RESEARCH ARTICLE

Hospital based prevalence of smoking among surgical patients in tertiary care hospitals of Karachi Pakistan

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Abstract

Objective: To determine the prevalence of smoking and to evaluate the knowledge about preoperative smoking cessation in patients coming for elective surgery.

Method: The cross-sectional study was conducted from July 30, 2019, to March 17, 2020, in the preoperative anaesthesia assessment clinic and surgical wards of Aga Khan University Hospital, Civil Hospital Karachi, and Abbasi Shaheed Hospital, Karachi, and comprised all patients of either gender aged >12 years scheduled for elective surgery having American Society of Anaesthesiologists physical status I-IV. Data was analysed using Stata 13.

Results: Of the 811 patients, 478(59%) were male and 333(41%) were female. The overall mean age was 43.4±16.4 years and mean BMI was 25.0±5.8kg/m2. There were 164(20.2%) smokers in the sample. The overall knowledge about preoperative smoking cessation was significantly associated with the level of education and gender ($p<0.05$).

Conclusion: Smoking in surgical patients was about one-fifth of the overall sample, and knowledge related to preoperative smoking abstinence was significantly associated with educational status and gender.

Keywords: Prevalence of smoking, Surgical patients, Knowledge of smoking abstinence. (JPMA 72: 2468; 2022)

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Introduction

Smoking is a known risk factor for a wide range of intraoperative and postoperative pulmonary and cardiovascular complications, and, therefore, it is associated with increased postoperative mortality and morbidity. Smoking is also associated with chronic diseases, economic losses and an extreme burden on the healthcare system. A recent study about the life expectancy of persistent smokers reported an unconditional difference of 9.3 years in the age of death among smokers than non-smokers, while bias-corrected difference was around 4.3 years.[1] According to 2019 data, around 1.14 billion individuals were current smokers globally and the reported global prevalence of smoking was about 27.5% and 37.7% among adult males and females, respectively.[2]

Cigarette smoke contains over 4,500 substances, some of which are pharmacologically active, cytotoxic, mutagenic and some are carcinogenic. The main gaseous component is carbon monoxide and the particulate component is nicotine.[3] Persistent smoking causes cough, mucous hypersecretion, airway hyperreactivity, and airflow obstruction because of irritants used in cigarettes. Long-term chronic smoking of more than 50 pack years carries a higher risk of postoperative admission to intensive care unit (ICU).[4] In a study,[5] specific respiratory events during anaesthesia, such as reintubation, laryngospasm, bronchospasm, hypoxaemia and aspiration, were compared in smokers and non-smokers. In smokers, the incidence of these complications was higher (5.5%) compared to non-smokers (3.3%).

The systemic effects of smoking are likely due to the increased amount of nicotine and carbon monoxide in the blood. After inhalation, nicotine causes activation of sympathetic system and release of adrenaline, which causes an increase in heart rate (HR), blood pressure (BP) and systemic vasoconstriction. Ultimately, the myocardial oxygen demand are increased, whereas coronary blood flow decreases along with the myocardial effects. As such, postoperative pulmonary complications are 6-8 times more in smokers compared to the non-smokers.[6] Moreover, oxygen-carrying capacity is reduced in smokers as carbon monoxide binds 200 times greater than oxygen with the haemoglobin (Hb) chain, hence oxygen transport and delivery are affected.[7] The immune system of the body is also affected by smoking, as is the mucociliary function of the respiratory tract, thus decreasing the activity of leucocytes and immunoglobulin which leads to increased chances of malignancy, infections and poor wound healing,[8] which may increase the length of hospital stay (LOS) and overall financial burden. Smoking cessation of 4-8 weeks before elective surgery has been recommended by the Societies of Anesthesiologists in both the United States and Canada.[8]

In a population-based cross-sectional survey in Pakistan, it

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has been reported that one out of every 2-3 middle-aged men smokes cigarettes.[9] In this survey, the overall prevalence of smoking was 15.2%. Among men of the middle age (40-49 years), the prevalence of smoking was eight-fold higher than in women.[10] In Karachi, the prevalence of smoking in the general population was reported in 2002 to be about 32.7%.[10] The Global Adult Tobacco Survey (GATS) is a global standard for systematically monitoring adult tobacco use (smoking plus smokeless tobacco), which was conducted in Pakistan in 2014, and reported that overall 19.1% adults in the general population were using tobacco in any form, including 31.8% men and 5.8% women.[11] The overall prevalence of adult smoked tobacco user was 12.4% (22.2% men and 2.1% women), while 7.7% adults (11.4% men and 3.7% women) were smokeless tobacco users.[11]

While the prevalence of smoking among general population has been estimated, no data is found regarding the prevalence of smoking in patients coming for surgeries under anaesthesia. The current study was planned to fill the gap by determining the prevalence of smoking among surgical patients and the patients' knowledge about preoperative smoking abstinence in a tertiary care setting.

Materials and Methods

The cross-sectional study was conducted from July 30, 2019, to March 17, 2020, in the preoperative anaesthesia assessment clinics and surgical wards of private-sector Aga Khan University Hospital (AKUH), and public-sector Civil Hospital Karachi (CHK) and Abbasi Shaheed Hospital (ASH) in Karachi. Due to the emergence of the coronavirus disease 2019 (COVID-19) pandemic in March 2020, elective surgical lists were halted in the selected hospitals which also stopped the recruitment process for the study. After permissions from the hospital administrations and approval from the institutional ethics review boards of the three hospitals, the sample was raised using modified single-stage cluster sampling. Each hospital was considered a cluster and within each cluster, consecutive sampling was used instead of random sampling because in hospital-based studies, the sampling frame cannot be defined at the beginning of the recruitment process.

The sample size was calculated using EPITOOLS[9] calculator using anticipated proportion 0.15[10] and precision 0.025 with 95% confidence level and estimated finite population of Karachi 16 million According to the Pakistan Bureau of Statistics website https://www.pbs.gov.pk/ content/final-results-census-2017-0.[11]

Two individuals were trained for data collection. They were assigned to the preoperative anaesthesia clinic

APPENDIX

Questionnaire

Study Title: Hospital Based Prevalence of Smoking Among Surgical Patients In Tertiary Care Hospitals Of Karachi Pakistan

- Date (DD/MM/YYYY): _____
- Surgical procedure: _____
- Patient ID: _____

1. Demographic Variables:

Education level

Illiterate/undergraduate:

Graduate:

Postgraduate:

Occupation: _____

Age (years): _____ Residential city: _____

Gender: Male Female

Marital status: Unmarried Married

Height (cm): _____ Weight (kg): _____

BMI (Kg/m^2): _____

ASA Physical status: I II III IV V

Comorbid (if any): _____

Contact number (Optional): _____

2. History of Smoking:

1. Do you smoke? Yes No (If No, skip to 1b and then 10)

If smoker: 1a) Current smoker 1b) Former smoker

2. Number of cigarettes smoked (per day): _____

3. Number of years smoked: _____

4. Pack year (number of cigarette smoked per day/20 × number of years smoked): _____

5. Brand of the cigarette used: _____

6. Have you ever attempted to quit smoking in your life? (Not for non-smokers)
Yes No

7. Are you advised by your Surgeon for cessation of smoking before surgery:
Yes No

8. If yes, since when is it advised: Hours _____ Days _____
Weeks _____ Months _____

9. Don't you think this is the best time to quit smoking? Yes No

10. Use of snuff or chewed tobacco: Yes No

3. Patient Knowledge About Effects of Smoking And Its Abstinence Before Surgery:

1. Does the patient know about abstinence from smoking is necessary before anaesthesia? Yes No Don't know

2. Does the patient know that smoking can cause complications during anaesthesia?
Yes No Don't know

3. If yes, how does patient know: through: Surgeon Anaesthesiologist
Nurse General knowledge Media Others

4. Does the patient know about postoperative surgical complications caused by smoking like:

4a. Slower healing of wound: Yes No Don't know

4b. Increased risk of infection: Yes No Don't know

4c. Increased hospital stay: Yes No Don't know

and/or surgical ward of the selected hospitals, five days per week from 9am to 5pm. The data collectors gathered information from the surgery outpatient clinics, operating room (OR) lists, preoperative anaesthesia clinics or from surgical wards of the hospitals where preoperative anaesthesia clinics did not exist.

Patients included were of either gender aged >12 years who were scheduled for all types of elective surgeries having American Society of Anaesthesiologists (ASA)[12] physical status I-IV. Those excluded were patients who refused t participate, had low Glasgow Coma Scale (GCS) score, bedridden, patients undergoing emergency surgeries and those in the ICU.

In the preoperative phase at the time of nursing assessment, written informed consent was taken from the patients and questions about their smoking habits and knowledge about abstinence from smoking before surgery were asked by the data collectors using a questionnaire (Appendix). Due to the differences in patients' educational status and levels of understanding, the questionnaire was filled up by the data collectors. After data collection, a patient information sheet regarding the hazards of smoking and the benefits of smoking cessation was given to each patient.

Data was analysed using Stata 13. Descriptive statistics of demographic variables, like age, body mass index (BMI), years of smoking and pack-years, were expressed mean ± standard deviation (SD) and Median with 25-75 percentiles. Gender, educational level, ASA physical status, marital status and the prevalence of smoking among surgical patients were expressed as frequencies and percentages. Patients' knowledge about the benefits of smoking abstinence was assessed by observing the proportion of correct answers. Multivariate logistic regression was used to determine the association of smoking status with gender, BMI, educational and marital status, while another multivariate logistic regression was done to analyse the association of knowledge about preoperative smoking cessation with age, educational status and gender. Standard errors and 95% confidence intervals (CIs) were calculated. In logistic regression analysis, $p< 0.05$ was considered statistically significant.

Results

Of the 811 patients, 478(59%) were male and 333(41%) were female. There were 300(37%) patients from the private-sector AKUH, while the rest were from ASH 330(40.6%) and CHK 181(22.3%). The overall mean age was 43.4±16.4 years and mean BMI was 25.0±5.8kg/m^2. There were 164(20.2%) smokers in the sample; AKUH 58(19.3%), ASH 56(17%) and CHK 50(27.6%). BMI of 21(2.6%) patients and ASA status of 63(7.7%) patients was missing (Table-1).

Table-1: Baseline characteristics.

Baseline Characteristics	Frequency (%) n= 811 [Total Sample]	Frequency (% of total sample) [Smokers]
Hospitals	811 (100)	164 (20.2)
• Aga khan University Hospital	300 (37.0)	58 (19.3)
• Abbasi Shaheed Hospital	330 (40.6)	56 (17.0)
• Civil Hospital Karachi	181 (22.3)	50 (27.6)
Gender		
• Male	478 (59.0)	158 (33.0)
• Female	333 (41.0)	6 (1.8)
Education status		
• Illiterate/Undergraduate	612 (75.4)	127 (20.7)
• Graduate	131 (16.1)	27 (20.6)
• Postgraduate	68 (8.3)	10 (14.7)
Marital status		
• Unmarried	135 (16.6)	31 (23.0)
• Married	676 (83.3)	132 (19.5)
ASA Physical Status		
• ASA I	357 (44.0)	71 (20.0)
• ASA II	317 (39.0)	60 (19.0)
• ASA III	73 (9.0)	16 (22.0)
• ASA IV	1 (0.1)	0 (0.0)
• Not Reported	63 (7.8)	17 (27.0)
Age (Years)		
• =< 18	31 (3.8)	5 (3.0)
• >18	780 (96.2)	159 (97.0)
Smoking Status		
• Smoker	164 (20.2)	164 (100)
• Non-smoker	647 (79.8)	0 (0)
Chewable tobacco/Pan users	131 (16.1)	38 (23.2)
Baseline Characteristics	**Mean±SD**	**Median [25-75 percentile]**
Age (years) n= 811	43.4±16.4	40.0 [30- 55.5]
BMI (Kg/m^2) n= 811	25.0±5.8	24.0 [22- 27.0]
Years of Smoking (164 Smokers)	16.3±13.1	13.5 [5 – 25]
Smoking (Pack-year in 164 smokers)	8.8±13.6	2.5 [0 – 12]

ASA: American Society of Anaesthesiologists, BMI: Body mass index.

Among the male subjects, there were 158(33.1%) smokers and 6(1.8%) among the females (Pearson's Chi2 = 119.14 & P= 0.001).

Overall, 71(19.8%) ASA-I, 60(18.9%) ASA-II and 16(21.9%) ASA-III patients were smokers. None of the patients with ASA-IV was smoker. Also, 45(23%) illiterate patients, 82(19.7%) undergraduates, 27(20.6%) graduates and 10(14.7%) having postgraduate education were smokers. Preoperative smoking abstinence was advised by surgeons to 48(30.7%) smokers.

Overall, 442(54.5%) patients were aware of discontinuing smoking before elective surgery. Among the non-

Table-2: Multivariable logistic regression analysis regarding smoking status.

Log likelihood = -320.87, Chi2 = 154.39, P-value = 0.0001			
Variables	**Odds Ratio**	**Standard error**	**95% CI**
BMI	1.13	0.05	1.02 to 1.25
Gender			
Male =1	1081.40	1940.20	32.12 to 36406.35
Female = 0	Ref.		
Gender * BMI	0.88	0.049	0.79 to 0.98
Constant	-7.63	1.72	-11.02 to -4.25

BMI: Body mass index, CI: Confidence interval.

Table-3: Multivariable logistic regression and knowledge of preoperative smoking cessation.

Log likelihood = -548.07, Chi2 = 21.56, P-value = 0.0001			
Variables	**Odds Ratio**	**Standard error**	**95% CI**
Educational status			
Illiterate/undergraduate	Ref.		
Graduate	1.76	0.35	1.19 to 2.62
Postgraduate	1.72	0.46	1.02 to 2.91
Gender			
Male =1	1.65	0.24	1.24 to 2.20
Female = 0	Ref.		
Constant	0.77	0.09	0.61 to 0.98

CI: Confidence interval.

smokers, 315(50.4%) illiterate/undergraduate patients, 84(64.1%) graduates and 43(63.2%) postgraduate patients had knowledge about abstinence from smoking before elective surgery (p=0.001). Among the smokers, 80(63%) illiterate/undergraduate, 27(67%) graduate and 4(40%) postgraduate patients were aware of the abstinence of smoking before surgery (p=0.03).

Overall, 345(42.5%) patients had superficial knowledge that smoking can cause perioperative complications. The knowledge about potential perioperative complications was highest among postgraduate patients 44 (64.7%), while it was the lowest among illiterate individuals 52(26.5%). The knowledge about perioperative complications were 175(42%) out of 416 undergraduate and 75 (57.2%) out of 131 graduates, respectively. Among the smokers, knowledge about complications under anaesthesia was highest in postgraduates 5(50%), followed by 48(38%) in illiterate/undergraduate, and 9(34%) in graduate patients.

The sources of information among 345(42.5%) patients who had the knowledge about perioperative complications, was acquired from different sources, including general knowledge 174(50%), electronic and print media 90(26%), anaesthesiologists 38(11%), surgeons 31(9%) and through nurses 7(2%). In <5% of cases, the sources of information were books, newspapers, cardiologists, dentists and other persons. Also, 148(43%) patients were aware of postoperative risk of infection, 145(42%) had awareness about possible prolongation of hospital stay and 126(36.5%) were aware of delayed wound healing.

In multivariable analysis, a significant interaction was found between BMI and gender (Table-2).

The level of education and gender were significantly associated with the knowledge of preoperative smoking abstinence (Table-3).

Discussion

In the multi-centric population-based study done in metropolitan Karachi, one in every five patients coming for surgery was smoking tobacco which is significantly higher than the prevalence of tobacco usage in the general population i.e., 12.4%.[13] The overall use of tobacco (smoking 20.2%, chewable tobacco 16.1% and smoking-plus-chewable 23.3%) in surgical patients was significantly high. The national data has shown a gradual rise in tobacco use both chewable (42%) and smoking (18%) over a period of time, especially in the female population and those aged 30-45 years,[14] which is almost similar to the current findings in which the median age was 40 years. Overall 33% males and 1.8% females are smokers in the study which is significantly different from a study conducted in the general population where tobacco consumption was almost similar between the males (51.2%) and the females (48.8%).[14]

ASA status showed that the smoked tobacco users were 20% ASA-I, 19% ASA-II, 22% ASA-III and there was none with ASA-IV status. A significant proportion of patients had ASA-III, which is similar to a study which found higher odds of smoking among patients with more serious ASA physical status.[15]

Most smokers in the current study were either illiterate/undergraduate (20.7%) or graduate (20.6%). This might be due to stress among specific groups related to peer pressures, social, cultural and domestic stresses, workplace stress and/or unemployment in society etc. The results, however, showed no significant association between smoking status and level of education.

A few years ago, to discourage the increasing use of tobacco, the World Health Organisation (WHO) advised the Pakistani government to increase tobacco tax rate up to 70%. They also advised increasing pictorial health warnings on cigarette packs to 80% which have not been fully implemented yet.[16] Chewable tobacco is the leading cause of oral cavity cancers among males in Pakistan,[17]

and the pictorial warnings should also be imprinted on the packs of chewable tobacco. There is a lot more to do for spreading awareness against tobacco use, especially among surgical patients because this is one of the best times to get rid of tobacco use. It is assumed that reduction in the burden of tobacco use helps to reduce the healthcare-related financial burdens. According to a survey, in 2018, the economic burden associated with smoking-related illnesses was Rs192 billion (US$1.3 billion).[18]

The current study found that knowledge about perioperative complications related to tobacco use was acquired by 11% from anaesthesiologists, 9% from surgeons and only 2% from the nurses. As a global surgery initiative, anaesthesiologists, surgeons and nurses should work as a single group in emphasising the importance of smoking cessation well before surgery.

One of the limitations of the current study was its duration. It was planned for a one-year period, but due to the emergence of the COVID-19 pandemic, data collection had to be halted in the 9th month. Although data was collected to satisfy the sample size calculation, relatively less data could be gathered from CHK, one of the two public-sector hospitals. The catchment areas of both public-sector hospitals are almost the same, and it was assumed that the sample collected from those were truly representative of the population.

Conclusion

Every fifth surgical patient was found to be a smoker. Smoking was more prevalent in illiterate/undergraduate, middle-aged, married, male patients with ASA-III status. Knowledge related to preoperative smoking abstinence was significantly higher among the educated compared to the illiterate, among males compared to females.

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