

# Effect of examination stress on Autonomic functions, Eating behavior and Quality of life in Dental students with Type D personality

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## Abstract

Dental education was reported to be stressful and higher levels of stress were reported in dental students when compared with the general population of same age groups. Individuals with higher levels of negative affectivity (more negative feelings) and social inhibition (those do not share the emotions with others) are labeled as Type D personality. The present study was undertaken to observe the effect of examination stress on autonomic functions, eating behavior and quality of life in dental students with type D personality. 64 apparently healthy students belonging to the first year of the BDS course who were willing to participate voluntarily, were included in the study. Based on the scores of DS 14 of the questionnaires, they were grouped into Type-D and Non-Type D. After grouping them, rest of the data was collected using standard methods mentioned in the literature. Data was collected during pre examination period that is 48 hours before the practical examinations. There was no significant difference in the demographic data of type D and non type D individuals. Perceived stress score was significantly high in type D personalities when compared with non-type D personalities ( $P < 0.05$ ). Systolic BP ( $P < 0.05$ ), Diastolic BP ( $P < 0.001$ ) and heart rate ( $P < 0.001$ ) was significantly higher in type D personalities when compared with non-type D personalities. EAT-26 scores were not significantly different among type D and non type D individuals. Physical health score, psychological health, social relationships and environmental scores were lower in type D personalities when compared with non-type D personalities. However, the difference was not statistically significant. In conclusion, there was a significant higher level of stress, impaired autonomic function in individuals with type D personality during pre examination period. Eating behavior and quality of life was not significantly different among type D and non type D personalities. We recommend further detailed, multi centre studies to understand and to develop effective coping mechanisms for management of type D personalities in general.

**Key words:** Examination stress; type D personality; Dental students; Quality of life

## Introduction

Dental education was reported to be stressful and higher levels of stress were reported in dental students when compared with the general population of same age groups [1]. Long-term stress may causes deleterious effects on different body systems and reduces the physical and mental well being of the students, which further decrease their academic performance and quality of life [2]. Examination is a well known stressor to any student population and in dental education fear of failure was reported to be the most frequent cause of stress during the examinations. Hence, it is the need of time to diagnose the students who are highly stressed and help him to cope-up with the stress by

effective methods. Individuals with higher levels of negative affectivity (more negative feelings) and social inhibition (those do not share the emotions with others) are labeled as Type D personality [3]. Higher levels of depression, anxiety and stress were reported in Type D individuals when compared to non-type D [4]. Further, it was reported that the two components of type D personality are risk factors for development of coronary heart diseases. In these individuals the activity of sympathetic system was very high and the activity of parasympathetic system was decreased. This leads to increased activity of cardio vascular system and persistent hypertension that leads to cardio vascular disorders [5, 6]. It is well known that stress alters the eating behavior like change in the food preferences and eating food with

high calories etc. This results in increase in the body weight and body fat mass and eventually obesity [7, 8]. Prolonged and poorly managed stress leads to increase in the cortisol levels which are responsible for alteration in the eating behavior [8]. High levels of stress effects all the systems of the body and deteriorates the body functioning and decreases the quality of life [9,10].The present study was undertaken to observe the effect of examination stress on autonomic functions, eating behavior and quality of life in dental students with type D personality.

## Materials and Methods

### Study population

64 apparently healthy students belonging to the first year of the BDS course, who were willing to participate voluntarily, were included in the study. Students suffering from any diseases, those under any kind of therapy or treatment or practicing any stress management method were excluded from the study. After recruiting to the study, one copy of DS-14 questionnaire (questionnaire to assess Type-D personality) was given to the students and they were asked to fill it and handover to the researchers. Based on the scores of the questionnaires, they were grouped into Type-D and Non-Type D. The grouping was not disclosed to students in the group, however, the details was informed them individually after collection of data and also started training them with effective coping methods. After grouping them, rest of the data was collected using standard methods mentioned in the literature. Data was collected during pre examination period that is 48 hours before the practical examinations.

### Study setting

The present cross-sectional study was conducted at Department of Physiology, Vishnu dental college, Bhimavaram, West Godavari District, Andhra Pradesh.

### Assessment of stress

Stress levels were assessed by using a perceived stress scale which is standard questionnaire [11].

### Assessment of autonomic functions

Blood pressure and heart rate was recorded using JSB fully automatic upper arm style Blood Pressure Monitor (Model: DBP05 digital arm BP monitor).

### Eating behavior

The EAT-26 was used to assess the eating behavior [12].

### Assessment of quality of life

The WHOQOL BREF questionnaire is used to assess the quality of life [13]. This was a standardized tool to assess quality of life prepared by World Health Organization. Prior permission was obtained to use the questionnaire from WHO.

### Ethical consideration

The study was approved by the Scientific Review Board of Vishnu Dental College, Bhimavaram. Written informed consent was obtained from all the participants after explaining the need of the study and clarifying their doubts. Confidentiality of the data was ensured.

### Data analysis

Data was analyzed using SPSS 20.0. Student t test was used to observe the significance of difference between the groups. P value less than 0.05 was considered as significant.

## Results

Table 1 presents the demographic data of the participants. There was no significant difference in the demographic data of type D and non type D individuals. Table 2 presents data of perceived stress, Blood Pressure, heart rate, EAT-26. Perceived stress score was significantly high in type D personalities when compared with non-type D personalities ( $P < 0.05$ ). Systolic BP ( $P < 0.05$ ), Diastolic BP ( $P < 0.001$ ) and heart rate ( $P < 0.001$ ) was significantly higher in type D personalities when compared with non-type D personalities. EAT-26 scores were not significantly different among type D and non type D individuals. Physical health score, psychological health, social relationships and environmental scores were lower in type D personalities when compared with non-type D personalities. However, the difference was not statistically significant.

**Table 1:** Demographic data of the participants

Parameter	Type- D	Non-Type-D	P value
Age (years)	18.62±1.44	19.21±2.12	0.1976
Height (cm)	156.4±3.28	158.29±4.96	0.0771
Weight(kg)	52.43±4.72	53.38±2.12	0.3030

Data was presented as mean ±SD. \*  $P < 0.05$  is significant, \*\* $P < 0.01$  is significant, \*\*\* $P < 0.001$  is significant.

**Table 2:** Perceived stress, autonomic functions and eating behavior among Type D and Non Type D personalities

Parameter	Type- D	Non-Type-D	P value
Perceived stress score	21.06±6.82	16.94±5.55	0.01*
Systolic BP (mmHg)	129±16.17	119±18.24	0.0236*
Diastolic BP (mmHg)	82±13.44	69±15.6	0.0007***
Heart rate (beats/min)	92±6.12	74±8.48	0.0001***
Eat-26	18.06±10.10	15.44±7.72	0.2474

Data was presented as mean ±SD. \*  $P<0.05$  is significant, \*\* $P<0.01$  is significant, \*\*\* $P<0.001$  is significant.

**Table 3:** Quality of life among Type D and Non Type D personalities

Parameter	Type- D	Non-Type-D	P value
Physical health score (T1)	67.78±12.22	70.28±10.50	0.3835
Psychological score (T2)	52.84±8.08	56.25±7.98	0.0949
Social relationship score (T3)	63.19±12.91	65.81±11.44	0.3925
Environmental score (T4)	63.25±13.97	64.38±12.99	0.7398

Data was presented as mean ±SD. \*  $P<0.05$  is significant, \*\* $P<0.01$  is significant, \*\*\* $P<0.001$  is significant.

## Discussion

Personality plays a key role in the professional education as it specifies the relationship and behavior of an individual with his co-workers, patients and students. Type D personality is specific as it has higher levels of negative emotions and also social inhibition. Hence, it must be diagnosed in early stages to prevent further damage to the body systems. The prevalence of type D personality was reported to be 31.3 percentages in professional students [23]. The morbidity and mortality related to cardiac disorders was reported to be higher in type D personality when compared to general population [14]. In fact, it was reported that the prevalence of cardiac diseases is 4.7 times greater in type D personalities when compared with non-type D [15]. Earlier studies reported that the activity of sympathetic system was higher and activity of parasympathetic system was decreased leading to autonomic imbalance [16]. Examinations are considered as natural stress for all students. In the present study we have used standardized scale DS14 to identify the individuals with type D personality and observed the stress, autonomic functions, eating behavior and quality of life and compared with non type D personality during examination period. There was significantly higher stress and higher blood pressure and heart rate in type D individuals. Eating behavior scores was not significantly different among type D and non-type D individuals. The scores of four domains of quality of life was lower in type D personalities, however, the difference was not statistically significant. This may be due to lower sample size.

Earlier studies reported that the type D personalities have higher levels of stress and they practices mal coping methods to relieve stress like withdraw from the competition or course and resignation from job. These methods will further increases stress levels and may leads to burnout. It was reported that in type D individuals there was poor glucose regulation, systemic

inflammation and impaired autonomic functions [17]. Further there was sleep disturbances and lack of social support in type D personalities [17]. Interestingly, it was reported that insomnia was associated with decreased heart rate variability and disturbed autonomic balance [18]. The present study results support these studies as we have observed significantly higher BP and heart rate in type D individuals. Impaired autonomic functions was further related to less context appropriate emotional responses, social threat and social anxiety [19,20]. Further, decreased vagal activity also contributes to poor health outcomes in type D individuals. Vagus nerve innervates different systems of the body and transmits the information about the immune status and blood glucose levels [18]. Earlier studies reported that type D personality individual's posses more unhealthy behavior and less healthy behavior when compared with general population [21]. As there is impairment in autonomic functions the type D individuals may not be able to regulate the visceral functions effectively and this has a negative impact on homeostasis and contributes in decrease in the quality of life. It was reported that there was decrease in the quality of life in type D personality individuals when compared with healthy individuals [22]. Hence, changing the life style may improve the quality of life in these individuals. As type D personalities has higher stress at rest itself, during the examinations it may still increases and provoke them to adopt mal coping methods like alcohol consumption or sometimes suicides. Hence, it is need of time to consider the assessment of type D personality and help them to cope up with effective methods.

## Limitations

A significant limitation of the current study is lower sample size and study was conducted at one centre, which limits generalization of the results.

## Conclusion

In conclusion, there was a significant higher level of stress, impaired autonomic function in individuals with type D personality during pre examination period. Eating behavior and quality of life was not significantly different among type D and non type D personalities. We recommend further detailed, multi centre studies to understand and to develop effective coping mechanisms for management of type D personalities in general.

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