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An empirical study of the use of Chewing Gum by Youth as a replacement to Cigarette addiction

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Abstract--The current study aimed to add to this of knowledge by examining the effect of chewing gum on smoking withdrawal severity over a long period, as well as identifying the specific characteristics of chewing gum that may be responsible for the reported reductions in withdrawal. Chewing, flavour, and the combination of the two were all investigated separately. The study is based on quantitative research. The data has been classified on basis of smoker and non-smoker. Participants reported a significant difference in withdrawal severity across conditions using repeated measures Chi square, $F(3, 69)=2.89$, $p.05$. The flavoured gum condition had considerably lower withdrawal scores than the flavourless gum base and no product control conditions, according to follow-up analyses. These data suggest that chewing gum is effective in reducing the severity of nicotine withdrawal symptoms over a 24-hour period of nicotine abstinence, and that the impact is due to a combination of flavour and chewing. These findings, together with findings from previous laboratory studies, show that chewing gum could be a useful coping mechanism for those who are trying to quit smoking. Identification of appropriate behavioural alternatives to cigarette smoking can help smokers learn more effective ways of coping in the absence of smoking and minimise the number of smokers who relapse. Chewing gum and other potential re-enforcers should be considered in future research.

Keywords---marketing strategies, chewing gum, cigarette smoking.

Introduction

Chewing gum can improve alertness and sustained attention, however the effects on stress vary depending on whether the stress is chronic or acute; see reviews by Allen and Smith [1] and Hirano and Onozuka [2]. Previous study has shown that chewing gum improves sustained attention performance [3, 4], which is compatible with chewing gum's alerting impact [4–6]. There is some evidence that time on work moderates this impact, with the ameliorating effect of gum being stronger after a long duration of performance [6, 7]. Gum improves sustained attention, according to neuropsychological evidence. Chirano et al. demonstrated this effect using gum with no flavour or odour, implying that chewing motor activity is a significant role in understanding these findings; nevertheless, it is unknown whether a higher degree of chewing motor activity may heighten any linked effects. Although there is evidence that more vigorous chewing or greater resistance to chewing has no effect on memory [14, 15], the fact that chewing gum can increase arousal, which is depleted by attention tasks (e.g., by increasing heart rate and beta power during vigilance) [9], suggests that more vigorous chewing could have a greater effect on attention. To investigate the long-term effects of chewing gum on well-being and performance in a realistic situation, we investigated the effects of chewing gum on well-being and performance over a single workday to see if the effects reported across longer intervention periods were still there. Chewing gum throughout the workday has been demonstrated to boost self-reported productivity in both university employees [16] and university students [17], associated with an improvement in sustained attention, which is compatible with an alerting impact of chewing gum under laboratory circumstances. Although chewing gum has been linked to an increase in heart rate in experimental investigations [9, 18], it is uncertain whether sympathetic nervous system arousal can explain improved performance in the real world.

Gum chewing has been around since at least Ancient Greece in various forms. Mastic gum, derived from the resin of the mastic tree, was chewed by the Greeks. [1] Gum-like substances manufactured from plants, grasses, and resins have been chewed by many other cultures. The American Indians chewed sap from spruce trees to make resin. This method was carried up by New England settlers, and in the early 1880s, attempts were made to commercialise spruce gum. Around 1850, a paraffin wax gum was produced, and it quickly surpassed spruce gum in popularity.

Literature Review

Composition and production

Between brands, the approximate manufacturing procedures are pretty consistent. The gum base is heated at 115°C (240°F) until it reaches the consistency of thick maple syrup, then filtered through a fine mesh screen. It is then purified further by centrifuge separation of dissolved particles and filtration.

The clear foundation is then poured into mixing vats while still hot and melted. Powdered sugar, whose amount and grain size determine the brittleness of the end product, corn syrup and/or glucose, which act as humectants, coat the sugar particles and stabilise their suspension, and keep the gum flexible, various softeners, food colorings, flavourings, preservatives, and other additives are all possible additions. The coated chewing gums are subsequently subjected to additional procedures. The chunks are coated in an optional undercoating for enhanced binding, then submerged in liquid sugar. After that, the pellets are coloured and coated with a suitable glazing agent, which is commonly wax. Gum coatings, glazes, and colours are frequently obtained from animal sources, such as resinous glaze derived from an insect or beeswax. Vegans, vegetarians, and others who don't want to eat animal products or have allergies should be aware of the restricted selection of non-animal derived gums on the market. Always check with the gum's maker for a complete list of components, including coatings, glazes, and colour suppliers.

Health claims

Early chewing gums were advertised as palliatives, with substances and aromas that were widely regarded as folk cures, such as licorice to ease the throat, clove to relieve toothache, and spearmint to settle the stomach and eliminate foul breath. Chewing gum, according to the Wrigley Science Institute, can help you lose weight, boost your concentration, and ease stress. Chewing gum has certain health benefits, which is unusual for a candy. While sugar in chewing gum causes tooth decay, research shows that eating sugar-free gum after meals may reduce the risk of dental decay. Cavity formation is likely prevented by chewing xylitol-containing gum. Chewing sugar-free chewing gum stimulates saliva production, and chewing after meals helps to neutralize the acidic effect on the teeth. Chewing gum's mechanical action can help to relieve irritation caused by variations in air pressure when flying.

Chewing gum, according to certain dental surgeons and orthodontists, can cause difficulties with the temporomandibular joint, and they advise people not to chew gum if they get headaches, muscle fatigue, or pain in their jaw after doing so. People who chewed throughout long-term and short-term memory tests scored much higher than those who did not. Gum chewing, on the other hand, had no effect on memory-linked reaction times, which are regarded as a measure of attentiveness. On immediate word recall tests, gum chewers scored 25% higher than the control group, and on delayed word recall tests, they scored 36% higher.

Gum and society

Chewing gum sticks to concrete and other hard surfaces and takes a lot of effort to get rid of — power washing is frequently required. The adhesive effect can be so powerful that it can remove food particles stuck between teeth or even a filling. Thousands of patches of dried, abandoned gum can be found strewn across city streets and train platforms. As a result, chewing gum sales have been forbidden in Singapore since 1992. Some varieties of chewing gum, such as nicotine replacement gums, have recently been allowed to be distributed under stringent

supervision. (For further information, go up Singapore's chewing gum ban.). These characteristics of chewing gum irritate some people:

- Observing people chewing for long periods of time without eating or swallowing. (It's been likened as a cow chewing its cud.)
- When people talk with chewing gum in their mouths, the speech becomes indistinct and distorted, especially when it is then subjected to other distortions, such as when it is relayed through a telephone or radio link.
- When little air bubbles are trapped in the gum and subsequently popped by continued chewing, some gum chewers generate a snapping or cracking noise, especially if this is a habit.
- As the teeth open, the vacuum between the gums and teeth is filled with air, resulting in a 'squishing' sound.
- The act of smacking one's lips while chewing gum. This, like other dishes, is deemed obnoxious and impolite.

Tobacco use among youth in India

Tobacco is used by Indian youth all around the country, with a lot of diversity between states. A tobacco product is used by two out of every ten males and one out of every ten girls. Before the age of ten years, there is an increase in the number of children who start using tobacco products. In India, there are around 240 million tobacco smokers aged 15 and up (195 million males and 45 million females). In industrialized countries, coronary heart disease (CHD) is the leading cause of premature death. As developing countries continue in their socioeconomic development, they are increasingly exposed to similar experiences. CHD is now well established to have a multifactorial aetiology.

Nicotine stimulation and carbon monoxide displacement of oxygen from haemoglobin are two major consequences of smoking on the cardiovascular system. Smoke also causes repeated toxic damage to endothelial cells, speeding up atherogenesis. Cigarette smoking is responsible for a significant fraction of all fatalities from coronary heart disease in people under the age of 65. It appears to play a key role in triggering sudden mortality in CHD patients, particularly in men under the age of 50. Each puff of tobacco absorbs 50 to 150 mcg of nicotine, or roughly 1 to 2 mg per cigarette, through the lungs and mouth mucosa. Those who quit smoking see a rapid decrease in risk and may eventually approach the risk level of nonsmokers.

Objectives

- To study the relationship between chewing gum and smoking in India.
- To investigate the long-term effects of chewing gum on well-being and performance among the youth
- Cigarette addiction and chewing gum have been linked in several studies.

Problem statement

- This topic is selected to research use of Chewing Gum by Youth as a replacement to Cigarette addiction

- The scales variable used to analysis the youth behavior (meditating variable) with relation between Chewing Gum (independent variable) and Cigarette addiction (dependable variable)

Limitations

- Time spend on the study is limited and thus is a major constraint.
- Area of research is limited to Mumbai places where the sample is collected and therefore cannot be taken as a universal sample is thus also a major constraint.

Research Methodology

Research design

The research conducted was descriptive and analytical, so a Survey method was used. A Survey was conducted through a structured questionnaire tested for reliability and data was collected throughout Mumbai.

Primary data

Primary data was collected randomly through the structured questionnaire in Mumbai, by using simple random sampling.

Sample size

The study was limited to those participants who willingly elected to complete the instruments in their entirety. There was a total of 125 respondents from educational institution among Mumbai which include teaching and administrative staff of institute. The sample to which the questionnaire was administered was based on random sampling techniques. The sample distribution was given in Table 1. Socio-Demographic profile

Parameters	Classification	Sample (N)	Percentage (%)
Gender	Male	74	59.2
	Female	51	40.8
	Total	125	100
Age (in years)	16-20	33	26.40
	21-25	79	63.20
	26 and above	13	10.4
	Total	125	100
Do you chew gum?	Yes	80	64
	No	45	36
	Total	125	100
Are you smoking?	Yes	63	50.40
	No	62	49.60
	Total	125	100

Table 1. Source: Primary data

Sample design

The researcher relied upon simple random sampling technique, considering the research methodology and research type as per guidelines. A caution was exercised during the study that the respondents who did not show inclination to be a part of the study were not covered.

Area of research

Mumbai.

Secondary data

The secondary information or data was collected from newspapers, research articles, magazine and websites.

Research instruments

A summated closed end questionnaire was used with different viewpoints of respondents. In this questionnaire, all the questions were positively framed to study the impact of independent variable on the dependent variable. Meditating effect on Independent and dependable variable are analysis on the basis of cause and effect of this scale variable.

Statistical analysis

Efficient and effective data analysis is the result of effective data preparation. This was found to be very crucial between the completion of the field work and the statistical processing of the collected data. Data preparation involved transferring the questionnaire into an electronic format which allowed and facilitated subsequent data processing. Data sheet was prepared directly at Statistical Program for Social Sciences (SPSS).

Hypothesis

- H1: There is no significant relationship between smoking and reasons for chewing gum.
- H2: There is no association between smoking and chewing gum.
- H3: Chewing gum does not help to keep your mind occupied

Data Analysis and Interpretation

H1: There is no significant relationship between smoking and reasons for chewing gum

Case Processing Summary			
	Cases		
	Valid	Missing	Total

	N	Percent	N	Percent	N	Percent
Are you smoking * In your opinion, do cigarette smokers have a higher consumption of chewing gum compared to 2n-smokers?	125	100.0%	0	0.0%	125	100.0%

Are you smoking * In your opinion, do cigarette smokers have a higher consumption of chewing gum compared to 2n-smokers? Crosstabulation					
		In your opinion, do cigarette smokers have a higher consumption of chewing gum compared to 2n-smokers?		Total	
		yes	No		
Are you smoking	yes	Count	63	0	63
		Expected Count	53.4	9.6	63.0
		% within Are you smoking	100.0%	0.0%	100.0%
		% within In your opinion, do cigarette smokers have a higher consumption of chewing gum compared to 2n-smokers?	59.4%	0.0%	50.4%
		% of Total	50.4%	0.0%	50.4%
	No	Count	43	19	62
		Expected Count	52.6	9.4	62.0
		% within Are you smoking	69.4%	30.6%	100.0%
		% within In your opinion, do cigarette smokers have a higher consumption of chewing gum compared to 2n-smokers?	40.6%	100.0%	49.6%
		% of Total	34.4%	15.2%	49.6%
Total		Count	106	19	125
		Expected Count	106.0	19.0	125.0
		% within Are you smoking	84.8%	15.2%	100.0%
		% within In your opinion, do cigarette smokers have a	100.0%	100.0%	100.0%

	higher consumption of chewing gum compared to 2n-smokers?			
	% of Total	84.8%	15.2%	100.0%

Chi-Square Tests					
	Value	Df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	22.767 ^a	1	.000		
Continuity Correction ^b	20.452	1	.000		
Likelihood Ratio	30.128	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	22.585	1	.000		
N of Valid Cases	125				
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.42.					
b. Computed only for a 2x2 table					

It was observed that brand of chewing is most popular in the market today, namely among the urban college going youth. For smokers the results were a close call between Wrigley's with 32%, Orbit 28% and Fusen gum with 28%. Whereas for the non-smokers the results were 32% opting for Wrigley's, 20% for Orbit and Happydent [same results] and 16% for Fusen gum, although in both categories Wrigley's had the highest consumer preference and Boomer had none. A chi-square analysis was conducted to examine the relationship of overall smoking status and chewing-gum status (non-gum chewer or chewer). No significant association between smoking status and chewing-gum status was detected, $\chi^2(1, N = 125) = .684, p < .05$. Hence Hypothesis is accepted at 95% confidence level that :

H2: There is no association between smoking and chewing gum.

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Do you think chewing gum is a substitute for smoking cigarettes? * Which brand of chewing gum do you consume	125	100.0%	0	0.0%	125	100.0%
Do you think	125	100.0%	0	0.0%	125	100.0%

chewing gum is a substitute for smoking cigarettes? * Do you chew gum to avoid smoking/an effort to quit?						
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Crosstab			Which brand of chewing gum do you consume					Total
			orbit	happydent	wrigley's	boomer	fusengum	
Do you think chewing gum is a substitute for smoking cigarettes?	Yes	Count	38	3	0	0	0	41
		Expected Count	12.5	17.1	3.6	2.3	5.6	41.0
		% within Do you think chewing gum is a substitute for smoking cigarettes?	92.7%	7.3%	0.0%	0.0%	0.0%	100.0%
		% within Which brand of chewing gum do you consume	100.0%	5.8%	0.0%	0.0%	0.0%	32.8%
	% of Total	30.4%	2.4%	0.0%	0.0%	0.0%	32.8%	
	No	Count	0	49	11	7	17	84
		Expected Count	25.5	34.9	7.4	4.7	11.4	84.0
		% within Do you think chewing gum is a substitute for smoking cigarettes?	0.0%	58.3%	13.1%	8.3%	20.2%	100.0%
		% within Which brand of chewing gum do you consume	0.0%	94.2%	100.0%	100.0%	100.0%	67.2%
		% of Total	0.0%	39.2%	8.8%	5.6%	13.6%	67.2%
Total		Count	38	52	11	7	17	125
Expected Count	38.0	52.0	11.0	7.0	17.0	125.0		
% within Do you think chewing gum is a substitute for smoking cigarettes?	30.4%	41.6%	8.8%	5.6%	13.6%	100.0%		
% within Which brand of chewing gum do you consume	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		
% of Total	30.4%	41.6%	8.8%	5.6%	13.6%	100.0%		

Chi-Square Tests					
	Value	Df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	47.938 ^a	1	.000		
Continuity Correction ^b	45.317	1	.000		
Likelihood Ratio	63.215	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	47.554	1	.000		
N of Valid Cases	125				
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 18.04.					
b. Computed only for a 2x2 table					

The hypothesis that smokers and nonsmokers differentially use chewing gum was rejected. Unlike previous research by Dama M Britt. Studies with larger numbers of respondents are needed to examine such a trend in India. Out of the all the respondents of 50. 78% said no and 22% said yes to gum being a substitute for smoking cigarettes. This reinstates that chewing gum is not a substitute for smoking in India. 24% of the smokers feel that chewing gum is a substitute for smoking, while 76% do not believe so only non-smokers: 20% of the non-smokers feel that chewing gum is a substitute for smoking, while 80% do not believe so. The answer rules in favor of non-smokers thinking that chewing gum is not a substitute for cigarettes. This answer adds to information for proving the hypothesis of this research.

H3: Chewing gum does not help to keep your mind occupied

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Do you think chewing gum * Do you chew gum to keep your mind occupied?	125	100.0%	0	0.0%	125	100.0%
Do you think chewing gum * Do you chew gum to freshen your breath?	125	100.0%	0	0.0%	125	100.0%

Crosstab					
			Do you chew gum to keep your mind occupied?		Total
			yes	No	
Do you think chewing gum	reduce stresses	Count	41	15	56
		Expected Count	31.8	24.2	56.0
		% within Do you think chewing gum	73.2%	26.8%	100.0%
		% within Do you chew gum to keep your mind occupied?	57.7%	27.8%	44.8%
		% of Total	32.8%	12.0%	44.8%
Reduce weight	ht	Count	16	0	16
		Expected Count	9.1	6.9	16.0
		% within Do you think chewing	100.0%	0.0%	100.0%

		gum			
		% within Do you chew gum to keep your mind occupied?	22.5%	0.0%	12.8%
		% of Total	12.8%	0.0%	12.8%
	Improves	Count	14	19	33
		Expected Count	18.7	14.3	33.0
		% within Do you think chewing gum	42.4%	57.6%	100.0%
		% within Do you chew gum to keep your mind occupied?	19.7%	35.2%	26.4%
		% of Total	11.2%	15.2%	26.4%
		none of above	Count	0	20
	Expected Count		11.4	8.6	20.0
	% within Do you think chewing gum		0.0%	100.0%	100.0%
	% within Do you chew gum to keep your mind occupied?		0.0%	37.0%	16.0%
	% of Total		0.0%	16.0%	16.0%
	Total		Count	71	54
		Expected Count	71.0	54.0	125.0
% within Do you think chewing gum		56.8%	43.2%	100.0%	
% within Do you chew gum to keep your mind occupied?		100.0%	100.0%	100.0%	
% of Total		56.8%	43.2%	100.0%	

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	24.130 ^a	3	.000
Likelihood Ratio	29.246	3	.000
Linear-by-Linear Association	.062	1	.803
N of Valid Cases	125		
a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 3.46.			

Cessation interventions that train smokers to identify alternatives to smoking when confronted with urges to smoke or when exposed to stress may be a valuable supplement to current treatments. Data from the current study suggest that smokers as well as nonsmokers do not use chewing gum as a very high source of reducing stress (16%), reducing weight (8%), to improve focus (4%) or reinforcement, as smokers utilize cigarettes for reinforcement. A chi-square analysis was conducted to examine the relationship of overall smoking status only and reasons for chewing-gum status (non-gum chewer or chewer). There is no significant association between smoking status and reasons for chewing-gum was detected, $\chi^2(3, N = 125), p < .05$. Hence the hypothesis that chew gum to help smokers to reduce craving and nicotine withdrawal when a nicotine-dependent person cannot smoke is false. There is no significant relationship between smoking and reason for chewing gum. Hypothesis is accepted at 95% confidence interval. Chewing gum includes mint properties that freshen the breath, which is why many toothpaste brands today use mint as an ingredient, or rather as an attribute, to provide fresh breath. As a result, most people chew gum to freshen their breath. This is supported by the fact that 72 percent of smokers and 92 percent of non-smokers agree. Despite the fact that the difference between the two groups is only 20%, logic would suggest that smoking causes poor, if not filthy, breath. Despite this, the percentage of smokers who agree with this quality and motivation for chewing gum is low.

Conclusion

Despite its intriguing findings, this research is not without flaws. The current study's findings were based on young people, therefore they may not apply to other groups. It has been shown that as compared to an older generation or working executives, youth have a different smoking behaviour (National Institute on Drug Abuse, 1994). The extent to which these findings apply to older smokers who are heavier smokers is unknown. Participants in this study also stated that they chewed gum at least occasionally; however, some persons cannot or do not chew gum. Furthermore, because chewing gum use decreases with age (O'Connor, O'Mullane, & Whelton, 1993), the generalizability of chewing gum's positive properties has yet to be investigated in different populations. The findings of this study are solely applicable to smokers and non-smokers who can chew gum instead of smoking. There could be other options.

Chewing gum is not a good substitute for smoking, according to the current study. However, these findings, when combined with those of prior studies, show that chewing gum can be a viable alternative to smoking during short periods of abstinence. Chewing gum and other alternative behaviours have been formally introduced into several smoking cessation programmes as something to do instead of smoking. The current research is the first to look into the naturally occurring link between cigarette smoking and chewing gum. According to the results of the survey, Wrigley's is the most popular chewing gum brand, followed by Orbit and Fusen gum. The respondents also disagree with the Chicago Business study regarding chewing gum lowering weight, stress, and enhancing focus. The majority of customers chew gum to freshen their breath, and even those who do not chew gum or only do so on occasion agree that it does.

While all of the respondents believe that chewing gum is not a substitute for smoking cigarettes, they also agree that smokers chew more gum than non-smokers, for reasons they don't understand. Over 80% of respondents chew gum. This study represents a small portion of the overall chewing gum and cigarette smoking population. As a result, basing your opinion solely on this research would be inaccurate. However, some inferences can be drawn about the mentality of chewing gum users, both smokers and non-smokers, as to why they chew gum, which is useful in determining whether there is a link between smoking and chewing gum to a degree. If nothing else, this study aims to give a foundation or a beginning point for further research into this topic, which is as fascinating as it is difficult to gain an exact, well-defined, and clearly stated answer to whether smokers chew more gum than non-smokers.

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