KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI

COLLEGE OF ART AND SOCIAL SCIENCES

DEPARTMENT OF ECONOMICS

ESTIMATING THE ECONOMIC COST OF HIV/AIDS IN RURAL GHANA

(A CASE STUDY- KASSENA NANKANA EAST DISTRICT OF UPPER EAST REGION)

A THESIS SUBMITTED TO THE DEPARTMENT OF ECONOMICS, FACULTY OF SOCIAL SCIENCES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF A MASTER OF ARTS DEGREE IN ECONOMICS

BY

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DECLARATION

I hereby declare that, under supervision I have personally undertaken the study herein submitted. All references made in the study are duly acknowledged and all aspects of this study have been discussed with and approved by my supervisor, Dr. (Sis) Eugenia Amporfu.

Signature…… Date……..

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(STUDENT)

I declare that I have supervised the student in undertaking the study submitted herein.

The student has been consistent in interaction with me for guidance and direction.

Signature……. Date…….

Dr. (Sis) Eugenia Amporfu.

(SUPERVISOR)

DEDICATION

This work is dedicated to my family, my wife – Mavis Armar Quarye and my unborn child.

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Abbreviations

AIDS Acquired Immune Deficiency Syndrome

ARV Antiretroviral drugs

CBO Community Based Organisation

CEC Communication and Extension Centre

CIP Chronically Ill Person

CSO Civil Society Organisation

DFID Department for International Development

FAO Food and Agriculture Organization of the United Nations

HBC Home Based Care

HEAP HIV/AIDS Emergency Action Plan

HIV Human Immunodeficiency Virus

GIC Ghana Aids Commission

LACA Local Action Committee on AIDS

LGA Local Government Area

MAP Multisectoral AIDS Programme

PMTCT Prevention From Mother To Child Transmission

NACA National Action Committee on AIDS

NGO Non-Governmental Organisation

PLWHA People Living With HIV /AIDS

PRA Participatory Rapid Appraisal

SACA State Action Committee on AIDS

SPSS Statistical Packages for Social Sciences

STD Sexually Transmitted Diseases

STI Sexually Transmitted Infections

USAID United States AID

WID Women in Development

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Abstract

This project aims to investigate and estimate the economic cost (direct, indirect and intangible costs) of the HIV/AIDS pandemic on rural livelihoods in Navrogo district of the Upper East Region of Ghana.

To estimate the cost, a household survey was conducted in Navirongo district in the upper east region of Ghana. A multi-stage sampling was used. The first stage was the choosing of the districts. The District was chosen because it encompasses one of the poorest districts in Ghana. This was done so that results reflected the economic cost of the HIV/AIDS on the livelihood of poor community in Ghana.

The second part of the questionnaire looked into the cost incurred by the household as a result of a member of the household infected and sick of HIV infection. The respondents were people who have visited the hospital within the past one year. A total of 200 households were covered by the survey. To achieve a broader coverage, only one respondent was interviewed in a household.
The researcher also estimated how each cost varies with patients characteristics. The current findings provide important information regarding the relationship between cost components (directs, indirect and intangible cost) and patients characteristics. Although some of the estimated coefficients of explanatory variables were not significant at 5% level, the entire regressions were significant.
It was evident from the findings that the highest infected age group was 21-40 years. This is due to increasing early sexual activity, and it is even believed that HIV/AIDS prevalence in this youthful age group was more than the proportion recorded.
The direct treatment cost of HIV is extremely high and this is leading many household into extreme poverty. This conclusion became evident as it was found from the study that household spent half (50.04%) of their income on treating HIV and its associated sickness.
These results suggest that there is a strong relationship between direct cost of treatment and incomes of patients. The result also indicated a strong relationship between indirect cost and income of patient. Age, income and higher education influence intangible cost (in terms of suffering, social exclusion, stigmatisation and all other forms of embarrassment associated with HIV/AIDS of HIV patients).
Recommendations made focused on cost reduction and distribution. These include suggestions that HIV/AIDS treatment centers be opened in rural communities in Ghana and treatments should be free of charge. This will reduced high direct cost of treatment associated with HIV. Intangible can be reduced if policymakers are to address HIV-related stigma by reviewing discriminatory laws and helping monitor their enforcement when they arise.

CHAPTER ONE

INTRODUCTION

1.1 Background

The HIV/AIDS epidemic has become a serious health and development problem in many countries around the world. The Joint United Nations Programme on AIDS (UNAIDS) estimates the number of HIV infections worldwide at about 36.1 million by the end of 2000 of which 25.3 million were found in sub-Saharan Africa. Another 21.8 million persons have already died from the disease since the beginning of the epidemic, mostly in Africa. And about 600,000 infants now become infected each year, about 70 percent of whom are Sub-Sahara African children.
The virus that causes AIDS has already infected and is infecting many Ghanaians.

About three percent of the entire adult population of Ghana is HIV infected. Most of these people do not even know they carry the virus. In 2000, about 330,000 adults and 20,000 children were already infected. Between the beginning of the epidemic in the mid-1980s and the end of 2000, more than 876,000 persons may have already developed AIDS, although not all of these have been officially recorded. No cure is available for AIDS, and the disease is becoming one of the most serious development issues in the country.

From 2001, the government of Ghana has committed US $50 million over a five year period to expanded national response, control and prevention The Government also secured a loan of US$1.5 million from World Bank's Multi-country HIV/AIDS Prevention and Control Adaptable Program Lending (APL) for the country.

Fifteen years after HIV/AIDS surfaced in Ghana in 1986, the Government created the Ghana AIDS Commission to coordinate the various, usually ineffective, public sector efforts to create

awareness about the menace. Now there is some focus. Awareness is increasing, but the rapid rise in HIV/AIDS incidence appears to be continuing[1].

Considering the fact that HIV has already affected sizeable populations, the disease has important implications for development. At the most basic level it will increase morbidity (illness) and mortality (death), particularly among young adult populations; decrease life expectancy, and increase infant and child mortality rates. The full cost is not clear, as nowhere has the epidemic run its course.

HIV/AIDS is of concern in the rural development sector. Evidence shows that in many countries including Ghana, though there is currently a lower rate of HIV infection in rural areas, the disease has a serious implication on the rural livelihood. For example in Ghana in 2007, HIV infection rate in urban and rural are 4.9 and 1.3 percent respectively. More specifically the infection rate in the Navirongo district area where the study was carried out is 1.3 percent.

The key determinant of the differential levels of infection is the amount of movement and interchange between urban and rural areas. Ironically, successful rural development will facilitate this process. It is possible that, even in rural areas with current low levels of HIV infection, these may climb, and in time approach those of the urban areas. Even if there is a differential between rural and urban areas, the rural sector will not be immune to the cost of the epidemic. There have been differing opinions over how the epidemic is costing the economic future of the rural areas and Ghana as a whole. According to National AIDS/STD Control Programme under the ministry of health mixed messages on the true economic cost of the disease have contributed to a limited response, despite the inclusion of combating HIV/AIDS in the Millennium Development Goals (MDGs).

One of the least studied but most significant areas of the epidemics is its economic cost on rural livelihood in Ghana. Rural livelihood is a critical factor in understanding the economic cost of HIV in the overall functioning of the rural household and its ability to provide for the basic needs of its members. Ellis as quoted by Niehof (2004:322) defines cost of livelihood as comprises of assets (natural, physical, financial and social capital), the activities, and the access to these

[1] Credit: Professor Sakyi Awuku Amoa, Director-General, Ghana AIDS Commission

(mediated by institutions and social relations) that together determine the living gained by the household. The concept of livelihood is therefore multifaceted in that it considers the activities that the household engages in and the outcomes thereof.

It also reveals the interconnectedness and/or the interplay between the household activities in rural community that determine the outcome or living of the household. Rural agriculture is a source of livelihood for millions Ghanaian and is now again being perceived as a crucial contributor to economic growth and development by such organizations as the New Partnership for Africa's Development (NEPAD). However this only source of rural livelihood is affected by HIV/AIDS pandemic. In order to fully appreciate the enormity of the crisis unleashed by the HIV/AIDS epidemic in rural Ghana, it is necessary not only to understand the epidemiology of the disease but also to understand its cost on economic on rural development in Ghana.

The HIV/AIDS epidemic has negatively affected rural household thereby jeopardizing the prospect of rural economy in economically, emotionally, financially and socially. In addition to appreciate the expenses that infected individuals accrue, each affected family must bear the psychic costs associated with the death and illness of a family member, the breakdown in family structure, and the stigma associated with HIV. The HIV/AIDS epidemic and it's associated morbidity and mortality rates carry a number of implications, such as reduced non-health consumption expenditures among household members.

Another implication may be reduced levels of consumption for children in affected households when they grow up to be adults, if HIV/ AIDS leads to lower levels of health and education achievements among them. These effects arise because of the costs of caring for family members with HIV, funeral expenses, and the premature mortality among younger adult members, which potentially constitutes the loss of an earning member of a household, coupled with a lack of adequate mechanisms to cope with these financial shocks.

More recent research has however begun to establish that countries with healthy populations tend to grow faster (particularly in a good policy environment) and that this apparent correlation between health and wealth operates through a number of channels including the effects of improved health on demography, education, the labor market, and investment (UNAIDS. *Report*

on the Global HIV/AIDS Epidemic, June 2000). HIV/AIDS affect the health status of the individual in the family and reduces the length of education, labour productivity, investment, etc and thus making sustainable livelihood difficult and challenging in the rural Ghana.

The cost of HIV/AIDS on rural development in Ghana is attributable to its ability to undermine four main determinants of economic growth, namely physical, human, natural and social capital upon which rural people livelihood depend. (Bonnel 2000). Current estimates suggest that HIV/AIDS has reduced the rate of growth of Ghana's per capita income by 0.4 percentage points a year (Bonnel 2000:1). Clearly then, not only is HIV/AIDS having a detrimental effect on the growth of Ghanaian economy, it is also reversing the modest gains made in recent times (Over 2002).

This thesis estimates the economic cost (direct, indirect and intangible) of HIV/AIDS in rural Ghana – case study Navrongo district. Navrongo district has a quite young population, with about 41% below 15 years. The broad age distribution is as follows: 0-4 years - 13.1%, 5-9 years - 28.0%, 15-64 – 54.2% and 65+ - 4.7%, implying an age dependency ratio of 84%. Females constitute 53% of the population, giving a sex ratio of 89 males per 100 females. Educational attainment in the district is quite low. In general, about two-thirds (65.5%) of the population aged 15 years and above have received no formal education and only 8.2% have attained senior secondary or higher levels of education. The distribution by sex indicates that more females (74.6%) tend to be uneducated than males (54.4%). Overall, about 55% of all the population aged 6 years and over have never been to school. The family size in the Navrongo District has an average of 10 members. Males dominate headship of these compounds, with females heading only 10.2%. Expectation of life at birth in the district is 52.6 years (ISSER 2008).

The main reason for conducting the research in one of the rural areas in Ghana is that these rural areas serve as the production point of our numerous agricultural produce needed to feed about 23.4million people in Ghana, raw materials for our industries and surpluses to export for foreign exchange. It is estimated that the agricultural sector contributes to more than 45% of the country's GDP, and so anything that reduces the productivity of this sector has a serious economic cost on Ghana's economy. Currently no study has estimated an elaborated economic cost of the pandemic in Ghana. The different structural studies done on the impact of HIV/AIDS

show that the pandemic has wide ranging costs that the traditional cost-of-illness approach was not designed to estimate. If we are to get a more comprehensive costing structure, we should include all the economic cost born by the household on HIV/IDS.

Economic cost of the disease is made up of direct, indirect and intangible cost- the direct and indirect costs of illness to households, households managing or coping with illness costs, the impact of illness costs and coping strategies on household assets, income flows, the psychological cost and processes of impoverishment.

1.2 Problem statement

Realising the extent of economic costs of the pandemic on rural livelihood in Ghana, the questions needed to be investigated and answered are:

- What are the economic costs (direct, indirect and intangible cost) of the disease particularly in rural Ghana?
- What are the components of these economic costs?
- How do these costs components vary with patients' characteristics in rural settings?
- How do Households response to these illness costs (borrowing and asset strategies etc)
- How much cost is incurred by the community as a result of a member being sick to HIV?
- How does resource limited rural health care characteristics impact on various costs components?

Investigating these questions have become imperative because AIDS disease has a profound implications for rural resource allocation, production, consumption, savings, investment, and the general well being of Household members in Ghana, (Ainsworth and Over, 1994a). Knowledge on costs components is relevant and necessary to design cost-reduction interventions not only to reduce these costs but also distributed cost components according to patients' characteristics depending on their income, gender and education in resource limited rural health care setting. This is because a work done by UNDP in 2007 only estimated the treatment costs alone of

HIV/AIDS in urban Ghana specifically Koforidua, in the Eastern region of Ghana where the prevalence rate is the highest in the country.

1.3 Objective

General objective

This project aim is to estimate economic cost of HIV/AIDS in six communities in the Navrongo district.

Specific objectives are to:

- Estimate the various cost components of direct cost.
- Estimate the various cost components of indirect cost.
- Estimate the various cost components of intangible cost.
- Find how selected costs vary according to patients characteristics.

1.4. Hypothesis

1) H_0 = Direct treatment cost borne by patients does not vary with patient age, gender income and education.

   H_1 = Direct treatment cost borne by patients does vary with patient age, gender, income and education.

2) H_0 = Indirect cost (in terms of time lost by household) does not vary with patient age, gender, income and education.

   H_1 = Indirect cost (in terms of time lost by household) does vary with patient age, gender, income and education.

3) H_0 = Stigmatisation cost borne by patients does not vary with patient age, gender income and education.

   H_1 = Stigmatisation cost borne by patients does vary with patient age, gender, income and education.

1.5 Justification

Currently, there are no specific operational policy directions and recommendations that Ghana can adapt to reduce and distribute cost of HIV illness across households' base on their income, gender and education. This is particularly important, as the topic is of relevance for policy makers and stakeholders since as part of condition under Millennium Development Goals Ghana aim to reduce the spread of HIV/AIDS and its associated costs on livelihood to its lowest minimum. The research aims to document and provide up-to-date an evidence-based recommendations to policymakers on effective strategies that can be employed not only to reduce various costs components but also to distribute these cost components in order to reduce burden depending on patients income, gender and education in a sustainable manner. This work provides an overview of these costs, and potential recommendations to reduce their burden on livelihood of HIV patients in rural Ghana.

Moreover, development of appropriate strategies first requires an understanding of these costs components which make up the economic costs of HIV on household livelihood in rural areas. This work therefore adds to our knowledge on the economic costs of HIV pandemic on rural livelihood in six communities in Navrongo district of Upper East Region of Ghana. This study is relevant since it brings out how HIV is imposing cost on livelihood of rural household and various interventions that can be employed to mitigate the burden of the disease in rural Ghana.

1.6 Data and methods

Conceptual framework

The economic costs of HIV on the rural livelihood consist of direct, indirect and intangible cost.

C = D + ID + G

Where;

C = Economic Cost

D = Direct Cost

ID = Indirect Cost

G = Intangible Cost

Direct Cost

- Household and Hospital expenditure linked with treatment.
- Non-medical expenses such as transport and the cost of special food borne by patients.

Indirect Cost

- The cost of income of patient (who is frequently the main breadwinner)
- The loss of income due to time spent by caregiver (i.e. other members of the household, usually daughters may miss school or and wives may work less in order to care for the sick person).
- Cost borne by community in providing services to HIV patients.

Intangible Cost

- The cost of suffering, grief or social exclusion arising from HIV/AIDS illness. Patient were asked to estimate in terms of monetary value, how much the patient is prepared to accept in order to endure the pain, social exclusion and stigmatisation.

1.6 Organization of study

The study is divided into five chapters. Chapter one deals with the introduction, the statement of the problems, justification of the study, objectives, methodology, the purpose of research, list of references, hypothesis as well as organization of the study

Chapter two provides an overview of existing literature. This chapter provided a review of already existing literature on this topic.

Chapter three gives the profile of the selected district to be studied. It also describes the data that form the basis for the research reported in this paper and provides an overview of the methods or the methodology used in the study. Again it will deal with the theoretical framework and the empirical model that underpin the analysis of the data.

Chapter four reports the results of the empirical analysis. That is, deals with the presentation, analysis and discussion of the data collected from the field.

Chapter five which is the last chapter look at the conclusion, recommendation and policy implications of the research.

CHAPTER TWO

THEORETICAL AND EMPIRICAL LITERATURE REVIEW

2.1 Introduction

This chapter reviews the theoretical and empirical literature on cost of HIV/AIDS on rural livelihood.

The economic cost of the HIV/ AIDS epidemic has attracted much attention in recent years. The available literature on Ghana and Sub – Saharan Africa highlights several forms in which HIVAIDS cost rural households livelihood adversity. It is costing rural livelihood through direct medical expenditure. Second cost of HIV AIDS is reduction in non- health consumption among household members (Bechu 1998; Booysen et al. 2002); another reduction in nutrition and educational attainment for children in affected households (Booysen et al. 2002; Donovan et al. 2003 Nanpanya – Serpell 2000). A third cost is the reallocation of household efforts away from income earning activity to care- giving roles. The cost arise because of the necessity of incurring large expenditures on treating members and care-giving responsibilities with HIV, and because premature mortality and morbidity among younger adult members potentially constitutes the loss of an earning member of a household, further coupled with a lack of adequate mechanisms to cope with these financial shocks (Barnett and Blaikie 1992; Yamano and Jayne 2004). In addition, there may be psychic costs associated with the death and illness of family members, breakup of families, or stigma associated with HIV.

2.2. Theoretical evidence of cost of HIV/AIDS illness for households; direct, indirect and intangible cost.

This segment reviews the fundamental concept underlying cost analysis. It highlights that there are several choices regarding the type of cost analysis that will be undertaken.

2.2.1 What are costs?

Economists define cost as opportunity cost. That is the value of resources which could otherwise be used to produce the next best alternative goods and services. However, the way these

resources are measured can differ. There are two main alternatives with respect to measurement of these resources: financial and economic costing.

Financial costs represent actual expenditure on goods and services purchased. Costs are thus described in terms of how much money has been paid for the resources used in the project or service. In order to ascertain the financial costs of a project we need to know the price and quantity of all the resources used, or alternatively the level of expenditure on theses goods and services.

Economist conceptualizes costs in a broader way. They define costs in terms of the alternative uses that have been forgone by using a resource in a particular way. These economic or opportunity costs recognize the cost of using resources, is that these resources are then unavailable for productive use elsewhere.

The basic idea is that things have a value that might not fully capture in their price. It is not difficult in many health programmes to identify resources inputs for which little or no money is paid. Thus the value to society of these resources, regardless of who pays for them, is measured by opportunity cost.

Economics cost then includes the estimated value of goods or services for which there were no financial transactions or when the price of the good did not reflect the cost of using it productively elsewhere. The main ways that financial and economic costs differ is in the way they treat:

- Donated goods and services
- Other inputs whose prices are incorrect or distorted
- Valuation of capital items

2.2.2 Direct Costs

Total direct costs and cost burdens

Direct cost refers to household expenditure linked with seeking treatment, including non-medical expenses such as transport or special foods. Indirect costs refer to the loss of household productive labour time for patients and caregivers. The term cost burden refers to direct or indirect costs expressed as a percentage of household income. Some analysts assume that a cost

burden greater than 10% of family income is likely to be catastrophic for the rural household economy, meaning that it is likely to force rural household members to cut their consumption of other minimum needs, trigger productive asset sales or high levels of debt, and lead to impoverishment. However, this 10% figure (in Collins DL, Leibbrandt M survey) is somewhat arbitrary because it may not be catastrophic for high-income households that can cut back on luxuries or for resilient households that can mobilize assets to pay for payment.

In DCPP Working Paper 15, Steven Russell summarized the direct costs of illness of HIV/AIDS disease. Three problems of interpretation are worth nothing at this stage and echo the methodological difficulties outlined above. First, within each table comparison across studies should be made with caution because of the different methodology used across studies, for example some:

- Ignored non-medical costs such as transport;
- Only measured costs of health care for AIDS patients alone.

2.2.3 Indirect cost

The indirect costs in terms of lost productive labour time often impose a double cost burden on households at the time of illness: its capacity to earn income is reduced at a time when the household needs additional money.

The scope of indirect costs can include the time spent seeking treatment by the patient and caregiver, the morbidity time during which the patient or caregiver stops or reduces their productive activities, and some studies go further and measure the costs of mortality in terms of life time income foregone. The scope of indirect costs could be broadened further to include the economic implications of households coping strategies for the household economy (Chima et al ., 2003), for example serious illness such as TB or HIV/AIDS can trigger borrowing, asset sales or withdrawal of children from school, responses that have long term income earning implications. These diseases can also lead to social exclusion or marital breakdown which also generates economic consequences for different household members.

Steven Russell (in DCPP Working Paper 15) estimated that rural Burkina Faso indirect costs were by far the largest proportion (73%) of total costs, and time by healthy caregivers was almost equal to the time lost by the sick. Relatively low direct costs reflect poor service coverage and low incomes, rather than good services at low cost to users.

2.2.4 Intangible cost

Intense negative feelings and actions directed towards HIV-infected individuals have characterised the HIV epidemic since its inception. Anecdotal reports have documented the human cost of this stigma and discrimination: HIV-infected individuals have been fired from their jobs, have experienced mental and physical abuse, and have been ostracised from their families and communities (Herek & Glunt, 1988; Mann, Tarantola & Netter, 1992). HIV-related stigma and discrimination is also acknowledged as a serious obstacle to prevention, care, and support efforts (Valdisserri, 2002; UNAIDS, 2004a). Negative attitudes towards people living with HIV or AIDS (PLHA) adversely affect the care and treatment of HIV-infected individuals within households (Castro, Orozco, Aggleton, Eroza, Hernandez & Manca, 1998; Bharat & Aggieton, 1999) and in healthcare facilities (Mbwambo, Kilonzo, Kopoka & Nyblade, 2004). The fear of being stigmatised may discourage individuals from being tested or seeking treatment for HIV infection (Chesney & Smith, 1999), soliciting support from friends and family members, or adopting practices that reduce the risk of viral transmission. Existing stigma-reduction interventions have primarily used community-based approaches to reduce stigma through increased knowledge of the disease or through testimonials of HIV-infected individuals (Brown, Macintyre & Trujillo, 2003). Although knowledge of HIV/AIDS (see Kegeles, Coates, Christopher & Lazarus, 1989) and a personal relationship with an HIV-infected individual (see Gerbert, Sumser & Maguire, 1991; Herek & Capitano, 1997) have been positively correlated with attitudes towards PLHA, programmes based on these approaches have had only limited success in improving attitudes towards PLHA (Brown ef a/., 2003). While mass media channels offer the potential to influence attitudes towards PLHA on a large scale, few stigma-reduction interventions have either used these channels or evaluated their effectiveness. Critics contend that stigma-reduction efforts need to address the social norms that inform attitudes towards PLHA (Parker & Aggleton, 2003; Castro & Farmer, 2005). In many settings, social norms and values define behaviours popularly associated with HIV risk, and the people that engage in them, as deviant from established norms of acceptable behaviour. Once this link between HIV infection and deviant behaviour becomes established, HIV infection status itself often becomes a symbolic marker of deviancy (Pryor & Reeder, 1993) and the negative attitudes associated with socially deviant groups are directed at all HIVinfected individuals.

2.3 Coping, struggling and impoverishment

This section reviews evidence on the strategies that individuals and households mobilize to cope with HIV/AIDS illness costs. Coping strategies have become a frequently used term in the development literature, initially highlighted by work investigating household's responses to famine and then to structural adjustment programmes (see for example Davies, 1993; Decereux, 1993; Kanji & Jazdowska, 1993; Moser, 1998; Swift, 1989). Coping strategies can be defined as a set of actions that aim to manage the costs of an event (shock) or process that threatens the welfare of some or all of the household members. Ultimately coping strategies are seeking to sustain the economic viability and sustainability of the household (Sauerborn et al., 1996b).

Coping strategies are vitally important for poor households faced with HIV A/AIDS illness cost shocks, since the cost associated with this serious illness can absorb a large proportion of the household budget and therefore require the mobilization of substantial additional resources. Even minor illness costs can exceed the low and insecure daily or weekly budgets for the poor, who often survive on a daily wage that is barely enough to meet minimum food requirements (Russell ,2001). Ability to cope with the extra costs of minor illnesses, let alone more serious ones like HIV/AIDS disease, is therefore essential for the health and livelihoods of poor households.

The concept of coping is now being applied to economic costs of HIV /AIDS and the short-or long-term shocks it imposes on the household economy (Goudge & Govender, 200; McIntyre 7 Thiede, 2003, Russell, 1996; Sauerborn et al., 1996b). These studies have categorized and listed different types of strategy and rural household employ to cope with HIV/AIDS illness costs.

Strategies to cope with costs were further divided into:

- Strategies to cope with the direct costs of illness: often adopted in sequence by households to minimize the risks to livelihood sustainability (for reviews see Russell 1996), Goudge & Govender (2000) and most recently McIntyre 7 Thiede (2003): using savings; pawning jewellery; borrowing or making claims from social networks; selling food stores; reducing consumption of non-essentials and then more essential items; diversifying income sources; selling unproductive assets; reducing investments (e.g. withdrawing a child from school); selling productive assets such as livestock, land or machinery.

- Strategies to cope with the indirect costs of illness; the above strategies are also used to cope with indirect costs, but a particularly important strategy rural households employ to cope with the loss of a worker is intra-household labour substitution (Sauerborn et al., 1996b)

Studies that ignore coping strategies can lead to misleading conclusions about the economic costs of HIV /AIDS illness (Chima et al., 2003). On the one hand, ignoring the effects of borrowing, cuts to food consumption or asset sales may underestimate the total cost of HIV/AIDS to rural households. On the other hand, ignoring intra-household labour substitution that mitigates or neglects any production or wage losses can lead to overestimation of indirect illness costs. Again overlooking at the intangible cost of the disease will also underestimate the economic cost of the disease on rural Ghana.

These Cost components found from these studies enabled the research estimated the economic cost of HIV in rural Ghana.

2.4 Comparative difficulties with cost of hiv illness studies

Comparing the results of studies that have measured the economic costs of illness for individuals and households is fraught with difficulties because they use different definitions of cost, different methodologies to measure and quantify cost, and different units of analysis to analyze and present costs (Chima et al., 2003; McIntyre & Thiede, 2003; Worrall et al., 2002).

There is no definitive accounting system for costing illness. As Chima et al,.. (2003) emphasis in their review of HIV costs, the range of effects and burdens that ill-health imposes is difficult to define and measure so it is difficult to allocate costs to multiple dimensions of illness imposed by HIV/AIDS. For example malaria can cause less obvious health burdens such as impacts on growth and intellectual development, anemia and low birth weight (Chima et al., 2003). The standard approach, as noted above, is to conceptualize and measure two different cost components: direct and indirect. Less tangible costs of illness such as the suffering, grief or social exclusion arising from illness are rarely included in cost calculations.

Direct costs of illness particularly that of HIV can be difficult to compare across studies because they include different costs items. For example, all measure medical costs but some ignore non-

medical casts such as transport. Studies have also used different units of analysis, with some measuring individual cost and others household costs (including the patient and caregiver). Different units of analysis also cause comparative difficulties, for example some papers expressed costs per episode, others cost per month or year, and others by per capita household spending or total household spending.

Indirect illness costs are even more difficult to compare across studies because there are variations in the scope of indirect costs included and the methodology used to quantify the loss of productive time. First, different studies include different individuals in their measurement of time lost: For example, Collins DL, Leibbrandt M in their survey on 'The financial impact of HIV/AIDS on poor households in South Africa' only include economically active family members and exclude children or elderly people; others include children's days off school, or if they do work a weight is given to their lost activity days based on estimates of productivity. Second, as noted before, the scope of indirect costs varies, although most include the time spent seeking treatment by the patient and caregiver and the morbidity time during which the patient or caregiver stop or reduce their productive activities.

A third comparative difficulty arises from the different methods used to place a monetary value on time lost. The most common is use to use an average wage rate but others have used average daily income, or average daily output per adult, or actual output and income lost for each respondent. A conclusion of this review is that studies need to adopt a common methodology to allow more meaningful comparisons.

Comparison and interpretation of direct and indirect cost data collected in different settings is also made difficult because these costs are driven by very context specific factors on the demand and supply side, for example: illness- related beliefs and willingness to spend money on treatment at different types of provider; household income and ability at different times of year or the value of activity days lost; service accessibility and availability (are there services on which people can spend money?); service quality and financing (in settings where user fees are charged, out-of-pocket expenses are likely to be higher than where treatment is free at the point of delivery).

Evaluating the economic cost of HIV illness for poor households was made difficult because few studies stratified their cost analysis by socio-economic status. Difficulties in measuring household income or socio-economic status are, partly to blame for this lack of poverty or equity focus.

Related to the above point, cost of illness studies face difficulties in how the data should be presented, in particular whether measures of central tendency best reflect or represent the cost burdens facing the study population. Illness and illness cost are usually distributed very unevenly across households, with a minority incurring very high costs, so measures of central tendency conceal wide variations in cost burdens. The use of mean cost figure, in particular, often exaggerates the cost burdens faced by most households because a minority of high values pull the mean above the median. Median figures may therefore reflect more accurately the costs facing the majority of households, but in many studies only the mean is presented. This research work estimated cost using mean because the mean takes every value into account and since the economic cost of HIV/AIDS include wide range of cost (direct, indirect and intangible cost) it was appropriate to use it.

2.5 Some empirical evidence on cost of HIV/AIDS illness for households

2.5.1 Conceptual framework

The framework is derived from several studies that have investigated the household costs of HIV, coping strategies and their consequences for household livelihoods (Saueborn et al. 1996b; Russell 2001; Wilkes, 1997) but the clear format presented here is copied directly from a recent review paper on a similar topic; the cost of illness (i.e. malaria, TB and HIV AIDS) on household (Mclntyre & Thiede, 2003). The starting point is the presence of the economic cost of illness, in response to which the sick individual and other members of the household make decisions about whether to seek treatment or not, and from which source, within the context of intra-household decision- making processes, resource constraints and resource allocation priorities.

According to McIntyre & Thiede, some illness and some individuals may be given priority over other, for example more resources may go to treating economically active members of the household with HIV infection. They summarized the main variables relevant to the analysis of economic costs of illness at the household level in figure 1 below:

Fig. 1. Individual & household HIV treatment costs

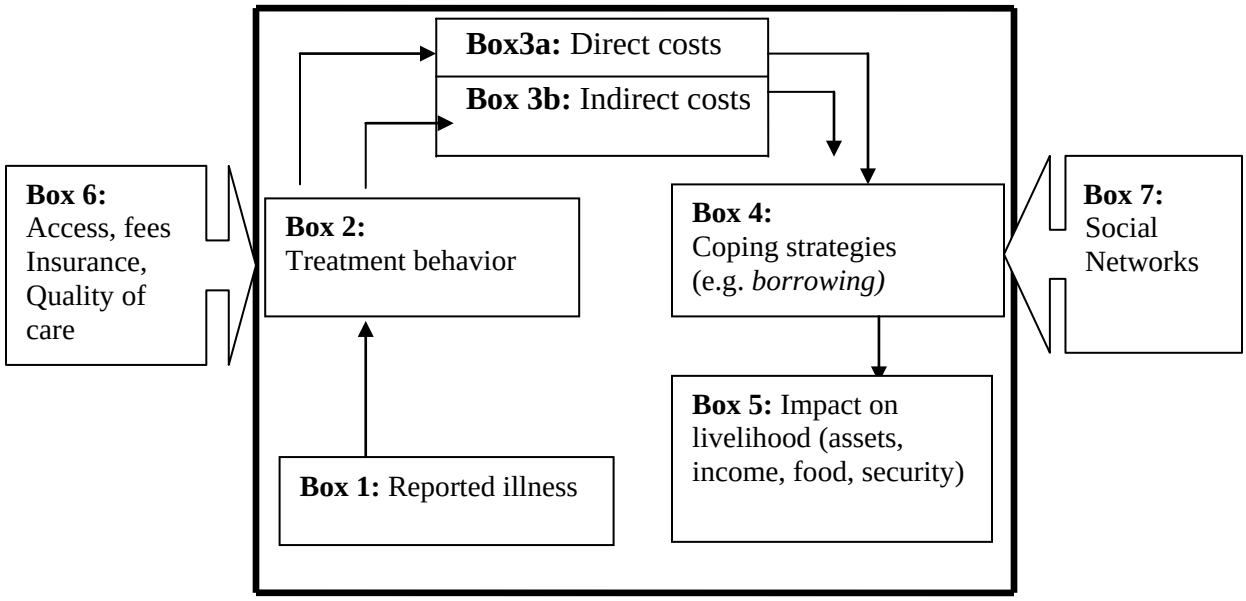


Figure 1: Framework.

The framework helps to illustrate the main focus of the paper, which is economic costs of HIV/AIDS on rural livelihood and the asset strategies that mobilize to cope with this illness costs. The implications of these illness costs and asset strategies for household asset portfolios and processes of improvement are vivid in rural Ghana.

This units of analysis in the cost of illness studies reviewed included cost per illness episode, cost per patient, or the household cost of illness. The household is preferred as a unit of analysis for assessing the economic cost and consequences of illness. This is because the costs of illness do not only fall on the sick but on other household members who care for the sick and accompany them to get treatment, and also because the costs of illness fall on the household budget which has implications for the resources available to other members (Berman et al., 1994; Sauerborn et al., 1995)As early as 1998 Davachi et al., (1988) examined the household spending on health care for patients suffering from HIV/ AIDS cases in Kinshasha and found that the costs of medical treatment alone and thus ignoring other were equivalent to 2-year salary for an average earner in kinshasha. The treatment cost shown in Table 1 are certainly very high in the rural and low cash income contexts where his studies took place, and in most cases the

researcher estimated that the direct costs of HIV/ AIDS were catastrophic, absorbing anything from 80% to 100% or more of annual income.

Table 1: HIV/AIDS studies overview of direct costs

Countries	Household Experiencing	Direct health cost over terminal period	Direct cost of funeral	Total direct costs	Total direct Costs as % of annual income	Source
Tanzania (Mwanza)	Aids death n=73	$70	$44.3	$114.3	100%	Ngalula et al., 2002
Tanzania (Kagera)	Male	$80.0	$77.0	$157	50-100%	World bank 1997
Tanzania (Kagera)	Female	$38.0	$54.00	$92	50-100%	World bank 1997
Cote d'Ivoire	Aids death n=73				48% (of Health care spending)	Bechu 1997
Thailand	Aids death n=116	$1036.6	$1537.6	$2574.2	Over 100%	Pityanon et al., 1997
South Africa	Aids death n=728				Over 50% (just Health care spending)	Johnson et al., 2002
Ghana	Aids death n=728	$120	$56	$176	57-100%	UNDP 2007

Where n = Sample size.

A similar survey in Uganda (Rakai district) reported that households experiencing an HIV – related death made substantial financial outlays for medical treatment, and that two-thirds of these households sold property to cover these direct costs (see section 5) (Menon et al., 1997).

Another research design in Kagera, Mwanza (Tanzania) and Chiang Mai (Thailand) allowed comparison of the direct costs of AIDS deaths and non-AIDS deaths because of the longer duration of illness (Ngalula et al., 2002; Pitayanon et al ., 1997; World Bank, 1997), as illustrated in table 2 below:

Table 2: The direct costs of AIDS and non- AIDS deaths in Thailand

Expenditure	HIV/AIDS death (n=116)	Non HIV/ AIDS death (n=100)
Medical treatment	$973	$883
Total direct costs	$ 2874	$2510

N = sample size

The problem about these researchers is that they only calculated the medical cost of the disease to households without considering other direct cost of the disease such as transport cost, funeral and wake cost etc. nevertheless, these researchers must be given the benefit of the doubt as lack of available data may hamper the estimate of these variables.

2.5.2 The poor pay more: direct cost burdens are regressive

Evidence shows that the direct costs of health care are regressive, imposing a greater burden (in terms of percentage of income) on poor families than on better-off families (Fabricant et al., 1999; McIntyre and Thiede, 2003). Although the poor in general spend less on treatment than other income groups (due to lack of access, inability to pay, greater use of public services)

This spending makes up a higher proportion of monthly or annual income for poor people than those on higher incomes.

With respects to costs of HIV on household, studies from india (mishra et al., 1993), china (wilkes et al/, 1997), Thailand (pannarunothai & Mills, 1997; mongkolsmai, 1993), Vietnam (ensor & san, 1996) and Sierraleone (fabricant et al., 1999) have revealed regressive cost burdens across income groups. For example in Vietnam household expenditure on HIV care was, over the whole sample, 48.9% of household income, but 76.4% for poor households and only 59.5% for 'rich' households (ensor 5 san, 1996). In Thailand annual household direct costs of HIV were 42.2% of household income for the highest income quintile but a staggering 61.2% for the poorest quintile, this clearly shows the potentially catastrophic cost of the disease on rural livelihood.

CHAPTER THREE

METHODOLOGY AND CHARACTERISTICS OF STUDY AREA

3.1 Demographic Indicators in Navrongo

Navrongo is in Ghana, near its northern (Burkina Faso) border. It is the capital of Kassena-Nankana district – which is within the Upper East Region of Ghana. The communities where the study was conducted include Pigu, Yaliyily, Timnu, Bakpe Loi, Shibge and Zimliyily. These communities were chosen in the Navrongo district base on socio-economic condition, thus comprising the most poorest communities in the district also and high HIV prevalent rate

The district lies between latitudes 10°30' and 11°00'N and longitudes 1°00' and 1°30'W and covers an area of 1675 km^2 along the Ghana–Burkina Faso border. It measures roughly 55 km × 50 km and has an altitude of 200–400 m above sea level.

The population is quite young, with about 41% below 15 years. The broad age distribution is as follows: 0-4 years - 13.1%, 5-9 years - 28.0%, 15-64 – 54.2% and 65+ - 4.7%, implying an age dependency ratio of 84%. Females constitute 53% of the population, giving a sex ratio of 89 males per 100 females.

Educational attainment in the district is quite low. In general, about two-thirds (65.5%) of the population aged 15 years and above have received no formal education and only 8.2% have attained senior secondary or higher levels of education. The distribution by sex indicates that more females (74.6%) tend to be uneducated than males (54.4%). Similarly, current school attendance among the 6- 25 age group is lower for girls (48%) than for boys (54%). Overall, about 55% of all the population aged 6 years and over have never been to school.

The family size in the Navrongo District has an average of 10 members. Males dominate headship of these compounds, with females heading only 10.2%. In 2005, the population recorded a crude death rate of 14.1 per 1000 person years and a crude birth rate of 28.0 per 1000, suggesting a rate of natural increase of 1.39%. The total fertility rate for the same year was 4.1 per woman. Mortality in the Kassena-Nankana district is very high.

The infant mortality and under five mortality rates for 2005 are estimated at 90 per 1000 live

births and 150 per 1000 children under five respectively. Expectation of life at birth in the district is 52.6 years. Generally, males in the district have a shorter life span (49.9 years) than females (54.8 years). For the period 1997/99, the crude death rate was 17.0 per 1000 person years for males and 14.0 per 1000 person years for females (see Table1). The age pattern of mortality for each of the three-year periods is, as expected, curvilinear, with children and adults being the most vulnerable. At all ages, males generally have higher mortality rates than females but the differentials are much higher for ages 35 and over.

Navrongo happens to be close to Paga, a busy border town. In recent times, there has been a high influx of human and vehicular traffic across the Paga border as a result of increasing political instability in Ghana's neighbouring countries. Notably all three neighbouring countries have HIV prevalence rates that are much higher than Ghana: the Ivory Coast – 10.76%; Togo – 5.98%; Burkina Faso – 6.44% as against Ghana’s 3.0%. The end results are clear and obvious as all these people turn to have sexual intercourse with these local girls thereby spreading the HIV menace in the district.

Political instability and changing patterns of commerce and road traffic between Ghana and its neighbours may be conspiring to change the epidemiology of the disease in Ghana. More needs to be done to understand the onset of this epidemic in border areas.

3.2 Materials and methods

3.2.1 Background of the Study setting

This research studied patients who visited and/or were admitted to the Navrongo government hospital. There is a district hospital with satellite health centres. Navrongo government hospital serves as the main district hospital for Navrongo and its environs. The district hospital in Navrongo is a 140-bed facility which serves the entire district for secondary care. The four health centres are run by medical assistants who provide clinical services and limited outreach services, referring complicated cases to the district hospital. Trained traditional birth attendants and village health workers and community health officers support the health centres. There is a large informal sector of health providers - the traditional healers and soothsayers who tend to be the first point of call for cases of HIV/AIDS, T.B. and several other conditions (altered

consciousness) considered to be caused by evil spirits. Inpatient admissions are authorized by casualty medical assistants who treat all emergency patients. Admissions are organized in a 7 day roster, such that consecutive admissions in a 24 hour period are admitted to a single ward.

3.2.2 Data Sources

Based on the socio-economic conditions of the districts in the Upper East Region, Navrongo district was selected for this study and also because it is close to the northern border. Six communities were selected from the Navrongo district. These communities are Pigu, Yaliyily, Timnu, Bakpe Loi, Shibge and Zimliyily. Both primary and secondary data were collected for the study. A field survey of the six selected community was conducted within full one year. Secondary data were sourced from the HIV control unit at Navrongo government hospital under the Ministry of Health.

3.2.3 Primary data

A district based cross-sectional survey of households was conducted to collect the data. Data was collected by face-to-face field interviews, based on structured questionnaires, conducted in households in the six communities in Navrongo district.
A household survey was conducted in Navrongo district in the upper east region of Ghana. A multi-stage sampling was used. The first stage was the choosing of the district. The district was chosen on the basis of socio - economic conditions (for example general income levels, economic activities, population growth rate and proximity to health care facilities), encompassing some of the poorest districts in Ghana. This was done so that results will reflect the economic cost of the disease on the poor community in Ghana.

In the second stage six towns were selected as sample sites within the district, again, with the view of a poor and an economically deprived area in mind. Households of persons living with HIV/AIDS were sampled purposively, reflecting the limitations of a probability sampling approach in identifying a sufficiently large sample, given the unwillingness of infected persons

to “self-identify.”

The respondents are people who have visited the hospital within the past one year. In the case where the respondent could not talk for themselves, their parents or close relatives were asked to speak on their behalf. A total of 200 households were covered by the survey. To achieve a broad coverage, only one respondent was interviewed in a household.

The research study was introduced to hospitals and NGOs working with people with HIV and the consent of eligible respondents was initially received verbally through the representatives of these organizations. Field workers were trained and introduce to persons living with HIV and AIDS, at a location convenient to the prospective respondent. At the same time, the prospective respondents were again introduced to the objectives of the study and their consent obtained in writing.

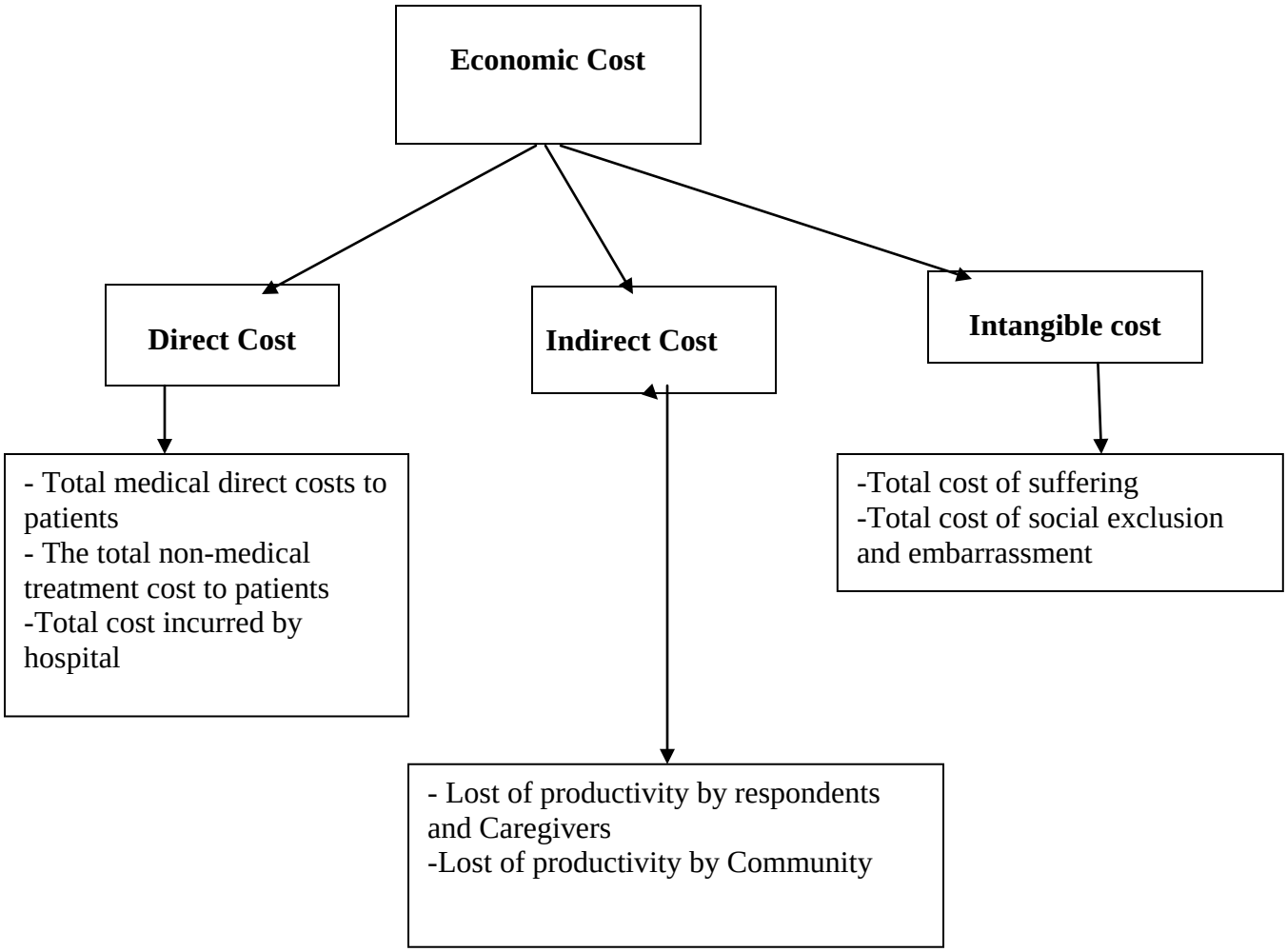
3.2.4 Secondary data

Secondary data on HIV/AIDS expenditure incurred by hospital were collected from HIV control unit under Ministry of Health, Public health service agents/staff, National Health Insurance Authority.

3.3.0 Conceptual framework

3.3.1 Description of costing methodology

Fig. 2 Conceptual framework



The conceptual framework in fig 2 above was design to help estimate the economic cost of HIV/AIDS in rural Ghana. The costing took the perspective of the hospital and the patients.

TC = D + ID + G, **AC = TC/R**

Where;

TC =Total Cost, **D** = Direct Cost, **ID** = Indirect Cost, **G** = Intangible Cost

AC = Average cost R = Total Respondents

Where, the Total economic cost (**TC**) of HIV on rural livelihood consists of direct (**D**), indirect cost (**ID**) and intangible cost (**G**).
Under Mclntyre & Thiede (2003), household illness cost (i.e. malaria, TB and HIV AIDS) include the cost of treatment (drugs and medical consultations), transportation and the cost of special food.

Again, Mclntyre & Thiede and Steven Russell (in DCPP Working Paper 15) included, cost of income of patient and loss of income due to time spent by caregiver in their indirect cost estimation. This research included the intangible cost to Mclntyre & Thiede estimation to make the economic cost more elaborate.

3.3.2.0 Direct Cost

3.3.2.1 Medical direct costs of treatment to respondents

Estimating the direct cost of medical treatment to HIV/AIDS respondents is complex because the distribution of health care costs shifts dramatically as the disease advances. Early stages of the illness are characterized by a relatively high proportion of drug costs, primary and community care, and outpatient visits, while later stages are marked by longer in-patient hospital stays. Medical treatment costs include the following:

3.3.2.1.a HIV pre treatment cost

Under this cost, the researcher estimated the cost per patient when ill which was latter on attributable to HIV infection. The cost was estimated from patients and the hospital side. Patients cost refers to hospital charge to patients who paid the full or part of hospital fee for the services rendered to him/her by the facility. The patients were asked to provide the type of disease suffered and the expenditure they incurred by either visiting/stay in the hospital and or the cost of the drugs they bought from a pharmacy shop for that specific disease. Under this, the research added consultations fee, *drugs cost (the cost of buying lab drugs)***,** laboratory cost and any other cost associated with the treatment of that disease. Where available receipts are verified to know the expenditure incurred. Hospital (health facility) on the other hand was also asked to provide the cost of providing care to the patients in respect of that specific ailment suffered. Where the

patient was under National Health Insurance Scheme (NHIS), the facility was asked to provide the cost incurred for treating that specific disease.

3.3.2.1.b Medical treatment processes for HIV/AIDS patients

Antiretroviral drug[2] treatment is the main type of treatment for ***HIV*** or ***AIDS***. It is not a cure, but it can stop people from becoming ill for many years. The treatment consists of drugs that have to be taken every day for the rest of a person's life.

The medical processes for treating HIV/AIDS is base on the World Health Organisation (WHO) staging procedure system[3] for HIV disease based on clinical symptoms. Table 3 below provides a number of procedures for providing treating to HIV patients. From the table there are basically three stages of treating HIV/AIDS. These include Primary, First line therapy and Second line therapy.

[2] The aim of antiretroviral treatment is to keep the amount of HIV in the body at a low level. This stops any weakening of the immune system and allows it to recover from any damage that HIV might have caused already.

[3] See appendix one for the WHO staging system

Table 3. The basic Procedures for treating HIV/aids patients[4]

Stages	Procedures	Target/Aim
Primary Stage	Counseling[5] This is done by Doctor, trained counselor, nurse or health care worker in private.	He or she will explain what the test involves and what the result means to the patients.
	Testing - HIV antibody testing -Test for viral load -Test for CD4 cell	The viral load test measures the amount of HIV virus in your blood. A CD4 test measures the number of T-helper cells(in a cubic millimetre of blood).
First line therapy	Initiation of Antiretroviral drug[6]	-To increase CD4 cells and to reduce the incidents of virus reproduction and multiplicity. -Give nutritional supplement - Transmission from mother-to-the-child (PMTCT) -Routine[7] blood test to measure CD4 counts and HIV viral load. e.g. Genotypic resistance testing[8], HIV drug resistance testing, etc.
Second line therapy	Change Antiretroviral drug	Second line therapy may need to be considered in cases of drug failure or drug toxicity. And also to treat opportunistic infection. Thus this line of therapy is needed to deal with HIV complications.

Source: HIV unit at the Bolgatanga Government hospital

[4] Treating HIV/AIDS is not an emergency but a necessity and must be tackled aggressively.
[5] Mostly Doctor, trained counsellor, nurse or health care worker in private who counsel also do the testing.
[6] There are more than 12 Antiretroviral drug class for treating hiv/aids cases
[7] CD4 testing should be carried out every 3 to 4 months at patient's regular check-up. Someone with a high viral load often has a low CD4 cell count.
[8] For patients who have pretreatment HIV RNA >1,000 copies/mL

From the table above the Primary stage is actually not a treatment process but a diagnostic one which helps a doctor to know whether a person is HIV positive or not. This is the Counseling and Test procedures. There are many tests available but the predominant ones used in Navrongo Government hospital are either the Viral load or the CD4 cell test. If the test shows that the person is HIV positive then the doctor advice the person to go through the HIV treatment therapy. The actual treatment therapies are the First line and Second line therapies. In both therapies medical doctor administers antiretroviral drugs to patients.

3.3.2.1.c Cost associated with the primary stage

Under this stage, total monetary cost was estimated for counseling and testing of patients HIV status from both patients and hospital perspectives. This was done by asking the patients to provide the expenditure incurred when they had HIV counseling and testing in order to know the amount they spent on counseling. Where patients underwent through two or more test, they were asked to include the cost also. In the same way, hospital was also asked to provide, the expenditures incurred by providing counseling and testing services to HIV patients. To do this, the hospital was asked to estimate the market value of providing counseling and testing to an HIV patient. This helped to know the cost per patient for receiving a single counseling and testing for HIV status. The result was then used to calculate for the 200 patients interviewed.

3.3.2.1.d Cost associated with the First line Therapy

This is actually the starting period where HIV antiretroviral drugs (therapy) are administered to HIV and AIDS patients. It is not a cure, but it can stop people from becoming ill for many years. The treatment consists of drugs that have to be taken every day for the rest of a person's life. The aim of antiretroviral treatment is to keep the amount of HIV in the body at a low level. This stops any weakening of the immune system and allows it to recover from any damage that HIV might have caused already. This process includes the following;

One: To increase CD4 cells and to reduce the incidents of virus reproduction and multiplicity.

A person infected by HIV/AIDS has his or her immune system (red blood cell or the CD4 cell) severely compromised exposing him or her to opportunistic infections such as pneumo-cystis

pneumonia, kaposi sarcoma, slim disease, persistent diarrhea etc which can kill. The main purpose of administering anti retroviral drugs is therefore to increase the red blood cells of the patient to enable it fight infections and diseases.

Under this cost, patients were asked to provide hospital attendant sheet which shows their medical history (or patient prescription sheets) and the drugs taken under this to know their drugs cost. The patients were then asked to estimate the cost they had incurred at this stage. This is because AVR drugs are scarce and expensive. Additionally patients need to pay for drugs like the vitamins and the Septrine they take. They also need to pay for certain labs test like a chest X-ray being done for them.

Hospital was also asked to provide the expenditure incurred by providing drugs to HIV patients under this first line. This was done after showing the drugs taken by each patient from their medical history to hospital pharmacy suppliers' price lists for assessment of the drugs cost at market prices. This helped to estimate the cost incurred by the hospital for providing drugs to HIV patients at this stage.

Two: Prevention from mother-to-the-child transmission (PMTCT)

Prevention from mother-to-the-child transmission (PMTCT) occurs in a situation where an infected pregnant mother is made to go through HIV therapy in order to prevent the child from contracting the virus. (PMTCT) requires a different working methods and separate medical records than the conventional HIV therapy. In such cases substantial time, money and resources are required to effectively handle such cases to achieve results.

To estimate the cost incurred by the hospital under this category, the medical history of each patient was taken into consideration. The combination of drugs taken by each patient was recorded and their costs were taken from Hospital pharmacy suppliers' price lists. The patients were also asked to estimate the amount they have spent so far on this (PMTCT).

Three: Nutritional supplement

Nutritional supplements drugs are given to HIV patients to add to the shortage of nutrition taken from their regular food they eat. These drugs are meant to increase the nutritional status of patients. The costs of these drugs were also taken from each patient medical history report to assess the cost incurred by the hospital. The patients were also asked to estimate the cost they had incurred if any on the nutritional drugs bought.

Four: Routine blood test to measure CD4 counts and HIV viral load. e.g. Genotypic resistance testing, HIV drug resistance testing, etc

Routines blood and other test are carried out to know the effectiveness of the AVR drugs and the general wellbeing of patients. These tests are carried out from time to time. This cost was also estimated after considering the number of tests each patient has gone through from their medical report and the amount each patient has paid. The total amounts for all the 200 patients were then calculated.

Hospital cost was also estimated in consultation with laboratory staff to find the market price of each specific routine test. Data on each person's medical report was therefore used to estimate the hospital cost of that specific routine test. The total amounts spent by the hospital for all the 200 patients were then calculated.

3.3.2.1.e Cost associated with the Second line Therapy

HIV patients who went through the first line antiretroviral therapy may experience drug resistance, treatment failure, drugs toxicity and opportunistic infections. Experts' advices say this condition is complex and critical ones and demands a combination of drugs to effectively handle the case in question. In some circumstance the medical officer after careful consideration can also start new therapy altogether.

One: Resistant strains, Drug toxicity and Immunologic failure

Under this, patients were asked to estimate the amount they had incurred in this process if they had gone through it anyway. Again, the patients were asked to provide their medical history report and the drugs taken under this treatment procedure was used to know their drugs cost. This helped to calculate the hospital drugs cost for the number of patients who had gone under this treatment, patients were also asked to estimate the expenditure they have incurred so far on this. That is, the number of drugs taken multiplied by the cost of those drugs in question.

Two: To treat opportunistic infection

Treating an opportunity infections are critical and are expected by medical officer when a person undergoes HIV treatment therapy. As mentioned earlier, this includes TB, cholera, yaws etc. Treating these diseases are costly and are sometimes done along side with HIV treatment therapy. The number of patients who had received treatment for opportunistic infections were asked to estimate the cost they had incurred. From the patients' side, this also includes the cost of buying drugs by the patients or their families outside the hospital because of shortages or exclusion from the essential drugs list.

The total hospital cost on drugs was also estimated for the numbers of 200 patients interviewed who have or are on opportunistic infections treatment after carefully examining the drugs on their medical report and cost from hospital pharmacy price lists.

3.3.2.1.f. Cost to hospital for providing service by Health Care Workers

This is the cost incurred by the hospital for proving care to HIV patients which include the cost of Outpatient and Inpatient consultations (medical and ward staff costs), Psychiatric services cost, Post Exposure Prophylaxis (PEP), Non-curative care (overhead) costs.

One: Outpatient visit and Inpatient consultations (medical and ward staff costs)

To estimate these costs, the average number of admission and the length of stay by patients and average consultation/investigations costs were calculated for each of the patient specific treatment procedure. That is, the patients were asked the number of time they had visited the

hospital for the year and or the number of times they have been admitted and length of stay at the hospital in order to estimate the cost of each visit and stay for the 200 respondents. Then the total costs on outpatient visit and inpatient consultations for the entire 200 patient for the whole year was then calculated. This thus represents the market cost of consultations and investigations provided by the hospital to HIV patients.

Two: Psychiatric services cost

This was calculated after finding the number of patients who had visited the Psychiatric services and for the number of times the persons had visited the service within the year under study (2008). Then, the total cost of providing psychiatric services to patients was calculated for the total number of patients who visited psychiatric services after estimating the cost per psychiatric visit at the hospital. This is because cost per psychiatric visit is the market price of seeking psychiatric visit. Here the research estimated the cost incurred by both patients and hospital.

Three: Post Exposure Prophylaxis (PEP)

The Post Exposure Prophylaxis (PEP) is occupational precaution taking by healthcare professionals from the epidemic infection. Research evidence seems to suggest that the use of antiretroviral drugs if given soon after an injury can reduce the rate of transmission. Such treatment is referred to as Post Exposure Prophylaxis (PEP). PEP is recommended for health care workers if they have had a significant occupational exposure to blood or another high risk body fluid which is likely to be infected with HIV. This is a cost to the hospital as a result of taking care of the sick HIV/AIDS patients.

To calculate this cost, the research found out the expenditure hospital has spent on this item for the whole year; the sum was then divided by the total HIV patients in the hospital catchment area (that is the total number of HIV/AIDS patients the hospital is giving them care and treatment). The result was in turn used to calculate for the 200 respondents interviewed.

Four: Non-curative care (overhead) costs.

This category includes the costs of laundry, catering, building maintenance, utilities, cleaning, transport and capital assets.

Laundry and catering

To estimate these items cost, the total number of patients in the hospital catchments area who were admitted to the hospital was taken into account, the number of days each stayed in the hospital for the year was recorded, and this helped to find the number of patients who benefited from the catering and laundry cost. The cost per patients was calculated and the total cost for the 200 interviewed was recorded.

Building maintenance, utilities, cleaning, transport and capital assets

The total sum of expenditures on these items was obtained from the hospital and then divided it by the total HIV population in the hospital catchments area to find the cost per unit of HIV patient in the area for these specific items. It was in turn used to calculate for the 200 HIV respondents interviewed. For building, the research took the annual cost of maintaining the buildings were HIV patients receive treatment. The annualised cost of capital assets was valued as 10% of recurrent costs,

3.3.3.1.g. Non-medical direct costs of treatment to HIV patient

Non-medical direct costs of illness to patients are costs which arise from HIV illness. These costs include the cost of transportation, 'Special diet' for the patients and other miscellaneous expenditures. Patients and their care givers need to travel to and fro to seek medical services which are sometimes very considerable. Understanding of these costs is very important as it also affect the patients' budget.

These include the cost of;

- *Transportation,*

Here, patients were asked to provide expenditure they have incurred on transportation to and fro for treatment. The amount was therefore computed and added to the costs.

- *'Special diet' for the patients*

'Special diet or food' is just an ordinary meal with high nutrition or precisely balanced diet. The 'Special diets or foods' were not usually part of patients' diets but have become necessary due to therapy for HIV patients. This particular meal is very important because patients are required to increase their nutritional intake to enhance the effectiveness of the anti retroviral therapy. Medical researchers have it that there is strong evidence that malnourished HIV patient are less likely to benefit from antiretroviral treatment. They are of the view that patients with mild malnutrition (a low body weight for their height) were twice as likely to die in the first three months of treatment.

3.4. Indirect Cost

Under the scope of indirect costs this project work estimated the loss of income of the patient (who is frequently the main breadwinner) in terms of lifetime income foregone.

To do this, the research work found out the monthly income the patients were earning before he/she became ill. Where the patients were not able work again due to the seriousness of the sickness, the research work calculated the loss of income by the sick person for one year. On the other hand, where it was found that the patient could do some 'petty' jobs and earn an income, then the research estimated the differences in income the patient was earning before he/she fell sick and what he is currently earning.

As part of the indirect cost this research work estimated loss of income due to time spent by caregiver (i.e. other members of the household, usually daughters may miss school or and wives may work less in order to care for the sick person). To estimate this loss of income and or reduction in output, the research found out the total number of productive days foregone multiplied by the daily wage to calculate the total income lost.

Where the caregiver is child/children and had to abandon school for one or two or even more academic years, the research found it necessary to estimate cost in terms of income the child would have earned if he/she had not delayed for one year. To do this, the research found out the work an average educated child is likely to do, and then one year expected income was then calculated using current salary of that category of workers as projections.

Where the child is dropped out of school for life this research work estimated the gap between the incomes that an average educated worker is expected to earn and the income that their educated partner is supposed to earn.

The research also estimated the cost in terms of the community support programmes like spiritual support and psycho-social counselling for people living with HIV/AIDS, as well as for the care-givers and other family members. This is given in the community and is greatly valued by affected families. Psycho-social support is provided by members of the community without any fee. They provide advice and moral support, help to reduce stigma, and also provide access to better care. This is a cost to the community.

3.5 Intangible cost

Intangible cost includes the cost of suffering, grief or social exclusion arising from illness. Approach adopted in estimating the intangible cost was that HIV/AIDS patient were asked to estimate in terms of monetary value how much the patient is prepared to accept in order to endure the pain, social exclusion and other forms of embarrassment suffered by the patient. This is in line with theory of equivalent variation.

3.7 Limitation of the research

This research estimated economic cost of HIV in respect of patients living with HIV/AIDS in rural Ghana and did not include funeral cost. Again, the research work did not include the quality of life years lost by patients. That is HIV/AIDS kills people in their early stage of lives, but this research did not estimate the cost interns of live years lost or premature death since all the patient interviewed are living.

3.8 Statistical Data Analysis

Statistical analysis was done in two parts namely descriptive and regression analysis.

3.8.1 Descriptive analysis

3.8.1.1 Unit costs of HIV-related services

The study calculated average unit costs of each of the services by dividing the cost of inputs incurred along each of the services during the year by the total number of respondents during the one year duration.

Hospital overhead costs were estimated on HIV-related services. The study used floor area to allocate utilities, maintenance and domestic service costs. The numbers of staff in each department were used to allocate administration and clothing costs; number of patients or quantity of service were used to allocate central store, medical records and pharmacy/dispensary costs to different activities.

3.8.1.2. Service use and mean annual cost of care

The study approximated the use of outpatient-based HIV-related services by the frequency of visits to the HIV Clinic, laboratory and imaging tests each patient underwent during follow-up, and by the quantity and frequency of prescription of ARV and other drugs. The research extracted these data from the outpatient database of the HIV unit of government hospital in Navrongo.

In estimating inpatient costs, the study evaluated annual use of inpatient services for the 200 HIV patients (on ART) who were admitted during the fiscal year 2008. Variables associated with inpatient service included the number of ARV drugs taken, investigations (laboratory,) done, general inpatient care, and meals. The cost of drugs and investigations were estimated based on the amount consumed by each patient, but study used the number of inpatient days to estimate the cost of general inpatient care and for treatment other than drugs and diagnostics. The study then multiplied the quantity of service each patient used with the respective unit cost to obtain the annual cost of inpatient service for each patient.

3.8.2 Presentation of Findings

The findings of this thesis were presented as a mean economic cost of AIDS in rural Ghana. So Average Total Cost Bill is given as a Total Cost Bill divided total number of respondents

ATC = TC/N

ATC = Average Total Cost Bill

TC = Total Cost Bill

N = Total Number of Respondents

3.8.3 Regression analysis

Log linear regressions models were used to estimate the impact of patients' characteristics (income, gender, age and education) on each cost component (direct cost, indirect cost in terms of time lost and Intangible cost). The log linear models were used because it reduces the potential for multicollinearity and heteroskedasticity, and provides direct parameter estimates of the elasticities.

Model specification

Model 1

D = f (AG, GE, I, E)

$$\text{Ln } D = \beta_1 + \beta_1 \ln AG + \beta_3 GE + \beta_4 \ln I + \beta_5 E + \varepsilon_1$$

Model 2

ID = f (AG, GE, I, E)

$$\text{Ln ID} = \theta_1 + \theta_2 \ln AG + \theta_3 GE + \theta_4 \ln I + \theta_5 E + \varepsilon_2$$

Model 3

S = f (AG, GE, I, E)

$$\text{Ln } S = \alpha_1 + \alpha_2 \ln AG + \alpha_3 GE + \alpha_4 \ln I + \alpha_5 E + \varepsilon_3$$

Where,

D = Direct cost of HIV incurred by patients.

ID = Indirect cost (in terms of productive time in days lost) by household in providing care for the patients

S = Stigmatisation cost suffered by of HIV patients.

GE = Gender

AG = Age

E = Educational level.

$\varepsilon_{1...3}$ = Is white noise (include all omitted variables that can influence the dependent variables)

$\boldsymbol{\beta_s}$ $\boldsymbol{\theta_s}$,$\boldsymbol{\alpha_s}$, = Parameters to be estimated to measure the impact of age, gender, income and educational level as independent variables in their respective functions.

Various regression models specified above are assumed to be linear in coefficients and specified in the log linear form. All the dependent variables in the models (direct treatment cost, indirect cost and stigmatisation), and the other independent variables like age and income are in logarithmic form. This specification is very important as it will make it easier to figure out the impacts in percentage terms (elasticities) of how various cost components specified above are affected by changes in age and income. The other independent variables were in the linear form.

3.8.4 Description of variables

The section explains how the variables were used for the econometric (modeling) analyses. Gender and educational level variables were entered as dummy but both age and income were entered as quantitative variables.

Gender

Gender was coded as 1 for males and 0 for females; hence females were the controlled category. The coefficient (β_3) of male on direct cost is expected to be positive. This is because male HIV patients are more economic active and earn more income than their female counterpart and are able to spend more on direct cost of treatment. However the coefficient (θ_3) of male on indirect cost (in terms of days lost by household in providing care for HIV patients) is expected to be negative. This is so because as males are economically active and expected to earn more income than their female counterpart, their reliance on family members for care reduces since they can afford the services of other labours in the community and also pay for their medical bills. The coefficient (α_3) of male on cost of stigmatisation is expected to be positive. The reason is that

men usually occupy various positions in the society including heads of families and so the stigma associated with the disease affects them more – hence higher cost of stigmatisation to male.

Education

In respect to education, those with no education were the controlled category. If patient highest education was primary, it was entered as 1 and zero otherwise. Those with secondary education were entered as 1 and zero otherwise and those with tertiary which were also entered as 1 and zero otherwise. The coefficient (β_5) of primary, secondary and tertiary education on direct cost is expected to have positive sign. HIV patients with primary, secondary and tertiary education tend to spend more on direct cost of treatment than patients with no formal education because they understand the nature of the disease and that without adequate treatment they may die early. Again the coefficient (θ_5) of primary, secondary and tertiary education on indirect cost is expected to have positive. Household is less willing to spend more time with patients with education than patient with no formal education. This is so because people with formal education tend to understand treatment procedures and hence need little or no assistance from relative when seeking medical treatment. The coefficient (α_5) of primary, secondary and tertiary education on stigmatisation cost is expected to be positive. Patients with higher education tend to occupy relatively high status in the society and so place higher cost of stigmatisation really affect their reputation.

Age

The respondents were asked to give their ages in years. Age is expected to have positive coefficient (β_2) with direct cost. This is because as patient grows the health status of the patient deteriorate and he or she may be more susceptible to HIV related sicknesses and general ailments, and therefore tend to spend more on direct cost of treatment. Again age is expected to have positive coefficient (θ_2) with indirect cost (in terms of days lost by household in providing care for HIV patients) because as patient grows and the health status of the patient deteriorate household are prepared to provide them (patients) enough care than their younger counterpart. However, the coefficient (α_2) of age on stigmatisation cost is expected to be negative because older people are less sensitive to stigmatisation and so have less stigmatisation cost.

Incomes

The respondents were also asked to give their annual earnings in Ghana cedis. The coefficient (β_4) of income on direct cost is expected to have a positive sign because as patients' income increases, they turn to be more concerned about their health and thus tend to spend more of their income on direct cost of treatment. But, the coefficient (θ_4) of income on indirect cost (in terms of days lost by household in providing care to HIV patients) is expected to have a negative. The reason is that as patients' income increases, their reliance on family members for care reduces since they can afford the services of other labours in the community. The coefficient (α_4) of income on stigmatisation cost is expected to be positive because as patients' income increases, stigmatisation reduces their reputation and societal status – hence higher stigmatisation cost.

3.8.6 Econometric analysis

To verify whether the estimated regression estimates are reliable, heteroskedasticity test was conducted using spearman's rank correlation coefficient. Multicollinearity was tested using correlation matrix. Models specification and stability test was carried out using Cummulative Sum of Residuals Squares (CUSUMQ).

Data were recorded with Microsoft Excel and analysed by the use of Statistical Package for Social Sciences (SPSS). Most of the variables constituting cost are presented in a form of frequencies, percentages and means.

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.1 Background Information of the HIV/AIDS Patients

4.1.1 Characteristics of the Respondents.

The highest infested age group of respondents is within 18-40 years followed by 41-60 years as shown in Table 4.

Table 4 Age, Marital Status, educational and composition of the Respondents

Patients Age and Gender			
Age	**Number**	**Female**	**Male**
<18	9 (4.5%)	3 (33.33)	6 (66.67%)
81 - 40	125 (62.5%)	77 (60.63)	48 (39.37%)
41 - 60	55 (27.5)	28 (50.90)	27 (49.10%)
61 +	11 (5.5%)	7 (63.63)	4 (36.37%)
Total	**200**	**115**	**85**
Marital Status of the Respondents			
Marital status	Number	Female	Male
Single	54 (27.0%)	36 (66.67%)	18 (33.33%)
Married	81 (40.5%)	36 (44.44%)	45 (55.56%)
Divorce	39 (19.5%)	26 (66.67%)	13 (33.33%)
Widow	26 (13.0%)	17 (65.38%)	9 (34.62%)
Total	200	115	85
Educational Level of Respondents			
Educational Level	Number	Female	Male
No Education	89 (44.5%)	57 (64.05%)	32 (35.95%)
Primary Education	78 (39.0%)	49 (62.82%)	29 (37.18%)
Secondary Education	28 (14.0%)	9 (32.14%)	19 (66.86%)
Tertiary Education	5 (2.5%)	0 (00.00%)	5 (100.00%)
Total	200	115	85

Source: Author from field survey data.

The number of female patients (57.5%) was more than males (42.5%) counterpart. There were more patients in the adult group of above 40 years than in the youth group of less than 20 years. Overall there is greater proportion of females (60.63%) than males (39.37%) were found in the most vulnerable age group of less than 40years.

From Table 4 above Married respondents were the highest with 81 respondents (representing 40.5%) with male constituting 55.56% of the married respondents; this was followed by those who are single (54 respondents, representing 27% of the respondents). Widow category had the least patients. Overall there is greater proportion of females (66.67%) than males (33.33%) were found in the Single, and also female (65.38) than male (34.62%) in the widow category.
Again from table 4 above, most of the respondents interviewed, 44.5% had no education – with more Females (64.05%) than Male (35.95%). Generally, the number of people in educational levels decreases as one moves along the educational ladder from table 4 above. No female respondent had tertiary education.

4.2 Wealth: potentials impact indicators

4.2.1 Occupations, incomes and financial dependent of respondents

From Table 5 below, most of the respondents (as much as 97 respondents representing 48.5%) listed farming as their main occupation; this was made up of 54 females and 43 males. The average cultivating farm land is 8.79 acres. From the table, other important activities included petty trade, crafts, and civil servants. There are more women (55.67%) in the petty trading than male (44.33%) while more men (66.67%) than women (33.33%) are in the civil servant. There were only 2 female in the unemployment category.

The earning capacities of the households are very low. From the table, it was clear civil servant had the higher proportion of income (40.32%) even though farmers constitute higher proportion of the respondents. Farmers have an average income of GH¢334.40 while average income of civil servants is GH¢2340.00. Others had the least income earning capacity of 2.66%.

Table 5 Occupations, incomes and financial dependent of respondents

Primary occupations of the respondent's household

Occupations	**Number**	**Female**	**Male**
Farming[9]	97	54 (55.67%)	43 (44.33%)
Craftsmen	19	13 (68.42%)	6 (31.58%)
Petty trade	64	40 (62.5%)	24 (37.5%)
Civil servant	18	6 (33.33%)	12 (66.67%)
Unemployed	2	2 (100.00%)	0 (0.00%)
Total	**200**	**115**	**85**

Income earning capacity of respondents households

Incomes GH¢	**Number**	**Amount** GH¢	**Percentages**
Farming[10]	97	32436.50	31.05
Craftsmen	19	10407.20	9.96
Petty trade	64	16723.22	16.01
Civil servant	18	42120.00	40.32
Others	2	2782.00	2.66
Total	**200**	**104468.92**	**100.0**

FINANCIAL DEPENDANTS OF PATIENTS

Dependant	Total	Adult dependant	Children dependant
Less than 3 persons	573	230	343
Between 3 and 6	731	319	412
7 and above	380	163	217
Total	1684	712	972

[9] Farming is described as the cultivation of crops and the rearing of animals (including livestock rearing and fishing)

[10] Farming is described as the cultivation of crops and the rearing of animals (including livestock rearing and fishing)

From the respondents, it was clear that on average a rural household has approximately 4 (actual figure is 3.56) adults dependant to cater for including him/herself and a spouse. In addition to this, total average number of children is also 5 (actual number is 4.86). Of this number, the average number of children not going school is 2.28. Therefore a peasant rural household and his/her spouse have to cater for nearly 9 people including themselves.

4.2.2 Transport facilities

Information received from respondents indicated that 1%, 11% and 47% of them said they own car, Motorcycle and Bicycle respectively. About 41% of them does not own any form of transport. Again, none of them said they own Tractor or Pickup/lorry.

4.3 Direct cost

4.3.1 Medical direct costs of treatment to respondents

4.3.1.a HIV pre treatment cost

Table 6 below present the expenditure incurred by both patients and hospital on HIV pre treatment cost. The respondents mentioned having suffered from these diseases. The 'others' include coughing, and other minor diseases. Under the patient cost, a total of 97 patients incurred various expenditures in the pretreatment cost. As much as 33% respondents suffered body pain which cost them GH¢950.30 while only 7.22% respondents suffered from the other diseases.

Table 6. HIV pre treatment cost

Diseases	Number of patients	Patients cost GH¢	Number of patients	Hospital cost GH¢	Total costs GH¢
Pain	32	915.30	42	1344.00	2259.30
Malaria	28	350.50	61	2848.17	3198.67
Diarrhoea	19	217.12	35	1330.00	1547.12
Skin diseases	11	97.84	39	4425.54	4523.38
Others	7	47.20	10	1021.79	1068.99
Total	97	1627.96	187	10969.50	12590.46

On the other hand, hospital incurred a total of GH¢10969.50 on various disease under the pretreatment cost for 187 patients. The hospital incurred as high as GH¢4425.54 on skin diseases even though only 20.86% respondents suffered from the disease, while the hospital spent 2848.17 on 32.62% of respondents who suffered from malaria.

4.3.1.b Cost associated with medical treatment processes for HIV/AIDS patients

4.3.1.c. Cost associated with the primary stage

The table 7 below presents the cost associated primary stage (i.e. counseling and testing) cost. It must be noted that because of the deadly nature` of the disease, many patients are not satisfied with one test. So some do multiple test to ascertain “the true” status. It must however be noted that for one to be engaged in the hospital treatment one must pass through hospital HIV test despite.- e any other test that might have been carried out.

On the HIV test cost, 173 patients either did their own test to know their HIV status before visiting government hospital for confirmation or the other way round, that is they had the first test at government hospital before they did another one at private hospital for confirmation. Under this cost, patients incurred a total of GH¢4190.26. In other words 86.5% of the respondents admitted that they have incurred private cost of GH¢4190.26 on counseling and test alone. This was made up of GH¢2076.00 counseling and GH¢2114.26 testing cost.

Table 7 Cost associated with the pre HIV treatment cost and test procedure

Items	Number of patients	Patients cost GH¢	Number of patients	Hospital[11] cost GH¢	Total cost GH¢
Counseling	173	2076.00	200	2400.00	4476.00
HIV Test cost[12] (laboratory, radiology etc**)**	173	2114.26	200	3000.00	5114.26
Total		4190.26		5400.00	9590.26

Source: From the author survey.

On the other hand hospital incurred a total of GH¢5400.00 primary stage cost. This is made up of GH¢4476.00 and GH3000.00 for counseling and testing cost respectively. HIV Test cost (laboratory, radiology etc**)** are generally higher than counseling cost

In all, a total of GH¢9590.26 was spent on Pre treatment and HIV counseling/Test cost by the patients and the hospital.

4.3.1.d Cost associated with the First line Therapy

The cost of providing the drugs is out of reach to "common" patients and so government and international organisations have taken bold measures to subsidise the cost of these drugs. So patients pay GH¢5.00.

Tables 8a and 8b below give the breakdown of the expenditures associated with the first line and second line therapy treatment processes respectively. From table 10a, an amount of GH¢21704.30 was spent by both patients and hospital to procure drugs to increase CD4 cells and to reduce the incidents of virus reproduction and multiplicity- of this amount, patients paid GH¢3184.30 and hospital paid GH¢28520.00. Again, a total of GH¢21873.20 was paid by patients and hospital on routine blood test to measure CD4 counts and HIV viral load (at least every three months). Nutritional expenditure borne by both hospital and patients was GH¢6146.81.

[11] It is worth noting that the hospital cost is in relation to the cost of drugs and treatment materials. And treatment is heavily subsidized.

[12] At least patients do two tests to confirm their HIV status.

Table 8a First Line Therapy treatment cost[13]

Specific Procedures	Number of patients	Patients cost GH¢	Number of patients	Hospital cost GH¢	Total cost GH¢
-To increase CD4 cells and to reduce the incidents of virus reproduction and multiplicity.	200	3184.30	200	28520.00	21704.30
-Prevention from mother-to-the-child transmission (PMTCT)[14]	27	5671.50	27	11632.00	17303.50
-Give nutritional supplement	200	2194.90	200	3951.91	6146.81
-Routine blood test to measure CD4 counts and HIV viral load. e.g. Genotypic resistance testing, HIV drug resistance testing, etc.	200	2019.20	200	19854.00	21873.20
Total		13069.90 (19.50%)		53957.91 (80.50%)	67027.81

Source: The laboratory monitoring requirements from Navrongo government Hospital.

Amount spent on Prevention from mother-to-the-child transmission (PMTCT) was GH¢17303.50 consisting of GH¢5671.50 and GH¢11632.00 respectively paid by patients and the hospital.

In all, a total of **GH¢67027.81** was spent on First Line Therapy of HIV/AIDS treatment. Of this amount patients paid **GH¢13069.90** (19.50%) and hospital paid **GH¢53957.91**(80.50%).

[13] Each treatment cost depends on the market value of the drugs and the salaries of health officers.

[14] Treatment from mother to child transmission demands higher resource use and hence higher cost to cost patients and clinic.

Table 8b Second Line Therapy treatment cost

Items	Number of patients	Patients cost (cost borne by Patients) GH¢/%	Hospital cost (cost borne by Hospital) GH¢/%	Total cost GH¢
Resistant strains, Drug toxicity and Immunologic[15] failure.	200	2603.00	22948.10	25551.10
To treat opportunistic infection	83	1765.70	32431.50	34197.20
Total GH¢		4368.70	55379.60	69748.30

Source: From the author survey.

From table 10b the total cost for Resistant strains, Drug toxicity and Immunologic failure is GH¢35551.10 (this consist of GH¢2603.00 paid for by the patients and GH¢22948.10 by hospital). The total cost for the treatment of opportunistic infections is GH¢34197.20 - consist of GH¢1765.70 paid for by the patients and GH¢32431.50 by hospital. Patient and hospital facility incurred GH¢69748.30 on Resistant strains, Drug toxicity and Immunologic failure and treatment of opportunistic infections.

In all, cost associated with **Pre HIV treatment, Primary Stage**, **First and Second Line Therapy** cost to patients and hospital is **GH¢158955.83.** – Of this amount, **GH¢33248.82**(20.92%) paid patients and **GH¢125707.01** (79.08%) was borned by hospital.

4.3.1.e Cost to hospital for providing service by Health Care Workers

The table 11 below gives the breakdown of the expenditure incurred by the HIV/aids units of the hospital for providing services to HIV patients in Navrongo and its environs for the year 2008. From the table 9 below, outpatient and impatient consultation turns to be small amount (32.27%) than Non-curative care (overhead) costs of 48.68%

[15] Immunologic failure can be defined as a failure to achieve and maintain an adequate CD4 response despite virologic suppression.

Table 9. The cost incurred by hospital for providing care to HIV patients

ITEMS		MARKET VALUE		%
Outpatient and Inpatient consultations[16] (medical and ward staff costs)			14846.90	32.27
Psychiatric services			4121.64	8.95
Post Exposure Prophylaxis (PEP)			4648.40	10.10
Non-curative care (overhead)[17] costs	Bed the patients sleep on	2262.40	22398.30	48.68
	Laundry	1069.00		
	Building maintenance and Capital Assets	10428.00		
	Utilities, cleaning and transport.	1956.90		
	Administrative spending and other costs	6693.80		
Total			46015.24	100.00

Source: From the author survey.

Expenditures on Psychiatric services and Post Exposure Prophylaxis are GH¢4121.64 (8.95%) and GH¢ 4648.40 (10.10%) respectively. So the total cost incurred by hospital for providing care to HIV patients is GH¢ 46015.24

[16] Salaries paid to medical and ward staffs for outpatient and inpatient consultations are part of their salaries and the amount depend on duration spent by the medical and ward staff.

[17] Non-curative care (overhead) costs refers to cost of costs of laundry, catering, building maintenance, utilities, cleaning, transport and capital assets Research and administrative spending, in service training to health workers, etc.

4.3. 2 Non-medical direct treatment costs to HIV/AIDS patient

Table 10 below shows expenditure patients incurred on non-medical direct treatment. From the table, Transportation cost is GH¢6545.00 (representing 34.40%) while the cost on special diet or foods' is GH¢12479.28.

Table 10. Non-medical direct treatment cost to patients

Items	Cost GH¢	%
Transportation	6545.01	34.40
Special diet or foods'[18]	12479.28	66.60
Total	19024.29	100.00

Source: From the author survey.

The expenditure on Special diet or foods' is the highest in the non-medical direct treatment costs to HIV/AIDS patients amounting to GH¢12479.28 and represents 66.60%. The total cost incurred by patients on Non-medical direct treatment GH¢19024.29

4.4 Indirect cost

4.4.1 Permanent loss of income by HIV patients.

Table 11 below presents the permanent income loss by HIV/AIDS patients for various occupational levels. The permanent income loss by respondents who are farmers constitutes the highest income of 38.43%. This was followed by the Civil servants having 33.51% of permanent income lost. Though Civil Servant had only 18 respondents, their figure is high due to the fact that civil servants are the highest paid among the occupations from the respondents' point of view. From the table 'Other' had only 0.86% of total loss of incomes.

[18] The cost of special diet is the difference between the cost of the normal food the patients eat before HIV/aids and the food they eat after infection.

Table11. Permanent income lost by HIV/AIDS patients for various occupational levels.

Occupations	Female	Male	Total Respondents	Total Income Lost GH¢	%
Farming	54	43	97	48306.60	38.43
Craftsmen	16	3	19	5371.80	4.27
Petty Trade	40	27	67	28827.92	22.93
Civil Servant	6	12	18	42120.00	33.51
Other	2	0	2	1076.50	0.86
Total	115	85	200	125702.82	100.00

Source: From the author survey.

From the table above, total permanent income loss is **GH¢ 125702.82**

4.4.2 *Cost of providing care*

4.4.2.1 *Cost of providing care by adult care givers*

Data retrieved from the respondents indicated that 57 and 131 were respectively male and female adult caregivers and only 13 of additional care givers were children (because they were not up to 18 years) consisting of 9 boys and 4 girls.

From table 11 below, it was clear that the total days lost by male caregivers amount to 21384 days giving and average lost days for male is 297 days. These days lost could have been used to produce goods and services or earn income to better a living. Using the government daily wage rate of GH¢2.25 the total loss of income by the male caregivers is GH¢ 48114.00

On the other hand, the total days lost by female caregiver amount to 56,259 days giving and

average lost days for male is 329 days. The reason is that women work more than their men counterpart and they are more often seen as one who should take care of the sick person – cooking, fetching and boiling water, etc. Therefore, the total loss of income by the male caregivers is GH¢ 116,795.25

Table 12. Total Number of days and income lost by adult caregivers.

Gender	**Average days lost**	**Total days lost**	**Daily income lost**	**Total income lost %**
Male N=57	297	21384	GH¢2.25	GH¢ 48114.00 (27.52)
Female N=171	329	56259	GH¢2.25.	GH¢ 126582.75 (72.48)
Total	726	73293	GH¢ 4.50	GH¢ 174696.75 (100.00)

Source: From the author survey.

From the table above the total income lost by adults care givers is GH¢164909.25

4.4.2.2 Cost of providing care by children

As it had already been noted that 13 of the caregivers were children at school going age, it was also important to factor in their cost. In addition to these, 26 more children had also stopped schooling (for one or two years or indefinitely) due to HIV/AIDS sickness of affected mother, father or guidance.

Out of these 39 children, 8 of them (5 boys and 3 girls) had stopped schooling for one academic year, 13 (6 boys and 7 girls) for two academic years and 18 (13 boys and 5 girls) of them had stopped schooling indefinitely.

On the account of 39 children who had stopped schooling for varying periods, It was found that

an average educated child is expected to be a trained teacher who earns GH¢250.00[19] for a month. So for one academic year 39 children will earn GH¢117000.00

The uneducated one who is expected to be a farmer will earn an annual income of GH¢334.40 (using average annual income of farmers estimated above). So for 39 children, the annual income will be GH¢13041.60.

Therefore the difference in incomes between educated worker and their uneducated partner is GH¢117000.00 - GH¢13041.60. = GH¢103958.4

In sum, total caregiver cost provided by children is GH¢ 103958.4

4.4.2.3 Community support

At least each respondent household said a member in the community do provide them support in either fetching water, fire wood, cooking, spiritual and psycho-social counselling support or a combination of these for at least once every week. From the respondents it was found that on average, a member from the community spend at least 4 hours in providing services to them. So then if such people are to get at most half a minimum wage[20] of GH¢1.25 for 12 months for the 200 respondents is GH¢ 12000.00.

Note that the 12 months is the average months after diagnosed of hiv disease.

Thus GH¢1.25 x 4 weeks = GH¢ 5.00

Then GH¢ 5.00 x 12 moths = GH¢ 60.00

Therefore GH¢60.00 x200 respondents = GH¢12000.00

So the total cost incurred by the community is GH¢**12000.00**

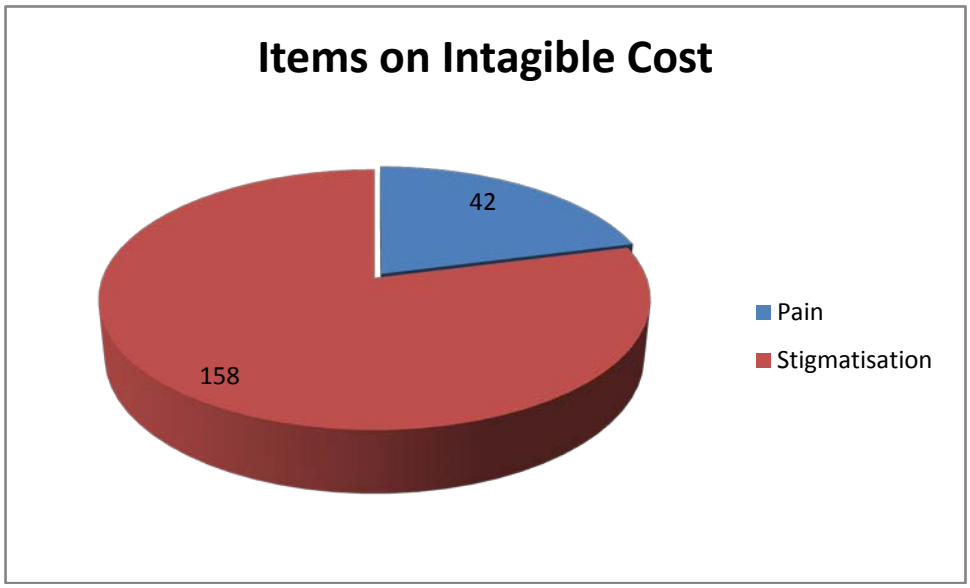
[19] 2008 Teachers salaries was used as projections

[20] Current minimum wage is GH¢2.50 a day

4.5 Intangible cost

Patients were asked to indicate between Pain and Stigmatisation which one is more of concern to them. From fig 3 below, patients overwhelmingly said stigmatisation is of more concern to them. 158 (79%) of the patients said they are more concern to stigmatization while only 42 (21%) worried more about pain. They main reasons they gave was that because they are on drugs, they do not endure more pain than the day-to-day stigmatization they face. Some concluded that they become worried when they hear some HIV/AIDS advert that 'the disease has no cure and one will die when he or she get it' and the like, are more some concern to them.

Fig 3 Pain and Stigmatisation which one is more of concern to them



Source: From the author survey.

So, HIV/AIDS patient were asked to estimate in terms of monetary cost how much the patients are prepared to accept in order to endure the pain, the value of lost leisure, social exclusion, stigmatization and other forms of embarrassment suffered by the patient. The total cost for the pain patients suffer is GH¢67543.00 and the social exclusion, stigmatization and psychological cost is GH¢114365.00

Total intangible cost is GH¢181908.00

4.6.1 Total economic cost of patient

Average cost of respondent refers to the cost per unit of respondents and it is calculated by dividing the Total Cost Bill of patients by the number of respondents.

From the analysis and discussion above,

Total direct costs include:

- Pre HIV treatment cost = **GH¢12590.46**
- Primary stage cost = **GH¢9590.26**
- First and Second Line Therapy cost = **GH¢158955.83.**
- Cost incurred by hospital for providing care = **GH¢ 46015.24**

Total direct cost is **GH¢227151.79**

Total indirect costs include:

- Permanent income loss = **GH¢125702.82**
- Total income loss by care givers is = **GH¢268867.65**
- The cost incurred by the community = GH¢**12000.00**

Total indirect cost is **GH¢406570.47**

Total intangible cost is **GH¢181908.00**

In all Total Cost Bill which is TC = D + ID + G

Where:

TC = Cost

D = Direct Cost

ID = Indirect Cost

G = Intangible Cost

TC = GH¢227151.79 + GH¢406570.47 + GH¢181908.00 = GH¢ 815630.26

4.6.2 Average cost of patient

Average cost of respondent refers to the cost per unit of respondents and it is calculated by dividing the Total Cost Bill of patients by the number of respondents. So Average Total Cost Bill is given as a Total Cost Bill divided Total Number of Respondents

ATC = TC/N = **GH¢815630.26 /200 respondents = GH¢4078.15**
Where N=sample size.
Total Cost = TC,
Average Total Cost =ATC

Therefore, Average Total economic Cost Bill is **GH¢4078.15** per year for a person living with HIV.

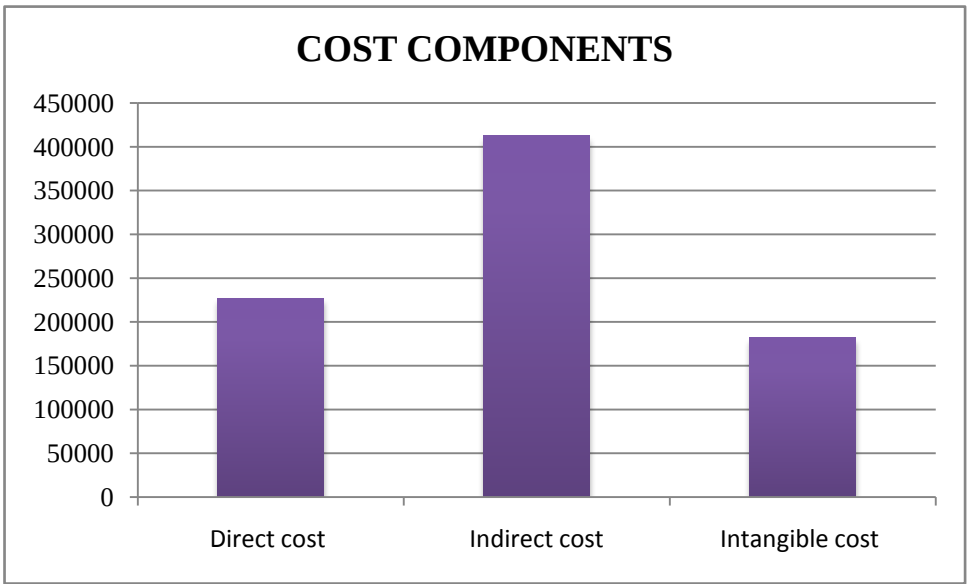
4.6.3. Direct cost burdens on patients

The total cost incurred by patients on direct treatment is GH¢52273.11 and the Average Total Cost for patients on direct treatment is GH¢52273.11/200 = GH¢261.37. When compared this Average Total Direct Treatment Cost for patients (GH¢261.37) with the average income for household GH¢522.34, it was realized that household spent as huge as 50.04% of their income on HIV/AIDS direct treatment alone.

4.7. Percentages of Cost components

From the fig 4 below **Total Indirect Cost** constitutes the highest cost of **GH¢412570.47** representing 50.21%, indirect costs borne by patients and their families from earnings lost from HIV/AIDS are commonly much greater than the direct costs of treatment. On the other hand, **Total Direct Cost** was **GH¢227151.79** representing 27.65 %, while that of Total intangible cost is **GH¢181908.00** representing 22.14%.

Fig 4 Composition of Costs



Source: From the author survey.

4.8. Ways of household financing cost

The sale of assets and borrowing

Table13 below illustrates the disposition of assets by households in attempt to cope with HIV illness cost. It is clear from table that the sale of livestock constitute a larger proportion (GH¢27968.42, 36.59%) of sale of asset to defray expense on HIV illness while savings is GH¢17696.00 (8.41%).

Table 13. Sale of assets and borrowings[21]

Items	Value/cost GH¢	Percentage %
Renting and sale of Land	27968.12	13.29
Crops/plants	32928.09	15.66
Livestock	76984.42	36.59
Household effect[22]	568.08	0.26
Remittance	10800.91	5.14
Savings	17696.66	8.41
Borrowing	43440.29	20.65
Total GH¢	210386.57	100.00

Source: From the author survey.

From table 13 above, rent and Sale of land by household is GH¢27968.00(13.29%) which consist of GH¢7324.95 rent and GH¢20643.17 of sales revenue. While crops/plant and remittances lost are GH¢32928.00 (15.66%), and GH¢10800.00 (5.14%) respectively. Borrowing was GH¢43440.00 and constitutes 20.65% of asset cost. The proportion of households reporting borrowing money increased from 38 % to 67 % during the study period. Household effect constitutes the lowest on asset table being GH¢568.00. Household effect include sale of Car, motorbike, bicycle, dishes etc. Household effect constitutes the least because with little income household finds it difficult to buy more of these items and enjoy them. The sale of assets and borrowing is **GH¢210386.57**

[21] Borrowing is lager than savings due to higher treatment cost of HIV/AIDS couple with general low incomes levels of rural household in Navrongo.

[22] Since general incomes levels are very low, household acquisition of 'Household effect' turn to be very low and hence nothing virtually is left to in order to meet treatment expenses.

4.9. Econometric analysis (the log-linear regression equation)

The three models described in chapter three (methodology) were estimated on the basis of the available data. The following tests were conducted before presenting the estimates for analysis.

There is multicollinearity when two or more independent variables have a log-linear relationship, or correlation, with one another. There are two important consequences associated with multicollinearity. First, standard errors of the coefficients would be very large thus, increasing the probability of type two error (failing to reject a false null hypothesis). Secondly, the most important consequence of perfect multicollinearity is that the Ordinary Least Squares method of estimation will not run. A correlation coefficient matrix is usually used to show correlation (multicollinearity) between independent variables. With absolute values greater than |0.70| on the correlation matrix, multicollinearity is present. Sensing the possibility of some correlation between the individual explanatory variables, I tested them for multicollinearity and found no indication of significant problems in this area for any of the three estimated Models. (A set of matrices showing the correlation between the explanatory variables are in appendix 3).

Spearman's correlation coefficient was used to test all regression models for the presence of heteroskedasticity. It was discovered that heteroskedasticity was not a problem as none of the correlation coefficient was more than the |0.70| threshold. (See appendix 4).

The stability of models specification test was carried out for the three models using Cummulative Sum of Residuals Squares (CUSUMQ) and the results indicated that the three models were stable and correctly specified at 5% error level (See Appendix 5).

The researcher also wanted to find how changes in age over time will have impact on the models thereby including age square in the model specification. It was found that age squared was not significant and so it was dropped.

Model 1: Regression of patients' characteristics on direct cost

Table 14: Regression of patients' characteristics on direct cost

Variable	Coefficient	P – value
Constant	-1.768	0.000
LnAge	0.256	0.001
Male	0.306	0.000
LnIncome	0.972	0.000
Primary education	0.135	0.017
Secondary education	0.253	0.005
Tertiary education	0.164	0.384
Dependent Variable: Direct cost R Square = 0.811 Adjusted R Square = 0.805 F – Statistics = 138.001 p -value = .000 N =200		

Source: From the author survey.

Hypotheses results:

- H_o hypothesis is rejected in favour of H_1 which state that direct cost of treatment does vary with patient income, age, gender, primary and secondary education .
- H_o hypothesis is accepted which state that direct cost of treatment does not vary with tertiary education

Age

From table 14 above, there is a positive relationship between direct costs of HIV and the age of respondents and this is statistically significant. As HIV patients grow by a year, direct cost borne by patients' on treatment increases by 25.60 %. This is because as patient grows the health status of the patient deteriorate and he or she may be more susceptible to HIV related sicknesses and general ailments, and therefore tend to spend more on direct cost of treatment.

Gender

From the table, male HIV patients tend to spend more on direct treatment than their female counterpart and this is statistically significant. The reason is that, male are more economic active and earn more income than female and are able to spend more on direct cost of treatment.

Income

Table 14 also shows that there is a positive relationship between direct treatment costs of HIV and the income of the respondents and this is also statistically significant. As HIV patients' income increases by 1% direct cost borne by patients' increases by 0.972%. Therefore the H_o hypothesis which state that direct treatment cost borne by patients does not vary with patient income is rejected in favour of H_1 which state that direct treatment cost borne by patients does vary with patient income. This so because as patients' income increases, they turn to be more concerned about their health and hence spend more of their income on direct cost of treatment.

Education

HIV patients with primary and secondary education tend to spend more on direct cost of treatment than patients with no formal education and these are statistically significant. However, direct cost of treatment does not matter whether patients have no formal education or tertiary education.

The regression estimation in table 14 has a higher adjusted R Square (0.805). This means that the independent variable together explain 80.5% variation in the direct treatment cost of HIV. Again the model as a whole is statistically significant (F – Statistics = 138.001, p -value = .000).

Model 2: Regression of patients' characteristics on indirect cost (in terms of days lost by household in providing care for HIV patients).

Table 14: Regression of patients' characteristics on indirect cost

Variable	Coefficient	P - value
Constant	11.058	0.000
LnAge	-0.294	0.025
Male	-0.160	0.088
LnIncome	-0.696	0.000
Primary education	-0.062	0.537
Secondary education	-0.512	0.001
Tertiary education	-0.499	0.134
Dependent Variable: Indirect cost R Square = 0.489 Adjusted R Square = 0.473 F – Statistics = 30.813 p-value = 0.000 N = 200 Where N is sample Size		

Hypotheses results:

- H_o hypothesis is rejected in favour of H_1 which state that indirect cost (in terms of time lost by household) does vary with patient income and age.
- H_o hypothesis is accepted which state that indirect cost (in terms of time lost by household) does not vary with patient education.

Age

Estimates from table 15 suggest that there is a negative relationship between indirect cost (in terms of days lost by household in providing care for HIV patients) and the age of the respondents and this is statistically significant. As HIV patients grow by a year, household are prepared to reduce their productive days by 29.40%. This is because older patients require less care than their younger counterpart.

Gender

However, gender was not significant with indirect cost because they all bear the same cost.

Income

The table 15 also shows that there is a negative relationship between indirect costs (in terms of days lost by household in providing care for HIV patients) and the income of the respondents and this is statistically significant. As HIV patients' income increases by 1%, household reduces care it offers 0.696%. This is so because as patients' income increases, their reliance on family members for care reduces since they can afford the services of other labours in the community. Hence, the H_o hypothesis which state that indirect cost (in terms of time lost by household) does not vary with patient income is rejected in favour of H_1 which state that indirect cost (in terms of time lost by household) does vary with patient income. This is so because as patients' income increases, they tend to be more concerned about their health and hence spend more of their income on direct cost of treatment.

Education

Household is less willing to spend more time with patients with secondary education than patient with no formal education and this is statistically significant. This is so because people with formal education tend to understand treatment procedures and hence need little or no assistance from relative when seeking medical treatment. However, primary and tertiary education are not statistically significant.

From table 15, adjusted R^2 is 0.473 which indicates that the independent variables together explain 47.30% variation in the indirect cost. The model as a whole is statistically significant (F – Statistics = 20.559, P - value = .000)

Model 3: Regression of patients' characteristics on stigmatisation cost

Variable	Coefficient	P - value
Constant	3.855	0.000
LnAge	-0.447	0.000
Male	-0.036	0.602
LnIncome	0.693	0.000
Primary education	0.125	0.092
Secondary education	0.409	0.001
Tertiary education	0.557	0.024
Dependent Variable: stigmatisation cost R Square = 0.582 Adjusted R Square = 0.569 F – Statistics = 44.725 p -value = .000 N = 200		

Hypothesis results:

- The H_o hypothesis is rejected suggesting that cost of stigmatisation does vary with education, age and income.
- The H_o hypothesis is accepted as against the alternative hypothesis suggesting that stigmatisation cost does not vary with gender.

Age

From table 16 above, there is a negative relationship between stigmatisation of HIV and the age of the respondents and this is statistically significant. This is because older people are less sensitive to stigmatisation.

Gender

From the patients' perspective, gender does not matter in respect of cost of stigmatisation. This is because they all they all do not like the stigma associated with the disease. The H_o hypothesis is accepted as against the alternative hypothesis suggesting that cost of stigmatisation does not vary with gender.

Income

The table also shows that there is a positive relationship between costs of stigmatisation of HIV disease and income of the respondents and this is statistically significant. As HIV patients' income increases by 1%, cost of stigmatisation also increases by 0.693%. This so because as patients' income increases, stigmatisation reduces their reputation and societal status – hence higher stigmatisation cost.

Education

HIV patients with secondary and tertiary education tend to place higher cost on stigmatisation of HIV/AIDS disease than patients with no formal education and these are statistically significant. However, cost on stigmatisation does not matter whether patients have no formal education or primary education. Patients with higher education tend to occupy relatively high status in the society and so place higher cost of stigmatisation. This has come about as a result the general perception that people who tend to have multiples of sex get infested with the disease.

From the regression estimation in table 16, independent variables together explain 56.9% variation in the cost of stigmatisation. Again the model as a whole is statistically significant (F – Statistics = 44.725, p -value =0.000). The H_o hypothesis is rejected suggesting that cost of stigmatisation does vary with education.

CHAPTER FIVE
CONCLUSION AND RECOMMENDATION

5.1. Conclusion

The highest infected age group of respondents was 21-40 years. This shows that vast majority of people living with HIV in Navrongo are people in their prime working lives. This is a clear indication that HIV/AIDS is dramatically affecting labour, setting back economic and social progress. The epidemic hits productivity through increased absenteeism by patients and their care givers.

From the respondents, it was clear that female constitute the largest proportion of the HIV respondents representing 57.5% of total respondents. The fact that more women were found in the youthful group is probably because of early sexual exposure with older men for economic reasons. While some women complained that they were infected by their husbands who travel to neighbouring countries to work seasonally, others believe that rising rates of HIV infection in women and young girls in the community is directly related to their inferior social, economic, cultural and legal status.

The low level of education in the data received from respondents is a visible cause of the epidemic in the area. The relationship between education and HIV prevalence has two distinct stages. In the initial stage of the spread of HIV, according to the statistical indicators above, there is a negative relationship between educational level and rate of infection. Education plays a vital role in sensitizing people to be aware of the wide spread of the disease and the modes of transmission. In the later stage of the disease education is also relevant as HIV patients are required to adhere to treatment and intake of drugs. Some illiterate patients do not take their prescription seriously hence developing complications and so forth. Most patients admitted having some strange side effects because they did not adhere properly to their drugs prescription.

From the data, the main occupation for people living in Navrongo and it environs is subsistence farming and the rearing of cattle and other farm animals. Apart from subsistence farming as primary, data received from the respondents has it that the people from Navrongo also engage

themselves in other income generating activities like brewing *pito,* corn mill, petty trading etc to supplement household incomes.

The average annual income of respondents is GH¢522.34. With this meager income size, the rural household will not be able to meet the most basic necessities of life for nearly 9 dependants let alone expenditure on investment which turn to postpone current consumption in the wake of HIV/AIDS disease. Almost all the respondents one way or the other were reducing spending on necessities even further. The expenses cut were clothing, food and other services.

Direct cost

Determining the direct cost of providing medical care to patients with HIV/AIDS is important for both short-term and long-term decision-making and for appropriate resource allocation.

The treatment of HIV or AIDS is done with the administration of antiretroviral drug. They are drugs to be taken every day for the rest of patients live. Treating HIV/AIDS is not an emergency but a necessity and must be tackled aggressively

This research documents that costs burden of HIV/AIDS in rural Ghana are indeed substantial and impose a heavy financial burden on the individuals, households and the economy as whole. Direct costs of HIV/AIDS fall under two categories. Firstly, there are direct cost implications because of increased medical cost. Medical costs reported are significantly high for households affected by AIDS. On average for a period of one year (2008), households spent total of GH¢23256.82 (GH¢23256.82 /200 = GH¢116.283) on medical treatment cost alone – a treatment which is heavily subsidized by government and other donor agencies. The part of treatment cost born by patients is 22.26% of average household annual income. What makes the situation serious about AIDS is that people do not recover.

In addition to this catastrophic medical cost, households also bear expenses on other non medical treatment cost such as transportation and the cost of special food. The ‘Special diets or foods’ were not usually part of patients’ diets but have become necessary due to therapy for HIV

patients. Households' expenditure on special diet or food is the highest (66.60% of direct non-medical treatment costs), because patients are required to increase their nutritional intake to enhance the effectiveness of the anti retroviral therapy. Medical researchers have it that there is strong evidence that malnourished HIV patient are less likely to benefit from antiretroviral treatment.

Medical treatment cost to the hospital turn to be far higher than the medical treatment cost incurred by the household due to the subsidized nature of hiv treatment in Ghana. The total cost incurred by the hospital on the treatment of HIV **GH¢171,722.25**.

The direct treatment cost of HIV is extremely high and this is leading many household into extreme poverty. This conclusion became evident as it was found from the study that household spent half (50.04%) of their income on treating HIV and its associated sickness. In 2005, World Health Organisation estimated that many household in Africa will enter into extreme poverty when they spent more than 10% of their annual income on treating HIV sickness.
Again, when average total direct cost of treatment of HIV is compared with the national Per Capita Income GH¢ 908.27 ($ 730.00, World Bank 2009) it was realized that household spent 28.77% of their income on direct treatment on HIV disease.

Furthermore, the average household cost of treating malaria was GH¢ 68.50 (WHO 2009). This is far below the average cost of treating HIV since patient recovers from malaria after treatment but HIV patients do not recover fully but must always continue his drugs for the rest of their lives.

Indirect cost

In addition to the catastrophic direct costs of HIV/AIDS estimated above, indirect costs borne by patients and their families earnings lost from HIV/AIDS illness are commonly much greater than the direct costs of treatment. This is because in its latter phases HIV/AIDS makes ill and kills children and prime-age adults. For patients with HIV/AIDS, the indirect costs arise from a loss of work or a reduction in productivity due to illness. Further losses result from earlier mortality

due to HIV/AIDS. On average, men lost 297 productive days while women lost 429 days. The reason is that women work more than their men counterpart and they are more often seen as one who should take care of the sick person – cooking, fetching and boiling water, etc.

Community support

Spiritual support and psycho-social counselling for people living with HIV/AIDS, as well as for the care-givers and other family members, is as important as treatment. This is given in the community and is greatly valued by affected families. Psycho-social support is also provided by members of the community without any fee. They provide advice and moral support, help to reduce stigma, and also provide access to better care.

Intangible cost

HIV/AIDS is regarded as a deadly disease with no cure. From the respondents, the outlook is so depressing that some prefer to ignore them and the issues as much as possible. This makes HIV patients suffer from wide range of discrimination. The Stigmatization of HIV/AIDS victims by the public in Navrongo district is really as it put HIV Patients at the highest form of embarrassment. So the psychological cost and trauma resulting from illness, deaths and stigma for HIV/AIDS is enormous.

Difficulties in Recovery from sickness costs

The economic cost of HIV/AIDS as estimated above in rural Navrongo on households is very severe. Although no part of the population is unaffected by HIV, it is often the poorest that are the most vulnerable to HIV/AIDS and on whom the costs and consequences are most severe. Respondents were of the view that in many cases, the presence of AIDS means that the household will dissolve, as parents die and children and other dependants are sent to relatives for care and upbringing. From the study, 63% of respondents (mainly women) said their households may dissolve should they die. But as stated earlier, much happens to the family before this

dissolution happens: HIV/AIDS strips the family of assets and income-earners, further impoverishing the poor.

Overall, the study documents that costs burden of HIV/AIDS in rural Ghana are indeed substantial and impose a heavy financial burden on the individuals, households and the economy as whole. With most rural households living below the poverty line, from evidence above, the additional cost of HIV/AIDS with the direct and catastrophic indirect cost makes livelihood a serious challenge to many rural households in Navrongo.

As assets coping strategies (like sale of assets) are gradually depleting with an increased reliance on borrowing, households are continually sinking into the valley of indebtedness and poverty.

Regression analysis

The current findings provide new and important information regarding the relationship between cost components (directs, indirect and stigmatisation cost) and patients characteristics. Although some of the estimated coefficients of explanatory variables were not significant at 5% level, the entire regressions were significant.

These results suggest that for direct cost, gender and higher incomes of patients are very important variable in influencing higher HIV treatment cost. The results also suggest that, gender, age, primary and secondary education are very important variable in direct treatment cost. Thus male HIV patients incur more treatment cost than their female counterpart. Educated patients appreciate the nature of HIV sickness and therefore adhere to all the treatment processes –hence higher treatment cost.

The regression results also indicate that age and income are significant with indirect cost (in terms of days lost by household in providing care to HIV patients). Most patients with higher income do not rely much on households' assistants. Both male and female HIV patients also place the same reliance on households' assistants.

Age, income and higher education influence intangible cost of HIV. Patients with higher income, secondary and tertiary education bear more cost on stigmatisation because of their high societal

status, and all other forms of embarrassment associated with HIV/AIDS. Patients with primary and no formal education have no effect on intangible cost.

5.2. Recommendations

This section makes recommendations based on the findings of the study to stakeholders involved in National AIDS/STD Control Programme for appropriate policy direction to mitigate the plight of HIV AIDS patients in the rural areas. These recommendations focus on cost reduction and distribution.

- These findings provide a strong case for strategies aimed at making HIV treatment affordable and targeted to low-income households. This should be particularly so, because the results document that the poor patients spend less on the direct cost because they find it difficult to raise money needed for the treatment. This will help reduce poor patients becoming more susceptible to various diseases associated with HIV/AIDS infection and the consequence of dying early.
- It is also recommended that the government and other non-governmental organization should help extend HIV/AIDS treatment to rural communities in Ghana, where there is or it is suspected that the infection rate is relatively high, to reduce transportation-related expenses.

- To reduce indirect cost (in terms of days lost by household in providing care for HIV patients) particularly among poor households, it is recommended that government employs adequate social workers to provide community care services to HIV patients. The NGOs and other care programs should also be visible in complementing government effort by deploying social workers and other necessary staff to assist in issues of care giving.

- To reduce intangible cost as a cost component, destigmatisation programmes be put in place with emphasis on educating people on the efficacy of anti retroviral therapy and policymakers are to address HIV-related stigma by reviewing discriminatory laws and helping monitor their enforcement when they arise.

- To reduce the incident of poverty associated with HIV for poor household after depleting their asset in an unsustainable manner, there is the need to intensifying poverty reduction programmes like youth in agriculture policy and funding be given to caregivers to start small and viable income-generating projects to address high incident of poverty.

5.3.3. Need for further research.

Having estimated the comprehensive cost of HIV in rural Ghana, the burden and the incidents of cost on the rural poor household, it is therefore recommended that at least the treatment cost be factored into the main stream national health insurance scheme. So therefore a research can be done on "*The development of a model to integrate HIV/AIDS treatment into the main stream National Health Insurance Scheme in Ghana***"**.

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APPENDIX 1: RESULTS OF REGRESSION ESTIMATIONS

Model 1: Regression of patients' characteristics on direct cost

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.901[a]	.811	.805	.34251

a. Predictors: (Constant), tertiary, Lnage, secondary, male, primary education, Lnincome

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	97.139	6	16.190	138.001	.000[a]
	Residual	22.642	193	.117		
	Total	119.781	199			

a. Predictors: (Constant), tertiary, Lnage, secondary, male, primary education, Lnincome

b. Dependent Variable: Lndirect cost

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.768	.384		-4.610	.000
	Lnage	.256	.074	.112	3.484	.001
	male	.306	.053	.196	5.806	.000
	Lnincome	.972	.057	.730	17.056	.000
	primary	.135	.056	.085	2.397	.017
	secondary	.253	.089	.113	2.843	.005
	tertiary	.164	.188	.033	.873	.384

a. Dependent Variable: Lndirect cost

Model 2: Regression of patients' characteristics on indirect cost (in terms of days lost by household in providing care for HIV patients).

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.699[a]	.489	.473	.60507

a. Predictors: (Constant), tertiary, Lnage, secondary, male, primary education, Lnincome

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	67.685	6	11.281	30.813	.000[a]
	Residual	70.659	193	.366		
	Total	138.343	199			

a. Predictors: (Constant), tertiary, Lnage, secondary, male, primary, Lnincome

b. Dependent Variable: Lnindirect cost

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.058	.678		16.320	.000
	Lnage	-.294	.130	-.119	-2.259	.025
	male	-.160	.093	-.095	-1.716	.088
	Lnincome	-.696	.101	-.486	-6.908	.000
	priedu	.062	.100	.036	.619	.537
	secondary	-.512	.157	-.214	-3.254	.001
	tertiary	-.499	.332	-.094	-1.506	.134

a. Dependent Variable: Lnindirect cost

Model 3: Regression of patients' characteristics on cost of stigmatisation

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.763[a]	.582	.569	.44791

a. Predictors: (Constant), tertiary, Lnage, secondary, male, primary, Lnincome

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	53.836	6	8.973	44.725	.000[a]
	Residual	38.719	193	.201		
	Total	92.555	199			

a. Predictors: (Constant), tertiary, Lnage, secondary, male, primary, Lnincome

b. Dependent Variable: Lnstigmatisation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.855	.502		7.686	.000
	Lnage	-.447	.096	-.222	-4.643	.000
	male	-.036	.069	-.026	-.522	.602
	Lnincome	.693	.075	.592	9.301	.000
	priedu	.125	.074	.090	1.694	.092
	secondary	.409	.116	.209	3.517	.001
	tertiary	.557	.246	.128	2.269	.024

a. Dependent Variable: Lnstigmatisation

APPENDIX 2. QUESTIONNAIRES

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF ECONOMICS

This questionnaire is to enable me collect necessary information to complete my research on the topic:

ESTIMATING THE ECONOMIC COST OF HIV/AIDS IN RURAL GHANA. CASE STUDY- NAVRONGO DISTRICT AREA.

All information provided in this study will be treated as confidential and your anonymity is assured.

PREDISPOSING CHARACTERISTICS

1. Age: …….
2. Religion: 1=Christian 2= Muslim 3=Traditional 4=Others (Specify)……..
3. Gender: 1= Male [ ] 2= Female [ ]
4.a. Marital status: 1=Single [ ] 2=Married [ ] 3=Divorced [ ] 4=Separated [ ] 5= Widowed [ ]
4. b. How many wives or husbands do you have……..
5. Educational level: 0=No schooling 1=Primary education 2=Secondary education 3=Tertiary education
6. What is your ethnic group?
……
7. Are you the head of the household? [1] Yes [2] No
8. Relationship to the head of family? 1=Spouse 2=Son 3=Daughter 4=Father 5=Mother 6=Other (Specify)……7=N/A
9. Household size: 1=less than 3 2=3-6 4= 7 and above
10. Primary occupation: 1=Farming 2 =Craftsmen 3= Petty trade 4=civil servant 5=unemployed
11. What is the annual household Income? …….
12. What is the distance from your house to the nearest Hospital or Clinic?
1=Below 1km [ ] 2=1km but less than 4km [ ] 3=4km but less than 6km [ ] 4=Above 6 km [ ]
13 what mode of transport does your household have? 1= car 2=Motorcycle 3=Bicycle

Cost estimation

14. How much have you spent on your transportation to hospital?
……
15 Did you suffer from any sicknesses before you were told that you have HIV/AIDS? 1=Yes 2= No
16 If yes, what types of sicknesses did you suffered from before you were told that you have HIV/AIDS?
…….
17. How much did you spent on these sicknesses?
…….
18 How much did you spent on the following.
Counseling ……..
Testing (laboratory, radiology etc) ……

19 what stage of HIV treatment are you?
First line Therapy/ second line Therapy

20 How much did you spent on the following First line Therapy
Drugs to increase CD4 cells ……..
Prevention from mother-to-the-child transmission (PMTCT)……..
Routine blood test (at least every three months). …….
Nutritional supplement expenditure …….

21 How much did you spent on the following Second Line Therapy
Resistant strains, Drug toxicity and Immunologic failure…….
Treatment of opportunistic infections. ……..

22 How much did you spent on Special diet or foods' as a result of your inability to eat your regular food.
…….

23 Did you receive support from any member of the community you live in?
Yes/No

24 If yes, what kind of support and how often did you receive from any member of the community you live in?
……
……
……
……

25 Estimate the amount of annual income you have lost as a result of your HIV sickness
Primary occupation:
Farming …….
Craftsmen……
Petty trade …….
Civil servant ……
Unemployed …….

26. Do you have a care giver (s)? Yes/No

27. Are the care givers children or adult? CHILDREN / ADULT
28. Are the adult caregiver a male or female? MALE / FEMALE
29. Total Number of days and income lost by adult caregiver(s)…….
30. How many children stopped schooling as a result of being a care giver or due to HIV/AIDS sickness of affected mother, father or guidance…….

31. Indicate between Pain and Stigmatisation which one is more of concern to you.

32 How much money are you prepared to accept in order to endure this pain and stigmatization.
Pain……
Stigmatization ……..…

33 Which assets have you sold off and how much was realized from the sale of assets in the course of seeking HIV/AIDS treatment?
……
……
……
……...……..……

34. How much have you borrowed if any to supplement your income in the course of seeking treatment?
…….

35. Do you have any general health problems with the provision of health care for people living with HIV in this district? 1=Yes 2=No 3=Not Aware
36. What do you think can be done to help improve health services for HIV patients in the district?
.....……
……
……..

COMMUNITY CHARACTERISTICS

37. What is the source of your drinking water? 1=treated water (pipe-borne) 2=bore hole 3=well 4=stream/river/pond
38. What type of toilet facility do you use? 1=W.C (Home) 2=W.C (Public) 3=KVIP (Public) 4=KVIP (Home) 5=others……..…
39. Are there any cultural/religious factors that promote polygamous marriage? 1=Yes 2=No 3=Not Aware
40. If Yes, name them ?
……
41 What general policies and why do you want government to adopt to reduce HIV in Ghana and also to help the plight of people living with HIV?

42. What form of assistant are you receiving from a member(s) of the community and how many times in a week?
…….

43. Give your general comment.
……
……

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF ECONOMICS

This questionnaire is to enable me collect necessary information to complete my research on the topic:

ESTIMATING THE ECONOMIC COST OF HIV/AIDS IN RURAL GHANA. CASE STUDY- NAVRONGO DISTRICT AREA.

All information provided in this study will be treated as confidential and your anonymity is assured.

Please indicate below how much did the HIV/AIDS control unit spent on the following HIV treatment for the 2008 fiscal year.

Counseling	Costs
HIV Test cost (laboratory, radiology etc**)**	
-To increase CD4 cells and to reduce the incidents of virus reproduction and multiplicity.	
-Prevention from mother-to-the-child transmission (PMTCT)	
-Give nutritional supplement	
Routine blood test to measure CD4 counts and HIV viral load. e.g. Genotypic resistance testing, HIV drug resistance testing, etc.	
Resistant strains, Drug toxicity and Immunologic failure.	
To treat opportunistic infection	

ITEMS		COST CEDIS		
Outpatient and Inpatient consultations (medical and ward staff costs)				
Psychiatric services				
Post Exposure Prophylaxis (PEP)				
Non-curative care (overhead) costs	Bed the patients sleep on			
	Laundry			
	Building maintenance and Capital Assets			
	Utilities, cleaning and transport.			
	Administrative spending and other costs			
Total				

APPENDIX 3.

CORRELATIONS MATRIX

		Primary	Secondary	Tertiary	Male	Lnage	Lnincome
Primary	Pearson Correlation	1	-.323**	-.128	-.086	-.042	.041
	Sig. (2-tailed)		.000	.071	.226	.550	.563
	N	200	200	200	200	200	200
Secondary	Pearson Correlation	-.323**	1	-.065	.207**	-.109	.379**
	Sig. (2-tailed)	.000		.363	.003	.124	.000
	N	200	200	200	200	200	200
Tertiary	Pearson Correlation	-.128	-.065	1	.186**	.065	.433**
	Sig. (2-tailed)	.071	.363		.008	.364	.000
	N	200	200	200	200	200	200
Male	Pearson Correlation	-.086	.207**	.186**	1	.055	.349**
	Sig. (2-tailed)	.226	.003	.008		.441	.000
	N	200	200	200	200	200	200
Lnage	Pearson Correlation	-.042	-.109	.065	.055	1	.104
	Sig. (2-tailed)	.550	.124	.364	.441		.144
	N	200	200	200	200	200	200
Lnincome	Pearson Correlation	.041	.379**	.433**	.349**	.104	1
	Sig. (2-tailed)	.563	.000	.000	.000	.144	
	N	200	200	200	200	200	200

**.Correlation is significant at the 0.01 level (2tailed)

APPENDIX 4

Spearman's Rank Correlation coefficient for model 1

		Ln direct cost of treatment
Ln income	correlation coefficient	0.467
	Sig (2-tailed)	.000
	N	200
Ln age	correlation coefficient	.189
	Sig (2-tailed)	.007
	N	200
Male	correlation coefficient	.467
	Sig (2-tailed)	.000
	N	200
Primary	correlation coefficient	.086
	Sig (2-tailed)	.228
	N	200
Secondary	correlation coefficient	.413
	Sig (2-tailed)	.000
	N	200
Tertiary	correlation coefficient	264
	Sig (2-tailed)	.000
	N	200

**.Correlation is significant at the 0.01 level (2tailed)

Spearman's Rank Correlation coefficient for model 2

		Ln indirect cost (Lost of days by family members)
Ln income	correlation coefficient	-0.662
	Sig (2-tailed)	.000
	N	200
Ln age	correlation coefficient	-.190
	Sig (2-tailed)	.007
	N	200
Male	correlation coefficient	-.348
	Sig (2-tailed)	.000
	N	200
Primary	correlation coefficient	.017
	Sig (2-tailed)	.816
	N	200
Secondary	correlation coefficient	-.318
	Sig (2-tailed)	.000
	N	200
Tertiary	correlation coefficient	.223
	Sig (2-tailed)	.001
	N	200

**.Correlation is significant at the 0.01 level (2tailed)

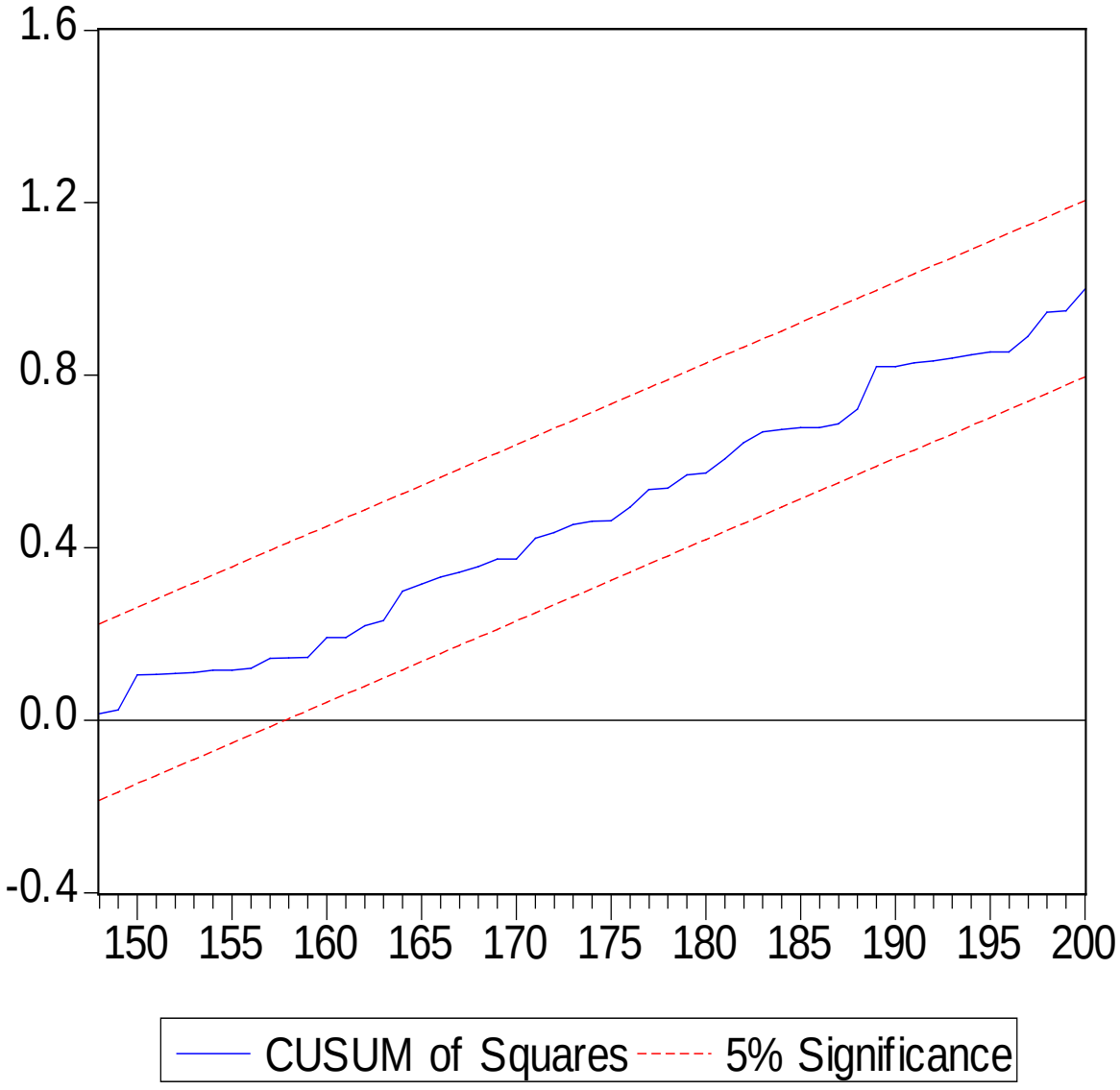
Spearman's Rank Correlation coefficient for model 3

		Ln cost of stigmatisation
Ln income	correlation coefficient	.597
	Sig (2-tailed)	.000
	N	200
Ln age	correlation coefficient	-.231
	Sig (2-tailed)	.001
	N	200
Male	correlation coefficient	.198
	Sig (2-tailed)	.005
	N	200
Primary	correlation coefficient	.078
	Sig (2-tailed)	.269
	N	200
Secondary	correlation coefficient	.444
	Sig (2-tailed)	.000
	N	200
Tertiary	correlation coefficient	.253
	Sig (2-tailed)	.000
	N	200

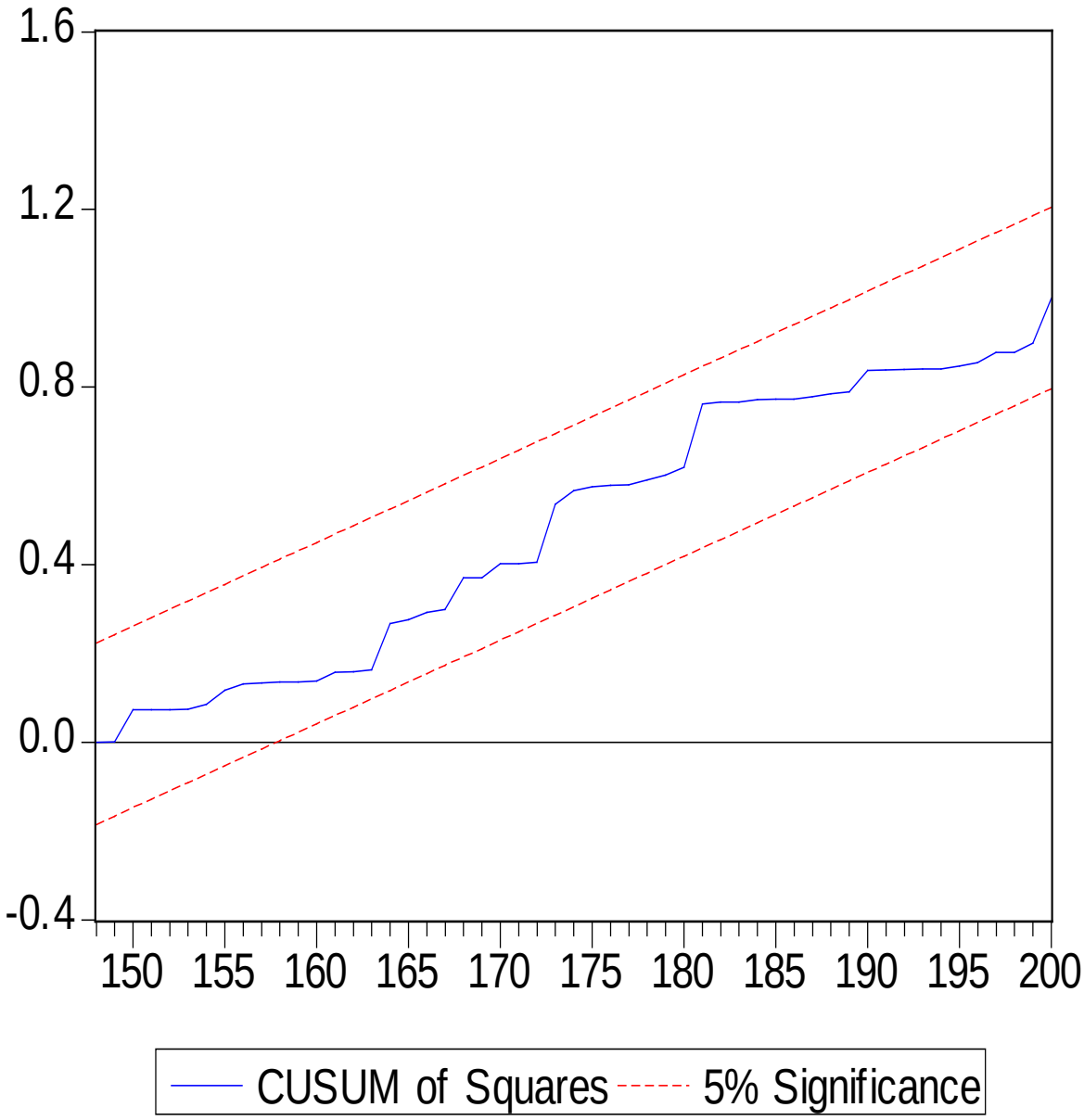
**.Correlation is significant at the 0.01 level (2tailed)

APPENDIX 5

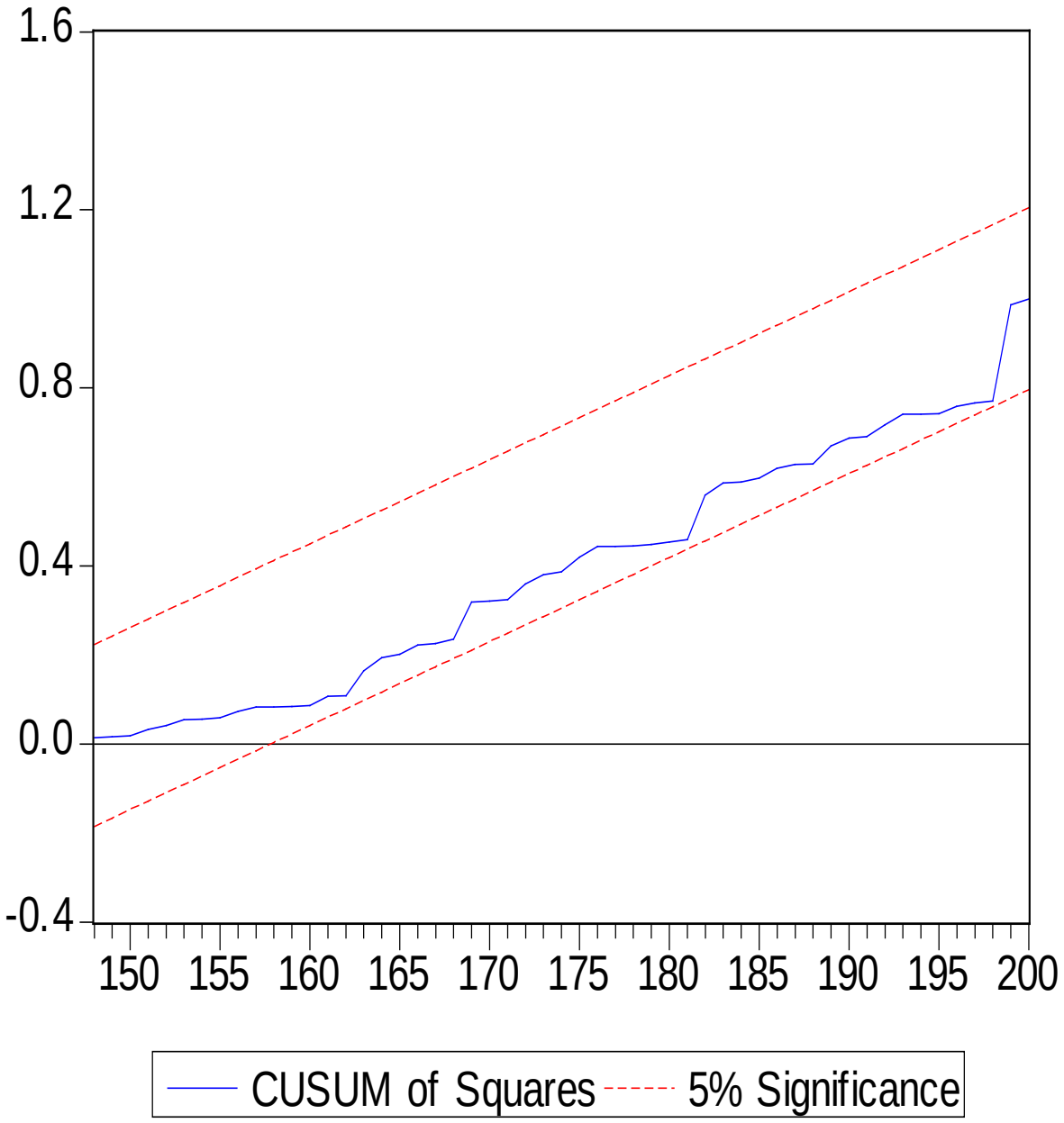
Stability of the Specification test for regression MODEL 1 models using Cummulative Sum of Residuals Squares (CUSUMQ)



Stability of the Specification test for regression MODEL 2 models using Cummulative Sum of Residuals Squares (CUSUMQ)



Stability of the Specification test for regression MODEL 3 models using Cummulative Sum of Residuals Squares (CUSUMQ)



Appendix 6
Data on descriptive statistics

Age Years	Gender	Education	Income GHC	Direct cost GHC	Indirect cost GHC	Stigmatisation cost GHC	Day lost by households
18.0	Female	Primary	296.11	96.11	1343.0	753.0	690.0
18.0	Female	No Education	146.4	46.73	706.44	431.0	524.0
20.0	Female	No Education	273.0	102.2	1323.0	450.0	961.0
21.0	Female	Primary	243.4	75.43	993.4	572.0	444.0
21.0	Female	No Education	209.1	119.0	1029.1	432.0	522.0
21.0	Female	No Education	270.2	42.91	930.2	863.0	453.0
21.0	Female	No Education	490.0	267.3	1120.0	784.0	563.0
22.0	Female	Primary	106.45	53.8	1106.45	570.0	763.0
22.0	Female	No Education	254.0	173.05	1204.0	672.0	563.0
24.0	Female	Primary	434.1	73.75	893.1	732.0	574.0
24.0	Female	Primary	459.22	86.35	611.22	982.0	191.0
24.0	Female	No Education	503.1	267.45	732.1	560.0	281.0
24.0	Female	No Education	432.19	288.4	532.9	892.0	217.0
24.0	Female	No Education	209.11	129.64	932.89	432.0	362.0
25.0	Female	Primary	439.2	223.55	1032.34	1089.0	452.0
25.0	Female	Primary	540.0	261.48	928.0	920.0	362.0
25.0	Female	Primary	684.4	298.25	732.43	1492.0	269.0
25.0	Female	Primary	573.2	235.3	674.23	1282.0	189.0
25.0	Female	Primary	826.0	364.98	435.2	1574.0	174.0
25.0	Female	Primary	387.11	177.2	903.22	742.0	462.0
25.0	Female	Primary	678.36	370.44	594.29	1532.0	331.0
25.0	Female	No Education	127.44	56.0	1404.2	629.0	662.0
25.0	Female	No Education	438.1	132.75	1032.0	1032.0	482.0
25.0	Female	Primary	423.3	196.33	842.32	1257.0	382.0
25.0	Female	Primary	723.1	326.65	634.29	1873.0	275.0
25.0	Female	Primary	432.45	106.2	1432.43	974.0	422.0
25.0	Female	Primary	603.1	209.42	1009.45	1843.0	372.0
26.0	Female	Primary	341.3	192.4	1432.23	652.0	833.0
26.0	Female	No Education	189.24	89.43	2543.0	532.0	951.0
26.0	Female	Primary	653.23	227.34	873.23	1902.0	562.0
26.0	Female	Primary	242.22	66.55	1423.0	672.0	510.0
26.0	Female	No Education	342.11	175.44	1243.0	570.0	732.0
26.0	Female	Primary	632.2	211.75	873.2	1320.0	313.0
26.0	Female	No Education	309.32	96.11	972.0	920.0	332.0
27.0	Female	No Education	534.3	46.73	1032.0	1032.0	563.0
29.0	Female	No Education	342.21	102.2	732.0	732.0	289.0
29.0	Female	Secondary	674.34	475.43	500.45	1300.0	209.0
29.0	Female	Secondary	932.0	319.0	672.0	2004.0	266.0

29.0	Female	Secondary	203.0	42.91	1420.9	425.0	774.0
29.0	Female	Primary	564.0	267.3	802.0	802.0	357.0
29.0	Female	No Education	244.0	53.8	1023.0	590.0	488.0
30.0	Female	No Education	432.2	173.05	172.0	273.0	97.0
30.0	Female	Secondary	523.0	473.75	793.0	793.0	331.0
30.0	Female	Secondary	1243.0	756.35	43.0	2894.0	23.0
30.0	Female	No Education	320.0	67.45	1227.0	450.0	573.0
30.0	Female	Secondary	499.1	288.4	562.0	940.0	301.0
30.0	Female	No Education	453.0	29.64	473.0	473.0	188.0
30.0	Female	Primary	321.0	123.55	742.0	742.0	355.0
30.0	Female	Secondary	832.0	361.48	652.0	1094.0	354.0
30.0	Female	No Education	225.1	98.25	973.0	487.0	392.0
30.0	Female	Secondary	982.14	455.3	49.0	3509.0	20.0
30.0	Female	Secondary	1083.05	504.98	342.0	963.0	91.0
30.0	Female	No Education	179.3	77.2	1398.34	309.0	683.0
30.0	Female	No Education	234.0	70.44	1893.0	100.0	643.0
30.0	Female	No Education	342.0	56.0	1672.0	432.0	553.0
30.0	Female	Secondary	1032.0	432.75	608.2	1327.0	260.0
30.0	Female	No Education	234.0	96.33	1423.0	372.0	601.0
30.0	Female	No Education	209.0	66.65	1290.0	642.0	492.0
30.0	Female	No Education	423.5	156.2	1362.0	421.0	673.0
30.0	Female	Primary	324.55	109.42	987.0	432.0	357.0
31.0	Female	No Education	321.23	142.4	1542.0	167.0	749.0
31.0	Female	Primary	142.19	89.43	1498.22	432.0	654.0
31.0	Female	Primary	574.2	227.34	643.0	742.0	267.0
32.0	Female	No Education	199.07	66.55	873.0	209.0	302.0
32.0	Female	No Education	423.0	175.44	452.0	320.0	189.0
33.0	Female	No Education	487.0	211.75	652.0	532.0	208.0
34.0	Female	Primary	234.0	96.11	1423.0	252.0	643.0
34.0	Female	No Education	103.45	46.73	1391.4	209.0	623.0
34.0	Female	No Education	352.0	102.2	940.0	743.0	421.0
35.0	Female	Primary	243.0	75.43	1092.0	751.0	443.0
35.0	Female	Primary	312.0	119.0	632.0	500.0	361.0
36.0	Female	Primary	178.34	42.91	1293.32	432.0	467.0
37.0	Female	No Education	200.45	67.3	1452.22	102.0	632.0
37.0	Female	Primary	132.0	53.8	162.0	243.0	45.0
39.0	Female	Primary	377.9	173.05	1092.6	192.0	482.0
39.0	Female	Primary	532.0	263.75	723.0	742.0	289.0
40.0	Female	No Education	113.0	26.35	1432.0	209.0	563.0
40.0	Female	Primary	341.0	67.45	672.0	642.0	276.0
40.0	Female	No Education	231.0	88.4	2298.0	570.0	973.0
41.0	Female	Primary	542.0	129.64	934.0	1021.0	405.0
41.0	Female	No Education	324.0	63.55	1034.0	67.0	472.0
41.0	Female	Primary	423.0	261.48	942.0	842.0	407.0
43.0	Female	Primary	312.0	198.25	903.0	465.0	402.0
43.0	Female	Primary	972.0	335.3	521.0	1250.0	189.0

44.0	Female	Primary	355.0	164.98	979.0	563.0	357.0
44.0	Female	Primary	423.0	177.2	609.34	600.0	270.0
44.0	Female	No Education	201.0	70.44	1225.0	421.0	635.0
48.0	Female	Primary	423.0	256.3	895.0	672.0	332.0
48.0	Female	No Education	324.0	132.75	887.0	502.0	397.0
49.0	Female	Primary	672.0	296.33	1423.0	1073.0	621.0
49.0	Female	Primary	153.0	66.65	1542.0	423.0	702.0
49.0	Female	No Education	166.0	56.2	1432.0	197.0	653.0
50.0	Female	Primary	312.0	109.42	972.0	452.0	332.0
50.0	Female	No Education	337.0	142.4	672.0	732.0	321.0
50.0	Female	No Education	231.0	89.43	1423.0	523.0	734.0
50.0	Female	No Education	435.0	227.34	880.0	342.0	376.0
50.0	Female	No Education	255.0	66.55	1422.0	632.0	643.0
50.0	Female	No Education	423.0	175.44	1065.0	653.0	502.0
51.0	Female	No Education	523.0	211.75	1190.0	1523.0	441.0
51.0	Female	Primary	542.0	296.11	980.0	762.0	367.0
54.0	Female	Primary	423.0	246.73	623.0	709.0	253.0
57.0	Female	Primary	382.0	102.2	572.0	420.0	197.0
57.0	Female	Primary	523.0	375.43	672.0	670.0	242.0
58.0	Female	Primary	472.3	209.2	972.0	567.0	432.0
60.0	Female	Primary	534.8	242.91	682.0	254.0	352.0
60.0	Female	No Education	342.4	167.3	1241.0	532.0	574.0
60.0	Female	No Education	423.0	253.8	782.0	673.0	249.0
61.0	Female	No Education	421.0	173.05	853.0	732.0	365.0
62.0	Female	No Education	524.0	263.75	579.0	1532.0	231.0
64.0	Female	No Education	423.2	326.35	609.0	1243.0	293.0
65.0	Female	No Education	234.0	67.45	753.0	720.0	342.0
65.0	Female	No Education	324.1	188.4	1092.0	532.0	479.0
70.0	Female	No Education	321.45	129.64	354.0	742.0	137.0
74.0	Female	No Education	312.0	123.55	673.0	670.0	207.0
76.0	Female	No Education	498.0	211.54	932.0	1201.0	350.0
18.0	Male	Primary	495.24	291.48	532.0	1432.0	211.0
19.0	Male	No Education	239.0	198.25	790.0	542.0	242.0
19.0	Male	No Education	430.3	135.3	563.0	697.0	211.0
19.0	Male	No Education	631.8	264.98	467.0	675.0	164.0
20.0	Male	Primary	441.76	247.2	786.0	732.0	385.0
20.0	Male	Primary	376.3	270.44	1075.0	1175.0	452.0
22.0	Male	Primary	412.45	153.6	873.0	773.0	362.0
23.0	Male	Primary	309.62	139.75	943.0	762.0	493.0
23.0	Male	Primary	466.16	396.33	732.0	978.0	274.0
23.0	Male	Secondary	612.15	266.65	587.0	1321.0	109.0
24.0	Male	No Education	346.2	106.2	1042.0	532.0	443.0
24.0	Male	No Education	367.0	109.42	906.0	806.0	332.0
25.0	Male	Secondary	422.24	142.4	1289.0	1484.0	599.0
25.0	Male	No Education	200.56	89.43	1573.0	652.0	773.0
25.0	Male	Primary	534.66	227.34	853.0	732.0	301.0

25.0	Male	Secondary	456.25	366.55	1032.0	1643.0	503.0
25.0	Male	Primary	352.67	175.44	1320.0	742.0	652.0
25.0	Male	No Education	409.3	211.75	872.0	872.0	352.0
27.0	Male	No Education	212.23	96.11	1081.0	542.0	452.0
28.0	Male	Secondary	726.45	246.73	523.0	1523.0	271.0
28.0	Male	Secondary	322.3	102.2	132.0	1093.0	56.0
28.0	Male	Secondary	1032.0	705.43	94.0	2319.0	45.0
28.0	Male	Secondary	371.56	159.1	1432.0	1432.0	742.0
29.0	Male	Secondary	376.45	242.91	798.32	754.0	374.0
30.0	Male	Secondary	523.0	367.3	653.0	1790.0	321.0
30.0	Male	Secondary	1127.21	513.8	59.0	3251.0	25.0
30.0	Male	No Education	528.35	173.05	482.0	1987.0	219.0
30.0	Male	Primary	567.2	363.75	523.0	872.0	239.0
30.0	Male	Primary	544.35	226.35	763.0	653.0	341.0
30.0	Male	No Education	410.1	167.45	672.0	724.0	292.0
30.0	Male	Primary	267.4	188.4	1272.0	432.0	543.0
30.0	Male	Tertiary	3328.22	1399.64	152.0	4320.0	58.0
30.0	Male	Primary	543.54	223.55	753.0	1523.0	276.0
30.0	Male	No Education	711.28	261.48	441.0	972.0	198.0
33.0	Male	No Education	1321.32	918.25	67.0	2053.0	34.0
33.0	Male	Secondary	1209.34	650.3	271.0	3562.0	109.0
34.0	Male	Primary	1110.35	614.98	375.0	2423.0	165.0
34.0	Male	No Education	423.0	177.2	652.0	543.0	342.0
35.0	Male	Primary	972.32	570.44	562.0	1432.0	301.0
35.0	Male	Secondary	1235.15	706.55	75.0	2971.0	37.0
35.0	Male	No Education	327.0	132.75	1072.0	423.0	643.0
35.0	Male	No Education	511.96	296.33	642.0	632.0	342.0
36.0	Male	Secondary	834.3	466.65	243.0	1762.0	98.0
36.0	Male	No Education	324.72	156.2	743.0	643.0	312.0
37.0	Male	No Education	341.81	109.42	673.0	732.0	266.0
38.0	Male	Secondary	742.2	442.4	172.0	1053.0	59.0
38.0	Male	No Education	321.22	189.43	902.0	632.0	402.0
39.0	Male	Primary	672.0	427.34	732.0	542.0	314.0
40.0	Male	Tertiary	1241.0	966.55	20.0	4213.0	9.0
40.0	Male	No Education	309.12	175.44	1234.0	430.0	573.0
40.0	Male	Primary	321.4	211.75	356.0	409.0	177.0
40.0	Male	No Education	173.0	96.11	1298.0	298.0	742.0
40.0	Male	Tertiary	742.19	546.73	567.0	1342.0	242.0
40.0	Male	Secondary	932.1	702.2	210.0	732.0	100.0
41.0	Male	Tertiary	3150.2	2005.43	116.0	4302.0	87.0
42.0	Male	No Education	467.45	319.2	763.0	602.0	255.0
43.0	Male	Primary	625.55	422.91	745.0	543.0	315.0
43.0	Male	Secondary	976.41	767.3	37.0	1108.0	14.0
43.0	Male	Secondary	624.32	453.8	572.0	963.0	312.0
43.0	Male	Secondary	703.6	473.05	401.0	752.0	198.0
43.0	Male	Primary	423.55	323.75	932.0	432.0	405.0

44.0	Male	No Education	442.03	306.35	752.0	690.0	327.0
44.0	Male	Primary	570.0	367.45	872.0	774.0	423.0
45.0	Male	Primary	422.65	188.4	977.2	570.0	529.0
45.0	Male	No Education	231.0	129.64	624.0	500.0	209.0
46.0	Male	Primary	732.9	323.55	60.0	790.0	27.0
47.0	Male	No Education	377.6	261.48	872.1	205.0	407.0
47.0	Male	Primary	521.33	398.25	672.0	450.0	267.0
47.0	Male	Primary	631.2	335.3	595.0	732.0	319.0
49.0	Male	Primary	872.0	464.98	243.0	790.0	199.0
50.0	Male	Primary	632.0	377.2	476.0	1320.0	232.0
50.0	Male	No Education	595.33	270.44	531.0	543.0	325.0
50.0	Male	No Education	366.1	256.34	1089.2	582.0	477.0
51.0	Male	Tertiary	3974.2	1532.75	94.2	2540.0	45.0
51.0	Male	Secondary	1539.71	996.33	55.2	1337.0	21.0
53.0	Male	No Education	236.0	146.65	942.64	432.0	332.0
54.0	Male	Primary	672.28	456.2	332.0	500.0	179.0
55.0	Male	No Education	449.25	279.42	572.12	341.0	209.0
59.0	Male	Primary	614.3	442.4	421.76	734.0	188.0
60.0	Male	Primary	700.2	389.43	327.32	873.0	123.0
60.0	Male	Primary	657.2	427.34	642.0	1163.0	309.0
62.0	Male	No Education	216.25	166.55	342.0	420.0	176.0
66.0	Male	No Education	445.15	375.44	772.92	418.0	266.0
67.0	Male	No Education	397.0	211.75	1202.0	107.0	557.0
80.0	Male	No Education	785.25	329.35	45.69	460.0	28.0