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## USAGE OF “SOFT ENHANCERS” FOR COGNITIVE ENHANCEMENT AMONG DENTAL STUDENTS- A SURVEY

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### Abstract

**Aim:** To investigate the dental student's attitudes towards the usage of “soft enhancers” for cognitive enhancement purposes.

**Methods:** A survey on the usage of “soft enhancers” consisted of a questionnaire with 15 questions was distributed among 105 undergraduates in a private hospital. The responses were obtained through the website SurveyPlanet.com and the results were analysed and the percentage was calculated.

**Results:** The survey that was conducted had the most response from 16-19 years olds (48.6%). In regards to it's usage, coffee with a high percentage of 77.1% was the most that is used by them. This is followed by energy drinks (48.6%), vitamin supplement (48.6%), herbal drinks (23.8%), caffeine tablets (3.8%) and tonics (3.8%). In all of the many reasons to use these substances, the main purpose for a majority (56.2%) of them was to improve and extend their learning. However, almost a three quarters (80.0%) of the participants agree that they only somewhat enhance their cognitive abilities while only 5.7% truly believe that there was a higher improvement.

**Conclusions:** Compared to other forms of PCEs such as prescription drugs and recreational drugs, soft enhancers are more acceptable to the public given that it's effects are at an average. The results of this study hints that there will definitely be an increase of usage in the future as well as more advanced studies to better it's function.

**Keywords:** Cognitive enhancement, Soft enhancers, Learning

### Introduction

The constant need to enhance our capabilities as human beings has been an ongoing strive throughout human civilization<sup>[1]</sup>. The initial form of enhancement; both mentally and physically have introduced the human race to primitive tools, language, the ability to write<sup>[2,3]</sup>. In the 21<sup>st</sup> century, human enhancement (HE) gives importance on

expanding the human potential above average rendering it possible and very much desirable<sup>[4, 5]</sup>. Pharmacological

Cognitive Enhancement (PCE); can be defined as the increase in normal neurocognitive capability through pharmacological methods; aiming to enhance the psychological ability of a physically healthy individual<sup>[6]</sup>. PCEs include prescription drugs, recreational drugs and soft enhancers<sup>[7-10]</sup>. Soft enhancers are substances that are easily accessible; which includes caffeine tablets, vitamin supplements, energy drinks, coffee, herbal drinks and tonics<sup>[9, 10]</sup>.

Eventhough the usage of drugs for cognitive enhancement have peaked, there are still various concerns regarding its usage both in terms of ethical and health reasons. For students, it is of concern because it is considered to be an unfair advantage<sup>[11-13]</sup>; similar to that of doping in sports<sup>[14]</sup>. The first case of drug misuse was recorded in the United States<sup>[15-17]</sup>. Recently, various European studies have been conducted to study the usage of PCE in students specifically<sup>[18-20]</sup>. Therefore, it was of main interest to explore the usage of PCE amongst dental students in India.

## Materials and Method

### Survey and Participants

The participants were asked to answer an online questionnaire in regards to their perception about the usage of “soft enhancers”. Before answering the questions, they were briefly acquainted with what exactly were soft enhancers and were informed beforehand that despite their experience with its usage, we would like to know their perception towards it. A validated questionnaire was used for the survey. A total of 15 questions were provided through SurveyPlanet.com

## Results

### Participant Characteristics and Awareness

The participants characteristics are recorded and presented in **Table 1**. In this study, a total of 105 students have participated in the questionnaire. Most of the participants are in the age group of 16-19 years old (48.6%) and 20-23 years old (40.9%) [**Figure 1**]. In terms of gender, more females (60.9%) have participated in this study compared to males [**Figure 2**].

**Table-1:**

Characteristics	Level	Frequency	%
Age (years)	16- 19	51	48.6
	20-23	43	40.9
	24-27	11	10.5

Gender	Female	64	60.9
	Male	41	39.0
Awareness of PCE prescription drugs	Ritalin	7	6.7
	Modafinil	16	15.2
	Methylphenidate	16	15.2
	Antidepressants	85	80.9
	None of the above	14	13.3
Awareness of PCE recreational drugs	Cannabis	35	33.3
	Cocaine	78	74.3
	Amphetamine	37	35.2
	Alcohol	95	90.5
	None of the above	1	0.95
Awareness of “soft enhancers”	Yes	95	90.5
	No	10	9.5
“Soft enhancers” used	Caffeine tablets	4	3.8
	Vitamin supplements	39	37.1
	Energy drinks	51	48.6
	Coffee	81	77.1
	Herbal drinks	25	23.8
	Tonics	4	3.8

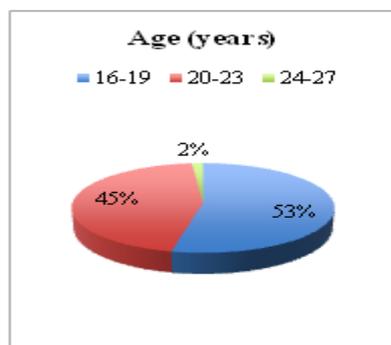


Figure 1

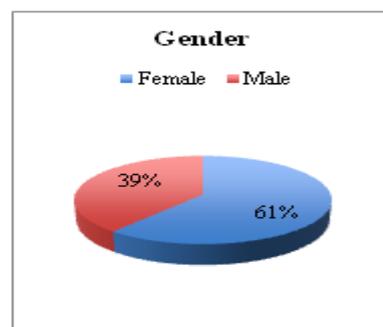


Figure 2

When the participants were asked about the awareness about PCE prescription drugs, 80.9% of them are aware of the existence of antidepressants while only 6.7% knew of ritalin[Figure 3]. On the other hand, more participants were aware of the usage of recreational drugs such as cocaine (74.3%) and alcohol (90.5%)[Figure 4]. Comparing to these both forms of cognitive enhancers, soft enhancers has most awareness; where a total of 90.5% were aware of these substances[Figure 5]. In regards to it's usage, coffee with a high percentage of 77.1% was the most that is used by them. This is followed by energy drinks (48.6%), vitamin supplement (48.6%), herbal drinks (23.8%), caffeine tablets (3.8%) and tonics (3.8%)[Figure 6].

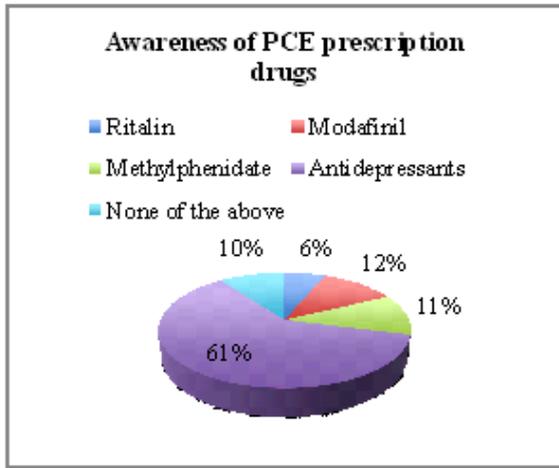


Figure 3

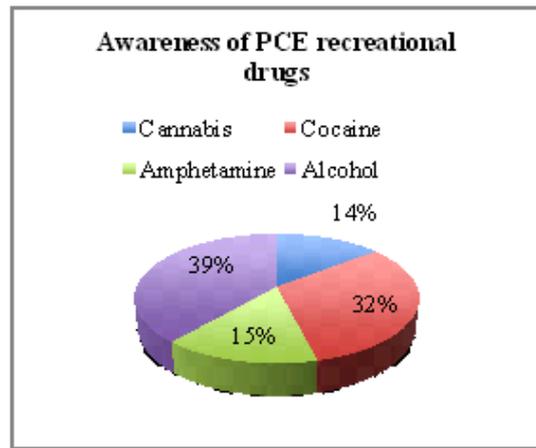


Figure 4

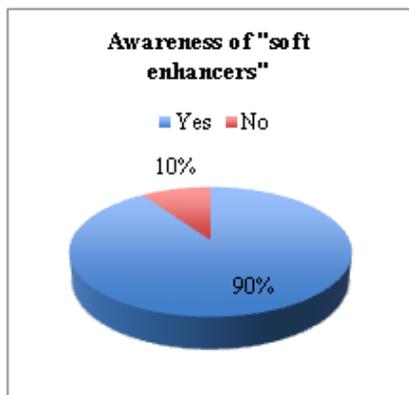


Figure 5

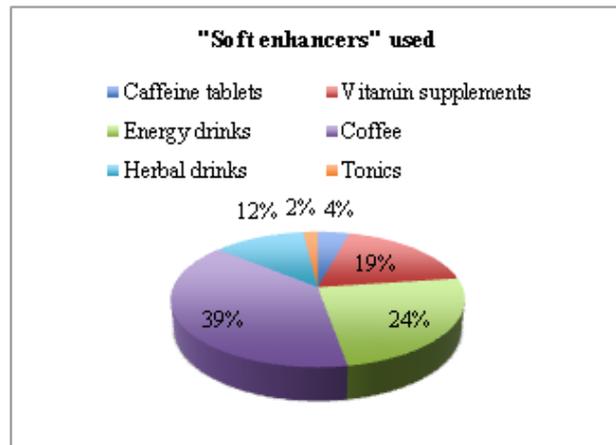


Figure 6

### Attitudes and perception towards soft enhancers

Based on the students own experience of "soft enhancers", they were asked about their intake on its function. These data was recorded in Table 2. In all of the many reason to use these substances, the main purpose for a majority (56.2%) of them was to improve and extend their learning [Figure 7]. In regards to the frequency of the usage of these substances, about 33.3% of the participants use soft enhancers nowadays while 30.5% have tried it a few times in the past. However, interestingly, a large number (30.5%) also have stopped using it but have admitted to use these

substances regularly in the past [Figure 8]. One of the main reason why such substances were introduced was to help

in improving the cognitive capabilities of people. However, almost a three quarters (80.0%) of the participants agree

that they only somewhat enhance their cognitive abilities while only 5.7% truly believe that there was a higher

improvement[Figure 9]. As students, there were some concern whether it was acceptable to take such substances.

Thus, we asked them about their own personal thoughts about it and almost half (47.6%) of them believed that its

intake is acceptable as long as it was controlled and monitored[Figure 10].

**Table-2:**

pic	Level	Frequency	%
Frequency of using “soft enhancers”	Have never tried it and not interested in doing so	3	2.8
	I have never tried it but have considered in doing so	7	6.7
	I tried a few times in the past	32	30.5
	I use it regularly in the past	28	26.7
	I use it nowadays	35	33.3
Primary purpose of usage	To perform better during exams	14	13.3
	To cope with stress	13	12.4
	To improve and extend learning	59	56.2
	For relaxing and to promote better sleep after a stressful day	16	15.2
	For fun	3	2.8
Opinion on how it improves cognitive	Not really	14	13.3
	Somewhat	84	80.0

capabilities	Very much	6	5.7
General opinion about the usage of "soft enhancers" amongst students	Not acceptable	1	0.95
	Normally acceptable and unproblematic	18	17.1
	Acceptable as long as it is safe	27	25.7
	Acceptable as long as it is controlled and monitored	50	47.6
	Acceptable as long as it has no side effects	9	8.6

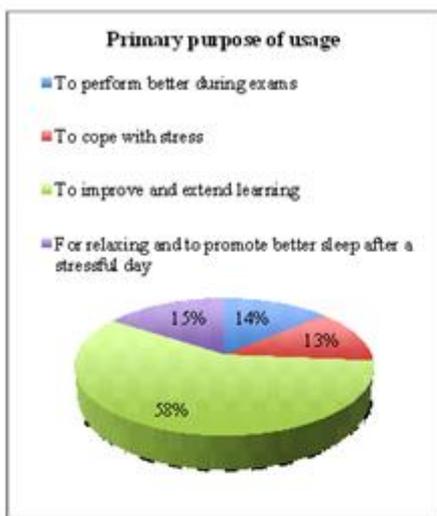


Figure 7

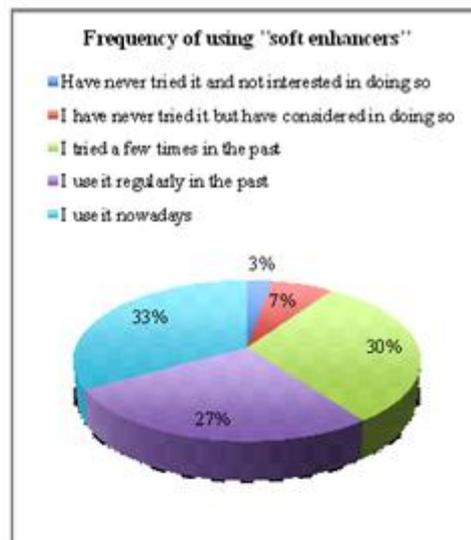


Figure 8

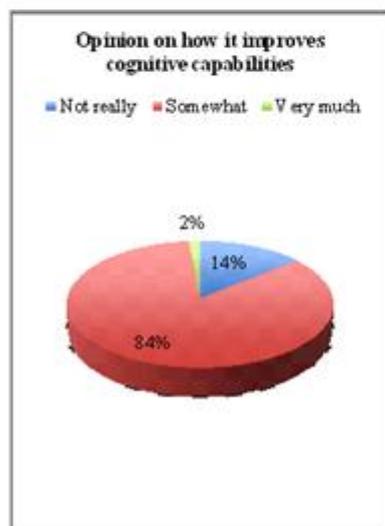


Figure 9

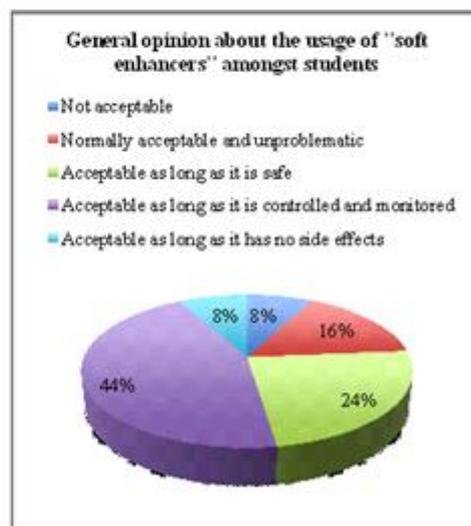


Figure 10

**Life situation and future possibilities**

To further understand what makes the usage of soft enhancers popular among students, we decided to direct a few questions concerning their current life situation as it may be related to each other. Since this study is directed towards undergraduates, performance in their studies can be of main priority to them and stress at often times can be a common setback especially in a studying environment. As much as 43.8% of the participants have agreed upon the fact that friends were the main cause of any performance pressure they have experienced throughout their studies. Which is then followed by family (25.7%), university (12.4%) and the society (11.4%) [Figure 11]. Interestingly, for them, having a good performance in university was was not a main priority as 75.2% of them have agreed to this statement[Figure 12]. In terms of their satisfaction in their current lifestyle, most (74.8%) have agreed upon the fact that it was somewhat satisfying[Figure 13]. Regarding the future of these substances, almost all (92.4%) of the participants were sure that there should be more effort and investments for the development of even better “soft enhancers”[Figure 14]. In regards to this, there is no doubt that 96.2% of them have said that there will be an increase of its usage in the near future[Figure 15].

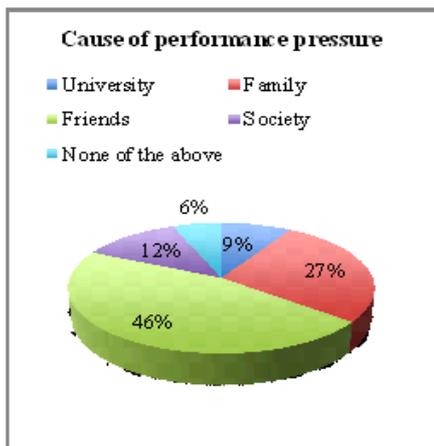


Figure 11



Figure 12

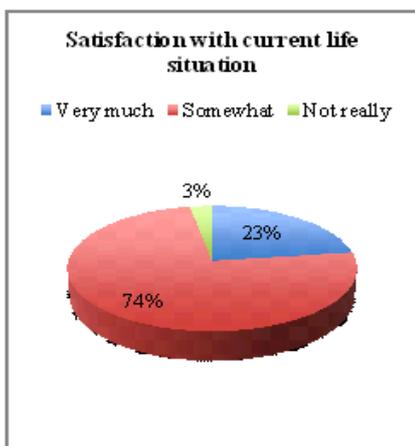


Figure 13

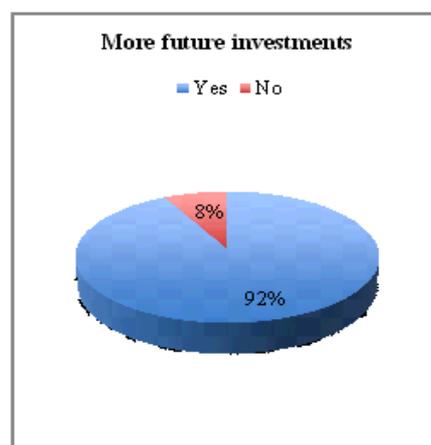


Figure 14

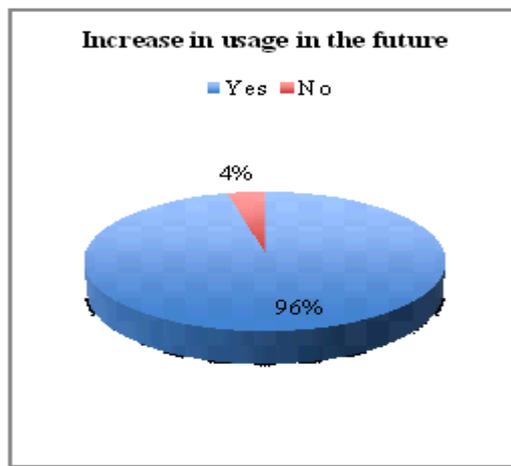


Figure 15

Table-3:

Topic	Level	Frequency	%
Cause of performance pressure in studies	University	13	12.4
	Family	27	25.7
	Friends	46	43.8
	Society	12	11.4
	None of the above	6	5.7
Whether a good performance in studies is an important factor	Very much	16	15.2
	Somewhat	79	75.2
	Not really	10	9.5
Satisfaction with current life situation	Very much	24	22.8
	Somewhat	78	74.3
	Not really	3	2.8
More future investments for soft enhancers	Yes	97	92.4
	No	8	7.6
Increase in usage of soft enhancers in the future	Yes	101	96.2
	No	4	3.8

## **Discussion**

This study that was conducted mainly investigates the attitudes and the motives for the usage of cognitive enhancers among dental students in a private college in Chennai. Based upon the questionnaire that was conducted, the most significant finding was that it was clear that at least one of the soft enhancers were used by these students. Out of the three sub groups of cognitive enhancers, soft enhancers were chosen as it was more readily available to the public especially to students. However, to further investigate the knowledge of these students about cognitive enhancers, they were asked about their awareness on prescription drugs and recreational drugs also used for cognitive enhancement purposes. It was clear that prescription drugs were the least known by students though some of the recreational drugs especially alcohol and cocaine were highly familiar to them. The results of our study was very much similar to a study done on secondary students in Switzerland, whereby the most commonly used soft enhancers were also coffee (64.3%) and energy drinks (75.4%). It was found that caffeine tablets were also not prevalent for the students (4%). Among the students, the main purpose of the usage of CE was to stay awake and improve their concentration. In regards to their academic performance, apprenticeship was the number one reason for having experience any performance pressure which is opposite to our study where friends were the main reason towards the pressure. Amongst the PCE users, only 12.9% of them were truly satisfied with their current life situation whereas 54.6% were only mildly satisfied with it<sup>[21]</sup>. Our results were prone to a few number of limitations. Firstly, the number of students who did participate in this survey was only of a small amount which limits an in depth understanding of PCE usage among dental students. Another thing is that there may be a possibility that some of the questions were not answered honestly given the fact that in the earlier questions substances such as cocaine and cannabis were included and they are less socially acceptable.

## **Conclusion**

Ultimately, at the end of this study, it was clear that soft enhancers have at least once been used for the purpose of enhancing the cognitive ability. Since these substances are readily available to the public, it was more commonly used by people especially students. Especially in the modern world, were caffeine specifically is popular in many commercials<sup>[22]</sup>.

Compared to other forms of PCEs such as prescription drugs and recreational drugs, soft enhancers are more acceptable to the public given that it's effects are at an average. The results of this study hints that there will definitely be an increase of usage in the future as well as more advanced studies to better it's function.

## Acknowledgements

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