

IS TOBACCO DETRIMENTAL THAN DIABETES?

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ABSTRACT

BACKGROUND

Our country is unique in a sense that we have largest numbers of diabetics. Tobacco usage and diabetes are major and known risk factors for cerebrovascular disease. To the best of our knowledge, there is no publication or research paper in literature which compares the ill effect of these two deadly evils.

MATERIALS AND METHODS

The study was conducted from the patients' data who attended Preventive Cardiology Clinic at HAH Centenary Hospital, Jamia Hamdard, New Delhi, from 2013 to 2015. Non-diabetic patients who had history of smoking, either past or present and those who use smokeless tobacco in any form made the first group. Second group was made by patients who are suffering from DM but never used tobacco in any form. Blood pressure, BMI, waist circumference, and lipid profiles were compared among the two groups. In order to compare quantitatively the disease burdens in the two groups, age and sex adjusted DALY scores for each major disease present in each individual were allotted.

RESULTS

Total DALY was significantly higher in diabetes in younger age groups (15-49 years). It becomes opposite i.e. higher in tobacco group in the higher age group of 50-59 years. It is still higher, though not significantly in 60-69 and beyond year's group also.

CONCLUSION

Although the impact of diabetes on health is earlier in onset as compared to tobacco use, its impact is lesser in later years. This indicates that tobacco is more detrimental to health as compared to DM.

KEYWORDS

Diabetes, Tobacco, Obesity, CAD.

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BACKGROUND

The "epidemic of tobacco" is one of the biggest public health threats the world has ever faced, killing around 6 million people a year. More than 5 million of these deaths are the result of direct tobacco usage while more than 600,000 are the result of non-smokers being exposed to second-hand smoke.¹ Tobacco use in any form smoking, chewing or swallowing is a major preventable cause of premature death and diseases. Tobacco users who die prematurely deprive their families of income, raise the cost of health care and hinder economic development.

Tobacco use including both the smoking and the non-smoking forms of tobacco is common in India. Prevalence of tobacco use ranges from 15% to over 50% among men and

about 4 % or less among females in most part of India.² The tobacco product which was most frequently used was bidi both in men and women.³ Bidis, the hand rolled form of tobacco, wrapped in the dried tendu leaf, were smoked by 51.7% and 81.2% of urban and rural smokers respectively.² About 14 percent of subjects reported the presence of one or the other respiratory symptoms.² Approximately 900,000 people die every year in India due to smoking as Global Adult Tobacco Survey conducted in 2009-10.⁴

Smoking is one of the modifiable risk factors for many chronic diseases, such as cardiovascular disease (CVD), cancer, chronic obstructive lung disease, asthma, and diabetes.⁵ Smoking, hypertension, diabetes, fibrinogen, and low-density lipoprotein cholesterol (LDL cholesterol) are widely accepted coronary heart disease (CHD) risk factors.⁶ The beneficial effects of smoking cessation on the risk of CVD have been well documented.^{7,8}

Smoking and diabetes share multiple health outcomes.⁹ Diabetes patients have an increased risk of cardiovascular morbidity and mortality.¹⁰ They particularly have an increased risk of congestive failure.¹¹ Type 2 diabetes increases the risk of cardiovascular mortality by a factor of 1.5 to 4.¹²

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There are numerous studies evaluating the interaction between diabetes and tobacco use. Smoking itself increases the risk of diabetes.^{13,14,15} Although reports on microvascular complications vary across the globe, increased incidence of macrovascular complications is well established.⁵ In an 8-year prospective study, smoking was significantly associated with an increased risk for CHD in diabetic patients.¹⁶

However, there has been no such study to compare the relative impacts on health from tobacco use and diabetes. This retrospective study was conducted to analyse the assumption that tobacco may be more deleterious to health as compared to diabetes, since diabetes patients do take medicines to control, whereas tobacco users continue to expose to toxic substances without any remedy.

MATERIALS AND METHODS

The study was conducted from the patients' data who attended Preventive Cardiology Clinic at HAH Centenary Hospital, Jamia Hamdard, New Delhi, from 2013 to 2015. Data were entered in spread sheets of Microsoft Excel. Non-

diabetic patients who had history of smoking, either past or present and those who use smokeless tobacco in any form made the first group. Second group was made by patients who are suffering from DM but never used tobacco in any form. Blood pressure, BMI, waist circumference, and lipid profiles were compared among the two groups. In order to compare quantitatively the disease burdens in the two groups, age and sex adjusted DALY scores for each major disease present in each individual were allotted. The total DALY scores of both groups in different age groups were compared. Statistical analyses and graph constructions were done by using Microsoft Excel and Med Calc V 10.2.0.0.

Observation

3735 records were reviewed. 2001 were males, and rests were females. 858 patients were identified as tobacco users in any form, either currently using or in recent past and who are not having diabetes. 471 patients had diabetes that does not use tobacco of any form. Following table summarizes the comparison of clinical and biochemical parameters.

Age Group	Parameters	Tobacco User		DM		p value
		N	Mean \pm SD	N	Mean \pm SD	
15-29	Age	175	23.71 \pm 2.79	9	22.33 \pm 6.72	0.19
	SBP	168	126.76 \pm 15.19	7	117.2857 \pm 6.550173	0.1029
	DBP	168	74.71 \pm 12.82	7	71.71429 \pm 6.264032	0.5395
	MAP	168	91.98 \pm 10.92	7	86.90476 \pm 6.202491	0.2240
	BMI	86	30.76 \pm 3.80	3	34.30057 \pm 11.65701	0.1501
	Waist circ	161	81.57 \pm 8.94	7	86.33333 \pm 29.14332	0.2366
	T. Chol	7	155.43 \pm 29.53	3	86.33 \pm 29.14	0.0093
	LDL	4	113.05 \pm 17.40	4	55.87 \pm 25.12	0.0096
	HDL	7	35 \pm 8.77	4	72.75 \pm 29.52	0.0099
30-49	Triglycerides	5	144.8 \pm 54.71	1	50.4	NA
	Age	305	38.81 \pm 6.35	120	42.13 \pm 4.38	<0.0001
	SBP	285	130.10 \pm 18.16	120	133.54 \pm 22.13	0.1043
	DBP	284	80.52 \pm 13.09	112	82.5 \pm 14.35	0.1880
	MAP	277	96.41 \pm 41.03	112	99.98 \pm 13.67	0.3686
	BMI	150	33.60 \pm 4.6	25	31.68 \pm 9.66	0.1132
	Waist circ	43	89.44 \pm 9.03	92	97.26 \pm 13.38	0.0007
	T. Chol	29	173.10 \pm 46.17	20	167.83 \pm 46.77	0.6978
	LDL	29	102.74 \pm 39.91	18	90.27 \pm 30.29	0.2691
50-59	HDL	29	41.21 \pm 11.32	20	51.85 \pm 37.59	0.1569
	Triglycerides	25	249.68 \pm 263.53	16	146.5 \pm 83.3	0.1385
	Age	156	53.59 \pm 2.76	142	54.17 \pm 2.54	0.0609
	SBP	139	134.29 \pm 24.92	120	142.65 \pm 23.88	0.0065
	DBP	139	79.01 \pm 16.66	120	79.64 \pm 13.51	0.7410
	MAP	132	97.10 \pm 17.55	119	100.46 \pm 15.45	0.1103
	BMI	68	35.38 \pm 6.41	38	28.91 \pm 6.23	<0.0001
	Waist Circ	118	113.05 \pm 67.49	103	96.40 \pm 10.32	0.0140
	T. Chol	26	182.82 \pm 60.50	24	168.232 \pm 55.52	0.38
60-69	LDL	23	104.27 \pm 33.14	24	93.77 \pm 41.03	0.3409
	HDL	23	38.18 \pm 12.95	26	48.71 \pm 34.34	0.1727
	Triglycerides	22	258.97 \pm 242.25	20	141.32 \pm 80.75	0.0451
	Age	153	62.41 \pm 2.71	177	63.49 \pm 2.83	0.0005
	SBP	138	137.49 \pm 22.39	150	138.51 \pm 25.13	0.7173
	DBP	138	78.62 \pm 14.63	150	77.00 \pm 17.93	0.4040
	MAP	136	98.44 \pm 15.49	143	97.42 \pm 16.06	0.5900
	BMI	59	36.43 \pm 6.53	134	29.32 \pm 5.57	<0.0001
	Waist Circ	108	90.23 \pm 13.20	128	104.20 \pm 54.40	0.0098
	T. Chol	29	211.76 \pm 189.34	51	170.93 \pm 46.29	0.1453
	LDL	27	113.22 \pm 58.74	41	108.95 \pm 49.60	0.7479
	HDL	29	38.53 \pm 19.0	47	50.83 \pm 31.40	0.0610

	Triglycerides	29	149.11 ± 87.68	44	136.55 ± 61.60	0.4743
70+	Age	64	75.77 ± 4.98	22	76.55 ± 5.25	0.5336
	SBP	46	137 ± 26.10	17	145.71 ± 25.67	0.2824
	DBP	46	76.09 ± 15.83	17	66.41 ± 10.10	0.0223
	MAP	45	96.39 ± 17.64	17	92.75 ± 11.27	0.4327
	BMI	14	33.11 ± 4.50	17	27.21 ± 2.95	0.0001
	Waist Circ	32	89 ± 10.53	16	98.88 ± 5.48	0.0010
	T. Chol	15	165.13 ± 40.90	7	140.43 ± 25.36	0.1595
	LDL	14	99 ± 30.12	7	82.29 ± 25.50	0.2244
	HDL	15	45.13 ± 14.35	8	50.25 ± 49.07	0.7067
	Triglycerides	13	119.77 ± 35.53	7	118.71 ± 56.15	0.9591

Table 1. Clinical and Biochemical Parameters Compared

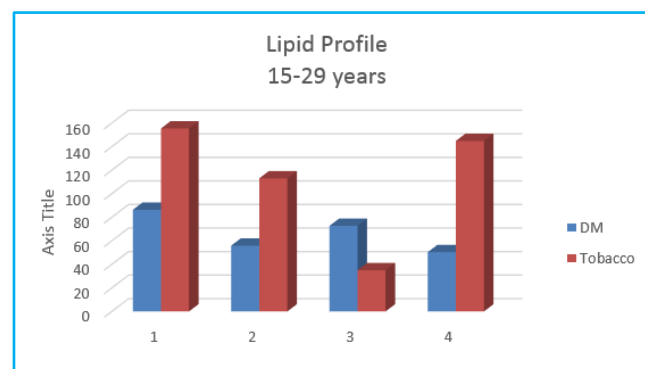


Figure 1. Graph Showing the Significant Levels of Lipids in the 2 Groups

(1= Total Cholesterol; 2= LDL; 3= HDL; 4= Triglycerides.)

In the first age group of 15-29 years, serum total cholesterol, LDL and TRIGLYCERIDES were significantly higher and HDL was significantly lower among tobacco users. Statistical significance of Triglyceride values cannot be determined (Table 1, Figure 1). BMI and waist circumferences didn't show any significant differences. In the second age group of 30-49 years, waist circumference was significantly higher among diabetes patients. No differences seen in other parameters. In contrast, both BMI and waist circumferences were significantly higher among tobacco users in older group of 50-59 years. Mix results of these anthropometric parameters were seen in older groups. Same is with BP, showing higher SBP among tobacco users in 50-59 years group and lower DBP among 70+ patients of same group. These results indicate that obesity and hypertriglyceridemia are more prevalent among tobacco users in middle aged groups. (Table 1)

DALY (per 100,000 population) 2012 of world population, obtained from WHO website, is used here to estimate the disease burden on every patient and compared with various groups. Following table shows the DALY scores in each group. Score of DM was not included in calculation for obvious reason. Total DALY were significantly higher in diabetes younger age groups (15-49 years) (Table 2, fig. 2, 3 and 7). It becomes opposite in the next higher age group of 50-59 years. (Fig. 4, 5). It is still higher, though not significantly in 60-69 years group also. (Table 2, Fig. 5).

Age groups	Tobacco Users (DALY)		DM(DALY)		P
	N	Mean ± SD	N	Mean ± SD	
15-29	172	32.5 ± 101.7	11	192.6 ± 187.5	0.0186
30-49	311	265.6 ± 548.5	118	396.8 ± 560	0.0305
50-59	161	2469 ± 2948.6	143	1551.7 ± 2134.5	0.0019
60-69	134	5758.5 ± 6727.2	176	4633 ± 4897.4	0.1035
70+	56	10161 ± 12364	23	11011 ± 9642.6	0.7691

Table 2. Comparison of DALY among the Study Groups

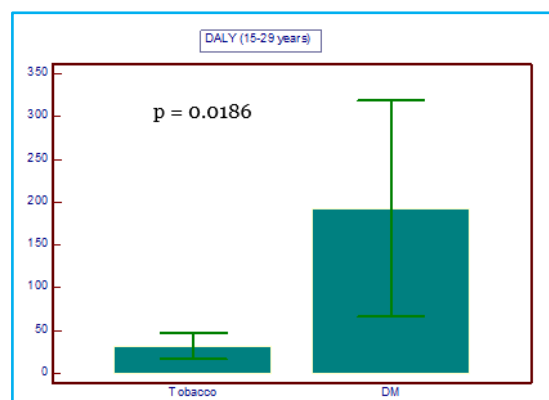


Figure 2. DALY for 15-39 Years Group

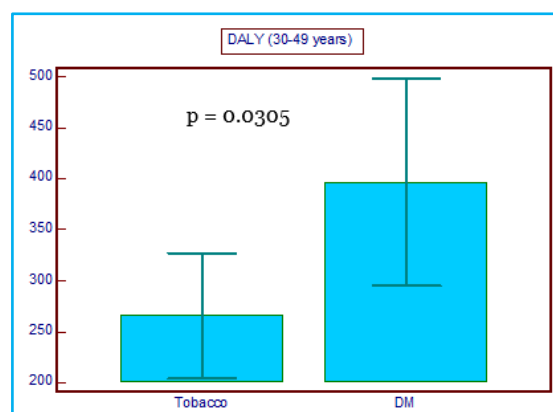


Figure 3. DALY for 30-49 Years Group

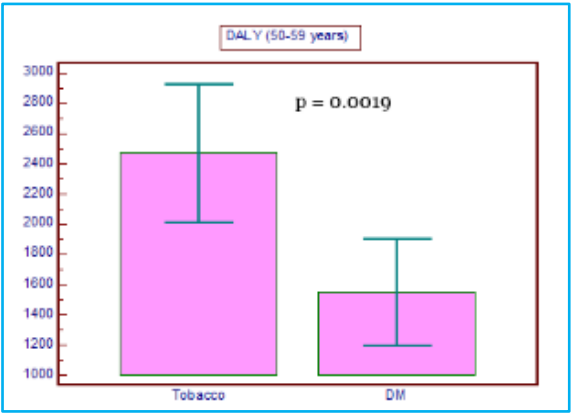


Figure 4. DALY for 50-59 Years Group

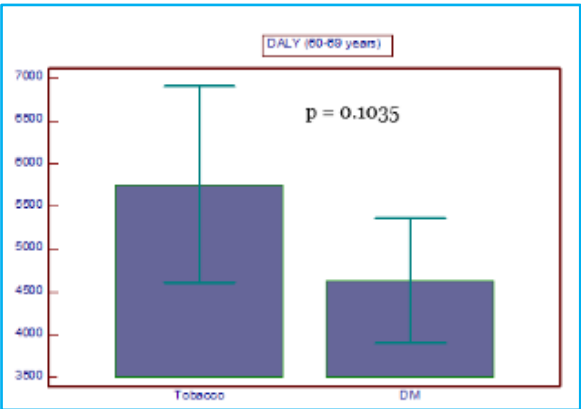
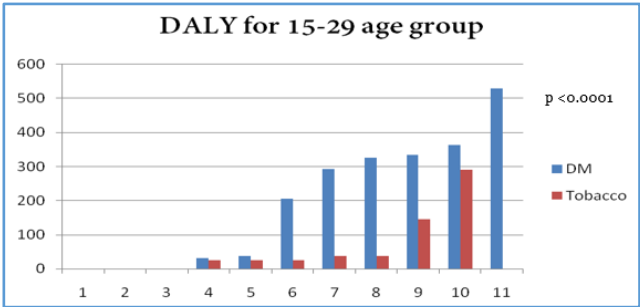


Figure 5. DALY for 60-69 Years Group

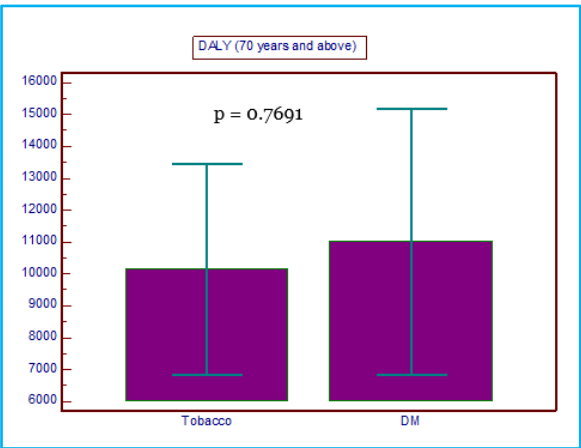
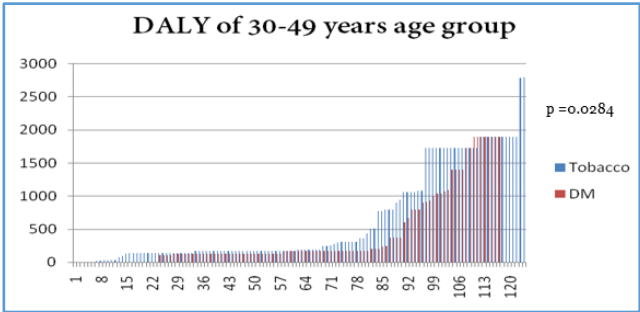


Figure 6. DALY Comparison among 70 Years and Above Age Group

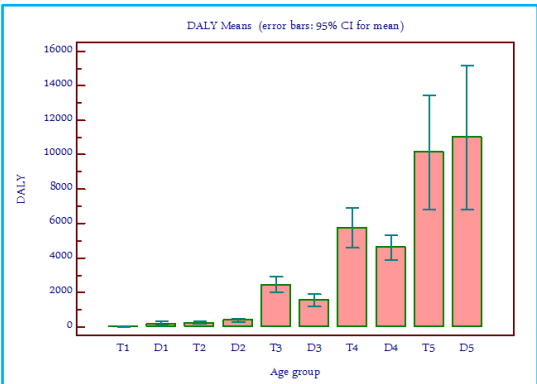
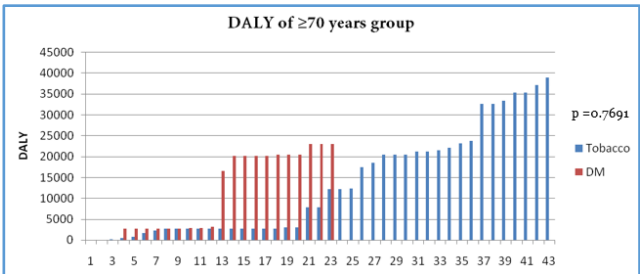
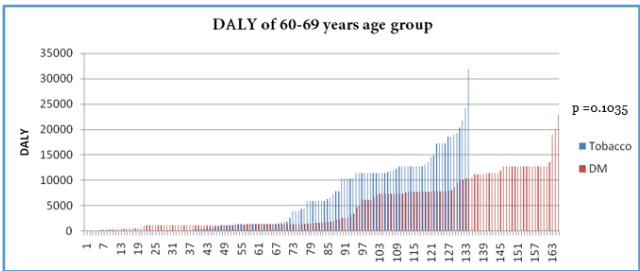
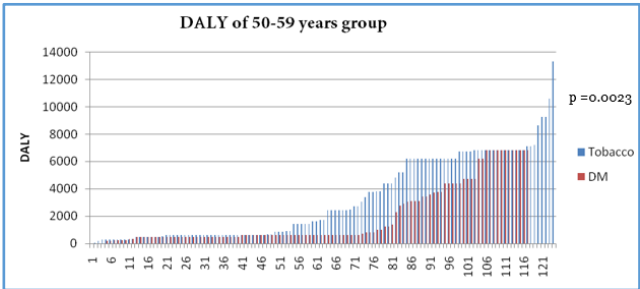


Figure 7. Comparison of DALY in all 5 Age Groups

	Tobacco		DM		
	N	Mean +SD	N	Mean + SD	P
Male	602	2952 + 6016	156	4802 + 6219	0.0007
Female	81	546.76 + 1206.9	220	2509.3 + 3595.9	<0.0001

Table 8. DALY of All Age Group as One

DISCUSSION

The disability-adjusted life year is a type of health-adjusted life year (HALY) that attempts to quantify the burden of disease or disability in populations. It measures overall disease burden, expressed as the number of years lost due to ill-health, disability or early death. $DALY = YLL + YLD$ where YLL is years of life lost, and YLD is years lived with disability. The DALY measure has been used by the World Health Organization, which publishes regular updates on the global burden of disease (GBD) as a statistical annex to the World Health Report.¹⁷

There has been no formal comparison of disease burdens secondary to tobacco use and diabetes so far. Duration and amount consumed for tobacco use are related to its complications. Likewise, duration and level of sugar control are independent risk factors for complications in diabetes. The present study gives a hint that tobacco use induces its complication slowly, from a normal individual to a diseased state. On the other hand, onset of diabetes itself is a diseased condition and results in earlier co-morbidities, as found in our study. However, in later age, the impact of tobacco use becomes more as compared to that of diabetes. Although smoking is known to decrease body weight, it is associated with central obesity.¹⁸ Waist circumference in 50-59 years age group was significantly higher among tobacco users.

There are few limitations of this study. Records were obtained from a single center. Sample sizes were different among study groups and between various parameters also. In spite of these unavoidable limitations, our study highlights the importance of considering tobacco use as more harmful than the well-known diabetes itself. Larger multi-centric trials are needed to strengthen the level of evidence.

CONCLUSION

Although the impact of diabetes on health is earlier in onset as compared to tobacco use, its impact is lesser in later years. This indicates that tobacco is more detrimental to health as compared to DM. Fortunately; tobacco is absolutely modifiable risk factor as opposed to diabetes. In spite of this, the general population are exposed to this risk and predisposes themselves to severe pathologies. So, it is necessary to strengthen the public awareness of tobacco avoidance and cessation.

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