Economic Cost of Tobacco-Related Diseases in Nigeria: a Study of three Hospitals in Ibadan, Southwest Nigeria

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Abstract

Costs of tobacco-related disease can be useful evidence for important macroeconomic health policy. The costs can be enormous given that tobacco-related diseases have major adverse effect on the quality of life and productivity of affected individuals. This is the gap in tobacco-related research in Nigeria that this paper attempted to fill. This paper provides estimates of economic costs of four active tobacco-related diseases in Nigeria. This paper is a hospital-based study which utilized an exploratory survey carried out between March to September 2010 to assess and document different components of economic costs of tobacco-related diseases within the Ibadan metropolis, South West Nigeria. A structured questionnaire form was used to collect data on tobacco smoking behaviour, as well as direct and indirect costs associated with outpatient visits and hospitalization. Using the prevalence-based method of the cost of illness (COI) approach, the paper estimated that the mean total direct and indirect costs during hospitalization period were $3,142 and $2,322.95 for Stroke or Transient Ischemic attack and lung cancer respectively while the costs were$ 1,445.24 and $741.43 for COPD and tuberculosis respectively (in term of dollars). The paper found that direct and indirect costs were `mainlypaid` by out of pocket by the victims and their respective families. The results further reveal that the high cost of the disease can be catastrophic for individuals from poor households. The paper thus concludes that anti-smoking measures to avoid tobacco-related diseases can reduce the economic costs of the disease.

ECONOMIC COST OF TOBACCO-RELATED DISEASES IN NIGERIA

1.1. Introduction

Health capital has great potential for improvement of the return to investment for economic growth and development because healthier workers are physically and mentally more energetic (Bloom, 2004). A country with a heavy burden of diseases like tobacco-related diseases tends to experience a multiplicity of several impediments to economic progress. Tobacco-related disease is a major cause of death throughout the world, claiming the lives of an estimated 13,000 persons every day and by 2030, it is expected to kill 10 million people per year between ages 35-69 (Chu et al, 2009). Smoking tobacco causes over 25 diseases in man. Ten diseases as a result of Maligent Neoplasms (Bladder Cancer, Lung Cancer, Leukemia etc.), five diseases from cardiovascular diseases (Coronary Heart Diseases, Cerebrovascular diseases, Stroke etc.), ten diseases from respiratory diseases and host of others (including Tuberculosis, Hypertension, Heart attack, Asthma etc.) (Hsieh, 1996).

Economic costs represent the monetary burden on society of illness and premature death as foregone alternative and are measured in terms of direct and indirect cost (Graham, 1992). Issues around tobacco-related diseases and economic costs show the relationship between health and economics (De Beyer et al, 2003). That is, the consumption of tobacco has an inverse relationship between the economic status and its consumers. This is because thehigher the consumptionof tobacco the lower the economic, health and living standards of its consumers.Tobacco-related diseases have major adverse effect on the quality of life of affected individuals and create a largeadverse effect on households, communities and the society as a whole. The economic cost or burden of tobacco-related diseases impacted on household directly or indirectly. Most of the tobacco-related diseases are terminal and costly. Households seeking health care as a result of tobacco-related diseases tends to reduce consumption on other goods because of high cost of treating tobacco-related diseases such as consultation cost, hospital cost, transport cost and other costs to treat diseases. The implication of this is that,an increase in household expenditure on seeking health carewill reduce households' income which may result into poverty and subsequently leads to macroeconomic problems. For instance, Neubauer et al, (2006) stated that the direct cost for acute hospital care, inpatient rehabilitation care,ambulatory

care and prescribed drugs in Germany were €7.5 billion. .The estimated cost of hospitalization for acute asthma was between $ 2,820 and $ 4,843 in France (Jane-Cluade, 2005). The economic cost in Thailand of direct out-of pocket medical costs and expenditure for treatment were 368.49m baht for lung cancer, 71714.88million baht for chronic obstructive pulmonary (COPD) and 1773.65million baht for Coronary heart diseases (CHD) (Jittrakul et al, 2006).

Besides, the indirect cost of incapacity due to sickness is the loss of production of the sick person (who may probably be the bread winner of the family) and the caregivers who forego his/her occupation to visit hospital as a result of a sick member. More so, the changes in illness perception and the different health care seeking reflect the high opportunity costs of time and the low availability of cash households face during the disease episode.For example, Neubauer et al, (2006) stated that the indirect cost of mortality was €4.7 billion and €8.8 billion for costs due to work loss days and early retirement, respectively.

Furthermore, tobacco-related diseases also impact negatively on government budget (Ross et al, 2007). This is because government spends more to subsidize for health care on cost of drugs and consultation. This means that the more government spends to subsidize health care the less it spends on the provision of social amenities and capital goods. In the same vein, adult mortality has a significant effect on national economies (Laxinarayan et al, 2007). Tobacco-related diseases deplete investment in human and physical capital and reduce work performance in developing countries. For instance, in 2005, 35 million people were estimated to have died from tobacco-related diseases worldwide (more than 60% of all death globally; WHO, 2005). Hence, WHO, (2004) stated that most of tobacco-related diseases death occurred in low and middle income countries. Tobacco kills 50% of lifetime smokers and half of these deaths occur among people in their middle age (35-69years).

In developing countries like Nigeria, many factors have deepened the economic burden of tobacco that causes many diseases. For example, The Federal Government of Nigeria welcomed tobacco investment and showed an active support for tobacco multinationals which cost US$ 150 million investment in Nigeria. Not only that, British American Tobacco Nigeria (BAT) was granted a concessionary import duty that lasted until the end of 2003 (Adirieje, 2006). For instance, in2006, a survey from 11 government- owned hospitals in Lagos State revealed that at least two persons die of a tobacco-related disease daily. It also revealed that same year, there

were 9750 tobacco-related cases reported in these hospitals. Not only that, the Lagos State economy lost N2, 847,000,000 to subsidise tobacco-related diseases treatment (Owoeye, 2010). In addition, Nigeria lacks baseline information on medical expenditures attributable to smoking pattern (Akinroye, 2004).All these factors impact negatively on the economy.

Many studies have estimated the economic cost of tobacco-related diseases in different countries. Few of them are (Rahman et al, 2000) for China, (Jha, 2000; Ligthwood, 2003; Harris, 1998) for US and United Kingdom; (McGhee et al., 2005) for Hong Kong; (Jittrakul, 2006) for Thailand and (John et al, 2009) for India.In Nigeria, fewer studies like Adelekan et al, 1992; Ndom et al, 1996; Oluwafemi et al, 2003; Aina et al., 2009 were not definite in estimating the expenditures on tobacco-related diseases.And also, the mission of government through Millennium Development Goals in health, Nigerian Heart Foundation (NHF), Nigerian Tobacco Control Alliance (NTCA) is to limit the frequent occur of diseases given the amount of resources allocated to that end by the society. Many health care providers (Government and Nongovernmental organization -NGOs) plan to evaluate costs and benefit cash flows over the short-term. However, it becomes a difficult issue for health care providers to make interventions on the prevalence of tobacco-related diseases especially when the amount of the expenditures on the diseases cannot be quantified. This makes formulation and implementation of a national policy on tobacco difficult.

Chu et al, (2009) stated that cost estimates help to prioritize substance abuse issues, provide useful information for targeting programming and identify information gap. Thus, economic costs of illnesses are important information for health decisions. There fore, proper estimate of expenditures on the tobacco-related diseases can form framework for important macroeconomic health policy. This study intends to estimate the economic cost of tobacco-related diseases in Nigeria. Arising from these problems are numbers of research questions. What are the actual costs derivable from tobacco smoking? What is the estimate of the amount spent on tobacco-related diseases in Nigeria? The objective of this paper is to find answers to these research questions.

The paper proceeds as follows. The next section presents a background on tobacco and tobacco related disease in Nigeria followed by a brief literature review in section 3. Section 4 presents the Methodology and the results are shown in Section 5. The discussion of the results are in Section 6 while the paper conclude with Section 7

2.1.   Background on Tobacco and Tobacco Related Disease in Nigeria

The economic cost of tobacco consumption in Nigeria varies among people of low, middle and high-income earnings (Adelekan et al, 1996). The annual per capital consumption of cigarette in Nigeria in 1995 was 191 sticks per day. The annual total consumption of cigarettes was 10259 million sticks The Prevalence of smoking among adults (15 years and older) in 1990 reveals that male adults accounted for 18.4% and female adults were 1.7%. In 2001, the prevalence of male youths was 23.9% while female youth was 17.0% (Table 1). The prevalence of smoking among male senior executives was to 17.4% while for the female counterparts it was 0.02% (Okojie et al, 2000).

Table L Smoking prevalence in Nigeria

	15 years and older	Youth	Senior Executives
Male	15.4	23.9	17.4
Female	1.7	17	0.02
Overall	8.9	18.1	13.9

Source:FMOH, Global Youth Tobacco Survey Collaborative Group (2002), Okojie et al., (2000)

The Impact of smoking-related diseases, mortality from cancer, respiratory and circulatory diseases in Nigeria in 2000 is high. The mortality rate of male age 45 above that contacted Trachea, Lung and Bonchus Cancer was 23% with total population 171,000. The mortality rate of males aged 45 above that contacted Lip, Oral Cavity and Pharynx Cancer was 65% with total population of 460,000 while female recorded 3.0% mortality rate with total population of 216,000.

3.1 Review of Empirical Issues

Tobacco is an agriculture product processed from the leaves of plants in the genus *Nicotiana*. In consumption, it most commonly appears in the forms of smoking, chewing, snuffing, or dipping tobacco (WHO, 2007).In the literature, tobacco related diseases vary from country to country due to different habits for tobacco usage (Peto et al, 2004).Tobacco is responsible for over 25 diseases in man. Ten of the diseases are malignant Neoplasms (Bladder cancer, lung cancer, leukemia etc.); five of them are cardiovascular diseases (coronary heart diseases, Cerebrovascular diseases, stroke etc.); ten of them are respiratory diseases and others including hypertension heart attack, asthma etc. (Department of Health and Human Services United State, 2004). Smoking tobacco is acknowledged to be the cause of many diseases, such as lung cancer, chronic bronchitis and emphysema, and ischemic heart disease (Hsieh, 1996)

In Nigeria, the current smoking prevalence among pharmacy students at the University of Lagos was 5.5% which is lower than the national prevalence rate of 8.9% (Aina et al, 2009).In China and India, studies have shown that the prevalence of tobacco related diseases are the incidence of pulmonary tuberculosis. (Gajalakshmi et al, 2003). The prevalence of diseases that is attributable to smoking in veteran population in the United State had cases of 90% of lung cancers. (Harries,1998). In United States 50% cases are attributed to stroke (Howard; 1994). Farley et al, (1998)found out that the prevalence Cerebrovascular Heart Disease (CHD) in Germany was 35%, stroke 28%. That of atherosclerotic diseases was 28%. The incidences of tobacco were high: 54% for CHD, 66% for cerebrovascular diseases and 82% for arterial diseases.

In Hong Kong, China, the prevalence of regular smoking among men in 2000 was 22%. This was lower than that of mainland China where over 53% of males smoked in 1998 (McGhee et al., 2005). According to McGhee et al., (2006) the current peak in the prevalence of cigarette smoking in China occurred about 40 years later than in the United States but postdates that in Hong Kong by about 20 years.In India, John et al., (2009) found out that prevalence of tuberculosis was 18% and 88% of male gender was attributed to this disease.

The channels through which cost of tobacco-related disease may impact on the economy interlink - directly or indirectly. It is well-recognized also that health positively influences economic wellbeing, growth and wealth. The reverse influence is also well-recognized. Countries would certainly be economically better-off in the absence of ill-health (morbidity and

mortality) from epidemic diseases, such as tuberculosis, stroke and cardiovascular diseases etc. If left unchecked, there will be poor economic performance and poor health especially at individual and household levels.

Direct costs are the value of resources (personal healthcare, hospital care, physician's services and drugs) that could be allocated to other uses in the absence of diseases (Graham, 1992). Barcelo, (2000) stated that the direct cost include all medical costs such as cost of drugs, hospitalization, out-of-pocket, ambulatory, transport cost, laboratory test and all other Medicare expenditures. Single et al., (1998) estimated the direct cost of alcohol, tobacco and illicit drug in Canada. The direct cost was $18.4 billion in 1992 which represent $649 per capital 2.7% GDP. In the same vein, alcohol accounted for approximately $7.52 billion. Barceloet al, (2000) estimated direct costs of diabetes mellitus in Latin America to be US $1, 0721 million.

Neubauer et al, (2006) stated that the direct cost for tobacco-related diseases on hospital care, inpatient rehabilitation care, ambulatory care and prescribed drugs were €7.5 billion. The annual value of direct medical costs and long term care for tobacco-related diseases in Hong Kong was US$532 million for active smoking and US$156 million for passive smoking (McGhee et al, 2006). Leal et al, (2006) estimated the direct costs of cardiovascular disease and coronary heart disease in European Union. Health care costs on CVD in EU were estimated to be EU 60 billion representing 57% of total health care.

Ross et al, (2007) stated that the total direct cost of inpatient health care caused by smoking in Vietnam was at least 1161829 million Vietnamese dollar or ($US77.5 million) in 2005. This represent about 0.22% of Vietnam Gross Domestic Product (GDP) and 4.3% of total health care expenditure. The majority of these expenses are for COPD treatment ($VN1033541 million or $US68.9 million per year), Lung Cancer ($VN78143 million or $US5.2 per year) and Ischaemic diseases ($VN50145 million or $US 3.3 million). Government directly financed about 51% of these cost. The rest was financed either by household (34%) or by the insurance sector (15%). John et al, (2009) stated that direct medical cost of tobacco related diseases in India amounted to $907 million for smoked tobacco and $285 million for smokeless tobacco.

On the part of indirect cost, it is the value of lost output because of cessation or reduction of productivity caused by morbidity and mortality. Morbidity costs are wages lost by people who are unable to work because of illness and disability and an imputed value for persons too sick to perform their usual housekeeping task while mortality costs are the present value of future earnings cost by people who die prematurely (Graham, 1992).Barceloet al, (2000) estimated indirect costs of diabetes mellitus in Latin America. The study found out that the cost was US $5,4496 million

In Germany, the indirect cost of mortality was €4.7 billion and €8.8 billion for costs due to work loss days and early retirement (Neubauer et al, 2006). Indirect cost was estimated to cost EU $ 29 billion. The productivity loss was estimated to cost about $ 24.4 billion (Leal et al, 2006). According to John et al, (2009) the indirect morbidity cost of tobacco use in India which includes the cost of caregivers and value of work loss due to illness amounted to $398 million for smoked tobacco and $104 million for smokeless tobacco. The indirect cost of tobacco, illicit drug, alcohol and loss of production in Canada were amounted $4.14 billion while a loss to law enforcement agencies was amounted to $1.36 billion.

Economic cost can simply mean an opportunity that is sacrificed when a choice is made (Louie, 2002). Economic cost includes only real resources consumed as a result of decisions made by consumers in the marketplace (Ligthwood, 2003). Hence, economic costs are the direct and indirect cost. According to Ligthwood et al, (2000) the estimates of the gros.s' healthcare costs of smoking (that is, all the expenditures associated with treating diseases attributable to smoking) for high-income countries range between 0.10% and 1.1% of gross domestic product (GDP). John et al, (2009) stated that the total cost of tobacco use in India amounted to $1.7 billion. Tuberculosis accounted for 18% of tobacco-related diseases which cost $311 million.

Neubauer et al, (2006) stated that the total costs attributable to smoking in Germany were €21.0 billion. The total costs of treating cardiovascular disease cost the EU economy $169 billion (Leal et al, 2006). The annual cost of tobacco-related illnesses in Bangladesh was estimated at 50.9 billion taka, including 5.8 billiontaka for second-hand smoking (WHO, 2007).Lightwood et al., (2008) estimated health care expenditure in California and the total cost of all health care expenditures were $86 billion in 2004.The annual economic cost of tobacco-related diseases in

Philippine was estimated at 6 billion USD (includes healthcare and productivity costs) (Baquilod et al., 2006).

3.2 Methodological Review

Graham (1992) used prevalence-based approach to estimate diabetes, cardiovascular and hypertension costs. Howard (1994) estimated cost of cancer, cardiovascular, cerebrovascular diseases in United State of America with cost of illness approach. Barcelo et al, (2000) estimated economic costs of diabetes mellitus in Latin America and the Caribbean with a prevalence based approach (COI). Lightwood et al, (2003) used cost of illness to estimate cost of cardiovascular in United State of America. In the same vein, Jittrakul (2006) used prevalence-based approach to estimate cost of lung cancer and other heart diseases in Thailand. Leal et al, (2006) estimated cost of cardiovascular among Europeans Union using cost of illness approach.

McGhee et al, (2006) estimated active and passive smoking-attributable mortality, hospital admissions, outpatient, emergency and general practitioner visits for adults and children, use of nursing homes and domestic help, time lost from work due to illness and premature mortality in the productive years with Population Attributable Fraction (PAF). The study calculated the risk of taking time off work for a smoker compared with a never smoked and used this together with an estimate of smoking prevalence among workers. Chuina et al, (2006) estimated the economic costs of malaria with prevalence-based approach (COI) in rural area in Kenya. Sanghamtra (2007) used Hedonic Pricing Approach to estimate the cost of HIV and AIDs in India.

Cost of illness method gives estimates of amount spent on medical expenses and employment compensation that are foregone as a result of illnesses, accidents or premature death (Golan, 1999). It is useful in highlighting the impact that illness and diseases have on health services and societies. Cost of illness study do not account for pain and suffering, the value of lost leisure time, or the costs and benefits of preventive measures (Joel, 2006; Lightwood, 2003). Goldman, (1996) and Warner et al., (1999) stated that cost of illness employed a variety of methods of estimating the different cost components, attributable risk methodology, incidence-based approach, prevalence-based approach and the human capital approach.

The prevalence-based approach is well suited to estimate the magnitude of diseases costs on acute or transient conditions. Prevalence-based approach also identifies the costs incurred during a given year by persons with a particular illness (Joel, 2006).The prevalence approach values the present costs associated with all existing cases of smoking-produced illness (including future lost earnings attributable to current deaths) (Rice et al, 1986).The cost of coronary artery disease in the UK was estimated by using the number of prevalent cases and aggregated data relating to mortality, morbidity and health service utilization. In addition, a societal perspective was employed by including both direct and productivity costs (Shearer, 2004). For example, the annual cost in Australia, using prevalence-based approach is AS4909 (National Asthma Campaign, 2003).The prevalence approach is good for measuring the effectiveness of cost control and how well health care expenditure targets are met (Chor, 1997). For example, Lightwood, (2003) used Prevalence-based approach to obtain economic cost of cardiovascular disease in United State.

Incidence-based approach is suited to estimate the magnitude of diseases cost for long period of time. For cost-of-smoking analysis, the incidence approach values all of the future costs associated with new cases of smoking-produced disease during the reference year (Hodgson, 1992). It is useful for analyses of interventions that might interrupt the development of smoking-related illness. For example, in Canada, the lifetime cost per patient suffering with multiple sclerosis was estimated to be $1, 148 570 (Canadian Burden of Illness Study Group, 1998).

The country costs of smoking related diseases are often done using the Smoking Attributable Fraction (SAF). This measures the average proportion of the occurrence of disease attributable to smoking. Accurate estimation of the SAF is complicated because it depends on the demographic structure, general health, and smoking habits and history of the population, as well as on the characteristics of smokers. (Ligthwood et al, 2000). McGhee (2005) applied smoking SAF approach to estimate cost of tobacco-related diseases including passive smoking in Hong Kong. The study estimated the attributable number of live lost at any age and under 65 years adjusted for the labour force participation rate. Average productive years lost was calculated by discounting at 35 per annum and monetized the losses by valuing a working year at the median wage in 1998. The study valued an attributable death using the value of 1.4 million euro (€), a

middle estimate worldwide which was used in a European valuation of air pollution related death with an exchange rate of €1 to HK$7.2 equivalent to HK$10 million or US$1.3 million.

The results showed that the cost of visits to public primary care outpatient clinics which were attributable to active smoking were estimated as $21 million which is 12% of the total cost for such clinics in 1998. The cost of attributable visits to accident and emergency department as a result of active smoking was $8 million. The attributable cost of private GP consultations due to active smoking was $12 million and $32 million for passive smoking. The value of the attributable absences from work was $ 11 million for active smoking and $45 million for passive smoking.The attributable cost of nursing home care in those over 65 years for disease due to active smoking was $117 million while the cost of home-based care was $0.7 million. For passive smoking , home-based care cost $0.3 million but the study did not estimate the cost of nursing home care for conditions caused by passive smoking.

John et al, (2009) used smoking attributable fraction (SAF), also known as population attributable risk, by disease category, rural/urban district, gender, and age to calculate economic cost of tobacco use in India. The estimated SAF is then multiplied by each cost measure of interest to derive the smoking attributable cost For instance, the product of SAF and total inpatient hospitalization expenditures is smoking attributable hospitalization cost; the product of SAF and total morbidity cost is smoking attributable morbidity cost. The results showed that the SAFs among men ranges from 22.8% for cardiovascular diseases to 43.2% for neoplasms. The SAFs among women are up to 22.6% for tuberculosis and 12.6% for neoplasms.

Neubauer et al, (2006) used Smoking Attributable Fraction (SAF) to assess the negative health consequences and associated cost of cigarette smoking in Germany in 2003 and to compare them with the respective results from 1993. The study derived SAF in three levels of cigarette smoking status: current, former and never. The Smoking-attributable years of potential life lost (YPFF) were calculated by multiplying the smoking-attributable deaths by age and sex with the respective group-specific life expectancy. The smoking-attributable costs of acute hospital care and ambulatory visits were estimated by calculating the proportion of smoking-attributable
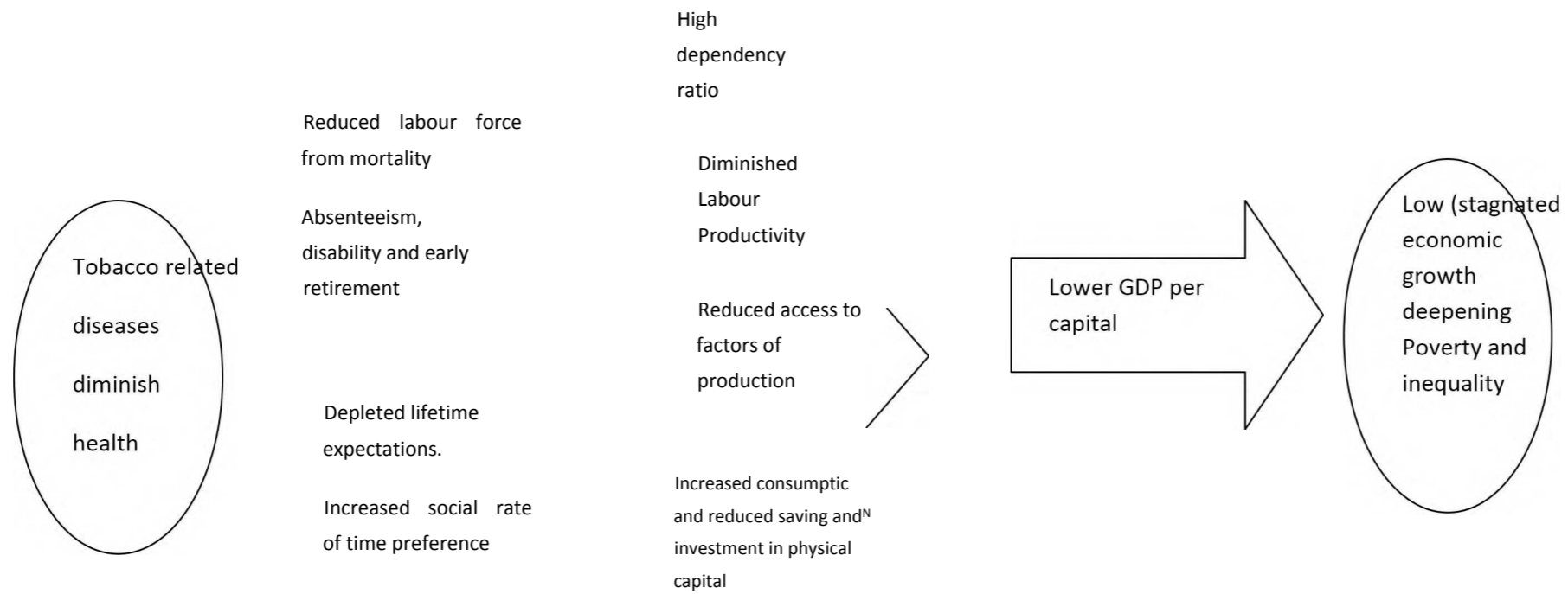
hospital days to the total sum of hospital days. Smoking-attributable hospital days were derived by applying the SAFs to the hospital days for Germany in 2003 according to age, sex and disease

More so, Gender-specific and age-specific smoking-attributable fractions (SAFs) of hypertension were obtained by multiplying the gender-specific and age specific smoking prevalence by the relative risk of hypertension. The smoking-attributable costs of early retirement were determined by multiplying the smoking-attributable cases of early retirement, according to age and sex, with the respective present value of the future net products per employed person, by age and sex.

3.3 Analytical Framework

The various channels through which cost of tobacco-related disease may impact on the economy are well-discussed in the growing literature on health and economic growth. Figure 3.1 show the linkage between tobacco-related diseases and productivity. Tobacco-related diseases diminish health which causes absenteeism, early retirement and reduce labour force from mortality. This process leads to high dependency ratio and diminish labour productivity that lower GDP and deepening poverty (Abegunde, 2006). The costs and the tobacco-related diseases show a positive relationship (De Beyer et al., 2003). That is, when tobacco-related diseases increase, economic cost and productivity loss increase. Hence, economic implication of increase in cost of tobacco-related diseases is the depletion of available manpower for economic development that results to economic losses. The interlink in contrast is that, good health improves levels of human capital which may in turn, positively affect individual productivity and ultimately affect economic growth rates. Workforce productivity is increased by reducing incapacity, disability and workdays lost. Finally, good health increases individuals' economic opportunities and levels of education (schooling and training of manpower).

Fig 3.1 LINKAGES BETWEEN TOBACCO RELATED DISEASES AND PRODUCTIVITY[1]

High
dependency
ratio

Reduced labour force
from mortality

Diminished
Labour
Productivity

Tobacco related

diseases

diminish

health

Absenteeism,
disability and early
retirement

Reduced access to
factors of
production

Lower GDP per
capital

Low (stagnated
economic
growth
deepening
Poverty and
inequality

Depleted lifetime
expectations.

Increased social rate
of time preference

Increased consumptic
and reduced saving and[N]
investment in physical
capital

May ultimately discourage foreign direct investment in country

Source: Abegunde (2006)

4.1. Methodology

This study specifically employed prevalence-based method from cost of illness (COI) approach. This approach measures the value of resources used (direct cost) or lost (indirect costs) from tobacco-related diseases(Rice et al, 1986; John et al, 2009). This method of estimation is designed to measure the aggregate economic burden imposed on society attributable to tobacco-related diseases.The estimation of the total costs of tobacco-related diseases follows the approach of Sauerborn et al, (1996) which is calculated as follows:

1. Direct costs of tobacco-related diseases

$$X = T2=o(.Cd + Cc + He + Tc + Sc + Lc)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots1$$

2. Indirect cost of tobacco-related diseases

$$> X''_0((/Vli',)/»)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots2$$

3. Economic cost tobacco-related diseases

$$r:'=_{''}(* + o \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 3$$

Where:

X = direct money costs of treating tobacco-related diseases

(\j = costs of drugs

C_c = consultation cost

H_c = hospitalization cost

T_c = transportation cost

S_c = expenses on supplies

L_c = total sum of charges on laboratory test

Y indirect cost

T_s = time cost of the sick person (days forgone in producing)

w = income

n = number of illness episode

a = age coefficient

s = related to the sick individual

This study considered three components of the economic cost (direct, indirect and total cost) of tobacco-related diseases as specified in the three equations above. Equation (1) shows the sum of direct healthcare expenditures or financial cost for inpatient hospitalization or outpatient visits, drugs, transport, laboratory test, supplies and consultation cost. Equation 2 shows the sum of the product of income and time cost of the sick personper number of illness episode. Equation 3 shows the total sum of equation 1 & 2 that is, direct costs and indirect cost.

4.2. DATA:

4.2.1. Study design and Sampling:

The study is cross-sectional conducted over a period of two months. It uses multi-stage sample design. The first stage was the sampling of hospital and the second stage was the sampling of patients. Samples of patients at the hospitals were randomly selected for the study. A survey was drawn from a randomly selected sample of n = 320 patients in three hospitals (University College Teaching Hospital (Ibadan North LGA); Oluyoro Catholic Hospital andJerico Chest Care Clinic (Ibadan South LGA)} in Ibadan, Nigeria. Hence, the study used these hospitals as a case study.

4.2.2. Description of the Research Instrument:

The patient questionnaire was designed to obtain information on characteristics such as demographics, household monthly expenditure, assets, tobacco usage per member, occupation and the educational achievement of each patient. General information on lifestyle habits, health. The questionnaire was used to obtain information on health-seeking behavior and the cost of treatment for tobacco-related disease patient. Questions was asked to ascertain whether the respondent had been diagnosed within the previous six months with any of the five tobacco-related diseases- ischemic heart disease (IHD), stroke or transient ischemic attack (TIA), oral cancer, lung cancer, laryngeal carcinoma, chronic obstructive pulmonary disease (COPD), pulmonary tuberculosis and Bronchi's disease. The questionnaire was developed by the researcher, pre-tested and finalized on the basis of the opinions of experts.

The medical officers in the hospitals assisted with the administration of the questionnaires. They were assured of confidentiality and the fact that information obtained would be used for research

purposes only. They also assisted in ensuring that the questionnaire is properly filled and In collecting the completed questionnaires. A senior doctor double-checked the questionnaires and supervised the medical officers.

Ethical Consideration

Given the nature of the study, the sampling and data collection procedure ensured that there is confidentiality of the data collected. Oral consent was got from the respondents after the objectives and procedures of the study have been explained to them. Although there was no immediate gain in terms of incentives for the participants, they were made to understand that their participation in the study will contribute towards future policy making and assist in the design of programmes to help the country's health system on costing of the diseases. The respondents were also informed that they could decline to participate in the study.In addition to the above procedure, the study obtainedethical **clearance** from the University of Ibadan, Nigeria /University College Hospital Research Ethics Review Committee (Clearance Number = UI/EC/10/0191)

5.1. Results

Table 1 shows the characteristics of the respondents. The proportion of males was 82.75% while female was 17.25%. The results on marital status shows that the proportion of single was 16.90%, 70.09% were married, 9.15% were divorced and 3.87% were separated. Public servants were 33.45% of respondents. 35.45% of respondent purchase health insurance while 64.68% respondents did not buy health insurance. The results on type of tobacco consumed shown that large number of respondents consumed more of cigarette with 53.87% while marijuana, snuff and cigar accounted for 31.34%, 8.10% and 6.69% respectively.

Table 1:   **Characteristics of the respondents**

	Freq.	Percent
Gender		
Male	235.00	82.75
Female	49.00	17.25
Marital		
single	48.00	16.90
married	199.00	70.07
divorce	26.00	9.15
separated	11.00	3.87
Occupatn (self)		
unemployed	6.00	2.11
employed (govt)	95.00	33.45
employed (private)	61.00	21.48
self employed	98.00	34.51
housewife	4.00	1.41
student	20.00	7.04
Purchase health insurance		
yes	102.00	35.92
no	182.00	64.08
Type of tobacco consumption		
cigarette	153.00	53.87
cigar	19.00	6.69
snuff	23.00	8.10
marijuana	89.00	31.34
Currently smoking		
yes	90.00	31.69
no	194.00	68.31
Educational attainment		
none	10.00	3.52
primary	58.00	20.42
secondary	87.00	30.63
post secondary	129.00	45.42
perception of personal health status		
good	3.00	1.06
fair	257.00	90.49
bad	24.00	8.45
Other smokers in the residence		
yes	119.00	41.90
no	165.00	58.10
Illness classified as terminal		
yes	58.00	20.42
no	226.00	79.58

The proportion of respondents who were not currently smoking was 68.31% while the proportion of respondents who currently smoke was 31.69%. The results on educational attainments showed that respondents withpost-secondary education had the highest visit to the three hospitals. This proportion was45.42% while 3.3% of respondents without education got the lowest case of hospital visit in the three hospitals. This result implies that Medicare and healthcare facilities were more crucial to the elite than the illiterate. The result on health status showed that across the three hospitals, 90.46% respondents got a fair health status while8.45% got bad health status and 1.06% got good health status. On terminality of diseases among respondents in the three hospitals, a proportion of 79.56% showed that there tobacco-related diseases were not terminal (tuberculosis)while 20.42% were tenninal. This means that 20 percent of the respondents are suffering from lung cancer and stroke which are tenninal diseases.

The Economic Costs of Tobacco Use

Table 2, shows the components of outpatient cost on four tobacco-related diseases in three hospitals in Oyo State, Nigeria. The results are analyzed by diseases and separately for outpatient costs. The average total outpatient visit cost of treating stroke or Transient Ischemic Attack (TIA) was N22,364.00 while lung cancer, Chronic Obstmctive Pulmonary Diseases (COPD), tuberculosis were N17, 265.98, N10,820,00 and 147,505.80 respectively. The stroke of Transient Ischemic Attack (TIA) disease bore the highest cost of consultation, dmgs and laboratory test which amounted to N816.00; N12,474.00 and N4,240.00 respectively. The outpatient visit costs of drugs of stroke or Transient Ischemic Attack (TIA) diseases were more than six times from tuberculosis which had the lowest costs amount to 141,266.81.

Table 2: Components of Outpatient Costs (naira)

	Consultation	Transport	Drugs	Laboratory tests	Others	TOTAL
stroke or Transient ischemic attack (TIA	816.00	1,608.00	12,472.00	4,240.00	3,228.00	22,364.00
lung cancer	785.66	1,271.31	7,927.05	3,581.15	3,700.82	17,265.98
chronic obstructive pulmonary diseases (COPD)	720.00	900.00	5,200.00	2,300.00	1,700.00	10,820.00
tuberculosis						

745.38   861.68   1,266.81   2,286.55   2,345.38 7,505.80

Table 3 shows the components of hospitalization costs. In the table, types of tobacco diseases were analyzed by hospitalization costs of bed, feeding and others. The average cost of hospitalization for ischemic heart disease was 14126,484.60, stroke or Transient Ischemic Attack (TIA) was 14164,472.00, lung cancer was 14156,501.60, Chronic Obstructive Pulmonary Diseases (COPD) was 1497,440.00 and tuberculosis was 1442,829.41. Stroke or Transient Ischemic Attack (TIA) bore the highest hospitalization cost of bed and feeding which amounted to 1440,320.00 and 1433,768.00 respectively. Tuberculosis diseases bore the lowest hospitalization cost of bed and feeding which accounted for 1413,888.24 and 148,558.82. The reason for the low level of hospitalization of tuberculosis disease is that tuberculosis disease is infectious. Therefore, patients with tuberculosis were not allowed for admission into most hospitals where this study was conducted.

Table 3: Components of Hospitalization Costs

	Bed	**Feeding**	**Others**	**mean costs of hospitalisation**
ischemic heart disease (IHD)	31,500.00	30,369.23	64,615.38	126,484.60
stroke or Transient ischemic attack (TIA	40,320.00	33,768.00	90,384.00	164,472.00
lung cancer	38,454.10	31,964.75	86,082.79	156,501.60
chronic obstructive pulmonary diseases (COPD)	25,200.00	13,440.00	58,800.00	97,440.00
tuberculosis	13,888.24	8,558.82	20,382.35	42,829.41

Table 4 shows cost of tobacco related diseases by smoking characteristics. The results were analyzed by type of tobacco use for types of tobacco related diseases and separated for average cost of hospitalization, average cost of outpatient visit, indirect costs and total cost. Stroke or

Transient Ischemic Attack (TIA) bore the highest average cost of hospitalization, average cost of outpatient visit, indirect cost and average total cost for smokeless and smoked tobacco use where smokeless tobacco use wasM215,250.00, 1426,475.00, Ml 13,666.00 and 14355,391.70 while smoked tobacco use was 14160.056.00,1422,006.52, 80,14185.51 and 14262,248.60 respectively.

Table 4: Cost of Tobacco Related Diseases by Smoking Characteristics (naira)

	mean costs of hospitalisation	Mean Outpatient cost	Mean indirect costs	Mean Total costs
Ischemic heart disease (IHD)				
smokeless tobacco				
	162,750.00	16,810.00	26,750.00	206,310.00
smoked tobacco				
	119,890.90	18,059.09	31,824.24	169,774.30
Stroke or Transient Ischemic attack				
smokeless tobacco				
	215,250.00	26,475.00	113,666.70	355,391.70
smoked tobacco				
	160,056.50	22,006.52	80,185.51	262,248.60
Lung cancer				
smokeless tobacco				
	135,520.00	15,053.33	28,151.11	178,724.40
smoked tobacco				
	159,443.00	17,576.17	58,829.28	235,848.40
COPD				
smokeless tobacco				
	96,600.00	8,200.00	33,400.00	138,200.00
smoked tobacco	98,000.00	12,566.67	22,666.67	133,233.30
Tuberculosis				
smokeless tobacco				
	47,250.00	5,175.00	24,000.00	76,425.00
smoked tobacco				
	42,753.85	7,545.64	15,288.32	65,587.80

The cost bore by Ischemic Heart Diseases (IHD) was a little higher than lung cancer where average cost of hospitalization, outpatient visit, indirect and average total cost for smokeless tobacco use was!4162,750.00,1416,810.00,1426,750.00 and 14206,310.00 while that for smoked tobacco use was!4199,890.90, 1418,059.09, M31,824.24 and M169,774.30 respectively.

Tuberculosis disease has the lowest average economic cost of treating tobacco related diseases. The average cost of treating tuberculosis for the smokeless tobacco use was greater than that for smoked tobacco uses except for the average indirect cost for the smoked tobacco use which wasN7,545.64 was greater than the smokeless tobacco use which was$45,175.00

Table 5 shows the cost of tobacco-related diseases by gender. The results were analyzed by type of tobacco use by gender separately for average costs of hospitalization, outpatient visit cost, indirect cost and average total cost. The respective average cost of hospitalization, outpatient cost, indirect cost, and average total cost for males were $4106,126.00, $413,533.02, $441,827.09 and $4161,486.10 while these for females were $4112,114.30, $413,568.37, $427,231.29 and $4152,913.90 respectively. The female average cost of hospitalization and outpatient cost for the smoked tobacco use were $4107,887.50 and $413,442.50 while for the corresponding male smoked tobacco use were $4104,258.80 and $413,431.18.

Table 5:   **Cost of Tobacco Related Diseases by Gender (naira)**

	mean costs of hospitalisation	Mean Outpatient cost	Mean indirect costs	Mean Total costs
Male respondents smokeless				
	135,600.00	15,140.71	38,826.19	189,566.90
smoked				
	104,258.80	13,431.18	42,017.20	159,707.20
Female smokeless				
	130,900.00	14,127.78	30,481.48	175,509.30
smoked				
	107,887.50	13,442.50	26,500.00	147,830.00
All male				
	106,126.00	13,533.02	41,827.09	161,486.10
All female				
	112,114.30	13,568.37	27,231.29	152,913.90

Table 6 shows the average costs of tobacco-related disease per person. The result showed the analysis of average cost of tobacco-related diseases per person by type of tobacco use. The average total cost for smokeless tobacco per person was$4184,066.10 while that for smoked tobacco use per person was$4157,886.90 where the average economic cost for tobacco use

wasN160,007.10. The average cost of tobacco related diseases per person was higher for all smokeless except the average indirect cost for smoked tobacco use which wasN39,639.08.
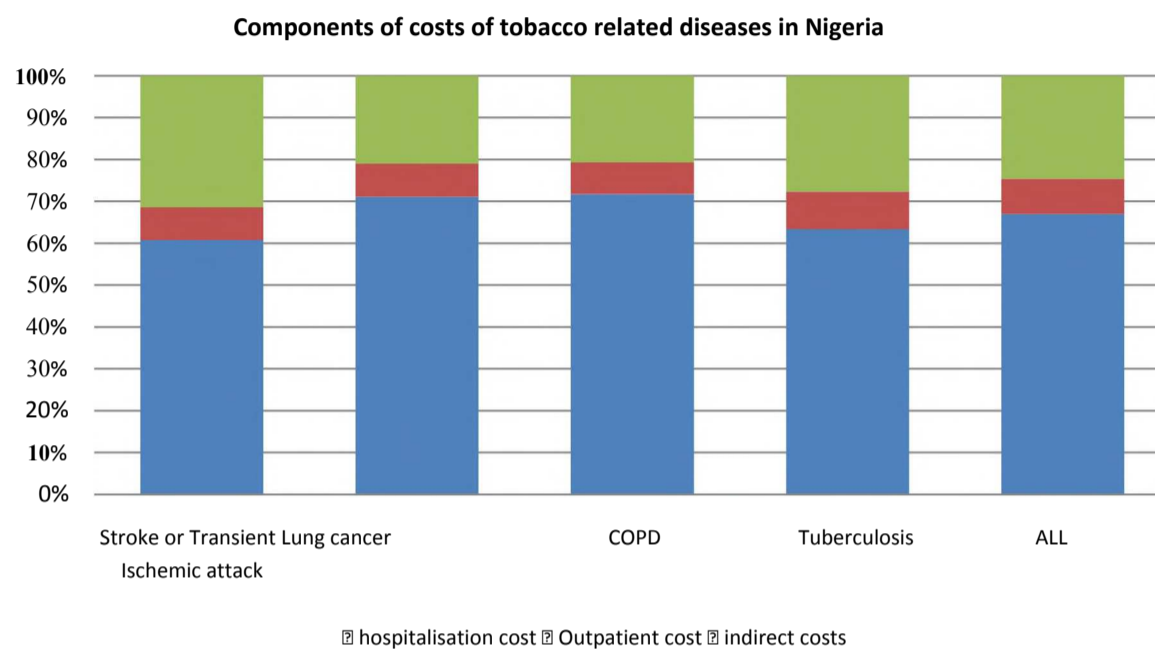
Components of costs of tobacco related diseases in Nigeria

hospitalisation cost ▯ Outpatient cost ▯ indirect costs

Table 6: Average per person cost of Tobacco related Diseases (naira)

		mean costs of hospitalisation	Mean Outpatient cost	Mean indirect costs	Mean Total costs
All smokeless respondents		133,760.90	14,744.35	35,560.87	184,066.10
All respondents	**smoke**	104,814.90	13,432.91	39,639.08	157,886.90
Mean respondents)	**(all**	107,159.20	13,539.12	39,308.80	160,007.10

Discussion of the Results

This paper presents estimates of the economic cost of tobacco related diseases in Nigeria using. The total economic cost of tobacco related diseases by type of tobacco use were Ml,821743.5 million. The percentage share of total hospitalization cost was for 67.9% from the total economic

cost while the total outpatient visit cost and indirect costs accounted for 8.2% and 23.9% respectively.

The economic cost of tobacco use in Nigeria among gender is important. The average total economic cost of male which includes (average hospitalization cost, average outpatient visit cost and indirect cost) for type of tobacco use (smokeless and smoked) wasN349,274.1 while that for female wasN323,339.26. Not only that, the percentage share of average total economic costs of tobacco-related diseases borne by male was 52% while the corresponding female was 47.9%. The implication of this result was that males bore higher cost of treating tobacco-related diseases than females. Therefore, the burdenof tobacco-related diseases was higher on male than female.

Smokeless tobacco in this study was attributable to "Snuff" as type of tobacco that is not smoked. This is because it is chewed or dousedthroughthe nose. In table 4, Stroke or Transient Ischemic Attack (TIA) and Ischemic Heart Disease (IHD) for smokeless had higher cost of treatment for tobacco-related illness. The total economic costs borne by smokeless tobacco use per person wasN184,066.10 while that for smoked tobacco use wasN157886.90. These results showed that the total economic cost of tobacco-related diseases per person was higher for smokeless tobacco uses than the smoked tobacco uses in this connection, stroke or Transient Ischemic Attack (TIA) and Ischemic Heart Disease (IHD) had the higher share of the cost.

Treating of tobacco-related diseases in Nigeria is costly. More than 76% of the health care cost in this study was for hospitalization and outpatient visit expenditures. Given that consumption in Nigeria is more prevalent among the poor (Aina, 2009), it is likely that much of the tobacco-related diseases and associated economic cost would be higher among them. However, hospitalization and cost of outpatient visit for tobacco related diseases force poor people into debt traps and can result in severe impoverishment.

Therefore, there are tendencies that the individual seeking healthcare may borrow and sell his/her properties during hospitalization or outpatient visit to cover their costs of illnesses. The implication of this is that household seeking healthcare may shift expenditures on food, education and other household needs. Hence, high economic cost with higher healthcare burden of treating tobacco-related diseases can push the sufferers and his/her household into a vicious circle of poverty.

In the same vein, considering the indirect cost, the percentage shares of cost of indirect cost of tobacco-related diseases for males was 60%. The loss of production has adverse effects and consequent toll on household income and the economy since the indirect costs were higher for male who take active parts in production. One of the limitations to this study was that our estimates were probably low. This is because of the sample sizes the study adopted and the numbers of hospitals visited were limited. However, the estimates presented here are still important because it provides insights into the characteristics of tobacco-related diseases in Nigeria.

Conclusion and Policy Implications

This study has shown the characteristics of economic costs associated with tobacco-related diseases. The study showed that the economic burden of tobacco related diseases was higher among the poor and the prevalence of male showed that males' have higher economic costs than the females. Stroke or Transient Ischemic Attack (TIA) had the highest average cost of hospitalization, average cost of outpatient visit, indirect cost and average total cost for smokeless and smoked tobacco use while the cost of Ischemic Heart Diseases (IHD) was a little higher than lung cancer. Tuberculosis diseases bore the lowest hospitalization cost of bed and feeding. These findings should give a strong boost to the Nigerian Heart Foundation (NHF), Nigerian Tobacco Control Alliance (NTCA) and government to promote tobacco control. Nongovernmental organizations should collaborate with government on making policies on health insurance that will reduce the social cost and the burden of the costs on personal income of patients.

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