Ageing and Chronic Diseases in Ghana: A Case Study of Cape Coast Metropolitan Hospital

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Introduction

The world has undergone a swift epidemiological transition towards non-communicable diseases. Chronic diseases are now the leading cause of death and illness in the world, accounting for 68 percent of deaths in the world and most disability (Anderson & Chu, 2007; Anderson, 2009). All population groups are affected, although screening and treatment outcomes are considerably worse for the aged and the poor in societies (Heslop, 1999). According to UN (2005) projections, by the middle of this century, the number of elderly people in the world will exceed the number of young people and this would be the first of its kind. This paradigm shift would come with its challenges, of which chronic diseases become one of the paramount issues.

The rate of increase of deaths from chronic diseases will outstrip that from infectious diseases, maternal and prenatal conditions, and nutritional deficiencies (WHO, 2005).

In African countries, ageing-related issues have low priority in many governmental sectors (Mkai & Ngalinda, 2000; Van der Heever & Booysen, 2000; Madzingira, 2000; Katsriku, 2000). This low priority may be due to lack of information relevant to the population and its situation (Apt, 1997). Ageing of the population poses significant problems to the healthcare system, including increased costs, inappropriate modes of service delivery and problems of chronic disease prevention. The Ghana Health Service (2003) noted that hypertension affects nearly one out of every five Ghanaian adults. The 2008 Ghana Demographic and Health Survey shows that 1 in 10 Ghanaian women is malnourished and 3 in 10 women are overweight or obese (Ghana Statistical Service-GSS, 2009). That is, there are more obese women (30.0%) than malnourished women (9%) in Ghana. Thus, some people in Ghana are becoming susceptible to hypertension due to obesity and unhealthy lifestyles (Cappuccio, Micah et al., 2004).

Among the researches on chronic diseases in Ghana include: diabetes in Accra (Dodu, 1966); obesity in Accra (Amoah, 2003a); cancers in Accra (Baako, & Badoe, 2001) and hypertension in Ashanti region (Cappuccio et al., 2004). There are also few researches on the aged focusing on risk factors associated with chronic disease (Saleh, Amanatidis & Samman, 2002; Agyemang, Bruijnzeels & Owusu-Dabo, 2006); cost of medication and treatment for chronic disease (Owusu & Ocran, 1972); burden of chronic disease on populations (Badasu, 2007) and treatment for chronic diseases (Ofei, 2005; Hesse & Nuama, 1997). Meanwhile, it appears no systematic academic inquiry exists on the subject of chronic diseases in the Cape Coast area where the current study is being conducted. This study will contribute to this growing literature on the issue of chronic diseases by looking at ageing and the types of chronic diseases reported at the Cape Coast Metropolitan Hospital, Ghana.

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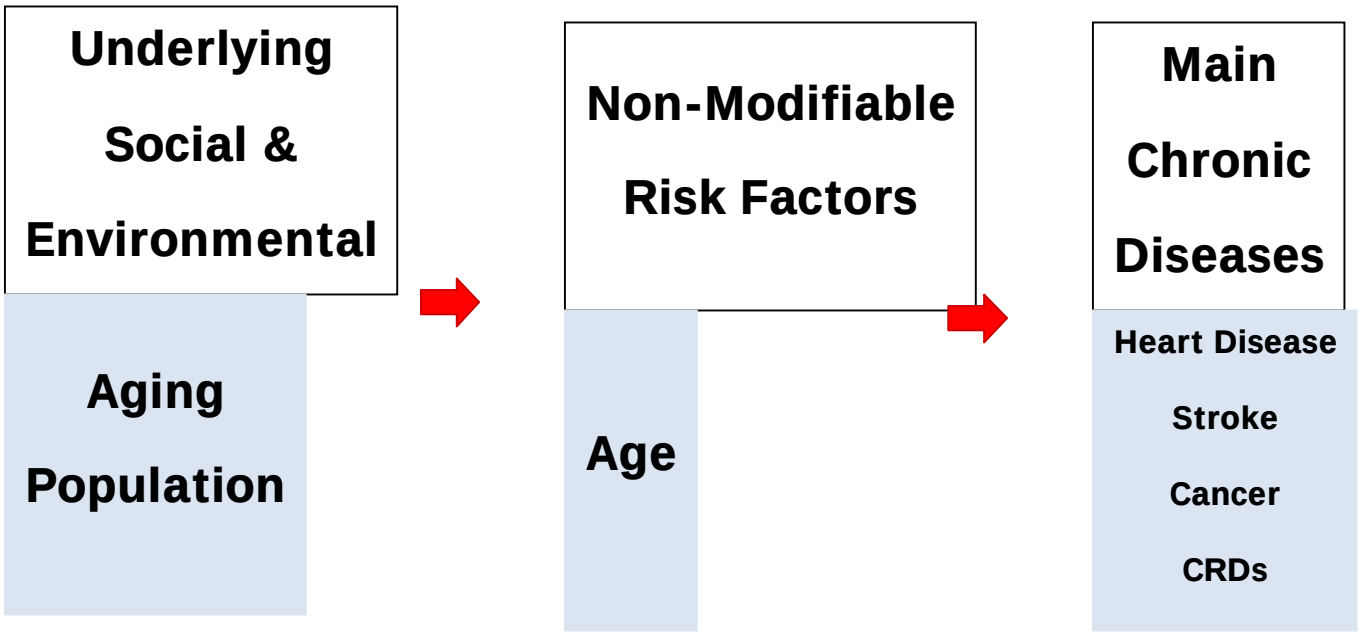
Conceptual and Theoretical Issues

Increases in aged population in addition to improved medical advances, health care and prudent health behavior contribute to increasing longevity (Popkin, 2006; Weeks, 1999). The study focuses on the complex changes in patterns of aging and disease, the interactions between these patterns, and their demographic, economic and sociological determinants and consequences. As individuals ages, their organs and cells undergo subtle physiologic changes even in the absence of disease.

This study was underpinned by two main theories namely the epidemiological transition model and element and progression of chronic disease model. According to the epidemiologic transition model, the pattern of mortality and morbidity is transformed from one of high mortality among infants and children, episodic famine and epidemic affecting all age groups to one of degenerative and man-made diseases affecting principally the elderly. The element and chronic disease progression model has featured strongly in epidemiology for several reasons. One, it is derived from socio-cultural, biological and physiological elements in public health and anthropology and, two, it clearly articulates the direct link between aging and the emergence of chronic disease among the elderly (Baberio, 2002). Its main assumption is that as one advances in age it makes the body susceptible to the development of chronic disease.

Figure 1: Conceptual Framework on Chronic Diseases



Source: Adapted from Barbiero, 2002

Despite the numerous advantages inherent in the element and chronic disease progression model by Baberio (2002), it has been criticized in a number of ways. Critics of the model argued that it has simplified the complex relationships between aging and chronic disease. Opportunistic diseases such as degenerative and chronic diseases would occur as a person ages, but Baberio (2002) is of the view that although advances in age leads to changes in bodily organs and cells, underlying social and environmental determinants such as urbanization can quicken the progression of chronic diseases.

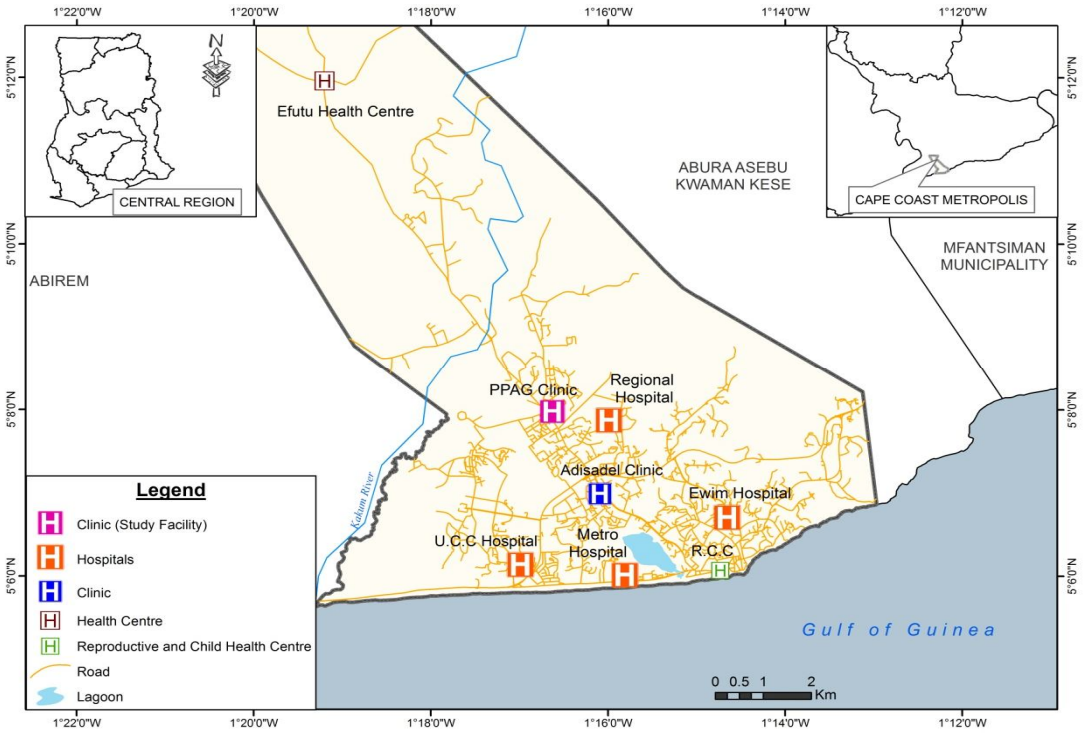
Although the two models (epidemiological transition and element and chronic disease progression model) have all contributed to a better understanding of the phenomenon of chronic diseases among the aged, the element and chronic disease progression framework by Baberio (2002) was found more insightful for the study and was, therefore, adapted used to guide the study.

The main reason for the adaptation of the model was that it best explains the basic variables underpinning the present study objective. One main limitation of this framework was that, some of the variables which were articulated in its level of analysis were found unrelated to the objective of this study and were, therefore, removed to make it more suitable. Variables which were taken from the original framework by Baberio (2002) included modifiable risk factors such as diet and activity and immediate risk factors such as high blood pressure, abdominal fat and high glucose.

Study Area

Cape Coast Metropolitan hospital is located at Bakaano- a suburb of Cape Coast. Cape Coast Metropolitan hospital is the second largest hospital in the Central Region, the main referral point for clinics and health centres in the metropolis and one of the three main hospitals in the Cape Coast metropolis which offer in-patients, out-patient and emergency services. The map of CCM hospital is shown in Figure 2. The CCM hospital serves the health care needs of the population of Cape Coast and its surrounding communities. The CCM hospital was selected for the study because, one, it provides services in an area where the population is considered to be aging and two, it serves as one of the only referral hospital to other health facilities within the region.

Figure 2: Map of Cape Coast Metropolitan Hospital and other major hospitals



Source: Cartography Unit- University of Cape Coast, 2011

Methods

The study analyzes facility based data extracted from Cape Coast Metropolitan hospital's records in its natural state without influencing it in any way. A cross sectional research design was adopted and used for the study. This study analyzed the varying types and patterns of chronic diseases among the aged (60+ years) who reported for care at Cape Coast Metropolitan Hospital (CCMH) for the years 2004 and 2009. A data extraction schedule was used for the data extraction. The instrument for the study comprised a mix of background characteristic of patients and the diagnosis made.

All ethical issues surrounding access to and use of the facility based data for the study was approved by the Ethical Review Board of University of Cape Coast. Facility based data was used for the study because the diagnosis has a reliable laboratory confirmation of the diseases. The data collection was carried out at the Records Unit of the CCM hospital. Prior to the actual data collection, a reconnaissance survey was conducted at University of Cape Coast (UCC) hospital to check for the validity and reliability of the instruments and to identify the data collection challenges. Data were extracted from the record books and data extraction scheme aided in obtaining the following information from the records books namely age, sex, address/residence, diagnoses, cost, prescription, occupation and remarks. Considering the study objectives as well as data quality reliability, the following records were used in the analysis: age, sex, address/residence and diagnoses of the aged.

The extracted chronic diseases which afflicted the aged were hypertensive heart diseases, stroke, heart failure, cardiac arrhythmia, and other cardiovascular attacks. Also, cancer cases included breast, lung/liver, uterus, prostate, and others. Diabetes, asthma as well as other chronic respiratory diseases were also among other chronic diseases reported by the aged. The overall sample size collected for the investigation was 1379 but 1333 was in good condition and was used for the analysis (Table 1). The aged were categorized into two groups: *young-old aged* (between 60 – 75 years) and *old-old aged* (above 75 years). The aged were further grouped into two to enable measurement of the age of the onset of chronic diseases. The data analysis plan employed mostly descriptive methods and some inferential statistics. The completed facility base data schedules was then coded and fed into the Statistical Package for Service Solution (SPSS version 16) software to process and analyze the data.

Table 1: Sample Size for the Study

Sex	Year	Age		Total
		Young-old	Old-old	
Male	2004	142	29	171
	2009	268	83	351
	Total	**410**	**112**	**522**
Female	2004	193	82	275
	2009	376	160	536
	Total	**569**	**242**	**811**
Total		979	354	1333

Source: Facility based data from CCMH, 2004 and 2009

Results

There are many chronic diseases that cause much pain, discomfort, and inconvenience in people's lives. Chronic diseases exert a substantial toll on people who live with them and the community at large.

The analysis of the entire chronic disease cases were grouped into two thematic areas (Table 2): heart related chronic diseases (HRCDs) and non-heart related chronic diseases (NHRCD). The HRCD cases are: stroke, hypertensive heart diseases (HHD), stroke and other chronic heart diseases (CHD). The NHRCDs are diabetes, cancer and chronic respiratory diseases (CRD) as shown in Table 3.

Table 2: Chronic Disease Cases Extracted

CDC	2004			2009			Grand Total
	Male	Female	Total	Male	Female	Total	
HRCD	102	210	312	208	367	575	887
NHRCD	51	48	99	122	225	347	446
Total	153	258	411	330	592	922	1333

Source facility based data from CCMH, 2004 and 2009
NB
CDC – Chronic Disease Cases
HRCD – Heart Related Chronic Diseases
NHRCD – Non- Heart Related Chronic Diseases

Heart Related Chronic Diseases

Table 3 presents the reported HRCDs in 2004 and 2009 at CCM hospital. In 2004, the most reported HRCD was HHD (229 cases). Males reported 70 as against 159 cases for females. Hypertension (68.6%) was more reported than severe hypertension. The young-old male reported the highest HHD cases (that is, hypertension - 60.0%). This was followed by severe hypertension (25.7%). The old-old male reported the least HHD cases, thus, 5.7% and 8.6% for severe hypertension and mild hypertension respectively. On the other hand, young-old females reported more HHD cases (159) than males but the highest HHD burden was 60.4% for mild hypertension. The old-old female reported 15.1% of mild hypertension and 12.6% severe hypertension among the young-old females. Reported HHD cases were similar in 2009 among the young-old aged: 57.8% and 52.2% of mild hypertension were recorded among the young-old males and females respectively.

Among the aged who reported CHDs in 2004, CVA was the most reported among the young-old males (37.5%) followed by cardiac arrhythmia (33.3%). But both young-old and old-old aged males reported the same heart failure cases (8.3%). On the other hand, CHD issues in 2009 were high among the young-old males (56.5%). Also, about 56.2% cases of CHD were recorded by the young-old females whilst no old-old male and female reported either CVA or heart failure. Stroke was the least recorded HRCDs in both years but among the stroke cases, it was realized that severe stroke was highly reported among the old-old aged than mild stroke. For instance, about 75% of severe stroke were reported by males and 62.5% by females in 2004. In2009, the proportion of young-old who reported severe stroke increased, it accounted for 76.7%and 78% among young-old males and females respectively. This was followed by 13.3% and13.6% mild stroke cases by the old-old males and females respectively whereas no old-old aged reported mild stroke.

Table 3: Types of Heart Related Chronic Diseases, 2004 And 2009

HRCD	Types	Age	Year			
			2004		2009	
			Male (%)	Female (%)	Male (%)	Female (%)
Stroke	Mild stroke	Young-old	25.0	6.3	10.0	8.5
		Old-old	0.0	6.2	0.0	0.0
	Severe stroke	Young-old	75.0	62.5	76.7	78.0
		Old-old	0.0	25.0	13.3	13.5
	Total		*8*	*16*	*30*	*59*
CHD	CA	Young-old	33.3	31.4	6.4	13.7
		Old-old	4.3	28.6	0.0	3.8
	Heart failure	Young-old	8.3	8.6	8.1	0.0
		Old-old	8.3	0.0	1.6	1.3
	CVA	Young-old	37.5	25.7	56.5	56.2
		Old-old	8.3	5.7	27.4	25.0
	Total		*24*	*35*	*62*	*80*
HHD	Mild Hypertension	Young-old	60.0	60.4	57.8	52.2
		Old-old	8.6	15.1	16.4	19.3
	Severe Hypertension	Young-old	25.7	12.6	19.8	17.1
		Old-old	5.7	11.9	6.0	11.4
	Total		*70*	*159*	*116*	*228*

Source: Facility based data from CCM Hospital, 2004 and 2009
HRCD – Heart Related chronic Disease
CVA – Cardiovascular Attacks
HHD - Hypertensive Heart Disease
CA – Cardiac Arrhythmia
CHD – Chronic Heart Disease

Non-Heart Related Chronic Diseases

Table 4 also deals with the types of NHRCDs reported at CCM hospital between 2004and 2009 by the aged. Among the aged who reported NHRCDs, other cancers accounted for the highest cases (43.7%) in 2004. It was then followed by prostate and lung/liver cancer which recorded the same proportions (18.8% each). Most of the cancer burden among the males was reported by the young-old aged. It was only other cancers (12.5%) which the old-old aged reported in 2004. Cancer cases among the females were dominated by the young-old females (42.2%). Young-old females reported same cases for cervical and breast cancers (10.5% each). It was then followed by cancer of the uterus which accounted for 5.4% for both young-old and old aged. In all, females (19 cases) outnumbered males (16 cases) in the reported cancer cases in2004. In 2009, cancer cases increased considerable between males and females, thus other cancers recorded almost half of the reported cases (49.1%) among the young-old males. The rest of the cancer cases recorded less than 10%. The old-old females also reported 13.2% of the cancer burden in 2009. Cervical cancer accounted for 11% of the cancer cases among the young old females and it was followed closely by breast cancer which accounted for 9.9% for the young-old and 4.4% among the old-old females. Diabetes was more recorded by males (25 cases) than females (19 cases) in 2004.

Type 2diabetes was the main diabetes challenge among the aged. In 2004, type 2 diabetes accounted for64% and 20% among young old and old-old males respectively (Table 4). Type 2 diabetes among the males was followed by 8% for type 1 and 4% severe diabetes each for both young-old and old-old males. Out of the diabetes cases (19) among the females, type 2 diabetes accounted for78.9% among the young-old females. No female reported type 1 diabetes

Table 4: Types of Non-Heart Related Chronic Diseases, 2004 And 2009

NHRCD	Types	Age	Year			
			2004		2009	
			Male (%)	Female (%)	Male (%)	Female (%)
Cancer	Scrotal/penile cancer	Young-old	6.2	0.0	5.7	0.0
		Old-old	0.0	0.0	1.9	0.0
	Other cancer	Young-old	43.7	42.2	49.1	52.7
		Old-old	12.5	21.1	18.8	13.2
	Prostate cancer	Young-old	18.8	0.0	9.4	0.0
		Old-old	0.0	0.0	1.9	0.0
	Cervical cancer	Young-old	0.0	10.5	0.0	11.0
		Old-old	0.0	0.0	0.0	1.1
	Lung/liver cancer	Young-old	18.8	0.0	7.5	1.1
		Old-old	0.0	0.0	5.7	0.0
	Cancer of uterus	Young-old	0.0	5.4	0.0	4.4
		Old-old	0.0	5.4	0.0	2.2
	Breast cancer	Young-old	0.0	10.5	0.0	9.9
		Old-old	0.0	5.4	0.0	4.4
	Total		*16*	*19*	*53*	*91*
Diabetes	Type 1	Young-old	8.0	0.0	2.1	3.1
		Old-old	0.0	0.0	0.0	1.1
	Type 2	Young-old	64.0	78.9	60.4	60.0
		Old-old	20.0	15.8	18.7	24.2
	Severe diabetes	Young-old	4.0	0.0	16.7	10.5
		Old-old	4.0	5.3	2.1	1.1
	Total		*25*	*19*	*48*	*95*
CRD	Asthma	Young-old	60.0	60.0	47.6	59.0
		Old-old	20.0	10.0	33.3	23.1
	COPD	Young-old	20.0	10.0	4.8	7.7
		Old-old	0.0	20.0	14.3	10.2
	Total		*10*	*10*	*21*	*39*

Source: Facility based data from Cape Coast Metropolitan Hospital, 2004 and 2009
NHRCD – Non-heart related chronic disease
CRD – Chronic respiratory disease
COPD – Chronic obstructive pulmonary diseases in 2004. In 2009, type 2 diabetes accounted for 60.4% among the young-old males, 18.7% for old-old males and only 2.1% for the young-old aged. Severe diabetes accounted for 16.7% and 2.1% for the young-old and old-old males respectively. Type 2 diabetes was the main diabetes burden for the females in 2009, thus, it affected 60% among the young-old and 24.2% among the old-old females. Severe diabetes accounted for 10.5% among the young-old females and only few old-old reported type 1 diabetes (1.1%). Males and females reported the same CRD cases (10 cases each). CRDs were the least reported NHRCDs in 2004 as well as 2009.

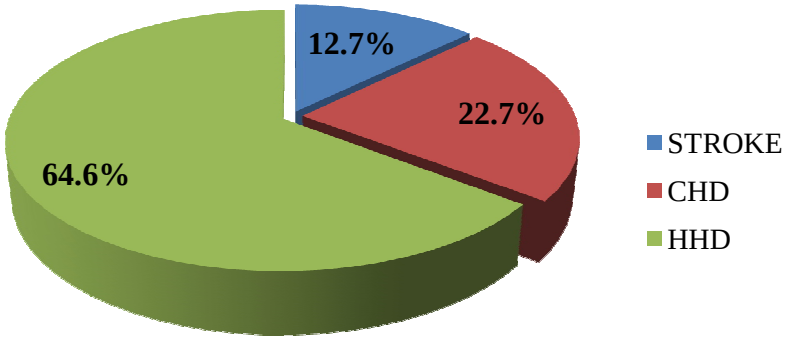
It recorded asthma and COPD as its main CRD cases. In 2004, asthma was more reported than COPD, thus asthmatic attacks affected 60% young-old males, followed by 20% for old-old males. Only 20% young-old males recorded COPD in 2004.

The young-old reported the main CRD burden in 2004. Similar situation happened among the females in 2004, the young-old female reported 60% asthma cases as compare to 10% for the old-old females. COPD recorded the highest COPD cases among the old-old females (20%). In 2009, CRD cases among the aged increased as compared to 2004. It recorded 21 cases for males and 39 for females. Out of the cases (21) for the males, asthma accounted for 47.6% and 33.3% for the young-old and old-old males respectively. Patients who reported COPD recorded 14.3% for the old-old males in 2009. Among the females in 2009, Table 4 shows that asthmatic patients accounted for 59% and 23.1% among the young-old and old-old females. About 10.2% old-old females reported COPD.

Reported Heart Related and Non-Heart Related Chronic Diseases

Among the HRCDs reported (Figure 3), hypertensive heart disease (HHD) was the highest reported cases (64.6%) and was followed by CHDs (22.7%). Stroke recorded the least (12.7%) HRCD cases for both years, that is, 2004 and 2009. Figure 3 shows the proportion of reported HRCDs in both 2004 and 2009. (Figure 2 here)On the other hand, among the reported NHRCDs, diabetes was the most reported cases (42%), followed closely by cancers (40%) and finally CRDs (18%). Figure 3 shows the proportions of NHRCDs reported in both 2004 and 2009.

Figure 3: HRCD in 2004 and 2009



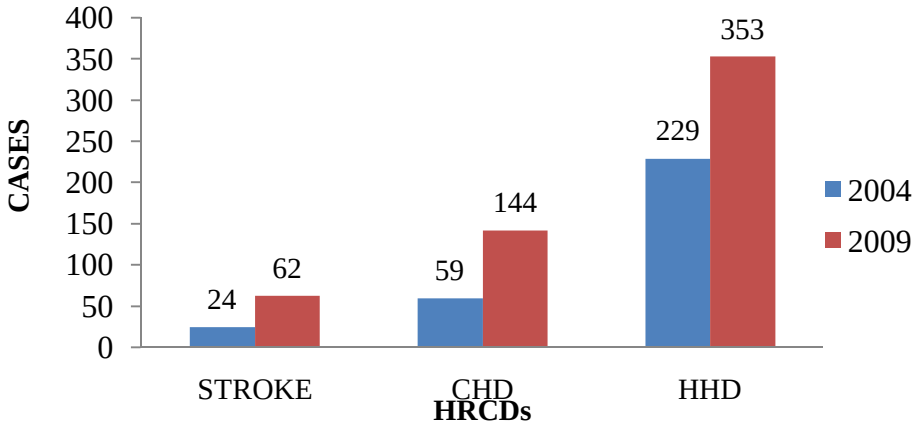
Source: Facility based data from CCMH, 2004 and 2009

Changes in Heart Related and Non- Heart Related Chronic Diseases: 2004 and 2009

Figure 4 shows the changes in HRCDs in 2004 and 2009. Out of the cases recorded for HRCDs, HHD was highest in both 2004 and 2009. It recorded about 229 cases in 2004 and it increased to 353 cases in 2009. The most significant change occurred among the aged who reported CHD, it increased more than four-fold between 2004 and 2009: that is, it recorded 59cases in 2004 as compared to 142 cases in 2009. Stroke also was the least reported condition in both years, 24 cases reported among the aged in 2004 while 62 cases reported in 2009 (Figure 4).With regard to reported NHRDs, there was a wide difference in the reported NHRCD cases in 2004 and 2009 (Figure 5). For instance, 44 diabetes cases were reported in 2004 compared to 95reported cases in 2009. Also, in 2004, there was 35 reported cancer cases but in 2009, the reported cases of cancer increased to 91 cases.

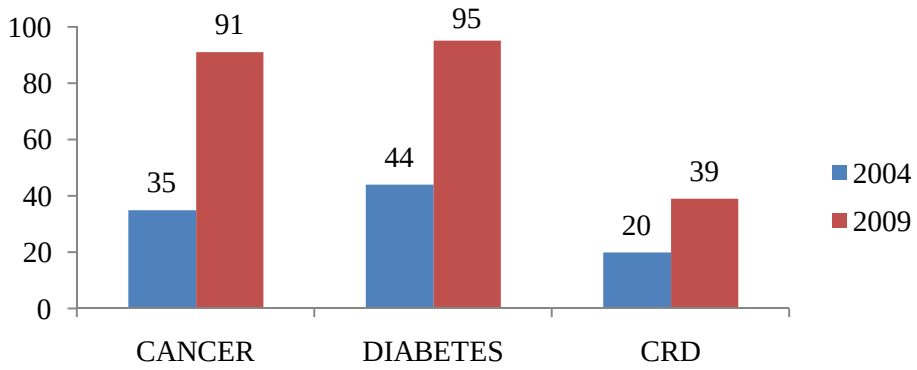
Reported CRD cases in 2004 were 20 and changed to 39 cases in 2009. The reported NHRCD cases in 2009 were more than three folds of that of 2004. Figure 5 presents the reported changes in NHRCDs for the years 2004 and 2009.

Figure 4: Changes in HRCDs in 2004 and 2009



Sources: Facility based data from CCM Hospital, 2004 and 2009
HHD - Hypertensive Heart Disease
CHD – Chronic Heart Disease

Figure 5: Changed in NHRCDs between 2004 and 2009



Source: Facility based data from CCM hospital, 2004 and 2009

Discussion

Among reported cases of HRCDs, the results revealed that HHD was the main reported HRCD and as an immediate risk factor for chronic diseases, it affects the people early in life and leads to other chronic diseases (American Heart Association, 2010; Baberio, 2002). The young-old aged category reported more chronic diseases cases than that of the old-old aged (60-75 years age cohort). There was a wide sex variation in the utilization of the CCM hospital. For instance, out of a total of 1333 cases reported, 811 were females aged while 522 were males aged. The overwhelming disparity in the utilization of the CCM hospital by sex could be attributed to male's poor attitude towards health care utilization in the metropolis. It could further be as a result of perceived gender stereotypes in the area where males in most societies in Ghana are expected to be stoic and resistant.

Therefore, males are preconditioned to endure pain and less health conscious which is likely to reduce males' utilization of health care services. On the other hand, considering reported NHRCD cases in 2004 and 2009, similar proportions of cancer and diabetics were reported. Reported diabetes cases were slightly more than cancer and CRD cases were the least reported NHRCD.

In 2004, the study has shown that aged males reported more NHRCD than aged females while in 2009, aged females reported more NHRCD cases than their male counterparts. The variation in sex (males and females) utilization of CCM hospital who reported NHRCD cases in 2004 and 2009 may be due to poor recordkeeping resulting in under reporting of NHRCDs by health workers. Also, other studies by American Heart Association (2010) and Appelros et al. (2009) have shown that females utilize health care facilities more than males which might have explained why more female cases outnumbered males in the utilization of CCM hospital. It was also established that more young-old aged reported NHRCDs than the old-old aged. This could be explained by the nature of the population structure of the Cape Coast Metropolis where most of the aged population falls within the young-old age cohort (60-75 years) (GSS, 2009).Generally, NHRCD cases increased between 2004 and 2009. The changes in reported NHRCD cases in 2004 and 2009 could be due to the introduction of the National Health Insurance Scheme (NHIS) in 2004, which might have influenced the high utilization of hospitals positively after its introduction.

Conclution and Policy Recommendation

Two major types of chronic diseases were identified from the data extracted for 2004 and2009. These major groups were heart related chronic diseases (HRCDs) and non-heart related chronic diseases (NHRCDs). Among all the diseases, HHD was the most reported accounting for almost half of the reported cases. Diabetes and cancer cases were similar in 2004 and 2009.Stroke and CRD cases were the least reported chronic diseases among the aged. Research which do focus on past and current trends and patterns of public health issues constitute important means of making inputs to policies and interventions targeted at achieving long life and healthy aging. In spite of the unfinished business of controlling infectious and parasitic diseases, chronic diseases have emerged where they have already been dubbed the future major health problem in developing countries (WHO, 2005). Therefore, this study takes into account the global political context as well as the local complexities which must be addressed to practically achieve greater coverage of the world's poor against chronic diseases. It is now up to the Ministry of Health in collaboration with Ghana health Service to come up with efficient, realistic and successful resolution to these pressing needs. The Ministry of Health announced a paradigm shift in 2005 from "curative to preventive services" which aims to empower communities to adopt healthy lifestyles. The campaign message focused on creating an environment of "regenerative health" in which people would adopt eating of green staple food, regular medical checkups and regular body exercises.

The facility based data provide some basic information on chronic diseases epidemiology and further recommends the following areas for action: one, the young-old age cohort requires special attention in terms of education on chronic disease prevention and management so as to improve their health status. Two, the CCM hospital should be equipped with the state of the art facilities to enable the facility gain greater control and resources to deal with this highly increasing chronic disease burden. Finally similar studies should be replicated nationwide so as to ascertain the chronic disease burden among the aged in Ghana.

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Declaration of Conflicting Interests

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References

Anderson, G. F., & Chu, E. (2007). Expanding priorities confronting chronic disease in countries with low income.*NEJM*, 356(3): pp. 209-211.

Anderson, G. F. (2009). Missing in action: International aid agencies in poor countries to fight chronic disease. *Health Affairs*, *28*(1): 202-205.

Apt, N.A. (1997). *Ageing in Africa*. Geneva: World Health Organization.

Agyemang et al. (2006). Factors associated with hypertension awareness, treatment, and control in Ghana, West Africa. *J Hum Hypertens*, 20(1): pp. 67-71.

American Heart Association (2010). Sex, race, place of residence influence high blood pressure incidence. Retrieved from www.sciencedaily.com on May 5, 2011.

Amoah, A. G. B. (2003). Obesity in adult residents of Accra, Ghana. *Ethnicity and Disease*, *13*(3):29-101.

Baako, B. N. & Badoe, E. A. (2001). Treatment of breast cancer in Accra: 5-years survival. *Ghana Medical Journal*, 35: 90-93.

Barbiero, V. K. (2002). *Chronic disease-management priorities in 21st century*. Department of Global Health: Wilson International Center for Scholars.

Badasu, D. (2007). Epidemiological transition, the burden of non- communicable diseases and tertiary health policy for child health in Ghana: lessons from a study on children in a Ghanaian Teaching Hospital. Retrieved from http://uaps2007.princeton.edu/abstractViewer.aspx on 22/05/11.

Cappuccio et al. (2004). Prevalence, detection, management, and control of hypertension in Ashanti, West Africa. *Hypertension*. *43(5): pp.* 1017-22.

Chawla, M. (2007). *From red to gray: The third transition of aging population in Eastern Europe and the former Soviet Union*. Washington D.C: World Bank.

Dodu, S. R. (1966). Diabetes in Accra.*Ghana Medical Journal*, *5(2)*: pp. 2-7.

Ghana Statistical Service (2005). *2000 Population and housing census reports.* Accra, Ghana: GSS.

Ghana Statistical Service (2009). *Ghana Demographic and Health Survey*. Calverton, Md, USA: GSS, NMIMR, GHS, GAC and MI.

Ghana Health Service. (2003). Nation health policy: *Creating wealth through health*. Accra: MOH.

Ghana Diabetes Association (2010). Annual Report. Retrieved from www.ghanadiabetesassociation.com/ on 16/06/10

German, T. & Ewing, D. (Eds). *The ageing and development report: poverty,independence and the world's older people.* London: Earthscan Publications.

Heslop, A. (1999). Poverty and livelihoods in an ageing world. In: Randel, J., Hesse, I. F. A., &Nuama, I. (1997). Pattern of out-patient drug treatment of Hypertension in Korle-Bu Teaching Hospital, Accra, West *African Journal of Medical,* 16,(3): pp. 133-138.

Katsriku, B. (2000). Ageing in Ghana. Paper Read at a Workshop on Creating a Minimum Data Set for Research, Policy and Action on Ageing and the Aged in Africa. Harare, Zimbabwe, January 20-22.

Madzingira, N. (2000). Ageing in Zimbabwe: a country profile. Paper read at a Workshop on Creating a Minimum Data Set for Research, Policy and Action on Ageing and the Aged in Africa. Harare, Zimbabwe, January 20-22.

Mkai, C. P. B. & Ngalinda, I. (2000). Ageing in the United Republic of Tanzania. Paper read at a Workshop on Creating a Minimum Data Set for Research, Policy and Action on Ageing and the Aged in Africa. Harare, Zimbabwe, from January 20-22.

Ministry of Health Ghana (2005). Creating wealth through health. Minister's Press Briefing, Accra: MOH.

National Institute of Neurological Disorders and Stroke (2009). *Brain Basics: Preventing Stroke*. Retrieved from http://www.ninds.nih.gov/disorders/stroke on 21/05/2011.

Owusu, S. K., & Ocran, K. (1972). Some peculiar problems of treatment of diabetes mellitus in Ghana. Ghana Medical Journal, 6, 174-178.

Ofei, F. (2005). Obesity – a preventable disease. Ghana Medical Journal, *39*(3),98-101.

Popkin, B. M., (2006). Global nutrition dynamics: the world is shifting rapidly toward a diet linked with non-communicable diseases. *Am J ClinNutr,* 84(1), pp. 289–298.

Saleh, A., Amanatidis, S., & Samman, S. (2002). Cross-sectional study of diet and risk factors for metabolic diseases in a Ghanaian population in Sydney. *Asia Pac J ClinNutr*. 11(3), pp. 210-216.

United Nations (2005). *World population prospects: The (2004) Revision.* New York:United Nations.U.S. CensusBureau.2004. International Programs Center, AIDShttp://www.census.gov. Retrieved on20/05/2011.

Unwin et al.(2001). Non-communicable Diseases in Sub-Saharan Africa: Where Do They Feature in the Health Research Agenda? Bulletin of the World Health Organization, 79 (10): 947–53.

Van den Heever, C. and Booysen (2000). Status of older persons: profiling those South Africans aged 65 years or older. Paper read in the Workshop on Creating a Minimum Data Set for Research, Policy and Action on Ageing and the Aged in Africa. Harare, Zimbabwe, January 20-22.

Weeks, J. R. (1999). *Population; An introduction to concepts and issues.*(7th Ed).Belmont CA: Wadsworth Publishing.

World Health Organization (2005). Preventing *Chronic Diseases: A Vital Investment*. Geneva: World Health Organization.

World Bank (1998). *Better Health in Africa: Experiences and Lessons Learned.* Washington DC: World Bank.