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# Frequency of DÉJÀ VU Experience and Its Relationship with Stress in Students of The Medical University of Islamabad

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## Abstract

**Objective:** This research aims to evaluate the frequency of déjà vu experience in medical students and its relationship with stress along with different prognostic factors that lead to déjà vu experience.

**Methods**: A descriptive cross-sectional study was conducted at Foundation University Islamabad over 4 months from May 2023 to August 2023. The sample size (239) was calculated using open Epi software with a previous prevalence of 67%. Stratified random sampling was used to select students. Data was collected through a questionnaire containing demographic variables from a validated déjà vu inventory and stress tool. Analysis was done on a validated déjà vu inventory and perceived stress scale 10. SPSS 26 was used to assess the relationship between stress and the frequency of déjà vu using the chi-square test, with statistical significance at $p<0.05$.

**Results**: 89.2% of the participants reported that they had experienced this sensation at least once in their life. The most popular ways this feeling happened were in a certain place or a certain situation. The association between stress and Déjà vu experiences was found to be significant(p-value 0.012)

**Conclusion**: 89.2% of the participants reported that they had experienced Déjà vu sensation at least once. There was a significant association between stress among medical university students and Déjà vu experience.

**Keywords**: Déjà vu, Stress, Familiarity, Sensation, Epilepsy, Dopamine.

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## 1. Introduction

Déjà vu (DV) is the sensation of being encountered by an ongoing circumstance or event that has already happened, but you are encountering it for the first time. It is often described as an eerie or strange sensation. The term déjà vu comes from the French language and means 'already seen'.[1] There are several varieties of déjà vu, including Classical déjà vu, which commonly occurs in a healthy individual and involves a feeling that a current experience has been experienced before, Recurrent Déjà vu, a persistent sense of familiarity, Pathological déjà vu, a sensation of familiarity caused by nervous disorders like temporal lobe epilepsy,[2] induced déjà vu is an impairment of cognitive dysfunction which may be caused by the use of certain drugs like a dopamine agonist mainly in Parkinson's disease which may suggest it occurs due to increase in dopamine activity.[3] Estimated about 60-70% of the masses had felt this experience once in life and a high number of participants experienced it frequently.[4] The feeling of Déjà Vu arises as a concurrence of two incidences of cognition, one is acknowledging the present circumstance along with understanding that this sensation is unfitting.[5] However, there have been comparatively fewer studies of déjà vu than those experienced by people with clinical anxiety. Research has suggested that there may be an association between elevated levels of anxiety and greater intensity and frequency of déjà vu.[6] Dopamine availability and dopaminergic neuronal firing in the dopamine-reward pathway are impacted by stress. Mesolimbic dopaminergic neurotransmission changes are crucial for controlling stress because they enable behavioural adaptation to a variety of environmental stimuli.[7] Neurons are lost as a result of repeated stress, especially in the hippocampus. Recent research indicated that changes in the hippocampus were likely responsible for the loss of declarative memory function brought on by stress, while the amygdala and other brain regions were thought to be involved in the stress-induced adrenal steroid effects on memories that were triggering this reward pathway.[8] Déjà-vu is caused by irregular coordination of the hippocampus and rhinal cortex, while recollection (the "indistinct

state") is caused by stimulation of the hippocampus's extra function of reorganizing the components of the previous experience networks.[9] For those interested in the effects of stress on the hippocampus, the hippocampus and its associated brain structures have become a legitimate area of research because of its central role in cognition and the feedback-mediated regulation of the stress response.[10]

There is no clear relationship between stress and déjà vu, as they are two distinct experiences. While stress can sometimes trigger déjà vu in some individuals, there is no evidence to suggest that the two phenomena are directly related. However, some studies have suggested that stress and anxiety can affect memory and perception, which could potentially lead to experiences of déjà vu. For instance, someone who endures a lot of stress might be more likely to misremember details or to experience a heightened sense of familiarity when encountering a new situation, which could result in feelings of déjà vu.

Additionally, some research has suggested that déjà vu may be linked to neurological processes in the brain, particularly those involving memory and the processing of familiar stimuli. It is possible that stress could affect these processes in some way, potentially leading to experiences of déjà vu. In a broader context, while certain correlations between stress and déjà vu might exist, the intricate interplay between these factors remains inadequately comprehended, necessitating comprehensive investigation. Given the limited literature on this subject within the context of Pakistan, further scholarly exploration is warranted to shed light on the potential interrelationship between stress and déjà vu phenomena.

## 2. Materials & Methods

The descriptive cross-sectional study was conducted at Foundation University Islamabad over 4 months from May 2023 to August 2023. The study was approved by the ethical review committee of Foundation University School of Health Sciences Islamabad before the initiation of research work. The informed and written consent of the students was also signed before data collection. The sample size was calculated using open Epi software, with a confidence level of 95%, a previous prevalence of 67% (13) experiencing frequent déjà vu, 5% absolute precision and a minimum required sample size of 239 from a population of 800. Stratified random sampling was used to select students aged 19-24 years of both genders as participants. strata of five classes were made, a minimum sample of 43 was selected from each stratum, with exclusion criteria including students taking drugs related to mental disorders and those who did not provide consent. Data was collected through a questionnaire consisting of three sections: demographic variables, a validated déjà vu inventory with 23 items,[11] and a pre-validated 10-item stress tool (perceived stress scale 10).[12]

PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items. Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress. Scores ranging from 0-13 would be considered low stress, 14-26 would be considered moderate stress,27-40 would be considered high perceived stress

Analysis of a validated déjà vu inventory and perceived stress scale 10 was conducted using SPSS 26, including frequency and percentage calculations for categorical variables, and mean and standard deviation calculations for quantitative variables. The relationship between stress and the frequency of déjà vu was assessed using the chi-square test, with statistical significance set at $p<0.05$.

## 3. Results

In this research study, we analyzed the responses of 239 participants from different years of MBBS study which included 108(45.2%) male and 131(54.8%) female participants. The maximum participation was from the fourth year 53(22.2%) followed by the first year 51 (21.33%), fifth year 47(19.66%), second year 45(18.82%) and third year 43 (17.99%) respectively. The participants were surveyed regarding their encounters with various experiences associated with déjà vu. About the sensation of déjà vu, a significant majority of the participants (89.2%) reported having experienced this phenomenon at least once in their lifetime. Additional parameters regarding the sensation of déjà vu are elaborated upon in Table 1.

**Table 1: Evaluation of the parameters for Déjà vu inventory (n=239)**

| Déjà vu variables | Never n (%) | Less than once per year n (%) | Few times per year n (%) | Few times a month n (%) | At least weekly n (%) | Don't know n (%) |
|---|---|---|---|---|---|---|
| **Experiencing Déjà vu** | 7.9 | 21.3 | 46.0 | 16.7 | 5.0 | 2.9 |
| **Impression that nothing is real.** | 25.5 | 28.9 | 27.6 | 8.8 | 4.2 | 5.0 |
| **Doing something in reality that had previously been imagined in a dream?** | 10.5 | 33.9 | 33.9 | 16.3 | 4.2 | 1.3 |
| **Feeling like something is happening to others while it's happening to you.** | 37.2 | 22.2 | 23.0 | 9.6 | 3.8 | 4.2 |
| **Ability to recall a dream so vividly that you can share it with someone?** | 5.0 | 16.3 | 32.2 | 29.7 | 15.1 | 1.7 |
| **Journey of a distance of at least 100 kilometers** | 7.9 | 16.7 | 46.0 | 19.2 | 6.7 | 3.3 |
| **Sensation of daydreaming** | 16.3 | 20.1 | 28.0 | 18.4 | 14.2 | 2.9 |
| **Sensation of something that happened in dream** | 13.0 | 28.5 | 34.3 | 15.1 | 5.4 | 3.8 |
| **Erroneous feeling of unfamiliar occurrence.** | 25.1 | 22.6 | 31.4 | 11.3 | 5.0 | 4.6 |

When the participants were asked about in what way this feeling happened to them. The most popular ways were when they were in a certain place (32.6%) or a certain situation (34.3%). Figure 1 explains different ways in which the participants have DV experienced.

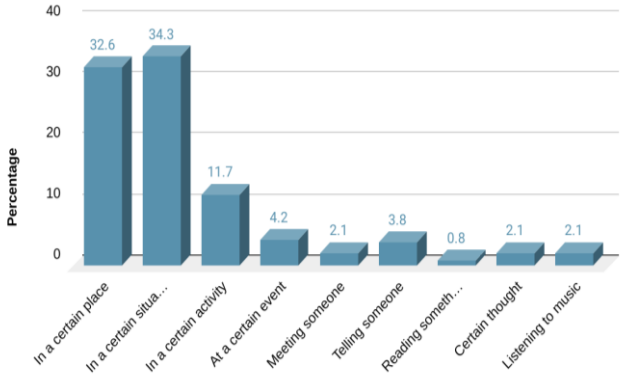


**Figure 1: Modalities in which déjà vu occurred**

Over 23% of participants, when questioned about their feelings following a déjà vu experience, expressed that they find this sensation to be frightening as shown in Figure 2.

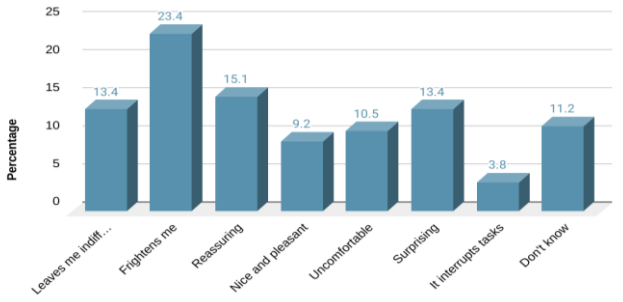


**Figure 2: Effects of Deja vu sensation**

In this study, three independent variables were considered that are stress, gender and study year to check whether they could be associated with a dependent variable which is Déjà vu. The participants' stress levels varied, with 2.15% experiencing mild stress, 76.52% experiencing moderate stress, and 21.33% reporting severe stress. Moderate stress was found to be significantly associated with Déjà vu (p-value 0.012). No significant association was found between gender and study year shown in Table 2

**Table 2: Deja vu sensation and its association with corresponding variables**

| Independent variables | Deja vu present n (%) | Deja vu absent n (%) | P-value |
|---|---|---|---|
| **Stress** | | | |
| **Mild** | 5 (2.1) | 0 (0) | |
| **Moderate** | 160 (66.9) | 23 (9.62) | **0.012*** |
| **Severe** | 49 (20.5) | 2 (0.83) | |
| **Gender** | | | |
| **Male** | 98 (41) | 10 (4.18) | 0.692 |
| **Female** | 114 (47.6) | 17 (7.11) | |
| **Study year** | | | |
| **First** | 44 (18.4) | 7 (2.92) | |
| **Second** | 41 (17.15) | 4 (1.67) | |
| **Third** | 36 (15.06) | 7 (2.92) | 0.196 |
| **Fourth** | 51 (21.33) | 2 (0.83) | |
| **Fifth** | 41 (17.15) | 6 (2.51) | |

** Indicates that the p-value is significant*

## 4. Discussion

Déjà vu is the sensation of being encountered by an ongoing circumstance or event that has already happened. It is often described as an eerie or strange sensation.[1] This study aims to assess the frequency of

déjà vu among medical students and its association with stress.

89% of the subjects participating in the study had encountered déjà vu at least once in their life. In previous studies. Participants gave mixed reviews on whether they can differentiate reality from the hyper familiarity that they are experiencing. So self-transcending realizations give a sense of hyper-familiarity and a context for statements that delusions and dreams are both conditions with inadequate 'reality testing'.[13] Approximately 97% of the population have experienced déjà vu at least once while rather a high number of study participants, 67%, experience it regularly. In many research reviews, there is evidence of a strong connection between stress and the frequency of déjà vu experience.[14] In a study,69% of epileptic cases and 73.1% of healthy individuals reported experiencing déjà vu once in their lifetime.[15]

This study does not include any subjects with mental illness because it is understood that people with certain mental diseases like temporal lobe epilepsy may experience more frequent déjà vu than non-epileptic.[16] In our study, gender was not significantly associated with the presence of déjà vu, these results are consistent with previous studies.[14] Previous research revealed that the experience of déjà vu decreased with age and that the age of a person was negatively correlated with precognitive dreams, dream recall, frequency of travel, and daydreaming. As a result, the findings indicate commonalities in the epidemiological distribution, gender, and age; yet, it is still unclear how much the physiological underpinning of nonpathological DV resembles Penfield's hypothesis of an ictal event.[17]

In this research the relation between stress and déjà vu experience is significant. A preliminary component analysis linked déjà vu to factors relating to dreams and memories including precognitive function rather than dissociation, depersonalization, derealization, and mental activity-related parameters including travel frequency and transcendental quality.[18] No study was found in the literature which assessed the relationship between déjà vu and stress

Déjà vu is sometimes attributed to an unconscious impression coming to consciousness because of the existence of a present, similar impression. The individuals in question were mindful of the earlier perception, but it had a symbolic meaning that they were ostensibly oblivious of. Déjà vu has been linked to recent or distant dreams as well as unconscious fancies.[19] Many types of research indicate a well-established link involving travelling and déjà vu. However, most of the respondents who experienced déjà vu did not frequently travel to distant locations. So, it was not possible to assess the factor of travelling in this instance.[20]

There are limitations in this research because cross-sectional methods only assess variables at one moment, they are unable to demonstrate causality. As a result, it is challenging to say whether stress causes Déjà vu or whether Déjà vu causes stress. So limited causal inference may cause variation in results. Participants might not precisely recall their instances of stress and Déjà vu, which might result in memory bias. Participants' erroneous or insufficient reporting of their experiences led to this bias. Déjà vu and stress may be overrepresented in cross-sectional research due to selection bias, which makes it more likely that people with these experiences will take part in the study. This study may include confounding factors that influence the association between stress and déjà vu like the effect of age, socioeconomic status, burden of formal medical education which may be associated with both stress and Déjà vu. Moreover, the study includes only medical students, which is why their level of stress is different from the common masses. So, there is a need for a longitudinal study to determine whether the relationship between déjà vu and stress changes over time.

## 5. Conclusion

Approximately 89.2% of the participants reported that they had experienced Déjà vu sensation at least once in their life. The research conducted found a significant association between stress among medical students at FUSH and Déjà vu experience but no correlation existed between Déjà vu experience and gender or year of study. Hence, it's safe to say that stress increases the frequency and experience of Déjà vu. Medical students undergo a lot of mental and physical grind due to the burden of studies and activities which elevates stress among them and hence such students have shown a higher frequency of Déjà vu experience.

**CONFLICTS OF INTEREST-** None

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**Contributions:**

M.R, H.M.H, K.U.N, F.T.J, D.A.A, M.M.M - Conception of study
M.R, H.M.H, K.U.N, F.T.J, D.A.A, M.M.M - Experimentation/Study Conduction
M.R, H.M.H, K.U.N, F.T.J, D.A.A, M.M.M - Analysis/Interpretation/Discussion
M.R, H.M.H, K.U.N, F.T.J, D.A.A, M.M.M - Manuscript Writing

M.R, H.M.H, K.U.N, F.T.J, D.A.A, M.M.M - Critical Review
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All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

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