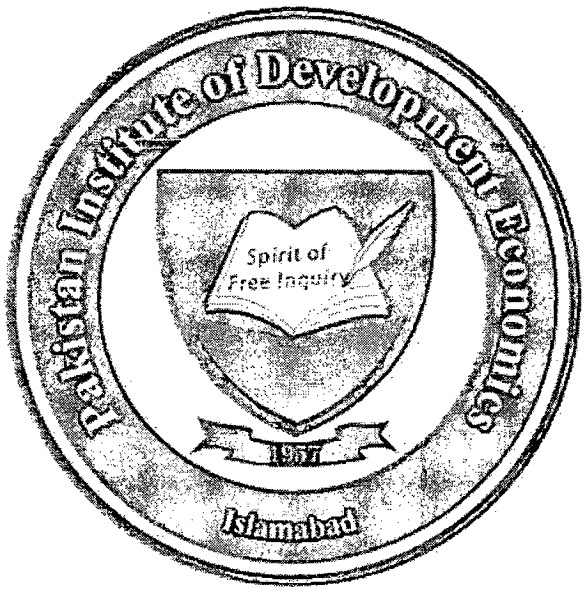
Tobacco Consumption and Health Consequences in Pakistan



Submitted by
Wajahat Ali
PROVPIDE2017FMPHILHE07
M.Phil. Health Economics

Supervisor:
Dr. Muhammad Jehangir Khan,
Assistant Professor,PIDE.

Pakistan Institute of Development Economics,
Islamabad

Pakistan Institute of Development Economics, Islamabad

PIDE School of Public Policy

CERTIFICATE

This is to certify that this thesis entitled: **"Tobacco Consumption and Health Consequences in Pakistan"** submitted by Mr. Wajahat Ali accepted in its present form by the School of Public Policy, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree in Master of Philosophy in Health Economics.

Supervisor:

Dr. M. Jehangir Khan
Assistant Professor,
Pakistan Institute of Development Economics,
(PIDE) Islamabad.

External Examiner

Dr. Javed Iqbal,
Assistant Professor,
School of Economics, Quaid-e-Azam
University, (QAU) Islamabad.

Head,
PIDE School of Public Policy:

Dr. Iftikhar Ahmad,
Assistant Professor,
Pakistan Institute of Development Economics,
(PIDE) Islamabad.

Table of Contents

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

World Health Organization	WHO
Federal Excise Duty	FED
Gross Domestic Product	GDP
Non-Communicable Diseases	NCD
United States of America	USA
Cardiovascular Diseases	CVD
Pakistan Social and Living Standards Measurement Survey	PSLM
Bureau of Statistics	PBS
Framework Convention for Tobacco Control	FCTC

ABSTRACT

In this study we investigate the determinants of tobacco consumption and the effect of tobacco consumption on health spending in Pakistan. For this purpose, we used Household Integrated Economic Survey (HIES-2015-16), conducted by Pakistan Bureau of Statistics (PBS) while implying Seemingly Unrelated Regression (SURE) model. We accounted for different household level characteristics in our analysis such as household income, household head education etc. Our findings show that there is positive and significant relationship between tobacco consumption and health expenditure in Pakistan, showing that those households who consumes tobacco spends more on health obviously due to the increase in tobacco related diseases. Thus, it is recommended that consistent and coherent tobacco taxation policies with a dual objective to reduce prevalence of tobacco consumption and raise revenues to offset the negative health implications of tobacco use. Tobacco Consumption and Heath Expenditures have a positive relationship. There is a dire need to decrease tobacco consumption in Pakistan to decrease burden on healthcare facilities.

CHAPTER 1

INTRODUCTION

The main cause of leading mortality is tobacco consumption. According to World Health Organization (WHO) 1 in 10 deaths around the world which is around 5 million deaths each year is due to tobacco consumption. Tobacco consumption is considered as one of the major cause of non-communicable diseases and mortality. Today tobacco is consumed abundantly in the whole world irrespective of its medical, social, and religious arguments against it. There are many types of tobacco consumption but cigarettes are the main source of tobacco consumption in the world. In 1881 the invention of tobacco machine increased the abrupt consumption of tobacco in the world.

In addition, snuff and chewing tobacco are the main forms of smokeless tobacco. Crushed tobacco in the form of powder is taken orally and is known as dry snuff. According to WHO if the circumstances related to tobacco consumption are not changed and remains same than the annual death toll due to tobacco consumption will be doubled within 25 years and tobacco related diseases will also be doubled. With tobacco consumption the chance of lung cancer increases by 12 times and the chance of stroke is increases by two times. Whereas the likelihood of coronary disease is two to four times higher and the likelihood of death is 10 times more from chronic obstructive diseases among those who consume tobacco regularly (Rashid et al, 2008). The use of tobacco is high in the developing countries. Nearly 80% of people who smoke are present in underdeveloped and developing countries that is almost one billion people who are tobacco consumers. For instance, India is number two in the world in tobacco consumption and is at number three in production. The burden of diseases caused by tobacco use is very high and more than 10 lakh people die annually due to tobacco related diseases in India which is 1/6 of all tobacco related deaths worldwide. If current trend remains same than by 2020 almost 13% of deaths in India will be caused by tobacco consumption (McKay et al, 2015). Tobacco use in Bangladesh is also very high. Almost 58% men and 29% women use tobacco in different forms. Jordan is also an example of middle income countries where smoking rate is very high and is highest among Middle Eastern states. Rate of smoking in Jordanian men is 47 % (Toukan, 2016).

The prevalence of tobacco use is high in rural areas mainly because of low education level and low socioeconomic power. In United States of America, the use of tobacco in rural states up to 28.0%, 23.6% in Bangladesh, 56.9% in Malaysia and 20.3% in Brail which is higher than as compared to urban areas (Silva et al, 2017). According to National Family Health Survey (NFHS) tobacco use in India above the age of 15 years was 37% (Singh A et al, 2014).

1.1 Tobacco Consumption in Pakistan

Pakistan has a population of 200 million and it is the sixth most populous country in the world. In Pakistan more than 100,000 people die annually due to tobacco related diseases according to Pakistan Demographic Health Survey. In Pakistan there are more than 22 million active tobacco consumers and about 100,000 deaths annually from tobacco consumption (WHO, 2015b). According to Economic Survey of Pakistan 2018-19 around 160,100 people die every year in Pakistan due to tobacco consumption and around 24 million adults use tobacco in different forms. The latest Pakistan Demographic Health Survey states that 5.7% women and 46% men smoke tobacco. The smoking habit is mostly found among the youth. Pakistan is in the list of those 15 countries worldwide where burden of tobacco related diseases is very high. According to World Health Organization in 2013, almost 31.8 % men, 5.8 % women and 19.1% youngsters consume tobacco in different forms. Among those 17.9 % men, 1 % women and 9.6 % youngsters are daily smokers. Among those 4.4 % men, 1 % women and 2.7 % of the adult population are daily water pipe smokers. Moreover, 10.5 % men, 3.5 % women and 7.1 % of adults use smokeless tobacco daily. Tobacco consumption result in economic loss but also have a huge impact in increasing burden of diseases which in turn is depriving country of healthy workforce. Mostly poor people tend to spend most of their income on smoking due to which they are not able to get basic necessities. It is also one of leading factor of malnutrition for poorest people. They are affected by non-communicable diseases i.e. cancer, respiratory diseases, heart attack and other diseases imposing additional costs for health care. Smoking is a major risk factor for non-communicable diseases like Acute Coronary Syndrome, Cerebrovascular accidents, debilitating chronic diseases like atherosclerosis, hypertension and Chronic Obstructive Pulmonary Disease (COPD). It is a leading cause of malignancies including cancers

of Lung, oral cavity, larynx, pancreas and Transitional cell carcinoma of urothelium. The purpose of this study is to have an insight into spending on tobacco by the households in Pakistan and the health consequences caused by tobacco related diseases on households.

The Global Adult Tobacco Survey (GATS) Pakistan national survey on tobacco shows that overall prevalence of tobacco use was 19.1%. Monitoring of tobacco use is an important aspect to decrease the burden of diseases. While monitoring the tobacco use in Pakistan and comparing the tobacco use in different studies/surveys in Pakistan and in the neighboring countries, it is seen that tobacco use is less in Pakistan when compared to its neighboring countries where this ranges between 27.2% and 43.3%.The NHSP (1990–1994) reported that overall 34% males and 12.5% females were using some form of tobacco while this figure in GATS, was 31.8% and 5.8% respectively indicating a decline in tobacco use over 20 years. Comparison within genders showed that in the NHSP, the male to female ratio for tobacco use was 3:1, and this dropped to 5:1 in the GATS, indicating a drop in female tobacco users. The decreasing trend of tobacco use in Pakistan should be taken as a good sign which indicates that with better awareness in the masses and stronger implementation of antismoking laws, we can control this menace to a larger extent. Persistently high prevalence of tobacco use among males needs a call for attention and an urgent plan. Many countries have used gender-specific strategies to deal with the high prevalence of tobacco use in males, and similar strategies may be employed in Pakistan. Cessation of tobacco smoking use is the only solution to not only get rid of this bad habit but also reduce the burden of smoking related diseases and its associated costs. The GATS survey showed that 24.7% tobacco smokers had attempted to quit smoking with most trying to quit without assistance (drugs/supportive therapy). Establishment of quitting sites, availability of supporting nicotine replacement therapies, and vigilant health-care staff for proper counseling for cessation are needed to reduce the tobacco use and its related burden diseases. In Pakistan, only 51.8% tobacco users were advised by their health-care providers to quit tobacco. This figure is almost similar to the findings of GATS data from 17 countries where 17.3–67.3% adults were advised by their health-care provider to quit tobacco. However, this percentage can be easily improved if all health care providers inquire about tobacco use from their patients and also advise the users to quit. This strategy has been reported to increase tobacco abstinence and to decrease tobacco related diseases.

As Pakistan is an agriculture country with most of its GDP dependent on agriculture. Tobacco farming is also one of the big economic source for farmers in Pakistan. WHO Framework Convention on Tobacco Control (FCTC) directs governments and other related organizations to provide technical and financial assistance to tobacco growers to shift to alternative crop production i.e., environmentally sounds and nutritious crops. During the diversification period income support should be provided to farmers so that they may easily start alternative crop production easily. Absence of tobacco litigations on tobacco companies is also a major factor responsible for increase in tobacco consumption in Pakistan. There are many examples in the developed world where tobacco litigations have decreased the ratio of tobacco consumption. Tobacco litigation bounds tobacco companies to provide medical assistance to those who are suffered from tobacco related illnesses. Those patients who have been effected by tobacco related illnesses can claim healthcare cost recovery from tobacco companies.

1.2 Problem Statement

Pakistan is among those developing countries which has a very high tobacco use and high mortality rate. In Pakistan above 100,000 people die annually due to diseases caused by tobacco consumption according to Pakistan Demographic Health Survey. In Pakistan there are more than 22 million active tobacco consumers (WHO, 2015b). Pakistan is in the list of the top 15 countries worldwide where the burden of tobacco related diseases is very high. So, it doesn't only have economic loss but also have a huge impact in increasing burden of diseases which in turn is depriving country of healthy workforce. The problem statement revolves around the issue that how much is spent on tobacco consumption in Pakistan, what are its health consequences and how much is spent on tobacco related diseases. Thus it is intended to explore the determinates of tobacco use and to quantify the impact of tobacco use on out of pocket household health expenditure in Pakistan. Further, majority of the people in Pakistan are living below poverty line, so there is a need for a reasonable policy to decrease tobacco consumption among this group, which will decrease their burden of diseases and mortality rate which will positively affect their wellbeing.

1.3 Objective of Study

The main objective of existing study are:

- To investigate the determinants of tobacco consumption.
- To examine the relationship between tobacco use and out of pocket health expenditure of households in Pakistan.

1.4 Significance of Study

The study will help to find out total spending on tobacco consumption and health and will contribute to decrease/eliminate negative economic impacts on households caused by burden of diseases due to tobacco consumption. Furthermore, to achieve a step towards tobacco free country for better health status of people in Pakistan.

1.5 Structure of the Thesis

The organization of the study includes Chapter 1, Introduction. Chapter 2 is Literature Review. Chapter 3 is the Theoretical and Conceptual Framework of the Study. Chapter 4 includes Data and Methodology. Chapter 5 includes Results and Discussion and Chapter 6 includes Policy Recommendation and Conclusion and in the end are the references.

CHAPTER 2

LITERATURE REVIEW

In Pakistan a close examination on tobacco consumption literature shows that the harms of tobacco consumption have not been given much attention. Tobacco consumption is a serious threat to health sector as it harms the mental and physical health of the user and their family. These harms can be reduced by discontinuation of tobacco consumption. Reducing or either cessation of tobacco consumption is a very complex process. Investigations are to be made to know the intense of damage, type of consumption and knowing factors related to tobacco use. For that, finding determinants related to tobacco consumption in order to find the ways for tobacco cessation in key population is required. In Brazil tobacco consumption was higher among settlers and prevalence slightly higher in rural areas than that of urban areas. The living styles of the population i.e. poor housing condition and basic sanitation for families also increases the risk of damages due to tobacco use. The potential of younger population in providing awareness against smoking and adding share in politics by youth has proved helpful for health promotion and social empowerment interventions. Tobacco consumption is main factor responsible for increase in global burden of diseases, increasing number of non-communicable diseases (Silva et al, 2017).

In Nepal, Bangladesh and Sri-Lanka tobacco consumption was mainly adopted by those whose parents and friends smoked, who were exposed to smoking at home and public places and the availability of free tobacco products. Whose friends and parents are tobacco consumers have a high tendency of consumption. It is also high among those who are offered free tobacco products. Advertisement of tobacco products also influence youth tobacco consumption. In Bangladesh and Sri-Lanka inclusion of hazards of smoking in school and college courses has helped to decrease smoking (Kabir et al, 2013).

Smoking remains a major public health issue in Pakistan. It is one of the leading risk factor for a number of illnesses including lung and other malignancies. It has been reported that up to 87% cases of lung carcinoma are detected in smokers. Smoking generally increases risk of developing lung carcinoma by 10 fold and people with 40 or more pack years history may have up to 60 times increased risk of developing lung cancer. Adolescents were found to be the most

vulnerable population to pick up habit of smoking. Results from various surveys conducted on this age group demonstrated that 9 – 14% of school children were regularly involved in this habit. Apart from cigarette smoking, the trend of *'Shisha'* (water pipe) smoking is also on the rise in Pakistan. It is perceived to be more socially acceptability and is often linked to culture. Contrary to popular belief, *'Shisha'* smoking is more injurious to health compared to cigarettes as it lacks appropriate filters, resulting in inhalation of toxins in excessive amounts. Akl et al. reported prevalence of *'Shisha'* use in Pakistan to be 33%. Passive smoking is also one of the major contributors to lung diseases. Published data states that every year 3000 nonsmokers succumb to complications of passive smoking. Anti-smoking laws for public areas have only recently come into the limelight, and even they are not being properly implemented. In a survey conducted by Mal et al. 11.7% commuters of air conditioned public transport reported smoking while travelling and while exposing other passengers to the cigarette smoke. Similarly study reported that majority of adolescents were exposed to passive smoking mostly by father smoking at home (Khuwaja et al).

Advertisements have proven to be a major culprit in promoting smoking. Only recently, laws have been introduced in Pakistan against such advertisement strategies. A study conducted by Zaidi et al. demonstrated that displaying pictures of complications of smoking (e.g. patient with oral cancer, those using electronic voice box and patients on ventilators for respiratory support) on cigarette packs were deemed effective in curbing this habit among high school students. Even though it has been estimated that by increasing the price of cigarettes by just 10%, an immediate decrease of 4.8% and a long term decrease of 11.7% in cigarette use can be achieved, the economics associated with the industry are proving to be major hindrance to tobacco control. Not only does this industry contribute millions of rupees annually to the national exchequer in the form of taxes, being a major cash crop tobacco is also major source of income for scores of individuals in this region.

In Pakistan, Bangladesh and India there is a strong association with tobacco consumption and lack of education. It's due to no knowledge about the outcomes of tobacco use. In rural areas smoking is higher with low household income than those of higher incomes and leading more people below poverty line due to burden of diseases caused by smoking. It's because of the stress of poverty or because of lack of awareness among poor people. Children are also vulnerable to

malnutrition and poor health because their fathers spend limited income on buying cigarettes or other tobacco products (Gilani & Leon, 2013). India produces almost 20 billion rupees annually and more than 3.5 million are engaged in tobacco production in India. It shows very high tobacco industry in India but contrary to that it there is a big burden in India due to different tobacco related diseases. Every year more than nine lakh people die due to tobacco related diseases. In men cancer caused by tobacco is more than half of cancer caused by other factors. In women tobacco related cancer account almost a quarter of all other factors responsible for cancer. The ratio of oral cancer is very high in India. Almost 90% of oral cancer patients are tobacco chewers. An estimated 8.3 million cases of coronary artery diseases and chronic obstructive airway diseases are attributable to tobacco every year(John et al, 2005).

There are many reasons that are responsible for the use of tobacco in youngsters. The main reason behind smoking is that it increases one's image and also helpful in decreasing tension and depression. The other main factor found in India in stimulating smoking among youth was the use of tobacco by their parents and their friends, poor educational performance, availability of pocket money and easy access to tobacco related products. Mainly the same factors were responsible for tobacco consumption among youth in Pakistan i.e. smoking of parents and their friends, easy availability of tobacco products and leisure time outside home with their friends were the main factors responsible for tobacco consumption among youth in Pakistan. Students of government colleges smokes more than those of private colleges due to more restrictions by private colleges and availability of more recreational activities. Tobacco use is a major public health concern both in low and middle income and developed nations (Rozi et al, 2007).

Those who never smoked or are ex-smokers had low mean cholesterol level and can do greater physical activity than those who smoke regularly. The serum thiocyanate level is also higher among those who smoke compared to those who never smoked. The age adjusted mortality rate also varies among smokers, reducers and non-smokers. The mortality may be due to cardiovascular issues, cancer caused by smoking or may be lungs cancer or critical heart related diseases. For the cancer caused by smoking the mortality rate is higher among those who smoke too much than those who smoke less. In men those who smoke less have lower mortality for the first 15 years than those of heavy smokers for all smoking related diseases i.e. heart disease and cancer caused by smoking. On the other hand, that's very much different for women smokers.

Women who have reduced smoking have higher mortality than those of heavy smokers during the whole period. For cardiovascular diseases there is no difference on mortality among reducers and heavy smokers in both men and women. Between the sexes there is a clear mortality difference for smoking related cancer. In men the heavy smokers have higher death rates and reducers have lower death rates whereas in women this is opposite (Tverdal et al, 2006).

There is a strong association with the use of areca, betel and smokeless tobacco with oral cavity cancers, sub mucous fibrosis, leukoplakia's and other head and neck malignancies. The chewing habit has a strong association with oral cancer. In India 49% of oral cancer in men and 90% in women are due to chewing habits (Balaram, 2002). There is 8.5 to 10 times more chance of oral cancer due to betel, Achaea and tobacco chewing in Pakistan. 58% of total head and neck cancer worldwide occurs in South and Southeast Asia. In western countries the head and neck cancer is much lower due to very low chewing habits. In Asia and Southeast Asia the most chewing products are Paan, Chaalia, Gutka, Naswar, Tambaku and Naas (Mazahir et al, 2006).

Unavailability of tobacco cessation clinics in hospitals of Pakistan is a barrier for those who want to give up smoking. It is very difficult to do that in the absence of tobacco cessation clinics. The health care providers also don't have any formal training on tobacco cessation during their undergraduate or post graduate training. In medical school curriculum tobacco control and smoking cessation is not included in Pakistan. The quit smoking medicines have very high price and are not available at affordable price. Reliance of government on tobacco revenues is a big hurdle for tobacco control in Pakistan. A huge foreign exchange can be saved by spending little on import of tobacco related medicines if government invests more on tobacco control (Khan, 2012).

All over the world smoking among youth especially among university students is a major health concern. Many factors are responsible for smoking among university students but main reason behind tobacco consumption or smoking among university students is progression to adulthood and freedom to make independent choices (Lee et al, 2011). Another study suggests that newly found independence provides opportunities to go for psychoactive substances i.e. tobacco, alcohol and other drugs. Stress is another factor among youth responsible for the initiation of psychoactive substances to achieve success in their academic and future goals (Wetter et al, 2004). The targeted advertising strategies on youth or on college and university students inspires

them to initiate smoking starting from experimenting to more frequent or heavier use. Smoking habit is not going to occur if it is not initiated at adolescence. The college and university students are at high risk of developing smoking habits than those who do not go to college or university because of high smoking rates among college and university students. One of a study also suggests that smoking among youth is more changeable and mutable as compared to those of older smokers. So this time period is also a window opportunity for early tobacco cessation. A ban on smoking in college and university campuses can limit smoking among students (Ansari et al, 2012). A study also revealed that initiation of tobacco consumption in the early twenties is to show that they are mature. Another reason for tobacco initiation is have company with their friends or either experience the thrill of experimenting something forbidden (Laishram et al, 2017).

One of a study states that developing countries or underdeveloped countries with struggling economies don't take risk to decrease tobacco consumption because it can affect their revenue generation of their economy. Over the years' tobacco industry has contributed more in revenue generation through agriculture, exports, manufacturing, taxes and creating more jobs. So it has become a main barrier for the policy makers of the developing or underdeveloped countries. Economy of Pakistan is also weak currently in a state of balance of payments crisis and threatened by inflation. Tobacco is one of the main contributors of Pakistan economy. Cigarettes and other tobacco related products are charged with two types of taxes i.e., sales tax and excise tax. Thus, increase in price of tobacco products decrease demand (Mushtaq et al, 2011).

A study by World Health Organization (WHO) revealed that deaths due to cardiovascular diseases (CVD) in low-income countries are on rise. Major CVD includes ischemic heart disease, cerebrovascular disease, hypertension, heart failure and rheumatic heart disease. The ratio of CVD is very high in low income countries including Pakistan. 29.2% of global deaths are caused by CVDs. The deaths caused by cardiovascular diseases in under developed and developing nations is 80%. Share of global burden of CVD by developing countries is eighty-six percent. Non-communicable diseases have a higher death rates and among non-communicable diseases cardiovascular disease is main cause of higher deaths in developing countries including Pakistan. The main reason for higher ratio of CVD is due to change in diet habits, physical

activity level and worldwide increase in tobacco consumption due to industrialization (Abbas et al, 2009).

Cigarette smoking contains toxic chemical substances produced during combustion and is the main cause of tobacco related cancer and different diseases. Different classes of carcinogens, toxins and addictive substances are present in tobacco smoke. Tobacco smoke consists of different toxic metals that includes cadmium (Cd), lead (Pb), Nickel (Ni) and chromium (Cr). They don't only have adverse health effects but also pose serious environmental threats. Cd and Pb are considered as main carcinogens. Pb causes anemia, headache, irritability and real damage. Cd causes damages to different body organs like lung, liver and kidney. Cr is a highly toxic carcinogen and cause death to humans if its level is elevated. Ni is responsible for dermal, lungs and nasal sinus cancers (Ajab et al, 2014).

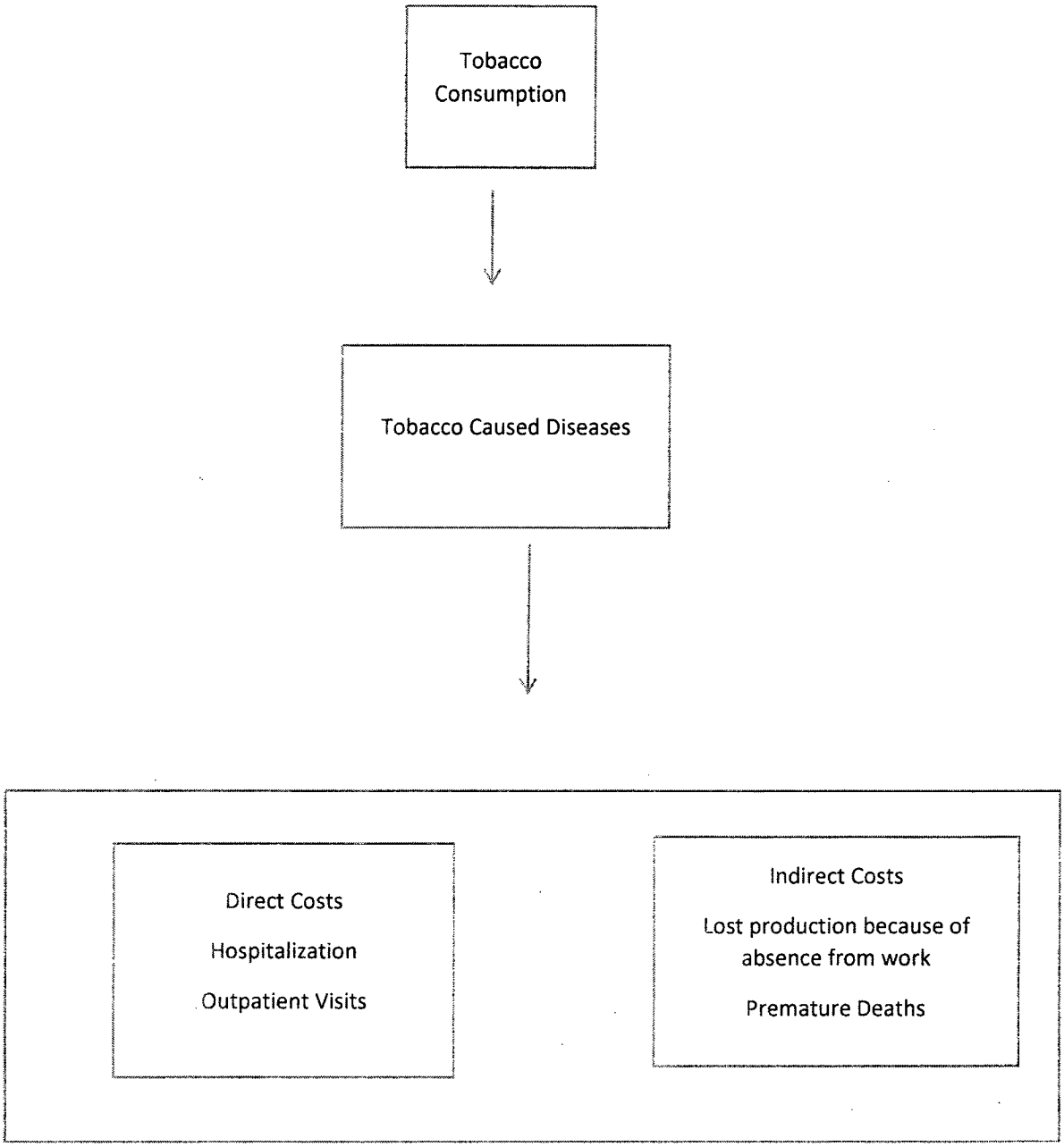
Indoor air pollution is a serious health threat in Pakistan. 70% of the population lives in rural areas. More than 90% of population in rural areas and almost 58% in urban areas use biomass fuels i.e. wood, dung and agricultural wastes for combustion. The incomplete combustion of these biomass fuels poses serious health issues to its users. Annually 28000 deaths and 40 million of acute respiratory diseases occur due to indoor air pollution. It causes a huge economic burden on Pakistan with an annual cost of 1 percent of GDP. Smoking also has a serious contribution in increasing indoor air pollution and ill health. Mostly women and children are effected badly by indoor air pollution. There is a dire need for exploration of modern fuels i.e., LPG and natural gas and indoor smoking is to be banned (Colbeck et al, 2010).

The lifestyle in developing countries is changing rapidly due to globalization. Change in lifestyle has changed eating habits and an increase in tobacco consumption.. NCDs are the main cause of mortalities in the world. According to World Economic Forum, at the start of 2030 the burden of diseases caused by non-communicable diseases in the world will cost 47 trillion dollars. The main causes of increase in NCDs are four main behavioral risk factors. 1) Tobacco use 2) unhealthy diet 3) insufficient physical activity 4) harmful use of alcohol. Globally there are almost one billion smokers and 80% of them in low- and middle-income countries that account for 3.4 million deaths (Khan et al, 2013).

CHAPTER 3

Theoretical Framework

This chapter includes theoretical framework of the study. The theoretical framework/structure is the display of the study that breaks down the theoretical channels and connections through which independent variables i.e. education, age, income, gender, urban, rural and marital status can impact the dependent variables i.e. tobacco consumption and health expenditures can be explained. As shown in figure below, the economic burden on households increases with the start of tobacco consumption. It is a theoretical framework which was used to estimate the economic burdens caused by tobacco consumption. When an individual starts tobacco consumption in different forms than he starts spending on it. In the below model or framework the two steps of spending are discussed i.e. the first is on tobacco consumption and the second one is spending on the recovery of different non-communicable diseases caused by tobacco consumption. The economic burden of tobacco related diseases are divided into two categories in the below framework. The first is direct cost that an individual bear for outdoor patient visits, hospitalization, spending on different medicines and laboratory tests. The other economic burden that an individual bear or suffers is indirect cost. Indirect cost can be discussed by lost productivity because of absence from workplace and the other one premature death. The above economic burden of an individual also creates different hurdles or burdens for his other household members. If an individual belongs to a poor family than he goes down below poverty line because of the out of pocket expenditures caused by tobacco related diseases. In this study we make some links between the variables which effect the health of individuals. These economic factors make a link or association between the dependent variables (tobacco consumption and health consequences) and independent variables of the study household). Once the tobacco consumption model is regressed then the other dependent variable, health expenditure can also be regressed by the same independent variables, including tobacco use an independent variable in the second model.



Theoretical Framework Diagram

CHAPTER 4

DATA AND METHODOLOGY

Data and methodology is the most import chapter of the research. It explains the detailed information regarding data and methodology. It explains which type of data is used either primary or secondary, detail description about the variables used in the study. How these variables are estimated and calculated. It also explains the type of economic theory and econometric model used for the estimation of the data. On the basis of these information, finding and conclusion is to be made.

4.1 Data Collection Instrument and Description

In this study we used *Household Integrated Economic Survey (HIES)* for the year 2015-16, conducted by the Pakistan Bureau of Statistics (PBS). About, 38000 households were surveyed in the present HIES for tobacco consumption and health expenditures each and useful insights were obtained, i.e., expenditures on tobacco consumption and expenditures on health by tobacco consumers and also expenditures on health by non-tobacco consumers at the national and provincial levels with urban/rural breakdown. Information on individuals and household characteristics is extracted from roster of this survey. About 10835 of the households consume tobacco whereas 27,165 households are non-tobacco consumers. However we focus on 16698 households, in our regression analysis, for whom data on out of pocket health expenditure is available in the survey.

There are two dependent variables (i) Tobacco Consumption (ii) Health Expenditure and different independent variables which are income, area, and education of the household head. Regression analysis is used to check the relationship among these variables and interpretation.

The unit of analysis is household spending on tobacco consumption and health expenditures. Basically it provides the data of household members about spending on tobacco consumption in one month and then spending of that household members on health. The health expenditures include hospitalization charges (fee for doctor, laboratory tests and X-Ray charges), medical fees paid to Doctors, Hakeem's outside hospitals and also includes purchase of medicines.

Names of Variables	Definition
Dependent Variables	
Tobacco consumption	Households' tobacco consumption expenditure.
Health Expenditure	Households' out of pocket health expenditure.
Independent Variables	
Urban	Whether the household belongs to urban areas (if yes=1 otherwise =0).
Province	Punjab, Sindh, Baluchistan and KPK
Household Head Education	Household Head is how much educated
Household Expenditure Per Capita	Per Capita Expenditures of Household

Table 2 List of Dependent and Independent Variables

4.2 Econometric Model

The seemingly unrelated regression which is also known an SURE model has many different linear equations. Every equation or regression has a dependent variable and different set of independent variables. Each regression can be run separately that's why it is known as seemingly unrelated but the error terms are correlated across the equations. There is a jointness among the equations and it provides additional information. For example in a country there are many more provinces and if we want to know the consumption pattern of every province. For every province there will be a separate equation and the variables in every equation can be different. So the

neighboring provinces may have some common characteristics and may have a common relationship but the equations looks individually. Such equations are used to find the jointness of distribution of disturbances assuming the error terms among the equations to be correlated. Thus the equations have not an independent relationship but are seemingly unrelated either.

Based on proposed variables: The following form of econometric model/sure model is assumed to be estimated

$$Tobacco\ consumption = \propto o + \propto 1 Household\ head\ Educationi + \propto 2 Provincei + \propto 3 Regioni + \propto 4 Household\ income\ per\ capita + ui$$

In the above regression of Sure Model, the dependent variable is tobacco consumption and the independent variables are region, vector of provinces, household head education and household expenditures per capita.

$$Health\ Expenditure = \propto o + \propto 1 Household\ head\ Educationi + \propto 2 Provincei + \propto 3\ Regioni + \propto 4 Tobacco\ consumptioni + 5 Household\ income\ per\ capitai + ui$$

The above regression of Sure Model is used to estimate the relationship between health expenditures and tobacco consumption along with other independent variables as controls. In Health Expenditures Model, dependent variable is health expenditure, the independent variables are different provinces and different regions, household head education and household expenditures per capita.

4.3 Study Design

This is a quantitative study to obtain the connection between Tobacco Consumption and Health Expenditures in Pakistan. This is secondary data research.

4.4 Duration of Study

This study was conducted over a period of 4 months. Data collection, analysis and interpretation was completed during the period.

4.5 Data Analysis Plan

SPSS is used for the analysis of the data taken from household integrated economic survey and to generate results. Two different equations of SURE model are used to analyze the data for tobacco consumption and health expenditures.

CHAPTER 5

RESULTS AND DISCUSSION

This chapter reports the estimates of the regression equations discussed in chapter 4. In the first part we undertake graphical analysis and discusses the descriptive statistics. In the second part we report the estimates of our regression equations for tobacco use and household health expenditure in Pakistan.

Descriptive Statistics and Graphical Analysis of Data

Figure 1 shows the distribution of tobacco consumption by region; about 10,835 households consume tobacco in which 4,123 are rural households while the remaining 6,712 belongs to urban areas.

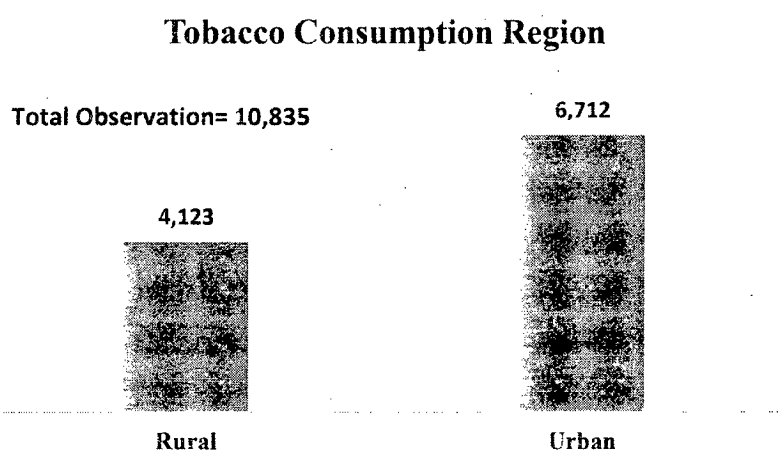


Figure 1 Tobacco Consumption Regions

Table 3 Consumption by Region Tobacco

Region	Freq.	Percent	Cum.
Rural	4,123	38.05	38.05
Urban	6,712	61.95	100
Total	10,835	100	

Figure 2 shows the distribution of tobacco consumption households by different provinces. A total of 10,835 households consumes tobacco in which 2400 belongs to KPK, 3,762 belong to Punjab, 3,286 belong to Sindh while remaining 1,387 belongs to Baluchistan.

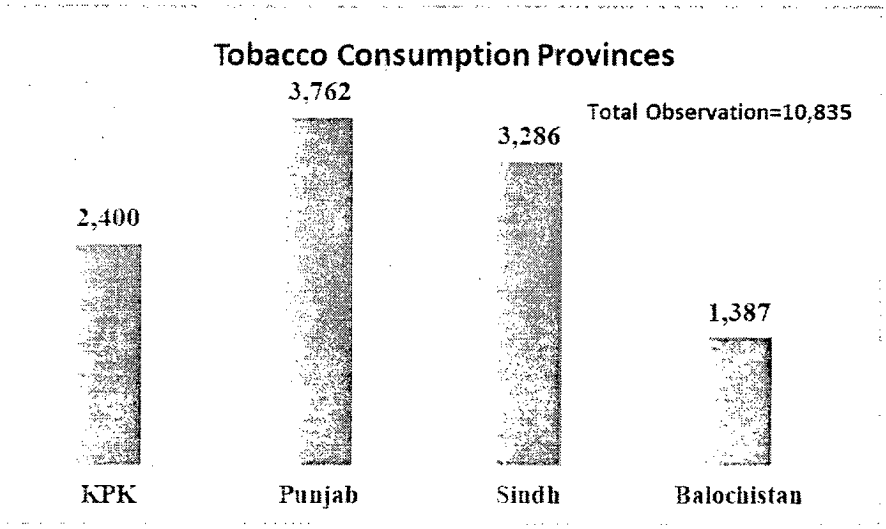


Figure 2 Tobacco Consumption of Different Provinces

Table 4 Tobacco Consumption of Different Provinces

Province	Freq.	Percent	Cum.
KPK	2,400	22.15	22.15
Punjab	3,762	34.72	56.87
Sindh	3,286	30.33	87.2
Baluchistan	1,387	12.8	100
Total	10,835	100	

Figure 3 shows that about 10,835 households consume tobacco where 27165 households do not consume tobacco.

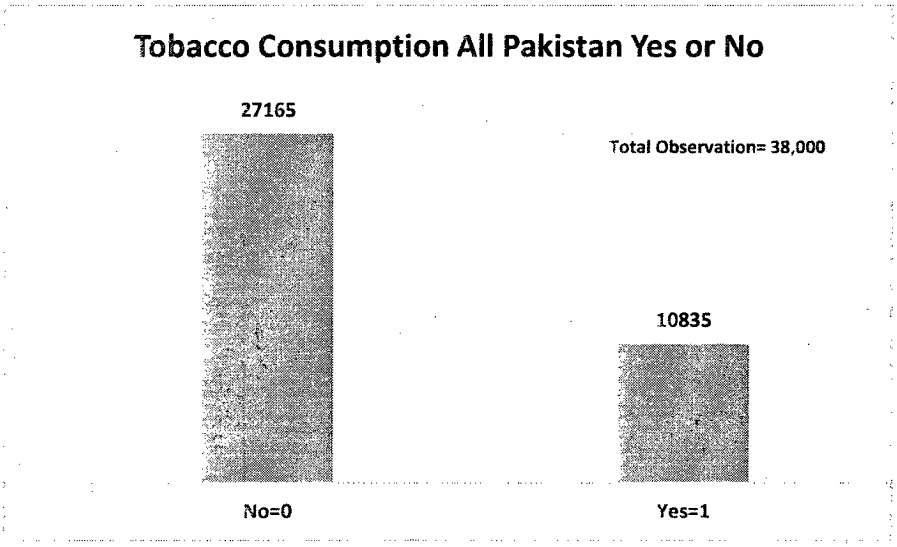


Figure 3 Tobacco use

Table 5 Descriptive Statistics Pakistan

Variable	Obs	Mean	Std. Dev.	Min	Max
Total Observation	38,000				
Tobacco Not Consumed	27,165				
Tobacco Consumption	10835	787.502	809.364	10	10500
Tobacco Dummy	38,000	0.28513	0.4514	0	1
Household Monthly Income	16698	17735.16	21523.93	0	1000000
Medical Expenditures	16698	3448.064	5552.102	20	140000
Medical Expenditure Tobacco Consumed	10835	3328.032	5152.102	20	140000
Medical Expenditure Tobacco not Consumed	5863	3694.315	6685.298	20	140000

The above table shows the descriptive analysis of overall Pakistan. The number of total households are 38,000 and number of households who consume tobacco are 10,835 while non-tobacco consumer households are 27,165. On average households spends 787 rupees per month on tobacco consumption. The next variable is tobacco dummy which means that if a household consumes tobacco than it is equal to 1 otherwise equal to zero. So total number of households who consume tobacco are 10,835. Furthermore, the next variable is household monthly income. So, the average household monthly income is Rs. 17,735. The next variable is medical expenditures. The mean of medical expenditure is Rs.3448. The next variable is medical expenditures of the households who consume tobacco and their total household observations is 10835. The average medical expenditures of households who consume tobacco is 3328.03 rupees, with standard deviation 5152, with minimum 20 and maximum 140000. The next variable is medical expenditures of those who didn't consume tobacco. The total households are 5863, with average value is 3694.31rupees, with standard deviation 6685.20, minimum 20 and maximum 140000.

Table 6 Descriptive Statistics KPK

Variable	Obs	Mean	Std. Dev.	Min	Max
Total Observations	8,417				
Tobacco Not Consumed	6,017				
Tobacco Consumed	2400	501.853	564.772	10	9300
Tobacco Dummy	8417	.285	.451	0	1
Household Monthly Income	3699	20412.56	25726.09	0	1000000
Medical Expenditure	3699	6446.082	3152.474	0	250000
Medical Expenditure Tobacco consume	2400	3734.064	5143.02	20	140000
Medical Expenditure Tobacco not consume	1299	3584.315	6165.298	20	140000

The above table shows the descriptive analysis of KPK province data, that total number of households are 8417 and number of households who consumed tobacco are 2400 while non-tobacco consumer households are 6017, the average spending of a household per month is 501 rupees, with the standard deviation of 564.77, with minimum 10 rupees and maximum 9300 rupees.

The next variable is tobacco dummy which means that if a household consumes tobacco than it equals to 1 otherwise equals to zero. So total number of households who consume tobacco is 2400. Furthermore, the next variable is household monthly income. The average monthly income is 20412 rupees with standard deviation 25726, with minimum 20 and maximum 950000 rupees. The next variable is medical expenditures, by total observation 3699, with mean value 6446 rupees, standard deviation 3152, minimum value 20 and maximum value 250000 rupees. The next variable is medical expenditures of those households who consume tobacco. The number of observations are 2400 households with average value 3734 rupees, standard deviation 5143, minimum 20 and maximum 140000 rupees. The next variable is medical expenditures of those households who didn't consume tobacco. Total number of observations are 1299 households with average value 3584 rupees, standard deviation 6165, minimum 20 and maximum 140000 rupees. So the households who consume tobacco regularly spends more on tobacco consumption, and their medical expenses are also higher compared to those who don't consume tobacco. So there is a positive relationship between tobacco consumption and spending on medical expenditures which means that greater the spending on tobacco consumption is greater the spending on health or medical expenditure

Table 7 Descriptive Statistics Punjab

Variable	Obs	Mean	Std. Dev.	Min	Max
Total Observation	13194				
Tobacco Non Consume	9,432				
Tobacco Consumption	3762	901.305	868.01	10	10500
Tobacco Dummy	13194	0.28513	0.4514	0	1
Household Monthly Income	5798	17634.405	22080.367	0	800000
Medical Expenditure	5798	4222.652	8150.108	0	180000
Medical Expenditure Tobacco Consume	3762	3852.064	5263.102	20	140000
Medical Expenditure Tobacco not Consumed	2036	3714.315	6147.298	20	140000

The above table shows the descriptive analysis of Punjab province that total number of observations are 13194 households and number of households who consumed tobacco are 3762 while non-tobacco consumption households are 9432. The average spending on tobacco of a household per month is 901 rupees with the standard deviation 868, minimum 10 rupees and maximum 10500 rupees.

The next variable is tobacco dummy which means that if individual consume tobacco than it equals to 1 otherwise equals to zero. So total number of households who consume tobacco is 3762. The next variable is household monthly income, the average monthly income is 17,634 with standard deviation 22080, with minimum 0 and maximum 800000 rupees. The next variable is medical expenditure of both the tobacco consumers and non-tobacco consumers, by total observation 5798 households, with mean value 4222, standard deviation 8150, minimum value 0 and maximum value 180000 rupees. The next variable is medical expenditures by those who consume tobacco. Total observations are 3762 households with average value 3852 rupees, standard deviation 5263, minimum 20 and maximum 140000 rupees. The next variable is medical expenditures of those who didn't consume tobacco. Total observations are 2036, with average value 3714 rupees, standard deviation 6147, minimum 20 and maximum 140000 rupees.

Table 8 Descriptive Statistics Sindh

Variable	Obs	Mean	Std. Dev.	Min	Max
Total Observation	11525				
Tobacco Non Consume	8,239				
Tobacco Consumption	3286	866.324	802.006	10	7500
Tobacco Dummy	11525	0.28513	0.4514	0	1
Household Monthly Income	5064	15740.794	19070.427	0	500000
Medical Expenditure	5064	3008.428	4600.014	0	100000
Medical Expenditure Tobacco Consume	3286	3952.064	5942.102	20	140000
Medical Expenditure Tobacco not Consumed	1778	3794.315	6635.298	20	140000

This table shows the descriptive analysis of Sindh province data, that total number of households are 11525 and number of households who consumed tobacco are 3286 while non-tobacco consumer households are 8239, the average spending of a household on tobacco consumption per month is 866.24 rupees, with the standard deviation of 802.006, with minimum 10 rupees and

maximum 7500 rupees.

The next variable is tobacco dummy which means that if a household consumes tobacco than it equals to 1 otherwise equals to zero. So total number of households who consume tobacco is 3286. Furthermore the next variable is household monthly income. The average monthly income is 15740 rupees with standard deviation 19070, with minimum 0 and maximum 500000 rupees. The next variable is medical expenditures, by total observation 5064, with mean value 3008 rupees, standard deviation 4600, minimum value 0 and maximum value 100000 rupees. The next variable is medical expenditures of those households who consume tobacco. The number of observations are 3286 households with average value 3952 rupees, standard deviation 5942, minimum 20 and maximum 140000 rupees. The next variable is medical expenditures of those households who didn't consume tobacco. Total number of observations are 1778 households with average value 3794 rupees, standard deviation 6635, minimum 20 and maximum 140000 rupees. So the households who consume tobacco regularly spends more on tobacco consumption, and their medical expenses are also higher compared to those who don't consume tobacco. So there is a positive relationship between tobacco consumption and spending on medical expenditures which means that greater the spending on tobacco consumption is greater the spending on health or medical expenditures.

Table 9 Descriptive Statistics Baluchistan

Variable	Obs	Mean	Std. Dev.	Min	Max
Total Observation	4864				
Tobacco Non Consume	3477				
Tobacco Consumption	1387	786.364	899.016	10	7800
Tobacco Dummy	4864	0.28513	0.4514	0	1
Household Monthly Income	2137	18633.697	16790.846	200	450000
Medical Expenditure	2137	3694.315	6685.298	20	140000
Medical Expenditure Tobacco Consumed	1387	3748.064	5852.102	20	140000
Medical Expenditure Tobacco not Consumed	750	3624.315	6172.298	20	140000

This table shows the descriptive analysis of Baluchistan province data, that total number of households are 4864 and number of households who consumed tobacco are 1387 while non-tobacco consumer households are 3477, the average spending on tobacco consumption of a household is 786 rupees, with the standard deviation of 899.016, with minimum 10 rupees and

maximum 7800 rupees.

The next variable is tobacco dummy which means that if a household consumes tobacco than it equals to 1 otherwise equals to zero. So total number of households who consume tobacco is 1387. Furthermore, the next variable is household monthly income. The average monthly income is 18633 rupees with standard deviation 16790, with minimum 200 and maximum 450000 rupees. The next variable is medical expenditures, by total observation 2137, with mean value 3694 rupees, standard deviation 6685, minimum value 20 and maximum value 140000 rupees. The next variable is medical expenditures of those households who consume tobacco. The number of observations are 1387 households with average value 3748 rupees, standard deviation 5852, minimum 20 and maximum 140000 rupees. The next variable is medical expenditures of those households who didn't consume tobacco. Total number of observations are 750 households with average value 3624 rupees, standard deviation 6172, minimum 20 and maximum 140000 rupees. So the households who consume tobacco regularly spends more on tobacco consumption, and their medical expenses are also higher compared to those who don't consume tobacco. So there is a positive relationship between tobacco consumption and spending on medical expenditures which means that greater the spending on tobacco consumption is greater the spending on health or medical expenditures.

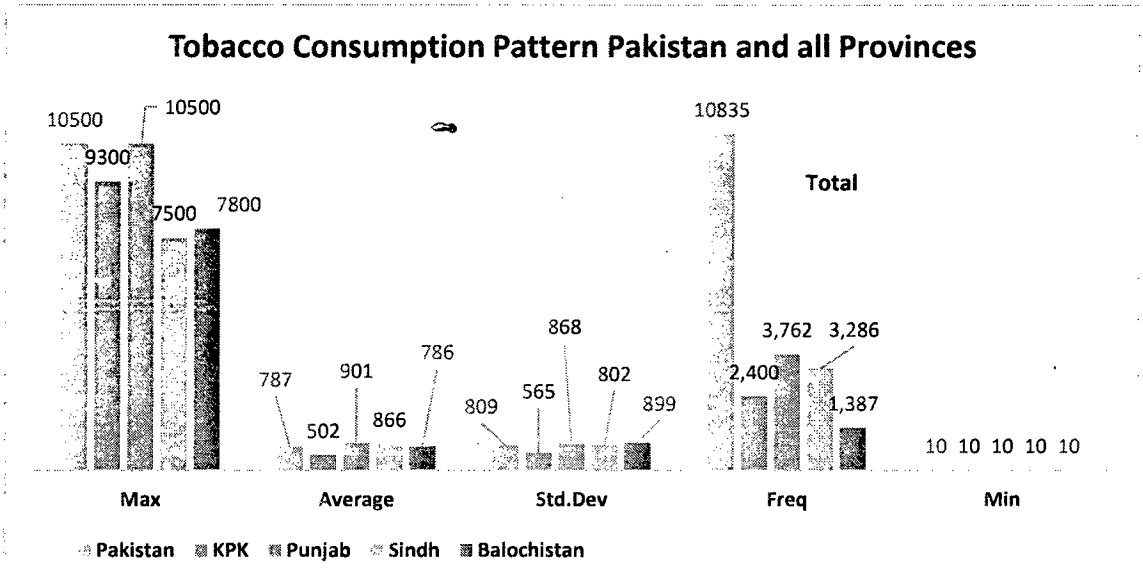


Figure 4 Tobacco consumption, Pakistan and Provinces Descriptive Graph

The above graph shows the overall tobacco consumption in Pakistan. The highest value is 10500 rupees in Pakistan, while in KPK the highest value is 9300, in Punjab the highest spending on tobacco consumption is 10500, while the highest tobacco consumption is 7500 in Sindh and the highest tobacco consumption in Balochistan is 7800 rupees. The minimum spending on tobacco consumption is 10 rupees in overall and all four provinces of Pakistan. The minimum is same across all provinces, the average tobacco consumption in Pakistan is 787 rupees, in KPK it is 502, while in Punjab it average is 901, while in Sindh 866 and the last Balochistan average tobacco consumption is 786 rupees, the standard deviation in Pakistan is 809, while in KPK is 565, in Punjab is 868, while in Sindh it is 802 and the last province Balochistan it is 899.

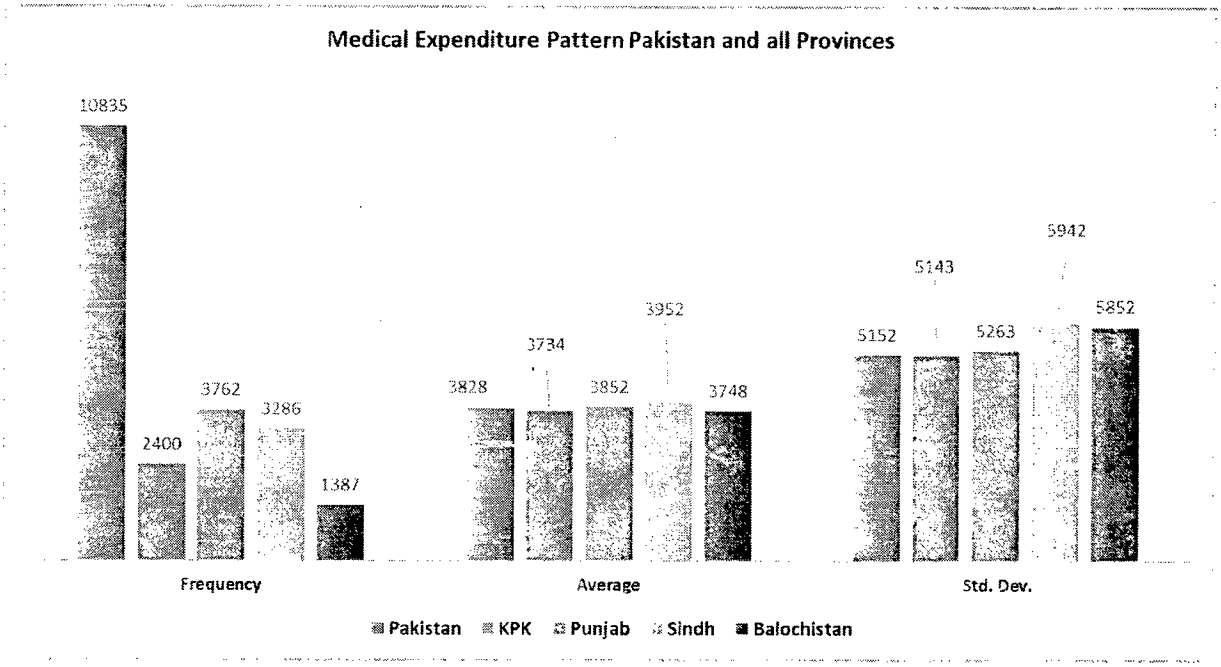


Figure 5 Medical Expenditures in Pakistan

The above graph shows the medical expenditures in Pakistan. The highest value is 140000 rupees in Pakistan and all other provinces, the minimum is 20 in Pakistan and all four provinces. The minimum is same across all provinces. The average household's medical expenditure in Pakistan is 3828 rupees, in KPK it is 3734, in Punjab the average is 3852, in Sindh 3952 and in Balochistan the average household medical expenditures are 3748 rupees. The standard deviation in Pakistan is 5152, in KPK is 5143, in Punjab is 5263, in Sindh is 5942 and the last province Balochistan it is 5852. The frequency distribution is explained in figure 3 above with total number of observations 10,835 households, KPK 2400, Punjab 3762, Sindh 3286 and Balochistan 1387 households.

Regression Results

Table 10 Tobacco Consumption Model/Regression

VARIABLES	(1) Tobacco consumption
Punjab Province	128.1*** (30.68)
Sindh Province	260.3*** (31.74)
Balochistan Province	67.90* (38.55)
Urban Region	-39.28** (17.58)
Household Head Education	-23.50*** (0.010)
Household Expenditure Per Capita	-5.32** (2.40)
Constant	606.1*** (29.47)
Observations	16,698
R-squared	0.22

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

SURE Model is used to calculate tobacco consumption of the households, in which dependent variable is spending on tobacco, the independent variables are four different provinces and

different regions, the base or reference category is Khyber-Pakhtunkhwa and rural region. The remaining provinces will be compared with Khyber-Pakhtunkhwa province and urban region with rural region which is our base or reference category. If a household belongs to Punjab province than their tobacco consumption on average will be 128 rupees greater than those compared to a household who belong to KPK which is highly significant at 1% level of significance. The second province is Sindh, if a household belongs to Sindh province than their tobacco consumption will be on average 260 rupees greater than KPK and is significant at 1% level. If a household belongs to Baluchistan province, then their tobacco consumption will be on average 68 rupees greater than a household who belong to KPK. Our next variable is Urban region we will compare urban with rural region. If a household belongs to urban region, then their tobacco consumption will be 39 rupees less than as compare to a rural area household and is significant at 5% level of significance. The next variable is smoking, which is dummy variable, we will compare this by non-smoking, if a member of a household is smoking than his tobacco consumption will be 103 rupees higher than compared to person who is non-smoking which is statistically significant at 5% level of significance.

The next independent variable is household head education, if one year increase in household head education than his tobacco consumption will be decrease by 23.50 rupees as he/she becomes more health conscious on his diet plan. So significant negative relation of household head education with tobacco consumption at 1%.

The last independent variable is household expenditure per capita, if one hundred increase in household expenditure per capita than his tobacco consumption will be decreased by 5.32 rupees as he/she become more conscious on his increased per-capita expenditures. So negative relation of household expenditures per capita with tobacco consumption at 5% level of significance. The constant variable shows that on average consumption of a household per year is 606, total number of observation is 10,835, R squared value shows that how much your dependent variable jointly explains our dependent variable tobacco consumption, here R square value is very low which means that model is not good fit but in cross sectional data R squared value is 0.22 which is low as compared to time series data which is trendy. So we can say that 22% variation in tobacco consumption is jointly explained by all independent variable.

Table 11 Health Expenditure Model

VARIABLES	(1) Health Expenditure
Punjab Province	-218***
	(164.2)
Sindh province	-453***
	(173.1)
Baluchistan Province	-341***
	(236.5)
Urban Region	-319.2**
	(128.1)
Tobacco Consumption	26.35*
	(4.27)
Household Head Education	-0.16***
	(0.010)
Household Expenditure Per Capita	-0.06**
	(0.029)
Constant	6,634***
	(142.0)
Observations	16,698
R-squared	0.27

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

SURE Model is used to estimate the effect of the independent variables on the health expenditure of the household. The health expenditures of the members of a household includes hospitalization charges (fee for doctor, laboratory tests and X-Ray charges), medical fees paid to Doctors, Hakeem's outside hospitals and also includes purchase of medicines. In Health Expenditures Model, dependent variable is health expenditure, the independent variables are

different provinces and different regions. Base or reference category is Khyber-Pakhtunkhwa and rural region, we will compare the remaining provinces with Khyber Pakhtunkhwa province and urban region with rural region which is our base or reference category. If a household belongs to Punjab province then their health expenditure will be 218 rupees less as compared to a household belongs to KPK which is highly significant at 1% level of significance. The second province is Sindh, if a household belongs to Sindh then on average health expenditures are 453 rupees less as compared to KPK and also significant at 1% level. If a household belongs to Baluchistan province then their health expenditure on average will be 341 rupees less as compared to a household who belong to KPK. Our next variable is Urban region. We will compare urban with rural region, if a household belongs to urban region then their health expenditure will be on average 319 rupees less as compared to a rural area household which is significant at 5% level of significance. The next variable is tobacco consumption, which show that with the increase in tobacco consumption spending on health are increases. Which is statistically significant at 1% level of significance.

The next independent variable is household head education. There is a significantly inverse relationship between household head education and health expenditure.

The last independent variable is household expenditure per capita, there is negative relation of household expenditures per capita with health expenditure at 5% level of significance. The R square value is 0.27 which shows that 27% variation in Health expenditure is jointly explained by all independent variables.

Discussion

According to WHO if the circumstances related to tobacco consumption are not changed and remains same than the annual death toll due to tobacco consumption will be doubled within 25 years and tobacco related diseases will also be doubled. The chance of lung cancer is 12 times higher, chance of stroke is two times higher. Chance of coronary disease is two to four times higher and likely have a chance to die 10 times more from chronic obstructive diseases among those who consume tobacco regularly .The use of tobacco is high in the developing countries.

Nearly 80% of people who smoke are present in in under developed and developing countries that is almost one billion people who are tobacco consumers. Bangladesh, India and Pakistan are the main examples among developing countries. India is number two in the world in tobacco consumption and is at number three in production. The burden of diseases caused by tobacco use is very high and more than 10 lakh people die annually due to tobacco related diseases in India which is 1/6 of all tobacco related deaths worldwide. If current trend remains same than by 2020 almost 13% of deaths in India will be caused by tobacco consumption. With the increase in tobacco consumption increases the health expenditures of a household and that there is a positive relationship between tobacco consumption and health expenditures. So in our results it is observed that 100 rupees increase in tobacco consumption then health expenditure will be increased by 20 rupees, it shows that there is a positive relationship between tobacco consumption and health expenditures. Health expenditures are increasing with the increase in tobacco consumption. Education of the household head or individuals also have a negative effect on tobacco consumption and health expenditures which means that if a household head/individuals are more educated than their tobacco consumption and health expenditures are decreased. In Pakistan, Bangladesh and India there is a strong association with tobacco consumption and lack of education. It's due to no knowledge about the outcomes of tobacco use. In rural areas smoking is higher with low household income than those of higher incomes and leading more people below poverty line due to burden of diseases caused by smoking. It's because of the stress of poverty or because of lack of awareness among poor people. Children are also vulnerable to malnutrition and poor health because their fathers spend limited income on buying cigarettes or other tobacco products. Thus, it is recommended that consistent and coherent tobacco taxation policies with a dual objective to reduce prevalence of tobacco consumption and raise revenues to offset the negative health implications of tobacco use. Tobacco Consumption and Heath Expenditures have a positive relationship. There is a dire need to decrease tobacco consumption in Pakistan to decrease burden on healthcare facilities.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

Conclusion

Tobacco Consumption is one of the main cause of non-communicable diseases and leading mortality both in developed and developing countries. According to WHO 1 in 10 deaths around the world which is around five million deaths yearly is due to tobacco consumption. Decrease in tobacco consumption and cigarette consumption per smoker is associated with decrease in consumer's healthcare expenditures. Those countries who have been successful to change smoking behavior by the implementation of tobacco control interventions, ban on smoking and increase in tobacco taxation have lower healthcare expenditures.Those countries that have introduced strict antismoking policies and interventions have decreased their medical costs caused by tobacco consumption. On the other hand, the countries that have failed to implement tobacco control interventions have higher healthcare expenditures caused by different non-communicable diseases. Countries that have been successful in reducing tobacco consumption have seen reduction in their healthcare costs. State and national policies that reduce smoking should be part of short term healthcare cost containment. If the circumstances related to tobacco consumption are not changed and remains same than the annual death toll due to tobacco consumption will be doubled within 25 years and tobacco related diseases will also be doubled which will also lead to increase in healthcare expenditures and burden on the healthcare facilities. Pakistan has very high mortality rate due to tobacco consumption where more than 100,000 people die annually due to tobacco related diseases. In Pakistan there are more than 22 million active tobacco consumers and about 100,000 pre mature deaths annually are caused from tobacco consumption. The smoking habit is mostly found among the youth. Pakistan is among the top 15 countries worldwide where the burden of tobacco related diseases are very high. If our government and NGO's creates awareness among masses by introducing tobacco control interventions than number of tobacco related diseases will be decreased which in turn can save

huge foreign exchange reserves which is mostly spend on curing tobacco related diseases and importing different medicines and medical products. Pakistan should follow the footsteps of different countries that have successful tobacco control interventions and have control on tobacco consumption. In USA, California tobacco control program spend US $1·4 billion during its first 15 years, but saved $86 billion in direct health-care costs, a 61 times return on investment. There was a dramatic decline in smoking prevalence as a result of this investment and it also saved money for the state. There is a dire need to change the tobacco related behavior of people in Pakistan where there is a huge burden on healthcare facilities due to other diseases and exponential growth of population also. Our results shows that there is a positive relationship between tobacco consumption and health expenditure of households in Pakistan. This can potentially lead to decrease in the wellbeing of the households.

Recommendations

In Pakistan tobacco taxations are less than the prescribed rate by the WHO. Moreover, cigarettes production and consumption are sensitive to taxation and have inverse relationship. It is recommended that the federal excise duty on cigarettes should substantially be enhanced to decrease consumption in the country. It is observed cost increments strongly affect the degree of utilization of cigarettes in Pakistan.

Inconsistent tobacco taxation policies with substantial yearly changes are not only causing fluctuations in tobacco production and consumption but are also contributing to significant revenue losses and increase in tobacco related diseases. Thus it is recommended that consistent and coherent tobacco taxation policies with a dual objective to reduce prevalence of tobacco consumption and raise revenues to offset the negative health implications of tobacco use.

With the increase in tobacco consumption increases the health expenditures of a household and that there is a positive relationship between tobacco consumption and health expenditures. So in our results it is observed that 100 rupees increase in tobacco consumption then health expenditure will be increased by 20 rupees, it shows that there is a positive relationship between tobacco consumption and health expenditures. Health expenditures are increasing with the increase in tobacco consumption. So there is a dire need to control tobacco consumption to decrease health expenditures.

Education of the household head or individuals also have a negative effect on tobacco consumption and health expenditures which means that if a household head/individuals are more educated than their tobacco consumption and health expenditures are decreased. In Pakistan, Bangladesh and India there is a strong association with tobacco consumption and lack of education. It's due to no knowledge about the outcomes of tobacco use. So educating the head and other individuals of the household about the health consequences and health expenditures related to tobacco diseases is necessary step to decrease the burden of tobacco related diseases.

In rural areas smoking is higher with low household income than those of higher incomes and is leading more people below poverty line due to burden of diseases caused by smoking. It's because of the stress of poverty or because of lack of awareness among poor people. Children are also vulnerable to malnutrition and poor health because their fathers spend limited income on buying cigarettes or other tobacco products. Thus, it is recommended that consistent and coherent tobacco taxation policies with a dual objective to reduce prevalence of tobacco consumption and raise revenues to offset the negative health implications of tobacco use.

Tobacco Consumption and Heath Expenditures have a positive relationship. There is a dire need to decrease tobacco consumption in Pakistan to decrease burden on healthcare facilities.

The government institutions and different NGO's must raise awareness among public by organizing different seminars and using every available platform to inform public about the addictive and harmful nature of tobacco products that leads to different non-communicable diseases that adds burden to healthcare facilities.

There should be a complete ban on the use of tobacco products in public offices and public places legally and implementation of the ban in its true spirit with the help of law enforcement agencies.

Tobacco Consumption and Heath Expenditures have a positive relationship. Increase in tobacco consumption leads to increase in healthcare expenditures and a decrease in tobacco consumption also decreases health expenditures. There is a dire need to decrease tobacco consumption in Pakistan to decrease burden on healthcare facilities.

The burden of diseases and mortalities caused by tobacco related diseases affects all but low- and middle-income countries are affected badly. Tobacco related diseases act as a key barrier in development and poverty alleviation on the low and middle income countries.

Thus, it is recommended that consistent and coherent tobacco taxation policies with a dual objective to reduce prevalence of tobacco consumption and raise revenues to offset the negative health implications of tobacco use. Tobacco Consumption and Heath Expenditures have a positive relationship. There is a dire need to decrease tobacco consumption in Pakistan to decrease burden on healthcare facilities.

REFRENCES

Abbas, S., Kitchlew, A. R., & Abbas, S. (2009). Disease burden of Ischemic Heart Disease in Pakistan and its risk factors. *Ann Pak Inst Med Sci*, *5*(3), 145-50.

Ahmed, R., Rizwan-ur-Rashid, M. P., & Ahmed, S. W. (2008). Prevalence of cigarette smoking among young adults in Pakistan. *J Pak Med Assoc*, *58*(11), 597-601.

Ajab, H., Yaqub, A., Malik, S. A., Junaid, M., Yasmeen, S., & Abdullah, M. A. (2014). Characterization of toxic metals in tobacco, tobacco smoke, and cigarette ash from selected imported and local brands in Pakistan. *The Scientific World Journal*, *2014*.

Akhtar, S., White, F., Hasan, R., Rozi, S., Younus, M., Ahmed, F., ... & Khan, B. S. (2007). Hyperendemic pulmonary tuberculosis in peri-urban areas of Karachi, Pakistan. *BMC Public Health*, *7*(1), 70.

Alam, A. Y., Iqbal, A., Mohamud, K. B., Laporte, R. E., Ahmed, A., & Nishtar, S. (2008). Investigating socio-economic-demographic determinants of tobacco use in Rawalpindi, Pakistan. *BMC Public Health*, *8*(1), 50.

Aslam, S. K., Zaheer, S., Rao, S., & Shafique, K. (2014). Prevalence and determinants of susceptibility to cigarette smoking among school students in Pakistan: secondary analysis of Global Youth Tobacco Survey. *Substance abuse treatment, prevention, and policy*, *9*(1), 10.

Balaram, P., Sridhar, H., Rajkumar, T., Vaccareila, S., Herrero, R., Nandakumar, A., ... & Munoz, N. (2002). Oral cancer in southern India: The influence of smoking, drinking, paan-chewing and oral hygiene. *International journal of cancer*, *98*(3), 440-445.

Berg, C. J., Stratton, E., Schauer, G. L., Lewis, M., Wang, Y., Windle, M., & Kegler, M. (2015). Perceived harm, addictiveness, and social acceptability of tobacco products and marijuana among young adults: marijuana, hookah, and electronic cigarettes win. *Substance use & misuse*, *50*(1), 79-89.

Colbeck, I., Nasir, Z. A., & Ali, Z. (2010). The state of ambient air quality in Pakistan—a review. *Environmental Science and Pollution Research*, *17*(1), 49-63.

Gilani, S. I., & Leon, D. A. (2013). Prevalence and sociodemographic determinants of tobacco use among adults in Pakistan: findings of a nationwide survey conducted in 2012. *Population health metrics*, *11*(1), 16.

Gilani, S. I., & Leon, D. A. (2013). Prevalence and sociodemographic determinants of tobacco use among adults in Pakistan: findings of a nationwide survey conducted in 2012. *Population health metrics*, *11*(1), 16.

http://www.finance.gov.pk/survey/chapters_19/Economic_Survey_2018_19.pdf

https://pide.org.pk/Research/Economics-of-Tobacco.pdf

https://www.who.int/nmh/publications/fact_sheet_tobacco_en.pdf

https://www.who.int/tobacco/about/partners/bloomberg/pak/en/

John, R. M. (2005). Tobacco consumption patterns and its health implications in India. *Health policy*, *71*(2), 213-222.

Kabir, M. A., Goh, K. L., & Khan, M. H. (2013). A cross-country comparison of tobacco consumption among youths from selected South-Asian countries. *BMC public health*, *13*(1), 379.

Kabir, M. A., Goh, K. L., Kamal, S. M. M., & Khan, M. M. H. (2013). Tobacco smoking and its association with illicit drug use among young men aged 15-24 years living in Urban Slums of Bangladesh. *PloS one*, *8*(7).

Kenford, S. L., Wetter, D. W., Welsch, S. K., Smith, S. S., Fiore, M. C., & Baker, T. B. (2005). Progression of college-age cigarette samplers: what influences outcome. *Addictive behaviors*, *30*(2), 285-294.

Khan, F. S., Lotia-Farrukh, I., Khan, A. J., Siddiqui, S. T., Sajun, S. Z., Malik, A. A., ... & McCormick, J. B. (2013). The burden of non-communicable disease in transition communities in an Asian megacity: baseline findings from a cohort study in Karachi, Pakistan. *PloS one*, *8*(2).

Khan, J. (2012). Tobacco epidemic in Pakistan. *Journal of Postraduation Medical Institute*, *26*(3), 233-236.

Kou, Y. R., Kwong, K., & Lee, L. Y. (2011). Airway inflammation and hypersensitivity induced by chronic smoking. *Respiratory physiology & neurobiology*, *178*(3), 395-405.

Ladusingh, L., Dhillon, P., & Narzary, P. K. (2017). Why do the youths in Northeast India use tobacco?. *Journal of environmental and public health*, *2017*.

Marinho, F., de Azeredo Passos, V. M., Malta, D. C., França, E. B., Abreu, D. M., Araújo, V. E., ... & Felisbino-Mendes, M. S. (2018). Burden of disease in Brazil, 1990–2016: a systematic subnational analysis for the Global Burden of Disease Study 2016. *The Lancet*, *392*(10149), 760-775.

Mazahir, S., Malik, R., Maqsood, M., Merchant, K. A., Malik, F., Majeed, A., ... & Ghaffar, S. (2006). Socio-demographic correlates of betel, areca and smokeless tobacco use as a high risk behavior for head and neck cancers in a squatter settlement of Karachi, Pakistan. *Substance abuse treatment, prevention, and policy*, *1*(1), 10.

McKay, A. J., Patel, R. K., & Majeed, A. (2015). Strategies for tobacco control in India: a systematic review. *PLoS One*, *10*(4).

Mushtaq, N., Mushtaq, S., & Beebe, L. A. (2011). Economics of tobacco control in Pakistan: estimating elasticities of cigarette demand. *Tobacco control*, *20*(6), 431-435.

Ngaruiya, C., Abubakar, H., Kiptui, D., Kendagor, A., Ntakuka, M. W., Nyakundi, P., & Gathecha, G. (2018). Tobacco use and its determinants in the 2015 Kenya WHO STEPS survey. *BMC public health*, *18*(3), 1223.

Pereira, C. M., Jung, D. W., & Penna, G. D. M. L. POWER PROJECTION IN THE INDIAN OCEAN: COOPERATION OR QUEST FOR DOMINANCE?.

Saqib, M. A. N., Rafique, I., Qureshi, H., Munir, M. A., Bashir, R., Arif, B. W., ... & Bhatti, L. (2018). Burden of tobacco in Pakistan: Findings from global adult tobacco survey 2014. *Nicotine and Tobacco Research*, *20*(9), 1138-1143.

Siddiqi, K., Shah, S., Abbas, S. M., Vidyasagaran, A., Jawad, M., Dogar, O., & Sheikh, A. (2015). Global burden of disease due to smokeless tobacco consumption in adults: analysis of data from 113 countries. *BMC medicine*, *13*(1), 194.

Singh, A., & Ladusingh, L. (2014). Prevalence and determinants of tobacco use in India: evidence from recent Global Adult Tobacco Survey data. *PloS one*, *9*(12).

Sreeramareddy, C. T., Pradhan, P. M. S., Mir, I. A., & Sin, S. (2014). Smoking and smokeless tobacco use in nine South and Southeast Asian countries: prevalence estimates and social determinants from Demographic and Health Surveys. *Population health metrics*, *12*(1), 22.

twentyseven

Vargas, L. S., Lucchese, R., Silva, A. C. D., Guimarães, R. A., Vera, I., & Castro, P. A. D. (2017). Determinants of tobacco use by students. *Revista de saude publica*, *51*, 36.

Vollset, S. E., Tverdal, A., & Gjessing, H. K. (2006). Smoking and deaths between 40 and 70 years of age in women and men. *Annals of internal medicine*, *144*(6), 381-389.