

## To Evaluate the Preferred Method of Nicotine Consumption and the Effect of Its Addiction on Health

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### Abstract

**Background and Objectives:** India is the second most populous country with more than 50% of the population less than 25 years of age. The country is the largest consumer and producer of nicotine in the world where the prevalence of smoking amongst school and college students and young adults is between 6.9% to 22.5%. Along with the conventional methods of nicotine consumption such as cigarettes, beedis, pan and gutkha, newer methods such as vape pens and JUULS in the market increase the health risk as they contain more percentage of nicotine than conventional methods. The study also helped to assess if the subjects are aware of Nicotine Replacement Therapy and if they have undergone counselling or are willing to. The study gives an insight to the whether the subjects understand the hazards of consumption. The purpose of this study is to evaluate the preferred method of nicotine consumption by the youth and to better understand the deteriorating health conditions associated with this tobacco epidemic.

**Method:** A total of 250 subjects, ranging from age 18-25 years (divided into groups of three- A being 18-21 years old, B being 21-23 years old and C being 24-26 year olds) present in VK Institute of Dental Sciences and surrounding areas, who have means and access to various forms of nicotine consumption, had been asked to take part in an anonymous (they were only asked to age, gender and their preferred method of consumption with the type and frequency) survey. Data that was collected was entered in frequency distribution tables in excel sheets and subjected to statistical analysis. Descriptive statistics and Chi square test (using spreadsheet software) is applied.

**Result:** The present study included a total of 250 subjects of all genders (selection was not based on religion, caste, racial or social status) that has access and means to consume nicotine and tobacco and was asked to anonymously fill a survey. Out of that, 68% said they preferred conventional methods of tobacco consumption with Belgaum coming under Karnataka tobacco belt- as it is more easily accessible and cheaper and more satisfying than electronic methods which holds within reason as compared to a study conducted about electronic cigarette experimentation and discontinuation amongst youth<sup>6</sup>. Subjects also chose to buy single cigarettes or packets of pan/gutkha as they say it is easier to quit if and when they want to. While less than 20% admitted preferring electronic methods stating that the reason of this choice was, although much more expensive to buy, it is cheaper in the long run and easier to use in classrooms as it looks like flash drives/pen drives and comes in different flavors with a higher nicotine content that directly dissolves into the blood stream (as it is in the form of vapor).

**Conclusion:** The study helped to check the rising trends in nicotine consumption in the current generation and their attitude and behaviour towards newer methods of consumption (e-cigarettes, JUULS) as compared to the conventional methods. It was found that overall, more number of participants (68%) preferred conventional methods of nicotine consumption with an increase in number of females who consume. Most of them considered themselves chippers and/ or non daily smokers. Almost all subjects were aware about the harmful effects of smoking but more than half of the subjects were not aware of Nicotine Replacement Therapy (NRT) and its uses.

**Keyword:** Nicotine consumption; Vape pens, JUULS; Health risk nicotine consumption; Consumption in India; forms of consumption.

## Introduction

India is one of the fastest growing populations in the world, threatening to overtake China as the most populous country in the next decade, with majority of its working citizens coming under the age of 25 years.<sup>1</sup> India is the third largest tobacco and nicotine producing country in the world as of 2017 (first and second being China and Brazil respectively) producing nearly 800,000 metric tonnes or 240m kgs compiling a total of 278.2 billion rupees annually.<sup>2</sup> The country also holds second place in consumer of nicotine products.

According to World Health Organisation, India constitutes of nearly 12-15% of world smokers which is approximately 120 million smokers, many of which lie in the age group of 18-25 years.<sup>3</sup> More than 80% of children have admitted using some form of nicotine while still in school (age group 12-17 years) and more than 65% are still using those products in colleges, universities and their respective jobs. Nicotine usage in adolescents and youth has reached pandemic levels with over 20 million children being addicted and 5500 users being added every day. Prevalence of smoking in school and colleges is in the range of 6.9-22.5% (according to National Sample Survey Organisation – Government of India).<sup>4</sup>

The nicotine problem in India is peculiar one as compared to the countries in the west as a wider variety of products are manufactured and consumed. Along with the old and conventional methods (cigarettes, beedis, gutkha, pan), with the rise of technological advancements, newer forms of consumption are rapidly making an appearance in the market in the form of vape pens, e-cigarettes making it difficult to combat the rising deteriorating health conditions associated with it as JUULs, Vape pens have a higher nicotine content than conventional nicotine consumption methods as they directly dissolve in the blood stream.<sup>5</sup>

The purpose of this study is to evaluate the preferred method of nicotine consumption amongst the Indian Youth – the millennials and the generation Z, the reason of their consumption and to evaluate their understanding of the various medical conditions associated with consumption.

## Methodology

Subjects between the ages of 18-25 years of age were selected (not subjected to gender, religion, racial and social bias) from KLE VK Institute of Dental Sciences and surrounding colleges and institutions and were asked to fill a survey related to the study anonymously using the Google Forms-Build Your Own Survey. The study was critically evaluated and approved by the Research and Ethics Committee of K.L.E. Vishwanath Katti Institute of Dental Sciences, Belgaum.

### *Method of Selection of Data*

Subjects are in age group of 18-25 years (with no regard to gender, religion, and racial and social status) present in the college and surrounding areas and were asked to take part in anonymous survey. Total number of subjects included in this study to be 250.

### *Selection Criteria*

#### *Inclusion criteria*

Subjects were of age 18 to 25 years of all genders and have means and availability of consuming tobacco.

#### *Exclusion criteria:*

Subjects below the age of 18 years and above the age of 25 years were not asked to participate

### *Statistical Analysis:*

Data was organised in frequency distribution table. Data was entered in Excel sheets and was subjected to statistical analysis. Descriptive statistics and Chi square test were applied using spreadsheet software.

## Results

It was found that overall, more number of participants (68%) preferred conventional methods of nicotine consumption with an increase in number of females who consume. Most of them considered themselves chippers and/ or non daily smokers. Almost all subjects were aware about the harmful effects of smoking but more than half of the subjects were not aware of NRT and its uses.

**Table 1:** Conventional Vs Electronic/Modern Methods.

		Cigarettes	Pan/ Gutkha	Gums/ Patches	Beedis	Hookahs	E - Cigarettes	Smokeless	Chi-Square	df	P value
Conventional	Count	120	8	12	3	18	18	1	39.937	14	.000
	% of Total	47.6%	3.2%	4.8%	1.2%	7.1%	7.1%	0.4%			
Electronic	Count	29	9	5	3	7	15	4			
	% of Total	11.5%	3.6%	2.0%	1.2%	2.8%	6.0%	1.6%			
Total	Count	149	17	17	6	25	33	5			
	% of Total	59.1%	6.7%	6.7%	2.4%	9.9%	13.1%	2.0%			

**Table 2:** Age.

		Cigarettes	Pan/ Gutkha	Gums/ Patches	Beedis	Hookahs	E - Cigarettes	Smokeless	Chi - Square test	df	P value
18 - 20	Count	18	3	6	3	8	7	1	29,556	14	0.009
	% of Total	7.1%	1.2%	2.4%	1.2%	3.2%	2.8%	0.4%			
21 - 23	Count	87	6	6	3	10	11	0			
	% of Total	34.5%	2.4%	2.4%	1.2%	4.0%	4.4%	0.0%			
24 - 26	Count	44	8	5	0	7	15	4			
	% of Total	17.5%	3.2%	2.0%	0.0%	2.8%	6.0%	1.6%			
Total	Count	149	17	17	6	25	33	4			
	% of Total	59.1%	6.7%	6.7%	2.4%	9.9%	13.1%	1.6%			

**Table 3:** Gender.

		Cigarettes	Pan/ Gutkha	Gums/ Patches	Beedis	Hookahs	E - Cigarettes	Smokeless	Chi-Square	Df	P value
Female	Count	62	4	9	2	11	14	3	14.448	14	.417
	% of Total	24.6%	1.6%	3.6%	0.8%	4.4%	5.6%	1.2%			
Male	Count	78	9	8	3	13	17	2			
	% of Total	31.0%	3.6%	3.2%	1.2%	5.2%	6.7%	0.8%			
Prefer Not to Say	Count	9	4	0	1	1	2	0			
	% of Total	3.6%	1.6%	0.0%	0.4%	0.4%	0.8%	0.0%			
Total	Count	149	17	17	6	25	33	4			
	% of Total	59.1%	6.7%	6.7%	2.4%	9.9%	13.1%	2.0%			

**Table 4:** Types of Consumers.

		Cigarettes	Pan/ Gutkha	Gums/ Patches	Beedis	Hookahs	E - Cigarettes	Smokeless	Chi-Square	Df	P value
Chipper	Count	57	5	8	4	11	10	4	49.532	35	.053
	% of Total	22.8%	2.0%	3.2%	1.6%	4.4%	4.0%	1.6%			
Light Consumer	Count	12	1	0	0	1	2	1			
	% of Total	4.8%	0.4%	0.0%	0.0%	0.4%	0.8%	0.4%			
Light and Intermediate	Count	14	2	4	0	3	1	0			
	% of Total	5.6%	0.8%	1.6%	0.0%	1.2%	0.4%	0.0%			
Q4 Non Daily	Count	27	6	2	0	8	4	0			
	% of Total	10.8%	2.4%	0.8%	0.0%	3.2%	1.6%	0.0%			
Moderate	Count	24	1	2	0	1	4	0			
	% of Total	9.6%	0.4%	0.8%	0.0%	0.4%	1.6%	0.0%			
Heavy	Count	15	2	0	1	1	12	0			
	% of Total	6.0%	0.8%	0.0%	0.4%	0.4%	4.8%	0.0%			
Total	Count	149	17	16	5	25	33	4			
	% of Total	59.6%	6.8%	6.4%	2.0%	10.0%	13.2%	2.0%			

Table 5: Frequency of Consumption.

		Cigarettes	Pan/ Gutkha	Gums/ Patches	Beedis	Hookahs	E - Cigarettes	Smokeless	Chi- Square	Df	P value
Rarely	Count	39	3	6	3	19	13	4	71.984	28	.000
	% of Total	15.5%	1.2%	2.4%	1.2%	7.5%	5.2%	1.6%			
Never	Count	6	2	2	2	0	2	1			
	% of Total	2.4%	0.8%	0.8%	0.8%	0.0%	0.8%	0.4%			
Often	Count	24	3	6	0	4	2	0			
	% of Total	9.5%	1.2%	2.4%	0.0%	1.6%	0.8%	0.0%			
Once Every Few Days	Count	34	4	2	0	1	4	0			
	% of Total	13.5%	1.6%	0.8%	0.0%	0.4%	1.6%	0.0%			
Multiple Times A Day	Count	46	5	1	1	1	12	0			
	% of Total	18.3%	2.0%	0.4%	0.4%	0.4%	4.8%	0.0%			
Total	Count	149	17	17	6	25	33	4			
	% of Total	59.1%	6.7%	6.7%	2.4%	9.9%	13.1%	1.6%			

## Discussion

The present study included a total of 250 subjects of all genders (selection was not based on religion, caste, racial or social status) that has access and means to consume nicotine and tobacco and was asked to anonymously fill a survey. Out of that, 68% said they preferred conventional methods of tobacco consumption (as seen in table 1 which is a compilation of preferred method of nicotine consumption in 250 subjects) with Belgaum coming under Karnataka tobacco belt- as it is more easily accessible and cheaper and more satisfying than electronic methods which holds within reason as compared to a study conducted about electronic cigarette experimentation and discontinuation amongst youth 6 (Reasons for Electronic Cigarette Experimentation and Discontinuation Among Adolescents and Young Adults- July 2105) which stated that the rise of electronic methods was due to their appealing flavours, peer pressure and experimentation.<sup>18</sup> Subjects also chose to buy single cigarettes or packets of pan/gutkha as they say it is easier to quit if and when they want to. While less than 20% admitted preferring electronic methods stating that the reason of this choice was, although much more expensive to buy, it is cheaper in the long run and easier to use in classrooms as it looks like flash drives/pen drives and comes in different flavors with a higher nicotine content that directly dissolves into the blood stream (as it is in the form of vapor).<sup>19</sup>

Subjects were between the ages of 18-26 years and were divided into groups of three, with group A consisting of ages 18-21 years (17.9%) ; group B has ages between 21-23 years (49.6%) and group C has ages between 24-26 years (32.9%) as seen

table 2 (which is a compilation of different method of nicotine consumption amongst different age groups of 18-26). It was seen that the most preferred method of nicotine consumption is through Cigarettes (59.1%) with Group A consisting of 7.1%, Group B consisting of 34.5% and Group C consisting of 17.5%. Electronic cigarettes and JUULs were only preferred by 2.8% of Group A, 4.4% of Group B and 6.0% of Group C with the total being 13.1%. The least preferred method was seen to be smokeless tobacco (total of all groups being 2.0%) which is different from the results given by a study conducted amongst Indian adolescents about nicotine and tobacco consumption.<sup>7</sup> (Tobacco used by Indian Adolescents) which states that Indian youth prefers smokeless tobacco and beedis more than cigarettes and does not have any relation with electronic methods.

Out of the 250 subjects- nearly 55.4% were males, 40.6% were females and 4% preferred not to specify their gender. Out of the total of cigarette consumers, it was seen that 24.6% were women, 31.0% were men and 3.6 % were those who chose to not specify their gender. Out of the total Electronic cigarettes consumers, it was seen that 5.6% were women, 6.7% were men and 0.8 were those who chose to not specify their gender (as seen in table 3 which shows the gender disparity between males and females with respect to the method of consumption). The perception that women do not smoke or consume less nicotine is a thing of the past and there is a rise in the percentage of young females smoking within the country as well as other nations as seen by the study conducted across seven cities in Europe based on smoking perceptions in different genders<sup>8</sup> (Smoking beliefs across genders, a comparative analysis of seven European countries.<sup>20</sup> BMC Public

Health 2019) which stated that even though girls understood the negative aspects better than the boys, the trend in schools which participated in the study showed a rise in the smoking amongst both genders.

Almost all the subjects were aware that consuming nicotine was harmful and were asked to give an estimate. The amount of nicotine content in conventional methods is about 1.25% to 1.50% though the quantity is higher in smokeless tobacco and beedis. There is 5% nicotine content in vape pens and JUULs, which is equivalent to one pack of cigarettes. Majority of them placed the nicotine content at the range of 26-30% and the least amount was placed between 46-50%. All three groups were however aware of most major forms and methods of nicotine consumption and have admitted to using one or more forms at least once. Most subjects admitted they consumed multiple times a day (18.3%). some of them have quit the habit (2.4%) while some admitted to consuming occasionally/often (9.5%). Many participants considered themselves to be either in the category<sup>9</sup> of 'chipper'-less than 5 times a day (22.8%) and the category of non daily consumers - less than 7 times per week (10.8%) but admitted to consuming several times a week by consuming once or twice in a day. Very few subjects considered themselves heavy smokers-that are more than 25 times per day (6.0%) as seen in table 4 (which depicts the classification of types of smokers according to rate of consumption) and table 5 (frequency of consumption of nicotine).<sup>10</sup>

Subjects were asked if they knew the harmful effects of consumption. Most of them replied in affirmative (86%) and gave multiple reasons such as oral cancer, respiratory problems such as COPD, bronchiogenic carcinoma, tremors in extremities, lack of appetite, weight loss, staining of teeth, malodor, pre malignant lesions and pathological changes in mucosa, neurological disorders, emphysema and infertility. This was compared with the findings from Global Adult Tobacco Survey based on perceptions of tobacco use<sup>10</sup> which stated that there was an increase in the awareness of effects of nicotine consumption with the highest awareness being that of lung cancer.

Subjects were asked the various reasons of the consumption and the most common answers were to relieve stress, habit formed due to peer pressure, easily accessible (in cases of conventional methods), non perishable (for electronic methods) and that it gives a sense of calmness.

Subjects were asked if they were aware of Nicotine Replacement Therapy (NRT) to which

most of them replied in negative (63%) which was consistent with the finding conducted about the awareness of NRT amongst dental students in Karnataka<sup>11</sup> (Knowledge and Perceptions Regarding Nicotine Replacement Therapy among Dental Students in Karnataka-JIOH) which stated that dental students are woefully unknowledgeable about NRT and its various products and therapy aids. Those who were aware of it were asked if they have tried it and if yes, they were asked to enumerate the different forms of NRT they have experienced. Majority of them replied that they have tried alternative methods in forms of patches and gums (55%) and the least preferred was taking services of a rehabilitation centre (2%).<sup>12</sup>

Subjects were asked if they would ever take therapy or counseling sessions to overcome the addiction or break the habit to which majority had a negative reply (55%).<sup>13</sup> This is because they believe that nicotine helps in dealing with everyday stressful lives and partly because they believe they can quit anytime they want to without seeking help or attention.<sup>14</sup>

## Conclusion

There is a constant threat of rise of deteriorating health conditions due to the sheer number of the youth who consume nicotine, with more being added in thousands every day. All genders are equally affected by it as they believe it helps them to alleviate daily stresses and help them navigate the channels of peer pressure.<sup>15</sup> Even if they know the toxic effects that accompany them, they are reluctant to break the habit as they don't want to discard the security that comes with it. Although electronic method gives higher nicotine content, it has been banned as of late in India, thus making the youngsters resort to conventional methods of consumption.<sup>16</sup> Considering that they are and will be the building blocks of the nation, it is highly needed to monitor the trends and usage of nicotine in various age groups as well as take important measures to monitor the rise of unchecked usage amongst the youth.<sup>17</sup>

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