

# Influence of Sleep Pattern and Oral Hydration on Academic Performance among Undergraduate Dental Students-A Pilot Study

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## Abstract

### Background:

Sound sleep is important for preserving good physical, mental, and emotional health. An association with learning skills, critical decision making and thinking is also observed [1]. Poor hydration is associated with several health outcomes including poor oral health and academic performance. Timely assessment of oral hydration of students holds a potential to improve their oral health and academic performance [1, 2]. This study is designed to investigate the influence of oral hydration status and sleep deprivation on academic achievements of dental college undergraduates.

### Methods:

A cross sectional study was conducted among undergraduate students at the College of Dentistry, King Faisal University, Saudi Arabia. Relationship between sleep patterns, oral hydration and academic performance was investigated using a self-reported questionnaire [3]. Oral dehydration was assessed using FishburneTabs™. Participants were instructed to follow the procedure as directed by the manufacturer. The procedure involved placing the tablet on the lingual surface, closing the mouth on the device, and opening and closing the mouth three times. The examiner recorded two readings: one as Stage-1 and the other as Stage-2. Stage-2 readings shown in figure-1, were considered as final. Linear regression was employed to identify a relationship between academic performance and sleep pattern, and at Stage-2 oral hydration status among students. Univariate and multivariate linear regression analyses were applied to reveal the associations between academic performance, sleep pattern, and Stage-2 oral hydration status. Data was analyzed using STATA 18.0 and the results were considered statistically significant at  $P \leq 0.05$ .



Figure 1: FishburneTabs™ after removal from participant mouth and wait for 3 minutes.

## Results:

A sample of 36 dental students participated in the study. Univariate regression analyses indicated a significant association between both oral hydration (Stage-2 scores) and sleep pattern (hours of sleep) with GPA. For oral hydration, the regression coefficient ( $\beta$ ) was -0.27 (95% CI [-0.14, -0.41]), suggesting that increase in oral hydration scores is associated with a decrease in GPA. For sleep pattern, the regression coefficient was 0.28 (95% CI [0.38, 0.17]), indicating that an increase in the number of hours of sleep is associated with a higher GPA.

Subsequently, a multivariate regression analysis was conducted, considering both sleep duration and Stage-2 oral hydration scores simultaneously. The results revealed that sleep duration exhibited a statistically significant positive association with GPA ( $\beta = 0.23$ ,  $p = 0.004$ ), signifying that a longer sleep duration is associated with a higher GPA. However, Stage-2 oral hydration scores did not show a statistically significant association with GPA ( $\beta = -0.0715$ ,  $p = 0.423$ ), suggesting that oral hydration status at Stage-2 does not significantly predict GPA in the context of the multivariate model.

Indicator	Univariate Regression	Multivariate Regression
	$\beta$ [95% CI]	$\beta$ [95% CI]
Stage-2 scores	-0.27 [-0.14, -0.41]*	-0.07[0.10-0.25]
Sleep pattern (Hours)	0.28 [0.38, 0.17]*	0.23[0.38 0.08]*

\*Significant  $P < 0.05$

## Conclusion:

These findings emphasize the importance of addressing sleep patterns in efforts to enhance academic performance among dental students. While oral hygiene remains a noteworthy aspect of overall health, its isolated impact on GPA may be more nuanced and require further exploration. It is essential to acknowledge the potential limitations of the sample size. With a larger and more diverse sample, the results may reveal a more comprehensive understanding of the relationship between oral hydration and academic success. In conclusion, optimizing oral hydration and promoting healthy sleep patterns could potentially serve as modifiable factors to bolster the academic achievements of undergraduate dental students. Future research and interventions in this area hold promise for enhancing both oral health and academic success in this demographic.

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