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Original Research Article

Impact of Demographic and Occupational Characteristics on Outcomes of Primary Pterygium Surgery

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Abstract: ***Background:*** Pterygium is a common ocular surface disorder in which surgical excision remains the definitive treatment for symptomatic cases. Postoperative outcomes may be influenced not only by the surgical technique but also by patients' demographic and occupational characteristics. This study aimed to evaluate the impact of these factors and to compare postoperative complications between conjunctival autograft and intraoperative mitomycin-C in primary pterygium surgery. ***Methods:*** This prospective comparative study included 70 patients with primary progressive pterygium who completed follow-up. Patients were allocated into two groups: Group A (n = 35) underwent pterygium excision with conjunctival autograft and Group B (n = 35) underwent excision with intraoperative mitomycin-C. Demographic variables (age, sex, education), occupational status and postoperative complications were recorded. Patients were followed up to six months. Data were analyzed using appropriate statistical tests, with $p < 0.05$ considered statistically significant. ***Results:*** The mean age was significantly lower in Group A than Group B (36.77 ± 10.05 vs. 42.66 ± 10.31 years; p = 0.018). Males predominated in both groups, with no significant difference in sex distribution (p = 0.434). Educational status differed significantly between groups (p = 0.002). More than half of patients in both groups were outdoor workers, with a significant association between occupation and type of operation (p = 0.042). Postoperative complications were significantly higher in Group B (54.3%) compared to Group A (11.5%). ***Conclusion:*** Demographic and occupational factors are important considerations in patients undergoing pterygium surgery. Conjunctival autograft demonstrated a significantly lower rate of postoperative complications compared to intraoperative mitomycin-C, suggesting a safer postoperative profile.

Keywords: Pterygium, conjunctival autograft, mitomycin-C, demographic factors, occupation, postoperative complications.

INTRODUCTION

Pterygium is a common degenerative ocular surface disorder characterized by a fibrovascular growth of conjunctival tissue extending onto the cornea [1]. It is frequently associated with chronic environmental exposure, particularly ultraviolet radiation, dust, wind and dry climatic conditions [2]. Although pterygium is often asymptomatic in its early stages, progressive disease may result in ocular irritation, cosmetic concerns, induced astigmatism, visual impairment and, in advanced cases, encroachment onto the visual axis. Surgical excision

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remains the primary treatment for symptomatic or visually significant pterygium [3].

Despite advances in surgical techniques, recurrence after primary pterygium surgery continues to be a major clinical challenge. Recurrence not only compromises visual outcomes but also leads to patient dissatisfaction and increased healthcare burden [4]. Multiple factors have been implicated in influencing surgical outcomes, including the choice of surgical technique, use of adjuvant therapy and postoperative care [5]. However, patient-related factors, particularly demographic and occupational characteristics, have gained increasing attention as potential determinants of postoperative success and recurrence [6].

Demographic variables such as age and sex are thought to influence wound healing responses and inflammatory activity following surgery [7]. Younger patients may exhibit a more aggressive fibrovascular proliferative response, predisposing them to higher recurrence rates, while differences in disease behavior between males and females have been variably reported [8]. These variations may reflect differences in hormonal influences, outdoor exposure, or occupational roles rather than biological sex alone [9].

Occupational characteristics play a crucial role in both the development of pterygium and its postoperative course [10]. Individuals engaged in outdoor or labor-intensive work are often exposed to prolonged sunlight, dust, heat and environmental irritants, which can contribute to chronic ocular surface inflammation [11]. Continued exposure to these risk factors after surgery may adversely affect healing and increase the likelihood of recurrence. Conversely, patients with predominantly indoor occupations may experience more favorable postoperative outcomes due to reduced environmental stress on the ocular surface [12].

Understanding the influence of demographic and occupational factors on the outcomes of primary pterygium surgery is essential for comprehensive patient assessment and individualized management. Identification of high-risk groups may help clinicians optimize surgical planning, tailor postoperative counseling and implement preventive strategies aimed at reducing recurrence. This study aimed to evaluate the impact of selected demographic and occupational characteristics on the clinical outcomes of primary pterygium surgery, thereby contributing to improved prognostication and patient-centered care.

METHODOLOGY & MATERIALS

This prospective study was conducted in the Department of Ophthalmology, Mymensingh Medical College Hospital and BNSB Eye Hospital, Mymensingh, from January 2008 to June 2009. A total of 80 eyes of 80 patients with primary progressive pterygium were selected on a random basis, with each patient considered as a single case. Due to the lack of sustained follow-up, we excluded 10 participants from the study cohort. The patients were divided into two equal groups: Group A included 35 patients treated with conjunctival autograft and Group B included 35 patients treated with intraoperative mitomycin-C. Allocation was initially done by lottery on the first day, followed by alternate assignment to the two groups on subsequent days. Eligible patients were between 20 and 65 years of age, included both sexes and represented various socioeconomic and educational backgrounds from rural and urban areas. Only healthy patients without local or systemic diseases were included. Patients with other ocular diseases, previous ocular surgery, recurrent pterygium, trauma, prior antimitotic therapy, cataract, glaucoma, systemic comorbidities, or those failing to complete follow-up were excluded.

All surgeries were performed under topical 0.4% oxybuprocaine and local 2% lignocaine with adrenaline. In Group A, the pterygium head was dissected and excised, followed by placement of a conjunctival autograft secured with 10-0 nylon sutures. In Group B, after excision, sponges soaked in 0.02 mg/ml Mitomycin-C were applied to the bare sclera for 150 seconds, followed by copious saline irrigation. Postoperative assessments were performed at Day 1, Week 1, Week 3, Month 3 and Month 6, evaluating visual acuity, ocular symptoms, signs, intraocular pressure, recurrence and graded symptom scores. Data were analyzed using SPSS with appropriate statistical tests. Ethical approval was obtained and written informed consent was taken from all participants.

RESULTS

Table 1: Distribution of the patients age by the type of operation

Age (in years)	Group A (n=35)	Group B (n=35)	p value
21–30	11 (31.4)	6 (17.1)	
31–40	14 (40.0)	12 (34.3)	
41–50	8 (22.9)	7 (20.0)	
51–60	2 (5.7)	10 (28.6)	**0.018**
61–65	0 (0.0)	0 (0.0)	
Total	35 (100.0)	35 (100.0)	
Mean ± SD	**36.77 ± 10.05**	**42.66 ± 10.31**	

Table 1 Shows the distribution of patients' age by type of operation, revealing that most participants in Group A were 31–40 years old (40.0%), while Group B had a higher proportion in the 51–60 age range (28.6%). The mean age was lower in Group A (36.77 ± 10.05) compared to Group B (42.66 ± 10.31) and this difference was statistically significant (p=0.018).

Table 2: Distribution of the patient's sex by the type of operation

Sex	Group A (n=35)	Group B (n=35)	p value
Male	26 (74.3)	23 (65.7)	
Female	9 (25.7)	12 (34.3)	**0.434**
Total	**35 (100.0)**	**35 (100.0)**	

Table 2 shows the distribution of patients' sex by type of operation, where males were predominant in both groups 74.3% in Group A and 65.7% in Group B. Female representation was lower in both groups, with 25.7% in Group A and 34.3% in Group B. The difference between groups was not statistically significant (p = 0.434).

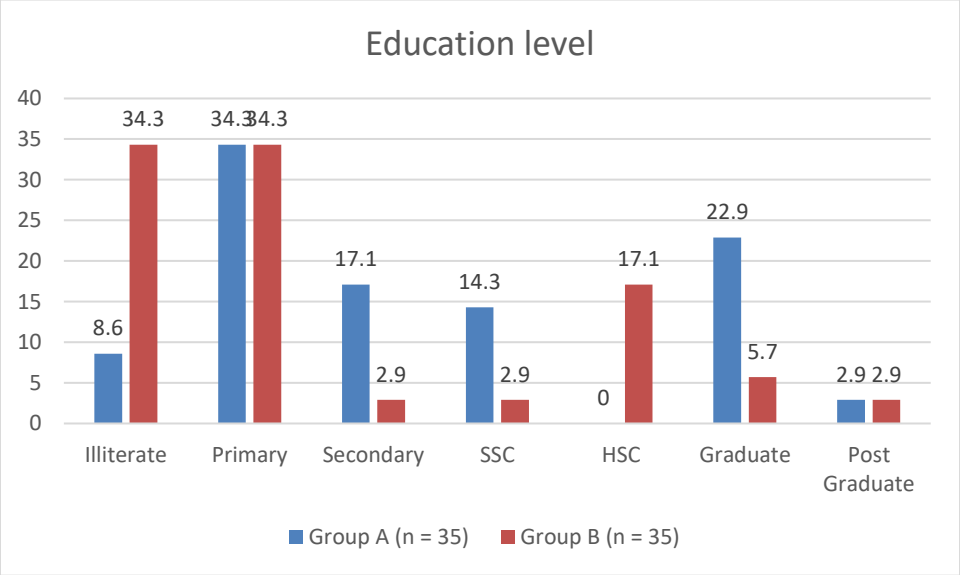

Figure 1: Distribution of the patient's education level by the type of operation

Figure 1 presents the distribution of participants according to their level of education in both groups. In Group A, the majority had primary education (34.3%) and 22.9% were graduates, while in Group B, 34.3% had primary education and 34.3% were illiterate. The difference in educational levels between the two groups was statistically significant (p = 0.002).

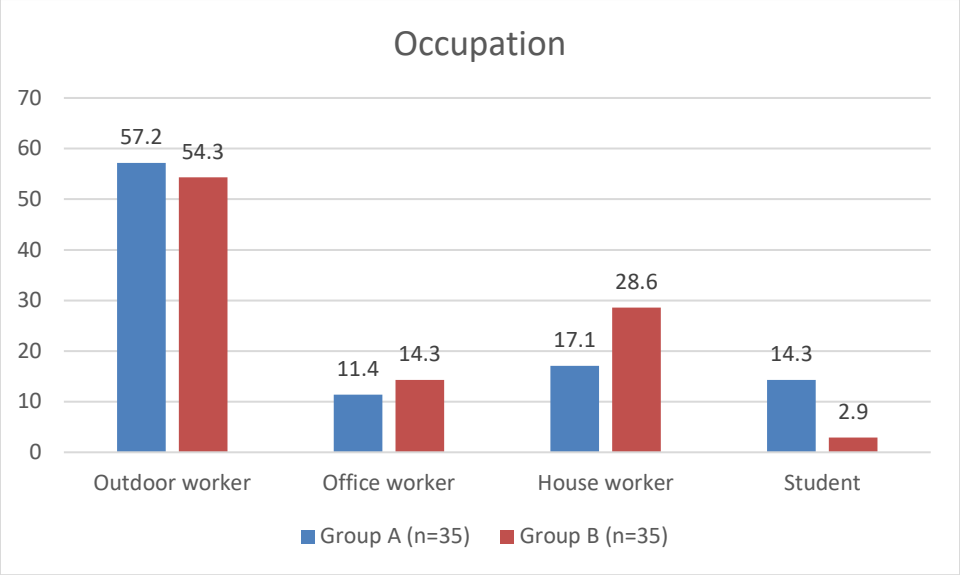

Figure 2: Distribution of patient's occupation by type of operation

Figure 2 compares the occupational distribution between the two surgical groups. Over half of all patients were outdoor workers (Group A: 57.2%; Group B: 54.3%). A statistically significant association was found between occupation and the type of operation (p = 0.042).

Table 3: Distribution of the patients' post-operative complications by the type of operation

Complication	Group A (n = 35)	Group B (n = 35)
Superficial punctate keratitis	0 (0%)	3 (8.6%)
Conjunctival granuloma	0 (0%)	2 (5.7%)
Delayed wound healing	1 (2.9%)	4 (11.4%)
Itching	2 (5.7%)	9 (25.7%)
Anterior chamber reaction	1 (2.9%)	0 (0%)
Limbal avascularity	0 (0%)	1 (2.9%)
Total	**4 (11.5%)**	**19 (54.3%)**

Table 3 shows the postoperative complications observed in both groups. Complications were more frequent in Group B (54.3%) compared to Group A (11.5%). The most common issue in Group B was itching (25.7%), followed by delayed wound healing (11.4%) and superficial punctate keratitis (8.6%). In contrast, Group A showed minimal complications, with only isolated cases of delayed wound healing (2.9%), itching (5.7%) and anterior chamber reaction (2.9%).

DISCUSSION

The present study evaluated the influence of demographic and occupational characteristics on outcomes following primary pterygium surgery and compared postoperative complications between conjunctival autograft and intraoperative mitomycin-C techniques. The findings highlight the relevance of age, education and occupation in the clinical profile of patients undergoing surgery, while also demonstrating a clear difference in postoperative safety between the two procedures.

Age distribution differed significantly between the two groups in our study, with a younger mean age in the conjunctival autograft group (36.77 ± 10.05 years) compared to the mitomycin-C group (42.66 ± 10.31 years, p = 0.018). This observation is important because younger age has been consistently linked with more active fibrovascular proliferation and higher recurrence risk. Anguria et al. reported that younger patients had significantly higher recurrence following pterygium surgery, attributing this to a more aggressive healing response [13]. Population-based studies by Zhong et al., Li et al. and Sun et al. have also shown that pterygium commonly affects individuals in the economically active age groups, supporting the demographic pattern observed in our cohort [14,15,16].

Male predominance was noted in both surgical groups in our study (74.3% in Group A and 65.7% in Group B), although the difference between groups was not statistically significant. Similar male predominance has been reported in large epidemiological studies by Li et al. and Lu et al., which linked this trend to greater outdoor exposure and

occupational risk rather than sex itself [17,18]. Taylor et al. also demonstrated a higher burden of pterygium among outdoor workers, reinforcing the relevance of lifestyle and work environment rather than biological sex alone [19].

Educational status differed significantly between the two groups (p = 0.002), with a higher proportion of illiterate patients in the mitomycin-C group (34.3%) and more graduates in the conjunctival autograft group (22.9%). Lower educational attainment may reflect reduced awareness of eye protection and delayed health-seeking behavior. Zhong et al. and Sun et al. similarly identified low education as an indirect risk factor for pterygium, likely mediated through occupational exposure and limited preventive practices [14, 16].

Occupation showed a statistically significant association with the type of operation (p = 0.042), with more than half of patients in both groups being outdoor workers (57.2% in Group A and 54.3% in Group B). This finding is consistent with reports by Li et al. and Taylor et al., who emphasized ultraviolet radiation, dust and wind exposure as key contributors to both development and progression of pterygium [17,19]. Continued exposure after surgery may also influence healing and complication rates, underlining the importance of occupational counseling.

Postoperative complications were markedly higher in the mitomycin-C group (54.3%) compared to the conjunctival autograft group (11.5%). Itching was the most frequent complication in Group B (25.7%), followed by delayed wound healing (11.4%) and superficial punctate keratitis (8.6%). In contrast, complications in Group A were minimal and isolated. These findings align with comparative studies by Agahan et al. and Kareem et al., which reported higher complication rates with antimetabolite use despite acceptable efficacy [20, 21]. Although mitomycin-C is effective in reducing recurrence, its association with epithelial toxicity and delayed healing has been well documented.

Conversely, conjunctival autografting has been shown to provide favorable safety and long-term outcomes. Luanratanakorn et al. and Huerva et al. demonstrated lower complication and recurrence rates with conjunctival autograft techniques, supporting the lower complication profile observed in our study [22, 23]. The preservation of normal ocular surface physiology with autografting may explain its better tolerability.

Limitations of the study

This study has several limitations. The sample size was relatively small, which may limit the generalizability of the findings. Allocation to treatment groups was not fully randomized, introducing potential selection bias. The follow-up period was limited to six months, which may be insufficient to capture late recurrences or long-term complications. In addition, environmental exposure and occupational risk were broadly categorized and not quantified objectively.

CONCLUSION

In conclusion, our findings suggest that demographic and occupational factors significantly shape the patient profile undergoing pterygium surgery, while the choice of surgical technique strongly influences postoperative safety. Younger age, lower education and outdoor occupation remain important considerations in patient counseling and risk stratification. Conjunctival autograft appears to offer a safer postoperative course compared to intraoperative mitomycin-C, particularly in populations with high environmental exposure.

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