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Tobacco use and cessation counseling in a population of health professions students in South Africa

**A Mini Thesis
Presented to**



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Masters of Public Health Degree

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Abstract

Background: Tobacco is a leading risk factor for the global burden of disease in both developed and developing countries. The morbidity and mortality caused by tobacco can be prevented efficaciously and cost-effectively by active intervention from health professionals. In developing countries, a limited number of studies have explored tobacco usage and training in smoking cessation and prevention amongst health professions students. This pilot study evaluated: 1. tobacco use patterns; 2. knowledge, attitudes and beliefs towards tobacco use and tobacco control; 3. environmental tobacco smoke exposures; and 4. training in smoking cessation and prevention amongst health professions students in South Africa.

Design: An anonymous and confidential self-administered cross-sectional university based quantitative pilot survey with standardized sampling, questionnaire and data collection. The data was analyzed using the statistical package STATA v10.1™ to calculate the prevalence rates and other descriptive measures.

Subjects: 86 health profession students studying nursing and health promotion at the Faculty of Health Sciences, Walter Sisulu University, Mthatha, South Africa.

Results: Thirty seven percent of the students were ever-smokers. Ever-smoking was more prevalent in nurses than health promotion students (Odds Ratio [OR], 3; P=0.01) and in males (OR, 7.6; P<0.01). Approximately 7% of the students are current smokers and >50% smoke 1-2 cigarettes a month. Of the ever-smokers, 45% had their first cigarette between the ages of 11-15 years. Of the smokers, 27% have smoked on the university campus previously and 25% have smoked inside the university buildings. None of the students used smokeless tobacco products. From all of the students, 35% were not aware of any university anti-smoking regulations. Approximately 78% of the students did not have smoking parents. The earlier smoking was initiated the more likely it was expected for the student to continue smoking into the future. Current smoking status and frequency also affect future smoking expectations. Approximately 64% of the students felt that it was difficult to stop smoking. Approximately 69% of the students felt tobacco sales to adolescents should be banned while 94% felt that smoking in restaurants should be banned. Approximately 71% of the students have smoked tobacco while drinking alcohol at the same time and 77% of the smokers have tried to stop smoking in the past with 27% stopping for health reasons. Approximately 66% of ex-smokers received smoking cessation counseling. The majority of ex-smokers only stopped recently. Approximately 89% of the students were taught about the dangers of smoking; 43% received formal training in smoking cessation counseling and 26% received training in smoking cessation counseling using pharmacological agents.

Conclusion: This study showed encouraging results compared to similar previous studies with regards to tobacco use and training curricula in smoking cessation counseling. Smoking cessation counseling training of health professions students remains under-explored in South Africa. It appears that information alone does not change behaviour and that social influences play a large role in tobacco use. Although a marked improvement from previous studies, awareness of tobacco control in South African health professions students appears limited in contrast to the progressive anti-tobacco legislation in South Africa. The pivotal role of health professionals in the tobacco epidemic implies that further tobacco cessation counseling research in health professionals, especially in developing countries, must remain a priority in the battle against tobacco.

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1. INTRODUCTION

Tobacco is a leading risk factor for the global burden of disease. It was estimated that 59 million disability adjusted life years (DALYS) were lost globally due to tobacco use (Ezzati et al., 2002) and that the tobacco related burden of disease is worryingly high in both developed and developing countries (Ezzati et al., 2002). Tobacco use and exposure resulted in more than 443,000 premature deaths, 5.1 million years of potential life lost (YPLL), and US\$96.8 billion in productivity losses annually during 2000-2004 in the United States alone (Centers for Disease Control and Prevention, 2008). Furthermore, the bulk of future tobacco induced deaths is expected to occur in developing countries such as China with a projected 3 million predicted deaths attributed to smoking by 2050: the average daily tobacco consumption per person increased from 1 cigarette in 1952 to 10 cigarettes in 1990; and there are currently 320 million Chinese smokers who represent approximately one-third of all smokers globally (Zhang and Cai, 2003).

Apart from the economic and health impacts, tobacco is also considered a gateway substance leading to the use of other addictive substances contributing to further mortality and morbidity (Lindsay and Rainey, 1997). Moreover, illicit tobacco is being used throughout the world to fund conflicts and violence in less developed countries (United Nations Office on Drug and Crime, 2009a), adding to further human misery and suffering. Being a highly addictive substance (Edwards et al., 1981), tobacco use and addiction aggravates poverty by adding extra expenses (direct cost of tobacco and indirect cost of healthcare) to already economically overburdened families (Efroymsen et al., 2001, de Beyer et al., 2001).

To further understand and eliminate the negative impact of tobacco there has been extensive public health research on smoking prevalence, behaviour and attitudes. This is especially prevalent in high-income countries where tobacco smoking has been the most wide-spread in the past few decades until recently (Molarius et al., 2001, U.S. Department of Health and Human Services, 1989).

More recently, tighter tobacco control legislation and the resultant decline in tobacco use in more industrialized countries has shifted the interest of tobacco companies and researchers alike to developing countries. These countries have tremendous growth potential in tobacco consumption and are expected to augment the total number of smokers worldwide from the present 1.3 billion to 1.6 billion by 2025 (Jha and Chaloupka, 1999). More than 70% of smoking related deaths are expected to occur in developing countries within the next 10 years where smoking amongst women is projected to increase by 20% (Mackay, 1998). Realizing the future trend and areas of potential growth in tobacco use globally, developing countries are now becoming the centre of attention (Chollat-Traquet, 1992, Corrao et al., 2000, Yach and Bettcher, 2000, Mackay et al., 2002). Women and adolescents are now being carefully fostered and targeted by tobacco conglomerates (Amos, 1996, Mackay and Crofton, 1996, Mackay et al., 2002).

In contrast to the recent rise in interest in developing countries, there is a lack of public health tobacco research due to other more immediate threats to life-expectancy such as human immunodeficiency virus (HIV) epidemic, political instability, and other natural and man-made disasters in the sub-Saharan region (Dugbatey, 1999, Kapp, 2004). Nevertheless, the devastating health consequences of smoking are already well demonstrated in existing data. In South Africa, 8% of all deaths, 58% of lung cancer deaths, 37% of chronic obstructive pulmonary disease (COPD) deaths; 20% of tuberculosis deaths and 23% of vascular deaths can be attributed to smoking (Sitas et al., 2004).

It is well established and intuitive that the morbidity and mortality caused by tobacco can be eliminated by smoking cessation and prevention (Cinciripini and McClure, 1998, Brown et al., 2000). Currently, many smoking cessation methods of varying cost and efficacy are available. In a Cochrane review of 20 studies, Lancaster et al. (2000) established that counseling by health professionals in physician facilitated smoking cessation programs are amongst the most effective interventions to achieve smoking cessation without unwanted side effects that may accompany pharmacological treatments.

The cost effectiveness of counseling by health professionals for smoking cessation also far outweighs that of other types of interventions (Law and Tang, 1995) and the cost of smoking-associated morbidity and mortality (Anderson et al., 1991, Stead et al., 2008). It was further highlighted in a Cochrane review of 41 randomized controlled trials that even one brief counseling session significantly increases the cessation rate in patients (Lancaster et al., 2000).

However, amidst the mounting evidence on the proven effect of health professional counseling and advice, it has been shown that health professionals have not been strong proponents of smoking cessation counseling (Richmond et al., 1998). One of the major reasons for this is the inadequacy of the training of health professions students in patient counseling on smoking cessation (Cantor et al., 1993, Kristeller and Ockene, 1996, Richmond et al., 1998, Ferry et al., 1999).

Concurrently, it has been found that health professionals' personal health and habits predict the frequency of their counseling and their smoking related behaviour at health facilities (Wells et al., 1984, Lewis et al., 1986, Lewis et al., 1991, Freed et al., 1995, Geller et al., 1998, Frank et al., 2002, Cornuz et al., 2000, Kolagotla and Adams, 2004). As these health-related habits and behaviors of health professionals shape the health advice that they impart upon their patients, and this can significantly impact on the behaviour of their patients (Fiore et al., 1994, Dekker HM and HP, 1995, Najem et al., 1995, Willaing and Ladelund, 2004). Most smoking initiation occurs around the age of 18- the age at which youth are in tertiary education institutions (U.S. Department of Health and Human Services, 1994, Global Youth Tobacco Collaborative Group, 2002). It is at this stage that the future smoking prevalence, attitudes and behaviour of health professionals and hence their future counseling behaviour in tobacco use cessation can be predicted (Shafey et al., 2003).

The lack of smoking cessation counseling training of health professions students, combined with their attitudes towards tobacco smoking, may send inconsistent messages to patients whom health professionals have to counsel (Lando and Hatsukami, 1999,

Jenkins and Ahijevych, 2003). Deficiencies in medical school curricula with regards to smoking cessation counseling training must be documented and researched in order to understand this phenomenon.

In developing countries only a limited number of previous studies have explored the prevalence of tobacco use and cessation counseling amongst health professions students. A recent study conducted amongst nurses in China showed that although most nurses have knowledge of the harmful effects of tobacco smoking, interventions towards smoking cessation were very rarely practiced (Chan et al., 2007). The paucity of data from developing countries prompted collaboration of the World Health Organization (WHO), the U.S. Centers for Disease Control and Prevention (CDC), and the Canadian Public Health Association in 2005 to conduct the Global Health Professions Students Survey (GHPSS) as part of the Global Tobacco Surveillance System. The GHPSS was designed in part on the Global Youth Tobacco Collaborative Group model (Global Youth Tobacco Collaborative Group, 2002) which has proven to be both inexpensive and effective. The GHPSS has a standardized sampling method, questionnaire and data collection procedures to ensure comparability and compatibility of the data collected globally.

South Africa has been at the forefront of tobacco control and has participated actively in global initiatives to collect data on tobacco use through the various Global Youth Tobacco Surveys (GYTS) and other tobacco surveys conducted in 1999 and 2005 (Swart et al., 1999, Reddy et al., 1999, Swart et al., 2003, Panday et al., 2005, Swart et al., 2006). However, there has been little interest in the health behaviour of health professionals. To date, there have only been a few surveys exploring the smoking habits and attitudes amongst discrete pockets of health professionals and health professions students in South Africa (Callander and Rocke, 1986, Birkholtz and Louw, 1996, Grant et al., 1989). Considering the critical role that health professionals play in the battle against tobacco, it is crucial to understand tobacco use prevalence, attitudes, behaviour and cessation counseling training amongst health professions students in South Africa. This study will

therefore be conducted as part of the Global Health Profession Student Survey (GHPSS) in South Africa.

2. LITERATURE REVIEW

2.1 *Natural History of Tobacco Addiction*

Tobacco addiction follows a complex biological and psychological pathway through the action of nicotine on the central nervous system. Addiction to nicotine is comparable to addiction to other narcotic substances with regards to the associated physical, psychological and social impairments (Kozlowski et al., 1989, Lynch et al., 1994).

Addiction and drug dependence is defined by the WHO as: “*a behavioral pattern in which the use of a given psychoactive drug is given a sharply higher priority over other behaviors that once had a significantly higher value*” (Edwards et al., 1981). Consequently this behaviour can have detrimental effects on both the individual and society.

Tobacco addiction usually begins with experimentation. A recent national survey indicated that 29.5% of South African teenagers have experimented with cigarettes (Reddy et al., 2010). Tobacco addiction has been described as having 5 stages: *preparatory; initial attempt; experimentation; regular use* and lastly, *nicotine addiction* (Flay et al., 1992). The “preparatory” stage refers to the early preteen years during which beliefs and attitudes about smoking are being formed; the “initial trying” stage refers to the first attempt at cigarettes; the “experimentation” stage refers to the situation specific irregular use of tobacco; the “regular smoking” stage refers to time-specific smoking over regular intervals and the “nicotine addiction” stage refers to regular smoking prompted by an internally regulated nicotine need (Flay et al., 1992).

The “initial attempt” stage of tobacco use is influenced and primed by environmental, behavioral, personal and socio-demographic factors (Perry and Silvis, 1987, van Teijlingen and Friend, 1992). An example of the likely influential factors is tobacco

advertising. These factors may become internalized through consistent repetition over multiple channels, especially in teenagers who are trying to form an identity (U.S. Department of Health and Human Services, 1994). The “experimentation” stage of tobacco use is reinforced by social factors, for example smoking parents who normalize tobacco smoking (Lynch et al., 1994). Similarly, with other factors such as the disapproval of friends and family, individuals may not progress to regular smoking (Lynch et al., 1994). It has been shown that adolescents predominantly derive their beliefs, values and attitude norms from their parents (Hurrelmann, 1989) and their beliefs, values and attitude towards tobacco use may also be reinforced by their peers (Millstein et al., 1993).

Psychological nicotine dependence is diagnosed by the following criteria as defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM IV) (American Psychiatric Association. and American Psychiatric Association. Task Force on DSM-IV., 2000):

“The user must demonstrate at least three of the following criteria occurring at the same time during a 12-month period:

- 1. Tolerance—Signs of tolerance are a need for a markedly increased amount of nicotine to produce the desired effect or a diminished effect with continued use of the same amount of nicotine.*
- 2. Withdrawal, as manifested by either the characteristic nicotine withdrawal syndrome, or nicotine (or a closely related substance) is taken to relieve or avoid withdrawal symptoms.*
- 3. Nicotine is used in larger amounts or over a longer period than intended.*
- 4. The user has a persistent desire or makes unsuccessful attempts to cut down on tobacco.*
- 5. A great deal of time is spent in obtaining or using the substance (e.g., chain smoking).*
- 6. Important social, occupational, or recreational activities are reduced because of tobacco use.*
- 7. Use of the substance continues despite recurrent physical or psychological problems caused or exacerbated by tobacco—for example, continuing to smoke despite diagnoses such as hypertension, heart disease, cancer, bronchitis, and chronic obstructive lung disease.”*

With repeated experimentation and the accompanying increase in nicotine intake, the original social need to smoke changes to a physical need leading to physical dependence on nicotine and an established nicotine addiction (Lynch et al., 1994). Once a person has been diagnosed with psychological nicotine dependence it is possible to quantify the degree of dependence with instruments such as the Fagerström Test for Nicotine Dependence (FTND) (Fagerstrom and Schneider, 1989). From initial attempts of tobacco use to nicotine addiction, there is usually a time lag of between two to three years (McNeill et al., 1989).

Most smokers develop tobacco addiction in their early teenage years. According to the 2008 National Survey on Drug Use and Health in the US, nearly 60% of new smokers were under the age of 18 when they first smoked a cigarette (Substance Abuse and Mental Health Services Administration, 2009). The earlier an individual attempts cigarette smoking the more likely they are to become a regular smoker. Teenagers who tried their first cigarette at the age of 11 years were more likely to become regular smokers (67%) compared to those who tried their first cigarette at the age of 15 (46%) (Chassin et al., 1990, Taioli and Wynder, 1991, Chassin et al., 1996, Everett et al., 1999). The role that adolescence plays in the pathway to tobacco addiction cannot be underestimated.

Recognizing the strategic position that adolescents occupy in the natural history of tobacco use and their vulnerability to social influences, tobacco companies are targeting adolescents as the ideal consumers (Lynch et al., 1994). The perception that adolescents are a vulnerable group mandates that they be recipients of extra protection from harmful substances and influences (Rutter, 1993, Luthar and Zigler, 1991, Hawkins and Catalano, 1992, Resnick et al., 1993, Garmezy N, 1991, Werner, 1994, Resnick et al., 1997). Hence, most countries in the world, including South Africa, have legislation in place to ban the sale of tobacco to minors and adolescents (Food and Agricultural Organization, 2003).

2.2 Social, Economic and Political Implications of Tobacco Addiction

Addictive substances such as narcotics and psychotropic substances were aggressively marketed and sold throughout the world in the manner similar to which cigarettes are being promoted today. It was not until the devastating effects of addictive substances were known and acutely felt by society that addictive substances became legally, politically and socially unacceptable in most countries in the world (United Nations Office on Drug and Crime, 2009b). The impetus behind such strict regulation and prosecution of addictive substances was stated by the UN as: a serious threat to the health and welfare of human beings; a serious threat to legitimate economies, security and political foundations of society (United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, 1988).

Although tobacco is an addictive substance and its production, distribution and economics are similar to that of other addictive substances, they are still considered to be consumer products that can be legally bought and sold throughout the world. According to the Oxford Medical Companion (1994), *“...tobacco is the only legally available consumer product which kills people when it is used entirely as intended.”*

Contrary to the relatively lax regulation and control by most countries in the world, tobacco kills more people every year globally than all the other illicit drugs combined (World Bank, 2000), and this lethal effect is not due to its intrinsic pharmacological properties but rather due to its relatively easy access compared to other addictive substances.

Utilitarian opponents of drug control suggest that legalization of illicit drug use would encourage economic gain through tax income; reduced cost of drug control enforcement; reduced healthcare costs from the premature deaths caused by drug use and reduction of organized crime related to illegal drug transaction. All the claimed benefits of

legalization of controlled substances can be and have been undeniably refuted (United Nations Office on Drug and Crime, 2009a). Surprisingly, these are the exact same arguments used by today's opponents of tobacco control.

As these arguments are not valid in illicit drug control, they are also not valid in tobacco control. This is demonstrated as follows: **1.** The lifetime healthcare cost for smokers is US\$6000 more than non-smokers (U.S. Department of Health and Human Services, 1991) and as smokers are twice as likely to die as non-smokers, insurance firms, including those owned by tobacco companies, charge a double premium for smokers. Smokers clearly cost the health system more. **2.** The tax generated from cigarettes is a perverse tax on generations lost to tobacco addiction and the economic gain of tobacco tax is offset by the toll on the public health system and the lost productivity of the ill or dead smokers. Annual productivity losses totaling \$96.8 billion in during 2000-2004 in the United States alone whilst the tobacco tax revenue generated was less than \$50 billion annually for the same period (Centers for Disease Control and Prevention, 2008). Thus, the cost of tobacco use far outweighs the tax revenue generated from tobacco which is then used mainly on the subsidization of tobacco healthcare costs. **3.** Illegal trade of tobacco already exists in the presence of relatively lax tobacco legislations and control. This illegality arises largely from tax evasion, which further reduces the benefit and economic gain of tobacco tax for governments. Approximately 15% of the world's illegal tobacco is sold to Africa and an estimated 600 billion cigarettes are smuggled every year to avoid tobacco tax (World Health Organization, 2007). Illegal tobacco trade has a market worth US\$30 billion (United Nations, 2005) and is currently being used to fund conflicts and violence in less developed countries such as those in West Africa (United Nations Office on Drug and Crime, 2009b). **4.** Tobacco worsens poverty by adding to the direct cost of purchasing tobacco and the indirect cost of healthcare (Efroymsen et al., 2001, de Beyer et al., 2001). Environmental exposure to tobacco smoke of family members of smokers and other non-smokers has been proven to cause significant disease (U.S. Dept. of Health and Human Services, 2006). As both the economic and health costs are borne by the family of the smokers and society as a whole,

it should be questioned whether individuals have the right to risk themselves and others to poverty and ill health to satisfy individual freedom of choice.

However, it is also becoming apparent that the cause of the tobacco problem cannot be eradicated with legislative control and enforcement alone, but by a concurrent and comprehensive multifaceted and multisectoral approach. Hence it has never been more important than the present to probe the attitudes and behaviour underlying tobacco addiction, smoking cessation methods, attitudes towards tobacco control that can effectively aid in the elimination of tobacco use.

2.3 Social Norms and Expectations of Tobacco Smoking

One of the most important areas of tobacco research is the social influences and perceptions of tobacco use (McLeroy et al., 1988). Arguably the most contentious issue is that of exposure of non-smokers to tobacco smoke. The social perception of second-hand smoking had changed from the wide acceptance of second-hand smoking in the past, to the current and commonly accepted social norm where the right of non-smokers not to be exposed to smoke is asserted and even placed above the rights of smokers to smoke (Grill, 2009).

Similarly, the perception of cigarette smoking has evolved in the past 30 years from being fashionable to culturally unacceptable, especially in the developed world through raised awareness of the responsibility towards personal health (Gusfield, 1993). Together with the social awakening of ownership and responsibility of personal health, it is now perceived as socially irresponsible to expose non-smokers to environmental smoke and the associated health hazards (Lynch et al., 1994). Increasingly, there is legalization of this social agreement that non-smokers' rights in public places far outweighs that of smokers. This has been demonstrated by tobacco control legislation in the US such as smokers being required to ask for permission before smoking in certain public places (Rabin and Sugarman, 1993). Further, the right of smokers to expose themselves to the harmful effects of tobacco is starting to be questioned as it is recognized that the health cost of smokers is being cross-subsidized by society (Melton, 1986). It is a balancing act between liberalism, where individuals are permitted to choose their own lifestyle, and

altruism where smokers agree to limit their options in order to protect the rights of non-smokers and to benefit society as a whole.

Arising from the changes in social awareness of the harms of environmental smoke exposure, the acceptability of smoking in different social venues has also changed over the past few decades. Currently, there is general consensus that smoking in restaurants is socially unacceptable: 70% of smokers and 84% of non-smokers found cigarette smoking in restaurants offensive. As a result, smoking bans in restaurants are widely accepted. This was evidenced by the fact that restaurants instituting smoking bans have no change in their level of business from both smokers and non-smokers alike (Glantz and Smith, 1997).

Apart from restaurants, other social venues where cigarette smoking was once considered to be acceptable are now associated with diminishing levels of social acceptance and tolerance. Pubs, bars and nightclubs were considered to be the last haven for smokers to smoke in public (Wakefield et al., 2009). As a result, these venues have become the marketing focus and distribution point by tobacco companies for advertising and promotion campaigns to entice and encourage experimentation with cigarettes, as well as to associate cigarette smoking with positive social experiences (Katz and Lavack, 2002, Sepe et al., 2002, Gilpin et al., 2005). Smoking bans in these venues can therefore remove the social pressure to smoke, prevent smoking initiation and experimentation and de-normalize smoking in these social venues where smoking was traditionally accepted (Shiffman, 1982, Borland, 1990, Wakefield et al., 2000, Farkas et al., 2000, Trotter et al., 2002). The perception of the acceptability of smoking in different social venues will be further probed in this study.

As smoking in women is not socially accepted in many ethnic groups in South Africa: there is a low female smoking rate of 17% compared to 52% in men in 1996 (Reddy et al., 1996) and 10% in women and 35% in men in 2003 (Peer et al., 2009) This male predominance in tobacco smoking is persistent even in studies involving health professions students (Coleman et al., 1989, Lewis and Wedderburn-Maxwell, 1985). Despite the current low prevalence, smoking in women is expected to rise to 20% by

2025 (Mackay, 1998). This prediction has been partially based on South African studies involving health professions students with the prevalence of female smokers rising from 8.9% in 1985 to 20% in 1989 (Coleman et al., 1989, Lewis and Wedderburn-Maxwell, 1985). This estimated increase in the number of women smokers is the expected and intended result of the sales and marketing efforts of tobacco companies that increased advertising campaigns portraying women smokers as being feminine, sophisticated and independent in order to fit in with the aspirations of professional women (Samet, 2001). In female health professionals the effect is devastating as reflected by the high rates of smoking in certain groups of health professionals, especially nurses - the majority of whom are women (Jenkins and Ahijevych, 2003). Nurses consist of a large part of the health professional work force and are the first line of contact with patients providing most of the life-style related health advice. Smoking in female health professionals can have a significant impact on the smoking cessation behaviour of the patient as will be discussed in other sections of this study.

2.4 Tobacco Advertising

Tobacco is a highly profitable industry. Phillip Morris, a U.S. based tobacco company ranked in the Fortune 500, made US\$6.3 billion in profit and was ranked as the 93rd most profitable company in the US in 2009 (Fortune Magazine, 2010). Paradoxically, although prevalent, tobacco is a non-essential product. To compete for the profits and to survive in such an industry, demand and need for tobacco must therefore be created and maintained in the market. Tobacco companies use the aspirations of individuals in their marketing and advertising campaigns to associate those aspirations with their tobacco products (Katz and Lavack, 2002). The most common methods of creating demand for tobacco are through advertising and promotion. Marketing is therefore the most important process to increase market share in the tobacco industry.

Further, tobacco advertising has been designed to increase its social acceptability and to appeal to customers by preparing the attitude of non-smokers for smoking initiation; thus normalizing the use of tobacco in different contexts and to eliminate health concerns that smokers may have about tobacco use (Lynch et al., 1994). Tobacco advertising has also

had a causal effect on increasing tobacco-uptake and consumption by establishing pro-tobacco attitudes (Hashibe et al., 2002, Saffer H, 1999, Pierce et al., 1991, Tye et al., 1987).

A comprehensive ban on tobacco advertising has been a proven method that effectively reduces the consumption of tobacco, in some cases up to 6% in countries instituting tobacco ban (Saffer H, 1999, Willemsen and De Zwart, 1999, Wakefield et al., 2000). A comprehensive tobacco ban is therefore an important and effective strategy for tobacco control.

Presently, public awareness of the effects of tobacco use and tobacco advertising has been raised through frequent public health media campaigns. However, controversy still exists in the public's mind due to the purposeful dissemination of contradictory information from tobacco companies about the causal effect between tobacco smoking and disease, despite convincing scientific and medical evidence (Kennedy and Bero, 1999).

2.5 Smoking Cessation and Prevention

Tobacco use and addiction can be decreased by reducing existing users and by preventing incident users. The implications of this on the present pilot study are two-fold: 1) tobacco use in health professions students needs to be prevented as they are similar to other vulnerable youth groups who are subject to multiple influences and social risk factors when it comes to tobacco initiation, 2) Health professionals are instrumental in smoking cessation and prevention programs and therefore their attitudes, beliefs and training in cessation and prevention counseling methods are pivotal to these programs' success.

Tobacco prevention and cessation initiatives first came into prominence when the harmful effects of tobacco became widely recognized. As public health interventions of non-communicable diseases gradually moved from purely informational to psychosocial, so did tobacco prevention programs. The health promotion and risk factor prevention school of thought increasingly recognized the importance of psychosocial factors and the

greater societal environment in shaping the behaviour and choices of individuals. This school of thought evolved gradually from the previous lifestyle based interventions in the past that victim-blamed and viewed health outcomes purely as the result of individual choices and behaviour (McLeroy et al., 1988).

Earlier tobacco interventions were based on the “information-deficit model” under the premise that individuals use tobacco due to their lack of knowledge of its harmful effects and therefore by providing knowledge of tobacco’s harmful effects, smoking cessation can be achieved (Thompson, 1978). This approach has proved to be ineffective especially in youths as it ignores the influence of social pressure, addictiveness of tobacco and the complex process involved in behaviour change (Thompson, 1978, Lynch et al., 1994). However, knowledge acquisition has been proven to be a basic and essential part of cessation and prevention and can be effectively provided by health professionals as the first step towards tobacco cessation and prevention.

The subsequent “affective education model” focused on changing beliefs, attitudes, perceptions and norms compatible with tobacco use to those that are incompatible with tobacco use (Durell and Bukoski, 1984). This approach has also proven to be ineffective as it ignores social influences on tobacco use (Kinder et al., 1980, Schaps et al., 1981, Hansen et al., 1988).

A third approach was based on the “social influence resistance model” which aimed at improving social skills such as assertiveness and communication strategies to resist social influences on tobacco use in especially the early teenage years. However, this was met with limited success (Botvin and Botvin, 1992). The findings from early interventional methods led researchers to believe that tobacco use is under multidimensional influences with direct, proximal factors leading to tobacco use and indirect, distal factors which modify and mediate the proximal factors (Flay and Petraitis, 1993). It was also found that tobacco use is influenced by socio-demographic, environmental, behavioural, personal and pharmacological factors (Evans, 1984, McAllister et al., 1984, Chassin et al., 1984). Smoking prevention methods such as the Waterloo Smoking Prevention Program which

incorporated both proximal and distal factors was more successful than the earlier mono-factorial trials (Best et al., 1988).

Additionally, meta-analyses of different smoking prevention methods have shown that studies targeting social and peer influences are the most effective (Bruvold, 1993, Perry et al., 1992). This finding revealed the importance of social and peer influence on tobacco use.

More recently, tobacco researchers have begun to recognize that smoking cessation and prevention programs should mirror marketing and promotional programs from tobacco companies by assessing epidemiological variables from the perspectives of corporate marketers (Ling and Glantz, 2002). Market segmentation techniques utilized by the tobacco industry have gained the attention of public health practitioners and marketing segmentation variables that target and divide the population by geographic (location of residence), demographic (age, race), behavioural (smoking status, purchasing habits) and psychographical (attitudes and aspirations) variables are now being carefully studied by public health practitioners in order to counter the effects of tobacco advertising, which has been shown to significantly impact tobacco uptake and use (Saffer H, 1999, Ling and Glantz, 2002). Thus, more attention is now given to the multidimensional drivers and the implications behind tobacco use as opposed to previously focusing solely on the health aspects of smoking.

As it becomes more widely accepted that tobacco use and addiction are more than simply personal choices but rather a pathological medical condition subject to multidimensional influences, smoking cessation treatment from health professionals should be considered together with other addictive disorders (Brown et al., 2000, Stead et al., 2008). Pharmacological agents for nicotine replacement, anxiolytics, antidepressants (e.g. bupropion) and newer, more targeted agents such as varenicline and other nicotine antagonists have been included in the arsenal of tobacco cessation methods (Cinciripini and McClure, 1998). Behavioural therapy, self-help, exercise therapy and hypnotherapy have also become mainstream methods of smoking cessation (Brown et al., 2000, Stead

et al., 2008). However, health professionals' knowledge of newer pharmaceutical cessation methods is not widespread (Roddy et al., 2004, Johnston et al., 2005, Geboy, 1989, Cummings et al., 1987). Part of this study will probe health professions students' knowledge and exposure to these newer, more effective methods.

Of all the interventional methods, pharmacological therapy and behavioral counseling have been proven to be the most effective, both of which are facilitated and delivered through health professionals (Cinciripini and McClure, 1998, Lancaster et al., 2000). Lancaster *et al.* (2000) established in a Cochrane review of 20 studies that counseling by health professionals in physician facilitated smoking cessation programs are amongst the most effective interventions to achieve smoking cessation. Stead *et al.* (2008) further found in a Cochrane review of 41 randomized controlled trials that even a brief counseling session increases the cessation rate in patients significantly. Health professional counseling on smoking cessation has further proved to be more cost effective than other cessation methods as well as the healthcare costs of no intervention (Law and Tang, 1995, Parrott et al., 1998). Health professionals have recently become an integral part of smoking cessation strategies and are key components of public health smoking cessation guidelines (West et al., 2000).

2.6 Tobacco Cessation and Prevention Training and Curricula

The health professional-patient interface has proven to be an effective means of providing tobacco cessation and prevention counseling and treatment. Health professionals are the main information providers, counselors and portals to pharmaceutical interventions for tobacco cessation. To prepare for these tasks, it has been identified that tobacco cessation curricula for health professions students should contain the following core themes to adequately train the health professional: the harmful health effects of tobacco use, passive smoking, the determinants of smoking, the content of cigarette smoke, pharmacology of nicotine addiction and its withdrawal symptoms, high risk groups, population strategies, nicotine replacement therapy, other pharmacological agents, clinical intervention and practical delivery (Roddy et al., 2004). Current literature has shown that health professionals who are adequately trained in comprehensive tobacco

cessation and prevention counseling methods either during their formal training or vocationally whilst working are more likely to initiate, advise, follow-through and maintain such services to tobacco users, and ultimately, improve the cessation rate in their patients (Rice and Stead, 2004, Johnston et al., 2005, Gelskey, 2002). The improved performance in health professionals is thought to be due to the results of improved skills, elevated self-confidence, and increased interest in providing smoking cessation services (Corelli et al., 2005, Walsh et al., 2007, Koerber et al., 2003). Despite the evidence, training and curricula in tobacco cessation and prevention counseling remained inadequate (Roddy et al., 2004, Johnston et al., 2005, Geboy, 1989, Cummings et al., 1987): approximately 42% of British medical schools made no references to smoking cessation and prevention counseling in published curricula and only 29% of British medical schools provide comprehensive smoking cessation and prevention counseling modules; 8% of recent British medical graduates recalled having received comprehensive training and 20% of recent British medical graduates feel well prepared to deliver cessation advice; only 5% feels well-prepared to prescribe bupropion and other pharmaceutical agents for smoking cessation. In South Africa, previous studies indicated that 87-99% of the students believed health professionals should have a role in smoking cessation counseling of patients, but only 5%-37% received formal training in cessation counseling (Borkon et al., 1983, Birkholtz and Louw, 1996).

The main reasons for insufficient training in tobacco use cessation were reported as due to: administrative problems, crowded university curricula, lack of enthusiasm from staff and students, and lack of legislation and regulation at the institutional and government level (Roddy et al., 2004). Recently, there have been innovative and efficacious changes in the training of health professionals attempting to overcome some of the barriers for implementation of tobacco use cessation curriculum and training using internet-based methods and standardized recipient patients (Walsh et al., 2007, Pederson et al., 2006, Humair and Cornuz, 2003).

This study will assess the current training and curricula in tobacco cessation and prevention counseling of health professions students at a South African university to guide policy and curriculum transformation.

2.7 Smokeless Tobacco

Smokeless tobacco refers to oral or nasal snuff and chewing tobacco. The epidemiology of smokeless tobacco and its social implications are very different from that of the cigarettes (Ayo-Yusuf et al., 2008, Ayo-Yusuf et al., 2004, Lynch et al., 1994, Boyd and Glover, 1989, Yach and Townshend, 1988). The mortality and morbidity of smokeless tobacco is significant and therefore requires a dedicated discussion.

The use of smokeless tobacco is less conspicuous than cigarettes and is therefore more difficult to monitor. Despite its benign appearance, smokeless tobacco causes serious oral pathology and is considered to be a gateway to cigarette smoking (Haddock et al., 2001). There is also a general perception that smokeless tobacco is less harmful than cigarettes (Schaefer et al., 1985). However, smokeless tobacco is as addictive and destructive as cigarettes (Ayo-Yusuf et al., 2008, Ayo-Yusuf et al., 2004, Lynch et al., 1994, Boyd and Glover, 1989, Yach and Townshend, 1988).

In South Africa, smokeless tobacco is popular amongst black women and children (Ayo-Yusuf et al., 2004, Peltzer, 2003, Bedi, 1996, Kaplan et al., 1990). The prevalence of smokeless tobacco in black women in South Africa was 13.2% and has been strongly linked with reproductive abnormalities (de Wet T et al., 2000). The prevalence of smokeless tobacco use in black South African adolescents has been reported to be as high as 14.5% (Swart et al., 2004). Use of smokeless tobacco has also been linked with cancer of the oropharynx and the respiratory tract (Winick, 1980, Sterling et al., 1992, Idris et al., 1995, Rodu and Cole, 2002). Further, the high nicotine content of smokeless tobacco caused a significant consumption rate of 6% compared to 25% for cigarette smoking (Steyn et al., 2002). Alarmingly, consumption of smokeless tobacco products in South Africa increased by 30% from 1992 to 1995 (Tobacco Board of Republic of South Africa,

1994). Smokeless tobacco use may require health interventions different to that of cigarettes.

Unlike cigarettes, the nicotine content of smokeless tobacco varied greatly (Ayo-Yusuf et al., 2004, Adams et al., 1987); this makes accurate quantification of use and addiction difficult. The nicotine level in smokeless tobacco is most accurately assessed by costly methods such as blood and salivary nicotine level assays. In surveys, questions on the frequency of use of smokeless tobacco are typically used to assess the degree of use and addiction (Ayo-Yusuf et al., 2000, Lynch et al., 1994). This measure is closely correlated with salivary nicotine assays (Severson et al., 1990) and can therefore be used as a proxy for smokeless tobacco use and addiction.

2.8 Tobacco Smoking in South Africa

South Africa is considered a medium income country according to the World Health Report in 2002. The smoking prevalence in adults 16 years and older was 27.1% in 2000 (van Walbeek, 2002), and the gender specific prevalence was 31% in males and 8% in females with a prevalence in adolescents of 10% in 2003 (Health, 2007). Compared to the South African general public, smoking data of health professionals is scarce. There have been only a limited number of reports on the smoking prevalence in health professionals in South Africa. One such study dating back to 1986 reported a high prevalence of 19% current smokers and 58% ex-smokers amongst South African anesthetists in Durban (Callander and Rocke, 1986). This phenomenon may be explained by the early stages of the tobacco epidemic that South Africa was in.

It was suggested that the tobacco epidemic follows distinct stages as a continuum in each affected country (Lopez et al., 1994): Countries in Stage 1 have low smoking prevalence (less than 20%) and smoking is mostly limited to males. This qualifies most of the sub-Saharan African countries due to their limited exposure to the global tobacco industry. Countries in Stage 1 are therefore extremely vulnerable to advertising and marketing campaigns from the tobacco industry. Currently, Africa tops the world's growth in tobacco consumption at 3.5% growth rate per year (Centers for Disease Control and

Prevention, 2003). This high growth rate in tobacco consumption further accentuates the vulnerability of stage 1 countries. South Africa differs from the rest of Africa in having a more mature tobacco industry and therefore longer exposure to the tobacco industry. Stage 2 is characterized by a smoking prevalence of 50% or more together with low levels of knowledge of the harmful effects of tobacco and low death rate attributable to smoking in the population (Lopez et al., 1994). South Africa exhibits the same elevated smoking prevalence of Stage 2 countries. However, there is typically low political and public support for legislation in tobacco control in Stage 2 countries. This phenomenon unique to Stage 2 manifested differently in South Africa. South Africa stands out from the rest of Stage 2 countries in having very progressive tobacco regulations and there is generally strong governmental support for tobacco control. In a study conducted in 1996, 61% supported a total ban of tobacco advertising on radio whilst 78% supported regulation of tobacco use in public places (Reddy et al., 1996).

During the early stages of the smoking epidemic health professionals tend to adopt the smoking prevalence of the general public and only in more mature stages of the tobacco epidemic become strong opponents of tobacco use (Shafey et al., 2003). The 1986 study on the smoking prevalence of South African health professionals had a smoking prevalence of 19% (Callander and Rocke, 1986). Viewed together with the waning cigarette consumption since 2000 (Shafey et al., 2003) and the high levels of support for tobacco control, it can be assumed that public health interventions against tobacco have shown progress in South Africa and that there seems to be an accelerated progression to more mature stages of the smoking epidemic than the rest of Sub-Saharan Africa. The awareness of tobacco control in South Africa is widespread without the high death toll that typically occurs in countries in more mature stages of the tobacco epidemic.

Reflecting the progressiveness in tobacco control, tobacco regulations and bans were instituted in South Africa. Sales of tobacco to minors was banned in 1993; sponsorship, promotion and advertising of tobacco in certain locations to certain audiences were banned and smoking in restaurants, nightclubs, bars, educational buildings, public

transport and other public places was restricted in 2002 (Food and Agricultural Organization, 2003).

2.9 Influence of Parental Smoking on Experimentation with Tobacco

Parental tobacco use has been regarded as one of the most important factors influencing the adult tobacco-using behaviour in the offspring. Li *et al.* (Li et al., 2002) demonstrated the influence of parental substance use on subsequent substance use in the children. Carr (Carr, 1972) has shown that parental smoking is linked with increased initiation of smoking in student nurses. There also seemed to be slight differences in this association in different ethnic groups (U.S. Department of Health and Human Services, 1994).

Parental smoking normalizes the behaviour of smoking and increases perceived acceptability of smoking in their children (Fishbein, 1973). Parental smoking also negates the credibility of anti-smoking messages and influences peer-selection of their children, thus increasing the offspring's adoption of smoking later in life (Dishion et al., 1995, Simons-Morton, 2002). A recent South African study also showed how smoking and other antisocial behavior in the parents was associated with increased cigarette smoking in the adolescent offspring (King et al., 2003). It was found that most of the smokers amongst South African university students came from families with smokers (Borkon et al., 1983).

2.10 Smoking in the Health Professionals

Health professionals are viewed as the guardians of health and role models of healthy behavior. The paradoxical phenomenon of smoking in health professionals has been of interest to public health specialists due to the recognized negative impact on patient smoking (Kottke et al., 1985, Dawley et al., 1981). Public health studies of smoking in health professionals started in the 1970's comparing the smoking prevalence and behaviour of health professionals with that of the general public in the United States

(Centers for Disease Control and Prevention, 1975, Garfinkel, 1976, Enstrom, 1983, Becker et al., 1986). From these early studies, nurses were found to be the most avid smokers amongst the health professionals and smoking prevalence in nurses surpasses that of the general population (Centers for Disease Control and Prevention, 1975, Garfinkel, 1976, Enstrom, 1983, Dalton and Swenson, 1983, Knobf and Morra, 1983, Tagliacozzo and Vaughn, 1982, Jacka et al., 1984). Psychological stress has been postulated to be part of the reason behind this phenomenon. It has been recognized that nursing and other health professions are stressful occupations (Leatt and Schneck, 1980) and that many smokers smoke to relieve stress (Ikard and Tomkins, 1973).

Another possible explanation is gender based stereotypes. As the result of aggressive marketing and targeting by tobacco companies (Brandt, 1996), there is a perceived correlation of professionalism with stereotyped masculine pursuits such as smoking. Professional women smoke more than women in the general population as reaffirmation of their place in the professional world (Waldron, 1991, Dickens, 1978). There is also a profound under-representation of females in certain health professions such as physicians and pharmacists in contrast with the female predominated health professions such as in nursing and midwifery (World Health Organization, 2009). The hierarchy of the different health professionals and the ensuing gender stereotypes can further act as sources of conflict and strain for health professionals which in turn could fuel the need to “masculinize” in order to secure a place in the competitive medical world. This may explain the high smoking prevalence in female health professionals over and above that of women in the general population. Considering that female health professionals form the majority of the global health workforce (World Health Organization, 2009), the significance and impact of smoking in female health professionals cannot be underestimated.

The line of enquiry of tobacco researchers progressed naturally from smoking in health professionals proximally onto smoking in the health professionals-to-be: the health professions students. This was an attempt to assess and understand the causal factors influencing the smoking attitudes and behaviour of health professionals. In an early study

on the smoking behaviour of nursing students (Haughey et al., 1986) it was found that 30% of the nursing students were current smokers; 25% of the nursing students never smoked and 45% of the nursing students were ex-smokers. It was also found that knowledge of the dangers of smoking did not significantly influence the smoking behavior in the nursing students.

Studies from the 1980's mapped smoking prevalence rates amongst health professions students as ranging from 6% to 57% (Burk and Nilson, 1975, Elkind, 1979, Neil et al., 1980, Ashley et al., 1981, Small and Tucker, 1981, Spencer, 1983). More recent studies showed a much decreased smoking prevalence in health professions students of 2%-25% which may have reflected the success of public health interventions of tobacco use (Baldwin et al., 1991, Dekker HM and HP, 1995, Birkholtz and Louw, 1996, Mangus et al., 1998, Charlton et al., 1997, Gorin, 2001, Patkar et al., 2003).

Previous studies have shown that health professions students are more likely to initiate or increase smoking in their college years (Small and Tucker, 1981, Neil et al., 1980) and that one of the major causes for smoking is social peer-pressure and psychological stress related to their professional training during which human illnesses, deaths and conflicts are dealt with daily (Hillier, 1973, Kirkby et al., 1976, Leather, 1980, Small and Tucker, 1981). Another explanation for smoking in health professionals and health professions students is the loss of idealism (Griffith and Wilson, 2003) and anxiety (Casey et al., 1989).

Piko (Piko, 2002) later affirmed that knowledge of the dangers of smoking does not significantly change the smoking behaviour of health professions students and that nursing students still have the highest frequency of smoking compared to other health professions students.

2.11 Barriers in Conducting Research on Health Professionals and Addictive Substances

Public health and epidemiology has had a very social and public-oriented background. From John Snow's cholera studies in London in the 1800's to modern molecular research on obesity, the focus of public health has always been on vulnerable and at-risk groups. Criteria for vulnerability in public health are often based on socio-economic status, race, gender, minority status and the presence of disabilities.

Access to healthy and nutritious food, prevention of exposure to harmful substances such as alcohol and tobacco and access to medication are all part of public health interventions that are aimed to improve the health of the population. Over the past few decades, as health-affecting variables such as food, tobacco, alcohol and medication became commercialized and commoditized; the health of the public became affected by commercial forces under the influence of private companies and corporations. Increasingly awareness has been raised that public health needs to change the focus from purely biological and behavioral variables to socio-economic, psychosocial and multi-dimensional variables resembling marketing approaches and market segmentation used by commercial enterprises to increase consumption of their products (Saffer H, 1999, Ling and Glantz, 2002). The definition and inclusion criteria of vulnerable groups therefore need to be revamped and reassessed. The traditional categorization of vulnerability may neglect significant at-risk groups and risk variables.

Health professionals are not traditionally considered as a vulnerable group or group of interest from the public health perspective. This phenomenon may have arisen from the fact that the scientific rigor required for health studies mandates objective, independent observers. And since health research is conducted by health professionals, this important requirement of impartiality cannot be fulfilled and important studies within health professions as a group are usually aborted at the stage of study design with the rare studies that reach fruition being influenced by observer bias (Sandelowski, 1986).

Health professionals are expected to take care of themselves before they take care of others. As providers of health related information and services, health professionals are expected to understand the risk and the treatment of harmful exposures (Miller and McGowen, 2000). Since knowledge is viewed as an important driver of health, health professionals are expected to behave in a healthy manner and are therefore rarely the group of interest for public health research.

However, health professionals are exposed to the same social forces and disease inducing variables as the rest of the population. Furthermore, it has been found that health professionals are more likely than the general population to use addictive substances due to work stress, easy access to substances and indifference to substance use from frequent occupational exposures (Brooke et al., 1993, McAuliffe, 1984, Vaillant et al., 1970). Further, there can be profound consequences when health professionals admit to addiction: professional reputation, trust, credibility, accreditation and future employment may be jeopardized (Weir, 2000). Compounded by the negative association of unhealthy habits in health professionals and the perceived invulnerability to diseases, health professionals have difficulty seeking help and treatment from their fellow health professionals (Strang and Sheridan, 2001, Talbott, 1984, Gold, 1972, Vincent et al., 1969, Pearson and Strecker, 1960). This results in unwillingness of health professionals to participate in research related to addictive substances and in the event of participation, introduces bias and error into the responses.

Moreover, there has always been a sense of solidarity amongst professional groups, more so in the health professions. The terms ‘medical fraternity’, ‘medical community’ and ‘health professions’ infers a closely-knit family where there is a sense of brotherhood/sisterhood. This sense of solidarity and secrecy thwarts attempts to study the health professionals by health professionals especially when the consequence of exposure is severe (Guadagnino, 1997, Seppala and Berge, 2010). Further, there is an understanding that health professionals practice health on other people and as one does not use one’s own merchandise, health professionals rarely “take their own medicine”. Health professionals have difficulty viewing and accepting their own role as a “vulnerable group” or “group of interest” (Modlin and Montes, 1964, Guadagnino, 1997).

As a result, robust data and studies are lacking when it comes to the health of health professionals. Most existing evidence on the use of addictive substances, including tobacco, in health professionals is based on descriptive study designs and convenience samples (O'Connor and Spickard, 1997, Weir, 2000).

Despite this lack of data, there is a dire need and manifold benefits for such research. With the high accessibility to researchers, health professionals can be a very convenient group for further research. Illness and impairment within the health professions has a double impact on society through impairment of the vehicle through which health is delivered to the population and impairment of a major segment of the population. It is therefore important to understand and prevent illness in health professionals. Studies in health professionals can similarly improve the health of society in many ways.

2.12 Smoking Behaviour in Health Professions Students

Previous studies done in the United States showed that more than 30% of college students had smoked in the past month (Johnston et al., 2005, Rigotti et al., 2000). Steptoe *et al.* (Steptoe et al., 2002) further demonstrated a similar prevalence in a 23 country survey of college students. A recent survey by Swart *et al.* (Swart et al., 2003) of South African teenagers revealed a past-month smoking prevalence of 18.5%. In a pilot survey tested in 10 countries, the prevalence of smoking was more than 20% in 3rd year health profession students registered for medicine, pharmacy, nursing and dentistry (Global Tobacco Surveillance System Collaborative Group, 2006). Earlier South African studies on tertiary students in South Africa revealed a decreasing smoking prevalence from 22% in general university students in 1983 (Borkon et al., 1983), 17% (Grant et al., 1989) to 12% in medical students (Birkholtz and Louw, 1996), and 15% in other university students in a more recent study (Peltzer, 2001). The expected smoking prevalence in South African health professions students is expected to be less than 12% assessing from the prevalence and trend in other South African studies. The data from these South African studies also depicted a decreasing trend in the number of cigarettes smoked over the past 30 years with earlier studies revealing heavier smoking (10-40 cigarettes a day) and lighter

smoking (less than 10 a day) in later studies (Borkon et al., 1983, Grant et al., 1989, Birkholtz and Louw, 1996, Peltzer, 2001).

The knowledge and awareness of the harmful effect of tobacco appears to be high amongst the university students and the health professions students. In a study by Borkon in 1983, (Borkon et al., 1983) 91% of university students considered smoking to be a health hazard and understood that the lung, heart and the other organ systems are involved. In a study done in 1989, most of the studied health professionals were aware of tobacco-related health effects (Grant et al., 1989). In a study by Birkholtz and Loew in 1996, health care students were also aware of most of the major tobacco related health effects (Birkholtz and Louw, 1996). This trend continued into 2001 with most of the university students researched in the study by Peltzer aware of the harmful effects of tobacco (Peltzer, 2001).

It was found that although the knowledge of the harmful effects of smoking was high amongst the health professions students (Peltzer, 2001, Borkon et al., 1983) and the non-health professions university students (Birkholtz and Louw, 1996), risk awareness was however not well correlated with smoking behaviour (Stephoe et al., 2002).

Awareness of the effect of smoking in health professionals on the patient is widespread. In a study by Grant in 1989 on South African medical students, the majority felt that health professionals who smoke would affect the smoking behaviour in patients but only 60% would take steps to discourage patients from smoking (Grant et al., 1989). The high level of awareness of the harmful effects of tobacco is probably the reason for the high levels of resistance from the health professions students to public exposure to tobacco smoke. In the study by Grant, 55% of smokers and 85% of non-smokers supported a ban on cigarette smoking in public areas in the medical school and preferred clear boundaries between smoking and non-smoking areas on the campus (Grant et al., 1989).

In terms of the patterns of smoking, college student smokers are considered to be social smokers who smoke more in the company of others and in the presence of alcohol but

smoke at low levels overall (Dierker et al., 2006, Moran et al., 2004). Alcohol was also found to be the most commonly used substance in conjunction with tobacco in university students (Bard and Peacock, 1976, Borkon et al., 1983).

Borkon *et al.* found that one of the most common reasons for tobacco initiation was academic stress (Borkon et al., 1983). This has also been confirmed by a later study (Birkholtz and Louw, 1996).

The relationship between smoking and stress whether in the form of a stressful life event or general anxiety levels has been recognized previously (Kassel et al., 2003, Naquin and Gilbert, 1996). As this relationship has been well-recognized in adults, the role of stress in university and college student smoking has also been illustrated (Nichter and Carkoglu, 2007). It was revealed that college students used smoking as part of stress-management and socialization (Nichter and Carkoglu, 2007).

With regards to smoking behaviour, the most obvious distinction is stress-level or perceived stress-level. In a South African study of health profession students, 71.4% of the students indicated that the cigarette smoking was brought upon by academic stress (Birkholtz and Louw, 1996). This was similar to an earlier study where academic and non-academic stress is a major reason for smoking initiation and perpetuation (Borkon et al., 1983).

Since stress-coping behaviour and mechanisms are likely to perpetuate from early adulthood onwards, stress related smoking is also likely to perpetuate from the time of being health professions students to fully trained health professionals.

In a South African study, (Borkon et al., 1983) the first attempt at smoking between the ages of 17 and 19 is most critical in determining whether the young adult will become a regular smoker in the future. This may be relevant when designing tobacco intervention and prevention programs.

2.13 Smoking Cessation in Health Professions Students

It was found that health professionals initiate regular smoking in Stages I and II of the smoking epidemic but in later stages, become supporter and implementers of smoking cessation programs and strategies (Shafey et al., 2003).

Haughey *et al.* (Haughey et al., 1986) have identified in a sample of nursing students that 57% of the smokers expressed the desire to stop and 81% had tried to stop smoking in the past. The major reasons for attempted smoking cessation were to improve health and the influence of family and friends (Borkon et al., 1983, Haughey et al., 1986).

It was found that heavy smokers were more likely to have future expectations of smoking. However, the actual behaviour of smoking was not consistent with their expectations and that smokers, especially those who smoke occasionally (light smokers), underestimate the power of their tobacco addiction (U.S. Department of Health and Human Services, 1994, Ayo-Yusuf and Szymanski, 2010).

3 AIMS & OBJECTIVES

This pilot survey aimed to:

- Determine the prevalence of tobacco use among 2nd to 4th year students in Nursing (BSc) and Health Promotion (BSc) at a selected South African University (Walter Sisulu University).
- Assess the training and curriculum provided with regards to smoking cessation and prevention counseling amongst health professions students at a selected South African university (Walter Sisulu University).

The objectives were to:

1. To assess the age of initiation and tobacco use patterns

2. To assess the knowledge, attitudes and beliefs of health professions students towards tobacco use, prevention and control
3. To assess environmental tobacco smoke exposures in health professions students
4. To assess smoking cessation curricula for health professions students

4 METHODOLOGY

4.1 Study Design

A cross-sectional university based quantitative survey on 2nd to 4th year health professions students studying nursing and health promotion in Bachelor of Science programs.

4.2 Questionnaire

The instrument administered was a questionnaire developed and piloted by the Global Health Professions Survey Initiative (Appendix 1) and was adapted and modified to local South African contexts. It was a self-administered, anonymous, paper-and-pencil, multiple-choice questionnaire consisting of 5 main sections: 1) tobacco use prevalence among health professions students, 2) exposure to environmental tobacco smoke, 3) attitudes towards tobacco use, 4) behavior and cessation of tobacco use and 5) curriculum and training with regards to cessation counseling and demographics. When appropriate, the 4-point Likert scale was used (1 = strongly disagree to 4 = strongly agree) to assess attitudes and beliefs with high reliability and validity (Lei Chang, 1994). However, all questions were designed to have all possible range of alternative responses that were stated unambiguously and in many cases the 4-point Likert scale could not be applied. This may have an effect on the internal consistency of the response especially when the number of response alternatives increases (Maydeu-Olivares et al., 2009). Part of the questionnaire modified the Fagerström Nicotine Tolerance questionnaire developed by Karl Fagerström to assess nicotine dependence (Fagerstrom and Schneider, 1989, Pomerleau et al., 1994, Reddy et al., 1996, Dijkstra and Tromp, 2002).

The questionnaire was administered in English, which was the language of instruction at the institution where the sample was drawn. Trained research assistants administered the questionnaire prior to the start of one lecture at the end of the university semester to ensure adequate time and attention from the students. Participation was voluntary and students were requested not to make any notes that would reveal their identity to ensure anonymity. Confidentiality and anonymity were important as the questionnaire contained sensitive questions (for example, substance use) that may jeopardize the student's academic career at the institution. Anonymity will thus improve the reliability of the self-reporting (Dolcini et al., 2003). The students were also informed that the response they provide in the questionnaire will not affect their academic standing at the institution where the study was conducted.

4.3 Sample Selection

South Africa has 12 tertiary institutions in 5 provinces offering undergraduate training in health related professions. Although all 2nd to 4th year health profession students were eligible to participate the sample size is constrained by financial resources and the final number of recruited institutions. For the purpose of this study, one institution had agreed for their nursing and health promotions students to participate. This study therefore served as a pilot study for later studies in South Africa. All health professions students from the selected institution were sampled in this pilot study.

Assuming that there are 100 eligible students at each institution, the total eligible population will be 1200 students at 12 institutions.

Expected prevalence took into account the known smoking prevalence of 27% amongst South African 16 years and older in a study conducted in 2000 (van Walbeek, 2002) and 15%, was the prevalence of cigarette smoking amongst black South African University Students (Peltzer, 2001). As health professions students are expected to smoke less than the general population of the same age group, the postulated smoking prevalence in health professions students was expected to be less than the prevalence of the general

population and similar to the prevalence of other university students and was estimated to be 14%.

Combined with a margin of error of 5% and confidence interval of 95%, expected prevalence of 14% in a population of 1200, alpha (α) of 0.05 and Beta (β) of 0.5, the required sample size was calculated to be 161 ($n=161$).

4.4 Development of Country Specific Questions

The core GHPSS survey common to all participating countries was augmented with South African specific questions that took into consideration the local conditions and cultural context. These questions attempted to explore the determinants of tobacco-using behavior among the students by ensuring that the questions were appropriate, understandable and culturally sensitive to the South African context and was reviewed by local health professions students. As a pilot study in South Africa, this study also served to assess the applicability and reliability of the questionnaire as a study instrument.

4.5 Data Collection and Analysis

Anonymous and confidential self administered questionnaires were administered to students prior to the start of one of their lectures. The data was captured manually into pre-designed databases. The data analysis was performed using STATA v10.1™ statistical software.

Prevalence rate and odds ratio were calculated. As the sample was very small, statistical significance was unreliable for some of the calculations and the results were limited to mainly descriptive data. When appropriate, the 95% confidence interval, test of homogeneity and student's t-tests between the variables were performed and the Pearson's χ^2 and p-value were calculated and presented (at a significance level of $\alpha = 0.05$).

Stratified analysis was performed to assess interactions. Stratified analysis is important to ensure that there is no confounding from the different variables. When appropriate, the variable was stratified into the composition variables and other likely confounding variables to elucidate interactions or relationships between the variables.

For specific cases where agreement between the two responses was of interest, Kappa statistics were calculated with its 95% confidence interval.

4.6 Ethical considerations

Permission to conduct the study was obtained from the Dean of the selected institution. The questionnaires were anonymous and confidential. Participation in the survey was voluntary and students were free to withdraw from the study at any stage. Signed informed consent forms were obtained from the students prior to administering the questionnaires.

5 RESULTS

5.1 Sample size and response rate

This study was the pilot study of a larger study that involved health professions students in South Africa from all the institutions including nursing, health promotion, physiotherapy, medical, dental and occupational therapy students.

The study was piloted at the Walter Sisulu University in Mthatha, Eastern Province with the Nursing and Health Promotions Students. Out of the selected 86 students enrolled in the two programs at the university, the response rate was 100%. Incomplete questionnaires (there were two questionnaires with more than 2 questions unanswered) were also included in the analysis and the missing values were disregarded during the analysis.

The sample size was below the calculated sample size for statistical power. The sample size recalculated with the recorded smoking prevalence of 7% is n= 93 which is slightly above the actual study sample of 86.

5.2 Background Characteristics of the Participants

<u>Characteristics</u>	<u>Distribution</u>	<u>Characteristics</u>	<u>Distribution</u>
Female	78%	Mean Age	27 years
Male	22%	2 nd year students	16%
Nursing Students	36%	3 rd year students	47%
Health Promotion students	64%	4 th year students	37%

The mean age of the participants is 27 years with a maximum age of 30 years and above and a minimum age of 18 years. The age of the students was not normally distributed as they were not randomly selected but selected out of discrete clusters of students at the same institution from the same classes.

Seventy eight percent of the participants were female and 22% were male. This gender distribution is significantly different from the recorded 57% female in South African health professionals (World Health Organization, 2009) (P = 0.0002). Nursing students and health promotion students made up 36% and 64% of the sample respectively. The participants were in their 2nd, 3rd and 4th years of study (16%, 47% and 37% respectively). As both nursing and health promotion are 4-year programs, the majority of the participants were senior students in the final years of their studies. This means that most of the students would have been exposed to most of the core-curriculum related to tobacco if it were part of the curriculum (Table 1).

5.3 Tobacco Use Prevalence among Health Professions Students

5.3.1 Ever Smokers

Ever-smokers are defined as individuals who have attempted smoking cigarettes, including one or two puffs. Approximately 37% of the students (n=86) have attempted to smoke cigarettes (including one or two puffs).

The prevalence of ever-smoking was significantly different between the nursing students (57%) and the health promotion students (27%) (57% vs. 27%, $P=0.01$). This showed that nursing students were 3 times (odds ratio [OR], 3; 95% confidence interval [CI], 1.16 to 9.03) more likely to have attempted smoking cigarettes than health promotion students.

Twenty seven percent of the female students ($n=67$) have attempted cigarette smoking compared to 74% of the male students ($n=19$). Also male students are 7.6 times more likely to have attempted cigarette smoking than female students (27% vs. 74%, $P < 0.01$).

Further breakdown of the prevalence of having attempted cigarette smoking showed that the prevalence was different for students whose parents also smoke: for students with neither parents smoking the prevalence of ever-smoking was 36%; in students whose father/male guardian smokes the prevalence was 44% and in students whose mother/female guardian smokes the prevalence of ever-smoking was 50%. Odds ratio of parental smoking and ever smoking and for maternal smoking compared with paternal smoking on ever smoked did not reach statistical significance due to the small percentage of participants with female parent as smoker ($n=2$). Odds ratio of parental smoking and ever smoking was 1.3 ($P=0.63$). Odds ratio for maternal smoking compared with paternal smoking on ever smoked was 1.4 ($P=0.81$). Results are summarized in Table 2.

	<u>Ever-smoking (number of students)</u>	<u>Prevalence (%)</u>
Ever smoking (even 1 or 2 puffs) (n=86)	32	37
in Nursing Students (n=30)	17	57
in Health Promotion Students (n=56)	15	27
in males (n=19)	14	74
in females (n=67)	18	27
both parents non-smokers (n=68)	24	36
male parent smokes (n=16)	7	44
female parent smokes (n=2)	1	50

5.3.2 Age of First Cigarette

When asked about the age at which they first attempted cigarette smoking, 45% of the ever-smokers responded that they started between 11-15 years of age, 26% between 16-19 years of age, 13% between 20-24 years of age and 6% between 25-29 years of age (Table 3). It can be seen that early teenage years accounted for most of the experimentation and that it was during their teenage years that more than 70% of the experimentation with cigarettes occurred.

Table 3. Distribution of First Cigarette Smoking Attempt

<u>Age attempted cigarette smoking (years)</u>	<u>In ever smokers (n=32)</u>	<u>Nursing (n=17)</u>	<u>Health Promotion (n=15)</u>	<u>Female (n=18)</u>	<u>Male (n=14)</u>
Age 10 or younger	10%	12%	13%	17%	0%
Age 11-15	45%	35%	53%	24%	72%
Age 16-19	26%	18%	33%	29%	21%
Age 20-24	13%	24%	0%	28%	7%
Age 25-29	6%	12%	0%	12%	0%

Further, to elucidate the pattern of smoking attempts in nursing students, the age of first attempted cigarette smoking was stratified by the degree studied.

Although both groups of students' first attempts peaked between 11-15 years, the age of the first attempt is more tapered in nursing students with a second peak in their early twenties (20-24 years) (Table 3).

Further analysis by gender, it seemed that the pattern of distribution of age of first attempted cigarette smoking differed quite significantly between males and females: age of first cigarette smoking attempt in female health professions students seems to be more evenly distributed with a peak during late teens between 16-19 years of age and tapering off to both extremes of under 10's and above 30's. In male students, 72% first attempted smoking cigarettes in their early teens with the proportion dropping sharply in late teens and early twenties (Table 3).

Analyzing the impact of ever attempting smoking, and more importantly, the age of first attempts on becoming chronic smokers, 25% of those who first attempted tobacco

smoking in teenage years and early twenties go on to become long-term smokers compared with 0% of those who first attempted smoking during other periods in life (Table 4). Of the current smokers, 50% smoked their first cigarette in their early teens, 33% late teens and 16% in their early twenties (Table 5). It seemed that the earlier cigarette smoking is initiated, the more likely one is to take up regular smoking.

Table 4. Age of First Cigarette and Persistence

<u>Age first attempted cigarette smoking (years)</u>	<u>Does not smoke</u>	<u>Smokes 1-2 day a month</u>	<u>Smokes up to 9 days a month</u>	<u>Smokes up to 30 days a month</u>
10 or younger (n=3)	100%	0%	0%	0%
11-15 (n=14)	79%	7%	7%	7%
16-19 (n=8)	75%	12.5%	12.5%	0%
20-24 (n=4)	75%	25%	0%	0%
25-29 (n=2)	100%	0%	0%	0%

Table 5. Age of First Cigarette and Current Smoking

<u>Age first attempted cigarette smoking (years)</u>	<u>Current Smoking(more than 1 cigarette/month)</u>
10 or younger (n=3)	0%
11-15 (n=14)	50%
16-19 (n=8)	33%
20-24 (n=4)	16%
25-29 (n=2)	0%

5.3.3 Age of Regular Cigarette Smoking

In those who smoke cigarettes regularly (n=31), 33% started daily smoking before the age of 15 years whilst 67% started after the age of 15 years. There is a lag period between the first attempt of cigarette smoking and later on daily cigarette smoking as 44% of the regular smokers have a 3-5 years lag between first attempting cigarettes and regular smoking. Of the ones who have attempted cigarette smoking, 70% never evolved into daily smoking. In other words about one third to one half of those who experimented with cigarette smoking eventually became daily smokers.

5.3.4 Current Smoker

Current smoking, as defined by one or more cigarettes a month, make up 7% of the study sample (n=86): 4.5% of the female students were current smokers compared with 15.8% of the male students; 3.5% smoke 1-2 cigarettes a month; 2.4% smoke up to 9 cigarettes a month and only 1.1% smoke 30 cigarettes or more a month (Table 6). The pattern of current smoking is not significantly different between female and male students (P=0.09).

(n=86)	<u>Prevalence</u>
Current smoking	7%
1-2 cigarettes a month	3.5%
3-9 cigarettes a month	2.4%
30 or more	1.1%

5.3.5 Cost of Cigarette Smoking

Twenty-nine percent of the smokers (n=6) spend up to ZAR15 (South African Rand) a month on cigarettes and only 14% of the students spend up to ZAR20 a month on cigarettes.

5.3.6 University Cigarette Smoking

Of those who ever smoked (n=32), 27% have smoked on the university campus in the past year and 25% have smoked inside university buildings. Further analysis using the Kappa statistic showed that those who smoke on campus in the past year are also likely to have smoked in university buildings in the past year (Kappa co-efficient = 0.86, 95% CI 0.83 to 0.89).

5.3.7 Other Tobacco

None of the students use tobacco other than cigarettes.

5.4 Environmental Tobacco Smoke Exposure

5.4.1 Exposure to Environmental Tobacco Smoke

The average number of days of environmental tobacco smoke exposure was 1.3 days per week at home: 60% of the students had no home exposure to environmental tobacco smoke, but 22% and 9.3% were exposed 1-2 days per week and 3-4 days per week respectively to home tobacco smoke. Similarly 4.7% were exposed for 5-6 days per week and 3.5 % were exposed for 7 days a week to home to tobacco smoke (Table 7).

	At home(n=86)	Out of home(n=86)
Days per week	1.33 days/week	2.24days/week
1-2days/week	22%	33%
3-4 days/week	9.3%	16%
5-6 days/week	4.7%	3%
7days/week	3.5%	10%

In students whose father/male guardian smokes the mean days of home tobacco smoke exposure was 1.13 days per week. In students whose mother/female guardian smokes the mean days of home tobacco exposure was 1 day per week.

The students were exposed to 2.24 days per week of out of home tobacco smoke on average. Compared to 1.33 days per week of home tobacco smoke exposure, the mean total second hand tobacco smoke exposure in and out of their home is 3.6 days per week. This means that the students are exposed to second hand tobacco smoke for more than half of the week.

Total mean exposure to environmental tobacco smoke is 3.3 days/week in females and 4.5 days per week in males and are not significantly different (P=0.21).

5.4.2 Permission to Smoke

Ninety seven percent of the sample felt that one should ask permission before smoking around others; 70% percent of the sample answered that they never allow smokers to smoke around them even if permission was requested; 29% responded that sometimes they do and 1% responded that they always allow smokers to smoke around them if permission was requested first.

There appeared to be a slight difference between females and males in their attitude towards smoking around them: 74% of female students (n=67) will never let people smoke around even if they request for permission to smoke compared to 52% of males (n=67) (P=0.07).

5.4.3 University Smoking Policy and Enforcement

Given that the sample came from one institution, the questionnaire assessed students' knowledge of university/institutional policy: 36% of the students were not aware of any official university policies against smoking; 22% thought that there are smoking bans but only in university clinics; 7% thought that there are anti-smoking policies in university buildings only; and 35% thought that anti-smoking policies are for both clinics and buildings (Table 8).

	Prevalence
(n=86)	
Not aware of any smoking policy	36%
Aware of policy in clinics and buildings	35%
Policy in clinics only	22%
Policy in buildings only	7%

When asked whether the smoking ban was enforced, 25% of the students were aware of enforcement of the university smoking ban.

The knowledge of enforcement of the smoking ban affects the tolerance of smoking significantly: 42% of those unaware of anti-smoking policy let people smoke around them and 5% of those aware of policy enforcement let others smoke around them ($P=0.018$).

Knowledge of the enforced smoking ban does not influence significantly whether students are current smokers or whether students smoke on campus ($P >0.05$).

5.4.4 Parental Smoking

Seventy-eight percent of the students ($n= 86$) had neither parents/guardian smoking, while 19% had only father/male guardian smoking and 2.4% had only the mother/female guardian smoking.

Parental smoking has a significant influence on whether a student is a current smoker: 3% of those whose parents do not smoke are current smokers compared to 21% of those whose parent/parents smoke (3% vs. 21%, $P<0.01$). Those whose parent/parents smoke are 8.3 times more likely to be current smokers. The attributable fraction in the population to be current smokers is 59% due to parental smoking and 88% in those exposed to parental smoking.

Parental smoking does not influence the students' tolerance to smoking around them nor does it influence their attitude on whether permission should be asked before people smoke around others ($P>0.05$). Parental smoke also had a negligible influence on whether a student ever attempts to smoke cigarettes; the age at which cigarettes smoking was first attempted; or the age daily smoking was started ($P>0.05$).

5.5 Attitude towards Future Smoking

Eighty-seven percent ($n= 86$) of the students will “definitely not smoke” in the next 12 months; 8% of the students will “probably not smoke” in the next 12 months; 4% will probably smoke” in the next 12 months and 1% will “definitely smoke” in the next 12

months. The probability of students smoking in the next 12 months is significantly different between current smokers and non current smokers (table 9).

Table 9. Probability of Smoking in the Next Year

<u>Smoke in the next 12 months</u>	<u>All students (n=86)</u>	<u>Non-current smoker (n=80)</u>	<u>Current Smoker (n=6)</u>	<u>Smokes 1 day/month (n=3)</u>	<u>Smokes 1-9 days/month (n=2)</u>	<u>Smokes 10-30 Days/month (n=1)</u>
Definitely not	87%	92.3%	16.7%	33.3%	0%	0%
Probably not	8%	6.4%	33.3%	33.3%	50%	0%
Probably yes	4%	1.3%	33.3%	33.3%	50%	0%
Definitely yes	1%	0%	16.7%	0%	0%	100%

At least 50% of current smokers and ever-smokers plan not to be smoking next year (“definitely not” smoking in the next 12 months).

When asked whether they will be smoking 5 years from the present, 95% of students responded “definitely not”; 2.4% said “probably not” and 2.4% said probably yes. None responded “definitely yes”.

This pattern does not differ significantly over sex, age, parental smoking, or environmental smoke exposure (P>0.05).

5.5.1 Difficulty in Smoking Cessation

Forty-four percent of the students (n=86) felt that it is “probably difficult” to stop smoking once it is started; 20% felt “definitely not difficult”; 20% “definitely difficult” to stop smoking and 15% felt that it is “probably not” difficult to stop smoking. This pattern did not differ significantly over gender, age, parental smoking, current smoking or age at which daily smoking commenced and remained fairly constant across different variables. (Table 10)

Table 10. Difficulty in Smoking Cessation

Difficult to stop smoking	Non-smokers (n=53)	Ever smokers (n=31)	Total
Definitely not	11(20%)	6(19%)	17(20%)
Probably not	9(17%)	4(13%)	13(15%)
Probably yes	25(47%)	12(39%)	37(44%)
Definitely yes	8(15%)	9(29%)	17(20%)

5.5.2 Attitude towards tobacco ban

Sixty-nine percent of the students (n=86) felt that tobacco sales to adolescents (under 18 years old) should be banned; 88% felt that tobacco advertising should be banned; 94% felt that smoking should be banned in restaurants; 74% felt that smoking should be banned in discos/pubs/bars; 91% felt that tobacco smoking should be banned in public places.

This attitude did not differ significantly over gender, age, parental smoking, current smoking or age at which daily smoking commenced and remained constant across different variables ($P>0.05$).

There is a marked difference between the attitude of the students towards banning smoking and there seemed to be a gradient of acceptance of smoking bans towards different locations: 94% said yes to smoking ban in restaurants; 91% wanted bans in public places, 88% for banning smoking adverts, 74% felt smoking should be banned in discos/bars/pubs, and 69% felt that tobacco sales to adolescents should be banned (Table 11).

<u>Desire for Tobacco Control in:</u>	<u>% Agreeing</u>
Restaurant	94 %
Public Places	91%
Tobacco Advertising	88%
Discos/Pubs/Bars	74%
Adolescent Tobacco Sale	69%

The odds ratio of attitudes on smoking bans revealed that: those who agree to banning cigarettes in public places are 22 times as likely to agree to banning smoking in restaurants ($P<0.001$); 11 times as likely to agree to smoking ban in discos/pubs/bars ($P<0.001$), but not more likely to agree to banning of smoking adverts and tobacco sales to adolescents ($P>0.5$).

5.5.2.1 Attitudes on Health Professionals' Role in Smoking Cessation

Ninety-eight percent (n=86) felt that health professionals should have special training for smoking cessation; 66% felt that health professionals who smoke are less likely to give smoking cessation advice. Similarly, 65% felt that health professions who use tobacco products other than cigarettes are less likely to give smoking cessation advice.

5.5.3 Other Risky Behaviour Associated with Smoking

Of the current smokers (n=6), 71% admits to smoking more cigarettes when drinking alcohol and/or using other drugs concurrently; 14% admitted to smoking cigarettes but denied ever using other drugs or drinking alcohol; 14% responded that they smoke the same amount of cigarettes when drinking alcohol and/or using other drugs such as dagga/marijuana, mandrax/“cream”, crack, cocaine, ecstasy, heroin and LSD.

Of the current smokers, 12% smoke less than 10 minutes after waking up; 12% smoke after 31-60 minutes within waking up and 12% smoke more than one hour after waking up.

5.6 Smoking Cessation

Of those who ever smoked (n=32), 19% still smoke. Of the ex-smokers (n=26), 68% stopped smoking for health reasons, 27% stopped smoking for reasons other than those listed (other than “to save money, disliked by family, disliked by friends, health reasons”) and 5% stopped as their friends do not like it when they smoke.

Current smokers (n=6) all think that they can stop smoking at will and 60% want to stop smoking; 77% of the current smokers have tried to stop smoking in the past year.

Interestingly, of the current smokers who think that they can stop at will, 12.5% felt that it is definitely not difficult to stop; 37% felt that it is definitely difficult to stop while 50% felt that it is probably difficult to stop.

Of the smokers (n=32) 66% has received help/advice to stop smoking. Similarly to the response on whether tobacco products other than cigarettes are used, none of the respondents currently uses tobacco products other than cigarettes and 7% used to be ex-non-cigarette tobacco product users.

Of the ex-smokers (n=26), 41% have stopped for 3 years or longer; 18% have stopped for 2 years; 5% have stopped for one year and 6-11 months respectively; 14% have stopped 1-5 months ago and 18% have stopped less than 1 month ago.

5.7 Curriculum/training

Eighty-nine percent of the students recall having been taught about the dangers of smoking cigarettes during their classes.

To assess the difference between the students from different degrees and year of study, a test of homogeneity was performed: 100% of the nursing students recalled having been taught about the dangers of tobacco while only 83% of health promotion students recalled that (100% vs. 80%, $P=0.02$). The percentage of students who cannot recall being taught about the dangers of smoking decreases significantly as the year of study increases: 28% in 2nd year; 12.5 % in 3rd year and 0% in 4th year ($P=0.01$).

To assess whether being taught about the dangers of smoking changes the behaviour of the student, a test of homogeneity was performed: 100% of current smokers recalled having been taught about the dangers of smoking compared to 88% of the non current smokers ($P=0.38$). Further stratified analysis showed that 93% of those who were taught the dangers of smoking never smoked, 6% stopped smoking and 1% still smokes, while of those who were not taught of the dangers of smoking 75% never smoked, 25% stopped smoking and 0% still smokes ($P=0.12$) (Table 12).

Table 12. Smoking Education vs. Smoking Behaviour

<u>Smoking status</u>	<u>Taught the dangers of smoking (n=77)</u>	<u>Not taught of the dangers of smoking (n=9)</u>
Never Smoked	93%	75%
Stopped Smoking	6%	25%
Still smokes	1%	0%
Chi ² = 4.2 p=0.12		

Seventy-three percent recalled discussing the reasons why people smoke in class. The odds ratio analysis revealed that health promotion students are 6 times (95% CI 1.86 ~ 19) more likely than nursing students to have discussed the reasons why people smoke in class.

For Health promotion students, there is not a significant difference between the year of study and whether they have discussed the reason why people smoke in class: 78% in 2nd year 90% in 3rd year and 50% in 4th year recalled such discussion (P>0.05).

Approximately 70% of the students (n=86) recalled having learned the importance of recording the smoking history of patient.

There is a significant difference between the response in the two degrees: Health promotions students are 0.24 times (95% CI, 0.05 to 0.85) less likely to recall the importance of recording the smoking history than Nursing students (P=0.01).

There was not a significant difference between the responses of students from different years of study: 64% of 2nd years, 58% of 3rd year and 100% of 4th years recall having been taught the importance of smoking history recording in class (P=0.47).

Forty-three percent of the students recalled having had formal training in smoking cessation during their course. This proportion is not significantly different between the different degrees or year of study (P>0.05).

Eighty-three percent recalled the importance of providing educational material for those who want to stop smoking.

Fifty-eight percent recalled having learned about nicotine replacement for smoking cessation in class.

Twenty-six percent recalled having learned about the use of antidepressants such as bupropion (Zyban®) in smoking cessation in class. The types of tobacco use cessation training received by the health profession students are summarized in Table 13 in descending order of proportion recalled.

Tobacco use cessation training received	% recall	95% confidence interval
Danger of cigarette smoking	89	83-96
Importance of giving educational material to patients who want to stop smoking cigarettes	83	75-92
Importance of taking smoking history from patients	70	60-80
Nicotine replacement in smoking cessation	58	47-68
Formal training in smoking cessation counseling	43	32-54
Use of antidepressants in smoking cessation	26	16-35

The calculated prevalence rate and the odds ratio are summarized in table 14 and table 15.

	Prevalence (%)
Ever smoking (even 1 or 2 puffs) (n=86)	37
in Nursing Students (n=30)	57
in Health Promotion Students (n=56)	27
in males (n=19)	74
in females (n=67)	27
both parents non-smokers (n=68)	36
male parent smokes (n=16)	44
female parent smokes (n=2)	50
Age of first cigarette (in ever-smokers) :	(n=31)
10 years or younger	10
11~15 years	45
16 ~19 years	26
20~24 years	13
25~29 years	6

Age of first cigarette (cigarette smokers):	Female (Male)
	n =18 (14)
10 years or younger	17% (0)
11~15 years	24% (72)
16 ~19 years	29 % (21)
20~24 years	28% (7)
25~29 years	12% (0)
Current smoking: (n=86)	7
1-2 cigarettes a month	3.5
3-9 cigarettes a month	2.4
30 or more	1.1
Cost of Cigarettes	(n=86)
R1-R15 a month	2
>R20 a month	1
Smoking on University Campus (n=86)	27
Smoking in University Building (n=86)	25
Environmental tobacco smoke exposure: (n=86)	
1-2days/week at home	22
3-4 days/week at home	9.3
5-6 days/week at home	4.7
7days/week at home	3.5
Attitude towards tobacco control (n=86)	
permission requested to smoke	97
Refuse permission to smoke	70
University smoking policy (n=86)	
No smoking policy	36
Policy in clinics and buildings	35
Policy in clinics only	22
Policy in buildings only	7
University anti-smoking policy enforcement	25
Parental Smoking (n=86)	
Neither	78
Father only	19
Mother only	2.4
Not smoking in next 12 months	87
Not smoking in next 5 years	95
Difficult to quit smoking	64
Ban tobacco sales to adolescents	69
Ban tobacco advertising	88
Ban smoking in restaurants	94
Ban smoking in discos/bars/pubs	74
Ban smoking in public places	91
Health professionals should receive training in smoking cessation	98
Health professionals who smoke are less likely to provide smoking cessation counseling	67
Ever smokers: (n=32)	
Concomitant use of tobacco and alcohol	71
More cigarettes when using alcohol	14
Smokes within 10min of waking up	12
Smokes 31-60min after waking	12
Current smoking in ever smokers	19

Stopped smoking for health reasons	27
Stopped smoking for friends and family	5
Stopped smoking for other reasons	27
Stop smoking at will	60
Tried to stop smoking in the past	77
Received smoking cessation counseling	66
Ex-user of tobacco products other than cigarettes	7
Ex-smokers:	(n=26)
Stopped 3 years or longer	41
Stopped 2 years	18
Stopped 1 year	5
Stopped 6 to 11 months	5
Stopped 1-5 months	14
Stopped less than 1 month	18
Curriculum	(n=86)
Taught dangers of smoking	89
Taught to record smoking history	70
Formal training in smoking cessation	43
Taught about educational material for smoking cessation	83
Nicotine replacement for smoking cessation	58
Antidepressant for smoking cessation	26

Outcome	Exposure	Odds Ratio	95% Confidence Interval	p-value
Eversmoking:	Nursing Students	3	[1.3;10]	0.01
	Male	7.6	[2.2;30.3]	<0.01
	Parental Smoking	1.3	[0.4;4.8]	0.63
	Maternal Smoking	1.4	[0.1;136]	0.81
Current smoking	Parental smoking	8.3	[1.1;96]	<0.01
Ban Cigarettes in Public Places:	Ban smoking in restaurants	22	[2;300]	<0.001
	Ban smoking in discos/pubs/bars	11	[1.8; 121.5]	0.001
Ban smoking in restaurants	Ban smoking in discos/bars/pubs	14	[1.2;699]	0.004
Can stop smoking at will	Smoking cessation difficult	4	[0.5;201]	0.15
Want to stop smoking	Tried stopping in the past year	31	[1.26;1861]	0.0002

6 LIMITATIONS

The study was limited by several factors. The sample size was small and there may have been sampling bias as only a selected few classes of nursing and health promotion students were sampled.

The low proportion of smokers within the sample may have magnified outliers and erroneous answers. This may have introduced confounding and other bias into the study. Stratified analyses were performed to minimize the confounding. However, due to the small sample size, some of the results lacked the required statistical power.

Representativeness and generalizability may have been limited due to the small sample size and sampling method. There may also have been a cluster effect as only discrete classes of students were selected. This effect was difficult to eliminate as it was inbuilt into the sample selection.

The validity and reliability of the instrument can be improved as shown in the results section. The questionnaire also categorized the tobacco users into either cigarette smokers or non-cigarette users (smokeless tobacco or other non-cigarette tobacco smoking e.g. pipes). This categorization may have underestimated the number of smokers (cigarette and non-cigarette smokers). Amongst the participants, only one person admitted to the use of non-cigarette products and so the effect of the mis-categorization was minimal.

The use of the modified Fagerström Tolerance Questionnaire for the measurement of nicotine dependence may have less than optimal sensitivity especially in the context of low smoking prevalence populations such as that of this study (Huang et al., 2008, Okuyemi et al., 2007, Kandel et al., 2005).

The results were based on self-reporting that could not be validated by biological markers (e.g. blood nicotine). Combined with the negative association of tobacco smoking, the students may have under-reported the use of tobacco and other substances (Midanik, 1989). There may also have been recall bias and reporting errors (Hilton, 1989). However, anonymity was emphasized during the administration of the questionnaire to minimize this effect. There could have been non-response bias should the original sampling plan be carried out. This can be excluded, as the response rate was 100%.

7 DISCUSSION

From a small pilot study with non-random sampling and significantly different background characteristics, it is surprising that compared with previous studies on health professions students in other countries (Haughey et al., 1986, Borkon et al., 1983, Grant et al., 1989, Birkholtz and Louw, 1996, Peltzer, 2001), this study showed very similar patterns of smoking behaviour, age distribution of initiation, reasons for quitting and age of smoking initiation. This may have confirmed that South Africa is in the early stages of the smoking epidemic similar to what the developed world experienced 20-30 years ago despite the progressive tobacco legislation. The behaviour of the health professionals in South Africa is consistent with the findings of studies done in countries from the early stages of the epidemic. Some of the findings were also surprisingly similar to that of the general South African public with regards to the some of the distribution, attitudes and behaviour of cigarette smoking.

However, the similarities with earlier studies did not preclude unique and interesting findings from this one. A few theories were confirmed:

1. The earlier smoking is initiated the more likely one is to become a regular smoker (Chassin et al., 1990). This is probably related to the addictive nature of nicotine and the vulnerability of teenagers to addictive substances (Lynch et al., 1994).
2. There is a lag period between first attempting cigarettes and regular smoking (McNeill et al., 1989). However, the lag indicated in earlier studies is slightly prolonged in health professions students: there is a lag of 3-5 years compared to 2-3 years in earlier studies (McNeill et al., 1989). Also, 67% of the health professions students became regular smokers in their late teens/early twenties contrary to earlier studies where in the majority of smokers, regular smoking is established in the early teens (U.S. Department of Health and Human Services, 1991). This slight difference indicates that regular smoking is established at the beginning and throughout tertiary education and revealed the formative

importance of the years at tertiary institutions for health professions students. The smoking behaviour and attitude acquired in earlier life seemed to be consolidated and modified through the socialization at tertiary institutions where health professions students receive their education. This phenomenon may be associated with the psychological stress experienced by the health profession students during their training and can be further explored in future studies.

3. It seemed that parental smoking elevates the prevalence of cigarette smoking attempts in health profession students: parental smoking has a significant influence on whether a student is a current smoker: 3% of those whose parents do not smoke are current smokers compared to 21% of those whose parent/parents smoke ($P < 0.01$). Those whose parent/parents smoke are 8.3 times more likely to be current smokers. The attributable fraction in the population to be current smokers is 59% due to parental smoking and 88% in those exposed to parental smoking. Earlier studies showed that parental smoking is instrumental in shaping the perception and social acceptability of smoking in the offspring (Fishbein, 1973, Dishion et al., 1995, Simons-Morton, 2002, King et al., 2003). This was reflected aptly in this study.
4. Knowledge of the dangers of smoking is not translated into aversive behaviour in health professions students: 100% of current smokers recalled having been taught about the dangers of smoking compared to 88% of the non current smokers ($P = 0.38$). This may have indicated that antismoking initiatives may not be effective with information alone. Skills training in coping with social pressure and stress may be viable options to be further explored (Perry et al., 1980).
5. In this study, 1.3% of non-current smokers and 50% of current smokers expect to be smoking in the next year ($P < 0.05$). This is consistent with previous findings where current smokers and heavy smokers are more likely to have expectations of smoking in the future (U.S. Department of Health and Human Services, 1994). It will be interesting to do a follow-up study of the same sample in 1 year and 5

years to assess the accuracy of self expectation of future smoking and whether the addictiveness of tobacco is over-or under-estimated.

6. There is a predominance of smoking amongst nursing students among health professionals. In this sample nursing students are 3 times more likely to smoke than health promotion students ($P < 0.05$). This behaviour is consistent with earlier studies (Piko, 2002). There is also evidence that the prompts for smoking in nursing students are strongly associated to risk factors students are exposed to during and after their tertiary studies and that the most probable cause was stress related to their professional training as revealed in earlier studies (Borkon et al., 1983). This finding is similar to earlier studies where there is a predominance of smoking amongst nursing and male health professionals (Centers for Disease Control and Prevention, 1975, Garfinkel, 1976, Enstrom, 1983, Becker et al., 1986, Knobf and Morra, 1983, Tagliacozzo and Vaughn, 1982).
7. Male predominance of tobacco use was still observed in this sample. Prevalence of smoking remained fairly constant amongst male health profession students at around 15%. Approximately 4.5% of the female students were current smokers compared with 15.8% of the male students. The persistent high prevalence amongst the male students is of concern as this may indicate inadequate penetration of the intervention and prevention amongst this vulnerable group. It is also interesting to see that although the prevalence in the male students remained fairly constant throughout the years, the prevalence amongst the female students varied widely. This may be due to sampling effect as some of the studies focused on health professions students whilst the others focused on general university students (Table 16).

Table 16. Gender Distribution of Current Smokers amongst South African University Students from 1980 to 2009¹

Gender	<u>1980</u>^a	<u>1983</u>^b	<u>1985</u>^c	<u>1989</u>^d	<u>2009 (current)</u>
Female	15%	19%	8.9%	20%	4.5%
M	29%	23%	14.9%	15.7%	15.8%

^a Coetzee AM. Rookpatroon van studenre aan die Universiteit van Pretoria. Geneeskunde 1980; 22: 103.

^b Borkon L, Baird DM, Siff M. Tobacco smoking among students at the University of the Witwatersrand, Johannesburg. S Afr Med J, 1983;64: 809-812.

^c Lewis K, Wedderburn-Maxwell A. A study of cigarette smoking amongst University of Cape Town medical students. Fourth-year project, Department of Community Health, University of Cape Town, May 1985.

^d Coleman M, Van der Merwe W, Gillies H, Rubidge S. Smoking at Medical School - the extent of the problem and attitudes to restrictions. Fourth year project, Dept of Community Health, Cape Town, January 1989.

* This table compares surveys that use different methods across different times and thus may not be directly comparable. This table can therefore only be used as a reference and may not be statistically comparable

8. In this study, it was found that teenage years accounted for more than 70% of the experimentation with cigarettes. Age of first cigarette smoking attempt in female health professions students seems to be more evenly distributed with a peak during late teens between 16-19 years of age and tapering off to both extremes of under 10's and above 30's. In male students, 72% first attempted smoking cigarettes in their early teens with the proportion dropping sharply in late teens and early twenties (Table 3). Teenage years seems to be pivotal in tobacco use and the early teenage years are the most vulnerable periods. This is consistent with earlier studies (Russell, 1990, U.S. Department of Health and Human Services, 1994). This phenomenon appeared to be more consistent in boys compared to girls who seemed to be more vulnerable to social cues of tobacco use later on in life. Tobacco smoking in girls may therefore be more amenable to intervention that during tertiary education as compared to boys who need earlier intervention in their early teenage years.

9. It was found that 12% of the smokers (n=6) need to use tobacco within 10 minutes of waking up. This showed significant addiction in this group. In addition, 71% of current smokers smoke more when using alcohol. This indicates the augmentative role of cigarettes and alcohol on each other in the pathway of

addiction. This figure is similar to earlier studies where alcohol drinking had a strong positive correlation with tobacco use and indicates that alcohol may be an important mediator in smoking. (Bard and Peacock, 1976, Borkon et al., 1983).

Some encouraging differences were:

1. Thirty-seven percent of the students have attempted cigarette smoking compared to 47% to 90% in similar studies previously (Russell, 1990).
2. The prevalence of current smoking is much lower than expected (7% vs. 14%). This may have been the result of aggressive anti-smoking campaigns and intensified curricula. This prevalence continues the downward trend in previous studies: 22% in general university students in 1983 (Borkon et al., 1983), 17% in 1989 (Grant et al., 1989), 12% in medical students in 1996 (Birkholtz and Louw, 1996), and 15% in other university students in a more recent study (Peltzer, 2001).
3. It was also interesting that none of the students used tobacco products other than cigarettes. This may reflect a change in the trend of tobacco use in South Africa.
4. Another encouraging finding is that the majority (87%) of the students and almost half (49%) of current smokers indicated that they will “definitely not” be smoking in the next year. This may be the result of training and curricula related to tobacco and the associated effects. Also 60% of the current smokers want to stop smoking; 77% of the current smokers have tried to stop smoking in the past year. Interestingly, of the current smokers who think that they can stop at will, 12.5% felt that it is definitely not difficult to stop; 37% felt that it is definitely difficult to stop while 50% felt that it is probably difficult to stop.
5. Training and curriculum in tobacco use cessation seemed to be more prevalent in this group of health profession students than other recent studies in the United Kingdom (Roddy et al., 2004, Johnston et al., 2005, Geboy, 1989, Cummings et al., 1987)

where only 8% of recent British medical graduates recalled having received comprehensive tobacco-use cessation training and only 5% feel well-prepared to use bupropion and other pharmaceutical agents for smoking cessation. In this study, 43% of the students recalled having formal training in smoking cessation and 26% have been trained in the use of antidepressants in smoking cessation. However, the training received seemed to be less structured and less formalized than their British counterparts. Knowledge of pharmacological methods of smoking cessation such as the use of nicotine replacement and antidepressants seemed to be limited as this study focused mainly on nursing and health promotions students and the British study included mainly medical students.

6. Previous findings that smoking health professions students are more likely to have a negative attitude towards smoking cessation counselling/programs in patients may not be true in this population as the results indicated: 98% of the students (n=86) felt that health professionals should have special training for smoking cessation and this percentage is not significantly different in smokers and non-smokers.
7. In this study, there is significant environmental smoke exposure in and out of home in health professions students (more than 3.6 days per week) and most of the exposure comes from non-parental associates. Encouragingly, the awareness of the students of the right to refuse second-hand smoking is high with 97% of the students who believe that smokers should ask for permission before smoking around others and 70% of the students refusing any exposure to tobacco smoke even if permission was requested. This is in contrast with earlier studies (Grant et al., 1989).

However, the finding that teenagers are exposed to more second hand tobacco smoke at home and out of home than older students may have indicated the vulnerability of this age group due to their lack of decision-making power on their living environment and parental behaviour.

8. Discos/bars and pubs are traditionally considered to be places where public smoking is expected (Wakefield & Murphy, 2009). It is surprising that more than half of the sample felt that smoking should be banned there. Current legislation in South Africa (Food and Agricultural Organization, 2003) restricts smoking in public places but does not ban it. It is interesting to find that the students feel that stricter legislation is required.

8 CONCLUSION & RECOMMENDATIONS

South Africa has always been very progressive with regards to tobacco control. There are strict legislations on smoking in public places, on tobacco advertising and sales (Food and Agricultural Organization, 2003). The findings of this study confirmed that the strict legislation is having a positive impact on the status of tobacco use in South Africa with the less than expected smoking prevalence of 7% and progressive and assertive attitude towards tobacco control and second hand tobacco smoke control amongst the health professions students.

Further, the curriculum and training that the health professions students receive seemed to be a marked improvement compared to the findings of earlier studies conducted in South Africa and in other countries. (Roddy et al., 2004, Johnston et al., 2005, Geboy, 1989, Cummings et al., 1987, Borkon et al., 1983, Grant et al., 1989, Birkholtz and Louw, 1996, Peltzer, 2001).

Many of HP's health/self health-related attitude studies have been initiated in view of HP's role in improving health of others. (Wells et al., 1984, Lewis et al., 1986, Lewis et al., 1991, Freed et al., 1995, Geller et al., 1998, Frank et al., 2002, Cornuz et al., 2000, Kolagotla and Adams, 2004). However, as health professionals play a major role in the health of society, the importance of research on health professionals and health professions students cannot be underestimated as is illustrated in this study.

This study uncovered interesting associations and potentially causal relationships that can be further explored in future studies. Although traditional variables such as age, gender, ethnic group have significant roles to play in tobacco use and addiction, other variables such as psychological perceptions, regard for human right and social cohesion may be critical areas of interest in the mechanisms of tobacco use.

It is therefore necessary to have further larger studies that focus specifically on the health professionals (and health professions students) to understand the underlying drivers and causes of smoking over and above informational and biological variables in health professionals, a unique group of people instrumental in the fight against tobacco.

Particular attention must be concentrated on nurses, nursing students and female health professionals as they are the target of tobacco companies as the next generation of smokers. They are also the largest group of health professionals globally. Interventions based on the future findings of the drivers of smoking in nurses and female health professions are desperately needed in order to protect this vulnerable group.

Smoking-related curricula at health education institutions should be augmented with practical methods and tools to achieve smoking cessation. Further training is required in the areas of pharmaceutical means to assist with smoking cessation.

As smoking initiation during university years seemed to play a major role in health profession students, the impact of stress and its management should be further studied and counteracted in health professionals/health professions students to reduce up-take of tobacco smoking. Health profession students require assistance and training to manage effectively the social peer-pressure and stress of entering a new profession.

Legislations and institutional policies should be revised and channels for public consultation need to be created. Discrepancies between the legislation and public opinion mean that awareness campaigns and further public education are required to enforce the policies and legislation.

The findings of this study remind us of the critical role health professionals play in the battle against tobacco. It also highlighted the important strides made towards tobacco control. This study pinpointed some of the pivotal issues that need to be further researched in the long journey towards achieving a tobacco free world.

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Appendix A: Questionnaire

GLOBAL HEALTH PROFESSION STUDENTS SURVEY (GHPSS) 2008

Content

- I. Tobacco Use Prevalence Among Health Profession Students
- II. Exposure to Environmental Tobacco Smoke
- III. Attitudes
- IV. Behavior /Cessation
- V. Curriculum/Training
- VI. Demographics

INSTRUCTIONS

Please note that answers are confidential and you do not have to write your name on the questionnaire.

There are 12 pages and 56 questions

Please read each question carefully before answering it.

Choose the answer that best describes what you believe and feel to be correct.

Choose only **one** answer for each question.

Circle your answer on the questionnaire.

Remember, each question only has one answer.

I. Tobacco Use Prevalence among Health Profession Students

1. Have you ever tried or experimented with cigarette smoking, even one or two puffs?
 - a. Yes
 - b. No

2. How old were you when you first tried a cigarette?
 - a. I have never smoked cigarettes
 - b. Age 10 or younger
 - c. Age 11-15
 - d. Age 16-17
 - e. Age 18-19
 - f. Age 20-24
 - g. Age 25-29
 - h. Age 30 or older

3. How old were you when you first smoked cigarettes on a daily basis?
 - a. I have never smoked cigarettes on a daily basis
 - b. 7 years old or younger
 - c. 8 or 9 years old
 - d. 10 or 11 years old
 - e. 12 or 13 years old
 - f. 14 or 15 years old
 - g. 16 years old
 - h. 17 years or older

4. During the past 30 days (one month), on how many days did you smoke cigarettes?
 - a. 0 days
 - b. 1 or 2 days
 - c. 3 to 5 days
 - d. 6 to 9 days
 - e. 10 to 19 days
 - f. 20 to 29 days
 - g. All 30 days

5. During the past 30 days (one month), how much do you think you spent on cigarettes?
- a. I did not spend money on cigarettes during the past 30 days (one month)
 - b. less than R 15
 - c. from R15 to R20
 - d. from R21 to R30.00
 - e. from R31 to R40.00
 - f. from R41 to R50.00
 - g. from R51 to R60.00
 - h. More than R60
6. Have you smoked cigarettes on university premises/property during the past year?
- a. I have never smoked cigarettes
 - b. Yes
 - c. No
7. Have you smoked cigarettes in university buildings during the past year?
- a. I have never smoked cigarettes
 - b. Yes
 - c. No
8. Have you ever used chewing tobacco, snuff, snus, cigars,cigarillos or pipes
- a. Yes
 - b. No

9. During the past 30 days (one month), on how many days did you use chewing tobacco, snuff, snus, cigars, cigarillos or pipes?
- a. 0 days
 - b. 1 or 2 days
 - c. 3 to 5 days
 - d. 6 to 9 days
 - e. 10 to 19 days
 - f. 20 to 29 days
 - g. All 30 days
10. Have you used chewing tobacco, snuff, snus, cigars, cigarillos or pipes on university premises/property during the past year?
- a. I have never used chewing tobacco, snuff, snus, cigars, cigarillos or pipes
 - b. Yes
 - c. No

II. Exposure to environmental tobacco smoke

11. During the past 7 days, on how many days have people smoked where you live, in your presence?
- a. 0 days
 - b. 1 to 2 days
 - c. 3 to 4 days
 - d. 5 to 6 days
 - e. All 7 days
12. During the past 7 days, on how many days have people smoked in your presence, in places other than where you live?
- a. 0 days
 - b. 1 to 2 days
 - c. 3 to 4 days
 - d. 5 to 6 days
 - e. All 7 days

13. Do you think a person who smokes around others should ask for their permission to smoke?
- Yes
 - No
14. If someone asks permission to smoke around you, do you let them?
- Yes, always
 - Yes, sometimes
 - No, never
15. Does your university have an official policy banning smoking in university buildings and clinics?
- Yes, for university buildings only
 - Yes, for clinics only
 - Yes, for both university buildings and clinics
 - No official policy
16. Is your university's official smoking ban for university buildings and clinics enforced?
- Yes, policy is enforced
 - No, policy is not enforced
 - University has no official policy

III. Attitudes

17. Do your parents / guardians smoke?
- Both my parents / guardians do not smoke
 - Both my parents / guardians smoke
 - Only my father / male guardian smokes
 - Only my mother / female guardian smokes
 - I don't know

18. At any time during the next 12 months, do you think you will smoke a cigarette?
- Definitely not
 - Probably not
 - Probably yes
 - Definitely yes
19. Do you think that you will be smoking cigarettes 5 years from now?
- Definitely not
 - Probably not
 - Probably yes
 - Definitely yes
20. Once someone has started smoking cigarettes, do you think it would be difficult to quit ?
- Definitely not
 - Probably not
 - Probably yes
 - Definitely yes
21. Should tobacco sales to adolescents (persons younger than 18 years old) be banned?
- Yes
 - No
22. Should there be a complete ban of the advertising of tobacco products?
- Yes
 - No
23. Should smoking be banned in restaurants?
- Yes
 - No

24. Should smoking be banned in discos/bars/pubs?
- Yes
 - No
25. Should smoking in all enclosed public places be banned?
- Yes
 - No
26. Should health professions get specific training on cessation techniques?
- Yes
 - No
27. Do health professions serve as “role models” for their patients and the public?
- Yes
 - No
28. Should health professions routinely advise their patients who smoke to quit smoking?
- Yes
 - No
29. Should health professions routinely advise their patients who use other tobacco products to quit using these products?
- Yes
 - No
30. Do health professions have a role in giving advice or information about smoking cessation to patients?
- Yes
 - No

31. Are a patient's chances of quitting smoking increased if a health profession advises him or her to quit?

- a. Yes
- b. No

IV. Behavior/Cessation

32. Are you more likely to smoke cigarettes after you have drunk alcohol or used another drug (dagga/marijuana, mandrax/"cream", crack, cocaine, ecstasy, heroin, LSD)?

- a. I have never smoked cigarettes
- b. I no longer smoke cigarettes
- c. I smoke cigarettes but never drink alcohol or use other drugs
- c. No, I smoke less cigarettes when I drink alcohol or use other drugs
- e. Yes, I smoke more cigarettes when I drink alcohol or use other drug
- f. I smoke about the same amount of cigarettes when I drink alcohol or use other drugs

33. Do you sometimes smoke tobacco mixed with other drugs, (dagga/marijuana, mandrax/"cream", crack, cocaine, ecstasy, heroin, LSD)?

- a. I have never smoked tobacco
- b. I no longer smoke tobacco
- c. No, I smoke tobacco, but I never mix tobacco with other drugs
- d. Yes, but only on one or two occasions
- e. Yes, I have mixed tobacco with other drugs on more than two occasions

34. How soon after you awake do you smoke your first cigarette?
- I have never smoked cigarettes
 - I do not currently smoke cigarettes
 - Less than 10 minutes
 - 10-30 minutes
 - 31-60 minutes
 - After 60 minutes
35. What was the main reason you decided to stop smoking? (SELECT ONE ONLY RESPONSE)
- I have never smoked cigarettes
 - I have not stopped smoking
 - To improve my health
 - To save money
 - Because my family does not like it
 - Because my friends don't like it
 - Other
36. Do you think you would be able to stop smoking if you wanted to?
- I have never smoked cigarettes
 - I have already stopped smoking cigarettes
 - Yes
 - No
37. Do you want to stop smoking cigarettes now?
- I have never smoked cigarettes
 - I do not smoke now
 - Yes
 - No
38. During the past year, have you ever tried to stop smoking cigarettes?
- I have never smoked cigarettes
 - I did not smoke during the past year
 - Yes
 - No

39. How long ago did you stop smoking cigarettes?
- a. I have never smoked cigarettes
 - b. I have not stopped smoking cigarettes
 - c. Less than 1 month
 - d. 1-5 months
 - e. 6 – 11 months
 - f. One year
 - g. 2 years
 - h. 3 years or longer
40. Do you think that you will be smoking cigarettes 5 years from now?
- a. Definitely not
 - b. Probably not
 - c. Probably yes
 - d. Definitely yes
41. Once someone has started smoking cigarettes, do you think it would be difficult to quit ?
- a. Definitely not
 - b. Probably not
 - c. Probably yes
 - d. Definitely yes
42. Have you ever received help or advice to help you stop smoking cigarettes?
- a. I have never smoked cigarettes
 - b. Yes
 - c. No

43. Do you want to stop using chewing tobacco, snuff, snus, cigars, cigarillos or pipes?

- a. I have never used chewing tobacco, snuff, snus, cigars, cigarillos or pipes
- b. I do not use chewing tobacco, snuff, snus, cigars, cigarillos or pipes
- c. Yes
- d. No

44. Are health professions who smoke less likely to advise patients to stop smoking?

- a. Yes
- b. No

45. Are health professions who use other tobacco products (chewing tobacco, snuff, snus, cigars, cigarillos or pipes) less likely to advise patients to stop smoking?

- a. Yes
- b. No

V. Curriculum/Training

46. During your (medical, dental, nursing, or pharmacy) university training, were you taught in any of your classes about the dangers of smoking?

- a. Yes
- b. No

47. During your (medical, dental, nursing, or pharmacy) university training, did you discuss in any of your classes the reasons why people smoke?

- a. Yes
- b. No

48. During your (medical, dental, nursing, or pharmacy) university training, did you learn that it is important to record tobacco use history as part of a patient's general medical history?

- a. Yes
- b. No

49. During your (medical, dental, nursing, or pharmacy) university training, have you ever received any formal training in smoking cessation approaches to use with patients?

- a. Yes
- b. No

50. During your (medical, dental, nursing, or pharmacy) university training, did you learn that it is important to provide educational materials to support smoking cessation to patients who want to quit smoking?

- a. Yes
- b. No

51. Have you ever heard of using nicotine replacement therapies in tobacco cessation programs (such as nicotine patch or gum)?

- a. Yes
- b. No

52. Have you ever heard of using antidepressants in tobacco cessation programs (such as bupropion or Zyban)?

- a. Yes
- b. No

VI. Demographics

53. How old are you?

- a. 14 years or younger
- b. 15 to 18 years
- c. 19 to 24 years
- d. 25 to 29 years
- e. 30 years or older

54. What is your gender?

- a. Female
- b. Male

55. What is your field of study?

- a. Medicine
- b. Nursing
- c. Health Promotion

56. What is your course year in university?

- a. First year
- b. Second year
- c. Third year
- d. Fourth year
- e. Fifth year
- f. Sixth year
- g. Seventh year

Thank You!