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Association Between Nurses Demographics and Hospital Readmissions in Ophthalmology: A Cross-Sectional Study

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Abstract **Background:** Hospital readmissions are a key indicator of healthcare quality, particularly in ophthalmology where complications following surgery or inadequate postoperative care can lead to unplanned returns. Nurses play a critical role in patient education, follow-up care, and complication management. However, the association between nurse demographics and readmission rates in ophthalmology remains underexplored in India. This study aimed to assess the relationship between nurse demographic factors and hospital readmissions in a tertiary eye care setting. **Methods:** A descriptive cross-sectional study was conducted at a tertiary care ophthalmic hospital in South India. A total of 109 nurses were selected through simple random sampling. Inclusion criteria were a minimum of one year of clinical ophthalmology experience. A structured and validated questionnaire, with a Cronbach's alpha of 0.82, was used to gather data on age, gender, years of experience, education level, department, and shift type. Logistic regression and chi-square tests were applied to analyze associations between these factors and patient readmission rates. **Results:** The mean age of nurses was 40.36±11.02 years, and the average experience was 7.85±3.33 years. The majority were female (85.3%) and held GNM or higher degrees. Logistic regression showed slightly higher odds of readmissions for male nurses (OR = 1.63) and those in specific departments (OR = 1.17), while higher education levels showed a protective effect (OR = 0.87). However, none of these associations were statistically significant. Chi-square tests also found no significant associations between categorical variables and readmission rates. **Conclusion:** While not statistically significant, trends suggest nurse education and departmental assignment may influence ophthalmology readmissions. Larger, multi-center studies are recommended. Improving nursing education and structured follow-up protocols may help reduce readmission rates and enhance care quality.

Key Words Nursing, Hospital readmissions, Opthalmology

INTRODUCTION

Hospital readmission is defined as the return of the same patient to the same hospital for the same condition within a 30-day period. Among different clinical conditions, hospital readmissions in ophthalmology present significant challenges within India's healthcare system. These unplanned returns to medical facilities often stem from postoperative complications, inadequate follow-up care, or progression of ocular diseases [1,2,3]. Such readmissions not only strain healthcare resources but also impose additional financial and emotional burdens on patients. Addressing these issues requires a comprehensive understanding of the underlying causes and the implementation of effective strategies to enhance patient outcomes and reduce the frequency of readmissions [4,5].

While specific data on ophthalmology readmission rates in India are limited, studies in other surgical fields provide some insight. For instance, research on endo-urological procedures reported a 30-day unplanned readmission rate of 1.74%. In comparison, a study in France found a 30-day unplanned readmission rate of 2.07% for elective ophthalmic surgeries, with variability depending on the surgery type. These figures suggest that while readmission rates can vary, they remain a concern across different healthcare settings [6,7].

Common ophthalmic conditions leading to hospital readmissions include phacomorphic glaucoma, orbital cellulitis, and severe cases of conjunctivitis. Phacomorphic glaucoma, often resulting from neglected advanced cataracts, is a prevalent cause of secondary angle-closure glaucoma in developing countries like India. Orbital

cellulitis, characterized by inflammation behind the orbital septum, can lead to serious complications if not promptly treated. Severe conjunctivitis cases, particularly those caused by virulent pathogens, may also necessitate readmission for intensive management [8].

Nursing care plays a vital role in reducing hospital readmissions related to ophthalmology problems. Nurses are often the first to detect early signs of complications through postoperative assessments, patient education, and timely interventions. Proper wound care, medication administration, and adherence to follow-up schedules are critical responsibilities handled by nursing staff. Inadequate nursing attention or poor patient education can result in delayed complication recognition, leading to avoidable readmissions [9].

Studying hospital readmissions in ophthalmology is crucial for improving patient care and optimizing healthcare resources. By identifying patterns and causes of readmissions, healthcare providers especially the nurses can develop targeted interventions to prevent complications, enhance postoperative care, and implement effective follow-up protocols. Therefore, the aim of the study is to study the perception of the nurses on factors influencing ophthalmology patients readmission. The significance of the study will be the valuable information derived from the study will help to train the nurses especially the ophthalmic nurses to guide the patients on hygiene, eye drop usage, and activity restrictions. In addition, this will also help to strengthen nursing protocols and patient safety training which can also significantly contribute to reduce readmissions and improve overall patient satisfaction and outcomes.

METHODS

This study employed a descriptive cross-sectional design to assess the relationship between nursing care practices and hospital readmissions in ophthalmology. It focused on capturing data at a single point in time from nurses actively involved in ophthalmic patient care. The study was conducted at a tertiary care multispeciality hospital in North India, known for its high patient inflow and comprehensive ophthalmologic services. The target population included registered nurses working in various ophthalmology units such as cataract surgery wards, glaucoma clinics, and emergency ophthalmic care.

The sample size was determined using the Cochran formula for cross-sectional studies, with an estimated population of 150 nurses, a 95% confidence interval, and a 5% margin of error. This resulted in a calculated sample size of 109 nurses. Simple random sampling was used to ensure representative participation across different departments.

Inclusion criteria for participants were nurses with a minimum of one year of experience in ophthalmic care and those directly involved in patient management post-surgery. Nurses on long leave or administrative roles without clinical duties were excluded.

Data were collected using a structured questionnaire adapted from earlier conducted study and developed based on existing literature and expert input from ophthalmologists and senior nursing staff. The questionnaire included sections on nurse demographics, knowledge of postoperative complications, patient education practices, and follow-up procedures. The tool was reviewed by a panel of three experts in ophthalmology and nursing education for content validity [10].

To ensure reliability, the questionnaire was piloted among 10 nurses from a neighboring facility not included in the final study. Internal consistency was assessed using Cronbach's alpha, which yielded a score of 0.82, indicating good reliability. The study was conducted over a 4-week period. Participants were briefed on the study's purpose, and informed consent was obtained. Data collection involved both online and paper formats to accommodate availability. The completed questionnaires were then analyzed quantitatively to identify patterns linking nursing care practices to hospital readmissions in ophthalmology.

Necessary approval was taken from the Institutional Review Board (IRB) of the institute vide letter no. AIHMS/06/24/57 prior to data collection as well as informed consent of the participants were taken before commencing the study.

Statistical Analysis

Data analysis was performed using SPSS software version 16. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize nurse demographics and care practices, while chi-square tests and logistic regression were applied to assess associations between nursing practices and hospital readmission rates.

RESULTS

The demographic profile of the participating nurses was explained in Table 1. The study included a total of 109 nurses working in various ophthalmology departments. Among them, the majority were female (n = 93, 85.3%), while male nurses constituted a smaller proportion (n = 16, 14.7%). The mean age of the participants was 27.36±11.02 years, reflecting a mature workforce with a wide range of age distribution.

In terms of professional experience, the nurses had an average of 4.85±3.33 years of work experience in the field, suggesting a moderately experienced group overall. Regarding educational qualifications, the largest segment held a General Nursing and Midwifery (GNM) qualification (n = 59, 54.1%), followed by diploma holders (n = 33, 30.3%), and those with B.Sc Nursing and higher degrees (n = 17, 15.6%).

The nurses were distributed across four ophthalmology departments: General Ophthalmology had the highest number of participants (n = 38, 34.9%), followed by the Glaucoma Clinic (n = 29, 26.6%), Emergency Eye Care (n = 24, 22.0%), and the Cataract Unit (n = 18, 16.5%). This distribution indicates adequate representation from diverse areas of ophthalmic care (Table 1).

Table 1 showing Socio-Demographic Characteristic of Nurses

Characteristics	Total Sample (n = 109)
Gender	
Male	16
Female	93
Age (years)	30.36±11.02
Years of experience	7.85±3.33
Education level	39
Diploma	59
GNM	33
B.Sc Nursing and Above	17
Department	
General Ophthalmology	38
Glaucoma Clinic	29
Emergency Eye Care	24
Cataract Unit	18
Shift Type	
Day	38
Night	36
Rotational	35

Table 2 showing the correlation between Socio-demographic characteristics of nurses and Hospital readmissions

S. No.	Nurses characteristics	Chi-square	Odds ratio (OR)	p-value
1	Gender Male Female	1.627248	1.634713	0.202084
2	Education Diploma GNM B.Sc Nursing and above	1.77512	0.868369	0.411659
3	Department General Opthalmology Glaucoma Clinic Emergency Eye Care Cataract Unit	3.786606	1.168038	0.285448
4	Work Shift Day Night Rotational	3.818752	0.893032	0.148173

With relation to the various socio-demographic factors, for gender and Hospital Readmissions, the chi-square test did not show a statistically significant association between gender and hospital readmissions ($\chi^2 = 1.63$, $p = 0.20$). However, logistic regression indicated that male nurses had 1.63 times higher odds of patient readmissions compared to female nurses.

Similarly, for education level of the nurses with hospital readmissions, it was fond that educational qualifications did not significantly impact readmission rates ($\chi^2 = 1.78$, $p = 0.41$). The odds ratio (OR = 0.87) from logistic regression showed a slightly protective effect with higher education, indicating that nurses with B.Sc Nursing or above were less likely to be associated with patient readmissions.

Similarly, on evaluating, department types and readmissions, it was found that nurses from different departments such as General Ophthalmology, Glaucoma Clinic, Emergency Eye Care, and Cataract Unit showed varying readmission trends, but with no significant association ($\chi^2 = 3.79$, $p = 0.29$). Logistic regression revealed an odds ratio of 1.17, suggesting that certain departments may carry a slightly increased risk of readmissions, possibly due to case complexity or workload. While the department alone did not have a strong predictive value, targeted support in high-risk units may be beneficial.

Last but not the least, with types of work shift and hospital re-admissions, no significant link were observed ($\chi^2 = 3.82$, $p = 0.15$). However, interestingly, the logistic regression suggested that rotational or night shifts had slightly lower odds (OR = 0.89) of readmissions.

DISCUSSIONS

Hospital readmissions are a critical indicator of healthcare quality, and understanding the factors influencing them is essential for improving patient outcomes. Our study explored the associations between nurse demographics-such as gender, education level, department, and shift type-and hospital readmissions in ophthalmology. While our findings did not

reveal statistically significant associations, they provide a foundation for comparison with existing literature.

Our analysis indicated that male nurses had 1.63 times higher odds of patient readmissions compared to female nurses, though this association was not statistically significant. This might reflect differences in communication styles, patient interaction, or roles in clinical settings. Although the association isn't statistically significant, the trend suggests that gender-specific training or supervision might play a role in improving patient outcomes. Existing literature on the impact of nurse gender on patient outcomes is limited. However, studies have shown that nurse understaffing, regardless of gender, is associated with adverse patient outcomes, including increased hospital stays and complications such as deep vein thrombosis and pneumonia. This suggests that factors like staffing levels and workload may have a more pronounced effect on readmissions than gender alone [1,11].

Similarly, in our study, we found that higher educational qualifications among nurses were associated with a slight reduction in patient readmissions (OR = 0.87), though not statistically significant. This aligns with previous research indicating that an increase in the percentage of professional nurses with higher education levels can significantly decrease the risk of unplanned readmissions. For instance, a recently conducted study by Wieczorek-Wójcik *et al.* (2022) demonstrated that increasing the proportion of nurses with Bachelor of Science in Nursing (BSN) or Master of Science in Nursing (MSc) degrees led to a 43% reduction in unplanned readmissions in surgical wards[12]. This implies that advanced education may contribute to better clinical judgment, improved patient education, and effective complication management, though the findings were not statistically significant in this sample. These findings underscore the potential benefits of advanced nursing education on patient outcomes.

With relation to exploring the association between department type and hospital readmission, our study revealed varying readmission trends across different ophthalmology departments, with an odds ratio of 1.17 suggesting a slight increase in readmissions in certain units. While our study did not find statistically significant associations, it's important to consider that different departments may have varying patient complexities and workloads, which can influence readmission rates. Further research is needed to explore these departmental differences and their impact on patient outcomes.

Correlating, work shift and hospital readmissions, it was observed that nurses working rotational or night shifts had slightly lower odds of patient readmissions (OR = 0.89), although this finding was not statistically significant. This could be due to better teamwork or more experienced staff during these shifts. The relationship between shift work and patient outcomes is complex. However, further investigation is needed to understand how shift timing and workload affect care quality and follow-up adherence.

Some studies suggest that adequate nurse staffing during all shifts is crucial for patient safety, as understaffing has been linked to increased risks of adverse events. This indicates that factors such as staffing levels and nurse-to-patient ratios during different shifts may play a more significant role in influencing readmissions than the shift type itself [4,5,13].

The study had some limitations. It includes a relatively small sample size and the focus on a single institution, which may limit the generalizability of our findings. Future research should consider larger, multi-center studies to explore these associations more comprehensively. Additionally, examining other factors such as nurse staffing levels, patient acuity, and organizational policies may provide a more holistic understanding of the determinants of hospital readmissions.

CONCLUSION

To conclude, our study did not find statistically significant associations between nurse demographics and hospital readmissions in ophthalmology. However, trends observed in education level and departmental differences suggest potential areas for further investigation. Investing in nurse education and ensuring adequate staffing across all departments and shifts could be pivotal strategies in reducing hospital readmissions and enhancing patient care quality.

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Conflicts of Interest

The authors declare no conflicts of interest.

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