AWARENESS AND PREPAREDNESS IN SMOKING CESSATION AMONG SMOKER PATIENTS SCHEDULED FOR ELECTIVE SURGERY IN HUSM

BY

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LIST OF SYMBOLS AND ABBREVIATIONS

CI	Confidence Interval
CO	Carbon monoxide
COHb	Carboxyhaemoglobin
GOT	General Operation Theatre
HUSM	Hospital Universiti Sains Malaysia
NRT	Nicotine replacement therapy
NSAIDS	Nonsteroidal Anti Inflammatory Drug
OR	Odds ratio
RCT	Randomised Control Trial

ABSTRAK

Tahap kesedaran dan kebersediaan untuk berhenti merokok dikalangan pesakit yang dijadualkan untuk menjalani pembedahan secara elektif di Hospital Universiti Sains Malaysia

Pengenalan: Merokok adalah faktor penyebab yang boleh diubah untuk pelbagai penyakit dan kematian awal. Merokok dalam jangkamasa pembedahan adalah berhubungkait dengan pelbagai komplikasi dan morbiditi sehingga boleh menambahkan beban ekonomi. Pembedahan secara elektif memberi peluang yang baik untuk doktor bedah dan bius untuk membantu perokok berhenti merokok. Kajian ini bertujuan untuk mengenalpasti faktor untuk berhenti merokok dikalangan perokok sebelum menjalani pembedahan yang dijadualkan; dan menentukan kesan latar belakang, status merokok dan pengetahuan mengenai risiko kesihatan berkaitan merokok terhadap sikap tersebut.

Metodologi: 106 pesakit yang merokok yang dijadualkan untuk pembedahan secara elektif di Hospital Universiti Sains Malaysia terlibat dalam kajian; dari April hingga September 2015. Kajian ini melaporkan keputusan hasil kajian secara 'cross-sectional' terhadap pesakit-pesakit terlibat dengan melengkapkan soalan kajiselidik sebelum atau sehari selepas pembedahan. Soalan kajiselidik ini merangkumi tiga bahagian iaitu latar belakang subjek, status merokok dan pengetahuan mengenai risiko yang berkaitan dengan merokok.

Results: Purata umur bagi subjek adalah 37 (SD, 17.3). 60.4% (n=64) pesakit berhenti merokok lebih dari 24 jam sebelum masa pembedahan, dan 39.6% (n=42) lagi berhenti kurang dari 24 jam sebelum pembedahan. Mempunyai niat untuk berhenti merokok didapati merupakan faktor terpenting untuk pesakit berhenti merokok didalam kajian ini. Perokok yang tidak mempunyai niat untuk berhenti merokok mempunyai 4.32 odd yang lebih tinggi untuk berhenti merokok kurang dari 24 jam sebelum pembedahan berbanding dengan subjek yang mampunyai niat untuk berhenti merokok (95% CI: 1.85, 10.10, p-value<0.001).

Kesimpulan: Melihat kepada banyak kesan kesihatan yang baik jika berhenti merokok sebelum pembedahan, doktor bedah dan bius sepatutnya memainkan peranan mereka, sekurang-kurangnya memberi nasihat untuk berhenti merokok, atau yang sebaik-baiknya melibatkan program rawatan berhenti merokok. Pengenalan kepada 'nicotine replacement therapy (NRT)' akan meningkatkan peluang untuk terus berhenti terhadap para perokok.

ABSTRACT

Awareness and preparedness in smoking cessation among smoker patient scheduled for elective surgery in Hospital Universiti Sains Malaysia

Background: Smoking is the single most cause of preventable disease and premature death. Perioperative smoking is linked to various complications and morbidity and to a significant economic burden. Elective surgery offers a powerful opportunity for surgeon and anesthetist to help smokers quit. This study set out to identify factor or predictor toward smoking cessation among smoker patients prior to scheduled surgery; and to determine how sociodemographic background, smoking status and knowledge on the health risks of smoking contribute toward development of such attitude.

Methodology: 106 smoker patients who scheduled for elective surgery in Hospital Universiti Sains Malaysia were enrolled from April till September 2015. This paper reports the results of a cross-sectional study on these patients by filling predetermined questionnaire before anesthesia and surgery or on the first operative day. The survey included three sections exploring demographical profile of respondent, smoking status and knowledge regarding smoking-related risks.

Results: Mean age of respondent was 37 (SD, 17.3). 60.4% (n=64) patients stopped smoking more than 24 hour prior to surgery while the other 39.6% (n=42) had cessation less than 24 hour preoperatively. Intention to quit turned out to be the most

significant predictor for early smoking cessation in this study. Smoker patients who did not have intention to stop smoking had 4.32 higher odds of cessation less than 24 hour compare to those who had intention to stop smoking (95% CI: 1.85, 10.10, p-value<0.001).

Conclusion: Considering many beneficial effects of preoperative smoking cessation, both surgeon and anesthetist should play their role to achieve this; to the least of brief smoking cessation advice, and to the extent of any form of smoking cessation interventions. Introduction of nicotine replacement therapy will double the chance of abstinence and cure among smokers.

Keywords: Smoking cessation, Elective Surgery, Awareness, Preparedness

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Tobacco use is the most important preventable cause of disease and death in the world today. This is true in most countries in the world including Malaysia. An estimated 10,000 Malaysian deaths are attributed to smoking-related diseases annually. In 2006, diseases related to smoking account for at least 15% of hospitalized cases and approximately 35% of hospital deaths (KH., M.G, & N.M, 2009).

Many physicians are not aware that there has been great progress in recent decades in the treatment of tobacco dependence, as summarized in the United States Public Health Service Guideline and Tobacco Use and Dependence. Main recommendation of this report is to 'systemically identify all tobacco users who come in contact with the health care system, strongly urge them to stop, and aid them in doing so'. (Fiore et al., 2008)

Cigarettes smoke contains over 4700 additional chemical compounds other than nicotine. It includes at least 43 carcinogens which generate broad pathophysiological effects. Failure to quit smoking before elective or emergency

surgery is ill judged which can lead to subsequent risk of intra and postoperative complications. The link between smoking and post-operative complication is well documented across surgical specialties. Not only is there an increased mortality risk, but also other complications including pulmonary, respiratory, wound infections, delayed wound healing and reduced bone fusion.

With regards to anaesthesia, main complications are related to cardiovascular and respiratory systems. There will be an increase in blood pressure, heart rate and systemic vascular resistance. Respiratory problems include impaired in oxygen uptake, transport and delivery; both during and after anesthesia. (Rodrigo, 2000). Smoking has been associated with increased length of time in intensive care, prolonged recovery from surgery and prolonged stay in the ward. (David O Warner, Michael G Sarr, Kenneth P Offord, & Lowell C Dale, 2004).

1.2 STATEMENT OF THE PROBLEM

Despite all the complications and risks, the incidence of smoking is about 30% for general surgical populations undergoing elective procedures and 14-38% for emergency procedures in western countries (Tonnesen, Nielsen, Lauritzen, & Moller, 2009), with advice on smoking cessation varying from surgeon to surgeon. Only 58% of surgeons and 30% of anesthetist routinely advice patients to stop smoking before undergoing surgical procedure (D. O. Warner, M. G. Sarr, K. P. Offord, & L. C. Dale, 2004).

Lim *et al*, in 2009 found that locally in Malaysia, knowledge and attitude among Malaysian smokers differ according to smoking status, education level and knowledge of health effect of tobacco products. On the other hand, only about 20-55% of patients are actually aware regarding role of anaesthesia and the risk related to it (Baaj & Takrouni, 2006; M.G., S., & S.K.Y., 1998; Naithani & Purohit, 2007). There is no study previously specifically look at predictors for smoking cessation among patient going for anaesthesia and surgery.

1.3 JUSTIFICATION OF THE STUDY

To the best of author's knowledge, no report has been found so far highlighting our local data pertaining our patients' level of awareness and preparedness before undergo anaesthesia and surgical procedure, in particular among the smokers. This study was designed to determine association factors or predictors for smoking cessation among smokers who are scheduled for elective surgery. At the same time, the level of understanding regarding importance of abstinence prior surgery can be obtained.

Since Hospital Universiti Sains Malaysia is a tertiary hospital which receives various cases and referrals not only form Kelantan but also form other neighbouring state, local data form this hospital might reflect general population for instance.

CHAPTER 2

2.1 LITERATURE REVIEW

In the past 20 years, the Malaysian government has recognized the importance of reducing smoking rates. Indeed the Malaysian National Health and Morbidity Survey found that smoking prevalence among adults 18 years old and older has decreased from 24.8% in 1996 to 21.5% in 2006. However, smoking prevalence is still extremely high, particularly among men. In Malaysia, almost half (46.4%) of all men smoke, whereas few (1.6%) women do (Omar, Awang, & Samin, 2012). Smoking prevalence among young people indicates continued high rates of future death and disease due to smoking.

2.1.1 Smoking and surgical outcome

Quitting smoking in community setting is influenced by physician quit advice and knowledge of smoking hazards, but there are few data on whether this applies in perioperative setting. Smoking and hazardous alcohol drinking are the most frequent lifestyle risk factors that can influence the outcome after surgery. The incidence of smoking is about 30% for general surgical populations undergoing elective procedures and 14–38% for emergency procedures in the western world (Tonnesen et al., 2009). The incidence is often higher than the general population.

Numerous studies have shown that smoking is associated with postoperative morbidity. Status as a current cigarette smoking is an independent risk factor for many postoperative complications (Moores, 2000). Smoking affects human physiology in different ways even in the absence of end-organ disease. The system most commonly affected by smoking are pulmonary function, cardiovascular function, the immune response , and tissue healing (M. Warner, Divertie, & Tinker, 1984). Smoking as well can alter the hepatic metabolism of commonly used drugs.

The most common perioperative complications related to smoking are impaired wound and tissue healing and wound infection, and cardiopulmonary complications (D. O. Warner, 2006). The relative risk of complications after surgery for smokers compared to non-smoker has been reported to increase from 1.4-fold to 4.3 fold (Hadi & Azrina, 2009).

Factors associated with an increased likelihood of developing pulmonary complications include: (Bluman & Mosca, 1998)

i. Pre-existing chronic lung disease
ii. Abnormal results of pulmonary function test
iii. Age > 60 years
iv. Upper abdominal or thorasic surgery
v. Smoking
vi. Obesity
vii. Total anaesthesia time > 3 hour

Table 2.2: Intraoperative and Immediate Postoperative Complications (Lee, Landry, Jones, Buhrmann, & Morley-Forster, 2013)

Cardiovascular complications • Myocardial ischaemia / infarction, stroke, pulmonary embolism • Bradycadia, tachycardia, arrhythmia requiring physician assessment and/ or treatment • Hypotension or hypertension
Respiratory complications • Unexpected oxygen desaturation requiring physician assessment / treatment • Excessive secretions or coughing • Postoperative need of ventilator support • Bronchospasm requiring therapy • Cancellation of surgery due to poor respiratory status
Other • Inadequate pain control • Nausea or vomiting • Excessive bleeding requiring intraoperative treatment, unexpected transfusion, or postoperative dressing changes • Agitation, delirium or confusion • Need for internal medicine (general or subspecialty) or critical care consultation • Death from any cause

2.1.2 Pathophysiology of effect of smoking

Pathological changes in smokers undergoing surgery have shown that smokers have multiple organ changes with potential effects on their surgical course. Increased levels of carbon monoxide (CO) in blood and up to 15% of the haemoglobin oxygen binding sites can be occupied by CO, resulting in significant reduction of the amount of oxygen available for cellular processes (Hlastala, McKenna, Franada, & Detter, 1976).

In addition, high p-nicotine levels mimic the sympathetic reflexes resulting in increased heart rate and arterial pressure and reduced peripheral blood flow. Consequently, oxygen consumption increased and reduced oxygen delivery. This may produce a relative hypoxia particularly in the heart and the peripheral tissue including surgical wounds.

Smoking also impairs immune function leading to an increased risk of infection (Hersey, Prendergast, & Edwards, 1983). Immune system appears to recover after 4-6 weeks of abstinence from smoking. Wound healing process is affected by smoking due to interference with the production of collagen.

Even for young, asymptomatic smokers have reduced pulmonary capacity, increased mucus production, and reduced ciliary function (Hans, Marechal, &

Bonhomme, 2008). This may lead to perioperative pulmonary complications. These pulmonary changes will improve over 6-8 weeks of abstinence from smoking (Hilding, 1956).

2.1.3 Effect of preoperative intervention on postoperative outcome

Up to 2009, six randomised studies of preoperative smoking cessation intervention have been published, with quit rates were found to be 40-89% (Lindström et al., 2008). There was one published study of 102 patients undergoing general surgery showed that a 3-4 weeks smoking cessation programme reduced the incidence of postoperative complications from 41% to 21% , P=0.03. The evidence level is 1b and the recommendation strength A for preoperative smoking cessation programmes of 3-4 and of 6-8 weeks duration. A review concluded that implementation of smoking cessation programmes 3-8 weeks preoperatively are cost-effective in reducing postoperative complications, that they are a matter of quality management.(Tonnesen et al., 2009)

Several trials showed that even short term preoperative smoking cessation interventions, particularly those started > 4 weeks preoperatively, can reduce postoperative complications by up to 20 to 34%. (Lindström et al., 2008; A. Moller & Villebro, 2005)

The beneficial effects of smoking intervention have been shown to be most important for wound healing and pulmonary complications (Møller, Villebro, Pedersen, & Tønnesen, 2002). Two clinical studies have reported that cessation of smoking more than 3 weeks before operation reduced the occurrence of wound healing complications in relation to head and neck and breast reduction surgery. (Kuri, Nakagawa, Tanaka, Hasuo, & Kishi, 2005). However no clinical studies have determined the optimal duration of preoperative smoking cessation intervention.

2.1.4 Long-term effect of preoperative interventions

In 2008, Villebro *et al* follow-up on the preoperative smoking cessation programme. The intervention group had significantly higher quit rate 1 year after the programme, 22% vs 3%, $P<0.01$. One year smoking cessation is related to gender (men), low nicotine dependency, non-smoking spouse, and preoperative smoking intervention. All patients gave the same reasons for smoking cessation; improved health and saving money.

In one systematic review, the result indicated that preoperative smoking cessation interventions can increase smoking cessation rates before operation and for up to as long as 12 months after surgery. Interventions include counseling initiated at least 4 weeks before operation and nicotine replacement therapy. (Thomsen, Tønnesen, & Møller, 2009)

2.1.5 Effects of cigarettes smoking on anaesthesia

Cigarette smoke contains over 4700 additional chemical compounds other than nicotine; some of which are pharmacologically active, some antigenic, some cytotoxic, some mutagenic and some others carcinogenic (Holbrook, 1977). It consists of gaseous phase and particulate phase. (Table 2.3)

Table 2.2: Some of the constituents of cigarette smoke (Sweeney & Grayling, 2009)

Gaseous portion	Particulate portion	
Aldehydes	Acids	Insecticides
Ammonia	Alcohols	Lactames
Arsenic	Aldehydes	Lactone
Benzene	Amides	Nicotine
Carbon monoxide	Brown pigments	Nitrosamine
Hydrogen cyanide	Cadmium	Polyphenols
Nitric oxide	Carbohydrates	Pyridines
Nitrogen dioxide	Esters	Vinyl chloride
Toluene	Imidazoles	
Toluidine	imides	

1. Effects on cardiovascular system
    i. Increase in systolic and diastolic blood pressure, heart rate and peripheral vascular resistance
    ii. Increase myocardial oxygen consumption
    iii. Polycythemia due to chronic hypoxia
    iv. 70% greater risk for coronary artery disease due to increased blood viscosity
    v. Expired CO concentration, an indicator of recent smoking, is correlated with the frequency of ST depression during general anaesthesia (Woehlck, Connolly, Cinquegrani, Dunning III, & Hoffmann, 1999).

2. Effect on the respiratory system
    i. Mucus becomes hyperviscous, cilia becomes inactive; thus resulting impaired tracheobronchial clearance.
    ii. Increase laryngeal and bronchial reactivity
    iii. 25% of smokers suffer from chronic bronchitis (Schwilk, Bothner, SCHRAAC, & Georgieff, 1997), incidence of chronic obstructive airway disease is also higher than in nonsmokers.

Following smoking cessation:

a) Ciliary activity starts to recover within 4-6 days (Egan & Wong, 1992)
b) Sputum volume takes 2-6 weeks to return to normal
c) Improvement in tracheobronchial clearance after 3 months

d) 5-10 days for laryngeal and bronchial reactivity to settle

Available studies estimating that at least 2 months of abstinence is required before postoperative pulmonary risk diminishes. (Moores, 2000; Woehlck et al., 1999)

3. Effect on perioperative events
    i. Schwilk et al found that incidence of respiratory events such as reintubation, laryngospasm, bronchospasm, aspiration, hypoventilation, hypoxemia is 5.5% in smokers, compared with 3.3% in nonsmokers.
    ii. Current smokers are 2 to 6 times more likely than noncurrent smokers to develop a postoperative pulmonary complication.(Bluman & Mosca, 1998)
    iii. Relative risk for perioperative events in all smokers is 1.8, 2.3 in young smokers, and in obese smokers it was 6.3 times the normal.
    iv. Inaccuracy of pulse oximeters monitoring due to overestimation of the oxygen saturation resulting from higher level of COHb in the blood (Alexander, Teller, & Gross, 1989) .

4. Effect on postoperative morbidity
    - Hypoxia occurs more following general anesthesia; compared with spinal anesthesia (J. Moller, Wittrup, & Johansen, 1990)

5. Effects of smoking cessation prior to surgery on postoperative morbidity

    i. Warner et al reported pulmonary complications such as purulent sputum, atelectasis, and pleural effusion in those that had stopped smoking for 8 weeks or more prior to surgery to be only 14.5%, compared with 57.9% in those who stopped smoking less than 8 weeks before surgery, a four times higher incidence in those who stopped less than 8 weeks from surgery .

    ii. Warner et al found that, if patients stopped smoking for 6 months or more prior to surgery, the incidence was the same as that in non-smokers.

6. Effect on postoperative nausea and vomiting (PONV)

    - Incidence of PONV is less in smokers compared with both nonsmoking males and in females. It is suggested that this may be due to antiemetic effect in the constituents of smoke (Chimbira & Sweeney, 2000).

7. Effect on the immune system

    i. Smoking impairs the immune response. The result is increased risk of infection and neoplasia.(Glasson, Sawyer, Lindley, & Ginsberg, 2002)

ii. Healing of surgical wounds may be impaired, especially after procedures such as face lifts that require wide undermining of skin flaps.(Silverstein, 1992)

8. Effect on drug metabolism
    - Cigarette smoking induces liver microsomal enzymes, increasing the metabolism of some drugs. There is no effect on thiopentone, lignocaine or corticosteroids (Miller, 1989).

9. Effect on pain and analgesic drugs
    i. Chronic smokers exhibit a decreased tolerance to pain (Miller, 1989). Thus, independent of the action on the analgesic drugs, they require more analgesics for pain.
    ii. In one study, author found that both smoking and alcohol consumption significantly influenced the requirement for pethidine and morphine (Glasson et al., 2002).
    iii. There is no consistent evidence to support altered pharmacokinetics of paracetamol and Nonsteroidal Anti Inflammatory Drugs (NSAIDS) among smokers.

2.1.6 Predictors of smoking cessation

The relationship between socioeconomic status and smoking is well established, with lower socioeconomic groups having a markedly higher prevalence of smoking in developed and many developing countries. Apart from level of education and occupation, smoking has also been associated with other direct indicators of deprivation such as financial stress (Huisman, Kunst, & Mackenbach, 2005; Sorensen, Gupta, & Pednekar, 2005). Siahpush *et al*. in 2007 reported that in Australia, smoking households headed by people with lower education and occupation spent more money on tobacco. He also showed that households with lower income were more likely to spend a higher percentage of their total household income on tobacco.

As a healthcare provider, it is important to understand factors that are associated with quitting behaviours in specific cultural and socioeconomic settings in order to provide people with appropriate support in their efforts to quit. Most related research are actually comes from Western developed countries. There is evidence that predictors of making quit attempts differ from those predict outcome among those who try. (Hyland et al., 2004)

Sociodemographics predictors of making attempt include being young (Hyland et al., 2004), male gender (Nides et al., 1995), white race (Tucker, Ellickson, Orlando, & Klein, 2005), and well educated (Hatziandreu et al., 1990). On the other hand, smoking-related predictors of making attempts include level of nicotine dependence (Hyland et al., 2006), measures of intention / motivation

(Hyland et al., 2006), past quit attempts, self-efficacy (Woodruff, Conway, & Edwards, 2008) and concern for health effects caused by smoking. (Hyland et al., 2006).

This knowledge from developed countries is not necessarily generalizable to developing countries, due to different socioeconomic conditions and cultural contexts as well as disparities in tobacco policies and social acceptability of smoking. Siahpush *et al.* in 2008 examined the association of socioeconomic position with cigarette consumption, intention to quit, and self-efficacy to quit among male smokers in Thailand and Malaysia using the ITC–Southeast Asia (SEA) survey. They found that in the Malaysian sample, higher level of education was not associated with intention to quit or self-efficacy to quit or cigarette consumption; in Thailand, higher level of education was associated strongly with not having self-efficacy, and higher income was not found to be associated with an intention to quit in either country. As a matter of fact, smoking prevalence, particularly among men, is higher in Malaysia than in Thailand (Table 2.1). These findings differs from studies in Western countries where higher level of education and socioeconomic status are predictive of making quit attempts and/or associated with staying quit.

Table 2.3: Summary of general information and tobacco control efforts in Malaysia and Thailand (Li et al., 2010)

	Malaysia	Thailand
-Populations (millions)	26	64
-Smoking prevalence		
Male (%)	45	37
Female (%)	2.5	2
-Number of fulltime equivalent employees in National Tobacco Control Agency	3	18
-Taxation (%)	39	79
-availability of NRT	Pharmacy	prescription

Locally in this region, Li *et al* 2 years later in 2010 examined prospective predictors of smoking cessation among adult smokers in Thailand and Malaysia. This study used longitudinal data from the International Tobacco Control Southeast Asia Survey. In this study, the aim was to find out whether the determinants of quitting are similar to those found in Western countries.

4004 smokers were surveyed in Malaysia and Thailand in 2005. Of these, 2426 smokers were followed up in 2006. The measures that had been taken were sociodemographics, dependence, and interest in quitting. Authors found that more Thai than Malaysian smokers reported having made quit attempts between the 2 waves. However among those who tried the rate of staying quit were not considerably different between Malaysians and Thais.

Multivariate analyses showed that smoking fewer cigarettes per day, higher level of self-efficacy and more immediate quitting intentions were predictive of both making a quit attempt and staying quit. Previous shorter quit attempts and higher health concerns about smoking were only predictive of making an attempt, whereas prior abstinence for 6 months or more and older age was associated with maintenance. In Malaysia, those retained the cessation were more likely to have lower education, be from dominant ethnic group (Malays), have stronger intention to quit, a previous quit history, higher self-efficacy, and a higher level of health concerns about smoking.

Various factors that influence smoking have been identified. They are social norms, social influence and social and economic status (KH. et al., 2009). Previous studies have identified knowledge on the hazards of smoking as a protective factor and positive attitude toward smoking as a risk factor for smoking especially among girls (Spear & Akers, 1987). Several studies revealed that smokers tend to downplay the adverse effect of smoking on health. This may be due to ignorance of the dangers of smoking or cognitive dissonance at work, wherein the smoker realises that smoking is harmful to health but to minimise psychological dissonance, downplays the risks through cognitive process so that it is compatible with his smoking habit (McMaster & Lee, 1991).

Previous studies also revealed that those who smoke especially heavy smokers have positive attitudes towards smoking compared to former smokers and non-smokers. Besides smoking status, attitude towards smoking is also associated with socioeconomic background. People with higher education have more negative

attitudes towards smoking and those with higher income believe that cardiovascular diseases and cancer are strongly associated with smoking compared to those with low income (Manfredi, Lacey, Warnecke, & Buis, 1992).

2.1.7 When to stop smoking?

Previous studies have demonstrated conflicting results with respects with respect to preoperative smoking cessation and postoperative risk. There have been concerns that stopping smoking within 8 weeks before surgery (recent quitters) may be detrimental to postoperative outcomes. This has generated considerable uncertainty in health care systems that consider smoking cessation advice in the hospital setting an important priority. This concern originated from a 1989 article that found postoperative pulmonary complications in 6 of 18 continuing smokers, compared with 12 of 21 ex-smokers who quit for less than 8 weeks prior to surgery (M. A. Warner et al., 1989). In this article, the author suggested that losing the cough-promoting effect of cigarettes before any improvement in sputum clearance might predispose to retentions of secretions and pulmonary complications.

Lawrence and Duncan in 1995 suggested that smoking cessation immediately before surgery did not appear to reduce the risk of pulmonary complications. Possible explanation for the unfavourable result was selection bias. Sicker patients at increased risk of postoperative pulmonary complications may have been more likely

to cut down on smoking prior to surgery. Another study by Leslie et al in 1998 also found that current smokers who reported reducing cigarette consumption prior to surgery were more likely to develop a complication compared with those who did not (adjusted OR= 6.7, 95% CI, 2.6 to 17.1).

However, later in meta-analyses, quitting smoking within 8 weeks before surgery was not associated with an increase or decrease in overall postoperative complications for all available studies (Myers, Hajek, Hinds, & McRobbie, 2011). The authors suggested that patients should be advised to stop smoking as early as possible, but there is no evidence to suggest that health professionals should not be advising smokers to quit at any time prior surgery. Lee *et al* in 2013 also did not detect any increase in intraoperative or immediate postoperative complications in the intervention group; who had been enrolled in 3 weeks prior to surgery. (Lee et al., 2013). In a different study, Moller and Villebro conclude that the impact on complications may depend on how long before surgery the smoking behaviour is changed, whether smoking is reduced or stopped completely, and the type of surgery.

Surgeons on the other hand may find cancelling an elective operation because a smoker has not quit smoking, resulting in delayed treatment and loss of revenue. A patient who has had his operation cancelled by one surgeon can likely to find a different surgeon willing to perform the procedure. Further compounding this dilemma is a concern for smokers' rights to privacy, possible discrimination, and fears that physicians may be stigmatizing smokers; a negative message delivered by

a physician may result in a frightened patient unwilling to see that physician again. However, operating on active smokers results in higher health care costs and jeopardizes the patient-physician relationship by knowingly placing patients at higher risk for surgical complications. (Dhruv Kullar, Schoeder, & Maa, 2013)

2.1.8 Helping surgical patient quit smoking

Smoking has been associated with increased length of time in intensive care, in recovery from surgery and on the ward (Theadom & Cropley, 2006). Despite this, a quarter of patients undergoing surgery continue to smoke up to, and after surgery; with advice on smoking cessation varying from surgeon to surgeon. Dhruv Kullar *et al* (2013) also added 25% to 30% of patients still smoke perioperatively. Warner *et al* revealed that only 58% of surgeons and 30% of anaesthetist routinely advise patients to stop smoking before undergoing surgical procedure.

A physician's advice to stop smoking provides important motivation for smokers to quit; however only half of current smokers report ever been asked about their smoking status or advised to quit by their physician, and even fewer have received specific advice on how to quit.(D. O. Warner, 2005)

Scheduling of elective surgery represents an excellent opportunity for smokers to permanently quit, with great benefit for their long term health. Elective surgery may represent a 'teachable moment', where smokers more likely to quit.

‘Teachable moments’ are health experiences that provide motivation to reduce risky behaviours and adopt positive behaviours.(Lawson & Flocke, 2009)

Although it is difficult for smokers to quit, there are now several interventions of proven benefit that can increase the chance of success (D. O. Warner, 2005). Moller and Villebro in 2005 reviewed the available literature on the effectiveness of interventions to help patients to stop smoking before surgery. Four RCT were reviewed and concluded that the interventions were effective in helping people to stop smoking preoperatively. The interventions that can be carried out include simple physician advice to quit, brief behavioural interventions that can be provided by physicians or other clinicians, and pharmacotherapy with drugs such as nicotine.

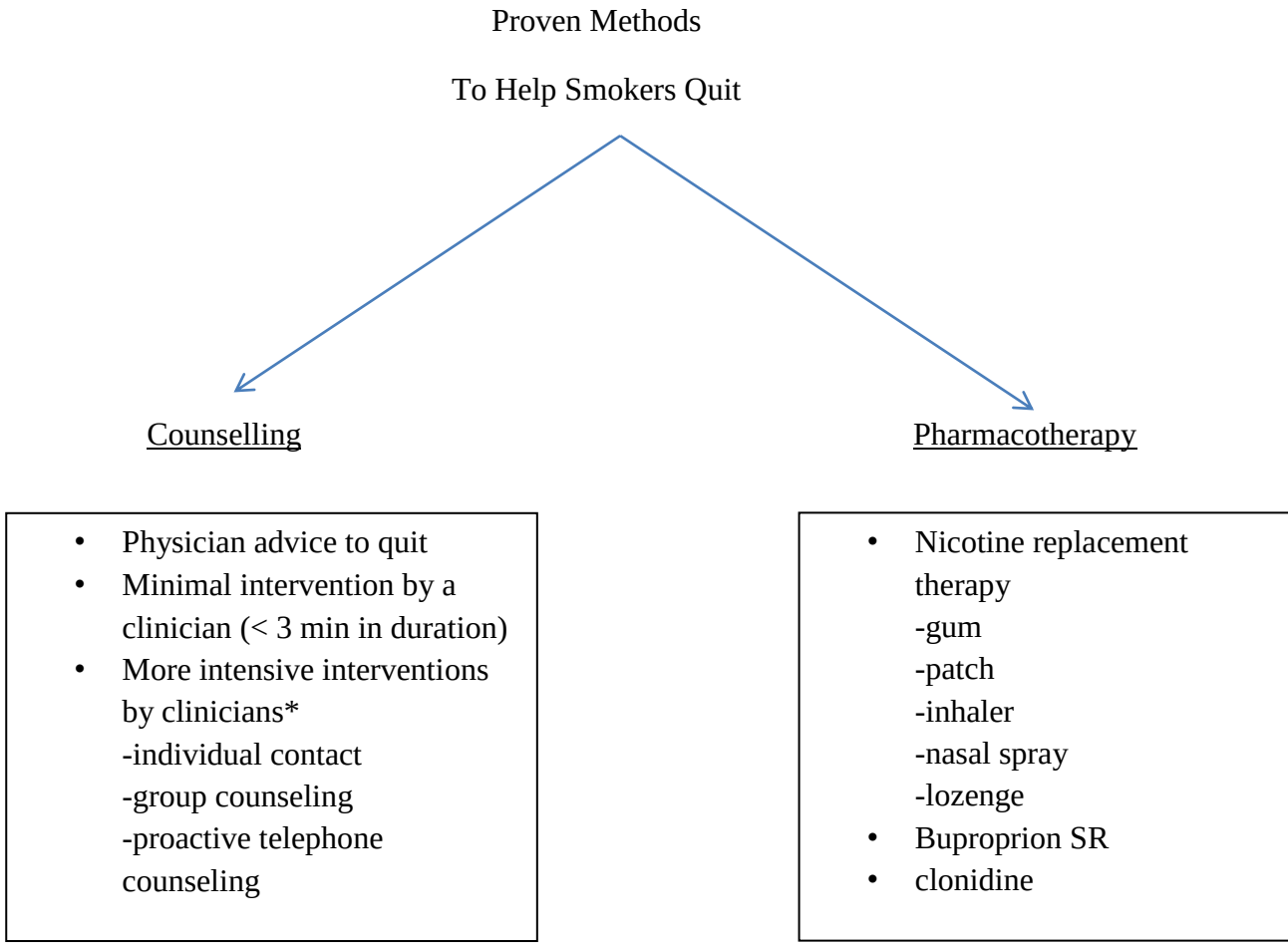
Preoperative period undeniably is an ideal time to help smokers to quit before being admitted to hospital. With many hospitals becoming smoke-free environments, some period of abstinence is mandatory, such that all smokers must at least temporarily address their tobacco dependence.

The efficacy of several interventions is supported by multiple randomised clinical trials (Figure 2.1). However, most of these trials have involved the general ambulatory population, and very few have specifically investigated surgical patients. More intensive interventions are even more effective. There is a dose-response

relationship between the total time spent in interventions and efficacy. It can be implemented by any provider with equal effectiveness. (D. O. Warner, 2005).

Pharmacotherapy in addition is an important element; with the use of this medications doubles the rate of abstinence (Hughes, Goldstein, Hurt, & Shiffman, 1999). A randomised clinical trial in 2013 demonstrated that addition of nicotine replacement therapy to counselling, and vice versa, improved smoking cessation rates over monotherapy alone both in hospitalised patient and in the general population (Rigotti, Munafo, & Stead, 2007).

There is increasing evidence of the importance of adding nicotine replacement therapy (NRT) to counselling as NRT increases the rate of smoking cessation by 50-70%. The effectiveness of NRT appears to be largely independent of additional support provided to the smoker.(Silagy, Lancaster, Stead, Mant, & Fowler, 2004)



*efficacy increases with the intensity of interventions and with the use of multiple counselling formats

Figure 2.1: Methods of proven efficacy to help patients quit smoking (D. O. Warner, 2005)