

Retrospective Study of Records on Epidemiological Transition in the Tamale Teaching Hospital

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Abstract: *Retrospective analyses of records of patients were done at the Tamale Teaching Hospital (TTH) from 2010 to 2014 to study the diseases trends and its causes in Northern Ghana and to determine the causes of the epidemiological transition. Morbidity and mortality from infective and non-infectious diseases were both at higher levels.*

Analysis of data from the GSS revealed that there has been an accelerated urbanization from 1970 to 2014. This unplanned urbanization coupled with lack of health education has led to unbalanced epidemiological transition in Northern Ghana, which is the double disease burden (communicable and non-communicable diseases). The solution to this public health problem lies in primary health; eradication of poverty, compulsory health education and control of population density; to reduce the risk factors, we need to work towards achieving the millennium development goals (MDGs).

Keywords: *Epidemiology, Non-communicable disease, Infectious disease, Urbanization, Globalisation, Risk factors, Mortality, Morbidity, Urban poverty and Tamale Teaching Hospital.*

1. INTRODUCTION

Epidemiological transition is the changes in trend of diseases have increased frequency on our medical wards and OPD.

This agrees with the phenomenon that explosive urbanisation and globalisation results to epidemiological transition. In Europe the industrial revolution resulted in transition from communicable disease to non-communicable diseases (WHO, 2010).

At Kor-lebu Teaching Hospital, retrospective records study reported that 75% of all causes of death were from Hypertension and its complications. There has been an explosive urbanisation in Tamale since independence. Tamale has been described as the fastest growing city in sub-Saharan Africa (UNICEF, 2000).

According to the health and demographic surveillance report, Tamale had the population of 36500 in 200, but the 2010 population census reported the same city to have 675,000 people. For the past few years there has been a higher level of immigration of surrounding villages and other cities with higher reproductive rate by the indigenes. This has made the risk factors to chronic non-communicable diseases CNCD (such as DM, HPT, cancer PUD) higher.

Also because of poverty and lower educational level, the disease burden of the communicable disease is still high. The TMA is therefore from the double disease burden CNCD and infectious diseases.

For Northern, we are still too far from achieving the MDG because the old local traditions and customs are still maintained while we adopt the life style of urbanisation which poses as risks factors to the CNCD. This means that the double public health burden of infectious and CNCD have no end as yet.

This main objective of this research is therefore to report the rate of epidemiological transition and the increase in mortality and morbidity caused by the fast rate of urbanisation in TMA.

1.1. Rational

The relevance of NCDs and the risk factors is high in some SSA settings. With the lack of vital statistics systems, epidemiologic studies with a variety of designs (cross sectional, longitudinal and interventional) capable of in-depth analysis of risk factors could provide a better understanding of NCDs in SSA, and inform health care policy to mitigate the oncoming NCD epidemic.

This retrospective study will bring more light as to how much epidemiological transition is manifested in the catchment area of the TTH with focus on the double public burden.

1.2. Research Questions

- What is prevalence of HPT, DM, and stroke at the TMA?
- What is mortality rate at TTH caused by CNCD before and after urbanisation?
- What is the relationship between awareness of CNCD and epidemiological transition be created in Northern Ghana?

1.3. Research Objectives

- To determine the prevalence of CNCD at the TMA
- To determine the mortality rate of CNCD at TTH
- To create awareness of the epidemiological transition in Northern Ghana.

Death rate of unknown causes is at a higher level at the TMA. In TTH, mortality and morbidity from non-communicable diseases is so high while the infectious disease such as TB, HIV, Meningitis and RTA. Snake bites are still at higher levels. This high level double burden public health conditions demands scientific research in to epidemiological transition at the TTH. The results from this study may be a basis for other further research in Northern Ghana on CNCD and epidemiological transition.

Tamale (TMA) has a disproportionate burden of both infectious and chronic diseases compared with other world regions. Current diseases estimates for sub-Saharan Africa are based on sparse data, but projections indicate increases in non-communicable diseases (NCDs) caused by demographic and epidemiological transition.

2. LITERATURE REVIEW

According to Dalals et al, the prevalence of NCDs and their risk factors is high in some SSA settings, with lack of vital statistics systems; epidemiologic studies with variety of in-depth analysis of risk factors could provide a better understanding of NCD in the Tamale Metropolitan Assemble of Northern Ghana.

Non-communicable diseases have been established as a clear threat not only to human health, but also to development and economic growth. Claiming 63% of all deaths, these diseases are currently the world's main killer. Eighty percent of these deaths now occur in low and middle income countries (World Economic Forum, 2010). Half of those who die of chronic non-communicable diseases are in the prime of their productive years, and thus, the disability imposed and the lives lost are also endangering industry competitiveness across borders. Recognizing that building a solid economic argument is ever more crucial in times of financial crisis, this report brings to the global debate fundamental evidence which had previously been missing: an account of the overall costs of NCDs including what specific impact NCDs might have on economic growth.

The evidence gathered is compelling. Over the next 20 years, NCDs will cost more than US\$ 30 trillion, representing 48% of global GDP in 2010, and pushing millions of people below the poverty line. Mental health conditions alone will account for the loss of an additional US\$ 16.1 trillion, over this time span, with dramatic impact on productivity and quality of life.

By contrast, mounting evidence highlights how millions of deaths can be averted and economic losses reduced by billions of dollars if added focus is put on prevention. A recent world health organisation report underlines that population based measures for reducing tobacco and harmful alcohol use, as well as unhealthy diet and physical inactivity, are estimated to cost US\$ 2 billion per year for all low and middle income countries, which in fact translates to less than US\$ 0.40 per person.

The rise in the prevalence and significance of NCDs is the result of complex interaction between health, economic growth and development, and it is strongly associated with universal trends such as ageing of the global population, rapid unplanned urbanisation and the globalisation of unhealthy lifestyles. In addition to the tremendous demands that these diseases place on social welfare and health systems, they also cause decreased productivity in the workplace, prolonged disability and diminished resources within families.

The results are unequivocal: a unified front is needed to turn the tide on NCDs. Governments, but also civil society and the private sector must commit to the highest level of engagement in combating these diseases and their rising economic burden. Global business leaders are acutely aware of the problems posed by NCDs. A survey of business executives from around the world, conducted by the world economic forum since 2009, identified NCDs as one of the leading threats to global economic growth. Therefore, it is also important for the private sector to have a strategic vision on how to fulfil its role as a key agent for change and how to facilitate the adoption of healthier lifestyles not only by consumers, but also by employees.

The need to create a global vision and a common understanding of the action required by all sectors and stakeholders in society has reached top priority on the global agenda this year, with the United Nations General Assembly convening a high level meeting on the prevention and control of NCDs.

If the challenges imposed on countries, communities and individuals by NCDs are to be met effectively this decade, they need to be addressed by a strong multi-stakeholder and cross-sectoral response, meaningful changes and adequate resources. We are pleased and proud to present this report, which we believe will strengthen the economic case for action.

Klaus Schwab; Julio Frenk: founder and executive chairman World Economic Forum.

As policy makers search for ways to reduce poverty and income inequality, and to achieve sustainable income growth, they are being encouraged to focus on an emerging challenge to health, well-being and development: non-communicable diseases (NCDs).

After, 63% of all deaths worldwide currently stem from NCDs – chiefly cardiovascular disease, cancers, chronic respiratory diseases and diabetes. These deaths are distributed widely among the world's population – from high income to low income countries and from young to old (about one quarter of all NCD deaths occur below the age of 60, amounting to approximately 9 million deaths per year). NCDs have a large impact, undercutting productivity and boosting healthcare outlays. Moreover, the number of people affected by NCDs is expected to rise substantially in the coming decades, reflecting an ageing and increasing global population.

With this in mind, the United Nations held its first high-level meeting on NCDs on 19-20 September 2011 – this was only the second time that a high level UN meeting was being dedicated to a health topic (the first time being on HIV/AIDS in 2001). Over the years, much work has been done estimating the human toll of NCDs, but work on estimating the economic toll is far less advanced.

In this report, the world economic forum and the Harvard school of public health try to inform and stimulate further debate by developing new estimates of the global economic burden of NCDs in 2010, and projecting the size of the burden through 2030. Three distinct approaches are used to compute the economic burden: (1) the standard cost of illness method; (2) macroeconomic simulation and (3) the value of a statistical life. This report includes not only the four major NCDs (the focus of the UN meeting), but also mental illness, which is a major contributor to the burden of disease worldwide. This evaluation takes place in the context of enormous global health spending, serious concerns about already strained public finances and worries about lacklustre economic growth. The report also tries to capture the thinking of the business community about the impact of NCDs on their enterprises.

2.1. Background on NCDs

Non-communicable diseases (NCDs) impose a large burden of human health worldwide. Currently, more than 60% of all deaths worldwide stem from NCDs. Moreover, what were once considered “diseases of affluence” have now encroached on developing countries.

In 2008, roughly four out of five NCD deaths occurred in low and middle income countries (WHO, 2011a), up sharply from just under 40% in 1990 (Murray & Lopez, 1997). Moreover, NCDs are having an effect throughout the age distribution – already, one-quarter of all NCD-related deaths are among people below the age of 60 (WHO, 2011a). NCDs also account for 48% of the healthy life years lost (Disability Adjusted life years - DALYs) worldwide (versus 40% for communicable disease, maternal and perinatal conditions and nutritional deficiencies, and 1% for injuries) (WHO, 2005a).

Adding urgency to the NCD debate is the likelihood that the number of people affected by NCDs will rise substantially in the coming decades. One reason is the interaction between two major

demographic trends. World population is increasing, and although the rate of increasing, and although the rate of increase has slowed, UN projections indicate that there will be approximately 2 billion more people by 2050. In addition, the share of those aged 60 and older has begun to increase and is expected to grow very rapidly in the coming years. Since NCDs disproportionately affect this age group, the incidence of these diseases can be expected to accelerate in the future. Increasing prevalence of the key risk factors will also contribute to the urgency, particularly as globalization and urbanization take greater hold in the developing world.

2.2. Defining NCDs

What exactly are NCDs? They are defined as diseases of long duration, generally slow progression and they are the major cause of adult mortality and morbidity worldwide (WHO, 2005a). Four main diseases are generally considered to be dominant in NCD mortality and morbidity: cardiovascular diseases (including heart disease and stroke), diabetes, cancer and chronic respiratory diseases (including chronic obstructive pulmonary disease and asthma).

The High-Level Meeting will focus on the four main diseases, but it is important to bear in mind that they do not make up a comprehensive list. A key set of diseases not included on the list are mental illnesses – including unipolar depressive disorder, alcohol use disorders and schizophrenia, all major contributors to the economic losses stemming from NCDs.

Also excluded are sense disorders such as glaucoma and hearing loss, digestive diseases such as cirrhosis, and musculoskeletal diseases such as rheumatoid arthritis and gout. These conditions impose private and social costs that are also likely to be substantial. For example, musculoskeletal diseases can severely diminish one's capacity to undertake manual labour, such as farming, which is the dominant productive activity in rural settings that are home to 50% of the world's population.

Moreover, the term NCD is something of a misnomer because it encompasses some diseases that are infectious in origin. Human papillomavirus is a cause of various cancers (for example, cervical, anal, genital and oral) and a portion of gastric cancers are caused by the *H. pylori* bacteria. Indeed, up to one in five cancers is said to be caused by infection.

In the social sphere, NCD risks are also shared – eating, drinking and smoking habits are powerfully influenced by social networks.

2.3. Major NCD Risk Factors

NCDs stem from a combination of modifiable and non-modifiable risk factors.

Non-modifiable risk factors refer to characteristics that cannot be changed by an individual (or the environment) and include age, sex, and genetic make-up. Although they cannot be the primary targets of interventions, they remain important factors since they affect and partly determine the effectiveness of many prevention and treatment approaches.

A country's age structure may convey important information on the most prevalent diseases, as may the population's racial/ethnic distribution. *Modifiable risk factors* refer to characteristics that societies or individuals can change to improve health outcomes. WHO typically refers to four major ones for NCDs: poor diet, physical inactivity, tobacco use, and harmful alcohol use (WHO, 2011a).

2.3.1. Poor Diet and Physical Inactivity

The composition of human diets has changed considerably over time, with globalization and urbanization making processed foods high in refined starch, sugar, salt and unhealthy fats cheaply and readily available and enticing to consumers – often more so than natural foods (Hawkes, 2006; Kennedy, Nantel, & Shetty, 2004; Lieberman, 2003; WHO, 2002). As a result, overweight and obesity, and associated health problems, are on the rise in the developing world (Cecchini, et al., 2010). Exacerbating matters has been a shift toward more sedentary lifestyles, which has accompanied economic growth, the shift from agricultural economies to service-based economies, and urbanization in the developing world. This spreading of the fast food culture, sedentary lifestyle and increase in bodyweight has led some to coin the emerging threat a “globesity” epidemic (Bifulco & Caruso, 2007; Deitel, 2002; Schwartz, 2005).

2.3.2. Tobacco

High rates of tobacco use are projected to lead to a doubling of the number of tobacco-related deaths between 2010 and 2030 in low- and middle-income countries. Unless stronger action is taken now, the 3.4 million tobacco-related deaths today will become 6.8 million in 2030 (NCD Alliance, 2011). A 2004 study by the Food and Agriculture Organization (FAO) predicted that developing countries would consume 71% of the world's tobacco in 2010 (FAO, 2004). China is a global tobacco hotspot, with more than 320 million smokers and approximately 35% of the world's tobacco production (FAO, 2004; *Global Adult Tobacco Survey - China Section*, 2010). Tobacco accounts for 30% of cancers globally, and the annual economic burden of tobacco-related illnesses exceeds total annual health expenditures in low- and middle-income countries (American Cancer Society & World Lung Foundation, 2009).

2.3.3. Alcohol

Alcohol use has been causally linked to many cancers and in excessive quantity with many types of cardiovascular disease (Boffetta & Hashibe, 2006; Ronksley, Brien, Turner, Mukamal, & Ghali, 2011). Alcohol accounted for 3.8% of deaths and 4.6% of DALYs in 2004 (GAPA, 2011). Evidence also shows a causal, dose-response relationship between alcohol use and several cancer sites, including the oral cavity, pharynx, larynx, oesophagus, liver and female breast (Rehm, et al., 2010).

The pathway from modifiable risk factors to NCDs often operates through what are known as “intermediate risk factors” – which include overweight/obesity, elevated blood glucose, high blood pressure and high cholesterol. Secondary prevention measures can tackle most of these risk factors, such as changes in diet or physical activity or the use of medicines to control blood pressure and cholesterol, oral agents or insulin to control blood sugar and pharmacological/ surgical means to control obesity.

Although intervening on intermediate risk factors may be more effective (and more cost-effective) than waiting until NCDs have fully developed, treating intermediate risk factors may, in turn, be less effective (and less cost-effective) than primary prevention measures or creating favorable social and policy environments to reduce vulnerability to developing disease (Brownell & Frieden, 2009; National Commission on Prevention Priorities, 2007; Satcher, 2006; Woolf, 2009).

After all, even those with the will to engage in healthy practices may find it difficult to do so because they live or work in environments that restrict their ability to make healthy choices. For these reasons, the need to address social determinants of NCDs was reiterated at the 64th World Health Assembly held in Geneva, Switzerland in May 2011 by WHO Member States in preparation for the UN High-Level Meeting in September 2011.

Macro-level contextual factors include the built and social environment; political, economic and legal systems; the policy environment; culture; and education. Social determinants are often influenced by political systems, whose operation leads to important decisions about the resources dedicated to health in a given country. For example, in the United States, freemarket systems often promote an individualistic cultural and social environment – which affects the amount of resources allocated for healthcare, how these resources are spent and the balance of state versus out-of-pocket expenditures that are committed to protect against, and cope with, the impact of disease (Kaiser, 2010; Siddiqi, Zuberi, & Nguyen, 2009).

Political systems that promote strong social safety nets tend to have fewer social inequalities in health (Beckfield & Krieger, 2009; Navarro & Shi, 2001).

Social structure is also inextricably linked with economic wealth, with the poor relying more heavily on social support through non-financial exchanges with neighbours, family and friends to protect against, and cope with, the impact of disease. Wilkinson and Marmot have written extensively on the role that practical, financial and emotional support plays in buoying individuals in times of crisis, and the positive impact this can have on multiple health outcomes including chronic disease (Wilkinson & Marmot, 2003).

The United Nations Population Fund (UNFPA) reports that the proportion of the world's population living in urban areas surpassed half in 2008. The United Nations Human Settlements Programme (UN-HABITAT) estimates that by 2050, two-thirds of people around the world will live in urban areas. Approximately 1 billion people live in urban slums. According to the UN, 6.5% of cities are made up of slums in the developed world, while in the developing world the figure is over 78%.

Although most studies note an economic “urban advantage” for those living in cities because of greater access to services and jobs, this advantage is often diminished by the higher cost of living in cities and low quality of living conditions in urban slums (ECOSOC, 2010).

In addition, urbanization and globalization heavily influence resource distribution within societies, often exacerbating geographic and socioeconomic inequalities in health (Hope, 1989; Schuftan, 1999). Notably, a 100-country study by Ezzati et al. found that both body mass index (BMI) and cholesterol levels were positively associated with a rise in urbanization and national income (Ezzati, et al., 2005). At a regional level, a study conducted by Allender et al. Similarly found strong links between the proportion of people living in urban areas and NCD risk factors in the state of Tamil Nadu, India (Allender, et al., 2010).

This study observed a positive association between urbanicity and smoking, BMI, blood pressure and low physical activity among men. Among women, urban concentration was positively associated with BMI and low physical activity. Similar findings have been observed in other countries as well (Vlahov & Galea, 2002). A growing literature has emerged on the effect of the built environment and global trends toward urbanization on health (Michael, et al., 2009).

Education matters, too. This effect is at least partially attributable to the better health literacy that results from each additional year of formal education. Improved health literacy has been linked to improved outcomes in breastfeeding, reduction in smoking and improved diets and lowered cholesterol levels (ECOSOC, 2010).

Non-communicable diseases (NCDs) in Ghana accounted for an estimated 39 per cent of all mortality in 2008. In 2008, the most prevalent NCDs were cardiovascular diseases (18 per cent).

Cancers, non-communicable variants of respiratory diseases and diabetes contributed 6 per cent, 5 per cent and 1 per cent to total mortality respectively (2008).

2.4. Non-Communicable Diseases in Northern Ghana

The prevalence of major chronic non-communicable diseases and their risk factors has increased over time and contributes significantly to the Ghana's disease burden. Conditions like hypertension, stroke and diabetes affect young and old, urban and rural, and wealthy and poor communities. The high cost of care drives the poor further into poverty. Lay awareness and knowledge are limited, health systems (biomedical, ethno medical and complementary) are weak, and there are no chronic disease policies. These factors contribute to increasing risk, morbidity and mortality. As a result chronic diseases constitute a public health and a developmental problem that should be of urgent concern not only for the Ministry of Health, but also for the Government of Ghana.

New directions in research, practice and policy are urgently needed. They should be supported by active partnerships between researchers, policymakers, industry, patient groups, civil society, government and development partners.

Major causes of death in Northern Ghana have shifted from predominantly communicable diseases to a combination of communicable and chronic non-communicable diseases (NCDs) over the last few decades. Hypertension, stroke, diabetes and cancers have become top 10 causes of death. Urbanization, changing lifestyles (including poor diets), ageing populations, globalization and weak health systems are implicated in chronic disease risk, morbidity and mortality.

Despite recognition of a growing chronic disease burden in the early 1990s, a series of low-level interventions over the last fifteen years, and a national health policy that emphasises health promotion and prevention of lifestyle diseases, Ghana does not have a chronic disease policy or an integrated plan. These structural deficiencies compound the financial and psychosocial challenges faced by individuals, caregivers and families affected by chronic diseases.

This *Ghana Medical Journal* Supplement Issue on Ghana's chronic disease burden developed from the proceedings of the first annual workshop of the UK-Africa Academic Partnership on Chronic Disease held at the Noguchi Memorial Institute for Medical Research in April, 2007. The workshop aimed to collate interdisciplinary information on Ghana's chronic disease burden as a starting point for engaging with national policy development and implementation, as well as with broader regional and international trends at subsequent meetings.

The partnership's flagship special issue published in *Globalization and Health* addressed local and global perspectives on Africa's chronic disease burden. This supplement offers insights into four key areas of the Ghana's NCD burden: epidemiological, clinical, psychosocial and intervention/policy. Some papers offer important comprehensive reviews of NCD research conducted over the last 40 years. Brief comments are made on these themes and future directions in research, practice and policy are outlined.

The epidemiological themes focus on hypertension, stroke, diseases of ageing, asthma and mental illness. Cross-cutting themes suggest that epidemiological studies are limited, prevalence of focal conditions are rising and future research must prioritise robust population-based research to improve prevention, detection, treatment and control of common conditions. The clinical themes focus on management of stroke, asthma, type 1 diabetes and cancers. NCD management is generally poor. Poor clinical care and poor self-care - both due partly to limited professional and lay knowledge - are implicated in avoidable complications and premature deaths.

The psychosocial themes illuminate the psychological, social, cultural and economic contexts of living with type 1 diabetes, terminal chronic conditions, mental illness and other common NCDs. There is agreement that policy responses to Ghana's NCD burden has been inadequate and that greater efforts are needed to bridge the gap between policy rhetoric and action.

Population-based studies, as well as action oriented research - e.g. implementation, impact, operational, evaluation studies - should be prioritised. More research is required, for example, on asthma in the adult population, to understand what happens to stroke patients after discharge, the help-seeking behaviour across medical systems and to estimate the indirect costs of NCDs on households. Impact studies on the psychosocial benefit of patient support groups are required to incorporate the work of patient and advocacy groups more adequately in medical care.

Robust qualitative and ethnographic studies are needed to increase understanding of the complex psychological and cultural contexts of risk, illness experience, caregiving and social attitudes.

Interventions must be multi-pronged and encompass primary and secondary prevention. Improved health communication strategies are needed to improve awareness and behaviour change. It is essential that interventions are targeted to young persons, regions with high prevalence (e.g. Greater Accra and Ashanti), and high-risk populations (obese individuals; individuals with multiple risks and co-morbid conditions). Health services need to be strengthened, to improve the capacity of peripheral institutions to deliver quality care and to reduce the congestion in the tertiary level facilities.

Poor knowledge and attitudes of health practitioners on chronic diseases undermine quality of care. It is important to include chronic disease management in the continuous professional development activities of health workers and to develop guidelines valid for local use.

Policy neglect has been due partly to limited research, weak surveillance systems and the lack of reliable data, limited political interest and donor investment. Innovative ways of mobilizing funds and strengthening political will to support NCD control and prevention are required. In Ghana, achievable interventions include passing tobacco legislation and passing or enforcing laws on food labelling to reduce salt and energy content of processed foods. The drive to enrol more registrants to the NHIS should be intensified as well as restructuring benefits package to include more chronic disease medicines and treatment. Best practice models in other African countries - such as South Africa and Cameroon - can inform Ghanaian research, practice and policy.

Chronic NCDs contribute significantly to the nation's disease burden. They constitute both a public health and a developmental issue that should be of urgent concern not only for the Ministry of Health, but also for the Government of Ghana. Pertinent challenges include limited knowledge of NCDs in the general population which contributes to late reporting to clinics for care, high costs of medicines and high rates of preventable complications. NCDs affect poor communities; the catastrophic costs of care drive them deeper into poverty.

The UN convened a High-level Meeting on NCDs in September 2011. Ghana participated in the conference, and endorsed the draft political declaration passed on NCDs. Central themes of the declaration included the adoption of a "whole-of-government and a whole-of-society effort" in tackling national NCD burdens. Ghana has a history of participating and endorsing several international, regional and sub-regional resolutions and declarations on chronic diseases which do not get implemented.

To bridge the gulf between policy rhetoric and implementation, joint action by government (and its various relevant sector ministries), health and public policymakers, industry, civil society, researchers and patient groups is urgently needed. The government needs to give high priority to policies and funded programmes for the prevention and control of chronic diseases.

Public-private partnerships with the pharmaceutical industry should aim to ensure availability, affordability and accessibility of low-cost generic drugs for the management of chronic diseases. Researchers need to focus efforts on implementation research questions relevant to Ghana.

It has been recognized that as societies modernize, they experience significant changes in their patterns of health and disease. Despite rapid modernization across the globe, there are relatively few detailed case studies of changes in health and disease within specific countries especially for sub-Saharan Africa countries. This paper presents evidence to illustrate the nature and speed of the epidemiological transition in Northern Ghana.

Ghana's socio-economic and demographic changes and burden of chronic disease. Our review indicates that the epidemiological transition in Accra reflects a protracted polarized model.

A "protracted" double burden is polarized across social class. While wealthy communities experience higher risk of chronic disease, poor communities experience higher of infectious diseases and a double burden of infectious and chronic diseases. Urbanization, urban poverty and globalization are key factors in the transition. We explore the structures and processes of these factors and consider the implications for the epidemiological transition in Northern Ghana.

3. METHODOLOGY

Records of clients were studied from OPD records room, female medical and male medical wards. Morbidity and mortality was studied by recording causes of death, diagnosis of each patient and also primary complains.

Mortality was also studied by review of the death certificate book from the mortuary. Also at the deaths and births registry, the records of deaths from various diseases was studied and recorded.

3.1. Population density (Urbanisation)

At the Ghana statistical board, the health and population census records was studied and analysed from 1960 – 2010, the results said that there was

4. DISCUSSIONS OF RESULTS

There has been accelerated increase in population density in Northern Ghana since 1970. (Ghana Statistical Board 2010). The increase resulted to urbanization. Urbanization results to increase in risk factors to disease of CND and also communicable disease. Since the catchment area of TTH is N/R. This explains the double disease burnden in Northern region from 2010-2014.

At the TTH, death rates from unusual conditions have increased. The prevalence of chronic non communicable diseases rises as a result of the epidemiology transition, yet the infectious diseases are still not eradicated. The two disease burdens are therefore competing.

From the WHO report 2010, there is Epidemic of NCD replacing infectious disease as epidemiological secondary to globalization or urbanization transition.

As shown in the table, the Northern region has a total population of 2,479,461 in 2010 with more females (1,249,574) than males (1,229,887). The population of the region increased by 36.2 percent between 2000 and 2010, making it the third fastest growing region in the country after the Central (38.1%) and Greater Accra (38.0%) regions (GSS, 2010).

According to the 1960, the population of the Northern region was 531,573; it increased to 727,618 in 1970 and to 1,164,583 in 1984 representing over 50% increase in 24 years. The region recorded an intercensal growth rate of 2.9 percent between 2000 and 2010. This is a slight increase over the 2.8 percent for the period of 1984 to 2000. Prior to 2000, the annual intercensal growth rate of the region had been above 3 percent (3.2 percent between 1960 and 1970 and 3.4 percent between 1970 and 1984). The region's share of the national population is 10.1 percent, making it the fourth largest in terms of population after the Ashanti (19.4%), Greater Accra (16.3%) and Eastern (10.7%) regions.

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Table. Population size and growth, 1960-2010

Year	Population	% Increase	% share of Ghana's population	Intercensal Growth rate
1960	531,573	-	7.9	-
1970	727,618	36.9	8.5	3.2
1984	1,164,583	60.1	9.5	3.4
2000	1,820,806	56.3	9.6	2.8
2010	2479,461	36.2	10.1	2.9

Unplanned urbanization leads to population density disorder which leads to urban poverty, change in life style and increase in risk factors that results to high prevalence of chronic non-communicable diseases are also communicable diseases.

In ability to benefit from health can facilities encourage self-medication. This lead change and herbal abuses. This explained the high level of cancer of the liver, kidneys and brain.

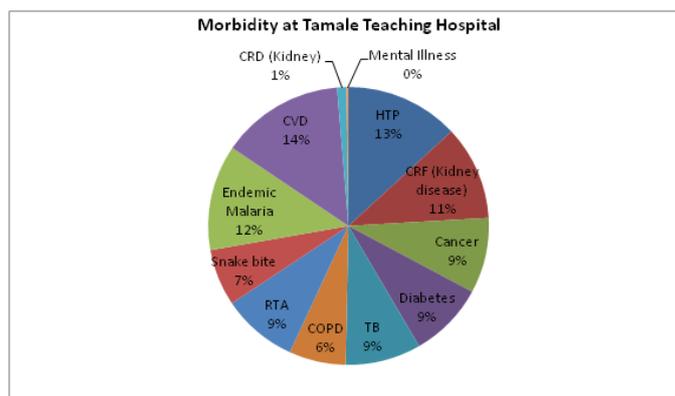
Urbanization and globalization leads to smoking and alcoholism. The polluted atmosphere by exhaust gasses leads to gastro- intestinal cancer and lungs cancer.

The prevalence of major chronic non-communicable diseases and their risk factors has increased over time and contributes significantly to the Ghana's disease burden. Conditions like hypertension, stroke and diabetes affect young and old, urban and rural, and wealthy and poor communities. The high cost of care drives the poor further into poverty. Lay awareness and knowledge are limited, health systems (biomedical, ethno medical and complementary) are weak, and there are no chronic disease policies. These factors contribute to increasing risk, morbidity and mortality. As a result chronic diseases constitute a public health and a developmental problem that should be of urgent concern not only for the Ministry of Health, but also for the Government of Ghana. New directions in research, practice and policy are urgently needed. They should be supported by active partnerships between researchers, policymakers, industry, patient groups, civil society, government and development partners.

5. CONCLUSIONS

A. Accelerated urbanization, coupled with lack of education, has resulted to the double disease burden in northern region (NCD and Infectious diseases).

Chronic NCDs contribute significantly to the nation's disease burden. They constitute both a public health and a developmental issue that should be of urgent concern not only for the Ministry of Health, but also for the Government of Ghana. Pertinent challenges include limited knowledge of NCDs in the general population which contributes to late reporting to clinics for care, high costs of medicines and high rates of preventable complications. NCDs affect poor communities; the catastrophic costs of care drive them deeper into poverty.

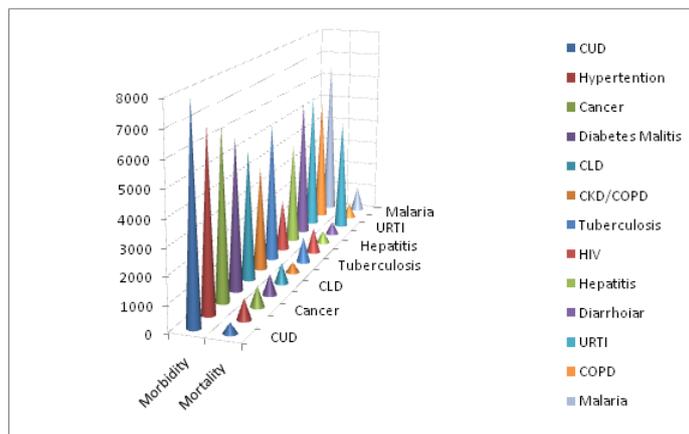


Morbidity and mortality of cnd/communicable diseases as recorded at the tamale teaching hospital

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government (and its various relevant sector ministries), health and public policymakers, industry, civil society, researchers and patient groups is urgently needed. The government needs to give high priority to policies and funded programmes for the prevention and control of chronic diseases.

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