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Assessing Hydration Patterns Among Surgical Resident Doctors During Duty Hours in a Tertiary Care Centre in South India

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ABSTRACT

Background: Proper hydration is essential for maintaining overall health and optimal physical and mental function. However, surgical residents often work long, demanding hours that limit their opportunities to drink enough fluids. This can lead to dehydration, which affects concentration, decision-making, and physical endurance—factors critical for safe and effective patient care. In India, where resident duty hours are often longer than international standards, the risk of dehydration is even higher. This study explores the hydration habits of surgical residents at a tertiary care hospital in South India, evaluating how their fluid intake compares to World Health Organisation (WHO) recommendations and identifying common barriers to staying hydrated.

Methods: We conducted a six-month cross-sectional study using a structured questionnaire among 150 surgical residents. The survey assessed how often and how much water they drank, their awareness of WHO hydration guidelines, factors that influenced their fluid intake, and any dehydration symptoms they experienced. Based on their reported daily intake, residents were grouped into four hydration categories: poorly, moderately, adequately, and well-hydrated, according to WHO standards.

Results: Among the 150 respondents, 65% consumed less water than the WHO guidelines suggest. Around 70% reported symptoms of dehydration, including fatigue (55%), headaches (40%), and trouble concentrating (35%). The main reasons for poor hydration were heavy workloads (80%), lack of time for breaks (70%), and limited access to drinking water (50%). There was a statistically significant link between lower fluid intake and decreased performance at work ($p < 0.05$).

Conclusion: Surgical residents in South India commonly face hydration challenges that can negatively impact their health and work efficiency. Addressing this issue requires institutional changes, such as improving access to water, scheduling hydration breaks, and promoting awareness about the importance of hydration in clinical settings. These measures are vital for protecting the well-being of resident doctors and ensuring high standards of patient care

Keywords: *Hydration, dehydration, surgical resident doctors, fluid intake, duty hours, tertiary care centre, WHO guidelines, cognitive performance, barriers to hydration, South India*

1. INTRODUCTION

Surgical residency programs in India are characterised by demanding workloads, extended duty hours, and significant patient care responsibilities. These rigorous conditions frequently compromise residents ability to meet essential physiological needs such as maintaining adequate hydration. Proper hydration is fundamental for maintaining physiological homeostasis, cognitive function, and physical endurance, which are crucial for ensuring safe and effective surgical performance [1,2].

Despite its significance, hydration often becomes a secondary concern for surgical residents due to the pressures of their schedules. The constraints of long shifts, high stress, and limited access to fluids during work hours impede adequate fluid intake. Furthermore, the prevailing medical culture in India tends to prioritise endurance and stoicism, thereby discouraging residents from taking hydration or rest breaks [3,4]. This neglect increases the risk of dehydration, which is associated with symptoms including fatigue, impaired cognitive function, slowed reaction times, and reduced procedural accuracy—factors that jeopardise both resident health and patient safety [5,6].

While hydration among healthcare workers has been studied in various countries, limited research exists in the Indian context, especially in regions with tropical climates such as South India where environmental heat and humidity exacerbate fluid loss through perspiration [7,8]. This study aims to assess hydration practices, awareness of recommended fluid intake, and barriers to hydration among surgical residents at a large tertiary teaching hospital in South India. The findings are intended to inform institutional policies that enhance resident well-being and optimise clinical care.

2. METHODOLOGY

Study DesignA cross-sectional observational study was conducted over six months at a tertiary care teaching hospital in South India. The study was designed to evaluate hydration habits, knowledge of hydration guidelines, and the perceived impact of hydration status on clinical performance among surgical residents. Ethical approval was granted by the Institutional Human Ethics Committee (Approval No. IEC/2024/07/05), and informed written consent was obtained from all participants.

ParticipantsA total of 150 postgraduate surgical residents (PGY1–PGY3) from diverse surgical specialties were recruited via convenience sampling. Eligibility criteria included active clinical duties during the study period and willingness to participate. Residents on leave or posted outside the study hospital were excluded.

Data CollectionA structured, self-administered questionnaire was utilised, which includes

- **Demographics:** age, gender, residency year, specialty
- **Hydration Habits:** frequency and volume of water intake during duty hours
- **Knowledge:** awareness of WHO daily water intake guidelines [9]
- **Barriers:** workload intensity, infrastructure availability, cultural attitudes towards hydration breaks
- **Dehydration Symptoms:** fatigue, headache, dizziness, concentration difficulties, urine colour
- **Clinical Impact:** self-reported effects of hydration status on cognitive and procedural performance
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Classification of Hydration Status Based on reported daily fluid intake, participants were classified relative to WHO guidelines (3.0 L/day for men, 2.2 L/day for women) [9]:

- Poorly Hydrated: <50% of WHO recommendation (<1.5 L men; <1.0 L women)
- Moderately Hydrated: 50–75% of WHO guideline (1.5–2.5 L men; 1.0–2.0 L women)
- Adequately Hydrated: 75–100% of WHO guideline (2.5–3.0 L men; 2.0–2.2 L women)
- Well Hydrated: >100% of WHO guideline (>3.0 L men; >2.2 L women)

Statistical Analysis Data were anonymised and analysed using SPSS version 25 software. Descriptive statistics summarised demographics, hydration status, and symptom prevalence. Associations between hydration status and variables such as clinical performance and symptoms were tested using Chi-square analysis. Logistic regression identified predictors of poor hydration and its impact on clinical outcomes. Statistical significance was defined as $p < 0.05$.

Figure-1: Showing pictorial representation of results

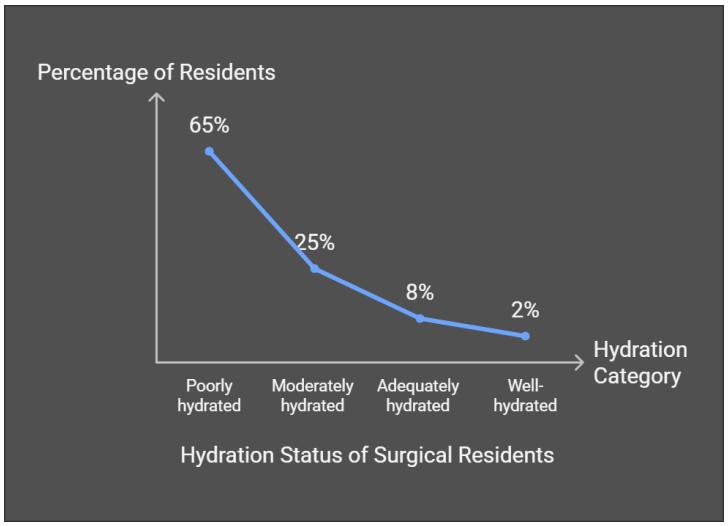
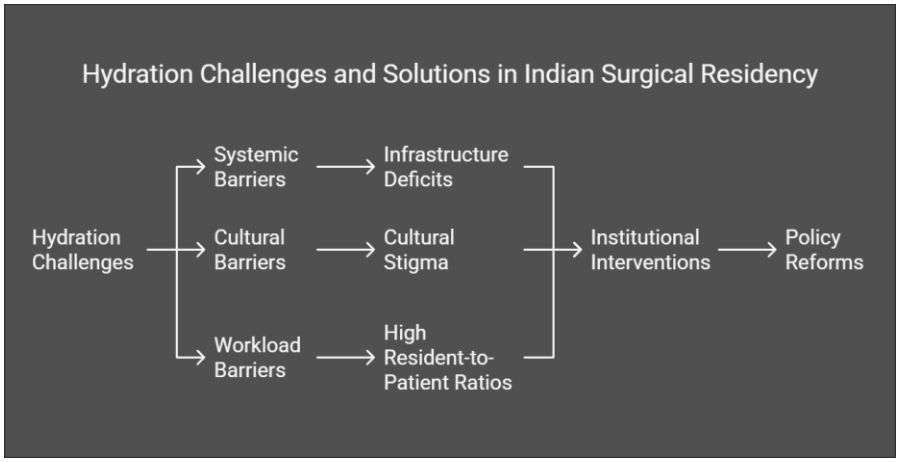


Figure-2: Showing flowchart of Plan to reform hydration challenges



3. RESULTS

Participant Demographics Among 150 residents, mean age was 27.5 years (±2.1). Gender distribution included 60% males and 40% females. Training levels were PGY1 (40%), PGY2 (35%), and PGY3 (25%).

Hydration Status Sixty-five percent of participants were classified as poorly hydrated relative to WHO guidelines. Moderately hydrated individuals comprised 25%, adequately hydrated 8%, and well hydrated 2%.

Knowledge of Hydration Guidelines Only 20% of residents reported familiarity with WHO-recommended fluid intake. The remaining 80% underestimated daily hydration requirements.

Barriers to Hydration Key barriers included:

- **High workload:** 80% reported that emergency duties and tight schedules limited opportunities to drink fluids.
- **Infrastructure:** 50% noted lack of water dispensers in critical clinical areas such as operating rooms and wards.
- **Cultural factors:** 40% expressed discomfort or embarrassment about taking hydration breaks, citing fears of appearing unprofessional or disrupting workflow.

Dehydration Symptoms Commonly reported symptoms were fatigue (55%), headaches (40%), dizziness (30%), and concentration difficulties (35%).

Clinical Impact Seventy percent of residents believed their hydration status negatively affected cognitive focus and

procedural performance, including delays in decision-making and increased minor errors.

Statistical Associations Significant correlations were found between hydration status and reported clinical performance outcomes ($p = 0.02$). Well- and adequately hydrated residents demonstrated better cognitive clarity and physical endurance compared to poorly hydrated peers.

4. DISCUSSION

This study highlights a critical yet under-recognised issue in Indian surgical training programs with inadequate hydration during clinical duties. The finding that nearly two-thirds of surgical residents do not meet WHO fluid intake recommendations reflects systemic barriers including excessive workload, infrastructural inadequacies, and cultural stigmas surrounding self-care during duty hours [1,3,10].

Heavy clinical demands and extended shift lengths (often exceeding 24 hours) leave limited time for hydration breaks, consistent with prior research documenting resident burnout and compromised self-care in Indian hospitals [1,4,11]. The absence of accessible water dispensers in operating theatres and wards, reported by half of participants, echoes findings from similar institutional surveys indicating infrastructural deficits in healthcare facilities [12].

Cultural attitudes play a notable role; reluctance to take breaks due to fear of judgment aligns with literature describing the hierarchical and endurance-focused medical culture in India, which often penalises self-care behaviours [4,13]. This cultural barrier likely contributes to the high prevalence of dehydration symptoms such as fatigue, headaches, and impaired concentration, which are known to degrade cognitive and motor performance [5,6].

The statistically significant association between hydration and self-reported clinical performance underscores the practical implications of this issue. Dehydration has been shown to impair vigilance, reaction times, and decision-making—abilities crucial in surgical settings where errors can have serious consequences [5,14].

To mitigate these challenges, a multi-faceted approach is necessary. Hospitals should install hydration stations proximate to clinical areas and schedule hydration breaks within shift routines. Educational initiatives should emphasise hydration's role in cognitive and physical performance, and cultural change should be promoted to normalise self-care among residents. Regulatory bodies such as the National Medical Commission must establish guidelines to protect resident well-being, including hydration standards and mandated breaks [3,15].

5. LIMITATIONS AND FUTURE DIRECTIONS

The study's single-center design restricts its generalisability across India's heterogeneous healthcare landscape. Larger, multicentric studies are needed to explore regional and institutional variability in hydration practices. Future research should incorporate objective measures of clinical performance (e.g., error rates, cognitive testing) to quantify hydration's impact on surgical outcomes [16].

6. CONCLUSION

Surgical residents in South India experience significant hydration deficits driven by excessive workloads, reluctance on self health, and cultural barriers that discourage breaks. These deficits adversely impact resident health and clinical performance, potentially compromising patient safety. Institutional policies must ensure water accessibility and structured hydration breaks, alongside educational and cultural interventions to prioritise hydration as a professional imperative. Regulatory support is essential to safeguard resident welfare and sustain quality surgical care.

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