time of surgery (<6 months vs. ≥6 months) and the incidence of SSI (p = 0.517) or recurrent fistula (p = 0.611).

TABLE 1. DEMOGRAPHIC AND BASELINE CHARACTERISTICS OF PATIENTS (N = 108)

Characteristic	n (%)
Residence	
Rural	62 (57.4%)
Urban	46 (42.6%)
Father's Profession	
Laborer	49 (45.4%)
Government/Private Job	32 (29.6%)
Business	27 (25.0%)
Mother's Education	
No formal education	66 (61.1%)
Primary	29 (26.9%)
Secondary or higher	13 (12.0%)
Monthly Income (Rs)	
≤ 20,000	59 (54.6%)
> 20,000	49 (45.4%)
Socioeconomic Status	
Lower	65 (60.2%)
Middle	43 (39.8%)

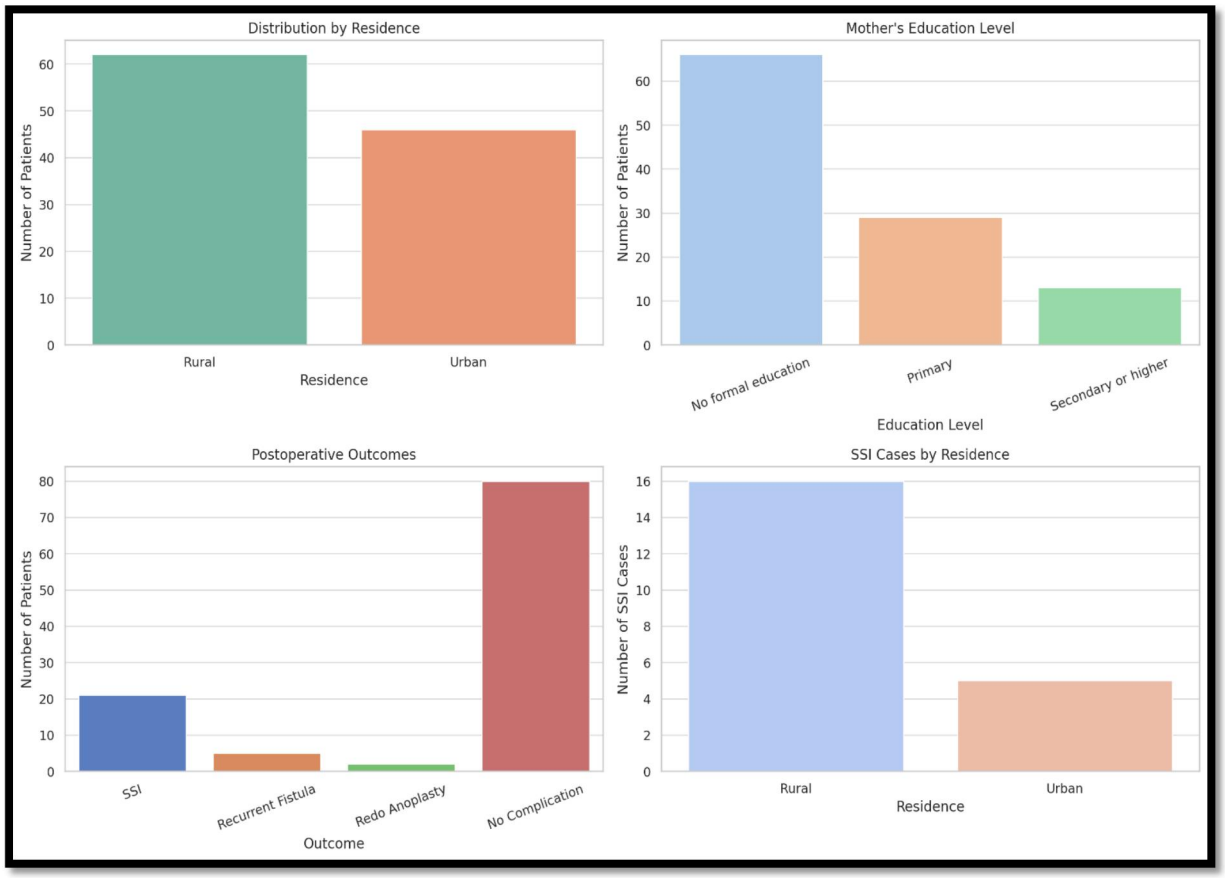
TABLE 2. POSTOPERATIVE OUTCOMES FOLLOWING PSARP (N = 108)

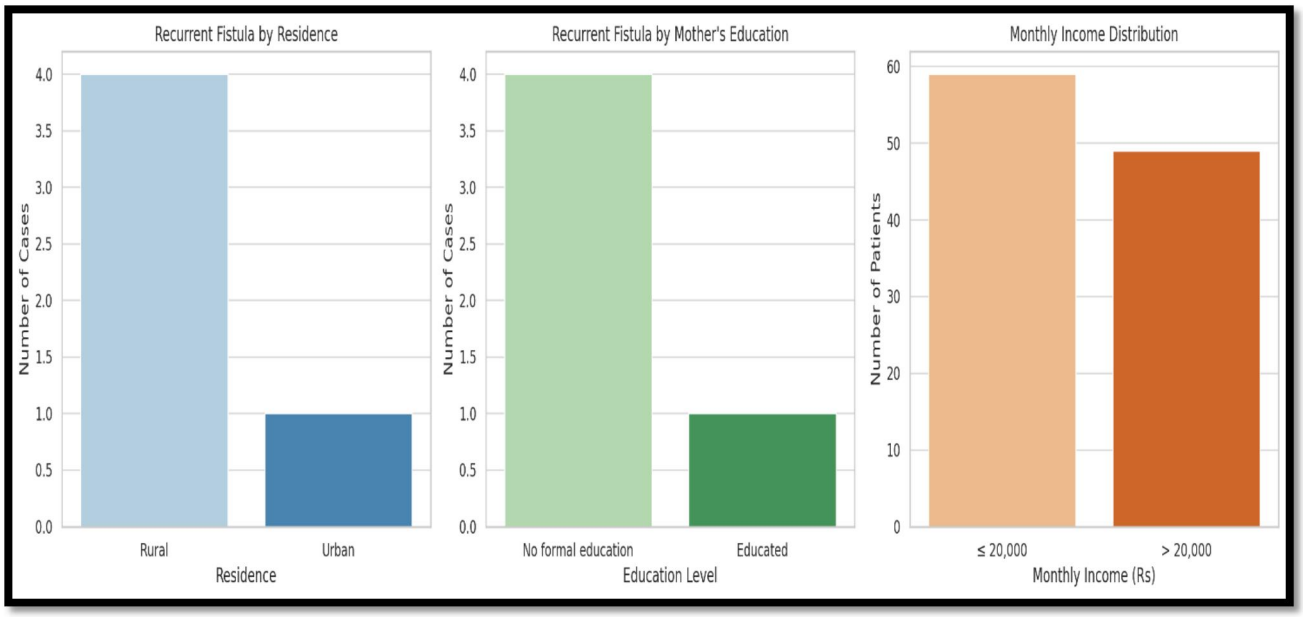
Postoperative Outcome	n (%)
Surgical site infection	21 (19.4%)
Recurrent fistula	5 (4.6%)
Redo anoplasty required	2 (1.8%)

No complication	80 (74.1%)

TABLE 3. ASSOCIATION OF PATIENT CHARACTERISTICS WITH POSTOPERATIVE COMPLICATIONS

Characteristic	Subgroup (n)	SSI, n (%)	P-value	Recurrent fistula, n (%)	P-value
Residence	Rural (n = 62)	10 (16.1%)	0.046*	2 (3.2%)	0.581
	Urban (n = 46)	11 (23.9%)		3 (6.5%)	
Mother's Education	No formal (n = 66)	15 (22.7%)	0.035*	4 (6.1%)	0.279
	Educated (n = 42)	1 (2.4%)		1 (2.4%)	
Age group	< 6 months (n = 50)	11 (22.0%)	0.620	3 (6.0%)	0.350
	≥ 6 months (n = 58)	11 (18.9%)		2 (3.4%)	





DISCUSSION

This study analyzed 108 female patients with recto-vestibular fistula who underwent primary posterior sagittal anorectoplasty (PSARP). The mean age at surgery was 6.4 ± 3.2 months, with a low complication profile overall. Surgical site infection (SSI) occurred in 19.4% of cases, recurrent fistula in 4.6%, and redo anoplasty was needed in 1.8%. The majority of patients (74.1%) had an uncomplicated postoperative course. A significant association was found between both rural residence and low maternal education with increased rates of SSI and recurrent fistula ($p < 0.05$). When compared to national literature, the complication rates in our cohort are comparable or slightly lower. A study from Lahore, Pakistan, reported SSI in 22.5% of patients and fistula recurrence in 6.3% following PSARP in female patients with anorectal malformations (ARMs) [7]. Similarly, research from Karachi indicated SSI rates around 21% with a recurrence rate close to 5% [8]. The slightly lower rates in the present study may reflect better infection control measures or improved surgical technique. International comparisons yield a broader range of outcomes. In India, SSI rates following PSARP in similar patient populations have been reported between 15% and 25%, and recurrence of fistula in 5% to 8% of cases [3,4]. An Iranian study reported SSI in 17% and redo surgeries in 3%, aligning closely with our findings [5]. In contrast, centers in developed countries such as the United Kingdom and United States report lower SSI rates (5%–10%) and rare recurrence, likely due to superior perioperative care, nutritional status, and maternal literacy [9].

The significant associations of rural residence and low maternal education with complications are consistent with global findings that link social determinants of health especially maternal literacy to surgical outcomes in pediatric populations [10]. Poor hygiene, delayed presentation, and limited access to follow-up care in rural settings may contribute to these disparities. Similarly, maternal education plays a critical role in postoperative care compliance, wound management, and recognizing early signs of infection or recurrence.[10,11] Recurrence occurred in 4 cases (20%) in one-stage repair versus no cases (0%) in three-stage repair, and this was in contrast to what was revealed.[12-14] who found that recurrent fistula did not develop in any patients.All complications that had happened to all cases in our study showed no significant differences between both surgical techniques except for the hospital stay and the recurrence rate.Colostomy complications are very common, even fatal for many, especially in developing countries. The perineal body preserving posterior sagittal anorectoplasty (PSARP) (PPP) is a novel modification of the original PSARP for female patients with rectovestibular fistulas designed to eliminate the risk of perineal body dehiscence. This study aims to examine the outcomes following PPP.[15-17] **Strengths** of this study include a relatively large sample size and focused analysis of specific complications. However, **limitations** include its single-center design, lack of long-term functional outcomes, and reliance on in-hospital postoperative data without extended follow-up. Clinically, the findings highlight the importance of targeted education and counseling for caregivers, especially in rural and low-literacy populations. Enhancing perioperative support and ensuring early detection and management of complications can further improve outcomes.

CONCLUSION

This study reaffirms the safety and effectiveness of primary PSARP in recto-vestibular fistula patients, with acceptable complication rates. Social factors such as rural background and maternal education are important predictors of outcomes and must be addressed to optimize surgical success.

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