ORIGINAL RESEARCH ARTICLE

# Prevalence of Abnormal Visual Acuity and Color Vision among Hotel Industry Personnel: A Cross-sectional Record-based Study

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## Abstract

**Background:** Normal visual acuity and color vision are critical for optimal performance in various occupations, especially those involving tasks such as dye matching, color photography, and fruit sorting. Visual impairments, whether due to refractive errors or color vision deficiencies (CVD), can adversely impact workers' abilities and workplace safety. Despite this, limited data exist on the prevalence of such impairments among hotel staff in India.

**Aim:** To estimate the prevalence of abnormal vision—including defects in visual acuity and color vision—among hotel employees.

**Materials and methods:** A cross-sectional, record-based analysis was conducted using health card data from 133 hotel staff members, after obtaining ethical clearance and authorization from the hotel management. Data entry and analysis were carried out using Microsoft Excel and Jamovi 2.6.23.

**Results:** The mean age of participants was 25.8 ± 6.66 years (mean ± SD), with 115 (86.4%) males and 18 (13.3%) females; 83.46% were aged between 18 and 32 years. Abnormal distant vision was found in 91% of left eyes and 93% of right eyes, while near vision abnormalities were seen in 30 and 31% of left and right eyes, respectively. Color vision defects were noted in 13% of both eyes.

**Conclusion:** The findings reveal a significantly high prevalence of visual impairments among hotel staff, particularly related to distant vision. For the safety and job performance, regular vision screening and prompt ophthalmic referrals are recommended to ensure early detection and correction of visual problems, thereby promoting a healthier and more efficient workforce.

**Keywords:** Color vision, Distant vision, Hotel industry personnel, Near vision, Visual acuity.

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## Introduction

Normal visual acuity and color vision are essential for effective functioning in numerous professions, each demanding specific visual capabilities for precision, safety, and productivity. The ability to perceive fine details and distinguish colors accurately plays a vital role in fields like dye matching, paint mixing, fruit sorting, art restoration, and color photography, where color perception is central to task execution.[1,2]

In regulated sectors such as transportation, aviation, marine navigation, and military operations, adherence to color-coded systems is a safety-critical requirement.[3] In hotel settings, staff rely on near and distant vision to read reservations, deliver timely services, and inspect cleanliness, while color vision is crucial in areas such as interior decoration, food presentation, and room maintenance.[4,5]

Employees with uncorrected visual impairments may struggle to meet expected standards, leading to reduced service quality and lower customer satisfaction.[6]

Despite the importance of visual competence, particularly color vision, in occupational settings, data on the prevalence of color vision deficiencies (CVD) among Indian workers remain sparse.[7] Globally, approximately 8% of men and 0.5% of women are affected by CVD—most commonly red-green deficiency.[8]

Similarly, refractive errors such as myopia, hyperopia, and astigmatism contribute significantly to visual morbidity. In visually intensive environments such as hotels, such impairments may interfere with day-to-day tasks that require attention to detail and accuracy.[4,6]

Although numerous studies have assessed visual health in industrial and safety-critical professions, limited attention has been paid to the hotel industry—a sector with high visual demands yet minimal routine screening for visual disorders.[6,7,9–11] There is an evident need for focused research to understand the extent of visual acuity and CVD in this workforce, particularly within the Indian context.

The present study was undertaken to evaluate the prevalence and patterns of visual impairments among hotel industry personnel, an area that remains relatively underexplored in occupational health research.

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### Aim and Objectives

- To assess distant and near visual acuity in hotel employees.
- To assess color vision in this occupational group.
- To compare the distribution of visual impairments between the right and left eyes.
- To analyze potential associations with demographic variables such as age and gender.

## Materials and Methods

### Study Design and Setting

This cross-sectional, record-based study was conducted to investigate the visual acuity and color vision status of hotel industry personnel in city. The study included all currently employed hotel staff members and was conducted over a period of 1 month.

### Ethical Considerations

Prior to the commencement of the study, approval was obtained from the Institutional Ethics Committee. Additionally, formal permission was secured from the concerned authorities of the hotel to access staff health records. The privacy and confidentiality of all participants were strictly maintained in accordance with ethical guidelines.

### Sample Size and Sampling Method

A total of 133 health cards of hotel staff were obtained through convenient sampling. Only available records in the Medical Records Department (MRD) were included.

### Inclusion Criteria

Health card records of hotel staff available in the MRD.

### Exclusion Criteria

Staff above the age of 65 years and those with comorbidities such as uncontrolled hypertension or untreated type 2 diabetes mellitus were excluded.

### Data Collection and Tools

The primary data source was the health card records, which documented the results of routine visual examinations.

The following tests were used for examination and data collection in health cards.

- Distant visual acuity: Assessed using the Snellen chart placed at 6 m. Each eye was tested separately with the other eye closed. The smallest line read correctly was recorded. A visual acuity of 6/6 or 6/5 was considered normal.
- Near vision acuity: Evaluated using the Jaeger chart held 25–30 cm from the eyes. Participants read letters of decreasing size, and the smallest line read comfortably was noted. Each eye was tested separately.
- Color vision: Assessed using the Ishihara pseudoisochromatic chart in a well-lit room. Participants were asked to identify numbers or trace lines on each plate within 5–10 seconds. Responses were recorded to detect any color vision defects.

### Data Analysis

The extracted data were categorized and coded for systematic analysis. Microsoft Excel was used to manage and analyze the data, enabling a comprehensive evaluation of the prevalence and distribution of visual acuity and color vision impairments among hotel staff.

## Results

This study focuses on analyzing health record data to assess the prevalence of visual acuity and color vision abnormalities among hotel industry personnel. The key parameters examined include demographic characteristics (age and gender), color vision status, and distant and near visual acuity. These aspects were sourced from health cards and collectively provide valuable insights into the overall visual health and physical profile of the hotel staff (Tables 1 and 2).

### Gender and Age Demography

A total of 133 hotel industry personnel were included in the study. The mean age of participants was 25.8 years (range 18–47 years). Among them, 86.47% were male ($n$ = 115) and 13.53% were female ($n$ = 18). Most participants were aged below 33 years, with 39.09% in the 18–22 age-group and 28.57% in the 23–27 group. Smaller proportions were in the 28–32 (15.79%), 33–37 (10.53%), 38–42 (3.76%), and 43–47 (1.5%) age ranges. The sample thus comprised predominantly young adult males.

### Color Vision

Color vision defects were found in 12.78% of participants in both eyes, while 87.22% had normal color vision, indicating that a small

**Table 1:** Demographic profile of study participants

| | *Gender* | | *Age* | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *Female* | *Male* | *18–22* | *23–27* | *28–32* | *33–37* | *38–42* | *43–47* |
| Frequency | 18 | 115 | 52 | 38 | 21 | 14 | 5 | 3 |
| Percentage (%) | 13.53 | 86.47 | 39.09 | 28.57 | 15.79 | 10.53 | 3.76 | 2.25 |

**Table 2:** Frequency and percentage of normal and defective vision in right and left eyes

| | | *Color vision* | | *Distant vision* | | *Near vision* | |
|---|---|---|---|---|---|---|---|
| | | *Frequency* | *Percent (%)* | *Frequency* | *Percent (%)* | *Frequency* | *Percent (%)* |
| Right eye | Normal | 116 | 87.22 | 9 | 6.77 | 92 | 69.17 |
| | Defective | 17 | 12.78 | 124 | 93.23 | 41 | 30.83 |
| Left eye | Normal | 116 | 87.22 | 12 | 9.02 | 93 | 69.92 |
| | Defective | 17 | 12.78 | 121 | 90.98 | 40 | 30.08 |

yet significant proportion may face difficulties in roles requiring accurate color discrimination.

### Visual Acuity

A high prevalence of defective distant vision was observed—93.23% in the right eye and 90.98% in the left eye—with normal distant vision found in only 6.77 and 9.02% of right and left eyes, respectively. This highlights a potential unmet need for refractive correction among employees.

## Discussion

The high prevalence of defective distant vision observed in this study suggests a significant burden of uncorrected refractive errors among hotel employees. This finding aligns with prior research by Dandona and Dandona, which identified uncorrected refractive error as a leading cause of visual impairment among adults in India.[12]

Regarding near vision, 30.83% of right eyes and 30.08% of left eyes showed defective acuity, suggesting that nearly one-third of the workforce may struggle with tasks requiring close visual attention, such as reading reservations or handling digital devices.

Only seven employees (5.26%) were documented as wearing corrective spectacles, as per their health records. This indicates a significant gap between the prevalence of visual impairment and the use of corrective measures.

There was no significant difference between right and left eye acuity, indicating that visual defects tend to occur bilaterally rather than unilaterally in this population. Similar findings were reported in a study by Dandona et al., which found that >90% of refractive errors in the Indian adult population affected both eyes.[13] These findings emphasize the need for regular visual screenings and better access to corrective eyewear, as well as workplace ergonomics, such as improved lighting, to support visual comfort and efficiency. Smith et al. emphasized the occupational health impact of uncorrected visual errors, showing decreased productivity and increased workplace errors in visually impaired staff.[14]

## Conclusion

This study reveals a substantial burden of visual impairments among hotel industry personnel, particularly concerning distant vision, with >90% of participants affected. Such impairments, if unaddressed, can hinder essential job functions, like guest interaction, safety monitoring, and maintaining service quality. Additionally, nearly one-third of the workforce exhibited defective near vision, further highlighting the need for workplace adaptations and corrective support.

Despite these findings, only a small fraction of employees reported using corrective eyewear, suggesting low awareness or limited access to eye care. The results underscore the importance of implementing routine visual screening programs, facilitating access to ophthalmic consultations, and promoting the use of corrective lenses among staff. Regular vision screening in working populations can help in the early detection of correctable causes of visual impairment.[15] Targeted health education and occupational vision care can play a pivotal role in enhancing employee well-being and operational efficiency.

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