

Effects of Smoking on Pilots of Bangladesh Air Force in Dhaka Area

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Abstract

Introduction: Smokers have a high morbidity and mortality rate and the causes of excess morbidity and mortality include lung cancer, COPD (Chronic Obstructive Pulmonary Disease) and cor pulmonale. An estimated 100 million people died in the 20th century from tobacco-associated diseases. Smoking also affects the performance and cause physical deterioration of pilots.

Objectives: To evaluate the effects of smoking on pilots of Bangladesh Air Force (BAF), Dhaka area.

Materials and Methods: This cross sectional study was conducted during the period of January to June 2014 among the available pilots of different age and ranks of 6 flying squadrons of BAF Dhaka area. Data were collected by using a pre-tested semi-structured questionnaire distributed among the pilots. Information were also collected from Central Medical Board (CMB), BAF about total number of pilots placed in low medical category and nature of their sickness. Finally chest X-ray and ECG of the pilots were done to find out any respiratory and cardiovascular abnormalities. Data obtained were entered into SPSS version 21.0 for analysis.

Results: Total 190 pilots were interviewed and among them, 80(42%) were smokers and 110(58%) were non-smokers. Most of the pilots were within the age group of 26-30 years (30%). Out of 80 smoker, 37(46%) smoked for more than 10 years, rest smoked for 10 years and less. Stress was the most common cause of starting smoking (96.3%). Fifty eight (72.5%) pilots agreed that their stamina and physical efficiency decreased due to smoking, 21 (26.3%) experienced breathlessness at high altitude, 26(32.5%) experienced visual disturbance during night flying. Fifty three (66.3%) pilots complained of

occasional episode of palpitation along with increase in pulse rate. Thirty one (39%) experienced occasional headache during high altitude flight, 58(72.5%) had heart burn related to smoking. Thirty eight (47.5%) had occasional bouts of cough with sputum and 40(50%) complained of occasional gum bleeding. These pilots also informed that they reported sick several times for headache, heart burn, cough and URTI (Upper Respiratory Tract Infection) and were unfit for flying duties. During January-June 2014, a total of 10 pilots of BAF Dhaka area were placed in low medical category out of them 6 (60%) pilots had smoking habits and suffered from IHD-4 (Ischemic Heart Disease) and HTN-2 (Hypertension). There was statistically significant association between number of the cigarette smoked, period of smoking and physical deterioration of smoker pilots ($P<0.05$). Those who smoked more than 10 sticks/day and more than 10 years had moderate to severe physical deterioration.

Conclusion: Smoking adversely affects all systems of human body. It impairs altitude tolerance, early induction of hypoxia, impairment of night vision. It affects autonomic systems and thus impairs all compensatory mechanism needed at higher altitudes. Morbidity and mortality related to smoking have linear relation. Pilots must be indoctrinated not to smoke for the sake of their safety flight, own life, their families and the nation.

Key-words: Effects of smoking, lung cancer, cor-pulmonale, physical deterioration of pilots.

Introduction

The task of piloting a complex aircraft is one that demands a high level of concentration, mental integration and psychomotor skills. Pilots whose

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ability is degraded by disease, emotional problems, drugs, fatigue or unusual physical stress are ill-equipped to deal with their task in flight^{1,2}. Since World war-I it has been recognized that illness and other problems, whether incurred on or off job, can have disastrous consequences in flight^{1,2,3}. Explosion in communication systems media use for commercial advantages resulted in tremendous increase in smoking habits. Commercial slogans and search of mood elation in moments of stress resulted in further rise in the smoking population³. Stress of war, operations, training and peculiarity of job pattern did contribute to its access in Armed Forces; Air Force is no exception to it.

This study was conducted with an aim to evaluate the effects of smoking on pilots of Bangladesh Air Force (BAF), Dhaka area. The main points of evaluation were to find out the number of smoker pilots, their age group, ratio of smoker and non-smoker, adverse effects of smoking at ground level and also during high altitude flying, non-effective days of smoker pilots due to sickness and to know the physical deterioration due to smoking among pilots of BAF Dhaka area. Finally to find out the association between numbers of cigarette smoked, periods of cigarette smoked with physical deterioration of the pilots.

Materials and Methods

This cross sectional study was conducted during the period of January to June 2014 among the available pilots of 6 flying squadrons of BAF Dhaka area where pilots of different ages and rank structure were available. Data was collected by using a pre-tested self-administered semi structured questionnaire distributed among the pilots to find out the smoking habits and its effects on their physical efficiency and health. Information were also collected from Central Medical Board (CMB), BAF about total number of pilots placed in low medical category and nature of their sickness. History was also collected from the low medical category pilots regarding their smoking habits.

A scale was prepared to determine the physical deterioration of smoker pilots⁴. From the answers of the questionnaire this scale was prepared. Considering the deterioration in physical efficiency, breathlessness and headache during high altitude

flight, visual disturbance during night flying, palpitation, increased pulse rate, heart burn, presence of bouts of cough with sputum and gum bleeding. The scale was calibrated as "No deterioration=0", "Mild deterioration=1-3", "Moderate deterioration=4-6" and "Severe deterioration=7-9". Finally chest X-ray and ECG of the pilots were done to find out any respiratory and cardiovascular abnormalities.

All questionnaires were reviewed for accuracy, consistency and completeness. Data obtained were entered into SPSS version 21.0 for analysis. Univariate and bivariate analyses were carried out using both descriptive and inferential statistics. In order to find out association between numbers and period of cigarette smoked with physical deterioration of the pilots Chi square (χ^2) test was done.

Results

The questionnaires were distributed among the pilots of BAF Dhaka area and 190 pilots returned the questionnaire. All the pilots were aged between 21 to 45 years. Among these 190 pilots, 80(42%) were smokers and 110(58%) non-smokers (Table-I). Of these 80 smoker maximum (30%) were within the age group of 26-30 years (Table-II). Among the 80 smoker pilots 59(73.8%) smoked for more than 10 years, rest smoked for 5 years and less (Fig-I). Table-III showed 61(76.3%) pilots smoked more than 10 cigarettes per day, 19(23.8%) smoked less than 10 cigarettes per day. Stress was the most common cause of starting smoking among 77 pilots (96.3%). Fifty eight (72.5%) smoker pilots agreed that their stamina and physical efficiency decreased due to smoking (Fig-2), 21(26.3%) experienced breathlessness at high altitude and 26(32.5%) experienced visual disturbance during night flying and 53(66.3%) smoker complaints of occasional episode of palpitation along with increase in pulse rate. These 53 pilots also reported that they were unfit for flying during pre-flight medical checkup due to tachycardia several times during their service life. Out of 80 smoker pilots, 31(38.8%) experienced occasional headache during high altitude flight, 58(72.5%) had heart burn related with smoking and 38(47.5%) had occasional bouts of cough with sputum. These pilots also informed that they reported sick several times for headache, heart burn, cough and RTI and were under treatment and were unfit for flying duties during the treatment period. It was found that out of 80 smoker pilots of BAF

Dhaka area 40(50%) complained of occasional gum bleeding. Diseases from which smoker pilots had suffered or reported sick in last year (January-June 2014) are shown in Table-IV. Among the 80 pilots 29(36.3%) were non-effective for more than 5 days, 19(23.8%) were non-effective for 5 days (Table-V). Table-VI showed severe physical deterioration among 18(22.5%) smoker pilots, moderate physical deterioration among 37(46.3%) pilots and 22(27.5%) smoker pilots did not have any physical deterioration. The bivariate analysis revealed statistically significant association between number of the cigarette smoked, period of smoking and physical deterioration of smoker pilots ($P < 0.05$). Those who smoked more than 10 sticks/day had moderate to severe physical deterioration and those less than 5 sticks/day had no physical deterioration (Table-VII). Table-VIII also showed that those who smoked for more than 10 years have moderate to severe physical deterioration. Those who were occasional smokers had no physical deterioration.

Table-I: Smoker-Non-smoker Ratio (n=190)

Category	Number of Pilots	Percentage
Non-smoker	110	58
Smoker	80	42
Total	190	100

Table-II: Distribution of the smoker pilots according to age (n=80)

Age group	Number of Pilots	Percentage
21-25 years	13	16.3
26-30 years	24	30.0
31-35 years	18	22.5
36-40 years	15	18.8
41-45 years	10	12.5
Total	80	100

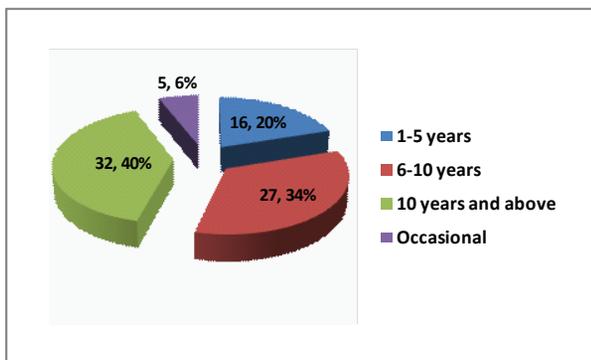


Fig-1: Distribution of the Period of Smoking of the Respondents (n=80).

Table-III: Distribution of the smoker pilots according to the number of cigarettes per day smoked (n=80)

Number of Cigarettes per day	Number of pilots	%
Less than 5 sticks/day	9	11.3
6-10 sticks/day	10	12.5
11-15 sticks/day	31	38.8
16-20 sticks/day	20	25.0
More than 20 sticks/day	10	12.5
Total	80	100

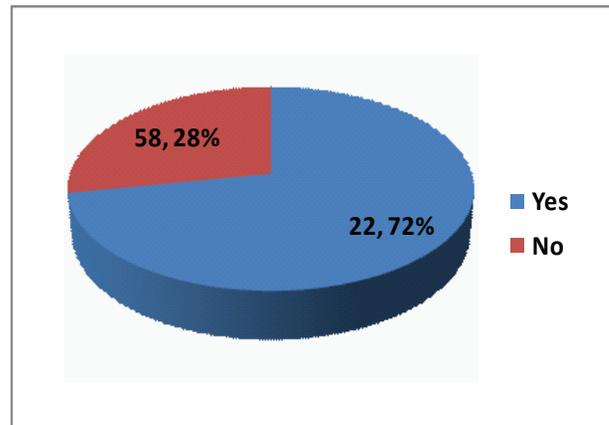


Fig-2: Distribution of deterioration in physical efficiency due to smoking (n=80).

Table-IV: Distribution of the smoker pilots according to disease from January-June 2014 (n=80)

Disease	Number of pilots	Percentage
Common cold	69	86.3
PUD	61	76.3
URTI	59	73.8
Anxiety	37	46.3
Gingivitis	34	42.5
Pharyngitis	5	36.3
Miscellaneous	52	65

Table-V: Distribution of sickness absenteeism (non-effective) of smoker pilots in the last year (January-June 2014)

Sickness absenteeism days	Frequency	Percentage
1 day	6	7.5
2 days	15	18.8
3 days	3	3.8
4 days	8	10.0
5 days	19	23.8
More than 5 days	29	36.3
Total	80	100

Table-VI: Distribution of smoker pilots according to physical deterioration (n=80)

Physical deterioration	Frequency	Percentage
No deterioration	22	27.5
Mild deterioration	3	3.8
Moderate deterioration	37	46.3
Severe deterioration	18	22.5
Total	80	100

Table-VII: Association between number of the cigarette smoked by the pilots and physical deterioration of smoker pilots (n=80)

		Distribution of physical deterioration of smoker pilots				Total Frequency (%)	Chi square df P value
		No Frequency (%)	Mild Frequency (%)	Moderate Frequency (%)	Severe Frequency (%)		
Number of The cigarette smoked by the pilots	< 5 sticks/day	7	1	1	0	9	$\chi^2=47.455$ df=12 P=0.024
		8.8%	1.3%	1.3%	0.0%	11.3%	
	6-10 sticks/day	6	0	4	0	10	
		7.5%	0.0%	5.0%	0.0%	12.5%	
	11-15 sticks/day	9	2	17	3	31	
		11.3%	2.5%	21.3%	3.8%	38.8%	
16-20 sticks/day	0	0	12	8	20		
	0.0%	0.0%	15.0%	10.0%	25.0%		
> 20 sticks/day	0	0	3	7	10		
	0.0%	0.0%	3.8%	8.8%	12.5%		
Total	22	3	37	18	80		
	27.5%	3.8%	46.3%	22.5%	100.0%		

Table-VIII: Association between period of smoking and physical deterioration of smoker pilots (n=80)

		Physical deterioration of smoker pilots				Total Frequency (%)	Chi square df P value
		No Frequency (%)	Mild Frequency (%)	Moderate Frequency (%)	Severe Frequency (%)		
Period of smoking	1-5 years	6	1	8	1	16	$\chi^2=19.184$ df=9 P=0.024
		7.5%	1.3%	10.0%	1.3%	20.0%	
	6-10 years	4	1	14	8	27	
		5.0%	1.3%	17.5%	10.0%	33.8%	
	10 years and above	7	1	15	9	32	
		8.8%	1.3%	18.8%	11.3%	40.0%	
Occasional	5	0	0	0	5		
	6.3%	0.0%	0.0%	0.0%	6.3%		
Total	22	3	37	18	80		
	27.5%	3.8%	46.3%	22.5%	100.0%		

Table-IX: Distribution of smoker pilots according to low medical category and diseases (January-June 2014) (n=10)

Number of low Medical category pilots	Smoker			Non-smoker		
	No	Disease	%	No	Disease	%
10	6	IHD-4 HTN-2	40 20	4	DM-2 PLID-1 Hepatitis-1	20 10 10
Total	10	6	60	4		40

X-ray and ECG of all 80 smoker pilots were done to find out any respiratory and cardiovascular diseases. But all the reports were within normal limits. In the year 2014, a total 10 aircrew of BAF Dhaka area were placed in low medical category out of which 6 (60%) aircrew had smoking habits and among them 4 were suffering from IHD and 2 were patients of HTN. The non-smoker aircrews in low medical category were patients of Diabetes Mellitus-2, PLID-1 (Prolapsed Lumbar Intervertebral Disc) and Hepatitis-1 (Table-IX). It is interesting to note that the respondents were aware of the ill effects of smoking and tobacco and also aware of the fact that passive smoking affects the health of their families and comrades.

Discussion

Smokers have a high morbidity and mortality rate and the causes of excess morbidity and mortality includes lung cancer, COPD (Chronic Obstructive Pulmonary Disease) and cor pulmonale^{1,2,3,5,6,7,10}. An estimated 100 million people died in the 20th century from tobacco-associated diseases^{3,5,6}. Cigarette smoking is by far the most important single factor in the causation of lung cancer. It is thought to be directly responsible for at least 90% of lung carcinomas, the risk being directly proportional to the amount smoked and to the tar content of cigarettes^{3,5,8,10}. Death rate from the disease in heavy smokers is 40 times than that in non-smokers^{5,7,9}. In women, smoking prevalence and death from lung cancer continue to increase and more women now die of lung cancer than breast cancer in the USA and UK⁵. In china 1.2 million people die from smoking related illness each year¹⁷.

Smoking primarily affects the lung as well as vascular system. It adversely affects the sensorial, respiratory capacities, volumes and respiration^{3,5-11}. It affects the cardiovascular system, haemodynamics, aggravating poor compensatory responses for mental function and psychomotor coordination^{3,5-12}. The well established and proven smoking induced symptoms and disease are oral plaque and gingivitis, pharyngitis and laryngitis, Bronchial asthma, COPD, spontaneous pneumothorax, impairment of night vision, altitude intolerance and hypoxia, IHD, hypertension, peripheral vascular disease, dyspepsia and peptic ulcer, exercise intolerance and bronchial carcinoma^{1-3,5-12,18}. Smoking is also responsible for low birth weight and increase in neonatal mortality^{3,5,7}.

From the in depth study carried out among the pilots at BAF Dhaka area regarding the effects of smoking, the main concern which has emerged is that the number of smokers are high. This is an ominous situation as it becomes evident that a prevalence of smoking in BAF pilots is more than 40%. This rising trend should be an eye opener for the medical authorities since it highlights their negligence in recognizing the evil and their inability to suppress the injurious habit¹. The most alarming fact that came out from the study that among the pilots of BAF Dhaka area who are placed in low medical category, more than 50% are smoker, who are suffering from serious diseases like IHD or hypertension^{13,15,16}. The revelation of the fact that the smokers develop Upper Respiratory Tract Infections (URTI) and other smoking related diseases more often, which result in higher number of non-effective days among smoker pilots and it should concern aviation medicine specialists as well as the competent higher authorities.

From the study it became evident that there was a noticeable deterioration in the physical efficiency and stamina of pilots who smoked 10 or more cigarettes per day for the past 10 years which it self is a flight safety hazard since decreased efficiency leads to errors in flight as well as lowering of confidence regarding their flying efficiency^{1,14}. Pathological phenomenon like hypoxia and hyperventilation decrease alertness and lack of concentration may become more pronounced in inflight emergency situation resulting in errors of judgment, slow reflexes, under confident control of the aircraft and inability to take timely corrective measures^{1,2,6-11,19}. A very sensitive part of flying the importance of which cannot be overlooked is high altitude flying which is adversely affected by smoking¹².

The Hypoxia that the smokers experience is enhanced during night flying, which may precipitate spatial disorientation as a consequence of deteriorating rod function profoundly reducing night adaptation^{1,2,11,13,19}. The questionnaire also pointed out that most of the pilots' smoked either just prior to their mission or soon after wards; moreover pilots were not aware of the ill-effects of nicotine on empty stomach. Pilots who smoked immediately after their mission did not acknowledge the fact that their stomach at that particular time was more or less empty which lead to increased gastric acid secretion causing so called heart burn, commonly experienced by the smoker pilots^{2,5,7}.

Conclusion

The demands of flying are extra ordinary; it requires unmatched general health and physique which should cater to high altitude stress tolerance, impeccable vision, hearing, touch and smell, a respiratory system to sustain and compensate all the allied insults. An aviator should have immaculate cardiovascular system, to stand G force and other insults. His higher mental function, judgment and reaction along with psychomotor co-ordination should be superior to normal human being. He must have good functioning autonomic system to withstand sudden mental, physical and psychological stress. For the sake of this poor nation a pilot should have long useful span of training which ends with experienced utilization. The review of health requirements of a flyer and the adverse effects of smoking reveals that flying and smoking is a mismatch. Smoking adversely affects all systems of human body. It impairs altitude tolerance, early induction of hypoxia, impairment of night vision. It affects autonomic systems and thus impairs all compensatory mechanism needed at higher altitudes. Morbidity and mortality related to smoking have linear relation. Flyers should be indoctrinated not to smoke for the sake of their own life, welfare of their families and the nation.

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