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TRENDS AND PATTERNS OF SMOKING IN THE SOUTH AFRICAN ADULT POPULATION (1995 – 1998)

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A RESEARCH REPORT SUBMITTED TO
THE FACULTY OF HEALTH SCIENCES,
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OF
MASTER OF SCIENCE IN MEDICINE
IN THE FIELD OF
EPIDEMIOLOGY AND BIOSTATISTICS

Johannesburg, 2005

DECLARATION

I, Bello Braimoh, hereby declare that this research report is my own work. It is being submitted for the degree of Master of Science in Medicine in Epidemiology and Biostatistics at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

…….

This 31st day of October 2005

Dedicated to **God Almighty**, and to His church

ABSTRACT

Background

Smoking is undoubtedly a major risk factor for morbidity, disability and premature death. Its use results in grave health and economic losses not only to the individual but also to the population and the world at large. Many surveys have been done in South Africa to estimate the prevalence of smoking. It is therefore imperative and expedient to have an overall impression of the prevalence rates over time. And also it is important to assess how subgroups affect the prevalence and trends in the national population. This will be of help in determining which subgroups have achieved reduction in smoking prevalence and which have not; evaluating the tobacco control policies in the country; and in designing specific interventions. This research was undertaken to determine the trends and patterns of smoking in the South African adult population

Objectives

The objectives for this study were:

Regarding the South African adult population during 1995 – 1998, to:

1. Compute the prevalence of smoking and assess the trends of smoking prevalence.
2. Assess the patterns and trends of smoking prevalence in subgroups by sex, age, marital status, race, locality (urban or rural), education and province.
3. Identify factors in the population that may account for patterns and trends in smoking prevalence over time
4. Make recommendations regarding the public health implications of the findings

Methods

This was an analytical study involving secondary analysis of existing datasets from four South African representative national surveys. From 11 surveys, which measured smoking in the South African population, four surveys were selected using some inclusion and exclusion criteria. The population of interest was the South Africa adult population (18 – 49), so variables of interest (outcome variable was current smokers) for this group were extracted. Prevalence (frequency) rates estimation of smoking in the national population and in subgroups were then estimated. Unadjusted odds ratios and adjusted odds ratios were computed by bi-variate cross tabulation and multivariate logistic regression respectively. Time-trend analyses (Maentel Haenszel chi-squared test) were computed by logistic regression for trend in proportions

Results

From 1995 to 1997 about 1/3 of the adult South African population were smokers, but that dropped significantly to about ¼ in 1998. For the period however, there was no significant trend. The prevalence of smoking varied with, and was largely depended on population subgroup; while it was as high as 63.9% among Coloured males, 62.3% among Coloured females, 53.7 % among all males, 52.7% among rural males, it was as low as 11.4% among all females, 6.8% among rural females, 10.83% among Indian females and 5.06% among Black females. The only significant trends was an increasing smoking prevalence among Blacks, Coloured men, people with tertiary education, Free State and Gauteng provinces, age group 35 – 44; urban men and a decreasing smoking prevalence in all women, urban women and black women, age group 18 – 24 and the Eastern Cape, Kwazulu-Natal, Northen Cape and Mpumalanga provinces. Sex, race, age, and education were the major risk factors for smoking in the

South African adult population. Locality (rural/urban) though had different smoking rate was not a risk factor for smoking. Marital status was neither a determinant nor risk factor for smoking.

Discussion and Conclusion

The prevalence of smoking in the South African adult population is very high and did not achieve any significant trend between 1995 and 1998. However the significant drop from 1997 to 1998 probably means that smoking prevalence in the national population may have started declining; therefore, more monitoring is needed to ascertain this. This high prevalence of smoking in the South African population, which may have been for years, may predict a high burden of chronic smoking-related diseases in the near future. The patterns of smoking analyses reveal that smoking in the South African adult population is determined by a complex interplay of different factors.

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CHAPTER ONE

INTRODUCTION

1.1 Background

Substantial evidence has stemmed from enormous research - more than 70, 000 scientific articles – since 1950 to douse any doubt that smoking is a risk factor for morbidity, disability and premature deaths worldwide [1]. Smoking is a major cause of illness, which is responsible for at least 90% of all cases of lung cancer, 75% of chronic bronchitis and emphysema and 25% of cases of ischaemic heart disease in men under 65 years. It is also a cause of many other types of cancer, pregnancy complications and different respiratory ailments in children from smoking families [2]. Smoking is also a risk factor for other diseases like gingivitis, angina, duodenal ulcer, cataract, Chron's disease, depression, sexual dysfunction, hearing impairment, fertility, osteoarthritis, pneumonia, stomach ulcer, tooth loss, tuberculosis[3].

It is currently estimated that at least one third of the male adult global population are smokers[4] and it is reported that half of all teenagers who are currently smoking will die from diseases caused by tobacco if they continue to smoke[5]. Estimates show that between 1950 and 2000, 60 million people worldwide have died from tobacco-related diseases[6]. A recent study directed by the Heart Foundation estimates that there are currently 3.5 million smoking related deaths per year[7]. The emergence of cardiovascular diseases in South Africa is documented, and it has been attributed to different factors, one of which is smoking[8].

1.2 Tobacco use in Africa

Tobacco is a native plant of the Americas, and there is evidence indicating the use of tobacco from pre-historic times[9]. Tobacco was introduced into Africa in 1560 when Portuguese and Spanish traders brought the leaves to East Africa from where it spread to other parts of the continent. As at 1650, the Europeans, which settled in South Africa, were already growing tobacco [10]. "Although the history of tobacco dates back over 5 centuries, the use of tobacco has been relatively uncommon in the continent until about a decade ago when Africa became a prime target for transnational tobacco companies' market explosion activities" [11].

Though a comprehensive and periodic tobacco consumption and prevalence survey is lacking, available data provide enough evidence to substantiate the rising smoking trend in Africa, particularly among the youth; in 2002, the World Health Organization (WHO) reported that the prevalence of smoking is falling in developed countries but is rising in developing countries at a rate of 3.4% per year[4]. Current research and reports show that apart from South Africa, tobacco consumption is rising in most developing countries, even dramatically in some populations and age groups[11]. From 131, 181 million cigarette sticks in 1995, the total cigarette consumption in the region rose to 212, 788 million in 2000; a figure, which represents an alarming 62.2% rise in just 5 years [12]. Current data put youth smoking rate in Nigeria at 18.1% (13 – 15 years), Rwanda 16.7% (11 – 15 years), South Africa 24.3% (13 – 15 years), Uganda 58.1% (14 – 18 years) and Zimbabwe 18.5% (13 –15 years). "Rising youth smoking prevalence may be partly due to the volume of tobacco advertisements that dot the African public space, one element of the industry's overwhelming promotional sponsorship presence"[11].

The true extent of tobacco consumption in the continent is likely to be underestimated if only manufactured cigarettes are used to measure consumption patterns as the use of pipes, snuff and rolled tobacco leaves is widespread among Africans.[11]

The WHO estimates that by 2030 if nothing is done to curb the trend of tobacco use, millions of people would die annually from cancer, cardiovascular diseases (CVD) and other conditions linked to smoking. It also predicts that 70% of these victims would be in the developing world [13]. This is in line with the theory of epidemiological transition, the general shift from acute infectious and deficiency diseases characteristic of underdevelopment to chronic non-communicable diseases characteristic of modernization and advanced levels of development .It is rather a continuous transformation process with some diseases disappearing and others re-emerging[14]. These transitional changes, which are usually precipitated by social and behavioural risk factors, require a change in the approach of national authorities to the emerging problems and in WHO collaborative programmes in response to national efforts.[15]

1.3 Smoking in South Africa

Smoking prevalence (number of smokers) and consumption (number of cigarettes smoked) in South Africa has been on the decrease since 1993: aggregate cigarette consumption decreased by 26% in South Africa during 1993 to 2000[16].

In 1995 it was reported that 34% of adult South Africans, a total of 7 million people, smoke[17]. Meyer-Weitz *et al*. (2002) reported that the smoking prevalence rate for adults dropped to 25% in a 1998 survey, which corresponds with the smoking

prevalence of 24% obtained from the South African Demographic and Health Survey (SADHS) in the same year.[18] The decrease in national prevalence rate; 34% in 1996 to 24% in 1998 could be attributed to the introduction of health warnings on cigarette packages and all tobacco advertisements, together with the extensive media coverage that the impending tobacco control legislation received during that time period. In addition, the consistent increase in tobacco excise tax could also have impacted on the prevalence of smoking[19].

Reports show that the smoking prevalence analysed by "race" and gender shows that the rate had increased for Coloured, Indian and White males; and for Black/ African, Indian and White females [20]. It has also been reported that the prevalence of smoking among Coloureds has increased alarmingly - by 12% since 1992 [21]

A 1996 national survey showed that there had been an increase in the prevalence of smoking among adults in five provinces when compared to the prevalence rates of a February 1995 national survey [22].

From February 1995 to October 1996, smoking prevalence in the 18 - 24 age group increased from 31% to 36%. The inference can be made that most of the members in this 18 - 24 age group most likely became regular smokers during their adolescent years. [18] Flisher *et al*. reported that of their sample in the Cape Peninsula, 18.1% of high school students smoked at least one cigarette per day[23]

1.3.1 Health and economic impact of smoking

The health and economic costs due to tobacco use are enormous. Economic analyses have shown that even with highly conservative assumptions, these costs of smoking far outweigh any benefits. One analysis, which evaluated the benefits of tobacco (to consumers and producers) against the mortality, morbidity and health cost, concluded that tobacco consumption results in very high losses. This analysis reported that if global tobacco consumption were increased by 1000 metric tons, there would be net economic losses of 13.6 million dollars per year, and concluded that tobacco is definitely a poor investment if the goal is the enhancement of the future welfare of the globe[24].

If reported levels of smoking in South Africa continue, what is imminent in a near future is a huge burden of smoking-related diseases most of which are chronic. Apart from the hospital cost of diseases due to smoking, which are equally devastating on the nation, it is responsible for prematurely killing many young people at their height of productivity, thereby depriving the family and the nation at large of a healthy work force.

A 1998 report by the Medical Research Council showed that by 1990, 25,000 tobacco related deaths were reported annually, and in 1994, estimates revealed that economic costs due to tobacco use exceed R2, 5 billion in lost productivity due to premature death and hospitalisation, while additional R1, 5 billion is estimated to be lost per year in the public sector alone due to direct health costs[19].

1.3.2 The South African Tobacco Products Control Act

The South African government's resolve and commitment to curbing the prevalence of smoking in the population is overt from consistent tobacco control legislations since 1993. The South African Tobacco Products Control Act of 1993 (Act 83 0f 1993) and more importantly, the 1999 Amendment to the Act[25] (Act 12 of 1999) was promulgated, amongst other reasons to curb the rising prevalence of tobacco consumption and to protect the rights of non-smokers to a tobacco smoke free environment [26, 27]. This legislation is a public health intervention to prevent the secondary effects of tobacco use, and ultimately reduce the incidence of tobacco-related diseases. The legislation amongst other measures bans the advertising of tobacco products, sports and arts sponsorship, use of tobacco trademarks on other products and smoking in public places including the workplace. South Africa has by the introduction of the tobacco advertising ban, joined more than 22 other countries, which have complete or near complete advertising bans in line with a WHO resolution[28]. Although the health impacts of this legislation are yet to be seen, studies have shown that the introduction of workplace smoking restriction is followed by lower smoking rates among workers[29, 30]. It has been reported that strong smoking restrictions ultimately reduces the prevalence of smoking in the community[31].

1.4 Determinants of smoking

Sex

Internationally, smoking prevalence is much higher among males than females[17, 32] United States research indicates that historical differences in patterns of smoking exist between men and women.[31]

Race

A research carried out in the United States reported that race was an important determinant of smoking[32]. With respect to race and ethnicity, the probability of cessation for both male and female Caucasians is significantly higher than that of Blacks[31] In South Africa, it has been reported that Coloured people have the highest smoking prevalence followed by Whites and Indians while smoking prevalence among Blacks is much lower[17, 34].

Age

It is been reported that in South Africa age is a significant factor that affect smoking status[33]. A study carried out in Australia also reported that age was a determinant of smoking[34].

Marital status

Marital status is a determinant for smoking and the probability for smoking cessation by males and females[31]. Females who live alone are significantly less likely to stop smoking than are females who do not live alone[31, 34]

Locality

Urban/rural locality may affect the tendency to smoke, as locality may affect access to the advertisements by tobacco companies. Smoking prevalence is significantly higher in urban areas than in small settlements and rural areas[16]. With respect to the type of community individuals reside in, both males and females who live in either rural or

suburban localities are more likely to quit smoking than individuals who live in urban settings[31]

Education

A South African study showed that smoking prevalence is highest among people with primary and secondary education, followed by people with tertiary education. People with no education have the lowest rates[16]. Another study showed that educational status is a determinant of smoking status [31]

Employment/Socio-economic status

The socio-economic status of a person may affect his usage of tobacco. Studies from the UK indicate that smoking prevalence in higher socio-economic groups has reduced significantly since the 1960s, whereas smoking prevalence in lower socio-economic groups decreased only marginally. This study reported that smoking prevalence and smoking related mortality are becoming lower class phenomena in the UK [35]. An analysis on South African data however reveals the contrary; smoking levels are highest among the more affluent sections of the population[16].

1.5 Justification

In South Africa, many black persons have been subjected to urbanisation, which is likely to have caused a significant increase in the prevalence of smoking in the population. Even with anti-smoking policy and campaign, many people continue to smoke or start to smoke every year[36]. This makes it especially important for the continuous monitoring of the smoking prevalence by trend analysis to assess for any significant difference between the proportions of persons that smoke each year.

Various national surveys have been done and their results of national smoking prevalence presented over the last decade. However, it is difficult to obtain an overall impression of trends in smoking prevalence in the national and sub-groups of the population, and whether reported changes in prevalence over time are statistically significant.

An electronic search found one study, which looked at trends and patterns of smoking overtime (1993 to 2000) in the South African adult population[16]. The study did not assess prevalence directly but estimated the prevalence of smoking using annual data obtained from a commercially generated database focusing on product usage. However consumption rate may not be a sensitive indicator of prevalence as consumption may reduce due to increase in cigarette prices while the smoking prevalence still remains the same or even increases.

In contrast, this study determines the trends in prevalence, patterns and risk factors of smoking in the South African adult population using various national survey data, from 1995 to 1998. This is an important study because firstly, it is important to determine smoking prevalence and patterns over time in the South African adult population and to identify factors contributing to these trends, since the prevalence of smoking in the population is dynamic. Secondly, it will also be of help in predicting the health problems that will predominate in future; so health care interventions and research can be planned in time. Thirdly, it may provide data that, in conjunction with other information, may reveal if the 1993 anti-smoking legislation in South Africa has had any effect on the prevalence of smoking before the amendment in 1999. Fourthly, it will be a reference point for future monitoring of smoking in South Africa. Lastly, pattern analyses are important to determine the subgroups contributing to trends since

the prevalence of smoking is affected by determinants like sex, age and race. From the public health viewpoint, it is not enough to look at the trend but also which sections of the population have achieved reduction and which sections have not [37]

1.6 Aim and Objectives

Aim

To determine the trends and patterns of smoking in the South African adult population.

Objectives

Regarding the South African adult population during 1995 – 1998, to:

1. Compute the prevalence of smoking and assess the trends of smoking prevalence.
2. Assess the patterns and trends of smoking in subgroups by sex, age, marital status, race, locality (urban or rural), education and province.
3. Identify factors in the population that may account for patterns and trends in smoking prevalence over time
4. Make recommendations regarding the public health implications of the findings

CHAPTER TWO

METHODS

2.1 Study Design

This was an analytical study involving secondary analysis of existing datasets from four South African representative national surveys, which measured amongst other variables smoking in the South African population.

2.2 Sources and quality of data

An initial data search, involving online data search, a national database – the South African Data Archives (SADA) - and personal communication, identified 11 surveys which measured smoking in the South African population, but when a set of inclusion/exclusion criteria where applied, only the four datasets described below were selected for this research. The *Omnibus surveys,* by the Human Sciences Research Council (HSRC) data were got from the surveys Statistician while the South African Demographic Health Survey (SADHS) data was got from the National Department of Health (DoH). These same datasets were eventually collected from SADA, and used to crosscheck with the already received ones.

Table 2.1 Description of study datasets included in the study

Survey	Principal Investigator	Year	Population surveyed	Sample Size
Omnibus	HSRC[38]	1995	All SA pop. Aged ≥18	2, 238
Omnibus	HSRC[39]	1996	All SA pop. Aged ≥18	2, 228
Omnibus	HSRC	1997	All SA pop. Aged ≥18	2, 231
SADHS	DoH[40]	1998	All SA pop. Aged ≥15	13, 827

2.3 Inclusion and exclusion criteria

Age

The age group of interest was 18 to 49. Surveys, which did not meet this age group requirement, were excluded from this study. Although all surveys reported prevalence rates for a wider age group (usually national rates), this study looked at rates and trend in this adult population of South Africa.

This study looked at the trends and patterns of smoking in this age group for the following reasons:

1. This is the age group that are most lured by the tobacco companies by their various advertisement schemes.
2. They represent the workforce of the nation where most years of productivity is likely to be lost due to ill health.
3. Smoking related diseases are mainly chronic and deaths due to smoking may only start to show after some years, and so including higher age groups may be of little public health significance. Thus the trends of smoking in this age group may be used to predict the future epidemic of smoking-related diseases.
4. They are the financial buoyant group who can afford cigarettes even when prices seem to have soared. The younger or older ages that are usually not economically active may no longer be able to afford cigarettes due to higher prices.
5. This age group may be more susceptible to peer pressure into smoking than children or higher age groups.
6. Most national (smoking) surveys have study population of ages starting from 18.

7. Generally, onset of tobacco use is in early teens with mean age of 15 years. All things being equal, initiation of tobacco use occurs in adolescence, typically the same in both sexes, between ages 16 and 18 [41].

Sampling and generalisability

All surveys were clustered multistage random sampling of the entire South African population (all nine provinces). The surveys which did not cover all nine provinces of South Africa or which did not use probability sampling were excluded from this study. Furthermore, only surveys that included all four races were included for this study. Those surveys that excluded one or more of these races were excluded.

Method of data collection

Only surveys that used structured face-to-face questionnaires were included for this analysis. Surveys that used telephone or postal interview were excluded.

Sample size

Because the representivity of a survey is not much a reflection of its sample size as of its design, the sample size of these surveys were not used as a part of these criteria, and so the sample size varied with surveys (as shown in the table above).

Definition of smoking

All surveys in this study used the same definition of smoking which was "do you currently smoke?"

Reference population

The entire South African population aged 18 - 49.

Keywords

Smoking, prevalence, trends, patterns, risk.

Important variables

Current smoker, sex, race, age, education, location, marital status, and province.

2.4 Data Extraction

The researcher had access to the four datasets used in this research. Variables in each dataset were then defined to capture the variables of interest. The population of interest was the South Africa adult population (18 – 49) so variables of interest for this population were extracted from all data. Stat Transfer was used to transfer data from original format to the format the researcher used for the analysis. Analysis was done using two statistical softwares - STATA and Epi-Info

2.5 Definition of terms

Smokers: People who currently smoke cigarettes, daily or occasionally

Prevalence: The proportion of the population (as a percentage) that are smokers.

Smoking rate: The prevalence rate of smoking

Trends: A long-term movement in an ordered series, e.g. a time series. An essential feature is that the movement while possibly regular in the short term, shows movement consistently in the same direction over a long term[42].

Trend Line: The line that best fits the distribution of a set of values plotted on two axes[42].

Patterns: Prevalence of smoking by sub-groups

Race: The four South Africa population groups; Black, Coloured, Indian, White

Sex: The human gender; male and female

Province: The nine provinces of South Africa

Locality: Urban and rural settlements of South Africa

Marital status: Defined as single, Married or Living together and Divorced/Widowed.

2.6 Data analysis

The guiding principle of the analyses was informed by the need to address the questions of whether the proportion of the population who smoke tobacco has been on the rise since 1995, and to determine the differentials in the population that may affect the trends.

Analyses carried out were:

1. Prevalence (frequency) rates estimation of smoking in the South African adult population from 1995 to 1998.
2. Univariate analysis to determine patterns of smoking by different subgroups; sex, age, race, marital status, locality (urban or rural), education and province.
3. Analysis of trends in the prevalence of smoking in the South African adult population and in subgroups over time, during 1995 to 1998.
4. Bi-variate analyses was used to obtain unadjusted odds ratio and determine whether there were significant differences in the risk of smoking by sex, race, age, education, location, marital status, and province; and thus identify risk factors and groups at risk.

Prevalence estimation

All datasets were already weighted, clustered and stratified. The survey mode in STATA was then used to compute all prevalence estimations accounting for weighting, clustering and stratification.

Time-trend analysis

Time-trend analysis (Maentel Haenszel chi-squared test) was computed by logistic regression for trend in proportions. A trend analysis was carried out to assess for any direction in the proportion of smokers over the 4-year period. This revealed if there has been a decrease or an increase, and if the differences were statistically significant. This was done as regression of smoking prevalence against time (year). The significance of the slope of the regression was determined by a coefficient p-value less than 0.05

The regression equation is:

$$Y = x + bt$$

Y = Smoking prevalence for the population or subgroup being analysed

x = the constant (intercept), which is the smoking prevalence for the first year for the duration analysed. In this case, 1995

b = the trend coefficient (the slope) which gives the direction and magnitude of the trend. A p-value confirms the significance of any trend.

t = time in years (in this case, 4)

All data for the different surveys (years) were given a unique identifier (in this case year of survey) and then pooled, and a regression analysis done on the relationship between prevalence and time (in years) i.e. the direction of prevalence as time increased.

This trend analysis was done for the national adult population and for subgroups, to assess if there was any trend in the national population and in the subgroups; and to determine how, if at all, sub-groups contributed to the national trends of smoking. Although overlapping confidence intervals can be used to ascertain significant differences between proportions for every year, the trend analysis looks at the prevalence over time and gives a more holistic picture on whether there has been a decrease or increase.

Risk Factors analysis

Bivariate analysis was done to check for the association between the independent variables (sex, race, age, education, location, and marital status) and smoking status. Bi-variate analyses using the χ^2 test at 95% confidence level was used to determine whether there are significant differences in the proportion of smokers among different groups. Unadjusted odds ratio was calculated for each exposure. Finally a multivariate logistic regression was carried out to determine the adjusted odds ratio for each exposure variable controlling for other factors.

2.7 Scope and limitations

Although all surveys included in this study used face-to-face questionnaires, social desirability bias (a kind of responder's bias) may have occurred during the data collection, as people may be less likely to report their smoking status. This is likely to underestimate the actual prevalence of smoking in the different subgroups and in the entire population. However, the tendency for such a bias may be considered to be about the same for all the surveys, and so is unlikely to have any effect on the trend

and risk factors analyses. Another limitation is that, in few cases, the variables of interest were not measured in the survey, and so were not included in the results for that year.

CHAPTER THREE

RESULTS

This section presents the results of this research. First the prevalence of smoking in the national adult population and by subgroups from 1995 to 1998 is presented. Then the trends of smoking in the national population and in subgroups are presented. Finally, the risk factors analyses of smoking in the national population are presented.

3.1 Prevalence of smoking from 1995 to 1998

National population

The prevalence of smoking in the SA adult population for this period was highest in 1997 (36.36%) and lowest in 1998 (26.83%). Although the prevalence seems to undulate for the period, there was no significant difference for the first three years as the 95% confidence intervals for these years all overlap. After 1997, the prevalence in the population dropped significantly from 36.36% to 26.83% in 1998 (Figure 1).

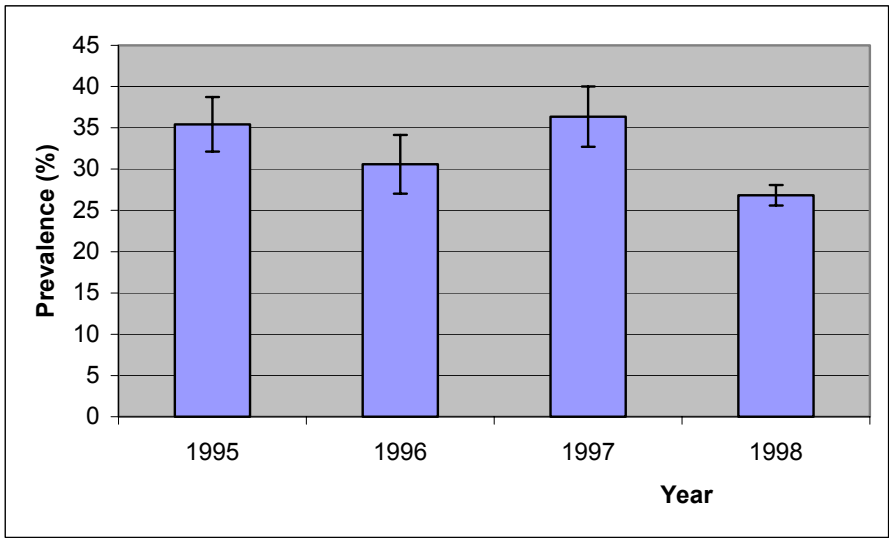


Figure 3.1 National prevalence (95% CI) of smoking in the SA adult population (1995 – 1998)

Locality

For the period, smoking rates were highest both for urban and rural locality in 1997, 37.3% and 35.5% respectively. For both localities, smoking rate did not differ significantly from 1996 to 1997 (Figure 3.2). After 1997, there was a significant drop in the smoking prevalence for both types of locality, but this drop was larger for the rural population.

Also there were no significant differences in the smoking rate for the urban and rural dwellers until 1998 when the urban smoking rate of 29.44 was significantly higher than the 22.53% of the rural.

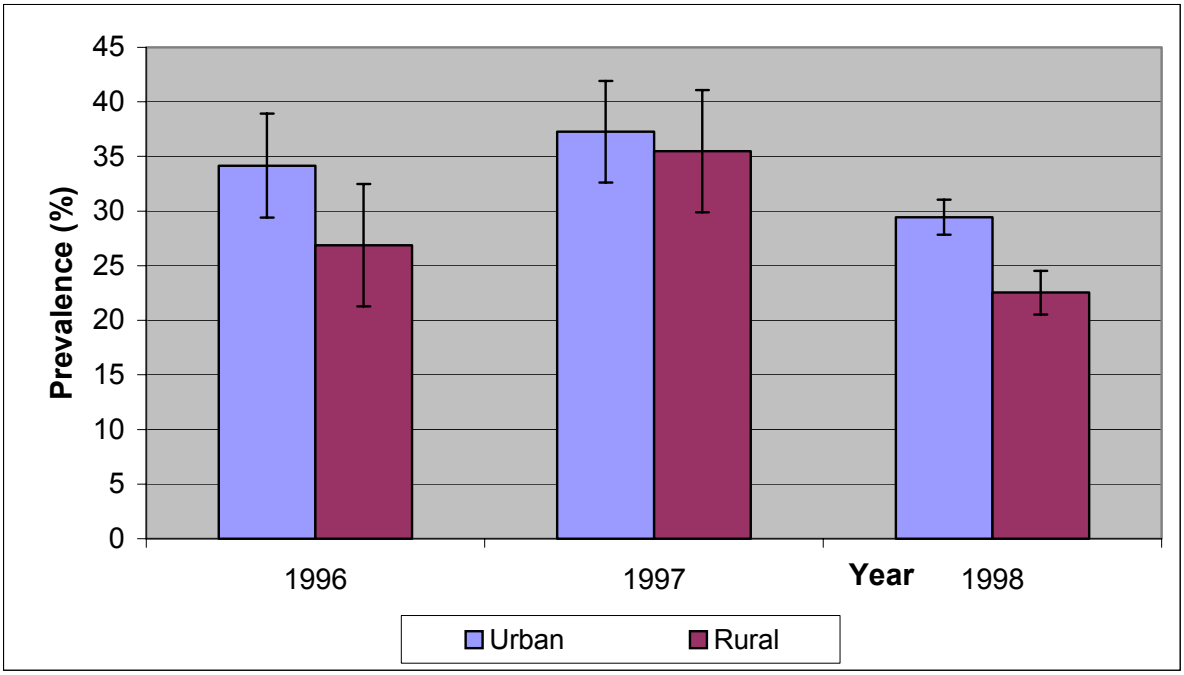


Figure 3.2 Prevalence (95% CI) of smoking among SA Adults by locality (1996 - 1998)

Province

In 1995, Eastern Cape and Gauteng had the highest and lowest smoking prevalence, 57.5% and 17.1% respectively. In 1998, however, the Western Cape and Kwazulu-Natal had the highest and the lowest, 43% and 21.7% respectively. There is no

discernible pattern of smoking by province. However it is immediately clear that the Western Cape, Eastern Cape, Northern Cape and Free State are among the higher smoking provinces while Gauteng and North West are among the lower smoking provinces (Table 3.1).

Table 3.1 Prevalence (95% CI) of smoking among SA Adults by province (1995 - 1998)

Province	**1995**	**1996**	**1997**	**1998**
Western Cape	52.47 40.65 - 64.29	47.94 38.05 - 57.84	49.86 39.05 - 60.67	42.98 38.11 - 47.79
Eastern Cape	57.50 45.88 - 69.14	42.94 31.30 - 54.58	34. 36 25.36 - 43.36	27.54 24.83 - 30.26
Northern Cape	27.88 19.77 - 36.00	19.80 10.80 - 28.81	36.28 25.41 - 47.14	47.20 42.97 - 51.43
Free State	40.04 29.84 - 50.23	44.54 24.09 - 64.99	40.78 29.81 - 51.76	29.94 26.53 - 33.35
Kwazulu-Natal	31.96 24.95 - 38.97	26.73 19.15 - 34.32	25.66 19.95 - 31.36	21.73 18.99 - 24.48
North West	22.94 11.70 - 34.17	23.60 15. 27 - 31.93	37.95 22.00 - 53.90	25.69 22.49 - 28.90
Gauteng	17.06 06.98 - 27.14	18.33 09.40 - 27.26	18.38 08.98 - 27.77	26.13 22.51 - 29.76
Mpumalanga	37.13 28.76 - 45.51	37.73 29.49 - 45.97	40.17 31.88 - 48.46	25.00 21.30 - 28.69
Northern Province	49.39 40.71 - 58.08	24.27 13.46 – 35.09	50.07 37.70 - 62.44	13.90 10.94 –16.85

Age

In 1995, the highest smoking rate was in the age group 25 – 34 (38.3%), and the lowest rate was in the age group 18 – 24 (30.4%). In 1998, the highest rate was in the age group 45 - 49 (35.6%), and the lowest rate was in the age group 18 – 24 (18%). There does not seem to be any discernible pattern of smoking by age. For all age categories, there were no significant differences in smoking prevalence between successive years. Also age did not seem to affect the prevalence of smoking, as there was no significant difference in smoking prevalence between age group for the four years. In 1998 however, the smoking rate increased significantly with age until the 35 – 44 age group (Table 3.2).

Table 3.2 Prevalence (95% CI) of smoking among SA Adults by age (1995 - 1998)

Age group	**1995**	**1996**	**1997**	**1998**
18 – 24	30.38 25.40 - 35.36	24.27 18.47 - 30.06	35.93 29.01 - 42.86	17.98 16.22 - 19.75
25 - 34	38.26 33.52 43.01	33.50 28.35 - 38.65	36.04 31.30 - 40.78	26.84 24.73 - 28.94
35 – 44	36.00 30.69 - 41.32	33.81 28.64 - 38.97	37.30 31.91 - 42.70	32.94 30.65 - 35.23
45 – 49	39.16 29.21 - 49.12	*	*	35.56 31.86 - 39.27

* Datasets did not have variables or values.

Sex

As in the national picture in figure 3.1, the prevalence for both sexes also undulates from 1995 to 1998. Consistently, the prevalence for females was significantly lower than that for males. For the period, the highest smoking rates for males was in 1995

(53.7%) and the lowest was in 1996 (42.4%) For females the highest rate was in 1997 (20.61%) and the lowest was in 1998 (11.4%). For males the smoking prevalence dropped significantly from 1995 to 1996; but from 1996 to 1998, there was no significant difference in the smoking rates. For the females however, the smoking rates did not vary from 1995 to 1997, after which it dropped significantly to 11.40% in 1998. (Figure 3.3)

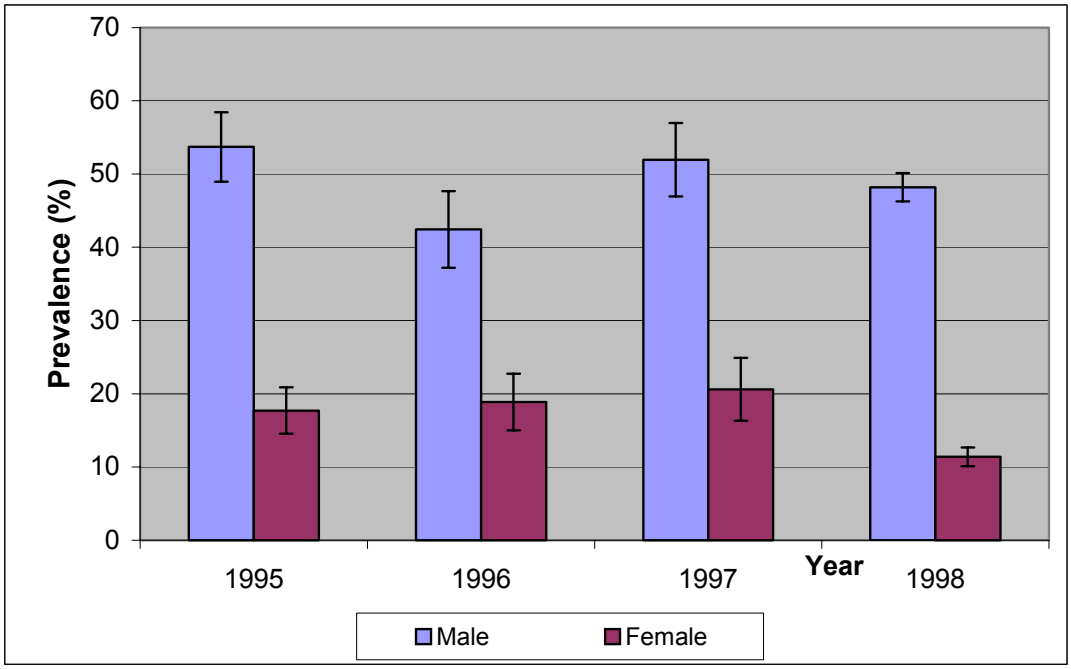


Figure 3.3 Prevalence (95% CI) of smoking among SA Adult men and women (1995 - 1998)

Sex and Locality

For the period urban men had smoking rates higher than rural men though this was not a significant difference. On the other hand the results show that urban women smoke significantly more than rural women (Table 3.3).

Table 3.3 Prevalence (95% CI) of smoking among SA Adults by sex and locality (1995 - 1998)

	1995	1996	1997	1998
Urban Male	*	43.51 36.43 - 50.59	51.03 44.42 - 57.64	49.69 47.37 - 52.00
Rural Male	*	41.46 33.58 - 49.34	52.77 45.38 - 60.17	45.64 42.24 - 49.03
Urban Female	*	25.90 19.92 - 31.88	24.91 19.32 - 30.49	14.30 12.48 - 16.12
Rural Female	*	10.75 06.26 - 15.24	15.93 09.24 - 22.61	06.80 05.21 - 08.39

Race

In the four-year period, only Blacks showed a decrease in their smoking rates, and that was only from 1997 to 1998. For the other three races there were no significant differences in the smoking rates between successive years for the whole period.

The smoking prevalence varied significantly by race (Table 3.4). For all four years, Coloureds had significantly higher smoking rates than Blacks, and for three years (1995, 1997 and 1998) their smoking rate was significantly higher than for Indians; and for 1995 and 1998, their smoking rates were significantly higher than for Whites. Whites had the second highest smoking rates after Coloureds and their rates were significantly higher than that for blacks in 1996 and 1998, but for all years there were no significant differences between Whites and Indians. Also, there were no significant differences between the smoking rates for Indian and Blacks except in 1998 when the Indian smoking rate (29.12%) was significantly higher than that for Blacks (22.03)

Table 3.4 Prevalence (95% CI) of smoking among SA Adults by race (1995 to 1998)

	1995	1996	1997	1998
Black	31.17 27. 22 – 35.12	26.03 21.68 - 30.37	33.36 28.87 - 37.85	22.03 20.81 - 23.25
Coloured	61.18 50.00 - 72.36	52.05 42.55 - 61.56	53.06 .43.61 - 62.51	52.32 48.41 – 56.23
Indian	34.89 21.07 - 48.71	33.80 19.37 - 48.23	29.20 18.30 - 40.10	29.12 24.02 - 34.21
White	40.82 33.55 - 48.09	40.29 32.33 - 48.25	41.74 32.65 - 50.84	39.53 33.45 - 45.60

Sex and Race

The smoking data for race was stratified by sex. From 1995 to 1997, though Indian men had the highest smoking rates, there were no significant racial differences in smoking prevalence among all men. However in 1998, the smoking rate for Black men was significantly lesser than that of Coloureds and Indians but not Whites. (Table 3.5)

Table 3.5 Prevalence (95% CI) of smoking among SA males by race (1995 to 1998)

	1995	1996	1997	1998
Black Male	53.15 47.35 - 58.94	40.44 33.82 - 47.05	51.17 45.02 - 57.31	45.97 43.78 - 48.15
Coloured Male	60.05 48.86 - 71.23	53.15 41.52 - 64.78	63.92 48.11 - 79.73	61.53 56.61 - 66.45
Indian Male	61.10 44.91 - 77.29	69.67 48.02 – 91.32	66.34 43.81 - 88.87	59.19 49.15 - 69.23
White Male	51.04 39.30 - 62.79	41.65 28.79 - 54.52	49.34 37.76 - 60.91	46.52 38.93 - 54.11

Amongst females as shown in Table 3.6, Coloureds had smoking prevalence that was consistently higher than all other races, followed by Whites. The lowest smoking rates were among the Indians except in 1998 when their smoking rate was significantly higher than that for Blacks.

Table 3.6 Prevalence (95% CI) of smoking among South African females by race (1995 - 1998)

	1995	**1996**	**1997**	**1998**
Black Female	10.20 7.49 - 12.92	11.63 7.86 - 15.39	14.33 9.57 - 19.09	5.06 4.17 - 5.96
Col. Female	62.28 48.44 - 76.11	50.98 37.76 - 64.14	46.21 34.45 - 57.97	44.87 39.30 - 50.43
Indian Female	6.36 0.9 - 13.59	8.69 3.3 - 20.74	12.75 04.15 - 29.66	10.83 06.20 - 15.46
White Female	30.37 21.91 - 38.84	38.95 28.51 - 49.40	33.11 21.55 - 44.67	34.00 27.61 - 40.39

Marital status

There was no obvious pattern of smoking by marital status. For all categories of marital status, there was no significant difference in smoking rates from 1995 to 1998 as all confidence intervals overlapped. Also, the smoking rates in the population did not vary with marital status; for each year, smoking rates between the three levels of marital status (Married/Living together, Divorced/Widowed and Single) did not differ significantly.

Education

Table 3.7 shows that on average the proportion of people that smoke decreased with increasing education for the period. Except for secondary education where the smoking rate dropped significantly from 34.43 percent in 1997 to 25.03 in 1998, for all levels of education, there were no significant changes in smoking prevalence over time.

Table 3.7 Prevalence (95% CI) of smoking among SA Adults by education (1995 - 1998)

	1995	**1996**	**1997**	**1998**
None	44.24 30.74 - 57.74	31.05 18.79 - 43.32	42.66 25.39 - 59.94	31.51 27.05 - 35.98
Primary	38.95 33.64 - 44.25	36.02 29.48 - 42.55	39.67 32.11 - 47.24	33.44 30.58 - 36.24
Secondary	32.12 28.24 - 36.00	28.05 24.27 - 31.84	34.43 30.45 - 38.41	25.03 23.57 - 26.49
Tertiary	27.52 20.18 - 34.85	24.77 17.32 - 32.22	27.60 19.87 - 35.34	22.87 18.19 - 27.54

3.2. Trends in the prevalence of smoking from 1995 to 1998

Trend lines are omitted where there is no significant trend or where its inclusion may render the chart clumsy.

National population

A trend analysis showed the slope of smoking in the South African adult population to be decreasing at a rate of 3% per year (Figure 3.4). However this trend is not significant (β = -0.03, p-value 0.1506).

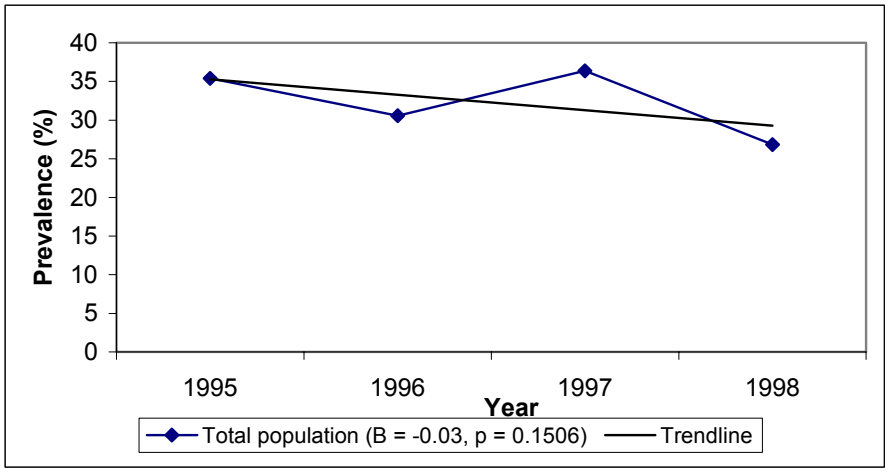


Figure 3.4 Trend of smoking prevalence in the SA Adult population (1995 - 1998)

Locality

Although, the smoking rates among urban and rural dwellers seem to show a decreasing trend (β = -0.001, p-value 0.977) and an increasing trend (β = 0.019, p-value 0.701) respectively, these trends were not statistically significant.

By Province

Trend analysis by province shows that four provinces; Eastern Cape, Kwazulu-Natal, Northern Cape and Mpumalanga, had smoking rates that were significantly

decreasing while two provinces; Free State and Gauteng had trends in the prevalence of smoking that were significantly increasing.

Age

On the one hand, the smoking rate of 18-24 year age group decreased significantly by 13% per year (β = -0.13; p-value less than 0.001); while on the other hand, there was a significant increase in the smoking rate of 6% per year for the 35-44 age group during the four-year period. The increase of 5% and decrease of 5% showed by 25-34 and 45-49 age groups respectively were not statistically significant. There were values for the 45 – 49 age groups for only two years (95 and 98) and so trend analysis could not be computed for the other two year for these age groups (Figure 3.5).

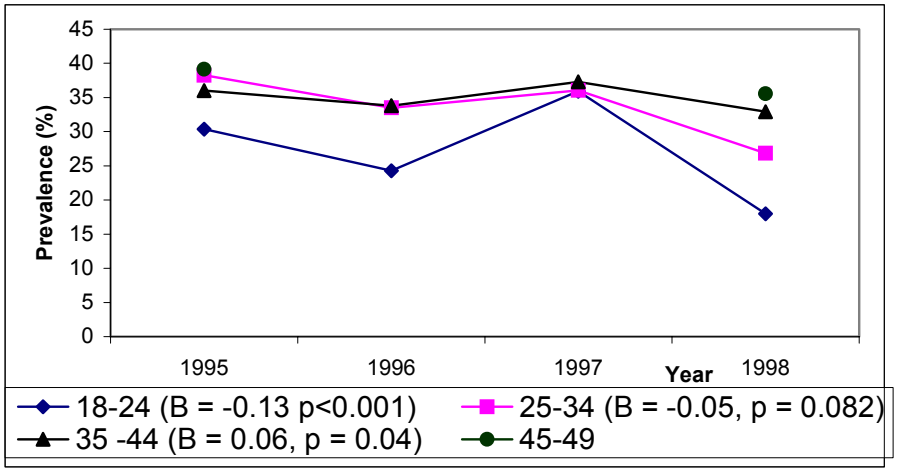


Figure 3.5 Trend of smoking prevalence (by age) in the SA Adult population (1995 - 1998)

Sex

The trend analysis by sex showed that from 1995 to 1998, the smoking rate among women decreased significantly at a rate of about 13% per year (Figure 3.6). The smoking pattern for men however did not show any significant trend (β = 0.25, p = 0.234)

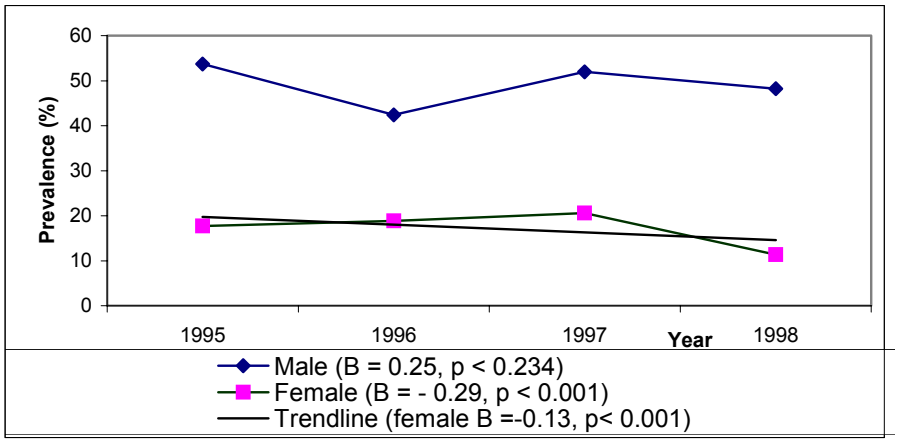


Figure 3.6 Trend of smoking prevalence (by sex) in the SA Adult population (1995 - 1998) with a trend line for females.

Sex and locality

There was a significantly increasing trend in smoking prevalence for urban men and a significantly decreasing trend for urban women at a rate of 13% and 21% respectively. There however were no significant trends for rural men and rural women (Figure 3.7)

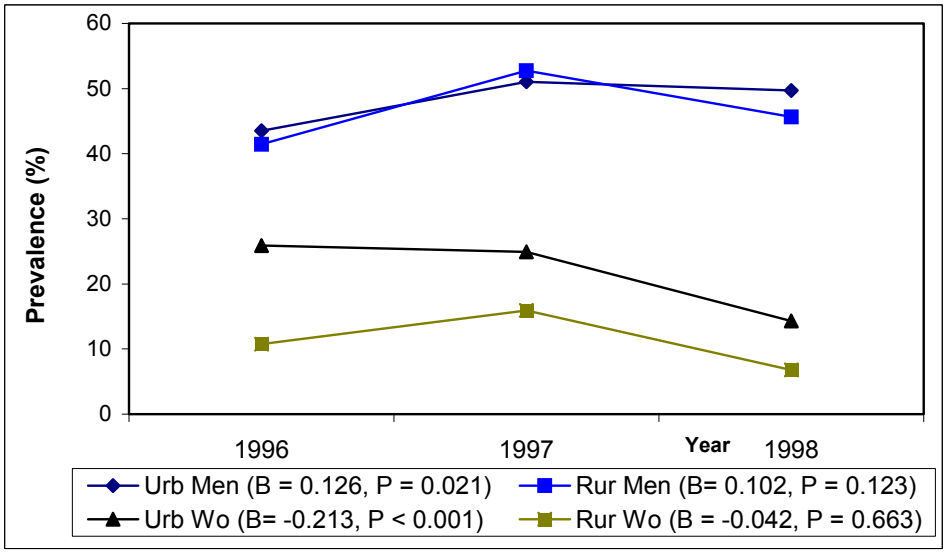


Figure 3.7 Trend of smoking (by sex and locality) in the SA Adult population (1995 - 1998)

Race

Figure 3.8 shows that from 1995 to 1998, the smoking rate of blacks showed a significant trend, a decrease of 5% per year. There were no significant trends for the other three races.

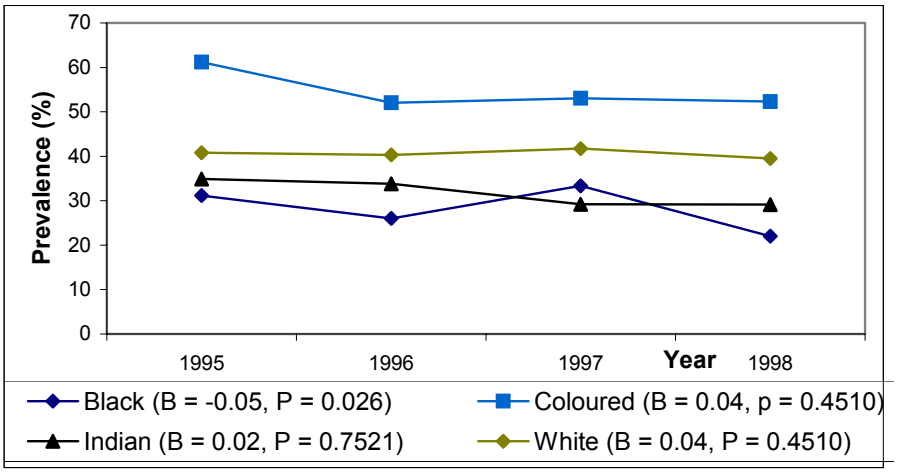


Figure 3.8 Trend of smoking (by race) in the SA Adult population (1995 - 1998).

Sex and Race

Amongst males of all the races, only Coloured men had a significant trend, and it was upward at a rate of 17% per year (Figure 3.9).

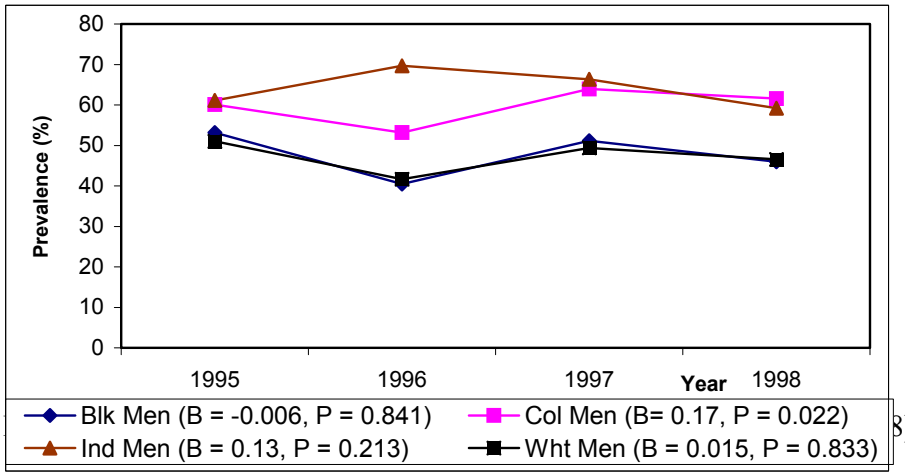


Figure 3.9 Trend of smoking (by race) in the SA adult males (1995 - 1998)

Among females, there was a significant decreasing trend in smoking prevalence among black. There was no significant trend for the other races (Figure 3.10).

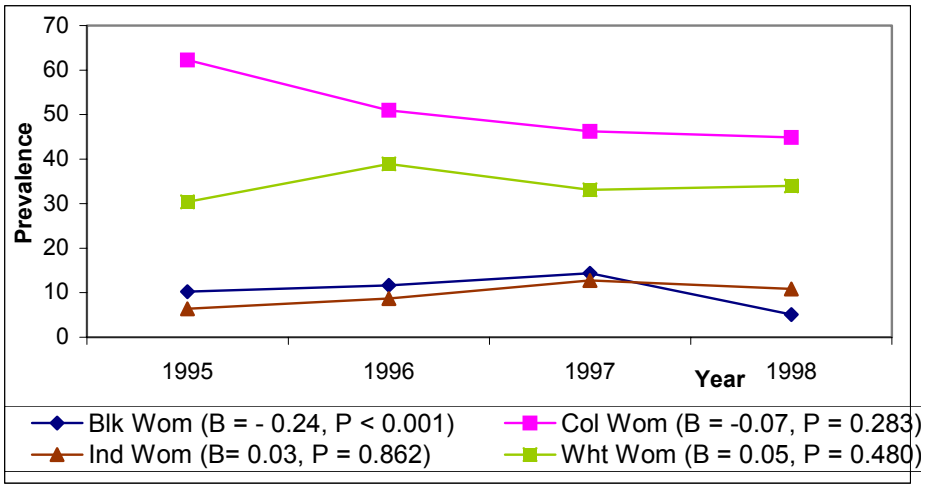


Figure 3.10 Trend of smoking (by race) in the SA adult females (1995 - 1998)

Marital Status

There were no significant trends for all strata of marital status (data not shown).

Education

The smoking rate among people with no education significantly dropped at a rate of about 15.5% per year, while the rate among people with tertiary education increased at a rate of 18% per year. For people with primary and secondary education, there were no significant trends (Figure 3.11).

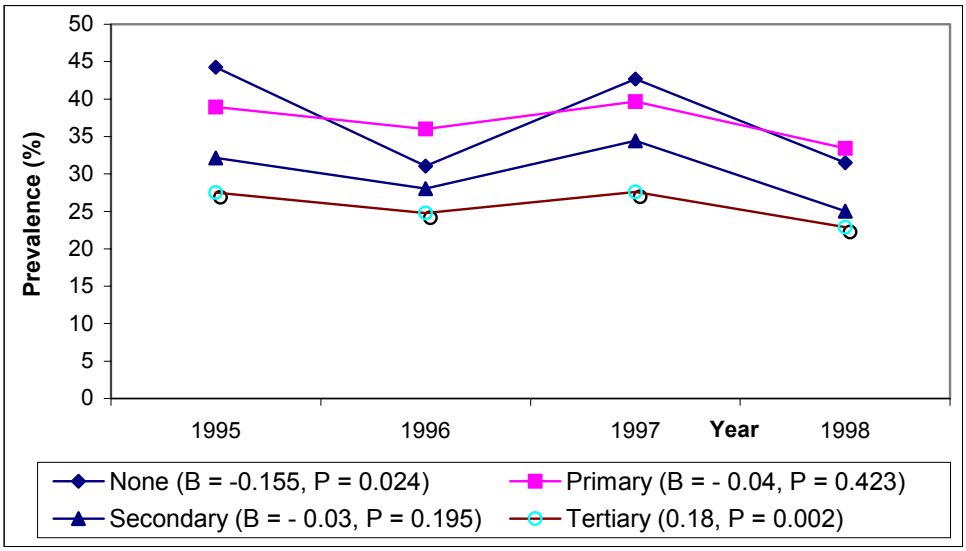


Figure 3.11 Trend of smoking (by education) in the SA population (1995 - 1998)

3.3 Risk factors of smoking in the South African adult population: 1995 to 1998

Locality

For the whole period, the unadjusted odds ratio shows that the odds of smoking by urban dwellers are significantly higher than the odds of smoking by rural dwellers. However, after adjusting for race, sex, age, education, province, and marital status, there was no significant difference in the odds of smoking between rural and urban people.

Age

There is no clear pattern of age as a risk factor for smoking as shown in Table 3.8. The 1998 data however showed that the odds of smoking were higher for older age categories than for 18 – 24. Odds ratios were adjusted for locality, race, sex, education, province, and marital status.

Table 3.8 Unadjusted and adjusted odds ratio of smoking among SA Adults by age (1995 - 1998)

Age	**1995**	**1996**	**1997**	**1998**
Unadjusted OR and 95 CI				
18 – 24	1	1	1	1
25 – 34	1.42 1.08 – 1.87	1.57 1.10 - 2.25	1.00 0.72 – 1.40	1.67 1.43 - 1.95
35 – 44	1.29 0.97 - 1.71	1.59 1.10 - 2.31	1.06 0.73 – 1.53	2.24 1.93 - 2.60
45 – 49	1.48 0.93 - 2.35	*	*	2.52 2.07 - 3.07
Adjusted OR and 95 CI				
18 – 24	1	1	1	1
25 – 34	1.38 0.99 - 1.93	1.57 0.97 – 2.53	1.01 0.68 - 1.50	1.93 1.60 - 2.32
35 – 44	1.11 0.76 - 1.63	1.54 0.90 - 2.66	1.01 0.64 - 1.63	2.48 2.05 – 3.00
45 – 49	1.42 0.84 - 2.42	*	*	2.39 1.85 - 3.08

* Data unavailable

Sex

For all the years, Table 3.9 clearly shows than men were more at risk of smoking than women, and this risk ratio was statistically significant. The risk was even higher after adjusting for race, marital status, age, education, locality and province. The risk of smoking by men increased significantly from 1996 and was highest in 1998 (Table 3.9).

Table 3.9 Unadjusted and adjusted odds ratio of smoking among South African adults by sex (1995 to 1998)

Sex	**1995**	**1996**	**1997**	**1998**
Unadjusted OR and 95 CI				
Female	1	1	1	1
Male	5.39 4.92 – 5.92	3.17 2.89 – 3.47	4.17 3.81 – 4.56	7.24 6.30 - 8.30
Adjusted OR and 95 CI				
Female	1	1	1	1
Male	6.45 4.91 – 8.48)	3.40 2.40 - 4.73	5.04 3.68 - 6.92	9.83 8.50 - 11.37

Race

For all the years, relative to blacks, the adjusted odds (adjusted for locality, sex, age, education, province, and marital status) of smoking was highest for Coloureds followed by Whites and then Indians (Table 3.10).

Table 3.10 Unadjusted and adjusted odds ratio of smoking among SA Adults by race (1995 - 1998)

Sex	**1995**	**1996**	**1997**	**1998**
Unadjusted OR and 95 CI				
Black	1	1	1	1
Coloured	3.48 2.10 - 5.76	3.09 1.98 - 4.80	2.26 1.47 - 3.46	3.88 3.27 - 4.61
Indian	1.18 0.63 - 2.23	1.45 0.73 - 2.87	0.82 0.47 - 1.45	1.45 1.12 - 1.88
White	1.52 1.07 – 2.17	1.9 1.27 - 2.90	1.43 0.93 - 2.21	2.31 1.78 - 3.01
Adjusted OR and 95 CI				
Black	1	1	1	1
Coloured	4.70 2.14 - 10.32	2.77 1.40 - 5.48	3.13 1.75 - 5.61	4.63 3.57 - 6.00
Indian	1.65 0.84 - 3.23	2.36 1.15 - 4.85	2.47 1.07 - 5.71	2.42 1.70 - 3.44
White	2.57 1.59 - 4.17	2.43 1.45 - 4.09	1.93 1.13 - 3.32	3.21 2.24 - 4.59

Marital status

The unadjusted and adjusted odds (adjusted for race, sex, age, education, province, and locality) of smoking did not differ significantly between the different statuses of marriage (data not shown).

Education

The odds of smoking decreased with increasing education though not significantly in all cases. After adjusting for sex, race, age, province, marital status and locality, results indicate there was no significant difference between “no education” and

"primary education" in all years (Table 3.11). However "secondary education" had significantly lower risk in 1995 and 1998 while the "tertiary education" had significantly lower risk for all the years.

Table 3.11 Unadjusted and adjusted odds ratio of smoking among SA Adults by education (1995 - 1998)

Education	**1995**	**1996**	**1997**	**1998**
Unadjusted OR and 95 CI				
None	1	1	1	1
Primary	0. 80 0.44 - 1.46	1.25 0.71 - 2.21	0.88 0.42 - 1.88	1.09 0.87 - 1.37
Secondary	0.60 0.34 - 1.05	0.87 0.48 - 1.56	0.71 0.34 - 1.47	0.72 0.58 - 0.90
Tertiary	0.48 0.24 - 0.94	0.73 0.37 - 1.46	0.51 0.23 - 1.15	0.64 0.46 - 0.90
Adjusted OR and 95 CI				
None	1	1	1	1
Primary	0.66 0.35 - 1.24	1.17 0.55 - 2.51	0.81 0.36 - 1.83	0.83 0.63 - 1.09
Secondary	0.37 0.20 - 0.70	0.68 0.31 - 1.48	0.52 0.23 - 1.21	0.46 0.35 - 0.59
Tertiary	0.16 0.07 - 0 .37	0.30 0.13 - 0.71	0.26 0.10 - 0.67	0.19 0.12 - 0.29

CHAPTER 4

DISCUSSION

This study analysed data from four national surveys to determine trends and patterns of smoking in the South African Adult population for the period 1995-1998. The four surveys were deemed to be comparable as they employed the same sampling and data collection methodology and they all assessed smoking status by asking respondents "have you ever smoked?" All four surveys, representing the national population of adults aged 18-49, were undertaken in all nine provinces of South Africa, including the four major race groups.

This study shows that the prevalence of smoking in the South African Adult population from 1995 to 1997 ranged from 31% to 36% meaning that about one of every three South African adults smoke. This corresponds with a 1996 report that 34% of the adult South African population smoke[16]. This is a very high figure compared to other African countries or even countries of the Western world. In 1993, the prevalence of smoking in the US was 25%[43], and in 1990, the reported smoking prevalence in Nigeria was 8.9%[44].

This is in contrast to Van Walbeek report that the smoking prevalence (number of smokers) and consumption (number of cigarettes smoked) in South Africa has been on the decrease since 1993[15]. This analysis shows that despite a significant drop in smoking prevalence from 36% in 1997 to 27% in 1998, there was no significant trend in the smoking prevalence of the adult population during 1995 to 1998. However, further monitoring in the subsequent years is needed to ascertain if this drop is the

beginning of a decreasing trend in smoking prevalence of the South African adult population or just a chance finding. This is important especially because this analysis was for a short time period of four years.

The smoking prevalence of 27% in 1998 is close to the 25% reported by Meyer-Weitz *et al*. (2000) in a 1998 survey[17]. This means that as at 1998 (most recent data), about one in four South African adult were current smokers. This drop of about 9% is very desirable and commendable, and is a greater decrease than the drop in the United States population from 25% in 1993 to 22.8% in 2001[43]. One of the American national health objectives is to achieve a smoking rate among adult that is less than or equal to 12% in 2010[43]. If this significant drop in smoking prevalence in the adult population of South African continues over a larger period, the country may successfully achieve low rates of smoking in the near future.

These results possibly show that the 1993 Tobacco Control act of the 1993, which was amended in the 1999, may have started to affect the prevalence of smoking in the population. The significant drop in the smoking rate in the national population (and in most subgroups) from 1997 to 1998 may be attributed to the sharp increase in the retail price of cigarettes in South Africa during that period. In 1995, the retail cost of a packet of cigarettes was R 3.48, but over a period of 3 years, (by 1998), this had increased by 40% to R 4.87[15]. Previous research has shown that increase in the prices of cigarettes significantly increases smoking quitting rates[31]. Thus although there was no significant trend for the period under review, the drop be the beginning of a continuous trend. This makes it especially important to continuously monitor the smoking rate in the population so that an overall impression of the trend can be

achieved over a longer period of time. With the recently concluded 2003 DHS, the result of this research can be a baseline for continuous monitoring.

Although there is no significant trend in smoking prevalence in the total population, there are significant trends in various subgroups possibly reflecting differences in smoking behaviour in these subgroups, and indicating that if the determinants of smoking in these subgroups were studied, more effective health intervention may be developed. Also striking is the observation that the association between smoking and these variables is remarkably consistent across the four studies.

As with the prevalence of smoking in the national population, the prevalence in the rural and urban areas shows a significant drop from 1997 to 1998. However there is no significant trend in either direction for both localities. For all years, the rate of smoking is higher for urban than for rural areas, this difference is however only statistically significant for 1998. That urban rates of smoking are higher than rural rates has been previously reported in the South African population[41]. The higher rate in the urban areas may reflect a higher effect of tobacco advertisement before the legislation, higher social activities, and higher financial status. For both localities, there is no significant trend in either direction.

The pattern of smoking by province is not consistent and there is no discernible pattern for the period. The trend analyses however show that Eastern Cape, Kwazulu-Natal, Mpumalanga and Northern Province have significant downwards trends while Gauteng and Northern Cape provinces show significant upward trends in the prevalence of smoking. The data however is important for respective provincial

administration and intervention policies. The high degree of variability in provincial prevalence may be largely due to migration. Since province is not a personal attribute, but a reflection of a population, prevalence is expected to fluctuate as people move from one place to another. The high Coloured population in Western Cape for example may explain the high prevalence of smoking in that province.

Although there is no significant pattern of smoking by age for the whole period, results from the 1998 survey show that the prevalence of smoking increases with age up to age 45 - 49. The significantly increasing trend in the prevalence of smoking among people aged 35- 44, may be largely due to the fact that people of this age group are not only very socially active but are also more likely to be economically buoyant, and so may be largely unaffected by the increase in tobacco price.
The good news from the trend analysis by age is that the prevalence of smoking among people aged 18 – 24 is decreasing at a rate of 13% per year. This is interesting because it is at about this age that most people start to smoke, and tobacco policies would be effective if they can curb the initiation of smoking and curtail the prevalence at young ages. If this reported trend continues, perhaps in a few years, we are likely to have a country where the smoking prevalence and the health and social consequences of smoking are very low.

The pattern analysis by sex shows that for all the years the prevalence of smoking in the population varied significantly by sex, with men having significantly higher smoking rates than women. Van Walbeek[15] reported that in 1993, approximately 51.4% of South African males and 12.9% of South African females smoked, which is very close to the 53.70% and 17.70% of 1995 reported for the adult male and female

population respectively in this research. These reported rates are very close to the 42% and 11% reported in 1998 DHS[40] for men and women respectively. Smoking is much more common among men than women, and this supports what reports have shown that internationally, smoking prevalence is higher in males than in females[16, 29, 30]. In 1998 the rate difference was as high as 37%.

Although Van Walbeek[15] reported also that the difference in smoking prevalence between males and females decreased from about 38% in 1993 to 32% in 2000, the rate difference in this case was largely unchanged after four years - 36% in 1995 and 36.81% in 1998. This may be due to the fact that this analysis was done for a four-year period compared to his analysis, which was done for an eight-year period. The trend results for males and females show that there is actually a significant trend of decreasing smoking prevalence for females while the males smoking rate shows no significant trend. The smoking rate for females decreased at about 13% per year. If these trend patterns remain then females may have very low smoking rate in a close future while it may be expedient to develop policies and strategies that will help curb the smoking propensity of males.

Analysis by sex and locality gave somewhat expected patterns: urban men smoke more than rural men (though not significantly different) and urban women have significantly higher smoking rates than rural women. For the three years analysed, the trend for urban men shows a significant increase in smoking prevalence at a rate of about 13% per year, but there is no significant trend among rural men. This is likely due to the fact that urban men are more likely to be richer, more socially active and more exposed to tobacco advertising. Urban females achieved a downward trend in

smoking prevalence at a rate of about 21% while rural women had no significant trend. This smoking pattern possibly reveals the fact that in the rural areas of South Africa, women are more likely to be bread winners while urban women are more likely to be house wives or coworkers with their husbands. This makes rural women possibly more economically buoyant and socially active.

Smoking analyses by race show that significant differences exist between the different races. Coloureds consistently have highest smoking prevalence followed by Whites and Indians, while Blacks have the lowest smoking rate. In the US, the pattern is somewhat different: Whites have higher prevalence of smoking than blacks while the rate for blacks is higher than the rate for Indians[43]. In South Africa, the differences in smoking rate among the four races are also well documented. Reports from previous research have shown a similar pattern: Coloureds have the highest smoking prevalence, followed by Whites and Indians with Blacks having the lowest rate[16, 33].

Of all four races, only the Black race achieved a significant drop in smoking rate between any successive years and this was from 33.36% in 1997 to 22.03% in 1998. Also, logistic regression showed that the only significant trend was in the Black race, which reflected a decreasing trend of smoking at a rate of 5% per year.
Van Walbeek in his research also reported that only blacks have a significantly decreasing smoking rate[15]. Since race is still a proxy for socio-economic status in South Africa. This decrease may reflect the impact of the consistent increase in cigarette price due to 1993 Tobacco Control Act as some Blacks may not be able afford cigarettes any longer.

Further analyses reveal that the smoking prevalence among the different races varies by sex. These analyses reveal that the smoking rates of men of all races in South Africa are very high, and about twice the rate for the same races in the US.

Coloured women have a smoking prevalence that is alarming and even higher than or equal to the smoking rates of black men and white men. This is followed by the smoking rates of White women. This smoking rate among the females is very similar to the pattern in the US: highest in white women followed by black women and then Indian women. In South Africa, the smoking prevalence for Indian women and Black women is very satisfactory if the 12% target[43] for the adult US population is to be used as a yardstick. These results reveal that for both Coloureds and Whites, the smoking prevalence is very high in both males and females, so contribution to the smoking rates of both races comes from the both sex strata; this is however not so for Blacks and Indians.

Trend analyses reveal that there is a significant decrease in smoking rates among black women at a rate of about 24% per year, while the smoking rate is significantly increasing for Coloured men at a rate of about 17% per annum. Thus the 5% downward trend reported among blacks is attributable to this 24% downward trend among the women. There is no significant trend for black men. Although the increase found among all Coloureds is not significant, there is a significant increase among the males.

Although analyses in other countries have shown that smoking status is dependent on marital status, such relationship was not found in this South African study[30, 33]. These

reported differences may be due to variations in the definition of marital status in different surveys.

The pattern of smoking by education is quite interesting; the prevalence of smoking generally decreases with increasing education. People with little or no education have a higher smoking rate than people with some or high education. This is exactly the pattern in the US [43]. However, with time the picture may change as this study shows that there is a significant trend of decreasing smoking prevalence at about 16% per year among people with no education and the trend among people with tertiary education is significantly increasing at a rate of 18% per year. People with primary and secondary education have no significant trend. The reason for this opposite trend may again be attributable to increase in cigarette prices and health warning labels on cigarette products. People with no education are less likely to continue to buy cigarettes when prices increase because they are more likely to be unemployed and poor. Also they may be more likely to hearken to health warnings about the hazards of smoking than people who are educated.

This study reveals that race, education, sex and age are risk factors for smoking. The unadjusted odds ratio shows that the urban people are more likely to be smokers than rural dwellers. This relationship is however confounded as the adjusted odds ratio shows that the risk is not significantly different for both localities.

Risk factor analysis shows that age started becoming a risk factor for smoking in 1998. This can be attributed to the downward increase in smoking prevalence among people aged 18 – 24. All higher age groups were significantly more at risk of smoking

than people of this age. This risk was highest for people aged 35 – 44 who were about 2.5 times (adjusted odds ratio) more at risk of smoking than people aged 18 – 24. This relatively high ratio is also because the former age group achieved a significant trend of increase in smoking rate. There was however no such significant risk ratio among the other age groups.

The study shows that men are consistently much more at risk of smoking in the South African population than women. The odds ratio adjusted for race, marital status, age, education, locality and province reveal that the true risk may be as high as 9.8 times for males, compared to women.

Race is a risk factor for smoking in South Africa. Relative to Blacks, for all four years (apart from 1995 for Indians), all races were more at risk of smoking. Coloureds had the highest risk of smoking, with adjusted odds ratio as high as 4.70 in 1995. In 1998, Whites were about 3.2 times more likely to smoke than blacks while Indians were about 2.4 times more at risk.

The unadjusted and the adjusted odds ratio of smoking by marital status show that the risk of smoking did not vary with marital status. Although research from other parts of the world suggest that marital status is a determinant for smoking and the probability for smoking cessation by males and females, this research shows that marital status is not a determinant of smoking in the South African adult population. It is worth mentioning however, that the definition of marital status may be responsible for these different findings.

Odds ratio adjusted for sex, race, age, locality, province and marital status show that education is a risk factor for smoking in South Africa. With increasing education the odds of smoking significantly decreases. Thus people who have little or no education are more at risk of being smokers than people who are educated.

CONCLUSION

This study shows that the prevalence of smoking in the South African adult population is very high and there was no significant trend in smoking prevalence between 1995 and 1998. However there was a significant drop in smoking prevalence from 1997 to 1998 probably meaning that smoking prevalence in the national population may have started declining. However the high prevalence of smoking in the South African population that may have been there for many years may predict a high burden of smoking-related chronic diseases in the near future. Smoking in the South African adult population is not determined by a single factor but rather a complex interplay of different factors including race, education, sex and locality.

RECOMMENDATIONS

The primary recommendation from this project is that there should be continuous surveillance of the smoking prevalence in the South African adult population and in subgroups as more national surveys are conducted. This will be of help in ascertaining any desired downward trends in the population and in subgroups, which is needful in not only evaluating the effect of smoking policies in the country but also developing specific interventions, aimed at changing smoking behaviour.

Also it is expedient to do a forecast analysis so as to project the future burden of smoking-related chronic diseases in the population. This is of great public health significance as research and interventions may then be set in place to manage these problems timeously

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