

Effect of increase in tax on consumption of tobacco related products

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Abstract:

Introduction:

Tobacco use also increases the risk of many fatal diseases such as cancer, emphysema, heart disease and other circulatory diseases. If trends in tobacco use continue, approximately 500 million people alive today will die from smoking, and, by 2030, tobacco is expected to be the leading cause of premature death, accounting for about 10 million deaths per year. There is great urgency to disseminate research findings that can inform the development and implementation of effective tobacco control policies.

Materials and methods:

A Multi-stage cluster sampling was employed to select the study population. Clusters of people using tobacco products were randomly selected for the study. A pre-tested, structured questionnaire was adapted from questionnaires used previously in studies done by Analice Gigliotti et al. and administered to 340 subjects and responses were collected and analyzed in SSPSS software version 20.

Results:

Tobacco consumption per day was found to be significantly increasing with the age of the study subjects ($b=0.534$, $p<0.001$). Tobacco consumption per day was found to be significantly less among females ($b=-0.184$, $p=0.002$). Tobacco consumption per day was found to be significantly decreasing with the SES of the study subjects ($b=-0.118$, $p=0.048$) and number of children ($b=-0.228$, $p=0.003$).

Conclusion:

Taxes and prices increases have great potential to stimulate cessation or reduction of cigarette consumption further among two important vulnerable populations of smokers in young smokers and those of low socio economic status level. The results from the present study also suggest that seeking illegal products may reduce the impact of increased taxes, but does not eliminate it.

Keywords: tax, GST, tobacco, economic condition, oral cancer

Introduction:

Oral cancers are the sixth most common cancer reported globally and one among the four most common cancers in India. It is the sixth most common cancer reported globally with an annual incidence of over 300,000 cases, of which 62% arise in developing countries. It also contributes to one third of total cancer burden in India.(1) Tobacco use and alcohol are known risk factors for oral cancers. The Global Adult Tobacco Survey India, conducted in 2009-10, revealed that 35% of adults (57% of all men and 11% of women) use some form of tobacco. Tobacco-related cancers are expected to constitute 30% of the total cancer burden by 2020.(2)

In India, the projected burden of cancers among males by the year 2020 shows the number of cases will be lung (102,300), mouth (99,495), prostate (61,222), tongue (60,669) and larynx (36,079). Cumulatively, this makes 'oral cancer' the leading cancer site for men in most of India.(3)

Tobacco use also increases the risk of many fatal diseases such as cancer, emphysema, heart disease and other circulatory diseases.(4) If trends in tobacco use continue, approximately 500 million people alive today will die from smoking, and, by 2030, tobacco is expected to be the leading cause of premature death, accounting for about 10 million deaths per year.(5) There is great urgency to disseminate research findings that can inform the development and implementation of effective tobacco control policies.

Tax increases and consequently price increases for tobacco products and are considered to be one of the best policies in reducing the demand for tobacco products. Tobacco taxation, passed on to consumers in the form of higher cigarette prices, has been recognized as one of the most effective population-based strategies for decreasing smoking and its adverse health consequences. (5-8) On average, a price increase of 10% on a pack of cigarettes would reduce demand for cigarettes by about 4% for the general adult population in high income countries.(5) Tobacco taxes can benefit smokers who quit, reduce the overall consumption of tobacco, and put smoking cessation on the radar of those who continue to smoke. Increased taxes also have a positive impact on non-smokers by reducing their exposure to second-hand smoke.(9)

Econometric studies have shown that a 10% increase in tobacco taxes may lead to a 5 to 8% reduction in the prevalence of smoking.(10) There are also evidences in the literature that these policies have a particular impact on young people and low-income populations.(11,12) The revenues from these taxes can be used to support other tobacco control efforts (e.g. enforcement of tobacco control policies, mass media information campaigns, and increased awareness of and access to cessation services and products). Given this evidence, Article 6 of the WHO FCTC, calls for Parties to the treaty to use tax and price policies to reduce tobacco use, while Article 15 calls for the adoption and implementation of measures aimed at eliminating the illicit trade in tobacco products that can undermine the effectiveness of increased tobacco taxes.(13-17)

The present study investigated how tobacco users in India react to price increases by taxation focusing on expected responses to a future hypothetical price increase that has a positive impact on health such as quitting smoking or reducing the demand for cigarettes instead of smokers adopting alternative behaviours such as switching to cheaper brands or buying from the illegal market.(18,19) This information is particularly important because to date there have been no studies conducted in India, with empirical data on tobacco users responses to price increases and their specific impact in reducing the prevalence of tobacco consumption.

AIM: To assess the effect of hypothetical increase in tax on tobacco products on tobacco consumption.

OBJECTIVES: To compare the effect of increase in tax on tobacco products on tobacco consumption among people of different socio economic class. To compare the effect of increase in tax on tobacco products on tobacco consumption among people of different nicotine dependence.

Materials and methods:

STUDY TYPE: Cross sectional study

STUDY AREA: Chennai.

Chennai is the capital of the Indian state of Tamil Nadu. Located on the Coromandel Coast off the Bay of Bengal, it is one of the biggest cultural, economic and educational centers in South India. According to the 2011 Indian census, it is the fifth-largest city and fourth-most populous urban agglomeration in India. The overall prevalence of tobacco use in Chennai was higher in the rural (23.7%) compared to semi-urban (20.9%) and urban (19.4%) areas. Tobacco smoking prevalence was 14.3%, 13.9% and 12.4% in rural, semi-urban and urban areas respectively. The corresponding values for smokeless tobacco use were 9.5%, 7.0% and 7.0% respectively.

STUDY POPULATION:

Tobacco users residing in Chennai city.

INCLUSION CRITERIA:

- Current and Daily Smokers who are residents of Chennai are included in the study.
- Current and Daily users of smokeless tobacco are included in the study.

EXCLUSION CRITERIA:

- People who were not residents of Chennai are not included in the study.
- Tobacco users who were not willing for the study are excluded.

ETHICAL CLEARANCE:

- Prior to the start of the study ethical clearance was obtained from the institutional ethics committee, Saveetha university.
- Written informed consent was obtained from the study participants (Annexure-2)
- The anonymity of the participants was maintained.

SCHEDULING: Data collection was scheduled in the month of November 2017

SAMPLE SIZE: The sample size was calculated as 340 based on Global Adults Tobacco Survey (2016, India using the formula $Z_{\alpha}2PQ/L2$.

$P = 54.9$; $Q = 45.1$; $Z_{\alpha}2 = 3.84$; $L = 5.49$

SAMPLING: A Multi-stage cluster sampling was employed to select the study population. Clusters of people using tobacco products were randomly selected for the study.

SURVEY INSTRUMENT: A pre-tested, structured questionnaire was adapted from questionnaires used previously in studies done by Analice Gigliotti et al. The survey tool consisted of several parts.(Annexure-3)

The first section collected demographic information of the participants such as age, gender, marital status and socio demographic details.

The second part of the questionnaire consisted of 16 questions to analyse nicotine dependence level and smoking frequency. The reported time to smoke the first cigarette after waking up was used as an indicator of tobacco dependence. Time to smoke the first cigarette after waking up was assessed by the question: "How soon after you wake up do you smoke your first cigarette?" A lower level of nicotine dependence was indicated by smoking more than 30 minutes after waking up, and a higher level of dependence was indicated by smoking within 30 minutes of waking up. A binary variable was created to separate heavy (>20 cigarettes per day) from non-heavy (\leq 20 cigarettes per day) smokers. A categorical dummy variable was created to indicate the three stages of change for smoking cessation: precontemplation, contemplation, and preparation. Smokers who were not seriously considering quitting within the next 6 months were in the precontemplation stage. Those who were seriously considering quitting within the next 6 months, but were not considering quitting within the next 30 days, or had not made an attempt to quit lasting 24 hours over the past year or both, were in the contemplation stage. Smokers who were planning to quit within the next 30 days and had made a 24-hour attempt to quit during the past year were classified as being in the preparation stage.

STATISTICAL ANALYSIS: Data was entered in Microsoft Excel spreadsheet and descriptive data were analyzed using SPSS software (Version 20.0). Descriptive statistics were used. One way ANOVA test for assessing the association between various age groups in years, socioeconomic status, addiction status and stage of quitting tobacco. For all statistical tests, a p- value of < 0.05 is to be considered statistically significant.

Table.1. Liner Regression analysis between age, gender, socioeconomic status and Children to predict duration of use of tobacco products, tobacco consumed per day, amount of money spent on tobacco per month and per day

Model	Independent variable	T Value	Regression coefficient-B	P-value
Duration of use of tobacco products	Age	14.131	0.726	0.001
	Gender	2.851	0.131	0.005
Tobacco consumed per day	Age	7.970	0.534	0.001
	Gender	-3.065	-0.184	0.002
	Socioeconomic status	-1.982	-0.118	0.048
	Children	-3.039	-0.228	0.003
Amount of money spent on tobacco per day	Age	4.200	0.285	0.001
	Gender	-3.961	-0.241	0.001
	Socioeconomic status	-3.684	-0.223	0.001
Amount of money spent on tobacco last month	Age	4.438	0.299	0.001
	Gender	-0.492	-0.247	0.001
	Children	-2.019	-0.153	0.044
	Socioeconomic status	-3.902	-0.235	0.001

Table 1 depicts Liner Regression analysis between age, gender, socioeconomic status and Children to predict duration of use of tobacco products, tobacco consumed per day, amount of money spent on tobacco per month and per day.

Table.2. Binomial Regression analysis between age and marital status to predict cravings caused by tobacco lead you to its consumption

Model	Independent variable	Regression coefficient-B	Odds ratio/ exponential beta	P-value
Cravings caused by tobacco lead you to its consumption	Age	-0.068	0.934	0.001*
	Marital status	1.978	7.225	0.001

Table 2 depicts Binomial Regression analysis between age and marital status to predict cravings caused by tobacco lead you to its consumption.

Table.3. Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict savings for future

Savings for future	Regression coefficient B	P-value	Exp(B)/ Odds ratio	95% Confidence Interval for Exp(B)		
				Lower Bound	Upper Bound	
Yes	Intercept	-1.685	1.000			
	Age	-.031	.874	.664	1.41	
	Child	-.660	.824	.517	172.42	
	Upper class	-15.516	1.000	1.82	.000	
	Upper middle class	-.812	1.000	.444	.000	
	Middle lower middle class	-15.919	1.000	1.22	.000	
	Lower upper lower class	-14.748	1.000	3.93	.000	
	Single	-12.578	.997	3.44	.000	
No	Married	0	.	.	.	
	Intercept	-5.884	.000			
	Age	.103	.001*	1.108	1.05	1.16
	Child	.073	.862	1.076	.47	2.44
	Upper class	2.296	.050*	9.931	.99	98.82
	Upper middle class	1.113	.076	3.042	.89	10.38
	Middle lower middle class	1.985	.002*	7.277	2.07	25.55
	Lower upper lower class	2.295	.	9.926	9.926	9.92
Don't know	Single	3.402	.001*	30.029	5.051	178.51
	Married	0c
	Intercept	11.130	.000			
	Age	.133	.001*	1.143	1.08	1.19
	Child	-.669	.077	.512	.24	1.07
	Upper class	-13.319	.001*	1.64	2.59	1.03
	Upper middle class	-15.557	.001*	1.75	6.06	5.06
	Middle lower middle class	-14.882	.001*	3.44	1.13	1.04
Lower upper lower class	-13.628	.	1.20	1.20	1.20	
Single	3.547	.001*	34.71	6.69	180.09	
Married	0c	.	.	.	.

Table 3 depicts Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict savings for future

Table.4. Multinomial Regression analysis between age, children and marital status to predict opinion about injurious health effects of tobacco

Consuming tobacco is injurious to health		Regression coefficient B	P-value	Exp(B)/ Odds ratio	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Yes	Intercept	-22.62	.995			
	Age	.123	.001*	1.13	1.054	1.213
	Child	-.101	.860	.90	.294	2.784
	Single	.928	.363	2.53	.342	18.728
	Married	0c	.	.	.	.
No	Intercept	-11.705	.027			
	Age	-.202	.323	.81	.548	1.220
	Child	1.409	.540	4.09	.045	370.523
	Single	-14.774	.990	3.83	.000	.b
	Married	0c	.	.	.	.
Don't know	Intercept	-15.835	.997			
	Age	.046	.243	1.04	.969	1.132
	Child	-1.587	.053	.20	.041	1.021
	Single	.513	.563	1.67	.294	9.503
	Married	0c	.	.	.	.

Table 4 depicts Multinomial Regression analysis between age, children and marital status to predict opinion about injurious health effects of tobacco

Table.5. Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict spent money on tobacco products that you think it would have been better if spent on household essentials

Spent money on tobacco products that you think it would have been better if spent on household essentials		Regression coefficient B	P-value	Exp(B)/ Odds ratio	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Yes	Intercept	-9.11	.999			
	Age	.176	.001*	1.19	1.09	1.29
	Child	-.962	.226	.38	.08	1.81
	Upper class	2.643	1.000	14.06	.000	
	Upper middle class	1.045	1.000	2.84	.000	
	Middle lower middle class	1.857	1.000	6.40	.000	
	Lower upper lower class	.693	1.000	2.00	.000	
	Single	4.041	.001*	56.87	6.08	531.50
	Married	0c	.	.	.	.
No	Intercept	-5.354	.998			
	Age	.120	.001*	1.12	1.07	1.18
	Child	-.304	.418	.73	.35	1.54
	Upper class	2.370	.999	10.69	.00	
	Upper middle class	.970	1.000	2.63	.00	
	Middle lower middle class	1.678	.999	5.35	.00	
	Lower upper lower class	2.120	.999	8.33	.00	
	Single	3.583	.001*	35.99	8.57	151.11
	Married	0c	.	.	.	.
Don't know	Intercept	6.299	.000			
	Age	.155	.001*	1.16	1.10	1.23
	Child	.785	.093	2.19	.87	5.48
	Upper class	-25.413	.919	9.19	1.08	7.79
	Upper middle class	-14.976	.001*	3.13	9.10	1.07
	Middle lower middle class	-13.447	.001*	1.44	4.37	4.78
	Lower upper lower class	-11.473	.	1.04	1.04	1.04
	Single	3.262	.001*	26.10	4.14	164.34
Married	0c	.	.	.	.

Table 5 depicts Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict spent money on tobacco products that you think it would have been better if spent on household essentials

Table.6. Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict attitude following increase in tax of tobacco related products.

Increase in tax of tobacco related products		Regression coefficient B	p-value	Exp(B)/ Odds ratio	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Try quitting smoking	Intercept	-4.193	.034			
	Age	.064	.098	1.06	.988	1.150
	Child	-.628	.418	.53	.117	2.441
	Upper class	.634	.687	1.88	.086	41.246
	Upper middle class	.135	.907	1.14	.119	10.999
	Middle lower middle class	.373	.743	1.45	.156	13.521
	Lower upper lower class	-1.559	.	.21	.210	.210
Smoke fewer cigarettes	Single	.700	.465	2.01	.307	13.196
	Intercept	-3.207	1.00			
	Age	.048	.182	1.04	.978	1.125
	Child	-.609	.353	.54	.150	1.966
	Upper class	.222	1.00	1.24	.000	.c
	Upper middle class	.322	1.00	1.38	.000	.c
	Middle lower middle class	.636	1.00	1.88	.000	.c
Switch cheaper brand	Lower upper lower class	-1.229	1.00	.29	.000	.c
	Single	-1.185	.240	.30	.042	2.208
	Intercept	17.813	.000			
	Age	-.051	.004*	.95	.917	.984
	Child	.642	.038*	1.90	1.03	3.489
	Upper class	-17.098	.001*	3.75	1.01	1.39
	Upper middle class	-16.020	.001*	1.10	5.53	2.19
Refused	Middle lower middle class	-16.344	.001*	7.98	3.95	1.61
	Lower upper lower class	-15.638	.	1.61	1.61	1.61
	Single	-1.597	.001*	.20	.079	.519

Table 6 depicts Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict attitude following increase in tax of tobacco related products.

Table.7. Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict trends in use of tobacco products following implementation of GST.

Reduced the number of cigarettes/smokeless tobacco you use per day following implementation of GST		Regression coefficient B	p-value	Exp(B)/ Odds ratio	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Yes	Intercept	1.925	1.000			
	Age	-.047	.830	.95	.624	1.460
	Child	.249	.951	1.28	.000	3396.089
No	Intercept	2.820	.999			
	Age	.008	.958	1.0	.753	1.348
	Child	.291	.918	1.33	.005	342.675
Don't know	Intercept	17.797	.995			
	Age	-.026	.859	.97	.730	1.300
	Child	1.269	.651	3.55	.015	873.238
Refused	Intercept	1.573	.999			
	Age	.054	.720	1.05	.786	1.416
	Child	-.553	.847	.57	.002	156.879

Table 7 depicts Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict trends in use of tobacco products following implementation of GST.

Table.8. Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict if price of cigarettes/smokeless tobacco affect your decision to stop smoking.

The price of cigarettes/smokeless tobacco affect your decision to stop smoking		Regression coefficient B	p-value	Exp(B)/ Odds ratio	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Yes	Intercept	1.949	1.000			
	Age	-.047	.830	.95	.623	1.461
	Child	.241	.951	1.27	.001	2576.11
No	Intercept	2.890	.999			
	Age	.001	.993	1.00	.749	1.338
	Child	.804	.768	2.23	.011	465.537
Don't know	Intercept	17.260	.993			
	Age	-.025	.865	.975	.730	1.302
	Child	1.078	.691	2.939	.014	599.585
Refused	Intercept	-.856	.999			
	Age	.079	.599	1.082	.805	1.455
	Child	-.108	.969	.897	.004	211.042

Table 8 depicts Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict if price of cigarettes/smokeless tobacco affect your decision to stop smoking.

Table.9. Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict much effect on your smoking do you think each of the following would have in reducing your tobacco habits

How much effect on your smoking do you think each of the following would have in reducing your tobacco habits		Regression coefficient B	p-value	Exp(B)/ Odds ratio	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
If the price is doubled	Intercept	15.559	.977			
	Age	-.144	.225	.86	.68	1.09
	Child	-1.941	.349	.14	.002	8.33
	Single	-6.553	.035*	.001	3.21	.63
If the price is increased half the original price	Intercept	9.346	.993			
	Age	-.071	.557	.93	.737	1.17
	Child	-1.438	.492	.23	.004	14.39
	Single	-4.848	.123	.008	1.65	3.72
Don't know/not sure	Intercept	23.570	.913			
	Age	-.056	.637	.94	.751	1.19
	Child	-2.020	.328	.13	.002	7.58
	Single	-4.931	.110	.007	1.70	3.06

Table 9 depicts Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict much effect on your smoking do you think each of the following would have in reducing your tobacco habits

Table.10. Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict quitting using tobacco related products

Do you feel like quitting using tobacco related products		Regression coefficient B	p-value	Exp(B)/ Odds ratio	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Yes	Intercept	8.999	.995			
	Age	.125	.001*	1.133	1.074	1.195
	Child	-.091	.834	.913	.388	2.147
	Upper class	-13.99	.992	8.35	.000	.b
	Upper middle class	-15.21	.991	2.47	.000	.b
	Middle lower middle class	-13.94	.992	8.75	.000	.b
	Lower upper lower class	-12.47	.993	3.82	.000	.b
	Single	1.292	.087	3.63	.831	15.937
No	Intercept	-3.814	.000			
	Age	.095	.001*	1.10	1.054	1.147
	Child	-.359	.300	.69	.354	1.377
	Upper class	1.620	.039*	5.05	1.089	23.467
	Upper middle class	.559	.263	1.74	.658	4.652
	Middle lower middle class	1.210	.018*	3.35	1.228	9.149
	Lower upper lower class	2.114	.	8.28	8.285	8.285
	Single	1.955	.001*	7.06	2.417	20.649

Table 10 depicts Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict quitting using tobacco related products

Table.11. Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict Stage of addiction

Stage of addiction		Regression coefficient B	p-value	Exp(B)/ Odds ratio	95% Confidence Interval for Exp(B)	
					Lower Bound	Upper Bound
Precontemplation	Intercept	21.885	.986			
	Age	-.078	.086	.925	.847	1.011
	Child	-.563	.414	.569	.147	2.199
	Upper class	-16.487	.990	6.91	.000	.b
	Upper middle class	-15.149	.991	2.63	.000	.b
	Middle lower middle class	-15.302	.991	2.26	.000	.b
	Lower upper lower class	-13.954	.991	8.71	.000	.b
	Single	-1.790	.188	.167	.012	2.391
Contemplation	Intercept	6.344	.005			
	Age	-.048	.303	.953	.871	1.044
	Child	-.784	.273	.456	.112	1.854
	Upper class	-1.595	.308	.203	.009	4.361
	Upper middle class	-1.634	.166	.195	.019	1.974
	Middle lower middle class	-1.607	.176	.201	.020	2.056
	Lower upper lower class	-.539	.	.583	.583	.583
	Single	.038	.978	1.038	.072	14.903

Table 11 depicts Multinomial Regression analysis between age, socioeconomic status, children and marital status to predict Stage of addiction.

Discussion:

Tax increases and consequently price increases for tobacco products are addressed in article 6 of The World Health Organization (WHO) Framework Convention on Tobacco Control and are considered to be one of the best policies in reducing the demand for tobacco products (20). Price increases contribute significantly towards reducing consumption, increasing the number of attempts to quit, promoting cessation, and preventing initiation (19-20). Econometric studies have shown that a 10% increase in tobacco taxes may lead to a 5 to 8% reduction in the prevalence of smoking. There have been no studies conducted in India to assess the impact of increase in tax on consumption of tobacco related products. Hence a study was done among 340 subjects who consume tobacco related products.

In the current study, With increasing age of the study subjects the duration of consuming tobacco products increases by 0.72 times which was statistically very highly significant ($p < 0.001$). The duration of consuming tobacco products increases 0.131 times among females which was statistically significant.

Tobacco consumption per day was found to be significantly increasing with the age of the study subjects ($b = 0.534$, $p < 0.001$). Tobacco consumption per day was found to be significantly less among females ($b = -0.184$, $p = 0.002$). Tobacco consumption per day was found to be significantly decreasing with the SES of the study subjects ($b = -0.118$, $p = 0.048$) and number of children ($b = -0.228$, $p = 0.003$).

Amount of money spent on tobacco per day was found to be significantly increasing with the age of the study subjects ($b = 0.285$, $p = 0.001$) and declined with the improved SES ($b = -0.223$, $p = 0.001$). Amount of money spent on tobacco per day was more among males compared to females ($b = -0.241$, $p = 0.001$).

Amount of money spent on tobacco last month was found to be significantly increasing with the age of the study subjects ($b = 0.299$, $p = 0.001$). Amount of money spent on tobacco last month was found to be significantly decreasing with the improving SES ($b = -0.235$, $p = 0.001$) and increasing number of children ($b = -0.153$, $p = 0.044$). Amount of money spent on tobacco last month was more among males compared to females ($b = -0.247$, $p = 0.001$).

Binary logistic regression results showed that as the age of the study subjects increases, the odds of consumption of tobacco due to the cravings caused by it decreases by 6.6% and it was statistically very highly significant ($p < 0.001$). The odds of consumption of tobacco due to the cravings caused by it was 7.22 times higher among singles' compared to married people which was statistically very highly significant ($p < 0.001$).

Conclusion:

Taxes and prices increases have great potential to stimulate cessation or reduction of cigarette consumption further among two important vulnerable populations of smokers in young smokers and those of low socio economic status level. The results from the present study also suggest that seeking illegal products may reduce the impact of increased taxes, but does not eliminate it.

References:

- [1] Sree Vidya Krishna Rao. Epidemiology of oral cancer in India: a life course study. Diss. 2014. Available at: <https://digital.library.adelaide.edu.au/dspace/bitstream/2440/91305/3/02whole.pdf>. Last accessed on 10-11-2017
- [2] Bhawna G. Burden of smoked and smokeless tobacco consumption in India-results from the global adult tobacco survey India (GATS-India)-2009-2010. Asian Pacific Journal of Cancer Prevention. 2013;14(5):3323-9..
- [3] Indian Council for Medical Research. Three-Year Report of Population Based cancer Registries 2012–2014. Bengaluru, India: National Centre for Disease Informatics and Research-National Cancer Registry Programme, 2016. Available at: <http://www.ncrpindia.org>. last accessed on 10-11-2017
- [4] Doll R. Uncovering the effects of smoking: historical perspective. Statistical Methods in Medical Research 1998, 7(2):87-117.
- [5] The World Bank. Curbing the epidemic: governments and the economics of tobacco control. Tobacco Control. 1999;8(2):196.
- [6] World Health Organization, Research for International Tobacco Control. WHO report on the global tobacco epidemic, 2008: the MPOWER package. World Health Organization; 2008 Feb
- [7] Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. CA: a cancer journal for clinicians. 2011 Mar 1;61(2):69-90.
- [8] Jha P, Chaloupka FJ, Moore J, Gajalakshmi V, Gupta PC, Peck R, Asma S, Zatonski W. Disease control priorities in developing countries. 2006. Available at: http://dcp-3.org.512elmp01.blackmesh.com/sites/default/files/resources/Chronic%20Disease_Challenge_Final%20Edits_1.pdf. Last accessed on 10-11-2017.
- [9] Pearl Bader, David Boisclair and Roberta Ferrence. Effects of Tobacco Taxation and Pricing on Smoking Behavior in High Risk Populations: A Knowledge Synthesis. Int. J. Environ. Res. Public Health 2011, 8, 4118-4139
- [10] Analice Gigliotti, Valeska C Figueiredo, Clarice S Madruga, Ana CPR Marques, Ilana Pinsky, Raul Caetano, Vera Luiza da Costa e Silva, Martin Raw and Ronaldo Laranjeira. How smokers may react to cigarette taxes and price increases in Brazil: data from a national survey. BMC Public Health 2014, 14:327
- [11] Chaloupka FJ, Yurekli A, Fong GT: Tobacco taxes as a tobacco control strategy. Tob Control 2012, 21(2):172–180.
- [12] Chaloupka FJ, Straif K, Leon ME: Effectiveness of tax and price policies in tobacco control. Tob Control 2010, 20(3):235–238.
- [13] Feig, S. A. IARC Handbooks of Cancer Prevention. Cancer, 2003; 97: 2045–2046.
- [14] Pradeep R Kumar, Joseph John. Assessment of periodontal status among dental fluorosis subjects using community periodontal index of treatment needs. Indian Journal of Dental Research 2011; 22 (2): 248-251.

- [15] Pradeep R Kumar, Joseph John. Assessment of periodontal status among dental fluorosis subjects using community periodontal index of treatment needs. Indian journal of Dental Research 2011; 22 (2): 248-251.
- [16] Benley George, Joseph John, S Saravanan, I Meignana Arumugham. Prevalence of permanent tooth loss among children and adults in a suburban area of Chennai. Indian journal of Dental Research 2011; 22 (2): 364- 369.
- [17] S Saravanan, I Madivanan, B Subashini JW. Felix Prevalence pattern of dental caries in the primary dentition among school children. Indian Journal of Dental Research 2005; 16 (4): 140-146.
- [18] Gopinath NM, John J, Senthilkumar E, Nagappan N. Knowledge awareness and attitude about research ethics among dental faculties in India. The Journal of Contemporary Dental Practice. 2014, 15(5):608-613.
- [19] George B., John J., Saravanan S., Arumugham I.M., Johny M.K. Dental caries status of inmates in central prison, Chennai, Tamil Nadu, India. Journal of Natural Science, Biology and Medicine. 2015;6: 5110-5112
- [20] World Health Organization, Research for International Tobacco Control. WHO report on the global tobacco epidemic, 2008: the MPOWER package. World Health Organization; 2008 Feb 11.

