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CONCURRENT CHRONIC CONDITIONS IN ADULT PATIENTS OF THE MEDICAL OUT-PATIENT CLINIC OF THE TEMA GENERAL HOSPITAL

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DECLARATION

I, Belinda Afriyie Nimako hereby declare that except for references to other people's works that have been duly acknowledged, this dissertation is a result of my own independent work undertaken under supervision. I further declare that this dissertation, either in whole or in part has not been submitted elsewhere for the award of another degree.

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ACADEMIC SUPERVISOR

DEDICATION

I dedicate this dissertation to Kwasi, Nana, and Adoma – I am blessed to have you in my life.

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To God be the Glory.

Kwasi, Nana, Adoma, Auntie Lydia and Omane – Thank you.

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LIST OF ACRONYMS

CI	Confidence interval
GBD	Global burden of disease
GHS	Ghana Health Service
NCDs	Non-communicable diseases
NHIA	National Health Insurance Authority
OPD	Out- patient department
OR	Odds ratio
SES	Socio-economic status
TGH	Tema General Hospital
WHO	World Health Organisation

DEFINITION OF TERMS

Item	Definition
Adult	Persons 18 years and older.
Chronic Diseases / Conditions	Diseases of long duration and generally of slow progression that require long-term management.
Co-morbidity	The combination of additional diseases beyond an index disorder. (Feinstein, 1970).
Concurrent chronic conditions	The co-existence of 2 or more of the selected 13 chronic conditions in an individual. The preselected conditions for this study are diabetes, hypertension, musculoskeletal conditions, asthma, sickle cell disease, occupational injuries, malnutrition, intestinal worms, other cardiovascular conditions; Blindness, cataract and other eye diseases, skin diseases and ulcers, gastrointestinal diseases and anaemia.
Elderly	Persons 60 years and above.
Multimorbidity	Co-existence of two or more chronic diseases in the same individual (van den Akker., Buntinx, & Knottnerus, 1996).
Routine medication	Medication for management of a chronic condition or that has been prescribed for greater than three consecutive months.
Young Adults	Persons aged 18 - 59 years.

ABSTRACT

Chronic conditions are a significant source of disease burden in Ghana including The Tema General Hospital (TGH). When concurrent in an individual, the outcomes are poorer. Yet medical research, preventive and clinical services are focused on single disease entities. The few studies conducted have predominantly been in developed countries and the elderly. This research determined the prevalence, distribution and socio-demographic risk factors of concurrent chronic conditions in our setting, to inform appropriate prevention and clinical care planning and practices.

A cross-sectional study was conducted in adult patients of the medical clinic of the main OPD of TGH from 21st May to 8th June 2012. Consecutive patients were sampled and interviewed using a structured questionnaire to collect data on socio-demographic characteristics and medical history. Medical diagnoses were extracted from the medical records. Concurrent chronic condition was defined as the presence of two or more of 13 pre-selected conditions in an individual, and its association with a range of socio-demographic characteristics was determined using multivariate logistic regression.

Of the 1,399 records analysed, 38.8% (95% CI: 36.3 – 41.4) had concurrent chronic conditions. As much as 48.6% of the persons with concurrent chronic conditions were young adults (18-59 years). The most common combination of conditions was diabetes mellitus and hypertension. Age, sex and a family history of chronic condition were independently associated with concurrent chronic conditions. Of these, age was the most significant; compared with the referent age group of 18 – 39 years, the adjusted odds for people aged 60 years and above was higher (OR =15.82 ,95%

CI:10.66- 23.48, p <0.0001). Notably, the increasing prevalence observed with increasing age plateaus at a prevalence of about 60% by age 57 years.

This study shows that concurrent chronic conditions are common in adult attendants of the medical clinic of the main OPD of the TGH. The most common combination was the pair of hypertension-diabetes mellitus and confirmed increasing age, female sex and a family history of a chronic condition as independent risk factors for concurrent chronic conditions. These prompt the need for research, medical education, prevention and clinical care plans on concurrent chronic conditions.

CHAPTER ONE

1.0. INTRODUCTION

1.1. BACKGROUND

Chronic conditions are currently a significant health challenge particularly with the ageing of society and the increasing contribution of non- communicable diseases (NCDs) to the global burden of disease. These chronic conditions are defined as diseases of long duration and generally of slow progression (World Health Organisation, 2012a). Chronic diseases include conditions such as hypertension, diabetes mellitus and musculoskeletal conditions. They are mainly NCDs but include a few infectious ones such as tuberculosis.

Worldwide, the burden of chronic diseases is rapidly increasing. Chronic diseases contributed almost half (46%) of the global burden of disease (GBD) in the world in 2001 (World Health Organisation, 2005), and this is expected to worsen to 57% by 2020 (Lopez & Murray, 1998). In the Sub-Saharan Africa region, 35% of the total burden of disease is caused by NCDs and 86% of these NCDs are chronic (Lopez & Murray, 1998). Also, chronic diseases are the major causes of death worldwide and contributed 60% of the 56.5 million total reported deaths in the world in 2001. Eighty percent of these deaths worldwide occurred in low and middle income countries (World Health Organisation, 2012c). Furthermore, of the 36 million people who died from chronic diseases in 2008, nine million were under 60 years and 90% of these premature deaths occurred in low- and middle-income countries (World Health Organisation, 2005). In summary, chronic conditions are the major causes of death

worldwide, impact on developing countries disproportionately and affect younger adults also.

A significant outcome of the chronic disease onslaught and the ageing of society is co-occurrence of these chronic conditions, as they tend to accrue with age. This is associated with poorer outcomes such as more frequent hospital visits and increased disabilities compared with situations in which these conditions occur in singles (Bayliss, Bayliss, Ware, & Steiner, 2004; Gijsen et al., 2001). Also, each condition may influence the care of the other condition(s) through interactions between therapies (Bayliss, et al., 2004; Parekh & Barton, 2010) and may have synergistic effects (Amoah, Owusu, & Adjei, 2002). Concurrence of chronic conditions is defined by two main terminologies; multimorbidity and co-morbidity. Multimorbidity is defined as the coexistence of two or more chronic diseases in the same individual (van den Akker., et al., 1996) whilst co-morbidity was originally defined as the combination of additional diseases beyond an index disorder (Feinstein, 1970).

The prevalence of concurrent chronic conditions in literature is widely varied due to variations in the methods used, yet the shared position is that it is a common health challenge particularly at the primary care level (Hughes, Jordan, Rajaratnam, Fawcett, & Croft, 2008). Yet, most research and clinical practice are still based on a single disease paradigm (Fortin, Lapointe, Hudon, & Vanasse, 2005) which may be inappropriate for patients with complex and overlapping health problems.

Provision of appropriate health care for persons with multiple chronic conditions remains a challenge, and opportunity, for clinicians, researchers, and policy makers today (Boyd & Fortin, 2010). This study estimates the magnitude, determines the distribution, patterns and the risk factors of concurrent chronic conditions. This can be useful in the planning and implementation of prevention and clinical services.

1.2. STATEMENT OF THE PROBLEM

Chronic conditions are significant sources of disease burden in Ghana (Ghana Health Service, 2010) and commonly co-exist in the same individual (Fortin, Lapointe, et al., 2005). When concurrent, they have consequences such as poor outcomes and increased healthcare costs (Valderas, Starfield, Sibbald, Salisbury, & Roland, 2009). However, the few studies on concurrent chronic conditions have been in developed countries (Marengoni et al., 2011) and the elderly (Khanam et al., 2011). Yet there is evidence of increased prevalence with low socio-economic status coupled with an earlier age of onset in such settings (Barnett et al., 2012) prompting the need to extend these researches to developing countries and in all adults.

Routine data in Tema General Hospital (TGH), like other facilities in Ghana is limited to single conditions- comparable with observations elsewhere that researches (as well as preventive and curative practises) are focussed on single disease entities (Fortin, Lapointe, et al., 2005). Records indicate that chronic conditions are consistently in the top ten reasons for OPD visits, in- patient care and deaths at the TGH (Tema General Hospital, 2010) even in young adults. For instance, age disaggregated data in TGH for 2011 shows that 24.6 % and 41 % of cases of hypertension and diabetes mellitus respectively were seen in young adults, aged18-49 years. These productive young adults with time may have chronic conditions not just in singles, but also in multiples.

There is the need for data on the prevalence of concurrent chronic conditions in all adults in our setting. This should characterise the affected persons and the chronic conditions most commonly involved – that is what this study does. This may be used to inform more detailed researches and formulate appropriate and effective preventive and curative measures.

1.3. JUSTIFICATION

This study estimates the magnitude of concurrent chronic conditions from a clinic where such patients are seen in a developing country.

The findings of this study highlights the socio-demographic characteristics of persons affected, how many people are affected, possible risk factors and the disease conditions involved. This may be used to design and package both preventive and curative interventions to address the challenge of concurrent chronic conditions.

In clinical management for instance, it can provide a basis for integrating / co-ordinating the care of affected people, which in addition to other merits will reduce increased hospital utilisation and the associated costs to both the individual and the health system. This can improve the outcomes in these patients.

Programmes can use the information on the distribution of concurrent chronic diseases as the basis for a focussed needs assessment and targeted interventions in the prevention and control of concurrent chronic conditions to reduce the burden it exerts on the health system as well as families and friends of affected persons.

In addition, policy guides such as the standard treatment guidelines could be designed to reflect the intricacy of managing these patients. The study also highlights the need for family practice and geriatric physicians at the hospital to provide the integrated and continuous care recommended for patients with concurrent chronic conditions.

1.4. OBJECTIVES OF THE STUDY

GENERAL OBJECTIVE

To characterise the patients affected by and describe the patterns of concurrent chronic conditions in adult patients of the medical clinic of the main outpatient clinic of The Tema General Hospital.

SPECIFIC OBJECTIVES

In adult attendants of the medical outpatient clinic of the Tema General Hospital:

1. To estimate the prevalence of concurrent chronic conditions.
2. To determine the socio-demographic risk factors associated with concurrent chronic conditions.
3. To determine the pattern of the prevalence of concurrent chronic conditions relative to age.
4. To determine the patterns of common concurrent chronic conditions.

CHAPTER TWO

2.0. LITERATURE REVIEW

2.1. THE CHANGING PROFILE OF DISEASES

The world is undergoing an epidemiological transition and is ageing. Concurrently the pattern of risk factors such as alcohol intake and physical inactivity is changing worldwide (World Health Organisation, 2009). This has resulted in an increase in chronic conditions. This is worrying as the majority of these chronic conditions are NCDs and have been proven to accumulate with age (Fortin, Stewart, Poitras, Almirall, & Maddocks, 2012; Salisbury, Johnson, Purdy, Valderas, & Montgomery, 2011; van den Akker, Buntinx, Metsemakers, Roos, & Knottnerus, 1998). Chronic diseases currently account for almost 60% of all deaths worldwide (World Health Organisation, 2005) and 43% of the global burden of disease. Currently, 79% of the deaths attributed to these diseases occur in the developing countries. It is estimated that by 2020, the contribution of chronic diseases is expected to rise to 73% of all deaths and 60% of the global burden of disease by 2020. (World Health Organisation, 2012a). This is corroborated by studies such as that by Uijen and van de Lisdonk (2008) which showed that the prevalence of chronic diseases doubled between 1985 and 2005.

2.2. CONCURRENCE OF CHRONIC CONDITIONS

Chronic conditions tend to add on and with time co-occur even in the same individual. When they co-exist, they have been described largely as multimorbidities or co-morbidities (Marengoni, et al., 2011). Multimorbidities and co-morbidities are distinct

from complications which are conditions that occur as a result of the primary one (Valderas, et al., 2009).

Research in this area is an emerging field. Most of these studies (Fortin, Lapointe, et al., 2005; Marengoni, Rizzuto, Wang, Winblad, & Fratiglioni, 2009; Wolff, Starfield, & Anderson, 2002) have focussed on determining the prevalence of the condition, its risk factors (Kirchberger et al., 2012; Marengoni, et al., 2009), the consequences of the condition on the affected individuals/society and the health system (Fortin et al., 2004; Vogeli et al., 2007) and frequently occurring combinations (Agborsangaya, Lau, Lahtinen, Cooke, & Johnson, 2012; Kirchberger, et al., 2012).

Various explanations have been given for the causes of concurrent chronic conditions. These include direct causation, associated risk factors, causal mechanisms, bias and a general susceptibility to disease in affected individuals (Valderas, et al., 2009). This is necessary in understanding the mechanisms behind the patterns of concurrent chronic conditions and in planning their prevention.

For the purposes of this research, however, the focus will be on literature that generates evidence on the prevalence, the distribution relative to age, sex, socio-economic status and other socio-demographic risk factors and finally the frequently occurring patterns in the population studied.

2.3. THE PREVALENCE OF CONCURRENT CHRONIC CONDITIONS

As a result of advances in medical care and public health, a growing proportion of people have concurrent chronic conditions (Uijen & van de Lisdonk, 2008).The prevalence of this is striking in studies conducted in several countries in different

parts of the world (Barnett, et al., 2012; Fortin, Lapointe, et al., 2005; Khanam, et al., 2011; van den Akker, et al., 1998).

The emerging problem of concurrent chronic conditions is attracting research primarily aimed at determining its magnitude. In a review of 41 studies, as many as 12 of the papers focussed on determining the prevalence of multimorbidity (Marengoni, et al., 2011). It must be noted however, that the studies reviewed were largely in developed countries like Canada, (Fortin, Bravo, Hudon, Vanasse, & Lapointe, 2005) the Netherlands, (van den Akker, et al., 1998) and the United States of America (Wolff, et al., 2002) which reported prevalence of multimorbidity of 90%, 74%-80% and 65% respectively. Very few studies have been carried out in developing countries. One of such studies in a developing country was in Bangladesh which determined the prevalence of multimorbidity to be 53.8% (Khanam, et al., 2011). Studies in Africa (Adebusoye, Owoaje, Ladipo, & Adeniji, 2011) tend to consider the total morbidity profile without limiting it to chronic conditions.

The prevalence of multimorbidities is widely varied. It ranges between 20%-30% when the general population is considered and 55% - 98% when the study is limited to the elderly (Marengoni, et al., 2011).

It is difficult to compare these results not just because of the variations in the results but also key variations in the methods employed. Despite the variations, what is certain and which has been reiterated by various studies (Mercer, Smith, Wyke, O'Dowd, & Watt, 2009; Uijen & van de Lisdonk, 2008; van den Akker, et al., 1998) is that the problem is common and not a rare occurrence in general practice.

As the threat of chronic conditions emerges in Ghana, the magnitude of the challenge of concurrent chronic conditions needs to be estimated and the affected people characterised. This is imperative as the mortality associated with chronic conditions is disproportionately higher in developing countries (World Health Organisation, 2005). Also when these chronic conditions co-occur (Bayliss, et al., 2004), there is the need to characterise affected individuals and to plan the prevention and control more effectively.

2.4. VARIATIONS IN THE METHODS FOR MEASURING CONCURRENT CHRONIC CONDITIONS

The prevalence of concurrent chronic conditions is widely varied as summarised in systematic reviews (Fortin, et al., 2012; Marengoni, et al., 2011). The variation cannot be explained in isolation of the methods employed by various studies in measuring concurrent chronic conditions.

The variation in prevalence appears to be dependent on the following: whether the study is hospital-based or community based; in an older age group/or the general population; the set of diseases being considered and the means of case ascertainment amongst others.

The mode of ascertainment of the conditions varied. Whilst some studies were based on self-reports (John, Kerby, & Hagan Hennessy, 2003) others relied on clinical examinations (Marengoni, et al., 2009). Some other studies combined various modalities such as laboratory and clinical examinations (Khanam, et al., 2011).

Mostly the hospital based studies have been sought from general practices (Britt, Harrison, Miller, & Knox, 2008; Fortin, et al., 2012) though others have been in other

populations such as medical in-patients (Schneider, Kaplan, Rodak, Battegay, & Holzer, 2012). Hospital based cases are more likely to show a higher prevalence (and more severity) as compared with community based studies. A reason identified for this is the tendency for such studies to over represent frequent attendees, who have more complex medical problems and are more likely to have concurrent chronic conditions (Fortin, et al., 2012). However it has been argued that if the focus is to determine the burden placed on the health system as a result of multimorbidity then it is appropriate to use hospital–based cases as these are the ones with diseases severe enough for reportage to health facilities (Marengoni, et al., 2011). They also give an insight into the physician's daily work (Fortin, et al., 2012) and burden on the health system. A viable source of data for studies in this field is the claims data from the national health insurance as was done in some of the studies (Wolff, et al., 2002).

Another source of variation is the set of diseases considered. Often, research into the co-occurrence of chronic conditions is limited to a few prevalent conditions (Diederichs, Berger, & Bartels, 2011; van den Akker, Buntinx, Roos, & Knottnerus, 2001). This has the statistical advantage that it makes it easier to analyse the data collected. More importantly, the more prevalent conditions are more relevant to society as they affect more people and are more likely to co-occur (van den Akker, et al., 2001). A counter argument to this position is that although these may be the most prevalent, they do not necessarily affect the largest proportion of the population (van den Akker, et al., 2001) and may not be the source of the greatest burden of disease in that population. It has also been realised that the higher the number of diseases included, the higher the prevalence of concurrent conditions that will be recorded. For instance, the proportion of subjects in the Registration Network Family Practices in the Netherlands 65 years or older suffering from two or more disorders from a list of

four was 2.8% but that increased to 8.9% when an additional condition was added (van den Akker, et al., 2001). Nevertheless, a systematic review of 21 articles suggested that 4 – 7 diagnoses led to an underestimation of the prevalence of multimorbidity and recommended the use of at least the 12 most prevalent chronic conditions with a high burden in any given population (Fortin, et al., 2012).

Also, active case finding, flexible diagnostic and inclusion criteria are likely to yield a higher prevalence (van den Akker, et al., 1998). In ascertainment of the cases, various modalities have been employed. Some studies (Marengoni, et al., 2009; van den Akker, et al., 1998) obtained data from medical / general records and reported prevalence of 74%-80 % and 55% respectively. A few studies (Britt, et al., 2008; Khanam, et al., 2011) used a combination of approaches by combining clinical examination with or without laboratory tests, self -reports and review of medical records. According to Fortin and colleagues (Fortin, et al., 2004), information about chronic medical conditions is more likely to be found in medical records. In addition, despite the shortfalls in the records of our health system, it is a cheaper and more feasible option as compared to active case finding. Furthermore it may be more reliable when compared to self–reports by respondents during interviews. Nonetheless it may be appropriate to combine these two in order to obtain more reliable results.

Criticisms of current methods include the failure of simple counts to account for variations in severity and the general non-recognition of emotional and psychological problems (Mercer, et al., 2009). However clinical studies tend to use cumulative indices such as the Index of co-existent of diseases (ICED) which integrates count and severity whilst epidemiological studies such as this use the simple counts (Marengoni, et al., 2011).

As varied as the prevalence's are, the most obvious facts are that multimorbidities are common and affect almost half the proportion of patients that attend primary health care facilities (Fortin, Lapointe, et al., 2005). It has been described as common and not a rarity in family practice but understudied (Fortin, Lapointe, et al., 2005).

2.5. THE PATTERNS OF CONCURRENT CHRONIC CONDITIONS

The patterns of concurrent chronic conditions in a specific population have implications for health care planning and resource allocation as well as clinical practice. Concurrent chronic conditions may influence the management of each other; for instance, through interactions between therapies (Parekh & Barton, 2010) or may worsen each other (Amoah, et al., 2002). Single disease guidelines fail to consider drug-drug and drug-disease interactions and so information on different clusters will be beneficial in developing strategies, which can be targeted to a pattern. Also, understanding the mechanisms behind the co-existing patterns will be useful in planning their prevention.

Various explanations have been given for identifiable patterns in concurrent chronic conditions. These include direct causation and associated risk factors (Valderas, et al., 2009; van den Akker., et al., 1996). It has also been reported that the disease combinations are widely varied; for instance, 99% of the possible combinations of chronic conditions were found in the database of a study in Germany (van den Bussche et al., 2011). Regardless of this wide variety of combinations, the most prevalent individual chronic conditions also dominate the combinations (van den Bussche, et al., 2011). For instance, the KORA age study in Germany considered 11 chronic conditions using self-administered questionnaires primarily. In respect of specific diseases, hypertension and diabetes, and hypertension and stroke were the

diseases most often to co-occur. The association was statistically significant and was independent of age, sex or the presence of other conditions. When the frequently occurring conditions were broadly classified, four patterns were identified. They were; cardiovascular & metabolic diseases; joint, liver, lung and eye disease; neurologic diseases; and gastrointestinal diseases and cancer. These results were not by chance and their overlap could be suggestive of underlying pathological mechanisms (Kirchberger, et al., 2012).

2.6. DISTRIBUTION OF CO-OCCURRENCE IN STUDIES BY SOCIO-DEMOGRAPHIC RISK FACTORS

Knowledge of risk factors of concurrent chronic conditions can help provide insight into the dynamics of patient care and also prevention strategies. Studies to identify the risk factors of multimorbidities have largely been limited to socio-demographic factors without considering the distribution of concurrent chronic conditions relative to life styles, environmental factors, genetic background, and biological causes (Marengoni, et al., 2011) probably because research in this subject area is in the very early stages. Socio-demographic factors that have been studied include age (Schafer et al., 2012; Taylor et al., 2010), sex (Schafer, et al., 2012; Uijen & van de Lisdonk, 2008) , socio-economic status (Barnett, et al., 2012; Khanam, et al., 2011; Schafer, et al., 2012), marital status (Schafer, et al., 2012) and social network (Marengoni, et al., 2011).

Globally the world's population is ageing. The life expectancy at birth worldwide has increased and is expected to rise further. Ghana, like other developing countries despite having lower life expectancies has not been left behind. The life expectancy at birth in Ghana has increased from 59 years in 2001 to 63 years in 2011. (The World

Bank, 2012). As a result, more and more people are living longer and are more likely to develop concurrent chronic conditions.

There have been varied age restrictions in studies on concurrent chronic conditions though most studies have been in the elderly (Khanam, et al., 2011; Wolff, et al., 2002). Several studies have shown that the concurrence of chronic conditions increases with increasing age (Marengoni, et al., 2009; Uijen & van de Lisdonk, 2008; van den Akker, et al., 1998). In one study (Uijen & van de Lisdonk, 2008) a prevalence of 30% in the age 65-74 compared with 55% in the 77 and above years group was obtained when the results were stratified.

Indeed a recent systematic review of 21 articles (Fortin, et al., 2012) suggests that the evidence for increase in the prevalence of concurrent chronic conditions with increasing age is almost conclusive. Fortin and colleagues in their review established that a graph of prevalence of multimorbidity by age for the studies showed an S-shaped curve with low prevalence estimates of less than 20 % before 40 years and then a steep increase followed by a plateau at 75% at about 70 years (Fortin, et al., 2012).

Notably however, Khanam and colleagues in Bangladesh in their study which was limited to persons aged 60 years and above reported there was an absence of differences in prevalence by age group in contrast to studies in the West on the prevalence of multiple chronic conditions (Khanam, et al., 2011). They suggested two probable reasons for this observation; that ageing of the population was a new phenomenon in Bangladesh compared with other countries such as Sweden and The United State and a second reason was attributed to the concept of selective survival

such that the people who survive from childhood are more robust and resistance to illnesses later (Khanam, et al., 2011).

Whilst it might be true that chronic diseases and hence multimorbidities are more common in older people, there have been studies which highlighted the fact that it is also a problem in younger ages (Barnett, et al., 2012; Taylor, et al., 2010). In a recent study on the prevalence of multimorbidity in a population-based cohort in South Australia (Taylor, et al., 2010), the authors found that more than 40 percent of the people with multimorbidity were less than 60 years of age and concluded that multimorbidity is not just a condition of the elderly. Specific chronic disease entities in Ghana are not limited to the elderly; over 25% of the recorded cases of hypertension, nationwide were persons aged less than 50 years (Ghana Health Service, 2010) and the situation may be similar for other chronic conditions also. Indeed the perception that chronic diseases are a problem only of the elderly has been described as a myth (World Health Organisation, 2005) which needs to be debunked. A way of dispelling this myth and in effect appreciate the true situation of chronic disease distribution is perhaps to broaden the age group in chronic diseases researches.

Additionally, the observed association between age and co-existing chronic conditions may be explained by the set of chronic diseases studied. Most chronic diseases are largely lifestyle mediated and these are bound to be commoner as the risk factors require time to permeate. Other chronic conditions such as HIV and sickle cell disease, which are commoner in our settings, affect younger adults significantly and may influence the prevalence of concurrent chronic conditions in this setting.

It has also been reported that in sub-Saharan Africa, people tend to have the problems associated with the elderly at younger ages prompting calls to even consider the cut–off age for elderly at 50 years rather than the commonly used 60 years in the minimum data set project (World Health Organisation, 2012b). In addition, Barnett and colleagues in Scotland (Barnett, et al., 2012) have reported that the onset of concurrent chronic conditions is 10 – 15 years earlier in people living in the most deprived areas compared with the most affluent. All these reasons prompt for the need to extend the age range in studies such as this in developing countries and in our setting to include young adults.

Various studies, (Marengoni, et al., 2009; Uijen & van de Lisdonk, 2008) have identified the female gender as a risk factor for the development of concurrent chronic conditions. For instance, the prevalence of multimorbidities was estimated to be 74% and 80% for men and women respectively aged, 80 years in the same study (van den Akker, et al., 1998). This is further supported by other studies (Khanam, et al., 2011) which determined the adjusted odds of being a woman with multimorbidity to be 2.86 times as likely as being a man. Conversely, a few studies (Schafer, et al., 2012) identified multimorbidity to be commoner in males attributing this to the target population among other reasons. Schafer and colleagues further suggested that observed sex association might be dependent on the type of multimorbidity considered. Other studies (Britt, et al., 2008) on the other hand did not reveal this association with sex.

Despite the variations in the methods employed which limit direct comparison, the trend is similar with regards to sex as a risk factor in the developing world. A study in rural Bangladesh which was carried out in persons older than 60 years also indicated

that multimorbidities was significantly higher in women (Khanam, et al., 2011). This could be due to the fact that more women grow to the very old ages as they have a higher life expectancy on average and as a result are more at risk of acquiring these chronic conditions, which are positively associated with age. Also, perhaps the men who are able to defy the odds and make it to the older age are resilient thus have a better health profile compared with their female counterparts.

Educational attainment, occupation, income or a composite of these measures are established indicators of socio-economic status (Krieger, Williams, & Moss, 1997; Winkleby, Jatulis, Frank, & Fortmann, 1992). Socio-economic factors such as education and income have been reported as risk factors associated with concurrent chronic conditions (Khanam, et al., 2011; Uijen & van de Lisdonk, 2008; van den Akker, et al., 1998). Most studies (Barnett, et al., 2012; Schafer, et al., 2012; Uijen & van de Lisdonk, 2008) have identified low socio-economic status (SES) as positively associated with concurrent chronic conditions.

Barnett and colleagues in Scotland using data from 1751841 patients, about a third of the Scottish population, report that people living in more deprived areas are more likely to have multimorbidities than those living in the most affluent areas. They further established that the onset of multimorbidity occurred 10 – 15 years earlier in people living in the most deprived areas compared with those living in the most affluent areas (Barnett, et al., 2012). Similarly, in Netherlands, a study (Uijen & van de Lisdonk, 2008) showed that low socio-economic class are associated with an increasing number of patients with multimorbidity.

Lower educational status has been positively associated with concurrent chronic conditions (Marengoni, Winblad, Karp, & Fratiglioni, 2008; Nagel et al., 2008). In a large prospective study in Germany, (The EPIC -Heidelberg Cohort), after adjustments were made for relevant confounding variables, low educational attainment was associated with a higher prevalence of multimorbidity (Nagel, et al., 2008). The association with lower education is further supported by an earlier study in The Netherlands which sourced information from general practitioner records and identified lower education as a risk factor for multimorbidity (van den Akker, et al., 1998). In the developing world, a study in Bangladesh also revealed that co-existing chronic conditions were commoner in illiterates (Khanam, et al., 2011) .

Low socioeconomic class has also been identified as at most risk of multimorbidities by a number of studies (Uijen & van de Lisdonk, 2008; van den Akker, et al., 1998). This is at variance with the study in Bangladesh which rather identified being in the non- poorest quintile (higher socioeconomic class) as being more affected (Khanam, et al., 2011). Although the studies cannot be directly compared on account of the variations in the methods used, the two situations could be plausible. Higher socioeconomic class could be protective as individuals may have better access to care. On the other hand, it could be associated with more established risks factors such as sedentary lifestyles and obesity, which could result in the development of multiple chronic diseases in an individual.

In some studies (Khanam, et al., 2011), singles had a higher prevalence of concurrent chronic conditions whilst other studies (Schafer, et al., 2012) observed no relationship between marital status and the presence of concurrent chronic conditions. Other associated factors identified include an individual's social support in which case a

good social support was reported to be protective (Marengoni, et al., 2011). A family history of chronic conditions has not been widely studied within the context of concurrent chronic conditions. However a family history has been identified as a risk factor in a number of chronic conditions such as ischaemic heart diseases (Padmavati et al., 2011), type 2 diabetes and hypertension (Das, Pal, & Ghosh, 2012).

Despite the differences in identified risk factors identified from the reviewed studies, older persons, women, and persons from low social classes appear more likely to be affected by multimorbidity.

CHAPTER THREE

3.0. METHODS

3.1. STUDY DESIGN

A cross sectional hospital-based study was conducted amongst adult patients of at least, 18 years of age who attended the medical out-patient clinic at the main out-patient department (OPD) of The Tema General Hospital between 21st May and 8th June 2012. Information was taken on both the explanatory variables and the outcome variable simultaneously.

3.2. STUDY SETTING

3.2.1. Profile of the study area

The Tema Metropolis is one of the thirteen districts of the Greater Accra Region, located in the Southeastern part of Ghana. The major seaport in Ghana, the Tema Harbour is part of this metropolitan area. The estimated 2012 population of Tema metropolis (from 2010 census) is 371,220.

There are various levels of health facilities in the Tema Metropolitan area including four health centres, a polyclinic, the Tema General Hospital and eighty-four private health facilities, which include hospitals, clinics and maternity homes.

3.2.2. The Tema General Hospital

The Tema General Hospital is the main government hospital serving the Tema metropolis and said to be a high volume health facility. The catchment area includes the Tema Metropolis and satellite towns and villages. It has 10 wards with a 294 bed

capacity and provides a 24-hour specialist and general services on both outpatient and in-patient basis.

Services provided include, Obstetrics and Gynaecological Care, Paediatrics, Medicine and General Surgery amongst others. The hospital also runs specialised clinics such as dermatology and eye clinics. Support services available include laboratory, radiology and pharmacy.

The top ten causes of out-patient care in 2011 included diabetes mellitus, hypertension, acute eye infection, rheumatism and joint pains, skin diseases and ulcer, and anaemia amongst others. Chronic conditions are a significant source of morbidity and mortality in the hospital. (The top 10 causes of outpatients, inpatient morbidity and mortality at TGH for 2009 till 2011 are in appendix 3). The medical outpatients' clinic attends to the highest proportion of patients followed by, the obstetrics and gynaecology clinics, the surgical and paediatric departments in descending order.

The outpatient clinic of the Tema General Hospital

The outpatient attendance excluding antenatal care for the year ending 2011 was about 146906 (168383 if inclusive of antenatal cases). For outpatient care, there are a general OPD, an eye clinic, HIV/AIDS clinic, dental clinic and other specialised OPDs. The general OPD provides outpatient care for the medical, surgical obstetrics and gynaecology, and paediatric units. The main OPD has ten active consulting rooms, six of which are used by the medical and surgical units. The medical and surgical clinics attended to 84192 patients in 2011. The medical OPD attends to the majority of the outpatients, 57 % (50% if inclusive of antenatal cases) of the annual outpatient load of the TGH. The medical clinic is run by one physician specialist, a

principal medical officer, one senior medical officer, three house officers and four medical assistants.

3.3. VARIABLES

The Outcome variable was concurrent chronic condition and was defined as the presence of two (2) or more of the 13 pre-selected chronic conditions co-existing in an individual. This was based on diagnoses extracted from medical records.

The pre-selected chronic conditions in this study are hypertension, diabetes mellitus, musculoskeletal conditions, asthma, sickle cell disease, occupational injuries, malnutrition, intestinal worms, other cardiovascular conditions; blindness, cataract and other eye disease; skin diseases and ulcers; gastrointestinal diseases and anaemia.

The Explanatory variables for the outcome included the patient's age, sex, level of education, a family history of chronic condition, marital status and occupation.

3.4. SELECTED CHRONIC CONDITIONS

The thirteen most prevalent (13) chronic / potentially chronic conditions were selected based on a review of the monthly morbidity returns of the hospital. This was similar to observations in systematic reviews of studies on concurrent chronic conditions in which majority of studies selected the set of diseases based on the most prevalent chronic conditions (Diederichs, et al., 2011; Fortin, et al., 2012). Thirteen (13) conditions were chosen based on the conclusions by a systematic review(Fortin, et al., 2012) of studies on concurrent chronic conditions which recommended the use of at least, 12 of the most prevalent chronic diseases with a high impact or burden in a given population (Fortin, et al., 2012).

In this study, the 13 selected chronic conditions included chronic conditions such as hypertension as well as others with the ability to become chronic health conditions such as anaemia. Duration of 3 months was the minimum acceptable duration to be classified as a chronic condition for conditions such as anaemia, skin conditions and ulcers, which could be either acute or chronic.

'Musculoskeletal conditions' referred to all types of arthritis and chronic back pain (Lumbago). Other cardiovascular conditions had three possible diagnosis; ischaemic heart disease, congestive cardiac failure and stroke. Gastrointestinal conditions included chronic gastritis, tumours and chronic peptic/gastric ulcers.

All conditions were captured as the diagnosis written and captured in the medical records except musculoskeletal conditions, cardiovascular conditions, gastrointestinal conditions, which were composite diagnoses, derived as previously described.

3.5. STUDY POPULATION

The study population was all adult patients aged 18 years and above attending the medical outpatient clinics of the Tema General Hospital during the survey period.

Inclusion and exclusion criteria

All patients 18 years and above attending the medical OPD during the survey period were eligible for inclusion. Patients who were seriously ill, lacked the capacity to comprehend for instance, persons with dementia or reporting for repeated visits and had been previously enrolled in the study during the study period were excluded.

3.6. SAMPLING

3.6.1. Sample size determination

There is no information on the prevalence of concurrent chronic conditions in Ghana and even in Africa. However in the review conducted in 2011 on co-existing chronic conditions in developed countries (Marengoni, et al., 2011), the prevalence was determined as 20% - 30% when the study was conducted in the general adult population. When the study was limited to only the elderly 60 years and above a prevalence of 55% - 98% was obtained. Chronic conditions are emerging and less of a threat in the developing countries relative to more developed countries. However since this is a hospital-based study, the prevalence was assumed to be high and a therefore a prevalence of 30% was used in the calculation.

The sample size was estimated on the assumption that 30 % of patients who present at the main OPD would have at least two concurrent chronic condition and that 150 patients would be interviewed per day for 10 ten days. A sample size of 1500 gave 98% power to detect an effect size of 30% (using a significance level of 5% and a confidence interval of 95%). The sample size of 1500 gave reasonable security against the effects of decline in the estimated prevalence of the outcome or a lower response rate in the study population. A prevalence of 20% would have a power of 86% whilst a sample of 1000 respondents would have had a power of at least 70 % to detect an effect size of 30% at a significance level of 5%. The determination was done using STATA version 10 for Windows (College Station, Texas, USA).

3.6.2. Sampling procedure

Generally, patients who reported at the OPD went through records procedures where they registered and obtained their folders. They then moved to a nurses' station where

their temperature, blood pressure and weight were recorded. The next point was the triage table from where they were assigned to a consulting room.

The clients waiting in front of the participating consulting rooms to see the clinician (in all the medical consulting rooms) were sampled, a method used in other studies (Britt, et al., 2008), consecutively. Each patient who met the eligibility and inclusion criteria was sampled until the study period was over.

If a person did not meet the eligibility criteria, the next patient was selected and approached. Eligible patients had the study explained and if they consent, they had to thumbprint / append their signatures and were then enrolled.

3.7. ETHICAL CONSIDERATIONS

Ethical clearance was sought from the Ghana Health Service Ethical review committee on research involving human subjects (ERCRIHS).

Permission was also sought from the hospital authorities to use the hospital as the study site and to extract the necessary information from the study participants and records for purposes of the study only.

Informed consent was obtained for both participation in the interview and access to the medical records of patients to obtain information on the clinical diagnosis. The research assistants explained the study and its significance to the potential participants. They were assured of its harmlessness, confidentiality and the option to opt out and quit the interview at any time they so desired. It was also explained to them that there was no financial compensation for participation. Potential subjects

who voluntarily agreed to participate had to append their signature or left thumbprint on the questionnaire.

Questionnaires were kept under lock and key by the researcher. Soft copies of the data are on an external drive and the researcher's personal computer and are password protected.

3.8. DATA COLLECTION TECHNIQUES / METHOD & TOOLS

3.8.1. Training of interviewers

Five Research assistants, who were national service personnel, fluent in Ga and Twi working in the hospital and familiar with medical diagnoses were engaged as well as the hospital biostatistician who was engaged as a supervisor. They were trained on informed consent, questionnaire administration and extraction of the information on diagnoses from the medical records.

3.8.2. Pre-test

The instrument was pretested at the Tema General Hospital main OPD following training of the research assistants; the data collected during the pre-test was not added to those analysed. Attention was paid to the wording, ease of administering the questionnaire of the instruments, skip patterns, omissions and other potential problems. The validity and reliability of the questionnaire was also tested. The approximate time for filling a single questionnaire was estimated also. Following the pre-testing, the instrument was revised.

3.8.3. Data collection

Data was collected using two principal methods; interviewer administered (using a face-to-face interview) questionnaire and review of medical records to extract

diagnoses. Data was collected from 21st May to 8th June 2012. Information was taken on both the explanatory variables and the outcome simultaneously.

Tool / Questionnaire administration

A pre-coded structured questionnaire was administered. Potential respondents waiting in front of the consulting rooms used were approached and the verbal information required in making an informed decision on whether or not to consent was given. Those who consented after reading or having the informed consent form explained had the structured questionnaire administered by a research assistant. Data was collected on demographic and socio-economic characteristics of respondents, the self-reported diagnoses, utilisation patterns using average hospital visits and admissions as the measures, medical history and medical diagnoses as per medical records. The interview was carried out first.

After the entries for the day had been made for each consulting room, the folders were handed over to the research team to extract the diagnosis. Each questionnaire was matched with the corresponding folder and the information on medical diagnoses and routine medications was then extracted.

All diagnoses from visit(s) over a year's period from the date the patient was interviewed (1st May 2011 was used as the reference date) was taken. Firstly all diagnoses were captured then only diagnoses for chronic conditions. If the diagnosis was in doubt, where clinicians use a question mark as prefix to mean query or if it was a number of diagnoses being investigated and the prefix, "rule out" was used, then it was not captured. Information was also taken on routine medications of the patients. Prescribed medications were considered routine if the duration for which it had been

prescribed was > 3 months or if patients had been on it for > 3 months. The extraction was carried out by the researcher and one research assistant together throughout the study period.

3.9. QUALITY CONTROL

The research assistants were selected based on their exposure to the hospital environment and familiarity with medical diagnoses. This ensured that they are comfortable with the subject area. All research assistants were fluent in the local dialects, Twi and Ga to ensure the comfort of both interviewers and interviewees. They were trained for one day. Training was to educate researchers on ethical considerations particularly the informed consent procedure, questionnaire administration and response to queries on the research. The questions were thoroughly explained and discussed in Ga and Twi. Training was provided in questionnaire administration, confidentiality and informed consent procedures. Pre-testing was carried out immediately after the training. The instrument was then edited to render it more valid and user friendly.

Records were checked for completeness daily. Telephone calls were made where necessary to ensure completeness of the data. As part of data validation, double entry was done and the resulting two datasets were matched for differences. The differences were resolved by checking from the questionnaire.

3.10. DATA PROCESSING AND ANALYSIS

The pre-coded questionnaires were serialised at the time of entry and entered in Microsoft excel 2010 without identifiers after the researcher had checked for completeness of the information. Data cleaning was done by running all frequencies,

identifying missing records and filling in missing detail. Questionnaires for which folders were unavailable for capturing the diagnoses were removed from the data set. The data was crosschecked for errors also. It was then exported to STATA version 10 for Windows (College Station, Texas, USA) for analysis.

The outcome variable was treated as a binary variable where, success was two (2) or more of the preselected chronic conditions and failure was one or no chronic conditions. The primary outcome was concurrent chronic condition, which was defined as the co-existence of at least two of the pre-selected chronic conditions in the same patient. The chronic conditions considered in this study were Hypertension, Diabetes mellitus. Rheumatism and joint pains, Asthma, Sickle cell disease, Occupational injuries, Malnutrition, Intestinal worms, Other cardiovascular conditions (stroke, heart failure, ischaemic heart disease), Blindness, cataract and other eye diseases, Skin diseases and ulcers, Gastro Intestinal diseases and Anaemia.

The prevalence of concurrent chronic conditions was estimated for the study population and for subcategories of the population. The prevalence was defined as the proportion of patients with at least two concurrent chronic conditions.

For potential risk factors with more than two levels, one of the levels was chosen as the baseline. Age was modelled as a categorical variable with categories defined by: 0 (<30 years), 1 (30-39 years), 2 (40-49 years), 3 (50-59 years), and 4 (60+ years). Type of occupation was collapsed into two groups; skilled workers included professional/managerial/clerical and skilled artisans whilst unskilled workers category included, traders and service providers, agricultural workers, students and unskilled

persons. The marital status was collapsed into three groups; never married, married/living together and divorced/separated/widowed.

Logistic regression was used to investigate the independent effect of potential risk factors on the odds of multimorbidity. To construct a model with risk factors independently associated with multimorbidity, each variable was candidate for inclusion, if, when considered singly, the P-value for association with multimorbidity was 0.1 or less. Variables were then removed if the P-value for the likelihood ratio test was more than 0.1 and if removal did not change the coefficients of variables in the model by more than 10%. The variables in these models were combined in a final model in a similar way. A risk factor was considered significant if the p-value was less than 0.05 following the multivariate logistic regression analysis.

CHAPTER FOUR

4.0. RESULTS

Study participants

1527 patients were interviewed. However the medical records of 128 (8.4%) respondents were either unavailable for extraction of medical diagnoses or the information captured was illegible thus were excluded from the analysis. Hence, a sample of 1399 respondents was left in the study. The participants were mostly females; 972 of the total 1399, (69.48%) were females. The mean age was 50.9 years (SD 17.0) whilst the age range was 18–109 years. Almost a third, 470 (33.6%) of the respondents were above age 60 years. Respondents were predominantly Christians 1245 (89%) whilst Akan was the major ethnic grouping 504 (36%). Most were married/ living together with a partner 790 (56.5%), few people had been educated beyond the secondary level 411 (29.4%) and majority were unskilled workers 897 (64.1%). The distribution of study participants is summarised in Table 4.1.

Prevalence of concurrent chronic conditions

Concurrent chronic condition was defined based on 13 selected chronic conditions. As many as 1003 (71.7%) of respondents had at least one of the selected chronic conditions. The top three conditions amongst the pre-selected conditions for defining concurrent conditions were hypertension (52.8%), diabetes mellitus (25.4%), and musculoskeletal conditions (17.9%) in descending order. More than one fourth (28.3%) of study participants had none of the selected conditions. In addition to these, 32.9 % had only one of the 13 conditions. The remaining 38.8 % of study participants had at least 2 of the selected conditions.

Of the 1,399 respondents, 543 i.e. 38.81% (95%CI 36.3 – 41.4) had concurrent chronic conditions as defined by the study as the presence of two or more of the 13 selected conditions in an individual. Table 4.1 summarises the socio-demographic characteristics of the total sample of study participants and the prevalence of concurrent chronic conditions for each category of the socio-demographic characteristics of the sample.

The prevalence was higher with increasing age and in females. Females had a prevalence of 41.3% (95% CI 38.2 – 44.4) compared with a prevalence of 33.3% (28.8 – 37.7) in males, a lead which was maintained across all the age categories. Table 4.2 summarises the age and sex stratification for the various levels of morbidity (relative to the selected conditions) in the study participants.

The uneducated, unskilled and divorced/separated/widowed had the highest prevalence in their respective groups.

Table 4.1: Distribution of study participants and concurrent chronic conditions by the socio-demographic characteristics of study participants, Tema General Hospital, May/ June 2012.

Characteristics	Participants (N = 1,399)		Frequency of concurrent chronic conditions ϕ (N=543)	
	n	%	N	Prevalence (95% C.I.)
Age (years)				
18-29	203	14.5	6	3.0(0.1 – 5.3)
30-39	211	15.1	29	13.7(9.1 – 18.4)
40-49	220	15.7	69	31.4(25.2 – 37.5)
50-59	295	21.1	160	54.2(48.5 – 60.0)
60+	470	33.6	279	59.4(54.9 – 63.8)
Sex				
Female	972	69.5	401	41.3 (38.2 – 44.4)
Male	427	30.5	142	33.3 (28.8 – 37.7)
Ethnicity				
Akan	504	36.0	208	41.3(37.0 – 45.6)
Ga / Dangme	350	25.0	149	42.6(37.4 – 47.8)
Ewe	364	26.0	137	37.6(32.6 – 42.6)
Guan	19	1.4	7	36.8(13.0 – 60.7)
Mole-Dagbani	66	4.7	17	25.8(14.9 – 36.6)
Other	96	6.9	25	26.0(17.1 – 35.0)
Marital status				
Never married	246	17.6	28	11.4(7.4 – 15.4)
Married/ Living together	790	56.5	327	41.4(38.0 – 44.3)
Divorced/separated/ Widowed	363	26.0	188	51.8(46.6 – 57.0)
Education				
No education	319	22.8	152	47.6(42.1 – 53.2)
Primary	160	11.4	65	40.6(32.9 – 48.3)
Middle/JSS	509	36.4	193	37.9(33.7 – 42.1)
Secondary+	411	29.4	133	32.4(27.8 – 36.9)
Occupation				
Skilled	502	35.9	196	34.7(30.5 – 38.8)
Unskilled	897	64.1	347	41.1(37.9 – 44.4)
Total	**1,399**		**543**	**38.8(36.3 – 41.4)**

ϕ Concurrent was defined as the presence of at least two of the 13 preselected conditions.

Table 4.2: Number of chronic conditions in study participants, Tema General Hospital, May/ June 2012 stratified by age group and sex.

No. of chronic conditions	Total participants (N = 1399)		18 – 59 years (N = 929)				60+ years (N = 470)			
			Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%	No.	%
0	396	28.3	134	50.6	216	32.5	18	11.1	28	9.1
1	460	32.9	77	29.1	238	35.8	56	34.6	89	28.9
2	433	31.0	42	15.9	177	26.7	67	41.4	147	7.7
≥3	110	7.9	12	4.5	33	5.0	21	13.0	44	14.3
≥2	**543**	**38.8**	**54**	**20.4**	**210**	**31.6**	**88**	**54.3**	**191**	**62.0**

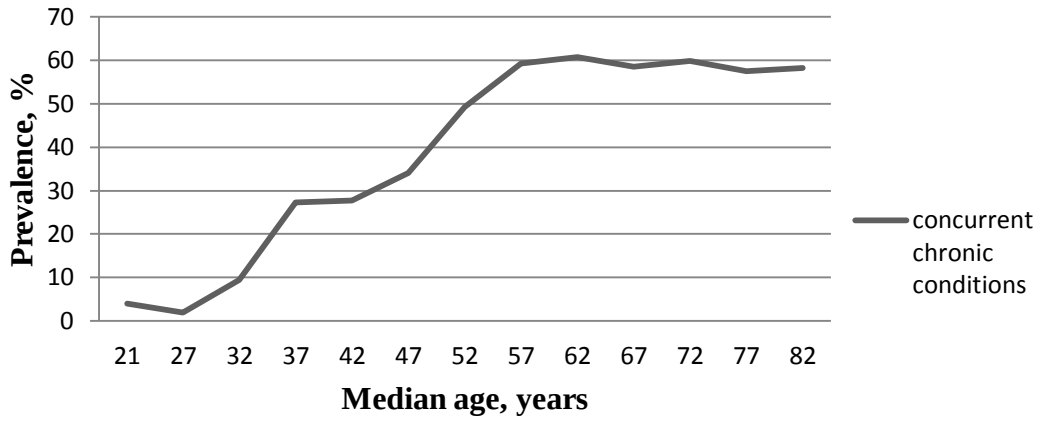
Age – related patterns of concurrent chronic conditions

The prevalence of concurrent chronic conditions in the survey population showed marked age differences across various age categories. The prevalence increased steadily with age. It was just 3% in age 18 – 29 years and about 1 out of three (31.4%) in respondents aged 40 – 49 years. Over half of respondents above 50 years of age had concurrent chronic conditions. Remarkably as many as 264 respondents, representing 48.6% of respondents with concurrent chronic conditions were less than 60 years.

Further analysis of age done to determine the prevalence of concurrent chronic conditions in more refined age groups of 18 – 24 years and thereafter at 5 – year intervals showed the increasing prevalence of concurrent chronic conditions with

increasing age. The line graph of the prevalence versus median age group was S-Shaped. Before age 30 years, the prevalence was under 10% and indeed was less than 20% below age 35. However, it increases rapidly from age 35 years till it reaches a peak of 60% at about 57 years and plateaus. Figure 4.1 shows the line graph obtained when prevalence of concurrent chronic conditions versus median age of each age group was drawn.

Figure 4.1 Prevalence of concurrent chronic conditions in study participants, Tema General Hospital, May/June 2012.



Patterns of concurrent chronic conditions

The commonest level of concurrent chronic conditions was pairs of conditions; as much as 433 (79.7%) of the 543 respondents with concurrent chronic conditions had 2 co-existing conditions. Amongst the 543 respondents with concurrent chronic conditions, 104 (19.2%) had 3 concurrent chronic conditions and only 6 (1.1%) had the highest number of concurrent chronic conditions of 4.

The three (3) commonest combinations of conditions were all pairs; hypertension-diabetes mellitus (36.6%), hypertension-musculoskeletal-conditions (19.9%) and hypertension-other cardiovascular conditions (11.4%) in descending order. These top three (3) combinations remained the same in both sexes and when considered in the respondents less than 60 years and those 60 years and above. In patients with three or four concurrent chronic conditions, the top two combinations of conditions were hypertension-diabetes mellitus-musculoskeletal conditions, and hypertension-diabetes mellitus-other cardiovascular conditions.

There was marked variation in the disease combinations. In all there were 57 different combinations. Despite the numerous combinations, out of the total 57 combinations, the top five combinations, which are shown on table 4.3 collectively, accounted for as much as 76.9% of the persons with concurrent chronic conditions. The prevalence of the commonest combinations of disease together with the interval estimate is summarised by Table 4.3.

Table 4.3.Distribution of combinations of chronic conditions[§] amongst study participants with concurrent chronic conditions, Tema General Hospital, May/June, 2012.

Chronic condition combination	Frequency (N=543)	Percentage	(95% CI)
Hypertension-diabetes mellitus	199	36.6%	(32.6 - 40.7)
Hypertension-musculoskeletal conditions	108	19.9%	(16.5 - 23.3)
Hypertension-other cardiovascular conditions	62	11.4%	(8.7 - 14.1)
Hypertension-diabetes mellitus-musculoskeletal conditions	33	6.1%	(4.1 - 8.1)
Hypertension-diabetes mellitus-other cardiovascular conditions	16	2.9%	(1.5 - 4.4)
Hypertension-musculoskeletal conditions-other cardiovascular conditions	15	2.8%	(1.4 - 4.1)
Diabetes mellitus-musculoskeletal conditions	10	1.8%	(.07 - 3.0)
Hypertension-musculoskeletal conditions-gastrointestinal conditions	9	1.7%	(.05 - 2.7)
Hypertension-anaemia	6	1.1%	(.02 - 2.0)

§ Combinations included are those with a prevalence of at least 1%.

Risk factors

Univariate logistic models showed that age, sex, marital status, educational status, type of occupation, family history of a chronic condition and ethnicity were associated with concurrent chronic conditions to varying extents (Table 4.4). Increasing age, female sex and a family history of chronic conditions were the categories most strongly associated with increased risk. Marital status showed a

strong univariate association with concurrent chronic conditions; compared with the never married, the odds of the married or living together was about 5 times whilst the odds for the divorced/separated/widowed was even much higher, 8.4 times that of the never married. Increasing levels of education was associated with decreasing odds (Table 4.4) of having concurrent chronic conditions. A skilled occupation also had less odds of being associated with concurrent chronic conditions compared with skilled occupation; OR 0.76 (95% CI: 0.61- 0.95 p-value = 0.0167). Religion and place of residence on the other hand were not found to be associated with the risk of having concurrent chronic conditions as defined by this study.

Multivariate logistic regression analysis which adjusted for the effects of all the possible risk factors which were significantly associated after univariate analysis found age, sex and a family history of chronic conditions (in descending order of significance) to be independently associated with the risk of having concurrent chronic conditions. The association between marital status, educational status, type of occupation and ethnicity versus concurrent chronic conditions disappeared after adjusting for the other demographic and socio-economic variables.

Age was the most important independent risk factor. There was a strong association between age and having a concurrent chronic condition; increasing age was associated with increasing risk of concurrent chronic conditions. The odds of having concurrent chronic conditions with increasing age compared with the referent age group of 18 - 39 years for the various age groups were as follows : 40-49 years; OR 4.68 (95% CI; 2.98 – 7.34) , 50-59 years; OR 12.48 (95% CI; 8.23 – 18.92) and for 60 years and above ; OR 15.80 (95% CI; 10.66-23.42). The p-value for all three age categories was <0.0001.

Male sex was associated with a lower odds of concurrent chronic conditions; OR 0.65 (95% CI; 0.49-0.87), p-value = 0.015 indicative of moderate positive relationship between female sex and the risk of having concurrent chronic conditions.

There was a strong association between self-reported family history of a chronic condition and the risk of having concurrent chronic conditions. OR 1.32 (1.04 -1.69) p –value =0.027.

Therefore the likelihood of concurrent chronic conditions (as defined in this study and in the study population) is positively associated with increasing age, female sex, and a family history of a chronic condition. Table 4.5 summarises the logistic regression output for the socio-demographic characteristics, which were found to be independently associated with concurrent chronic conditions in the multivariate logistic model.

Table 4.4: Univariate analysis of potential risk factors of concurrent chronic conditions in study participants, Tema General Hospital, May / June 2012.

Risk factors	Crude OR (95%C.I.)	LR p-value
Age (years)		
18-39	1	
40-49	4.95(3.16 – 7.75)	
50-59	12.83(8.47 – 19.44)	< 0.0001
60+	15.82(10.69 – 23.41)	
Sex		
Female	1	
Male	0.71(0.56 – 0.90)	0.005
Marital status		
Never married	1	
Married / Living together	5.50(3.62 – 8.35)	< 0.0001
Divorced / separated / Widowed	8.36(5.36 – 13.04)	
Educational status		
No education	1	
Primary	0.75(0.51 – 1.10)	
Middle / JSS	0.67(0.57 – 0.89)	0.004
Secondary+	0.52(0.39 – 0.71)	
Occupation		
Unskilled	1	
Skilled	0.76(0.60 – 0.95)	0.017
Family history of chronic conditions		
No family history	1	
Family history	1.43(1.16 – 1.78)	0.001
Ethnicity		
Akan	1	
Ga / Dangme	1.05(0.80 – 1.39)	
Ewe	0.86(0.65 – 1.13)	
Guan	0.83(0.32 – 2.14)	0.008
Mole- Dagbani	0.49(0.28 – 0.88)	
Others	0.50(0.31 – 0.82)	

Table 4.5: Risk factors of concurrent chronic conditions in study participants, Tema General Hospital, May / June 2012.

Risk factors	Adjusted OR	95% CI	Adjusted LR; p-value*
Age (years)			
18-39	1	1	
40-49	4.68	2.98 – 7.34	
50-59	12.48	8.23 – 18.92	< 0.0001
60+	15.80	10.66– 23.42	
Sex			
Female	1	1	
Male	0.71	0.54 – 0.94	0.015
Family history of chronic conditions			
No family history	1		
Family history	1.43	1.03 – 1.68	0.027

* Odds ratios (OR) were adjusted for age, sex, family history, marital status, educational status, type of occupation and ethnicity which were the risk factors significant after univariate analysis using logistic regression; CI = confidence interval; OR = Odds ratio)

CHAPTER FIVE

5.0. DISCUSSION

This study has shown that nearly 4 out of 10 adult patients of the medical clinic of the main OPD of the Tema General Hospital had concurrent chronic conditions as defined in this study. Almost half (48.6%) of the persons with concurrent chronic conditions were young adults (18-59 years). There were varied combinations of chronic conditions but the most common was diabetes mellitus and hypertension, which accounted for over a third (36.6%) of the cases of concurrent chronic conditions. Age, sex, family history of chronic condition and marital status were independently associated with concurrent chronic conditions whilst the association between occupation and educational status and concurrent chronic conditions disappeared after adjusting for the other factors.

The overall prevalence of concurrent chronic condition was 38.8% in the study population of adults 18 years and above who attended the medical clinic of the main OPD of the Tema general hospital during the study period. Several studies particularly in developed countries have determined the prevalence of concurrent chronic conditions albeit in varied settings and with varied methods making comparison difficult (Fortin, et al., 2012; Marengoni, et al., 2011). Notwithstanding, what this study has shown is that over a third of the adults surveyed have concurrent chronic conditions, defined as the presence of two or more of the 13 selected conditions in this study. The prevalence estimated is similar to the reported prevalence of 37.1% from Australia where the study population was sourced from patients who were attending a general practice and were sampled from the waiting room (Britt, et al., 2008). Generally, however, the prevalence obtained is much lower

than that obtained in other hospital-based studies (Fortin, Bravo, et al., 2005; Wolff, et al., 2002) . For instance, Fortin and colleagues from Canada reported that 9 out of 10 patients had more than one chronic condition (Fortin, Bravo, et al., 2005). This is expected since concurrent chronic conditions increase with age and the populations in these countries are more aged. The age-group specific prevalence for persons 60 years and over was 59.4%. This is also similar to the reported prevalence of 58.6% for a sample of people aged 65 – 94 years in Germany (Kirchberger, et al., 2012).

It is worth noting, however, that the methods used were varied and these comparisons must take into account the methods used for instance with respect to the set of diseases considered. Despite these difficulties with comparison, since the purpose was to measure the burden, what this study has done is to provide evidence that amongst the surveyed population, concurrent chronic conditions, as defined in this study, are an appreciable challenge. It makes a case for consideration of concurrent chronic conditions in medical training and in designing guidelines and strategies for prevention and health care provision.

It would, however be useful to determine the prevalence in the community to assess the actual burden. This would provide a more reliable estimate than a hospital – based study, which tends to overestimate the prevalence of diseases. It is also especially important in this country where awareness of the presence of specific disease entities has been described as low (Addo, Amoah, & Koram, 2006; Amoah, et al., 2002). The low awareness probably influences health service utilisation resulting in the observation that Ghanaian hypertensive patients present late and with complications such as stroke and heart failure (A. G. Amoah, 2003) which lead to multiple chronic conditions co-existing in the same individual.

The prevalence was significantly higher in older persons, women, persons with a family history of a chronic condition, divorced/ separated/ widowed persons. It was also positively associated with the least educated, unskilled workers whilst the ethnic status as a Mole-Dagbani was protective though these did not have statistical significance.

Age was the most significant socio-demographic risk factor for concurrent chronic conditions in this study. Notably, over half of the patients above 60 years had concurrent chronic conditions This is similar to almost all studies (Marengoni, et al., 2008; Uijen & van de Lisdonk, 2008) and the evidence for the positive association has been described as almost conclusive (Fortin, et al., 2012).

However, the only reviewed study from a developing country, Bangladesh (Khanam, et al., 2011) did not find significant differences between age and the number of chronic conditions. This was attributed to the reasons that ageing was a new phenomenon in Bangladesh and also due to selective survival such that the ability to survive various childhood illnesses in such a setting produces cohorts that are more resistant to diseases (Khanam, et al., 2011). The study in Bangladesh considered persons 60 years and older and the age was stratified as 60-69 years and 70 years and above. In contrast, this study considered younger age groups (less than 60 years). An analysis of the prevalence versus age gave an S- shaped curve similar to findings of a systematic review of 21 articles on prevalence of multimorbidity (Fortin, et al., 2012). Nevertheless, there were two differences in the trends observed in the systematic review and in this study. Firstly, the dramatic increase starts at an earlier age and a prevalence of above 20% is obtained even before age 40 years, as was the case in the studies, which were reviewed. This could be due to earlier reports (Barnett, et al.,

2012) that the onset of concurrent chronic conditions is earlier in deprived settings. In addition, the prevalence plateaued at about 57 years at a prevalence of 60% whilst the prevalence in the studies reviewed plateaued around the age of 75 years at 70% (Fortin, et al., 2012). This is probably because the life expectancy in Ghana is lower than that of the developed countries therefore the aged population is relatively less resulting in a lower prevalence and the plateau at a younger age. The plateau was said to be due to a balance between new cases and mortality at the older ages (Fortin, et al., 2012). It could be due to the fact that by age 60 years, concurrent chronic conditions have already been diagnosed or are established thus no longer increases with age. This has implications in screening or deciding the target population for preventive measures. Hence what this study has done in this setting is to show that increasing age is a risk factor of concurrent chronic conditions but less so in persons above age 60 years where the risk is similar across different ages.

The proportions of cases seen in each group of under 60 years and 60 years and above were nearly equal; as much as 48.6% of the cases of concurrent chronic conditions were in patients less than 60 years. This is comparable with another study (Taylor, et al., 2010) which showed that 40% of the persons with concurrent chronic conditions were actually less than 60 years. Although not remarkable like that of other studies (Agborsangaya, et al., 2012; Barnett, et al., 2012) which reported that the, proportion of patients who were younger than 65 years with concurrent chronic conditions was higher than for persons older than 65 years; for instance, Agborsangaya and colleagues reported that 70% of patients with multimorbidity were under 65years. This indicates that these young adults in their productive years are also affected by concurrent chronic conditions. Hence, the problem is not exclusive to the elderly. This finding shows that efforts to prevent concurrent chronic conditions must be targeted at

younger adults in whom the risk is highest. It also requires that effort must be made to diagnose concurrent chronic conditions in the elderly in particular in whom the prevalence is highest. The need for family practitioners as well as geriatric physicians to provide continuous and comprehensive care for such patients described as complex patients (Valderas, et al., 2009) cannot be overemphasised. In the planning of healthcare, this provides evidence to give priority to persons with concurrent chronic conditions particularly the elderly but not to the exclusion of younger adults. These efforts must be aimed at providing continuum of care and integration (Boyd & Fortin, 2010).

Females were at an increased risk of having concurrent chronic conditions irrespective of the age category. This is similar to findings of various studies (Marengoni, et al., 2008; Uijen & van de Lisdonk, 2008) but contrasts other studies (Britt, et al., 2008) which did not find an association with sex. Reasons for the increased risk may be due to genetic, living and working environments, life events, behavioural risk factors or risks associated with socio-economic status (Khanam, et al., 2011). Consequently, further studies may be required to identify the most critical factors in this setting. Efforts at prevention may particularly be beneficial to the young female adult.

Socioeconomic status (SES) is usually measured by determining education, income, occupation or a composite of these dimensions (Winkleby, et al., 1992). In this study, both education and occupation were associated with concurrent chronic conditions in the univariate logistic models only and did not show any association after adjusting for the other factors. A similar finding was obtained in a study in Canada (Agborsangaya, et al., 2012) where only a crude association was found between

education and concurrent chronic conditions. The absence of a clear association could be due to the methods of assessment used. It could also be because of the interplay between the influences of sedentary lifestyle with higher SES and yet better knowledge for prevention and access to health care in the same group or the reverse scenario in the case of low SES.

The univariate association between marital status and concurrent chronic conditions disappeared following multivariate analysis. Singles have been identified to have an increased risk of concurrent chronic conditions (Khanam, et al., 2011). This could be attributed to better social support which has been documented to be protective in other studies (Marengoni, et al., 2011). Other studies (Schafer, et al., 2012), however did not show any association between concurrent chronic conditions and marital status. The univariate relationship observed in this study, which shows less risk in the never married category, could be attributed to a fairly younger age group within the group. Besides, social support may not be markedly different between the married and the single in a society as ours with a strong extended family system.

A positive family history meant an increased likelihood of having multiple chronic conditions. This may be due to genetic, behavioural or environmental factors common to members of the same family. There was a crude association between ethnicity and concurrent chronic conditions in this study. Mole- Dagbanis appeared to be protected relative to Akans or Ga/Dangmes. Together with the risk associated with a positive family history, this provides a basis for further studies to identify the genetic/ behavioural/ environmental factors associated with the development of concurrent chronic conditions to inform their control.

Similar to findings from other studies (Agborsangaya, et al., 2012), the combinations of diseases were widely varied. Regardless, the combinations were dominated by the most prevalent individual conditions. In this study, the most common combinations were combinations of hypertension, diabetes mellitus, other cardiovascular conditions (stroke/ischaemic heart disease/chronic heart failure) and musculoskeletal conditions (arthritis and lumbago). These individual conditions have also been identified amongst the most common combinations in other studies on the patterns of concurrent chronic conditions (Britt, et al., 2008; Kirchberger, et al., 2012; Schafer, et al., 2012; Woo et al., 2007). The commonest disease combination was hypertension and diabetes mellitus. This is comparable to findings (Schafer, et al., 2012) which identified the pair of cardiovascular and metabolic disorders to be the leading pattern of concurrent chronic condition. Unlike that study however, this study failed to show any sex difference in the pattern but this must be interpreted in the context of the different methods employed by the studies.

Information on the patterns is necessary because when diseases come together, they may interact and have adverse effects on each other or between medications (Parekh & Barton, 2010) which influences the prevention and care of concurrent chronic conditions. For instance in allocating resources, estimates of future costs will not be well represented as a sum of the costs of the separate illnesses and may well be either greater or less than that sum depending on the nature of the interactions among the co-existing illnesses (Valderas, et al., 2009). Determining the overall burden of diseases will therefore assist in health care planning.

These identified dominating chronic conditions could present an opportunity to develop guidelines and strategies for both prevention and provision of clinical care.

They may be used to integrate and co-ordinate the care for this patient to prevent fragmentation which has been identified as one of the challenges in managing patients with multiple chronic conditions (Boyd & Fortin, 2010)

Strengths and limitations

The ascertainment of diagnosis was based on review of medical records, a data collection method used by other studies (Britt, et al., 2008), to determine prevalence at the practice level. This method has the advantage of being based on written evidence. Also this study considered multiple chronic conditions across various adult age groups thus allowing for estimation of the magnitude of this problem on the health facility. It also used the most prevalent chronic conditions and adhered to the recommended limit of at least 12 condition by Fortin and colleagues (Fortin, et al., 2012).

The study has a number of limitations, as a cross-sectional study; it is unable to establish the temporal associations between the socio-demographic factors studied and concurrent chronic conditions. Although it was a Hospital – based study meant to provide insight into the physician's daily work, the prevalence of concurrent chronic conditions could be over-estimated. This is because the approach of including patients seen during clinical sessions within a time period may lead to oversampling of complex patients with several diseases or frequent attendees (Fortin, et al., 2012).

The other limitations originate from the absence of clearly defined methods and measures of concurrent chronic conditions. The set of diseases used did not include psychological conditions and cancers, which may be important sources of morbidity particularly in the elderly leading to under estimation of the burden of concurrent

chronic conditions. In addition, the morbidity status of individuals was purely based on the diagnosis of various clinicians and subject to their diagnosing patterns. It also assumes that the records are complete, which may not always be the case. This could lead to misclassification of the patients' disease status. Finally , surveyed patients who had chronic conditions which were not included in the list could not be classified as having concurrent chronic conditions even if they had two of such or one in addition to another one on the list. This could lead to underestimation of the prevalence of the outcome.

Consequently any interpretation of the findings of this study should take into consideration the limitations outlined especially the definition of concurrent chronic conditions used, the methods employed particularly with reference to the study population, the means of determining the morbidity status and the number and set of conditions included in the determination of the outcome.

CHAPTER SIX

6.0. CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

This study has determined the prevalence of concurrent chronic conditions in adult patients of the medical clinic of the main outpatient department (OPD) of the Tema General Hospital (TGH). It has also characterised the affected persons and has described the patterns of concurrent chronic conditions relative to age and commonly occurring combinations.

It has shown that concurrent chronic conditions exist in nearly 4 out of every 10 patients of the medical clinic of the main OPD of TGH. Age was the most significant socio-demographic determinant of concurrent chronic conditions. Despite being more prevalent in the elderly, the onset of concurrent chronic conditions was early and involved young adults. The risk of concurrent chronic conditions was constant after age 57 years. Other socio-demographic determinants of concurrent chronic conditions include sex and a family history of chronic conditions. The most common combination of conditions was the pair of hypertension and diabetes mellitus.

The findings provide a basis for consideration of concurrent chronic conditions in designing policies, guidelines and strategies for both prevention and clinical care for persons with chronic conditions. Further research is needed to establish the prevalence across different levels of health facilities and in the population, to determine the consequences of concurrent condition, to develop and evaluate interventions to prevent concurrent chronic conditions and to improve the outcome of care in such patients.

6.2 RECOMMENDATIONS

Researchers / Clinicians / Policy makers

Considering the appreciable prevalence of concurrent chronic conditions, clinicians and researchers should give attention to diagnosis and management of concurrent chronic conditions particularly in the elderly but including all adults.

Researchers and policy makers need to work together to develop and evaluate strategies and programmes to prevent concurrent chronic conditions and provide optimum care for affected persons.

The Ministry of Health / Ghana Health Service need to find ways to strengthen primary care as these patients may be best managed at that level rather than at the secondary level as in this instance.

Health Promoters / Health Educators

Health promotion workers need to alert the public that with chronic conditions, there is always a likelihood of having not just one condition, but multiple chronic conditions simultaneously and hence must be avoided as much as possible.

The National Health Insurance Authority (NHIA)

The NHIA should consider formulating policies that permit financing of preventive health practices such as screening for chronic conditions in persons at risk of concurrent chronic conditions and not just financing clinical care for the affected persons.

Tema General Hospital and other Regional / Teaching Hospitals

Hospitals with similar settings as the Tema General Hospital (TGH) and TGH in particular which run different clinics (that may be uncoordinated) for some of the major individual chronic disease entities, need to find ways of integrating the care of such patients.

The Tema General Hospital should consider sponsoring the training of medical officers in family practice and geriatric medicine to provide expert, integrated and continuous care to the clients with concurrent chronic conditions.

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9.0. APPENDICES

9.1. ETHICAL CLEARANCE FOR THE STUDY

GHANA HEALTH SERVICE ETHICAL REVIEW COMMITTEE

In case of reply the number and date of this Letter should be quoted.

My Ref. :GHS-ERC: 3
Your Ref. No.

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Tel: +233-302-681109
Fax + 233-302-685424
Email: Hannah.Frimpong@ghsmail.org

21 June, 2012

BELINDA AFRIYIE NIMAKO, Principal Investigator
School of Public Health
College of Health Science
University of Ghana

ETHICAL CLEARANCE - ID NO: GHS-ERC: 41/03/12

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol titled:

"Patterns of Co-Occurrrence of Chronic Conditions in the Adults Attending the Out-Patient Clinics of the Tema General Hospital"

This approval requires that you submit periodic review of the protocol to the Committee and a final full review to the Ethical Review Committee (ERC) on completion of the study. The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Please note that any modification of the project must be submitted to the ERC for review and approval before its implementation.

You are also required to report all serious adverse events related to this study to the ERC within seven days verbally and fourteen days in writing.

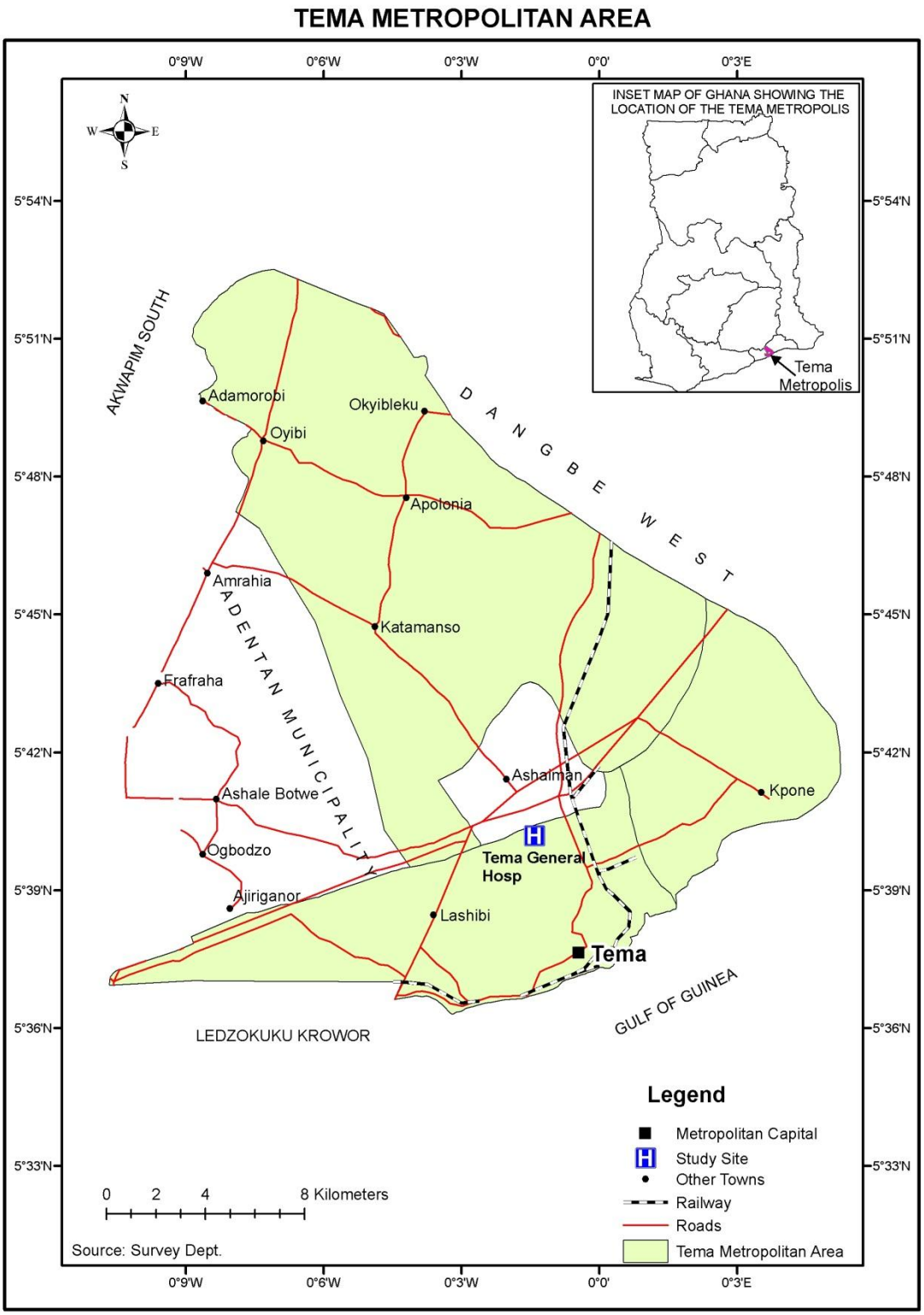
You are requested to submit a final report on the study to assure the ERC that the project was implemented as per approved protocol. You are also to inform the ERC and your mother organization before any publication of the research findings.

Please always quote the protocol identification number in all future correspondence in relation to this protocol

SIGNED.....
PROFESSOR FRED BINKA
(GHS-ERC CHAIRMAN)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra

9.2. MAP OF STUDY SITE



9.3. TOP TEN CAUSES OF MORBIDITY AND MORTALITY AT THE TEMA GENERAL HOSPITAL (2009 – 2011)*

A. TOP TEN CAUSES OF OPD ATTENDANCE

CONDITION	2011	2010	2009
Malaria	17.3%	13.5%	12.3%
Diabetes	11.0%	4.4%	5.3%
Pregnancy related conditions	8.8%	9.2%	8.1%
Hypertension	8.3%	8.0%	10.1%
Eye infection	6.5%	5.2%	5.5%
Rheumatism & joint pains	4.6%	4.4%	5.1%
Skin disease	4.1%	7.3%	5.7%
Anaemia	3.2%	3.1%	3.2%
Gynaecological conditions	2.9%	-	-
Pneumonia	1.8%	-	-
Intestinal worms	-	4.8%	6.0%
Dental caries	-	2.9%	3.3%
Total Top Ten	**68.5%**	**62.8%**	**64.6%**
Total number of patients	**160,991**	**232,776**	**212,082**

B. TOP TEN CAUSES OF ADMISSIONS

CONDITION	2011	2010	2009
Malaria	8.0%	17.8%	15.1%
Abortion	4.7%	5.4%	5.3%
Anaemia	3.3%	6.2%	7.3%
Hypertension	2.8%	7.5%	5.7%
Pneumonia	2.6%	4.4%	6.4%
Gastroenteritis	2.5%	5.1%	5.5%
Sickle cell disease	2.0%	2.6%	-
Diabetes	1.8%	3.3%	3.9%
Retroviral infection	1.3%	2.6%	2.9%
Cerebro-vascular accident	1.3%	2.5%	3.3%
Uterine fibroid	-	-	2.7%
Total Top Ten	**30.3%**	**57.4%**	**58.1%**
Total number of patients	**19,877**	**19,757**	**10,729**

C. TOP TEN CAUSES OF DEATHS

CONDITION	2011	2010	2009
Malaria	11.2%	2.4%	3.3%
Hypertension	8.4%	1.9%	0.0%
HIV / AIDS	7.1%	9.5%	15.0%
Anaemia	7.0%	6.8%	6.3%
Cerebro-vascular accident	6.9%	12.2%	14.4%
Gastroenteritis	3.3%	-	-
Diabetes	3.2%	2.3%	3.6%
Congestive cardiac failure	2.9%	4.3%	3.1%
Septicaemia	2.3%	7.5%	7.1%
Pneumonia	2.0%	3.8%	5.1%
Tuberculosis	-	2.0%	3.1%
Chronic liver disease	-	-	2.5%
Total Top Ten	**54.3%**	**52.7%**	**63.5%**
Total number of deceased	**896**	**745**	**751**

* Source: Tema General Hospital Annual Report (2009, 2010, 2011)

9.4. STATEMENT OF INFORMED CONSENT

STATEMENT OF INFORMED CONSENT FOR STUDY ON CONCURRENT CHRONIC CONDITIONS IN ADULTS PATIENTS OF THE MEDICAL CLINIC OF THE TEMA GENERAL HOSPITAL

I am **Belinda Afriyie Nimako**, a student of the School of Public Health, University of Ghana. As part of the requirements for the award of the Master of Public Health Degree, I am conducting a research on concurrent chronic conditions in the same individual. The purpose is to estimate the magnitude of this phenomenon and to characterise the affected persons. The study will be conducted from 22ndMay 2012 to 8th June 2012.

Procedure:

We will conduct an interview after you have been attended to by the doctor and record the medical diagnoses in your folder. A structured questionnaire will be used for the interview and will have questions about yourself and your medical history. No blood sample will be taken and no treatment will be given. Hence there is no possibility of physical harm to you. There will be no financial compensation for participation.

Freedom to participate:

Your participation is completely voluntary and you may refuse to participate. You may ask me to stop the interview if it makes you feel uncomfortable, or you may also decline to answer any question(s) if you are uncomfortable with it.

Privacy, anonymity and confidentiality;

Your name will not appear on any of my notes or any of the reports. The information you provide for the interview will be handled with strict confidentiality and will be used for the purpose of the study and other scientific purposes, and the results may be published in the aggregate.

Whom to contact;

In case you have any question regarding the research, you can contact

Belinda Afriyie Nimako

Mobile: 026 2206 206

Email: belindanimako@gmail.com

Statement of consent;

I, ---------- after understanding the information given on the study, hereby give consent to participate in this study.

---------- ----------

Signature / thumbprint of participant Date

Statement of the Researcher;

I have provided verbal information regarding this study. I agree to answer any future questions concerning the Study as best as I am able. I will adhere to approved protocol.

Name of Researcher……

Signature……

Place……

Date……

9.5. STRUCTURED QUESTIONNAIRE

STUDY ON PATTERNS OF CO-OCCURRENCE OF CHRONIC CONDITIONS IN PATIENTS ATTENDING THE TEMA GENERAL HOSPITAL

QUESTIONNAIRE

Having consented to participate in this study, we entreat you to answer the following questions. We would need information on a few of your background characteristics and health related information in relation to the topic directly from you and from your folder. The questionnaire will be administered to you. Kindly answer to the best of your knowledge and remember you can always opt out. Thank you.

_____ _____ _____

Respondent's sign. / Thumbprint Tel. Number Date: DD/MM/YYYY(DOE)

SERIAL NO. **FOLDER NO.**

DEMOGRAPHIC / SOCIO ECONOMIC INFORMATION				
	Question	**Response**		**Variable Name**
1	Sex	Male Female	1 2	Q1SEX
2	Age (in complete years)			Q2AGE
3	Date of Birth		_____ _____ _____ DD MM YYYY	Q3DOB
4	Place of residence	Within Tema Outside Tema	1 2	Q4POR
5	Ethnicity	Akan Ga/Dangme Ewe Guan Mole-Dagbani Other, please specify	1 2 3 4 5 19_____	Q5ETN

DEMOGRAPHIC / SOCIO ECONOMIC INFORMATION				
	Question	**Response**		**Variable Name**
6	Religion	Nil Christian Traditionalist Muslim Other, please specify	1 2 3 4 19_____	Q6REL
7	Marital status	Never married Married Living together Divorced/separated Widowed	1 2 3 4 5	Q7MS
8	Educational status	No education Primary Middle/JSS Secondary+	1 2 3 4	Q8ES
9	Occupation	Professional/technical/ managerial Clerical Sales and services Skilled Unskilled Agriculture Other, please specify	1 2 3 4 5 6 19_____	Q9OCN

HEALTH RELATED				
	Questions	**Response**		**Variable Name**
10	Do you have any family history for any chronic condition? If No, please go to question 12.	YES NO	1 2	Q10FHX
11	Please name the condition(s) for which you have the family history. **Please, select as many as applicable**	Hypertension Diabetes mellitus Asthma Sickle cell disease Blindness, cataract and other eye diseases Other(s), please specify	1 2 3 4 5 19_____	Q11FHC

HEALTH RELATED				
	Questions	**Response**		**Variable Name**
12	Do you have any medical condition(s) that has / have persisted for more than 3 months? If NO, please go to question 14.	YES NO	1 2	Q12MC
13	Please indicate the condition(s) which has/ have persisted for more than 3 months duration**.** **Please, select as many as applicable.**	Hypertension Diabetes mellitus Rheumatism and joint pains Asthma Sickle cell disease Occupational injuries Malnutrition Intestinal worms Other cardiovascular conditions (stroke, heart failure, ischaemic heart disease) Blindness, cataract and other eye diseases Skin diseases and ulcers Gastro Intestinal diseases Anaemia Other(s), please specify	1 2 3 4 5 6 7 8 9 10 11 12 13 19_____	Q13RMC

HEALTH RELATED				
	Questions	**Response**		**Variable Name**
14	**Pleased, I would record like to the diagnosis / condition(s) in your folder** **(For attendance(s) from April 2011 to date).** **Please, select as many as applicable.**	Hypertension Diabetes mellitus Rheumatism and joint pains Asthma Sickle cell disease Occupational injuries Malnutrition Intestinal worms Other cardiovascular conditions (stroke, heart failure, ischaemic heart disease) Blindness, cataract and other eye diseases Skin diseases and ulcers Gastro Intestinal diseases Anaemia Other(s), please specify	1 2 3 4 5 6 7 8 9 10 11 12 13 19_____	Q14RDC
15	**Of the conditions recorded in question 14, I would like to record the ones that are chronic and are currently on going.** **Please, select as many as applicable.**	Hypertension Diabetes mellitus Rheumatism and joint pains Asthma Sickle cell disease Occupational injuries Malnutrition Intestinal worms Other cardiovascular conditions (stroke, heart failure, ischaemic heart disease) Blindness, cataract and other eye diseases Skin diseases and ulcers Gastro Intestinal diseases Anaemia Other(s), please specify	1 2 3 4 5 6 7 8 9 10 11 12 13 19_____	Q15CCC

HEALTH RELATED				
	Questions	**Response**		**Variable Name**
16	Are you on any routine medication? If NO, please go to question 18.	YES NO	1 2	Q16MED
17	How many types of routine drugs are you on? (prescribed or otherwise)			Q17HME
18	**Please record the number of routine medication(s) prescribed on index visit from patient's folder.**			Q18RME
19	On average how often do you visit a health facility in a 6 months period?			Q19HOV
20	Have you been hospitalised for any condition since April 2011 to date?	YES NO	1 2	Q20AD
21	Name the condition(s) for which you were hospitalised (from April 2011 to date. **Please, select as many as applicable.**	Diabetes mellitus Hypertension Sickle cell Other(s), please specify	1 2 3 19_____	Q21RAD

This is the end of the questionnaire. Thank you.

Signature of Interviewer: _____